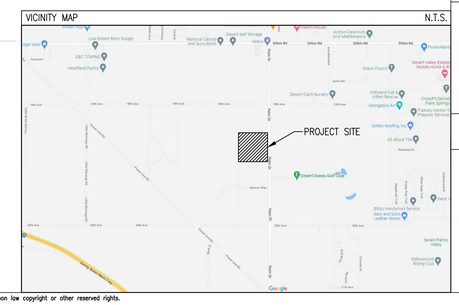
APPENDICES

APPENDIX A

PROJECT PLANS



VICINITY MAP N.T.S.



SRK
STEWART
ROMBERGER
KITE
SRK ARCHITECTS INC.

2254 South Figueroa Street
Los Angeles, CA. 90007
Tel. (213) 747-1199
www.srkarchtectsinc.com

DEVELOPER:
LA WORLD CONSTRUCTION
2029 Century Park East #400
Century City, CA, 90067

CONSULTANTS:

CIVIL ENGINEER
ASAP CONSULTING
ASAPCONSULTING2017@GMAIL.COM
602-446-6479

LANDSCAPE ARCHITECT
LYNN CAPOUYA INC.
17992 MITCHELL SOUTH
SUITE 110
IRVINE, CA 92614
949-756-0150

GREEN DAY VILLAGE
19155 PALM DRIVE
DESERT HOT SPRINGS CA 92240

NOT FOR CONSTRUCTION

DRAWINGS ISSUED

DELTA	DESCRIPTION	DATE
-	ENTITLEMENT SUBMITTAL	6/30/22
	REVISED PARCEL LINES	11/28/22
	SUBMITTAL UPDATE: SITE PLAN, PARCEL LINES, 100 YR. FLOOD REVISIONS &	3/06/23
	ADDITIONAL FARMING AREA	3/06/23
	UPDATE FROM 36' TO 40' ROW	3/17/23

Scale: 1" = 80'-0"
Checked by: RH, BK
Drawn by: RH, HC
Project #: 22002.01

Drawing Title & Number:

CONTEXT PLAN

A-1.0

S:\1+KRK ARCHITECTS INC\1+1 PROJECTS\ACTIVE PROJECTS\2022\22002- Green Day Village- Desert Hot Springs\DRAWINGS\CAD\ENTITLEMENTS PACKAGES\GDV_A-1.0_CONTEXT PLAN.dwg Jun 15, 2023 3:30pm

© 2023 Ownership and use of documents: All drawings, specifications and copies thereof furnished by Stewart, Romberger & Kite are and shall remain its property. They are to be used in respect to this project and are not to be used on any other project. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the project is not to be construed as publication in derogation of Stewart, Romberger and Associates' common law copyright or other reserved rights.

© SRK Architects Inc. 2023 – 36"x24" Sheet



SUMMARY

SITE AREA TOTAL 1,642,186 S.F. OR 37.29 ACRES
TENTATIVE TRACT

PARCEL #1	– COMMERCIAL	62,344.15 S.F.
PARCEL #2	– COMMERCIAL	166,782.44 S.F.
PARCEL #3	– COMMERCIAL	157,028.80 S.F.
PARCEL #4	– RESIDENTIAL	46,787.55 S.F.
PARCEL #5	– COMMON/RESIDENTIAL	20,953.92 S.F.
PARCEL #6	– RESIDENTIAL	117,327.33 S.F.
PARCEL #7	– RESIDENTIAL	127,220.81 S.F.
PARCEL #8	– RESIDENTIAL	113,685.67 S.F.
PARCEL #9	– RESIDENTIAL	197,332.05 S.F.
PARCEL #10	–RESIDENTIAL	245,069.03 S.F.
PARCEL #11	–RESIDENTIAL	123,790.53 S.F.
PARCEL #12	–RESIDENTIAL	126,922.10 S.F.

COMMERCIAL	
BLDG. 1 – FAST FOOD W/DRIVE-THRU & OUTDOOR SEATING	4,608
BLDG. 2 – RETAIL CONVENIENCE STORE	1,024
BLDG. 3 – RETAIL STORE	20,000
BLDG. 4 – RESTAURANTS	6,144
BLDG. 5 – RETAIL	3,749
BLDG. 6 – RETAIL	2,592
BLDG. 7 – RETAIL	1,920
BLDG. 8 – RETAIL	15,360
BLDG. 9 – MEDICAL OFFICE 2-STORY (10,927 FOOTPRINT)	21,854
BLDG. 10 – RECYCLING CENTER	240
BLDG. 11 – RECYCLING CENTER	480
COMMERCIAL TOTAL SF	77,971

TYPICAL RESIDENTIAL BUILDING (92 BUILDINGS)		
UNIT 1 – TWO STORY STUDIO		
LOWER LEVEL	229	
EXT. COVERED AREA	92	
UPPER LEVEL	324	645
UNIT 2 – TWO STORY (2 BDR.)		
LOWER LEVEL	388	
EXT. COVERED AREA	134	
UPPER LEVEL	408	930
UNIT 3 – TWO STORY (1 BDR.)		
LOWER LEVEL	378	
UPPER LEVEL	325	703
UNIT 4 – TWO STORY (1 BDR.)		
LOWER LEVEL	389	
UPPER LEVEL	321	710
UNIT 5 – TWO STORY (1 BDR.)		
LOWER LEVEL	376	
UPPER LEVEL	324	700
UNIT 6 – TWO STORY (1 BDR.)		
LOWER LEVEL	352	
UPPER LEVEL	353	705
LOWER LEVEL TOTAL	2,338	
UPPER LEVEL TOTAL	2,055	
BUILDING TOTAL		4,393

RESIDENTIAL UNITS	
UNIT 1 – 2-STORY STUDIO	92
UNIT 2 – 2-STORY 2-BDR.	92
UNIT 3 – 2-STORY 1-BDR.	92
UNIT 4 – 2-STORY 1-BDR.	92
UNIT 5 – 2-STORY 1-BDR.	92
UNIT 6 – 2-STORY 1-BDR.	92
APT. – 1-BDR. LOFT	56
TOTAL	608

RESIDENTIAL DENSITY UNIT PER ACRE RATIO	
PARCEL 4-12, RESIDENTIAL	25.67 AC.
TOTAL UNITS	608 UN.
TOTAL	24 UNITS/ACRE

COMMERCIAL PARCEL	F.A.R.
PARCEL 1 (BLDGS. 1)	0.07
PARCEL 2 (BLDGS. 2–6 & 11)	0.20
PARCEL 3 (BLDGS. 7–10)	0.25

SET BACK REQUIRED
10FT MIN. TO PROPERTY LINES
20 FT MIN. BUILDING TO BUILDING
SEE SHEET 4/A-2.1.0 FOR SETBACK INFORMATION

RESIDENTIAL	
PHASE 1	
BLDGS. A1–A10	43,930
PHASE 2	
BLDGS. A11–A23	57,109
BLDG. AA – POOL HOUSE	1,200
PHASE 3	
BLDGS. B1–B11, B14–B15, B22–B23	65,895
PHASE 4	
BLDGS. B12–B13, B18–B21, C3–C6, C7–NOT USED, C8–C10	57,109
BLDG. BA – POOL HOUSE	1,200
BLDG. CA – BARN	384
BLDG. – VILLAGE SERV. BLDG.	1,920
PHASE 5	
BLDGS. B16–B17, B24–B26, C1–C2, D1–D6	57,109
BLDG. DA – POOL HOUSE	1,200
BLDG. DB – BARN	384
PHASE 6	
BLDGS. E1–E14	61,502
BLDG. EA – POOL HOUSE	1,200
PHASE 7	
BLDGS. D8–D10, D–11–NOT USED, D12–D14, F1–F8	61,502
BLDG. FA – POOL HOUSE	1,200
OTHERS	
COMMUNITY CENTER – 2–STORY	8,886
STUDIO LOFT APARTMENTS – 2–STORY+BASEMENT (16,425 FOOTPRINT)	32,850
VEGETABLE STANDS TOTAL OF 4 (72 EACH)	288

PARKING	REQ. RATIO	REQ. STALLS	PROVIDED
PARCEL #1			
BLDG. 1 (INCLUDES OUTDOOR SEATING)	1/100 + 6 STACK FOR WINDOW	56	57
PARCEL #2			
BLDG. 2	1/250	5	
BLDG. 3	1/250	80	
BLDG. 4	1/75	82	
BLDG. 5	1/250	15	
BLDG. 6	1/250	11	
BLDG. 11	1/300 + 1/10,000 GROSS YARD AREA	3	
	PARCEL #2 SUB–TOTAL	196	199
PARCEL #3			
BLDG. 7	1/250	8	
BLDG. 8	1/250	62	
BLDG. 9	10 FOR FIRST 2,000 + 1/175 OVER 2,000	62	
BLDG. 10	1/300 + 1/10,000 GROSS YARD AREA	2	
	PARCEL #3 SUB–TOTAL	134	210
PARCEL #4			
APARTMENTS	1.5 COVERED +	84	
	1 UNCOVERED GUEST FOR EVERY 5 UNITS	11	
	PARCEL #4 SUB–TOTAL	95	64 (26+38 BSMT.)
R.O.W.			12
PARCEL #5			–
PARCEL #6			50
PARCEL #7			65
PARCEL #8			75
PARCEL #9			76
PARCEL #10			70
PARCEL #11			70
PARCEL #12			75
	TOTAL		1,023

LEGEND

- PROPERTY LINE
- NEW PROPERTY LINE
- FH FIRE HYDRANT
- FENCE
- PERIMETER WALL
- WALKWAY POLE LIGHT 12' HIGH
- SOLAR PANEL CANOPIES @ RESIDENTIAL PARKING BAYS
- TYPICAL TRASH ENCLOSURE @ RESIDENTIAL AREAS
- TE TRASH ENCLOSURE @ COMMERCIAL AREAS
- STREET POLE LIGHT 18' HIGH

0' 60' 120' 180'
SCALE: 1" = 60'

SRK STEWART ROMBERGER KITE SRK ARCHITECTS INC.
2254 South Figueroa Street
Los Angeles, CA. 90007
Tel. (213) 747-1199
www.srkarchtectsinc.com

DEVELOPER:
LA WORLD CONSTRUCTION
2029 Century Park East #400
Century City, CA, 90067

CONSULTANTS:
CIVIL ENGINEER
ASAP CONSULTING
ASAPCONSULTING2017@GMAIL.COM
602-446-6479

LANDSCAPE ARCHITECT
LYNN CAPOUYA INC.
17992 MITCHELL SOUTH
SUITE 110
IRVINE, CA 92614
949-756-0150

GREEN DAY VILLAGE
19155 PALM DRIVE
DESERT HOT SPRINGS CA 92240

NOT FOR CONSTRUCTION

DRAWINGS ISSUED

DELTA	DESCRIPTION	DATE
-	ENTITLEMENT SUBMITTAL	6/30/22
	REVISED PARCEL LINES	11/28/22
	SUBMITTAL 'UPDATE' SITE PLAN, PARCEL LINES, 100 YR. FLOOD, REVISIONS &	3/06/23
	ADDITIONAL FARMING AREA	3/06/23
	UPDATE FROM 36' TO 40' ROW	3/17/23
	UPDATED HOUSING AREAS, DEFINED SET BACKS AND UNIT PER ACRE RATIO	3/23/23
	DEVELOPMENT PERMIT UPDATE	6/27/23
	DEVELOPMENT PERMIT UPDATE	6/29/23
	DEVELOPMENT PERMIT UPDATE	7/20/23

Scale: 1" = 60'-0"
Checked by: RH, BK
Drawn by: RH, HC, JH
Project #: 22002.01

Drawing Title & Number:
PROPOSED SITE PLAN
A-1.1

S:\1-HDR ARCHITECTS\ 1KCI-1\PROJECTS\ACTIVE PROJECTS\2022\22002- Green Day Village- Desert Hot Springs\DRAWINGS\CAD\ENTITLEMENTS PACKAGES\GDV_A-1.1_SITE PLAN.dwg Jul 24, 2023 - 10:58am

© 2023 Ownership and use of documents: All drawings, specifications and copies thereof furnished by Stewart, Romberger & Kite are and shall remain its property. They are to be used in respect to this project and are not to be used on any other project. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the project is not to be construed as publication in derogation of Stewart, Romberger and Associates' common law copyright or other reserved rights.

© SRK Architects Inc. 2023 – 36"x24" Sheet

APPENDIX A1

PROJECT GRADING PLANS

N89°41'59"E

1226.13'

1308.45'

APN: 657-280-005

FF=66.70
4,608 S.F.

1,152 S.F.

,024 S.F.

15,360 S.F.

6,144 S.F.

2,944 S.F.

2,592 S.F.

1,920 S.F.

15,360 S.F.

10,927 S.F.

CART

LOADING

Drive

Palm

1322.08'

N00°25'03"E

N89°40'04"W

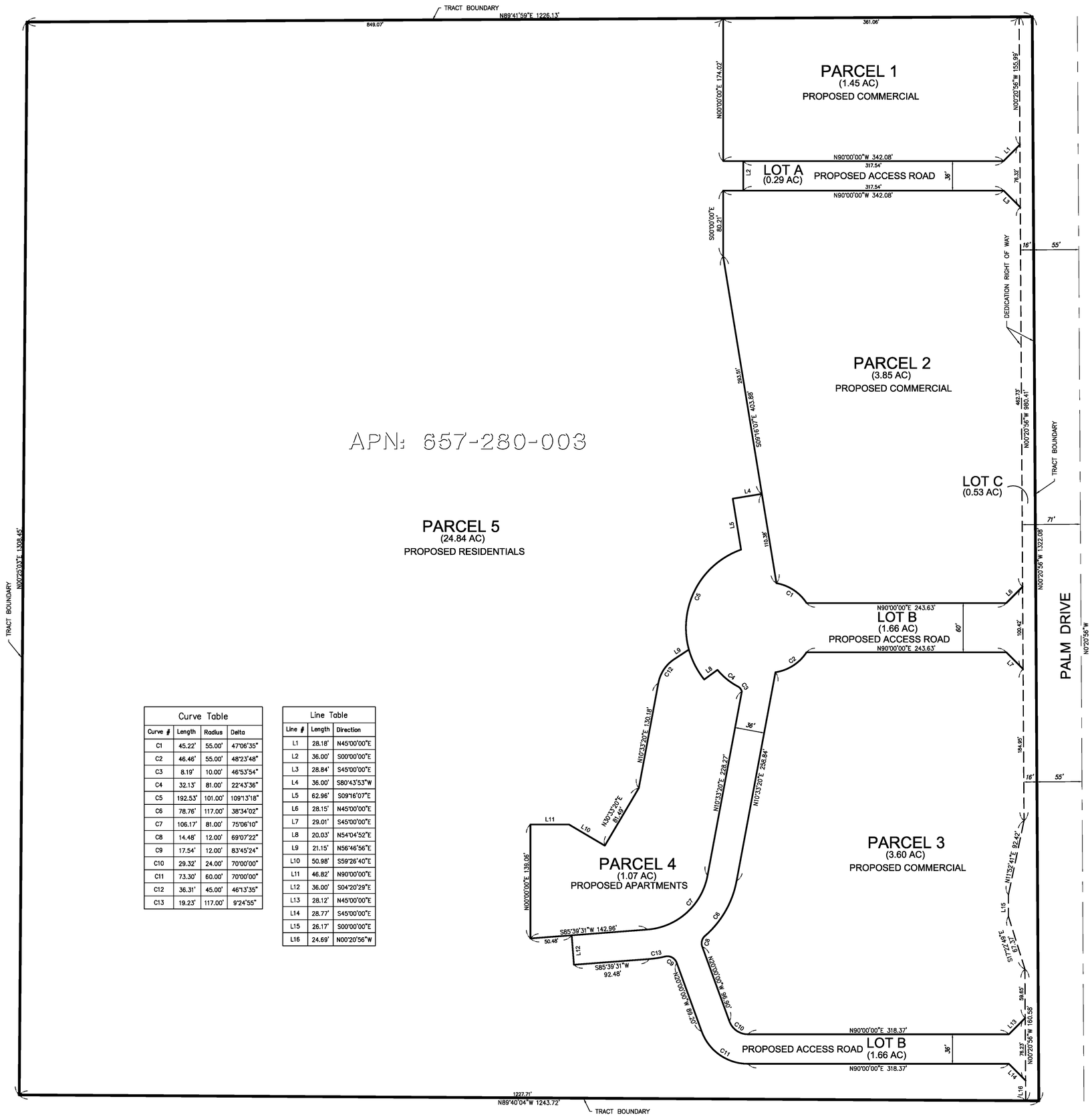
1243.72'

N00°20'56"W

N

0 20' 40' 80'

SCALE: 1"=40'



Curve Table			
Curve #	Length	Radius	Delta
C1	45.22'	55.00'	47°06'35"
C2	46.46'	55.00'	48°23'48"
C3	8.19'	10.00'	46°53'54"
C4	32.13'	81.00'	22°43'36"
C5	192.53'	101.00'	109°13'18"
C6	78.76'	117.00'	38°34'02"
C7	106.17'	81.00'	75°06'10"
C8	14.48'	12.00'	69°07'22"
C9	17.54'	12.00'	83°45'24"
C10	29.32'	24.00'	70°00'00"
C11	73.30'	60.00'	70°00'00"
C12	36.31'	45.00'	46°13'35"
C13	19.23'	117.00'	9°24'55"

Line Table		
Line #	Length	Direction
L1	28.18'	N45°00'00"E
L2	36.00'	S00°00'00"E
L3	28.84'	S45°00'00"E
L4	36.00'	S80°43'53"W
L5	62.96'	S09°16'07"E
L6	28.15'	N45°00'00"E
L7	29.01'	S45°00'00"E
L8	20.03'	N54°04'52"E
L9	21.15'	N56°46'56"E
L10	50.98'	S59°26'40"E
L11	46.82'	N90°00'00"E
L12	36.00'	S04°20'29"E
L13	28.12'	N45°00'00"E
L14	28.77'	S45°00'00"E
L15	26.17'	S00°00'00"E
L16	24.69'	N00°20'56"W

APPLICANT / OWNER / DEVELOPER

OWNER:
GREEN DAY VILLAGE DHS LLC

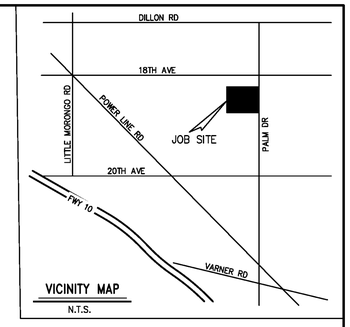
DEVELOPER:
LA WORLD CONSTRUCTION
2029 CENTURY PARK EAST #400
CENTURY CITY, CA 90067

BENCH MARK

ELEV = 250.607 FEET, BM # 603.60 NGS NAVD88,
DESERT HOT SPRINGS QUAD (1978)

BASIS OF BEARING

THE BASIS OF BEARING IS TAKEN AS THE CENTERLINE OF PALM DRIVE PER PARCEL MAP No. 26564, P.M 177-91-93, BEING N00°02'56"W



LEGAL DESCRIPTION

THE SOUTH HALF OF GOVERNMENT LOT 1 OF THE NW ¼ SECTION 18, T 3 S, R 5 E, SBBM COUNTY OF RIVERSIDE, STATE OF CALIFORNIA; EXCEPT EAST 55.00 FEET AS CONVEYED TO THE COUNTY OF RIVERSIDE BY DEED OF RECORDED APRIL 11, 1996, INSTRUMENT NO. 37515 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CA

PARCEL DATA

PROPOSED PARCEL	AREA	USE
PARCEL 1	63,059.27 SF 1.45 AC	COMMERCIAL
PARCEL 2	167,493.95 SF 3.85 AC	COMMERCIAL
PARCEL 3	157,028.80 SF 3.60 AC	COMMERCIAL
PARCEL 4	46,653.77 SF 1.07 AC	APARTMENTS
PARCEL 5	1,082,055.49 SF 24.84 AC	RESIDENTIALS
LOT A	12,559.84 SF 0.29 AC	ACCESS ROAD AND P.U.E.
LOT B	72,115.73 SF 1.66 AC	ACCESS ROAD AND P.U.E.
LOT C	23,219.62 SF 0.53 AC	DEDICATION R/W

PROPERTY AREAS

	NET AREA	GROSS AREA
TOTAL	37.29 AC	37.29 AC

ASSESSOR'S PARCEL NUMBER

657-280-003

ZONING ORDINANCE

RESIDENTIAL HIGH (R-H), MIXED-USE CORRIDOR (MU-C)

FLOOD ZONE:

PROPERTY IS LOCATED IN HAZARD OR WITH RISK OF FLOODING AREA, FEMA ZONE: D

UTILITY COMPANIES:

WATER/SEWER
MISSION SPRINGS WATER DISTRICT
PHONE (760) 329-6448

COUNTY ROADS
RIVERSIDE COUNTY TRANSPORTATION DEP.
PHONE (760) 863-8267

CITY STREETS
CITY OF DESERT HOT SPRINGS
PHONE (760) 329-6411

ELECTRICITY
EDISON INTERNATIONAL
PHONE (800) 655-4555

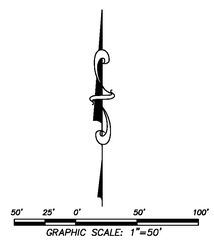
GAS
SOUTHERN CALIFORNIA GAS
PHONE (909) 335-7729

TELEPHONE
VERIZON
PHONE (760) 864-1715

CABLE TV
TIME WARNER CABLE
PHONE (760) 329-6436

FLOOD CONTROL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
PHONE (909) 955-1200

UNDERGROUND UTILITIES
UNDERGROUND SERVICE ALERT
PHONE (800) 227-2600



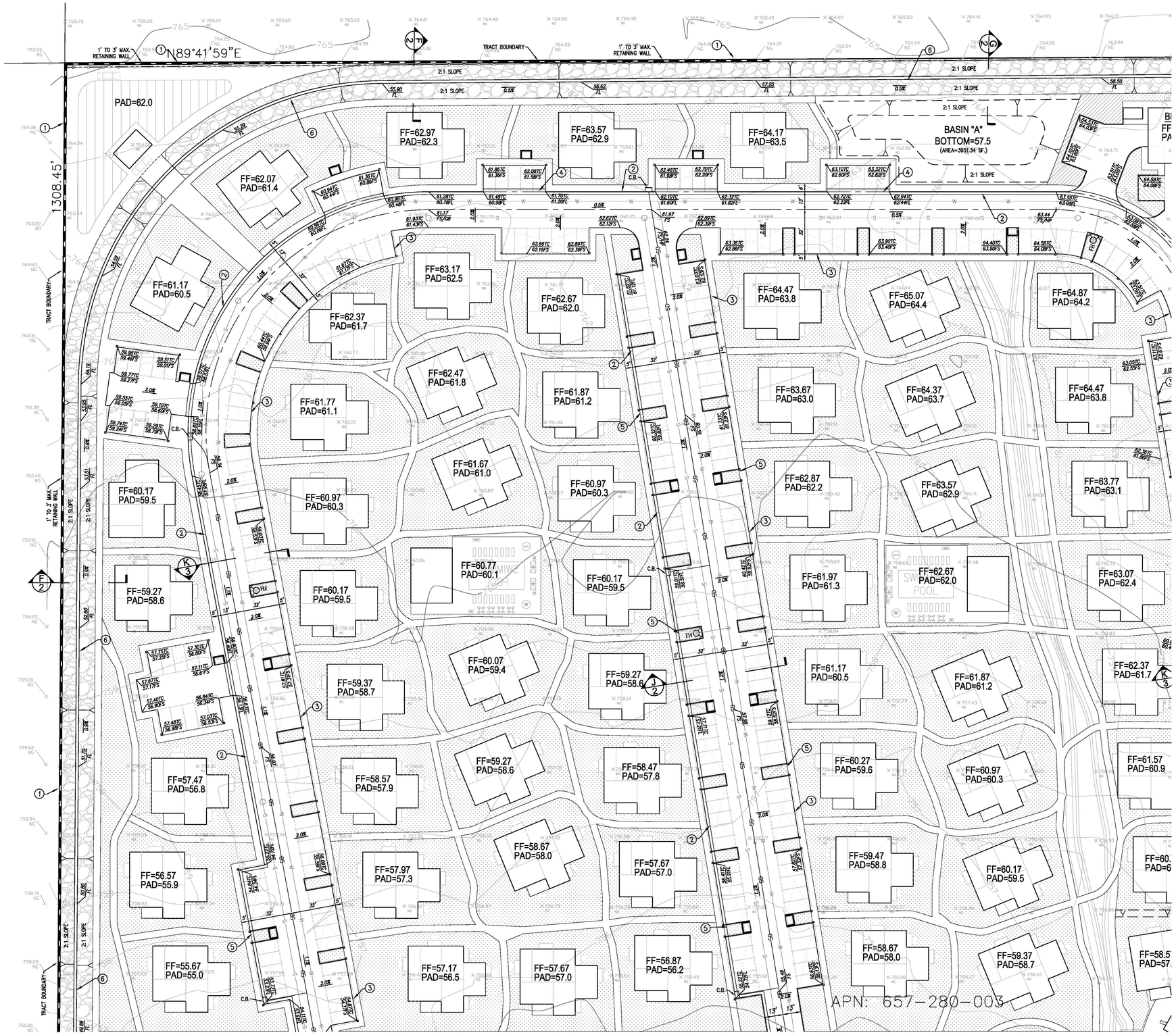
IN THE CITY OF DESERT HOT SPRING
COUNTY OF RIVERSIDE, CALIFORNIA

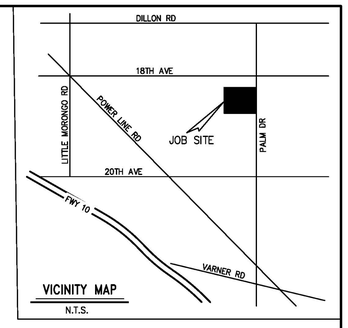
TENTATIVE TRACT MAP NO.

SHEET 1 OF 1

PRELIMINARY GRADING PLAN FOR

GREEN DAY VILLAGE
APN 657-280-003
CITY OF DESSERT HOT SPRING, COUNTY OF RIVERSIDE, CA.





APPLICANT / OWNER / DEVELOPER

OWNER:
GREEN DAY VILLAGE DHS LLC

DEVELOPER:
LA WORLD CONSTRUCTION
2029 CENTURY PARK EAST #400
CENTURY CITY, CA 90067

DISTURBED AREAS

1,642,186 SQ.FT. OR 37.29 ACRES

BENCH MARK

ELEV = 250.607 FEET, BM # 603.60 NGS NAVD88,
DESERT HOT SPRINGS QUAD (1978)

BASIS OF BEARING

THE BASIS OF BEARING IS TAKEN AS THE CENTERLINE OF PALM DRIVE PER PARCEL MAP No. 26564, P.M 177-91-93, BEING N00°02'56"W

LEGAL DESCRIPTION

THE SOUTH HALF OF GOVERNMENT LOT 1 OF THE NW ¼ SECTION 18, T 3 S, R 5 E, SBBM. COUNTY OF RIVERSIDE, STATE OF CALIFORNIA; EXCEPT EAST 55.00 FEET AS CONVEYED TO THE COUNTY OF RIVERSIDE BY DEED OF RECORDED APRIL 11, 1996, INSTRUMENT NO. 37515 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CA

LEGEND

	PROPERTY LINE
	DEDICATION R/W
	CENTER LINE
S	PROPOSED SEWER WITH MANHOLE
W	PROPOSED WATER LINE
FW	PROPOSED FIRE WATER LINE
SD	PROPOSED STORM DRAIN
W	EXIST. WATER LINE
S	EXIST. SEWER LINE WITH MANHOLE
	PROPOSED RETAINING WALL
	LANDSCAPE AREA

TC	TOP OF CURB
HP	HIGH POINT
FG	FINISHED GRADE
FL	FLOW LINE
FS	FINISHED SURFACE
FF	FINISHED FLOOR
PAD	PAD ELEVATION
R/W	RIGHT OF WAY
P.L.	PROPERTY LINE
TW	TOP OF WALL
TF	TOP OF FOOTING
N.A.P.	NOT A PART
EX	EXISTING
HT	WALL HIGH
GB	GRADE BREAK
CB	CATCH BASIN

CONSTRUCTION NOTE:

1. PROPOSED RETAINING WALL
2. PROPOSED 6" CONC. CURB AND GUTTER
3. PROPOSED 6" CONC. CURB
4. PROPOSED 4' WIDE RIBBON GUTTER
5. PROPOSED 2' WIDE CONC. CURB CHANNEL
6. PROPOSED RIPRAP CHANNEL

N

30 15 0 30 60
scale 1"= 30' feet

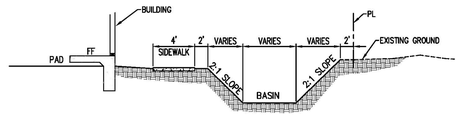
SEE SHEET 1

APN: 657-280-003

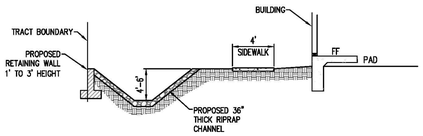
SEE SHEET 4

CONSTRUCTION NOTE:

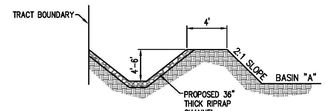
1. PROPOSED RETAINING WALL
2. PROPOSED 6" CONC. CURB AND GUTTER
3. PROPOSED 6" CONC. CURB
4. PROPOSED 4' WIDE RIBBON GUTTER
5. PROPOSED 2' WIDE CONC. CURB CHANNEL
6. PROPOSED RIPRAP CHANNEL



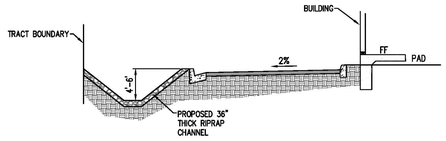
SECTION "E"
NTS



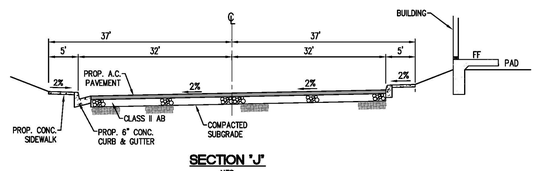
SECTION "F"
NTS



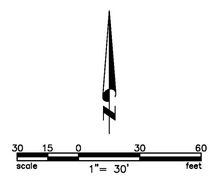
SECTION "G"
NTS

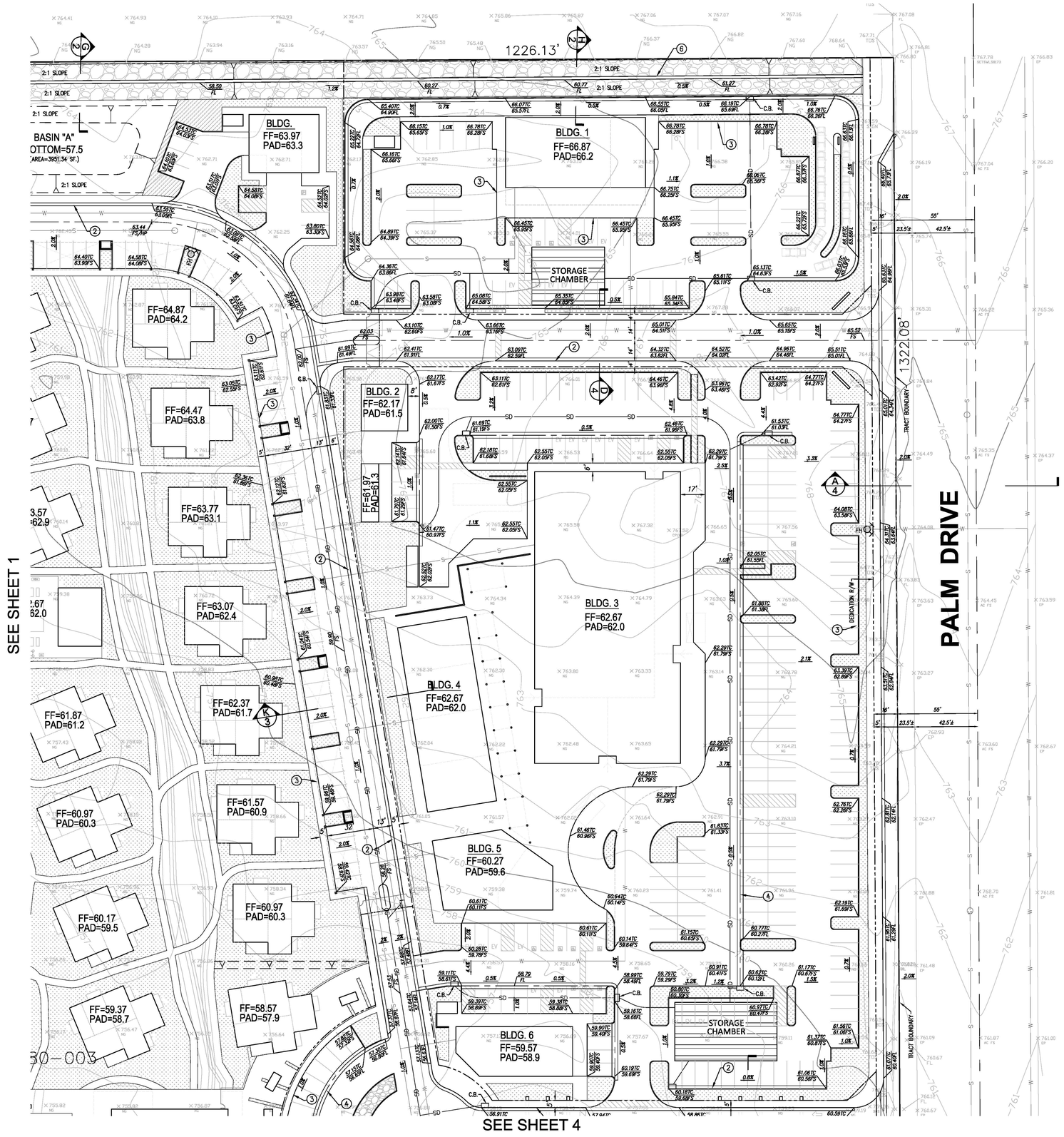


SECTION "H"
NTS



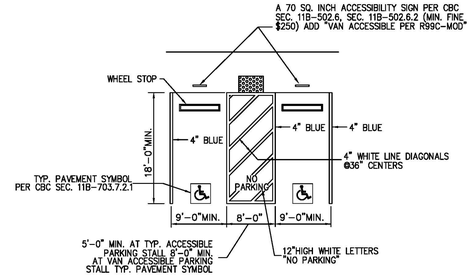
SECTION "J"
NTS



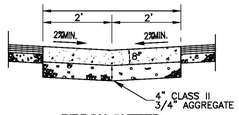


CONSTRUCTION NOTE:

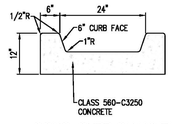
1. PROPOSED RETAINING WALL
2. PROPOSED 6" CONC. CURB AND GUTTER
3. PROPOSED 6" CONC. CURB
4. PROPOSED 4' WIDE RIBBON GUTTER
5. PROPOSED 2' WIDE CONC. CURB CHANNEL
6. PROPOSED RIPRAP CHANNEL



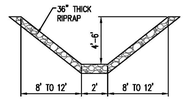
ACCESSIBLE PARKING DETAIL
NOT TO SCALE



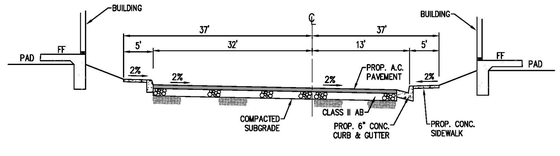
RIBBON GUTTER
NOT TO SCALE



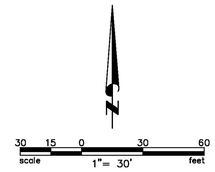
CONC. CURB CHANNEL
NTS



RIPRAP CHANNEL
NTS



SECTION 'K'
NTS

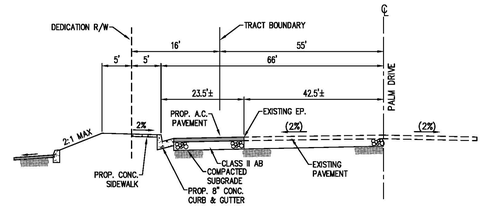


SEE SHEET 3

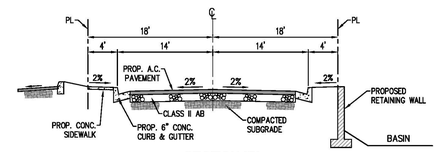
SEE SHEET 2

CONSTRUCTION NOTE:

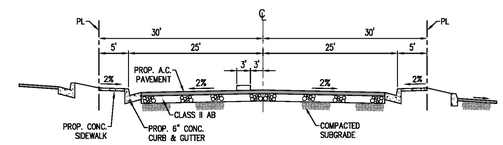
1. PROPOSED RETAINING WALL
2. PROPOSED 6" CONC. CURB AND GUTTER
3. PROPOSED 6" CONC. CURB
4. PROPOSED 4' WIDE RIBBON GUTTER
5. PROPOSED 2' WIDE CONC. CURB CHANNEL
6. PROPOSED RIPRAP CHANNEL



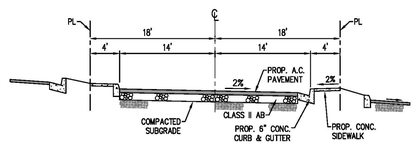
SECTION 'A' PALM DR.
NTS



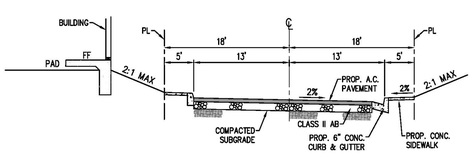
SECTION 'B'
NTS



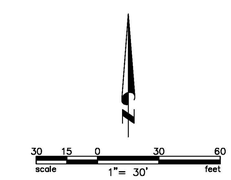
SECTION 'C'
NTS



SECTION 'D'
NTS

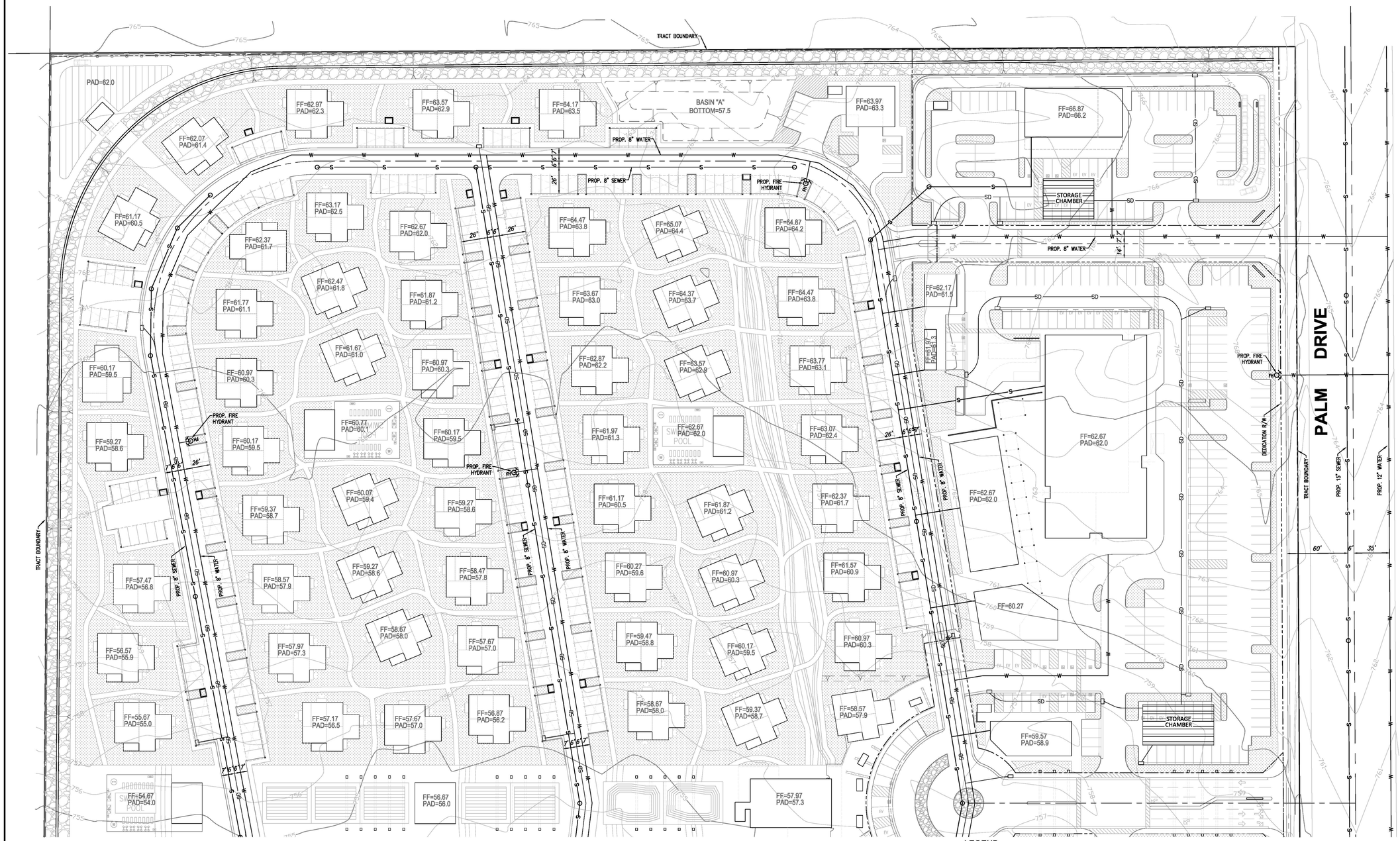


SECTION 'I'
NTS

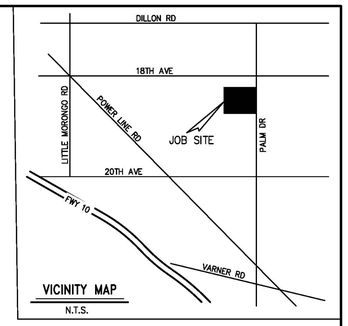


PRELIMINARY SEWER AND WATER PLAN FOR

GREEN DAY VILLAGE
APN 657-280-003
CITY OF DESSERT HOT SPRING, COUNTY OF RIVERSIDE, CA.



SEE SHEET 2



APPLICANT / OWNER / DEVELOPER

OWNER:
GREEN DAY VILLAGE DHS LLC

DEVELOPER:
LA WORLD CONSTRUCTION
2029 CENTURY PARK EAST #400
CENTURY CITY, CA 90067

BENCH MARK

ELEV = 250.607 FEET, BM # 603.60 NGS NAVD88,
DESERT HOT SPRINGS QUAD (1978)

BASIS OF BEARING

THE BASIS OF BEARING IS TAKEN AS THE CENTERLINE OF PALM DRIVE PER PARCEL MAP No. 26564, P.M 177-91-93, BEING N00°02'56"W

LEGAL DESCRIPTION

THE SOUTH HALF OF GOVERNMENT LOT 1 OF THE NW ¼ SECTION 18, T 3 S, R 5 E, SBBM COUNTY OF RIVERSIDE, STATE OF CALIFORNIA; EXCEPT EAST 55.00 FEET AS CONVEYED TO THE COUNTY OF RIVERSIDE BY DEED OF RECORDED APRIL 11, 1996, INSTRUMENT NO. 37515 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CA

UTILITY COMPANIES:

WATER/SEWER
MISSION SPRINGS WATER DISTRICT
PHONE (760) 329-6448

COUNTY ROADS
RIVERSIDE COUNTY TRANSPORTATION DEP.
PHONE (760) 863-8267

CITY STREETS
CITY OF DESERT HOT SPRINGS
PHONE (760) 329-6411

ELECTRICITY
EDISON INTERNATIONAL
PHONE (800) 655-4555

GAS
SOUTHERN CALIFORNIA GAS
PHONE (909) 335-7729

TELEPHONE
VERIZON
PHONE (760) 864-1715

CABLE TV
TIME WARNER CABLE
PHONE (760) 329-6436

FLOOD CONTROL
RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT
PHONE (909) 955-1200

UNDERGROUND UTILITIES
UNDERGROUND SERVICE ALERT
PHONE (800) 227-2600

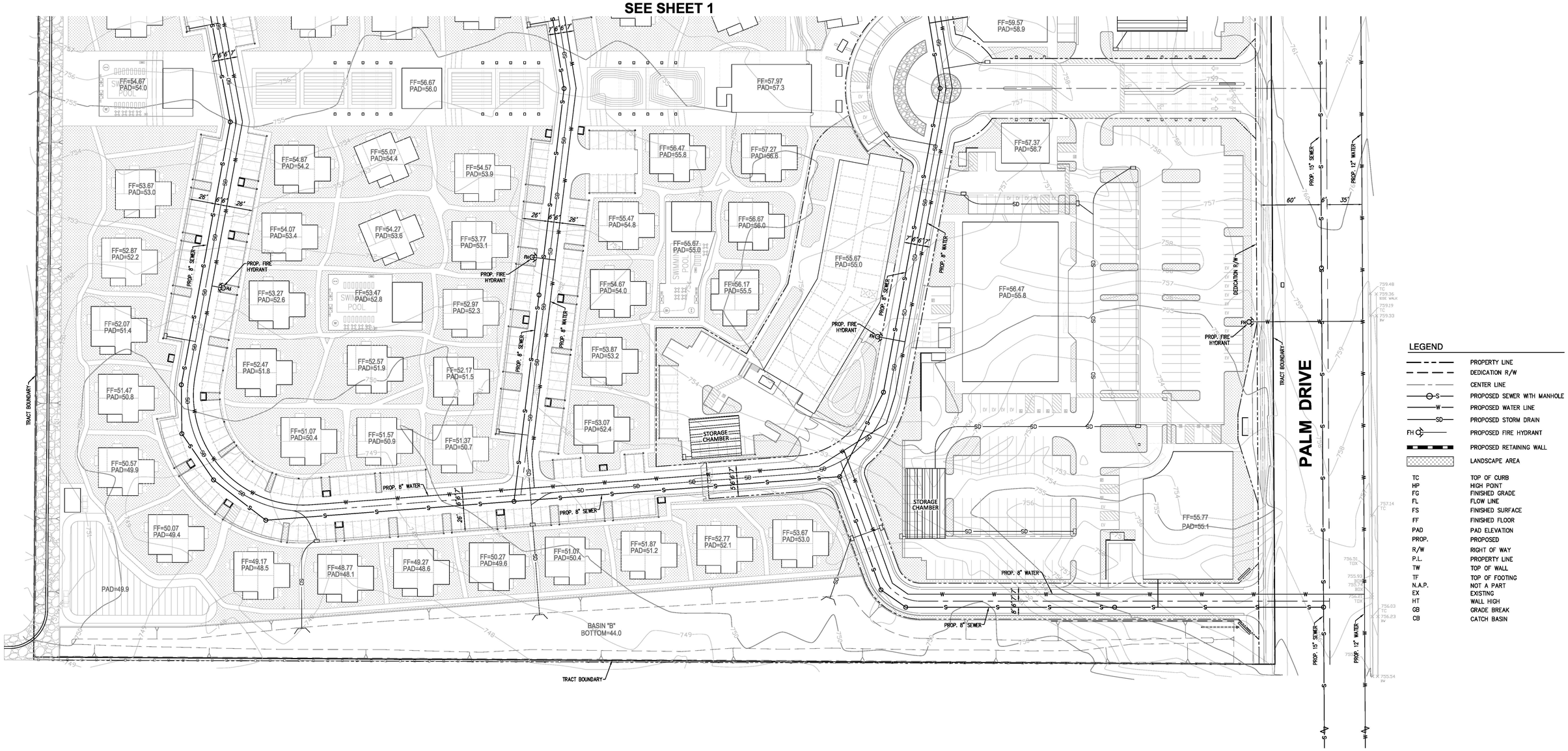
LEGEND

	PROPERTY LINE	TC	TOP OF CURB
	DEDICATION R/W	HP	HIGH POINT
	CENTER LINE	FG	FINISHED GRADE
S	PROPOSED SEWER WITH MANHOLE	FL	FLOW LINE
W	PROPOSED WATER LINE	FS	FINISHED SURFACE
SD	PROPOSED STORM DRAIN	FF	FINISHED FLOOR
		PAD	PAD ELEVATION
FH	PROPOSED FIRE HYDRANT	PROP.	PROPOSED
		R/W	RIGHT OF WAY
	PROPOSED RETAINING WALL	P.L.	PROPERTY LINE
		TW	TOP OF WALL
	LANDSCAPE AREA	TF	TOP OF FOOTING
		N.A.P.	NOT A PART
		EX	EXISTING
		HT	WALL HIGH
		GB	GRADE BREAK
		CB	CATCH BASIN

N

40 20 0 40 80
scale 1"= 40' feet

SEE SHEET 1



LEGEND

	PROPERTY LINE
	DEDICATION R/W
	CENTER LINE
S	PROPOSED SEWER WITH MANHOLE
W	PROPOSED WATER LINE
SD	PROPOSED STORM DRAIN
FH	PROPOSED FIRE HYDRANT
	PROPOSED RETAINING WALL
	LANDSCAPE AREA

TC	TOP OF CURB
HP	HIGH POINT
FG	FINISHED GRADE
FL	FLOW LINE
FS	FINISHED SURFACE
FF	FINISHED FLOOR
PAD	PAD ELEVATION
PROP.	PROPOSED
R/W	RIGHT OF WAY
P.L.	PROPERTY LINE
TW	TOP OF WALL
TF	TOP OF FOOTING
N.A.P.	NOT A PART
EX	EXISTING
HT	WALL HIGH
GB	GRADE BREAK
CB	CATCH BASIN

N

40 20 0 40 80
scale 1"= 40' feet

APPENDIX B1

AIR QUALITY AND GREENHOUSE GAS ANALYSES

REVISED DECEMBER 2022

AIR QUALITY AND GREENHOUSE GAS EMISSIONS REPORT

FOR THE

GREEN DAY VILLAGE OASIS DEVELOPMENT

DESERT HOT SPRINGS, CALIFORNIA

Prepared for:

CITY OF DESERT HOT SPRINGS

City of Desert Hot Springs
Patricia Villagomez, Associate Planner
11999 Palm Drive
Desert Hot Springs
T: 760/329-6411 x243

Prepared by:

UltraSystems Environmental Inc.
16431 Scientific Way
Irvine, CA 92618
(949) 788-4900

December 2022

AIR QUALITY AND GREENHOUSE GAS EMISSIONS REPORT
FOR THE
GREEN DAY VILLAGE OASIS DEVELOPMENT
DESERT HOT SPRINGS, CALIFORNIA

PREPARED FOR:

City of Desert Hot Springs
Patricia Villagomez, Associate Planner
11999 Palm Drive
Desert Hot Springs
T: 760/329-6411 x243

~~July~~ December 2022

Prepared by: _____ Date: _____
UltraSystems Environmental Inc.

Reviewed by: _____ Date: _____
UltraSystems Environmental Inc.

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1

2.0 PROJECT DESCRIPTION 2-1
2.1 Project Overview 2-1
2.2 Construction 2-1
2.2.1 Site Access, Circulation, and Parking 2-2
2.2.2 Landscaping 2-2
2.2.3 Building Characteristics 2-6
2.2.4 Perimeter Walls 2-6
2.3 Operations 2-6

3.0 ENVIRONMENTAL SETTING 3-1
3.1 Regulatory Framework 3-1
3.1.1 Federal Regulations 3-1
3.1.2 State Regulations 3-3
3.1.3 Regional 3-12
3.1.4 City of Desert Hot Springs 3-16
3.2 Existing Conditions 3-20
3.2.1 Climate and Meteorology 3-20
3.2.2 Pollutants and Effects 3-21
3.2.3 Regional Air Quality 3-25
3.2.4 Local Air Quality 3-26
3.2.5 Existing Health Risk 3-27
3.2.6 Sensitive Receptors 3-27
3.2.7 Baseline Emissions 3-28

4.0 PROJECT IMPACTS 4-1
4.1 Methodology 4-1
4.1.1 Criteria Pollutants 4-1
4.1.2 Toxic Air Contaminants (TAC) 4-4
4.1.3 Greenhouse Gases 4-4
4.2 Thresholds of Significance for Criteria Pollutants 4-5
4.2.1 CEQA Guidelines Appendix G 4-5
4.2.2 SCAQMD Quantitative Thresholds 4-5
4.3 Thresholds of Significance for Greenhouse Gas Emissions 4-8
4.3.1 CEQA Impact Review Criteria 4-8
4.3.2 GHG Emissions Thresholds 4-8

5.0 CEQA ANALYSIS 5-1
5.1 Air Quality Impacts (Criteria Pollutants and Toxic Air Contaminants) 5-1
5.1.1 Construction Impacts 5-1
5.1.2 Long-Term Impacts 5-3
5.1.3 Consistency with Air Quality Management Plan 5-5
5.2 Greenhouse Gas Emissions Impacts 5-5
5.2.1 Emissions 5-5
5.2.2 Consistency With GHG Reduction Plans 5-7

LIST OF TABLES

Table 3.1-1 - Ambient Air Quality Standards for Criteria Air Pollutants 3-4
Table 3.3-1 - Federal and State Attainment Status 3-26
Table 3.4-1 - Ambient Air Quality Monitoring Data 3-27
Table 4.2-1 - Construction Equipment Assumptions 4-3
Table 4.2-1 - SCAQMD Emissions Thresholds for Significant Regional Impacts 4-6
Table 5.1-1 - Maximum Daily Unmitigated Regional Construction Emissions 5-1
Table 5.1-3 - Results of Localized Significance Analysis 5-2
Table 5.1-3 - Maximum Daily Project Operational Emissions 5-4
Table 5.2-1 - Unmitigated Annual GHG Emissions, 2024 And Beyond 5-6

LIST OF FIGURES

Figure 2.1-1 - Regional Location 2-3
Figure 2.1-2 - Project Vicinity 2-4
Figure 2.1-3 - Site Plan 2-5
Figure 3.2-1 - Sensitive Receptors Near Project Site 3-29

ATTACHMENTS

Attachment 1 CALEEMOD Output
Attachment 2 City of Desert Hot Springs General Plan Update - GHG Reduction Policies

1.0 INTRODUCTION

This air quality and greenhouse gas (GHG) emissions technical study was prepared by UltraSystems Environmental Inc. (UltraSystems) for the Green Day Oasis Specific Plan, which would permit a mixed-use residential and commercial development on a 38.34-acre site on the west side of Palm Drive between 18th Avenue and 20th Avenue, in the city of Desert Hot Springs, California. The project applicant (LA World Construction of Los Angeles, CA) proposes to construct and operate approximately 612 residential units. Most units would be in 92 two-story six-unit buildings, with 60 loft apartments in one two-story building. The total floor area of the residential units would be 355,218 square feet. The project proposes 77,971 square feet of commercial uses in the eastern part of the project site. The project would include five pool houses of 1,200 square feet each, a two-story community center with 8,886 square feet in floor area, and a farm equipment building 1,620 square feet.

Construction is projected to start in January 2023, and full buildout is expected by late October 2025.

The purpose of this report is to provide a detailed technical air quality and GHG analysis of the proposed Green Day Village Project. The analysis was prepared in accordance with the *CEQA Air Quality Handbook* prepared by the South Coast Air Quality Management District (SCAQMD).[1,2] Regional climate and meteorology, air quality monitoring data, and the area's attainment status with respect to criteria air pollutants are discussed. The report includes a description of federal, state, and local agencies that govern air quality and climate change, and their pertinent statutes and regulations. It identifies potential impacts of air pollutants of concern for this project, including criteria pollutants (i.e., pollutants for which National Ambient Air Quality Standards [NAAQS] have been established by the U.S. Environmental Protection Agency, and their precursors) and mobile source air toxics. The report describes the analytical methodologies and assumptions used for this study as well as the results of these analyses.

1 CEQA Air Quality Handbook: South Coast Air Quality Management District, Diamond Bar, CA. 1993.
2 Updates to the CEQA Air Quality Handbook are at http://sfprod.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook.

2.0 PROJECT DESCRIPTION

2.1 Project Overview

The City of Desert Hot Springs (City) is processing an application for the Green Day Oasis Specific Plan that would permit a mixed-use residential and commercial development on a 38.34-acre site on the west side of Palm Drive between 18th Avenue and 20th Avenue (APN 657280003). The City is the Lead Agency for the purposes of the California Environmental Quality Act (CEQA).

The project site is currently vacant and vegetated mostly with creosote bush – white bursage scrub. The project site is near the Desert Dunes Golf Club across Palm Drive to the east and surrounded by vacant land to the north, west, and south. The City's zoning and General Plan land use designations for approximately the east half of the site are both Mixed Use Corridor (MU-C), which permits integrated residential and commercial uses including residential density of 20 to 30 units per acre. The zoning and General Plan designations for the west half of the site are both Residential High (R-H), permitting development of multifamily residential uses with densities of 20 to 30 units per acre.[3] **Figure 2.1-1** shows the regional location of the project, and **Figure 2.1-2** shows the site area. A plot plan is provided in **Figure 2.1-3**.

The proposed project would include 612 residential units. Most units would be in 92 two-story six-unit buildings, with 60 loft apartments in one two-story building. The total floor area of the residential units would be 355,218 square feet. The site plan divides the 92 two-story residential buildings into six phases, A through F. The project proposes 77,971 square feet of commercial uses in the eastern part of the project site, including two restaurant/food service buildings totaling 10,752 square feet, seven retail uses totaling 45,365 square feet, a two-story medical office building with 21,854 square feet in floor area, and two recycling centers totaling 720 square feet.

The project would include five pool houses of 1,200 square feet each, a two-story community center with 8,886 square feet in floor area, and a farm equipment building 1,620 square feet. Four farming areas would be provided – two in the center of the site, one in the northwest corner of the site, and one in the southwest corner totaling approximately 21,689 square feet. One area for aquaponics – that is, a combination of aquaculture (fish and/or shellfish farming) with hydroponics (growing plants without soil in a solution of minerals in water) would be provided in the middle of the project site. An equipment building housing maintenance and operations supplies for the residential unit management would be near the northeast corner of the residential portion of the site. Four vegetable stands would be placed near the middle of the project site.

2.2 Construction

It is estimated that construction for the proposed project is divided in three phases: zero (site preparation, grading and utilities trenching), one (housing construction) and two (commercial construction). Phase 0 would begin in January 2023 and end in late June 2023. Construction would involve (1) site preparation; (2) rough grading and (3) trenching. Phase 1 would begin in July 2023 and end in December 2024. Construction would involve (1) fine grading; (2) building construction; (3) paving and (4) architectural coating. Phase 2 would begin in January 2025 and end in late October 2025. Construction would involve (1) grading; (2) building construction; (3) architectural coating

[3] Desert Hot Springs, City of. 2020. General Plan. Accessed online at: https://storage.googleapis.com/proudcity/deserthotspringsca/uploads/2021/11/Desert-Hot-Springs-General-Plan-Adopted-07-2020-Small.pdf, on July 6, 2022.

and (4) paving. The foregoing activities are not all consecutive and often overlap. It is anticipated that the time from site preparation to occupancy-ready would be approximately 34 months.

2.2.1 Site Access, Circulation, and Parking

Site access would be via three driveways from Palm Drive. The main entrance would be in the center of the site's frontage on Palm Drive and would lead to a roundabout connecting to two driveways into the residential portion of the project. The northerly entrance would be near the northeast corner of the site and would connect to a driveway around the northern perimeter of the residential area. The southerly entrance would be near the southeast corner of the site and would connect to a driveway along the south perimeter of the residential area. An internal driveway would surround most of the residential buildings. Access from Palm Drive to the internal road in the residential area would be via the three driveways from Palm Drive described above, which would continue through the commercial uses in the eastern part of the site and connect to drive aisles through parking lots in the eastern part of the site. A combination drive aisle and fire lane would extend north-south through the central part of the project site.

The project would provide 1,057 parking spaces. Parking for the residential portion of the site (472 spaces) would be located along the driveway along the perimeter of the residential area, and along the north-south drive aisle through the middle of the site. Parking for the commercial part of the site (483 spaces) would be in parking lots next to the proposed commercial buildings. Parking for the 60 loft apartments (64 spaces) would be in one semi-subterranean parking level under the apartment building (38 spaces) and surface parking next to the southwest side of the apartment building.

2.2.2 Landscaping

The project proposes approximately 501,500 square feet (11.5 acres) of drought-tolerant landscaping consisting of 10.1 acres in the residential area of the site and 1.4 acres in the commercial area. Several farm areas would be provided.

Figure 2.1-1
REGIONAL LOCATION

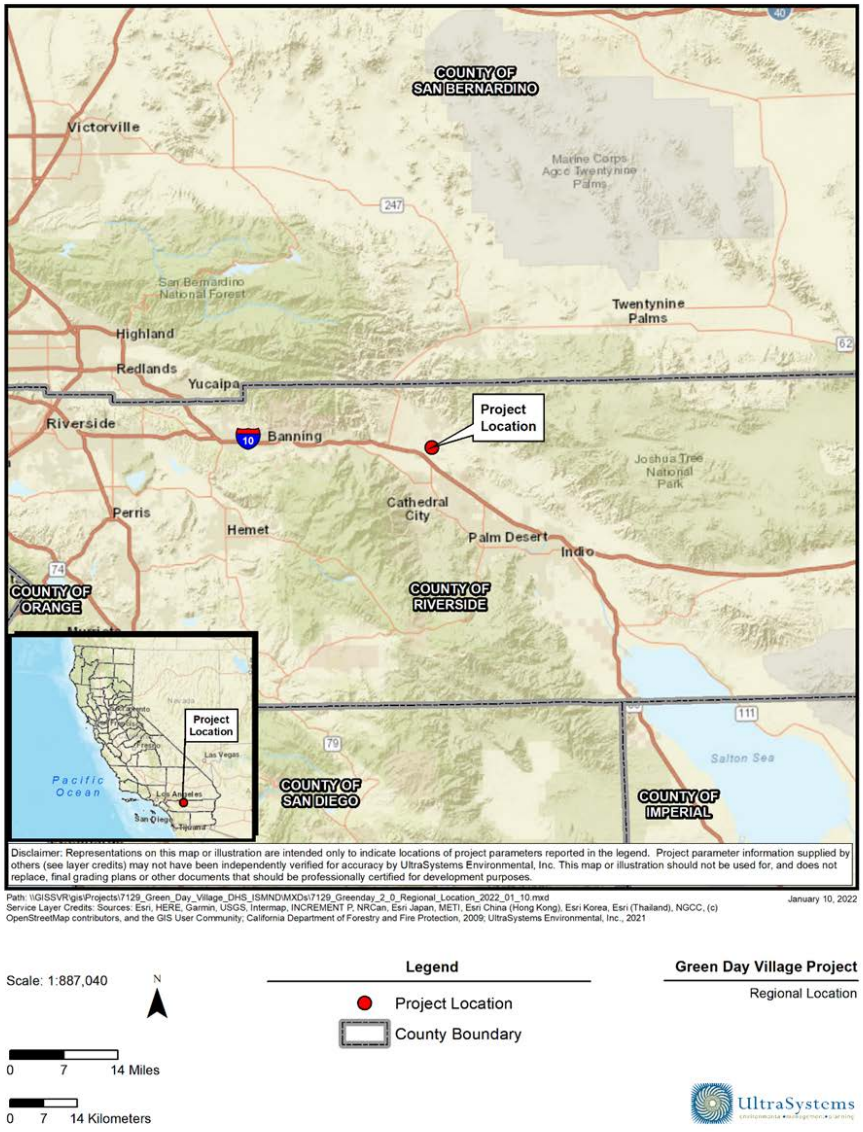


Figure 2.1-2
PROJECT VICINITY

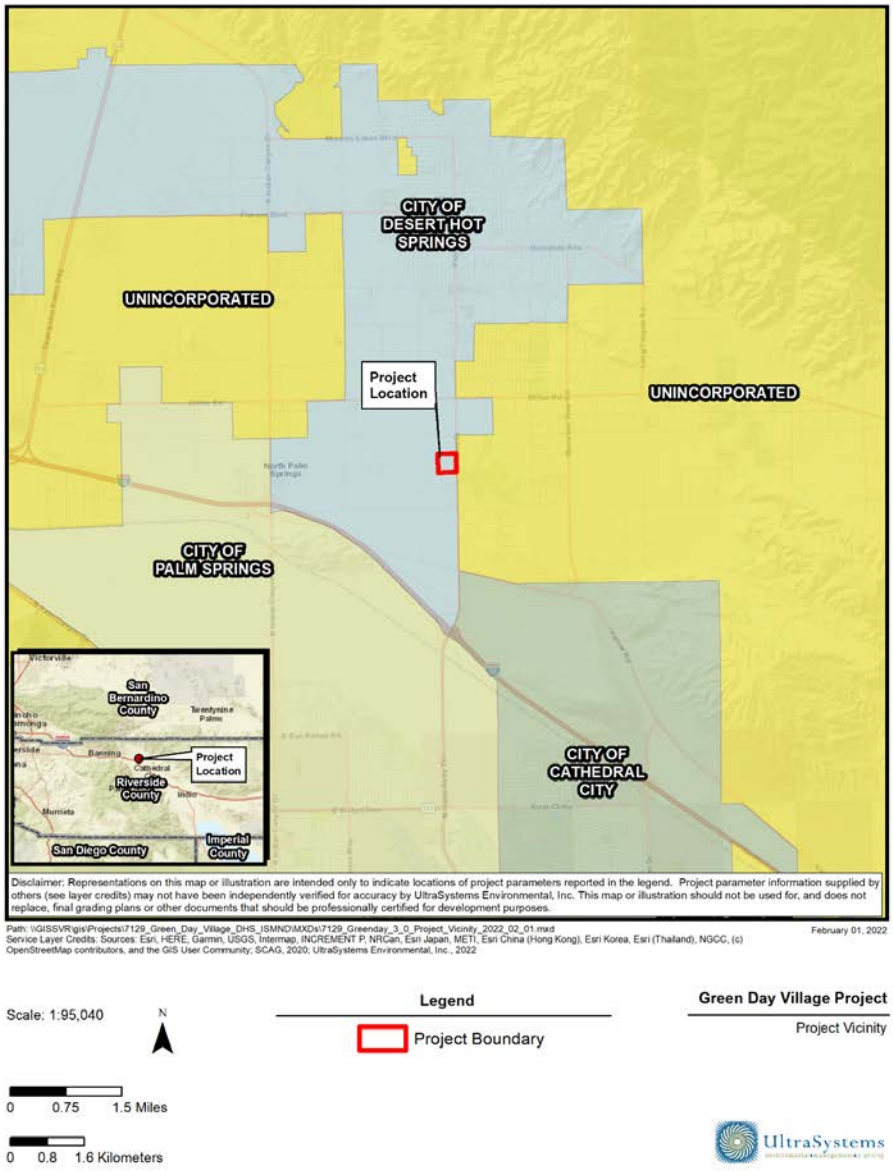
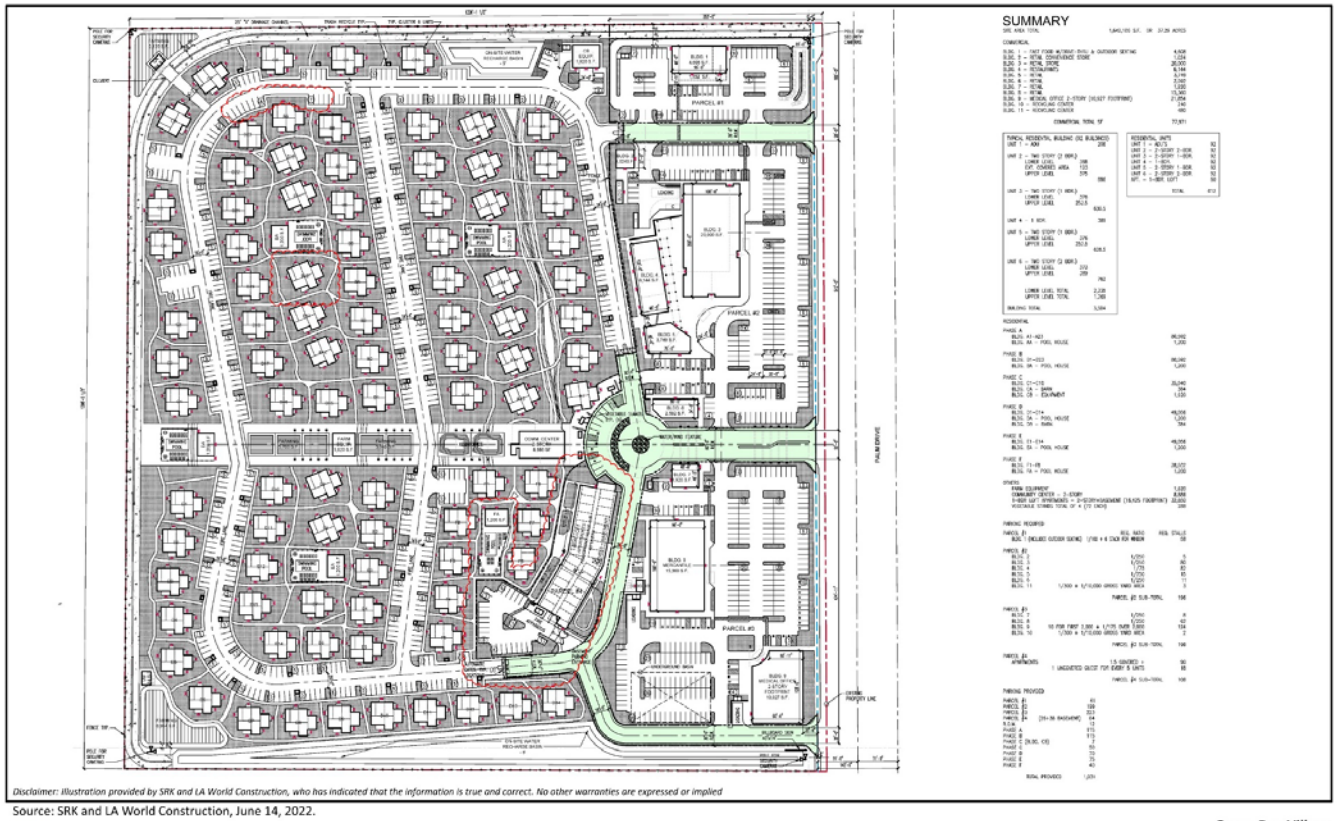


Figure 2.1-3
PROPOSED SITE PLAN



Source: SRK and LA World Construction, June 14, 2022.

UltraSystems

Green Day Village
Proposed Site Plan

2.2.3 Building Characteristics

The proposed project would include 612 residential units. The total floor area of the residential units would be 355,218 square feet.

The site plan divides the 92 two-story residential buildings into six phases, A through F, with the number of residential buildings per phase ranging from 8 (phase F) to 23 (phases A and B). The sites of all six phases would be mass graded, and utilities installed, at one time. Project plans involve some slight difference in timing of development per phase: for example, after one phase is completed and is being leased, construction on a second phase could proceed. This project description—and the environmental analysis in this Initial Study—treats these six residential phases as one large phase. The six phases might not be developed in alphabetical order.

Energy-efficient features, including insulated and glazed windows and low E coating on windows, would be incorporated into building design to comply with the provisions of the California Green Building Code, Title 24, Part 11 of the California Code of Regulations. Title 24, Part 11 requires new structures to incorporate a variety of mandatory features to promote green buildings as means to improve energy efficiency, reduce water demand, promote recycling, and other measures. The project would be designed and constructed in compliance with applicable City codes, including, but not limited to, the 2019 California Building Code, California Plumbing Code, California Mechanical Code, California Electrical Code, California Building Energy Efficiency Standards, and California Residential Codes.

As will be discussed in **Section 4.3** and **Section 5.2**, the project has a large number of design features that will reduce energy use and, as a consequence, greenhouse gas emissions.

2.2.4 Perimeter Walls

The project proposes installation of a six-foot-high metal fence along the northern, western, and southern site perimeter and within the site, separating the commercial (publicly accessible) from residential (gated) portions of the project site.

2.3 Operations

The project proposes several sustainable features, including farming areas and vegetable stands, stormwater infiltration through two retention basins and a constructed stream, and a mix of land uses to reduce the need for vehicle trips offsite.

3.0 ENVIRONMENTAL SETTING

3.1 Regulatory Framework

3.1.1 Federal Regulations

3.1.1.1 Criteria Pollutants

The Federal Clean Air Act (CAA), passed in 1970, established the national air pollution control program. The basic elements of the CAA are the NAAQS for criteria air pollutants, hazardous air pollutants standards, state attainment plans, motor vehicle emissions standards, stationary source emissions standards and permits, acid rain control measures, stratospheric ozone protection, and enforcement provisions.

The NAAQS are the maximum allowable concentrations of criteria pollutants, over specified averaging periods, to protect human health. The CAA requires that the USEPA establish NAAQS and reassess, at least every five years, whether they are adequate to protect public health, based on current scientific evidence. The NAAQS are divided into primary and secondary standards; the former is set to protect human health within an adequate margin of safety, and the latter to protect environmental values, such as plant and animal life.

Data collected at permanent monitoring stations are used by the USEPA to classify regions as "attainment" or "nonattainment," depending on whether the regions have met the requirements stated in the primary NAAQS. Nonattainment areas are subject to additional restrictions, as required by the USEPA.

The CAA Amendments in 1990 substantially revised the planning provisions for those areas not currently meeting NAAQS. The Amendments identify specific emission reduction goals that require both a demonstration of reasonable further progress and attainment and incorporate more stringent sanctions for failure to attain the NAAQS or to meet interim attainment milestones.

3.1.1.2 Toxic Air Contaminants

The USEPA regulates toxic air contaminants mainly through its National Emission Standards for Hazardous Air Pollutants (NESHAP) program.[4] In California, most of the NESHAPs are enforced by the ARB and local air pollution control districts, including the SCAQMD. Some NESHAPs have been locally adopted verbatim, while others have been modified to meet local conditions.[5] The great majority of the NESHAPs apply to new industrial sources and are therefore not relevant to the proposed project.

3.1.1.3 Greenhouse Gas Emissions

The federal government has been involved in climate change issues at least since 1978, when Congress passed the National Climate Program Act (92 Stat. 601), under authority of which the National Research Council prepared a report predicting that additional increases in atmospheric CO_2 would lead to non-negligible changes in climate. At the "Earth Summit" in 1992 in Rio de Janeiro,

4 U.S. Environmental Protection Agency. National Emission Standards for Hazardous Air Pollutants (NESHAP). URL: https://www.epa.gov/stationary-sources-air-pollution/national-emission-standards-hazardous-air-pollutants-neshap-9. Accessed July 6, 2022.

5 This is allowed, as long as the state or local versions are at least as stringent as the EPA versions.

President George H. W. Bush signed the United Nations Framework Convention on Climate Change (UNFCCC), a nonbinding agreement among 154 nations to reduce atmospheric concentrations of carbon dioxide and other greenhouse gases. The treaty was ratified by the U.S. Senate. However, when the UNFCCC signatories met in 1997 in Kyoto, Japan, and adopted a protocol that assigned mandatory targets for industrialized nations to reduce greenhouse gas emissions, the U.S. Senate expressed its opposition to the treaty. The Kyoto Protocol was not submitted to the Senate for ratification.

In 2007, Massachusetts et al. v. Environmental Protection Agency et al. (549 U.S. 497), the U.S. Supreme Court ruled that CO_2 was an air pollutant under the Clean Air Act, and that consequently, the USEPA had the authority to regulate its emissions. The Court also held that the Administrator must determine whether emissions of greenhouse gases from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision. On April 24, 2009, the USEPA published its intention to find that: (1) the current and projected concentrations of the mix of six key greenhouse gases—CO_2, CH_4, N_2O, HFCs, PFCs and SF_6—in the atmosphere threaten the public health and welfare of current and future generations, and that (2) the combined emissions of GHG from new motor vehicles and motor vehicle engines contribute to the atmospheric concentrations of these key greenhouse gases and hence to the threat of climate change (74 Fed. Reg. 18886). These findings are required for subsequent regulations that would control GHG emissions from motor vehicles.

The federal government is taking several common-sense steps to address the challenge of climate change. The U.S. Environmental Protection Agency (USEPA) collects several types of GHG emissions data. These data help policy makers, businesses, and USEPA track GHG emissions trends and identify opportunities for reducing emissions and increasing efficiency. USEPA has been collecting a national inventory of GHG emissions since 1990, and in 2009 established mandatory reporting of GHG emissions from large GHG emissions sources.

Until January 19, 2017 the USEPA's regulatory initiatives included USEPA's vehicle GHG rules and Clean Power Plan; partnering with the private sector through voluntary energy and climate programs; and reducing USEPA's carbon footprint with the federal GHG requirements and USEPA's Strategic Sustainability Performance Plan.

The recently concluded Trump administration had a different strategy in relation to climate change and took the USEPA in a new direction.[6] President Trump's Executive Order 13783, "Promoting Energy Independence and Economic Growth,"[7] specifically addressed revisions in the Clean Power Plan and standards of performance for GHGs for new stationary sources; CH_4 standards for the oil and gas sector; and light-duty vehicle GHG standards. On January 20, 2021, President Biden issued Executive Order 13990,[8] which rescinded the Executive Order on Energy Independence, along with several other executive orders concerning energy, climate, and environmental protection. Among the stated goals of Executive Order 13990 are "to reduce greenhouse gas emissions" and "to bolster

6 USEPA, 2020. Available online at: https://www.epa.gov/laws-regulations/summary-energy-independence-and-security-act, on July 6, 2022.

7 Executive Order 13783, Promoting Energy Independence and Economic Growth. March 31, 2017. URL: https://www.federalregister.gov/documents/2017/03/31/2017-06576/promoting-energy-independence-and-economic-growth.

8 Executive Order 13990. Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis. January 20, 2021. Accessed online at https://www.energy.gov/sites/default/files/2021/02/f83/eo-13990-protecting-public-health-environment-restoring.pdf, on July 6, 2022.

resilience to the impacts of climate change." Various federal agencies are restoring prior regulations and developing new ones to further these policies.

3.1.2 State Regulations

3.1.2.1 California Clean Air Act

The State of California began to set California ambient air quality standards (CAAQS) in 1969 under the mandate of the Mulford-Carrell Act. There were no attainment deadlines for the CAAQS originally. However, the State Legislature passed the California Clean Air Act (CCAA) in 1988 to establish air quality goals, planning mechanisms, regulatory strategies, and standards of progress to promote their attainment. The ARB, which became part of the California Environmental Protection Agency (CalEPA) in 1991, is responsible for ensuring implementation of the CCAA, responding to the federal CAA, and for regulating emissions from motor vehicles and consumer products.

The California CAA requires attainment of CAAQS by the earliest practicable date. The state standards are generally more stringent than the corresponding federal standards. Attainment plans are required for air basins in violation of the State O_3, PM_{10}, CO, SO_2, or NO_2 standards. Responsibility for achieving state standards is placed on the ARB and local air pollution control districts. District plans for nonattainment areas must be designed to achieve a 5-percent annual reduction in emissions. Preparation of and adherence to attainment plans are the responsibility of the local air pollution districts or air quality management districts.

Table 3.1-1 lists the NAAQS and CAAQS for criteria pollutants.

Table 3.1-1
AMBIENT AIR QUALITY STANDARDS FOR CRITERIA AIR POLLUTANTS

Pollutant	Averaging Time	California Standards[1]		Federal Standards [2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary [3,6]	Method[7]
Ozone (O_3)[8]	1 Hour	0.09 ppm (180 µg/m³)	Ultraviolet Photometry	—	Same as Primary Standard	Ultraviolet Photometry
	8 Hour	0.070 ppm (137 µg/m³)		0.070 ppm (137 µg/m³)		
Respirable Particulate Matter (PM_{10})[9]	24 Hour	50 µg/m³	Gravimetric or Beta Attenuation	150 µg/m³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 µg/m³		—		
Fine Particulate Matter ($PM_{2.5}$)[9]	24 Hour	No Separate State Standard		35 µg/m³	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 µg/m³	Gravimetric or Beta Attenuation	12 µg/m³	15 µg/m³	
Carbon Monoxide (CO)	1 Hour	20 ppm (23 mg/m³)	Non-Dispersive Infrared Photometry (NDIR)	35 ppm (40 mg/m³)	—	Non-Dispersive Infrared Photometry (NDIR)
	8 Hour	9.0 ppm (10 mg/m³)		9 ppm (10 mg/m³)		
	8 Hour (Lake Tahoe)	6 ppm (7 mg/m³)		—	—	
Nitrogen Dioxide (NO_2)[10]	1 Hour	0.18 ppm (339 µg/m³)	Gas Phase Chemiluminescence	100 ppm (188 µg/m³)	—	Gas Phase Chemiluminescence
	Annual Arithmetic Mean	0.030 ppm (57 µg/m³)		0.053 ppm (100 µg/m³)	Same as Primary Standard	
Sulfur Dioxide (SO_2)[11]	1 Hour	0.25 ppm (655 µg/m³)	Ultraviolet Fluorescence	75 ppm (196 µg/m³)	—	Ultraviolet Fluorescence; Spectrophotometry (Pararosaniline Method)
	3 Hour	—		—	0.5 ppm (1300 µg/m³)	
	24 Hour	0.04 ppm (105 µg/m³)		0.14 ppm (for certain areas)[11]	—	
	Annual Arithmetic Mean	—		0.030 ppm (for certain areas)[11]	—	

Pollutant	Averaging Time	California Standards[1]		Federal Standards [2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary [3,6]	Method[7]
Lead[12,13]	30 Day Average	1.5 µg/m³	Atomic Absorption	—	—	High Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 µg/m³ (for certain areas)[12]	Same as Primary Standard	
	Rolling 3-Month Average[j]	—		0.15 µg/m³		
Visibility Reducing Particles[14]	8 Hour	See footnote 14	Beta Attenuation and Transmittance through Filter Tape	**No National Standards**		
Sulfates	24 Hour	25 µg/m³	Ion Chromatography			
Hydrogen Sulfide	1 Hour	0.03 ppm (42 µg/m³)	Ultraviolet Fluorescence			
Vinyl Chloride[12]	24 Hour	0.01 ppm (26 µg/m³)	Gas Chromatography			

1. California standards for ozone, carbon monoxide (except 8-hour Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter–-PM_{10}, $PM_{2.5}$, and visibility reduction particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM_{10}, the 24-hour standard is attained when the expected number of days per calendar with a 24-hour average concentration above 150 µg/m³ is equal to or less than one. For $PM_{2.5}$, the 24-hour standard is attained when 98% of the daily concentrations, averaged over 3 years, are equal to or less than the standard.
3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.
4. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
5. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
6. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
7. Reference method as described by the EPA. An "equivalent method" of measurement may be used but must have a "consistent relationship to the reference method" and must be approved by EPA.
8. On October 1, 2015, the national 8-hour ozone primary and secondary standards were lowered from 0.075 to 0.070 ppm.
9. As of December 14, 2012, the annual primary $PM_{2.5}$ standard changed from 15 µg/m³ to 12 µg/m³. The existing national 24-hour $PM_{2.5}$ standards (primary and secondary) were retained at 35 µg/m³, as was the annual secondary standard of 15 µg/m³. The existing 24-hour PM_{10} standards (primary and secondary) of 150 µg/m³ also were retained. The form of the annual primary and secondary standards is the annual mean, averaged over 3 years.

Pollutant	Averaging Time	California Standards[1]		Federal Standards [2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary [3,6]	Method[7]

10. To attain the 1-hour national standard, the 3-year average of the annual 98th percentile of the 1-hour daily maximum concentrations at each site must not exceed 100 ppb. Note that the national 1-hour standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the national 1-hour standard to the California standards the units can be converted from ppb to ppm. In this case, the national standard of 100 ppb is identical to 0.100 ppm.
11. On June 2, 2010, a new 1-hour SO_2 standard was established and the existing 24-hour and annual primary standards were revoked. To attain the 1-hour national standard, the 3-year average of the annual 99th percentile of the 1-hour daily maximum concentrations at each site must not exceed 75 ppb. The 1971 SO_2 national standards (24-hour and annual) remain in effect until one year after an area is designated for the 2010 standard, except that in areas designated nonattainment for the 1971 standards, the 1971 standards remain in effect until implementation plans to attain or maintain the 2010 standards are approved.
    * Note that the 1-hour national standard is in units of parts per billion (ppb). California standards are in units of parts per million (ppm). To directly compare the 1-hour national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
12. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
13. The national standard for lead was revised on October 15, 2008, to a rolling 3-month average. The 1978 lead standard (1.5 $\mu g/m^3$ as a quarterly average) remains in effect until one year after an area is designated for the 2008 standard, except that in areas designated nonattainment for the 1978 standard, the 1978 standard remains in effect until implementation plans to attain or maintain the 2008 standard are approved.
14. In 1989, the ARB converted both the general statewide 10-mile visibility standard and the Lake Tahoe 30-mile visibility standard to instrumental equivalents, which are "extinction of 0.23 per kilometer" and "extinction of 0.07 per kilometer" for the statewide and Lake Tahoe Air Basin standards, respectively.

3.1.2.2 Toxic Air Contaminants

California's air toxics control program was established by two pieces of legislation in the 1980s: the Toxic Air Contaminant Identification and Control Act (AB 1807) and the Air Toxics "Hot Spots" Information and Assessment Act of 1987 (AB 2588). Under AB 1807, the ARB uses a two-step process of risk identification and risk management to address the potential health effects from air toxic substances and protect the public health of Californians.[9] The first step is to determine which compounds and compound classes are to be considered as TACs. After considering criteria relating to "the risk of harm to public health, amount or potential amount of emissions, manner of, and exposure to, usage of the substance in California, persistence in the atmosphere, and ambient concentrations in the community,"[10] the ARB identifies candidate TACs. The Office of Environmental Health Hazard Assessment (OEHHA) then obtains and evaluates information on the health effects of exposure to each candidate compound. The scientific accuracy of the work of the ARB and OEHHA is reviewed by an independent Scientific Review Panel (SRP). After SRP approval, the substances are formally designated as TACs. The second step is for the ARB to develop air toxics control measures (ATCMs) to reduce emissions in the state. Local agencies, including the SCAQMD, may adopt the ATCMs as is, or develop more stringent rules.

The purpose of AB 2588 is to identify individual facilities whose TAC emissions pose a significant health risk to the surrounding community. Using procedures prescribed by the ARB, OEHHA, and (in the SCAB) the SCAQMD, the facility first prepares an air toxics emission inventory. The inventory includes emission from permitted sources and from sources that do not require permits. Then the facility uses dispersion modeling to estimate maximum one-hour and 70-year annual average exposures at sensitive receptor points, such as residences, schools and hospitals. Exposure of workers in nearby businesses are also estimated. Using concentration-based risk factors from OEHHA, the facility then estimates cancer risk and acute and chronic non-cancer risk. If the cancer risk is above 10 in one million or the non-cancer risk is above a certain threshold, then the facility must prepare and implement a risk reduction plan.

3.1.2.3 Greenhouse Gas Emissions

For the past 15 years, the State of California has been a leader in efforts to reduce GHG emissions. The following are statutory and regulatory measures that are relevant to the proposed project and are still in effect.[11]

Executive Order S-3-05 (GHG Emissions Reductions). Executive Order #S-3-05, signed by Governor Arnold Schwarzenegger on June 1, 2005, called for a reduction in GHG emissions to 1990 levels by 2020 and for an 80% reduction in GHG emissions to below 1990 levels by 2050.

The California Global Warming Solutions Act of 2006 (AB 32). In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Global Warming Solutions Act of 2006 (Health and Safety Code § 38500 et seq.), into law. AB 32 was intended to effectively end the scientific debate in California over the existence and consequences of global warming. In general, AB 32 directs the ARB to do the following:

9 AB 1807 - Toxics Air Contaminant Identification and Control. California Air Resources Board. Undated. URL: https://ww2.arb.ca.gov/resources/documents/ab-1807-toxics-air-contaminant-identification-and-control.
10 Health and Safety Code § 39666(f).
11 Many state measures set GHG emissions reduction targets which have been met; these are not discussed here.

- On or before June 30, 2007, publicly make available a list of discrete early action GHG emission reduction measures that can be implemented prior to the adoption of the statewide GHG limit and the measures required to achieve compliance with the statewide limit;

- By January 1, 2008, determine the statewide levels of GHG emissions in 1990, and adopt a statewide GHG emissions limit that is equivalent to the 1990 level (an approximately 28% reduction in existing statewide GHG emissions);

- On or before January 1, 2010, adopt regulations to implement the early action GHG emission reduction measures;

- On or before January 1, 2011, adopt quantifiable, verifiable, and enforceable emission reduction measures by regulation that will achieve the statewide GHG emissions limit by 2020, to become operative on January 1, 2012, at the latest. The emission reduction measures may include direct emission reduction measures, alternative compliance mechanisms, and potential monetary and non-monetary incentives that reduce GHG emissions from any sources or categories of sources as the ARB finds necessary to achieve the statewide GHG emissions limit; and

- Monitor compliance with and enforce any emission reduction measure adopted pursuant to AB 32.

On December 11, 2008, the ARB approved the *Climate Change Scoping Plan*[12] pursuant to AB 32. The Scoping Plan recommended a wide range of measures for reducing GHG emissions, including (but not limited to):

- Expanding and strengthening of existing energy efficiency programs;

- Achieving a statewide renewables energy mix of 33 percent;

- Developing a GHG emissions cap-and-trade program;

- Establishing targets for transportation-related GHG emissions for regions throughout the state, and pursuing policies and incentives to meet those targets;

- Implementing existing state laws and policies, including California's clean car standards, goods movement measures and the Low Carbon Fuel Standard; and

- Targeted fees to fund the state's long-term commitment to administering AB 32.

2014 Update to Climate Change Scoping Plan*:* On May 22, 2014, the ARB approved the First Update to the Climate Change Scoping Plan Pursuant to AB 32,[13] which shows that California is on track to meet the near-term 2020 greenhouse gas limit and is well positioned to maintain and continue

12 Climate Change Scoping Plan. A Framework for change. California Air Resources Board. December 2008. Final Version (May 2009). URL: https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/document/adopted_scoping_plan.pdf.

13 First Update to the Climate Change Scoping Plan. Building on the Framework. California Air Resources Board. May 2014. URL: https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/2013_update/first_update_climate_change_scoping_plan.pdf.

reductions beyond 2020 as required by AB 32. In accordance with the UNFCCC, the ARB is beginning to transition to the use of the IPCC's Fourth Assessment Report (AR4) 100-year GWPs in its climate change programs. The ARB has recalculated the 1990 GHG emissions level with the AR4 GWPs to be 431 million metric ton of CO_2e ($MMTCO_2e$); therefore, the 2020 GHG emissions limit established in response to AB 32 is now slightly higher than the 427 $MMTCO_2e$ in the initial Scoping Plan. The updated scoping plan evaluates the effectiveness of policies from the original scoping plan and adds recommendations for expanding and improving upon those programs including, but not limited to:

- Leveraging public money to fund technologies including medium and heavy duty Zero Emission Vehicles (ZEVs).
- Expanding local, regional, and state transportation plan goals to improve transit efficiency.
- Supporting the High-Speed Rail Authority and Sustainable Freight Strategy.
- Extending Low Carbon Fuel Standards beyond 2020 with more aggressive goals.
- Developing accurate methods for estimating agricultural emissions so that greenhouse gas reduction techniques can be assessed.
- Eliminating disposal of organic matter and promote methane recovery at landfills.
- Instituting the Forest Carbon Plan to model and understand the carbon cycle of forestry.
- Implementing economic incentives for the destruction of short-lived climate pollutants.
- Allowing limited future allowances for Cap-and-Trade to reduce cost spikes.
- Setting interim goals to reach greenhouse gas emissions of 80% of 1990 levels by 2050.

2017 Update to Climate Change Scoping Plan: The 2017 Update to the Scoping Plan[14] builds upon the former Scoping Plans and Updates by outlining priorities and recommendations for the State to achieve its long-term climate objectives. The 2017 Update establishes a proposed framework of action for California to meet the climate target of a 40% reduction in GHGs by 2030, compared to 1990 levels. The major elements of the framework proposed are enhancement of the Renewables Portfolio Standard and the Low Carbon Fuel Standard; a Mobile Source Strategy, Sustainable Freight Action Plan, Short-Lived Climate Pollutant Reduction Strategy, Sustainable Communities Strategies, and a Post-2020 Cap-and-Trade Program; a 20% reduction in GHG emissions from the refinery sector and an Integrated Natural and Working Lands Action Plan.

Senate Bill 97*.* Senate Bill 97 was signed by the governor on August 24, 2007. The bill required the Office of Planning and Research (OPR), by July 1, 2009, to prepare, develop and transmit to the Resources Agency guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, including, but not limited to, effects associated with transportation or energy consumption. On April 13, 2009, OPR submitted to the Secretary for Natural Resources its proposed amendments to the State CEQA Guidelines for greenhouse gas emissions. The Resources

14 The 2017 Climate Change Scoping Plan Update: The Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target. California Air Resources Board. January 20, 2017. URL: https://www.arb.ca.gov/cc/scopingplan/2030sp_pp_final.pdf.

Agency adopted those guidelines on December 30, 2009, and they became effective on March 18, 2010. The amendments treat GHG emissions as a separate category of impacts; i.e., they are not to be addressed as part of an analysis of air quality impacts.

Section 15064.4, which was added to the CEQA Guidelines, specifies how the significance of impacts from GHGs is to be determined. First, the lead agency should "make a good faith effort" to describe, calculate or estimate the amount of GHG emissions resulting from a project. After that, the lead agency should consider the following factors when assessing the impacts of the GHG emissions on the environment:

- The extent to which the project may increase or reduce GHG emissions, relative to the existing environmental setting;
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project; and
- The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

The OPR asked the ARB to make recommendations for GHG-related thresholds of significance. On October 24, 2008, the ARB issued a preliminary draft staff proposal for *Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act.*[15] After holding two public workshops and receiving comments on the proposal, ARB staff decided not to proceed with threshold development.[16] Quantitative significance thresholds, if any, are to be set by local agencies.

Senate Bill 375. Senate Bill (SB) 375 passed the Senate on August 30, 2008, and was signed by the governor on September 30, 2008. According to SB 375, the transportation sector is the largest contributor of GHG emissions and contributes over 40% of the GHG emissions in California, with automobiles and light trucks alone contributing almost 30%. SB 375 indicates that GHGs from automobiles and light trucks can be reduced by new vehicle technology. However, significant reductions from changed land use patterns and improved transportation also are necessary. SB 375 states, "Without improved land use and transportation policy, California will not be able to achieve the goals of AB 32." SB 375 (1) requires metropolitan planning organizations to include sustainable community strategies in their regional transportation plans for reducing GHG emissions, (2) aligns planning for transportation and housing, and (3) creates specified incentives for the implementation of the strategies.

Senate Bill 375 requires coordination of land use and transportation planning to reduce GHG emissions from transportation sources. Regional transportation plans, which are developed by metropolitan transportation organizations such as the SCAG, are to include "sustainable community strategies" to reduce GHG emissions.

15 Preliminary Draft Staff Proposal. Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act. California Air Resources Board. October 24, 2008, URL: https://ww3.arb.ca.gov/cc/localgov/ceqa/meetings/102708/prelimdraftproposal102408.pdf.

16 Personal communication from Douglas Ito, California Air Resources Board, Sacramento, CA, to Michael Rogozen, UltraSystems Environmental Inc., Irvine, CA. March 29, 2010.

Title 24 Building Energy Efficiency Standards. The Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24, Part 6, of the *California Code of Regulations*) were established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Compliance with Title 24 will result in decreases in GHG emissions. The California Energy Commission (CEC) adopted the 2019 changes to the Building Energy Efficiency Standards on April 23, 2008, with an aim to promote the objectives listed below.[17] They focus on improving "the energy efficiency of newly constructed buildings and additions and alterations to existing buildings. The most significant efficiency improvements to the residential Standards include the introduction of photovoltaic into the prescriptive package, improvements for attics, walls, water heating, and lighting. The most significant efficiency improvements to the nonresidential Standards include alignment with the ASHRAE 90.1 2017 national standards. The 2019 Standards also include changes made throughout all of its sections to improve the clarity, consistency, and readability of the regulatory language."[18]

The provisions of Title 24, Part 6 apply to all buildings for which an application for a building permit or renewal of an existing permit is required by law. They regulate design and construction of the building envelope, space-conditioning and water-heating systems, indoor and outdoor lighting systems of buildings, and signs located either indoors or outdoors. Title 24, Part 6 specifies mandatory, prescriptive and performance measures, all designed to optimize energy use in buildings and decrease overall consumption of energy to construct and operate residential and nonresidential buildings. Mandatory measures establish requirements for manufacturing, construction, and installation of certain systems; equipment and building components that are installed in buildings.

Title 24 California Green Building Standards Code. The California Green Building Standards Code (Title 24, Part 11 code) commonly referred to as the CALGreen Code, is a statewide mandatory construction code developed and adopted by the California Building Standards Commission and the Department of Housing and Community Development. The CALGreen standards require new residential and commercial buildings to comply with mandatory measures under the topics of planning and design, energy efficiency, water efficiency/conservation, material conservation and resource efficiency, and environmental quality. CALGreen also provides voluntary tiers and measures that local governments may adopt that encourage or require additional measures in the five green building topics.

The CEC updates Title 24 standards every three years and the most recent 2019 revisions to the standards became effective July 1, 2020.

Executive Order B-30-15 (Interim GHG Emissions Reduction). On April 29, 2015, Governor Brown signed Executive Order B-30-15, which sets a California GHG reduction target of 40% below 1990 levels by 2030.[19] This target is an intermediate goal between the 2020 and 2050 targets set by Executive Order S-3-05. The executive order also directs state agencies to update the Scoping Plan, update an Adaptation Strategy every three years, and take climate change into account in their

17 The 2019 changes to Building Energy Efficiency Standards became effective January 1, 2020.

18 2019 Building Energy Efficiency Standards for Residential and Nonresidential Buildings for the 2019 Building Efficiency Standards. California Energy Commission, Publication No. CEC-400-2018-020. URL: https://www.energy.ca.gov/publications/2008/2019-building-energy-efficiency-standards-residential-and-nonresidential. Accessed November 15, 2021.

19 New California Goal Aims to Reduce Emissions 40 Percent Below 1990 Levels by 2030. State of California. Office of Governor. https://www.gov.ca.gov/news.php?id=18938.

planning and investment strategies. Additionally, it requires the State's Five-Year Infrastructure Plan to take current and future climate change impacts into account in all infrastructure projects.

3.1.3 Regional

3.1.3.1 South Coast Air Quality Management District Rules

The South Coast Air Quality Management District (SCAQMD) is responsible for maintaining and improving air quality in all of Orange County and the urbanized portions of Los Angeles, Riverside and San Bernardino Counties. Its jurisdiction includes the Riverside County portion of the Coachella Valley. Through its regulations and rules, the SCAQMD implements state and federal laws and regulations within its geographic distribution.

The SCAQMD has an extensive set of rules for controlling air pollutant emissions. These rules apply whether or not permits are required for emission sources. The following discussion focuses on rules that potentially apply to construction and operation of the proposed project.

The project site is located in a Blowsand Zone[20] as defined by the SCAQMD as a corridor of land extending two miles to either side of the centerline of the I-10 Freeway beginning at SR-111 and I-10 junction and continuing southeast to the I-10 and Jefferson Street interchange in Indio. The project is located 1.39 miles northeast of the I-10 and falls within the Blowsand Zone criteria.

Criteria Pollutant Emissions

SCAQMD Rule 403

SCAQMD Rule 403 (Fugitive Dust) limits particulate matter emissions from construction projects. The following requirements apply to all construction projects, regardless of the size of their disturbed areas:[21]

- No person shall cause or allow emissions of fugitive dust to remain visible in the atmosphere beyond the property line of the emission source or to exceed 20 percent opacity if the dust emission is a result of a moving motorized vehicle.

- Apply applicable Best Available Control Measures (BACM) in Table 1 of Rule 403 to minimize fugitive dust emissions during active operation.[22]

- No person shall cause or allow PM_{10} levels to exceed 50 micrograms per cubic meter when determined as the difference between upwind and downwind samples collected on high-volume particulate matter samplers or other USEPA-approved equivalent method for PM_{10} monitoring at the project limits for a five-hour period during the time of Active Operations.[23] Sampling will only occur if a complaint is reported to the SCAQMD, in which case the decision to conduct sampling will be made by SCAQMD, and SCAQMD will conduct sampling.

21 SCAQMD Rule 403(d), as Amended June 3, 2005.
22 SCAQMD Rule 403(d)(2), as Amended June 3, 2005.
23 SCAQMD Rule 403(d)(3), as Amended June 3, 2005.

- No person shall allow track-out to extend 25 feet or more in cumulative length from the point of origin from an active operation, and all track-out from an active operation shall be removed at the conclusion of each workday or evening shift.[24]

- No person shall conduct an active operation with a disturbed surface area of five or more acres, or with a daily import or export of 100 cubic yards or more of bulk material without at least one of the measures listed under (D)(5) of Rule 403 at each vehicle egress.[25]

SCAQMD Rule 403.1.

SCAQMD Rule 403.1. (Supplemental Fugitive Dust Control Requirements for Coachella Valley Sources) limits fine particulate matter (PM_{10}) emissions from construction projects. The following requirements apply to all construction projects, regardless of the size of their disturbed areas.[26]

- Any person who conducts or authorizes the conducting of an active operation with a disturbed surface area of more than 5,000 square feet shall not initiate any earth-moving activities unless a fugitive dust control plan is prepared and approved by the Executive Officer.[27]

- Wind Monitoring Implementation Requirements: For facilities without an onsite anemometer,[28]
    - When wind speeds in excess of 25 miles per hour are forecast to occur in the Coachella Valley for that day. This condition shall apply to the full calendar day for which the forecast is valid. (The Executive Officer shall determine meteorological conditions which will cause wind speeds in excess of 25 miles per hour, and shall issue daily forecasts of expected wind conditions. Such forecasts shall be available to the public).[29]

    - When wind speeds in excess of 25 miles per hour are not forecast to occur by the District, and fugitive dust emissions are visible for a distance of at least 100 feet from the origin of such emissions, and there is visible evidence of wind driven fugitive dust.[30]

~~**Blowsand Zone**~~

The project site is located in ~~a~~the "Coachella Valley Blowsand Zone," which is defined by the SCAQMD as "the corridor of land

extending two miles to either side of the centerline of the I-10 Freeway beginning at the SR-111/I-10 junction and continuing southeast to the I-10~~/~~ Jefferson Street interchange in Indio."[31] The project site is located 1.4 miles to the northeast of the I-10 freeway centerline, just east of the SR-111/I-10

Formatted: Font: (Default) Times New Roman, 12 pt, Bold, Underline

Formatted: Normal, No bullets or numbering

Formatted: Body Text, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

24 SCAQMD Rule 403(d)(4), as Amended June 3, 2005.
25 SCAQMD Rule 403(d)(5), as Amended June 3, 2005. This does not apply to the proposed project, for which the disturbed surface area will be less than one acre.
26 SCAQMD Rule 403.1(e), as Amended April 2, 2004.
27 SCAQMD Rule 403.1(e)(1), as Amended April 2, 2004.
28 SCAQMD Rule 403.1(g)(B), as Amended April 2, 2004.
29 SCAQMD Rule 403.1(g)(B)(i), as Amended April 2, 2004.
30 SCAQMD Rule 403.1(g)(B)(ii), as Amended April 2, 2004.
31 SCAQMD Rule 403.1(c)(7), as Amended April 2, 2004.

junction, and is therefore in the Blowsand Zone". FRule 403.1(d)(2) requires urthermore any person involved in active operations in the Coachella Valley Blowsand Zone shallto stabilize new man-made deposits of bulk material within 24 hours of making such bulk material deposits and new deposits of bulk material originating from off-site undisturbed natural desert areas within 72 hours. Below are the general requirements for conducting construction operations inside a Blowsand Zone.

General Requirements

Stabilization procedures when performing construction operations in a Blowsand Zone shall include one or more of the following:

- Application of water to at least 70 percent of the surface area of any bulk material deposits at least 3 times for each day that there is evidence of wind driven fugitive dust; or

- Application of chemical stabilizers in sufficient concentration so as to maintain a stabilized surface for a period of at least 6 months; or

- Installation of wind breaks of such design so as to reduce maximum wind gusts to less than 25 miles per hour in the area of the bulk material deposits.[32]

- Application of water to at least 70 percent of the surface area of any bulk material deposits at least 3 times for each day that there is evidence of wind driven fugitive dust; or

- Application of chemical stabilizers in sufficient concentration so as to maintain a stabilized surface for a period of at least six months

o

SCAQMD Rule 1113

The purpose of this rule is to limit the VOC content of architectural coatings used in the District and applies to any person who supplies, sells, markets, offers for sale, or manufactures any architectural

Formatted: Font: Bold

Formatted: Justified

Formatted: Indent: Left: 0.25", Hanging: 0.25", Space After: 12 pt, Add space between paragraphs of the same style, No bullets or numbering

Formatted: Indent: Hanging: 0.25", Space After: 12 pt, Add space between paragraphs of the same style

Formatted: List Bullet, Indent: Left: 0.5", Space After: 12 pt, No bullets or numbering, Adjust space between Latin and Asian text, Adjust space between Asian text and numbers

Formatted: Font: (Default) Times New Roman, 12 pt

Formatted: Font: (Default) Times New Roman, 12 pt, Font color: Auto

Formatted: Normal, No bullets or numbering, Don't adjust space between Latin and Asian text, Don't adjust space between Asian text and numbers

32 This requirement applies only to new man-made deposits of bulk material; see SCAQMD Rule 403.1(d)(2)(C).

coating that is intended to be field applied within the District and any person who applies, stores at a worksite, or solicits the application of any architectural coating within the District.[33]

Toxic Air Contaminants

SCAQMD Regulation XIV, Toxics and Other Non-Criteria Pollutants, comprises 28 rules governing emissions of TACs in the SCAB. As with most other SCAQMD rules, these apply whether or not a facility has a permit. The following requirements apply:

- SCAQMD Rule 1466. Control of Particulate Emissions From Soils With Toxic Air Contaminants: The purpose of this rule is to minimize the amount of off-site fugitive dust emissions containing toxic air contaminants by reducing particulate emissions in the ambient air as a result of earth-moving activities, including, dredging, excavating, grading, earth-cutting and filling, loading, unloading, handling, mechanized land clearing, treating, stockpiling, transferring, and removing of soil that contains applicable toxic air contaminants.[34]

3.1.3.2 Air Quality Management Plan (AQMP)

The SCAQMD is required to produce plans to show how air quality will be improved in the region. The CCAA requires that these plans be updated triennially to incorporate the most recent available technical information. A multi-level partnership of governmental agencies at the federal, state, regional, and local levels implement the programs contained in these plans. Agencies involved include the USEPA, ARB, local governments, SCAG, and SCAQMD. The SCAQMD and the SCAG are responsible for formulating and implementing the AQMP for the SCAB. The SCAQMD updates its AQMP every three years.

The 2016 AQMP[35,36] was adopted by the SCAQMD Board on March 3, 2017, and on March 10, 2017 was submitted to the ARB as part of the California State Implementation Plan (SIP).[37] It focuses largely on reducing NO_x emissions as a means of attaining the 1979 1-hour ozone standard by 2022, the 1997 8-hour ozone standard by 2023, and the 2008 8-hour standard by 2031. The AQMP prescribes a variety of current and proposed new control measures, including a request to the USEPA for increased regulation of mobile source emissions. The NO_x control measures will also help the SCAB attain the 24-hour standard for $PM_{2.5}$.

The Coachella Valley Planning Area is defined as the desert portion of Riverside County in the SSAB, and is part of the SCAQMD. Ozone is measured continuously at two locations in the Coachella Valley at the Palm Springs and Indio air monitoring stations. The "severe-15" attainment date for the 2008 8-hour ozone NAAQS of 2027 is the primary focus of the 2016 AQMP modeling demonstration for the Coachella Valley. Since the mid-1990s, the days that have exceeded the 24-hour PM10 federal standard at the SCAQMD Coachella Valley monitoring stations at Indio and Palm Springs have been associated with high-wind natural events.

33 SCAQMD Rule 1113, as Amended February 5, 2016.
34 SCAQMD Rule 1466, as Amended June 4, 2021.
35 2016 Air Quality Management Plan. South Coast Air Quality Management District. 2017.
36 The 2022 Air Quality Management Plan is under development, and has not yet been adopted.
37 Letter from Wayne Nastri, Executive Officer, South Coast Air Quality Management District, Diamond Bar, CA to Richard Corey, Executive Officer, California Air Resources Board, Sacramento, California re: Submittal of 2016 Air Quality Management Plan.

3.1.3.3 Southern California Association of Governments (SCAG)

The Southern California Association of Governments (SCAG) is the federally-designated metropolitan planning agency for Ventura, Los Angeles, Riverside, San Bernardino and Imperial Counties. It works together with the SCAQMD to prepare the above-described AQMP. One of SCAG's major responsibilities is to prepare and periodically update the Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS), which is required for the region to receive federal and state transportation funding for public transit, streets and roads, and bicycle and pedestrian improvements. The SCS, which is required by the Sustainable Communities and Climate Protection Act (SB 375), has as its primary goal the reduction of per capita passenger vehicle-generated GHG emissions.

The most recent update, Connect SoCal (2020-2045 RTP/SCS), was adopted on September 3, 2020.[38] The SCS details how, through coordination of transportation investments and a regional development pattern, the region can achieve the GHG reduction targets set forth by California Air Resources Board (ARB). SCAG's SCS current target is to reduce greenhouse gas (GHG) emissions from automobiles and light duty trucks by eight percent per capita by 2020 and 19 percent by 2035 from 2005 emissions levels.[39]

3.1.4 City of Desert Hot Springs

3.1.4.1 General Plan ~~Open Space and Natural Resources Element~~Implementation Measures

The recently adopted Desert Hot Springs General Plan Update includes a number of implementation measures that potentially apply to the proposed project. Table A-3 of the document contains the following two air quality-related measures:[40]

B-5 - "Super Compliant" Architectural Coatings. The City shall require development projects to:

1) Submit evidence, such as emissions estimates, coating use estimates and manufacturers specifications for VOC content, or other evidence that indicates VOC emissions during architectural coating activities would not exceed SCAQMD CEQA significance thresholds.

2) Prepare a Coating Restriction Plan (CRP), consistent with SCAQMD guidelines. The project applicant/developer shall include in any construction contracts and/or subcontracts a requirement that Project contractors adhere to the requirements of the CRP. The CRP shall include a requirement that all interior and exterior residential and non-residential architectural coatings used in Project construction meet the SCAQMD "super compliant" coating VOC content standard of less than 10 grams of VOC per liter of coating. The CRP shall also specify the use of high-volume, low-pressure spray guns during coating applications to reduce coating waste.

Formatted: Indent: Left: 0.5"

38 Connect SoCal - The 2020-2045 Regional Transportation Plan/ Sustainable Communities Strategy of the Southern California Association of Governments. Adopted September 3, 2020. URL: https://scag.ca.gov/sites/main/files/file-attachments/0903fconnectsocal-plan_0.pdf?1606001176. Accessed July 6, 2022.

39 Ibid., p. 9.

40 City of Desert Hot Springs General Plan, Safety and Noise Element. Appendix A: Implementation. Adopted May 26, 2020, pp. A-6, A-7. URL: https://storage.googleapis.com/proudcity/deserthotspringsca/uploads/2021/11/Desert-Hot-Springs-General-Plan-Adopted-07-2020-Small.pdf.

B-6 - AQ-2B: Tier IV Construction Equipment. To reduce construction equipment emissions of NO_x, diesel particulate matter, and other pollutants, the City shall require development projects to:

1) Use electric-powered and liquefied or compressed natural gas equipment instead of diesel-powered equipment to the maximum extent feasible.

2) All construction equipment with a rated power-output of 50 horsepower or greater shall meet U.S. EPA and CARB Tier IV Final Emission Standards for NO_x. This may be achieved via the use of equipment with engines that have been certified to meet Tier IV emission standards, or through the use of equipment that has been retrofitted with a CARB-verified emission control strategy (e.g., selective catalytic reduction) capable of reducing exhaust NO_x emission to levels that meet Tier IV standards.

3) The City may grant an exemption from these requirements in the event an applicant can factually document that the specific equipment needed to construct a project is not reasonably available (e.g., the specific Tier IV equipment needed is not available within Riverside County within the scheduled construction period).

3.1.4.2 ~~Desert Hot Springs is located on an upper valley plain and mountain foothills at the western edge of Southern California's Colorado Desert region. The San Bernardino and Little San Bernardino Mountains bound the city on the west and north, respectively. The extensive alluvial plains formed by drainage from these mountains form the elevated valley on which most of the city has been developed. Elevations range from approximately 600 feet along Interstate 10 to approximately 1900 feet in the northeast portion of the city. Major drainage courses which traverse the community include Mission Creek, Big and little Morongo Creeks, Long Creek and Blind Creek. Big Morongo Canyon Preserve and Joshua Tree National Park are located north and northeast of the city, respectively.~~Desert Hot Springs Municipal Code

Provisions of the Desert Hot Springs Municipal Code that apply to the project are summarized as follows:

Municipal Code § 17.40.080 Dust and Dirt

In addition to the provisions of the City Grading and PM_{10} Ordinances ~~and~~ all land use activities shall be conducted so as to not create any measurable amounts of dust and dirt emissions beyond ~~the parcel~~any boundary line of the parcel.~~, furthermore to ensure a dust free environment the following~~Appropriate grading procedures shall include, but are not limited to:~~be the following:~~

- Schedule grading activities to ensure repeated grading will not be required so that construction of desired land uses will be completed as soon as possible while disturbing minimal amounts of vegetation.
- To prevent blowing dust and dirt, ~~W~~water grad~~ing~~ed ~~are~~as often as necessary~~ to prevent blowing dust and dirt~~, implement hydroseeding~~: the use of~~ with temporary irrigation, add a dust palliative, and/or build wind fences.

- ~~and r~~Revegetate the grad~~ing~~ed areas as soon as possible.

- Construct appropriate walls or fences to contain dust and dirt in the parcel pending approval by the City Engineer~~. (Prior code § 159.20.030(5).~~

Municipal Code Chapter 15.84 [Control of Fugitive Dust (PM_{10} Emissions)], § 15.84.040

- No operator shall conduct any dust-generating activity on a site unless the operator utilizes one or more ~~the~~ Coachella Valley best available control measures identified in the Coachella Valley Fugitive Dust Control Handbook.

- Any operator involved in any potential dust-generating activity on a site with a disturbed surface area greater than one acre shall operate a water application system as identified in the Coachella Valley Fugitive Dust Control Handbook, if watering is the selected control measure.

- No person subject to the requirements of subsection A of this section shall cause or allow visible fugitive dust emissions to exceed 20 percent opacity, or extend more than 100 feet either horizontally or vertically from the origin of a source, or cross any property line. ~~(Prior code § 150.118)~~

-

Formatted: Bullet w-Space, Indent: Left: 0.5"

Municipal Code Chapter 15.84 [Control of Fugitive Dust (PM_{10} Emissions)], § 15.84.050

- Any operator applying for a grading permit, or a building permit for an activity with a disturbed surface area of more than 5,000 square feet, shall not initiate any earth-moving operations unless a fugitive dust control plan (FDCP) has been prepared to the provisions of the Coachella Valley Fugitive Dust Control Handbook (2003) and approved by the City.

- A copy of the approved fugitive dust control ~~(FDC)~~ plan must be kept on site at all times and provided to the City and the SCAQMD upon request.

- During nonworking hours, stabilize soils by maintaining them in a damp condition, watering, or applying a chemical dust suppressant.

  ~~Any operator involved in demolition activities shall comply with AQMD Rule 1403 (Asbestos Emissions from Demolition/Renovation Activities) requirements, and the requirements of Title 40, Part 61 of the Code of Federal Regulations and short term stabilization methods.~~

Formatted: Indent: Left: 0.5", No bullets or numbering

- Within ten days of ceasing activity, an operator shall implement at least one of the following long-term stabilization techniques for any disturbed surface where construction activities are not expected to occur for at least 30 days: (1) ~~by~~ 75% revegetation of ground coverage; or (2) surrounding the area with physical access restriction and establishing a stabilized surface by watering or applying chemical stabilizers.

- ~~watering or using chemical or~~Remove bulk material track-~~-~~out to any paved road open to traffic ~~open to traffic and the operator shall remove bulk material within one hour at a distance of~~when the track-out reaches 25 feet, and at the conclusion of each workday.

- Any operator with a disturbed surface area of five or more acres or of any project that involves the import or export of at least 100 cubic yards of bulk material per day shall install and maintain at least one of the following control measures at the intersection of each site entrance and any paved road open to traffic with all vehicles exiting the site:

    - A ~~P~~pad with one-inch washed gravel maintained in a clean condition to a depth of six inches and extending 30 feet and 50 feet long.

    - A ~~with~~ paved surface extending 100 feet and 20 feet wide.

    - A ~~; along with a~~ wheel shaker/spreading device consisting of raised dividers three inches tall and at least six inches apart and 20 feet long.

    - A ~~with a~~ wheel washing system.

- Any operator required to submit a FDCP~~C~~ plan shall display project contact signage that meets the minimum standards of the Coachella Valley Fugitive Dust Control Handbook.

~~; furthermore, with a disturbed surface area of 50 or more acres shall have an on-site environmental observer that is hired by the developer to employ dust mitigation 24/7.~~

- No operator required to submit a FDCP shall cause or allow visible fugitive dust emissions to exceed 20 percent opacity, or extend more than 100 feet either horizontally or vertically from the origin of a source, or cross any property line.

- Exceedance of the visible emissions prohibition in subsection (J)(1) of this section occurring due to a high-wind episode shall constitute a violation of subsection (J)(1) of this section, unless the operator demonstrates to the City all the following conditions:

    - All FDC plan measures or applicable Coachella Valley prevention methods were implemented and maintained on site; and could not have been prevented by recordkeeping compiled and retained during the event due to meteorological conditions

- Before Construction. The operator of a project with ten acres or more of earth-moving operations shall forward all documents of FDC within 10 days after city approval and notify the jurisdiction and ACQMD within 24 hours prior to operation.

- During construction operators involved in earth-moving operations shall keep records for a period of not less than three years and record keeping contained in the Coachella Valley FDC Handbook.

- Any operator involved in earth-moving operations that utilizes chemical dust suppressants for dust control on a site shall compile records indicating the product applied and technical data for record keeping not less than 3 years.

- After Construction. Any operator subject to the provisions of subsection (K)(1) of this section shall notify the City and the AQMD within ten days of the establishment of the finish grade or at the conclusion of the finished grading inspection. ~~(Prior code § 150.119)~~

3.1.4.3 Other General Plan Provisions

The City's General Plan supports the goals of the Climate Action Plan (CAP) (see **Section 3.1.4.4**) and Energy Action Plan (EAP) with policies that promote energy conservation in new development projects (Policy OS-4.1), solar energy systems in commercial uses (Policy OS-4.4), and green building/sustainable construction (Policies OS-6.1 and OS-6.2). A summary of General Plan provisions is provided as **Attachment 2** to this report.

Formatted: Body Text

3.1.4.4 Desert Hot Springs Climate Action Plan

The City of Desert Hot Springs is located in central Riverside County and is one of the nine incorporated cities within the Coachella Valley.[41] In July 2013, the City of Desert Hot Springs adopted a Climate Action Plan (CAP) for the development and implementation of policies and programs to reduce GHG emissions within the City. [42]. The CAP is based on the directives of the Assembly Bill (AB) 32 and Executive Order S-3-05. The CAP uses a GHG emission inventory from the Year 2010 to establish the City's baseline emissions for the purposes of assessing future GHG reduction goals and forecasting GHG emissions in the future. The CAP estimated that the City's community-wide GHG emissions in 2010 were approximately 100,654 metric tons of carbon dioxide equivalent (MTCO2e). Based on this historical emissions profile, the CAP established its annual Year 2020 GHG emission reduction goal to be 64,047 MTCO2e, which would require an approximately 48,769-MTCO2e decrease from its business-as-usual forecasted scenario for the Year 2020. The CAP includes 80 specific measures to reduce the City's GHG emissions. The project's consistency with CAP measures is evaluated in **Section 5.2.2**.

3.2 Existing Conditions

3.2.1 Climate and Meteorology

Air quality is affected by both the rate and location of pollutant emissions, and by meteorological conditions that influence movement and dispersal of pollutants. Atmospheric conditions such as wind speed, wind direction, and air temperature gradients, along with local topography, provide the link between air pollutant emissions and air quality.

The project site is located in the Coachella Valley portion of the Salton Sea Air Basin (SSAB), which includes the Imperial Valley and the central part of Riverside County. The Coachella Valley portion is about 2,500 square miles and is within the jurisdiction of the South Coast Air Quality Management District. The Valley is bounded by the San Jacinto Mountains to the west, and the Little San Bernardino Mountains to the east. The climate of the Coachella Valley is a continental, desert-type, with hot summers, mild winters, and very little annual rainfall.

41 City of Desert Hot Springs, 2013 Climate Action Plan. Accessed online at: https://storage.googleapis.com/proudcity/deserthotspringsca/uploads/2021/09/Climate-Action-Plan.pdf, on June 24, 2022.
42 Ibid., p.3.

The annual average high and low temperatures, as recorded at the Palm Springs meteorological station (#0466; latitude 33.8275°, longitude -116.5097°), which is approximately 5.78 miles south of the project site,[43] are 88.6°F and 57.2°F, respectively. Average winter (December, January, and February) high and low temperatures are approximately 71.03°F and 43.4°F and average summer (June, July, and August) high and low temperatures are approximately 106°F and 72.17°F. The annual average of total precipitation is approximately 5.49 inches, which occurs mostly during the winter and relatively infrequently during the summer. Monthly precipitation averages approximately 1.05 inches during the winter (December, January, and February), approximately 0.27 inch during the spring (March, April, and May), approximately 0.33 inch during the fall (September, October, and November), and approximately 0.17 inch during the summer (June, July, and August).

3.2.2 Pollutants and Effects

3.2.2.1 Criteria Pollutants

Criteria pollutants are air pollutants for which acceptable levels of exposure can be determined and an ambient air quality standard has been established by the U.S. Environmental Protection Agency (USEPA) and/or the California Air Resources Board (ARB). The criteria air pollutants of concern are nitrogen dioxide (NO_2), carbon monoxide (CO), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), lead (Pb), and ozone (O_3), and their precursors. Since the proposed project would not generate appreciable SO_2 or Pb emissions,[44] it is not necessary for the analysis to include those two pollutants. Presented below is a description of the air pollutants of concern and their known health effects.

Nitrogen oxides (NO_X) serve as integral participants in the process of photochemical smog production and are precursors for certain particulate compounds that are formed in the atmosphere. The two major forms of NO_X are nitric oxide (NO) and NO_2. NO is a colorless, odorless gas formed from atmospheric nitrogen and oxygen when combustion takes place under high temperature and/or high pressure. NO_2 is a reddish-brown pungent gas formed by the combination of NO and oxygen. It acts as an acute respiratory irritant and eye irritant and increases susceptibility to respiratory pathogens. A third form of NO_X, nitrous oxide (N_2O), is a GHG. (See **Section 3.2.2.3**.)

Carbon monoxide (CO) is a colorless, odorless non-reactive pollutant produced by incomplete combustion of carbon substances (e.g., gasoline or diesel fuel). The primary adverse health effect associated with CO is its binding with hemoglobin in red blood cells, which decreases the ability of these cells to transport oxygen throughout the body. Prolonged exposure can cause headaches, drowsiness, or loss of equilibrium; high concentrations are lethal.

Particulate matter (PM) consists of finely divided solids or liquids, such as soot, dust, aerosols, fumes, and mists. Two forms of fine particulate matter are now regulated. Respirable particles, or PM_{10}, include that portion of the particulate matter with an aerodynamic diameter of 10 micrometers (i.e., 10 one-millionths of a meter or 0.0004 inch) or less. Fine particles, or $PM_{2.5}$, have an aerodynamic diameter of 2.5 micrometers (i.e., 2.5 one-millionths of a meter or 0.0001 inch) or less. Particulate discharge into the atmosphere results primarily from industrial, agricultural, construction, and transportation activities. However, wind action on the arid landscape also contributes substantially to the local particulate loading. Fossil fuel combustion accounts for a significant portion of $PM_{2.5}$. In

43 Meteorological station location information from National Oceanographic and Atmospheric Administration, National Climate Data Center https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca6635, Accessed July 6, 2022.

44 Sulfur dioxide emissions will be about 0.064 pound per day during construction and about 0.59 pound per day during operations.

addition, particulate matter forms in the atmosphere through reactions of NO_x and other compounds (such as ammonia) to form inorganic nitrates and sulfates. Both PM_{10} and $PM_{2.5}$ may adversely affect the human respiratory system, especially in those people who are naturally sensitive or susceptible to breathing problems.

Reactive organic gases (ROG) are compounds comprised primarily of atoms of hydrogen and carbon that have high photochemical reactivity. The major source of ROG is the incomplete combustion of fossil fuels in internal combustion engines. Other sources of ROG include the evaporative emissions associated with the use of paints and solvents, the application of asphalt paving and the use of household consumer products. Some ROG species are listed toxic air contaminants, which have been shown to cause adverse health effects; however, most adverse effects on human health are not caused directly by ROG, but rather by reactions of ROG to form other criteria pollutants such as ozone. ROG are also transformed into organic aerosols in the atmosphere, contributing to higher levels of fine particulate matter and lower visibility. The term "ROG" is used by the CARB for air quality analysis and is defined essentially the same as the federal term "volatile organic compound" (VOC).

Ozone (O_3) is a secondary pollutant produced through a series of photochemical reactions involving ROG and NO_X. O_3 creation requires ROG and NO_X to be available for approximately three hours in a stable atmosphere with strong sunlight. Because of the long reaction time, peak ozone concentrations frequently occur downwind of the sites where the precursor pollutants are emitted. Thus, O_3 is considered a regional, rather than a local, pollutant. The health effects of O_3 include eye and respiratory irritation, reduction of resistance to lung infection and possible aggravation of pulmonary conditions in persons with lung disease. O_3 is also damaging to vegetation and untreated rubber.

3.2.2.2 Toxic Air Contaminants

A toxic air contaminant (TAC) is defined by California law as an air pollutant that "may cause or contribute to an increase in mortality or in serious illness, or which may pose a present or potential hazard to human health."[45] The USEPA uses the term hazardous air pollutant (HAP) in a similar sense. The main mobile HAP source associated with this project will be combustion of fossil fuel by project-induced traffic. The following pollutants are components of fossil fuel combustion exhaust from onroad motor vehicles.

Acetaldehyde

Acetaldehyde is a colorless liquid with a high vapor pressure and, at dilute ambient concentrations, a "fruity and pleasant odor."[46] It is present as a product of incomplete combustion in the exhausts of stationary equipment (e.g., boilers and generators) and mobile sources. It is also a secondary pollutant, formed through the photochemical reaction of VOC and NO_X in the atmosphere. The primary acute effect of inhalation exposure to acetaldehyde is irritation of the eyes, skin, and respiratory tract in humans. At higher exposure levels, erythema, coughing, pulmonary edema, and necrosis may also occur. Chronic exposure to acetaldehyde causes inflammation and injury to the upper respiratory tract (e.g., lesions of the nasal passages).[47] The chronic noncancer effects of acetaldehyde in humans have not been well characterized. No information is available on the

45 California Health and Safety Code §39655(a).
46 U.S. Environmental Protection Agency, "Acetaldehyde." Technology Transfer Network, Air Toxics Web Site, Internet URL: www.epa.gov/ttn/atw/hlthef/acetalde.html. Updated November 6, 2007.
47 California Office of Environmental Health Hazard Evaluation, "Acetaldehyde Reference Exposure Levels." Draft Technical Support Document for Noncancer RELs. Scientific Review Panel. December 2008.

reproductive or developmental effects of acetaldehyde in humans. The USEPA has classified acetaldehyde as a probable human carcinogen.

Acrolein

Acrolein is a water-white or yellow liquid that burns easily, is readily volatilized, and has "a disagreeable odor."[48] It is present as a product of incomplete combustion in the exhausts of stationary equipment (e.g., boilers and heaters) and mobile sources. It is also a secondary pollutant, formed through the photochemical reaction of VOC and NO_X in the atmosphere. Acrolein is considered to have high acute toxicity and causes upper respiratory tract irritation and congestion in humans. The major effects from chronic (long-term) inhalation exposure to acrolein in humans consist of general respiratory congestion and eye, nose, and throat irritation. No information is available on the reproductive, developmental, or carcinogenic effects of acrolein in humans. The USEPA considers acrolein data to be inadequate for an assessment of human carcinogenic potential.

Benzene

Benzene is a volatile, colorless, highly flammable liquid with a "sweet" odor.[49] Most of the benzene in ambient air is from incomplete combustion of fossil fuels and evaporation from gasoline service stations. Acute inhalation exposure to benzene causes neurological symptoms, such as drowsiness, dizziness, headaches, and unconsciousness in humans. Chronic inhalation of certain levels of benzene causes disorders in the blood in humans. Benzene specifically affects bone marrow (the tissues that produce blood cells). Aplastic anemia, excessive bleeding, and damage to the immune system (by changes in blood levels of antibodies and loss of white blood cells) may develop. Human data on the developmental effects of benzene are inconclusive due to concomitant exposure to other chemicals, inadequate sample size, and lack of quantitative exposure data. The USEPA has classified benzene as a known human carcinogen by inhalation.

1,3-Butadiene

1,3-Butadiene is a colorless gas with a mild gasoline-like odor. Sources of 1,3-butadiene released into the air include motor vehicle exhaust, manufacturing and processing facilities, forest fires or other combustion, and cigarette smoke.[50] Acute exposure to 1,3-butadiene by inhalation in humans results in irritation of the eyes, nasal passages, throat, and lungs. Neurological effects, such as blurred vision, fatigue, headache, and vertigo, have also been reported at very high exposure levels. One epidemiological study reported that chronic exposure to 1,3-butadiene via inhalation resulted in an increase in cardiovascular diseases, such as rheumatic and arteriosclerotic heart diseases, while other human studies have reported effects on the blood. No information is available on reproductive or developmental effects of 1,3-butadiene in humans. USEPA has classified 1,3-butadiene as a "probable human carcinogen" by inhalation.[51]

48 U.S. Environmental Protection Agency, "Acrolein." Technology Transfer Network, Air Toxics Web Site. Internet URL: www.epa.gov/ttn/atw/hlthef/acrolein.html. Updated November 6, 2007.
49 U.S. Environmental Protection Agency, "Benzene." Technology Transfer Network, Air Toxics Web Site. Internet URL: www.epa.gov/ttn/atw/hlthef/benzene.html. Updated February 4, 2008.
50 U.S. Environmental Protection Agency, "1,3-Butadiene." Technology Transfer Network, Air Toxics Web Site. Internet URL: www.epa.gov/ttn/atw/hlthef/butadiene.html. Updated March 31, 2009.
51 U.S. Environmental Protection Agency, "1,3-Butadiene (CASRN 106-99-0)." Integrated Risk Information System web site, Internet URL: www.epa.gov/iris/subst/0139.htm. Updated July 9, 2009.

Diesel Particulate Matter/Diesel Exhaust Organic Gases

Diesel particulate matter/diesel exhaust organic gases[52] comprise a complex mixture of hundreds of constituents in either a gaseous or particle form. Gaseous components of diesel exhaust (DE) include CO_2, oxygen, nitrogen, water vapor, CO, nitrogen compounds, sulfur compounds, and numerous low-molecular-weight hydrocarbons. Among the gaseous hydrocarbon components of DE that are individually known to be of toxicological relevance are several carbonyls (e.g., formaldehyde, acetaldehyde, acrolein), benzene, 1,3-butadiene, and polycyclic aromatic hydrocarbons (PAHs) and nitro-PAHs.[53] Diesel particulate matter (DPM) is composed of a center core of elemental carbon and adsorbed organic compounds, as well as small amounts of sulfate, nitrate, metals, and other trace elements. DPM consists primarily of $PM_{2.5}$, including a subgroup with a large number of particles having a diameter <0.1 micrometer. Collectively, these particles have a large surface area, which makes them an excellent medium for adsorbing organics. Also, their small size makes them highly respirable and able to reach the deep lung. A number of potentially toxicologically relevant organic compounds, including PAHs, nitro-PAHs, and oxidized PAH derivatives, are on the particles. Diesel exhaust is emitted from onroad mobile sources, such as automobiles and trucks, and from offroad mobile sources (e.g., diesel locomotives, marine vessels, and construction equipment). DPM is directly emitted from diesel-powered engines (primary particulate matter) and can be formed from the gaseous compounds emitted by diesel engines (secondary particulate matter).

Acute or short-term (e.g., episodic) exposure to diesel exhaust (DE) can cause acute irritation (e.g., eye, throat, bronchial), neurophysiological symptoms (e.g., lightheadedness, nausea), and respiratory symptoms (cough, phlegm). Evidence also exists for an exacerbation of allergenic responses to known allergens and asthma-like symptoms.[54] Information from the available human studies is inadequate for a definitive evaluation of possible noncancer health effects from chronic exposure to DE. However, on the basis of extensive animal evidence, DE is judged to pose a chronic respiratory hazard to humans. USEPA has determined that DE is "likely to be carcinogenic to humans by inhalation" and that this hazard applies to environmental exposures.[55]

Formaldehyde

Formaldehyde is a colorless gas with a pungent, suffocating odor at room temperature.[56] The major emission sources of formaldehyde appear to be power plants, manufacturing facilities, incinerators, and automobile exhaust. However, most of the formaldehyde in ambient air is a result of secondary formation through photochemical reaction of VOC and NOx.[57] The major toxic effects caused by acute formaldehyde exposure via inhalation are eye, nose, and throat irritation and effects on the nasal cavity. Other effects seen from exposure to high levels of formaldehyde in humans are coughing, wheezing, chest pains, and bronchitis. Chronic exposure to formaldehyde by inhalation in humans

52 USEPA MSAT regulations consider both the particulate and gaseous components of diesel engine exhaust, while California regulations focus on diesel particulate matter (DPM).

53 U.S. Environmental Protection Agency, Health Assessment Document for Diesel Engine Exhaust. Washington, DC: National Center for Environmental Assessment, Office of Research and Development, EPA/600/8-90/057F. May 2002.

54 U.S. Environmental Protection Agency, Health Assessment Document for Diesel Engine Exhaust. Washington, DC: National Center for Environmental Assessment, Office of Research and Development, EPA/600/8-90/057F. May 2002.

55 Ibid.

56 U.S. Environmental Protection Agency, "Formaldehyde." Technology Transfer Network, Air Toxics Web Site. Internet URL: www.epa.gov/ttn/atw/hlthef/formalde.html. Updated November 6, 2007.

57 Rogozen, M. B. et al. Formaldehyde: A Survey of Airborne Concentrations and Sources. Hermosa Beach, California: Science Applications, Inc. for the California Air Resources Board, Sacramento, California, SAI-84/1642. 1984.

has been associated with respiratory symptoms and eye, nose, and throat irritation. USEPA considers formaldehyde to be a probable human carcinogen.

3.2.2.3 Greenhouse Gases

GHGs are defined under the California Global Warming Solutions Act of 2006 (AB 32)[58] as carbon dioxide (CO_2), methane (CH_4), N_2O, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs) and sulfur hexafluoride (SF_6). Associated with each GHG species is a "global warming potential" (GWP), which is a value used to compare the abilities of different GHGs to trap heat in the atmosphere. GWPs are based on the heat-absorbing ability of each gas relative to that of CO_2, as well as the decay rate of each gas (the amount removed from the atmosphere over a given number of years). The GWPs of CH_4 and N_2O are 25 and 298, respectively.[59] "Carbon dioxide equivalent" (CO_2e) emissions are calculated by weighting each GHG compound's emissions by its GWP and then summing the products. HFCs, PFCs, and SF_6 are not emitted in significant amounts by project sources, so they are not discussed further.

Carbon dioxide (CO_2) is a clear, colorless, and odorless gas consisting of molecules made up of two oxygen atoms and one carbon atom. Fossil fuel combustion is the main human-related source of CO_2 emissions; electricity generation and transportation are first and second in the amount of CO_2 emissions, respectively. Carbon dioxide is the basis of GWP, and thus has a GWP of 1.

Methane (CH_4) is a clear, colorless gas, and is the main component of natural gas. Anthropogenic sources of CH_4 are fossil fuel production, biomass burning, waste management, and mobile and stationary combustion of fossil fuel. Wetlands are responsible for most of the natural CH_4 emissions.[60] As mentioned above, within a 100-year period CH_4 is 25 times more effective in trapping heat than is CO_2.

Nitrous oxide (N_2O) is a colorless, clear gas, with a slightly sweet odor. N_2O has both natural and human-related sources and is removed from the atmosphere mainly by photolysis (breakdown by sunlight) in the stratosphere. The main human-related sources of N_2O in the United States are agricultural soil management (synthetic nitrogen fertilization), mobile and stationary combustion of fossil fuel, adipic acid production, and nitric acid production. Nitrous oxide is also produced from a wide range of biological sources in soil and water.[61] Within a 100-year span, N_2O is 298 times more effective in trapping heat than is CO_2.[62]

3.2.3 Regional Air Quality

Table 3.2-1 (Federal and State Attainment Status) shows the area designation status of the SSAB for each criteria pollutant for both the NAAQS and CAAQS. Based on regional monitoring data, the SSAB is currently designated as a state non-attainment area for O_3 and a PM_{10} and attainment area for $PM_{2.5}$,

58 AB 32 is discussed in detail in Section 3.2.6.
59 GMI, 2019. What is a Global Warming Potential? And Which One Do I Use? GHG Management Institute. https://ghginstitute.org/2010/06/28/what-is-a-global-warming-potential/. Accessed
60 USEPA, 2019. Overview of Greenhouse Gases. U.S. Environmental Protection Agency. https://www.epa.gov/ghgemissions/overview-greenhouse-gases Accessed.
61 USEPA, 2019. Overview of Greenhouse Gases. U.S. Environmental Protection Agency. https://www.epa.gov/ghgemissions/overview-greenhouse-gases Accessed
62 IPCC, 2007. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. 2007

and a federal non-attainment area for O_3 and PM_{10}.[63,64] The Federal ozone classification is "severe 15."[65] A severe-15 non-attainment area has an 8-hour ozone design value of 0.105 up to but not including 0.111 ppm.[66]~~.~~

Table 3.2-1
FEDERAL AND STATE ATTAINMENT STATUS

Pollutants	Federal Classification[67]	State Classification[68]
Ozone (O_3)	Non-Attainment (Severe-15)	Non-Attainment
Particulate Matter (PM_{10})	Non-Attainment (Serious)	Non-Attainment
Fine Particulate Matter ($PM_{2.5}$)	Non-Attainment (Serious)	Attainment
Carbon Monoxide (CO)	Unclassified/Attainment	Attainment
Nitrogen Dioxide (NO_2)	Unclassified/Attainment	Attainment
Sulfur Dioxide (SO_2)	Unclassified/Attainment	Attainment
Sulfates	N/A	Attainment
Lead (Pb)	Unclassified/Attainment	Attainment
Hydrogen Sulfide (H_2S)	N/A	Unclassified
Visibility Reducing Particles	N/A	

3.2.4 Local Air Quality

The SCAQMD has divided the Coachella Valley portion of the SSAB into source receptor areas (SRAs), based on similar meteorological and topographical features. The proposed project site is in SCAQMD's ~~Desert Hot Springs City~~Coachella Valley source receptor area (SRA 30)~~, which is served by t~~The nearest air monitoring station to the project site, Palm Springs - Fire Station, located at 590 East Racquet Club Avenue, Palm Springs, ~~which~~ is approximately 4.5 miles south of the project site.[69] All the criteria pollutants discussed in this report are monitored at this station. The ambient air quality data in the proposed project vicinity as recorded at the Palm Springs - Fire Station from 201~~8~~ to 202~~0~~ and the applicable federal and state standards are shown in **Table 3.2-2**.

63 U.S. Environmental Protection Agency (USEPA, 2022). Nonattainment Areas for Criteria Pollutants (Green Book). Accessed online at https://www.epa.gov/green-book, current data as of May 31, 2022. Accessed on June 27, 2022.
64 California Air Resources Board (CARB, 2022). Maps of State and Federal Area Designations. Accessed online at www.arb.ca.gov/desig/adm/adm.htm. Accessed on June 27, 2022.
65 U.S. Environmental Protection Agency. "8-Hour Ozone (2015) Designated Area/State Information." Green Book. https://www3.epa.gov/airquality/greenbook/jbtc.html. Updated June 30, 2022.
66 U.S. Environmental Protection Agency. "Ozone Designation and Classification Information." Green Book. https://www.epa.gov/green-book/ozone-designation-and-classification-information. Updated October 8, 2021.
67 U.S. Environmental Protection Agency (USEPA, 2022). Nonattainment Areas for Criteria Pollutants (Green Book). Accessed online at https://www.epa.gov/green-book, current data as of May 31, 2022. Accessed on July 6, 2022.
68 California Air Resources Board (CARB, 2022). Maps of State and Federal Area Designations. Accessed online at www.arb.ca.gov/desig/adm/adm.htm. Accessed on July 6, 2022.
69 Site Survey Site Report for ~~Los Angeles~~Palm Springs (Fire Station~~Main St.~~). South Coast Air Quality Management District. Updated May 19, 2022. http://www.aqmd.gov/docs/default-source/clean-air-plans/air-quality-monitoring-network-plan/aaqmnp-palmsprings.pdf. Accessed on October~~July~~ 2~~8~~6, 2022.

Table 3.2-2
AMBIENT AIR QUALITY MONITORING DATA

Air Pollutant	Standard/Exceedance	2019	2020	2021
Ozone (O_3)	Max. 1-hour Concentration (ppm) Max. 8-hour Concentration (ppm) # Days > Federal 8-hour Std. of 0.070 ppm # Days > California 1-hour Std. of 0.070 ppm # Days > California 8-hour Std. of 0.070 ppm	0.100 0.0850.085 34 5 39	0.119 0.0940.094 49 9 53	0.110 0.0930.093 35 10 38
Nitrogen Dioxide (NO_2)	Max. 1-hour Concentration (ppm) Annual Average (ppm) # Days > California 1-hour Std. of 0.070 ppm	0.03545 0.007 0	0.03442 0.006 0	0.03340 0.006 0
Respirable Particulate Matter (PM_{10})	Max. 24-hour Concentration (µg/m³) Est. # Days > Fed. 24-hour Std. of 150 µg/m³ State Annual Average (µg/m³)	75.6 0 19.9	129.8 ND ND	35.2 0 18
Fine Particulate Matter ($PM_{2.5}$)	Max. 24-hour Concentration (µg/m³) #Days > Fed. 24-hour Std. of 35 µg/m³ State Annual Average (µg/m³)	15.5 0 6	23.9 0 6.4	13.5 0 6.21

Source: ARB, 2022a. iAdam. Accessed online at https://www.arb.ca.gov/adam, on October 18, 2022.

~~3.2.5~~

~~3.2.6~~3.2.5 Existing Health Risk

~~**CalEnviroScreen 4.0**~~

CalEnviroScreen 4.0 is the latest iteration of the California Communities Environmental Health Screening Tool. The CalEnviroScreen model is based on the CalEPA working definition in that: [70]

- The model is made up of multiple components as contributors to cumulative impacts. The model includes two components representing Pollution Burden – Exposures and Environmental Effects – and two components representing Population Characteristics – Sensitive Populations (e.g., in terms of health status and age) and Socioeconomic Factors.

Formatted: Indent: Left: 0.25", No bullets or numbering

The overall CalEnviroScreen score is calculated by multiplying the Pollution Burden and Population Characteristics scores. Since each group has a maximum score of 10, the maximum CalEnviroScreen Score is 100.

The proposed project site address was input to CalEnviroScreen 4.0. The score for the proposed project's census tract is higher than 30% to 40% of census tracts in the state.

~~3.2.7~~3.2.6 Sensitive Receptors

Some people, such as individuals with respiratory illnesses or impaired lung function because of other illnesses, persons over 65 years of age, and children under 14, are particularly sensitive to

[70] OEHHA, 2022. CalEnviroScreen 4.0. Office of Environmental Health Hazard Assessment. URL: https://experience.arcgis.com/experience/11d2f52282a54ceebcac7428e6184203/page/CalEnviroScreen-4.0/. Accessed on July 6, 2022.

certain pollutants. Facilities and structures where these sensitive people live or spend considerable amounts of time are known as sensitive receptors. Land uses identified to be sensitive receptors by the SCAQMD *CEQA Air Quality Handbook* include residences, schools, playgrounds, childcare centers, athletic facilities, long-term health care facilities, rehabilitation centers, convalescent centers, and retirement homes. Sensitive receptors may be at risk of being affected by air emissions released from the construction and operation of the proposed project.

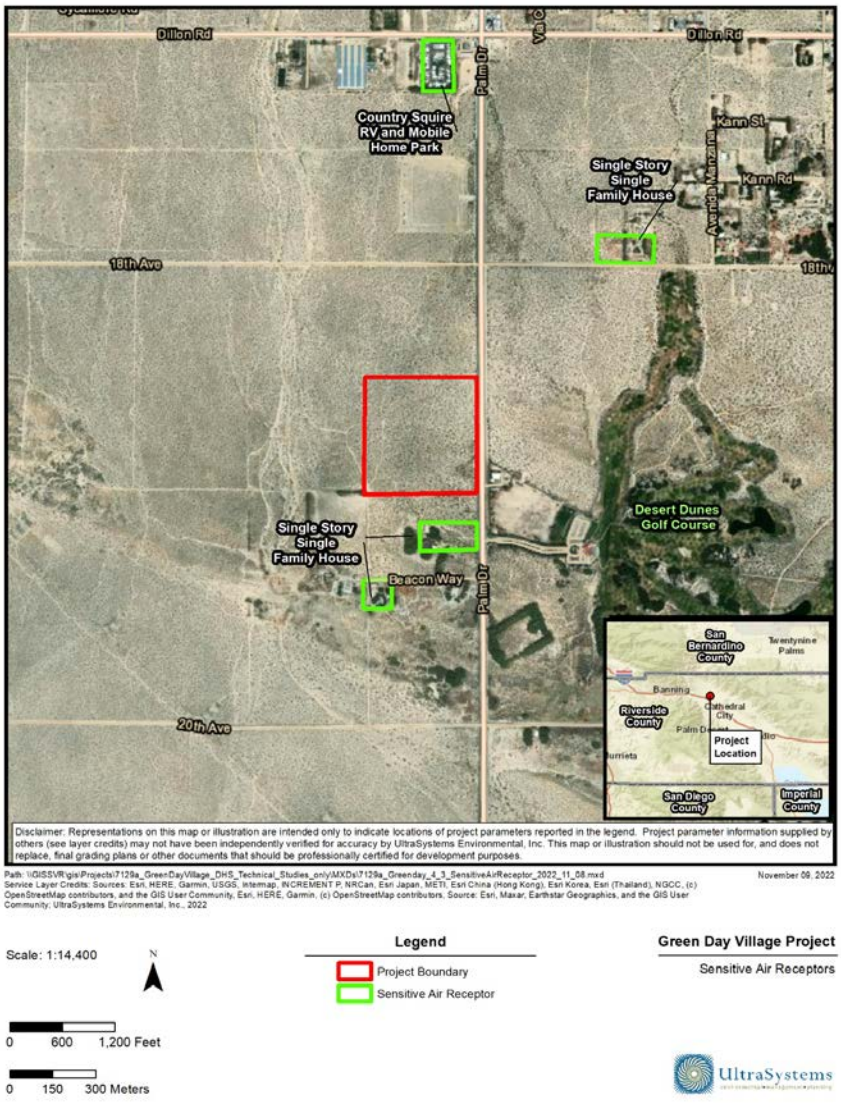
Figure 3.2-1 shows sensitive receptors in the general area of the proposed project. The closest sensitive receptors are residents of a single-story house that is about 334 feet south of the project site.

~~3.2.8~~3.2.7 Baseline Emissions

According to a phase I environmental site assessment for the project, the project site is vacant and undeveloped and appears never to have been developed.[71] Under CEQA, the baseline conditions for an environmental impact statement (EIR) are as of the date of the notice of preparation (NOP). For an initial study/mitigated negative declaration (IS/MND) the baseline date is when someone begins work on the CEQA analysis. Under both of these definitions, the site is inactive and there are no baseline emissions to deduct from estimated emissions of the proposed project.

71 Phase I Environmental Site Assessment, Green Day Village, West of Palm Drive and 1,320 Feet South of 18th Avenue, Desert Hot Springs, California, 92240. Prepared by All Phase Environmental, Inc., Huntington Beach, CA for LA World Construction, Los Angeles, CA. November 21, 2021.

Figure 3.2-1
SENSITIVE RECEPTORS NEAR PROJECT SITE



4.0 PROJECT IMPACTS

4.1 Methodology

Commented [MR1]: Andrew: Fix heading format

Estimated criteria pollutant and GHG emissions from the project's onsite and offsite project activities were calculated using the California Emissions Estimator Model (CalEEMod), Version 2020.4.0. CalEEMod[72] is a planning tool for estimating emissions related to land use projects. Model-predicted project emissions are compared with applicable thresholds to assess regional air quality impacts.

4.1.1 Criteria Pollutants

4.1.1.1 Construction

Project construction activities will generate short-term air quality impacts. Construction emissions can be distinguished as either onsite or offsite. Onsite air pollutant emissions would principally consist of exhaust emissions from off-road heavy-duty construction equipment, as well as fugitive particulate matter from earth working and material handling operations. Offsite emissions would result from workers commuting to and from the job site, as well as from trucks hauling demolition and construction debris for disposal.

~~Estimated criteria pollutant emissions from the project's onsite and offsite project activities were calculated using the California Emissions Estimator Model (CalEEMod), Version 2020.4.0. CalEEMod[73] is a planning tool for estimating emissions related to land use projects. Model-predicted project emissions are compared with applicable thresholds to assess regional air quality impacts.~~ As some construction plans have not been finalized, CalEEMod defaults were generally used for construction offroad equipment and onroad construction trips and vehicle miles traveled. However, the user may override the default values where project-specific data are available. Various construction and demolition quantity assumptions were presented in **Section 2.2**. ~~The only m~~Another modification to CalEEMod defaults was use of a ~~the~~ construction schedule provided by client. It was also assumed that the construction contractor would comply with all pertinent provisions of SCAQMD Rule 403 and Rule 403.1.[74] Finally, General Plan implementation measures B-5 and B-6 (see **Section 3.1.4.1)** were incorporated into the model. Measure B-5 requires "super compliant" architectural coatings having less than 10 grams of VOC per liter, while measure B-6 requires use of Tier IV construction equipment to reduce emissions of NO_x and diesel particulate matter. CEQA does not considered these as mitigation measures, since they are required by the Lead Agency for all construction projects.

Formatted: Font: Bold

Formatted: Font: Bold

~~CalEEMod uses many default assumptions based upon surveys of various types of construction projects. However, the user may override the default values where project-specific data are available. Various construction and demolition quantity assumptions were presented in **Section 2.2**.~~ **Table 4.1-1** lists the construction equipment types and characteristics used in the modelling.

72 California Emissions Estimator Model® User's Guide. Version 2020.4.0. Prepared by BREEZE Software for the California Air Pollution Control Officers Association. November. URL: http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/01_user-39-s-guide2020-4-0.pdf?sfvrsn=6. Accessed on July 6, 2022.

~~73 California Emissions Estimator Model® User's Guide. Version 2020.4.0. Prepared by BREEZE Software for the California Air Pollution Control Officers Association. November. URL: http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/01_user-39-s-guide2020-4-0.pdf?sfvrsn=6. Accessed on July 6, 2022.~~

74 Rule 403 applies to fugitive dust emissions. All projects in the SCAQMD are required to implement dust control measures such as regularly wetting disturbed soils.

Table 4.2-1
CONSTRUCTION EQUIPMENT ASSUMPTIONS

Phase	Construction Phase	Equipment Type	No. of Pieces	HP	Load Factor
Phase 0	Site Preparation	Rubber-Tired Dozers	3	247	0.40
		Tractors/Loaders/Backhoes	4	97	0.37
	Rough Grading	Excavators	2	158	0.38
		Graders	1	187	0.41
		Rubber Tired Dozers	1	247	0.40
		Scrapers	2	367	0.48
		Tractors/Loaders/Backhoes	2	97	0.37
	Trenching	Tractors/Loaders/Backhoes	3	97	0.37
		Trenchers	3	46	0.45
Phase 1	Fine Grading	Graders	1	187	0.41
		Rubber Tired Dozers	1	247	0.40
		Tractors/Loaders/Backhoes	2	97	0.37
	Building Construction	Cranes	1	231	0.29
		Forklifts	3	89	0.20
		Generator Sets	1	84	0.74
		Tractors/Loaders/Backhoes	3	97	0.37
		Welders	1	46	0.45
	Paving	Pavers	2	130	0.42
		Paving Equipment	2	132	0.36
		Rollers	2	80	0.38
	Architectural Coating	Air Compressors	1	78	0.48
Phase 2	Fine Grading	Graders	1	187	0.41
		Rubber Tired Dozers	1	247	0.40
		Tractors/Loaders/Backhoes	2	97	0.37
	Building Construction	Cranes	1	231	0.29
		Forklifts	1	89	0.20
		Generator Sets	1	84	0.74
		Tractors/Loaders/Backhoes	1	97	0.37
		Welders	3	46	0.45
	Paving	Cement and Mortar Mixers	1	9	0.56
		Pavers	1	130	0.42
		Paving Equipment	1	132	0.36
		Rollers	1	80	0.38
		Tractors/Loaders/Backhoes	1	97	0.37
	Architectural Coating	Air Compressors	1	78	0.48

4.1.1.2 Operations

Operational emissions were calculated with CalEEMod. The model's default values were used for most parameters. For the onroad mobile source emissions analysis, the default trip generation rates

were adjusted so that trip rates equaled those in the traffic access analysis prepared for this project.[75] CalEEMod defaults include weekday, Saturday and Sunday trip generation rates for each land use. UltraSystems first defined average daily trip generation rate (Trip Rate) as:

Trip Rate = [(5 * Weekday) + Saturday + Sunday]/7

The traffic access analysis presented a single value of average daily traffic (ADT) for each land use. Assuming that the ADTs presented were calculated by the same formula as shown here, UltraSystems multiplied each day-specific trip generation rate by the following adjustment factor:

Adjustment = (Traffic Access Analysis ADT)/(CalEEMod Trip Rate)

4.1.2 Toxic Air Contaminants (TAC)

The proposed mixed-use project (residential and commercial) will not be a significant source of air toxics emissions. Furthermore, none of the important TAC sources mentioned in the ARB's Air Quality and Land Use Handbook: a Community Health Perspective[76] is within the recommended buffer distances. The center line of the nearest of these source types, Interstate 10, is about 1.5 miles to the southwest, far beyond the buffer distance of 500 feet.

As discussed in **Section 5.1.2**, a qualitative approach was used to evaluate impacts from toxic air contaminants.

4.1.3 Greenhouse Gases

GHG emissions come from both the construction and operation of the project. Construction of the project would result in temporary emissions of GHGs from fuel combustion by onsite construction equipment and by on-road vehicle traffic (i.e., worker commute and delivery truck trips). Operational direct GHG emissions will come from on-road mobile sources and onsite area sources, such as landscaping. Indirect GHG emissions will come from energy use, water supply, wastewater, and solid waste.[77] A detailed summary of the assumptions and model data used to estimate the project's GHG emissions are provided in **Attachment 1**.

One-time GHG emissions are those construction emissions that do not recur over the life of the project. The major construction phases included in this analysis are demolition, grading, building construction, paving, and architectural coating. Emissions are from offroad construction equipment and onroad vehicles like worker and vendor commuting and trucks for soil and material hauling.

Other GHG emissions would occur annually after buildout. GHGs are emitted from buildings because of activities for which electricity and natural gas are typically used as energy sources. Combustion of carbon-based fuel emits CO_2 and other GHGs directly into the atmosphere; these emissions are considered direct emissions. The project's primary direct source of annual GHG emissions will be on-road mobile sources. GHGs are also emitted during the generation of electricity from fossil fuels; when produced offsite, these emissions are indirectly associated with the project. Indirect GHG

75 Green Day Village Access Analysis. Memorandum from Mike Arizabal, IBI Group, Irvine CA, to Michael Milroy, UltraSystems Environmental Inc, Irvine, CA. October 6, 2022. Rates determined by this analysis are shown in **Attachment 3.**

76 Air Quality and Land Use Handbook: a Community Health Perspective. California Air Resources Board, Sacramento, CA. April 2005, p. 4. URL: https://www.arb.ca.gov/ch/handbook.pdf. Accessed July 12, 2022.

77 Indirect emission sources are those for which the project is responsible, but which are not located at the project site.

emissions also result from the production of electricity used to convey, treat, and distribute water and wastewater. A final indirect GHG emission source is decomposition of organic waste that is generated by the project and transported to landfills.

Temporary construction and long-term operational GHG emissions from the project's onsite and offsite project activities were calculated using CalEEMod Version 2020.4.0.[78] Operational emissions consider area emissions, such as space heating, from energy use associated with land uses, and from the vehicle trips associated with the land uses. To assess the overall lifetime project GHG emissions, the SCAQMD developed an Interim Guidance[79] that recommends that construction emissions should be amortized over the life of the project, defined in the guidance as 30 years. Annualized GHG emissions are then added to the operational emissions and the sum is compared to the applicable interim GHG significance threshold.

4.2 Thresholds of Significance for Criteria Pollutants

4.2.1 CEQA Guidelines Appendix G

In accordance with *State CEQA Guidelines* Appendix G, implementation of the project would result in a potentially significant impact to air quality if it were to:

- Conflict with or obstruct implementation of the applicable air quality plan;
- Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is nonattainment under an applicable federal or state ambient air quality standard;
- Expose sensitive receptors to substantial pollutant concentrations;
- Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.

Where available, the significance criteria established by the applicable air quality management district (AQMD) or air pollution control district (APCD) may be relied upon to make the significance determinations. As will be discussed in the next section, the SCAQMD has developed a *CEQA Air Quality Handbook* to provide a protocol for air quality analyses that are prepared under the requirements of CEQA.

4.2.2 SCAQMD Quantitative Thresholds

4.2.2.1 Regional

The SCAQMD has developed criteria for determining whether emissions from a project are regionally significant. They are useful for estimating whether a project is likely to result in a violation of the

78 CAPCOA (California Air Pollution Control Officers Association), 2022. California Emissions Estimator Model (CalEEMod) Version 2020.4.0. Prepared for the California Air Pollution Control Officers Association, in collaboration with South Coast Air Quality Management District and the California Air Districts. July 2022

79 SCAQMD, 2008. Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold. South Coast Air Quality Management District. October 2008. http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgattachmente.pdf. Accessed on July 7, 2022.

NAAQS and/or whether the project is in conformity with plans to achieve attainment. The SCAQMD no longer has "indirect source" rules, e.g., rules that place restrictions on housing or commercial development, or require reductions in trip generation and/or vehicle miles traveled to developed commercial or industrial sites.[80] Instead, the District has published guidance on conducting air quality analyses under CEQA[81] SCAQMD's significance thresholds are summarized in **Table 4.2-1** for criteria pollutant emissions during construction activities and project operation. A project is considered to have a regional air quality impact if emissions from its construction and/or operational activities exceed the corresponding SCAQMD significance thresholds.

Table 4.2-1
SCAQMD EMISSIONS THRESHOLDS FOR SIGNIFICANT REGIONAL IMPACTS

Pollutant	Mass Daily Thresholds (Pounds/Day)	
	Construction	Operation
Nitrogen Oxides (NO_x)	100	~~55~~100
Volatile Organic Compounds (VOC)	75	~~55~~75
Respirable Particulate Matter (PM_{10})	150	150
Fine Particulate Matter ($PM_{2.5}$)	55	55
Sulfur Oxides (SO_x)	150	150
Carbon Monoxide (CO)	550	550
Lead	3	3

Source: "SCAQMD Air Quality Significance Thresholds." 2019. Diamond Bar, CA: South Coast Air Quality Management District, http://www.aqmd.gov/docs/default-source/ceqa/handbook/scaqmd-air-quality-significance-thresholds.pdf. April 2019. Accessed July 7, 2022.

4.2.2.2 Localized

Construction

As part of its environmental justice program to address localized air quality impacts of development projects, the SCAQMD developed localized significance thresholds (LSTs) in 2003.[82] LSTs represent the maximum NO_x, CO, PM_{10}, and $PM_{2.5}$ emissions from a project that are not expected to cause or contribute to an exceedance of the most stringent applicable federal or state ambient air quality standard. NO_x and CO LSTs are based on the ambient concentrations of that pollutant for each SRA[83] and distance to the nearest offsite receptor. For PM_{10}, LSTs were derived based on requirements in SCAQMD Rule 403. Note that the LST analysis does not apply to ROG emissions, since there is no ambient air quality standard for ROG.

For the purposes of a CEQA analysis, the SCAQMD considers a sensitive receptor to be a receptor such as a residence, hospital, or convalescent facility where it is possible that an individual could remain

80 Two indirect source rules (1501 - Work Trip Reduction Plans and 1501.1 - Alternatives to Work Trip Reduction Plans) were repealed in 1995.
81 SCAQMD (South Coast Air Quality Management District), 1993. CEQA Air Quality Handbook. Diamond Bar, CA. November.
82 Chico, T. and J. Koizumi. Final Localized Significance Threshold Methodology: South Coast Air Quality Management District, Diamond Bar, CA. July 2008. URL: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf?sfvrsn=2.
83 The SCAQMD has defined 38 source receptor areas (SRA) for various regulatory purposes. Each SRA is assumed to have a unique set of geographic and meteorological characteristics.

for 24 hours. Commercial and industrial facilities are not included in the definition of sensitive receptor, because employees typically are present for shorter periods of time, such as eight hours. Therefore, applying a 24-hour standard for PM_{10} is appropriate not only because the averaging period for the state standard is 24 hours, but because the sensitive receptor would be present at the of location for the full 24 hours.

The SCAQMD has developed mass rate look-up tables that can be used to determine whether a project may generate significant localized air quality impacts to offsite receptors (including sensitive receptors). ~~Note that the use of LSTs is voluntary, to be implemented at the discretion of the lead agency pursuant to CEQA.~~

Carbon Monoxide Hotspots

Increased local vehicle traffic may contribute to offsite air quality impacts. The traffic increases in nearby intersections may contribute to traffic congestion, which may create "pockets" of CO called hotspots. These pockets have the potential to exceed the state 1-hour standard of 20 parts per million (ppm) and/or the 8-hour standard of 9.0 ppm, thus affecting sensitive receptors that are close to these roadways or intersections. CO hotspots historically were found at busy intersections but could also occur along congested major arterials and freeways. They occurred mostly in the early morning hours when winds are stagnant and ambient CO concentrations are elevated.

It has long been recognized that CO exceedances are caused by vehicular emissions,[84] primarily when vehicles are idling at intersections.[85,86] Accordingly, vehicle emissions standards have become increasingly more stringent. Before the first vehicle emission regulations, cars in the 1950s were typically emitting about 87 grams of CO per mile.[87] Currently, the CO standard in California is a maximum of 3.4 grams/mile for passenger cars (with provisions for certain cars to emit even less).[88] With the turnover of older vehicles, introduction of cleaner fuels and implementation of control technology on industrial facilities, CO concentrations in the Air Basin have steadily declined.

An analysis prepared for CO attainment in the SCAB by the SCAQMD can be used to assist in evaluating the potential for CO exceedances due to development projects. CO attainment was thoroughly analyzed as part of the SCAQMD's 2003 Air Quality Management Plan (2003 AQMP) and the 1992 Federal Attainment Plan for Carbon Monoxide (1992 CO Plan).[89] In the 1992 CO Plan, a CO hot spot analysis was conducted for the four worst-case scenario intersections in Los Angeles County at the peak morning and afternoon time periods. The intersections evaluated included Long Beach Boulevard and Imperial Highway (Lynwood); Wilshire Boulevard and Veteran Avenue (Westwood); Sunset Boulevard and Highland Avenue (Hollywood); and La Cienega Boulevard and Century Boulevard (Inglewood). These analyses did not predict a violation of CO standards. The peak modeled CO concentrations due to vehicle emissions occurred at the intersection of Wilshire Boulevard and Veteran Avenue, which had a daily traffic volume of approximately 100,000 vehicles. The 2003 AQMP estimated that the 1-hour concentration for this intersection was 4.6 ppm, which indicates that the

84 USEPA. 2000. Air Quality Criteria for Carbon Monoxide. EPA 600/P-099/001F.
85 SCAQMD. 1993. CEQA Air Quality Handbook. Section 4.5.
86 SCAQMD. 2003. Air Quality Management Plan.
87 USEPA, Timeline of Major Accomplishments in Transportation, Air Pollution, and Climate Change, www.epa.gov/air-pollution-transportation/timeline-major-accomplishments-transportation-air-pollution-and-climate, accessed July 7, 2022.
88 California Air Resources Board. California 2015 and Subsequent Model Criteria Pollutant Exhaust Emission Standards and Test Procedures and 2017 and Subsequent Model Greenhouse Gas Exhaust Emission Standards and Test Procedures for Passenger Cars, Light-Duty Trucks, and Medium-Duty Vehicles. Adopted March 22, 2012.
89 SCAQMD, 1992. Federal Attainment Plan for Carbon Monoxide.

most stringent 1-hour CO standard (20.0 ppm) would likely not be exceeded until the daily traffic at the intersection exceeded more than 400,000 vehicles per day.[90] The AQMP CO hotspots modeling also took into account worst-case meteorological conditions and background CO concentrations. The Los Angeles County Metropolitan Transportation Authority (Metro) evaluated the level of service (LOS) in the vicinity of the Wilshire Boulevard and Veteran Avenue intersection and found it to be Level E for peak morning traffic and Level F for peak afternoon traffic.[91,92] If a project intersection does not exceed 400,000 vehicles per day, then the project does not need to prepare a detailed CO hotspots analysis using California LINE Source Dispersion Model, version 4 (CALINE4), which is a model used to assess air quality impacts near transportation facilities (i.e., roadways, intersections, street canyons, and parking facilities).

Odors

The SCAQMD air quality significance thresholds discussed in **Section 4.2.2.1** define a significant impact for a situation in which a project creates an odor nuisance pursuant to SCAQMD Rule 402 [Nuisance]. Rule 402 broadly defines nuisance odors; in reality, it is imposed only in cases in which (1) complaints are received by the District, and (2) an inspector personally observes the offensive odor. ~~Because the proposed facility is in a mainly residential area, and unusually odorous materials will not be handled, Rule 402 complaints are unlikely~~Project odor issues are discussed in detail in **Section 5.1.2.3**.

4.3 Thresholds of Significance for Greenhouse Gas Emissions

4.3.1 CEQA Impact Review Criteria

In accordance with *State CEQA Guidelines* Appendix G, implementation of the project would result in a potentially significant impact to greenhouse gases if it were to:

- Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment;
- Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

4.3.2 GHG Emissions Thresholds

Neither ~~the,~~ the SCAQMD nor the State CEQA Guidelines Amendments has adopted specific quantitative thresholds of significance for addressing a project's GHG emissions. The City of Desert Hot Springs adopted a Climate Action Plan (CAP) for the development and implementation of policies and programs to reduce GHG emissions within the City.[93] Nonetheless, § 15064.4 of the CEQA Guidelines serves to assist lead agencies in determining the significance of the impacts of GHGs. As required in § 15064.4, this analysis includes an impact determination based on (1) an estimate of the

90 Based on the ratio of the CO standard (20.0 ppm) and the modeled value (4.6 ppm).
91 The Metropolitan Transportation Authority measured traffic volumes and calculated the LOS for the intersection of Wilshire Blvd./ Sepulveda Ave. which is a block west along Wilshire Blvd., still east of Interstate 405.
92 Metropolitan Transportation Authority. 2004. Congestion Management Program for Los Angeles County. Exhibit 2-6 and Appendix A.
93 Environmental Impact Report: Desert Hot Springs General Plan Update and Zoning Amendment .City of Desert Hot Springs, 2020. ~~Environmental Impact Report: Desert Hot Springs General Plan Update and Zoning Amendment.~~ Accessed online at https://cdn2.hubspot.net/hubfs/4435988/Desert%20Hot%20Springs%20GPU%20&%20Zoning%20Amendment%20DEIR.pdf, on July 7, 2022.

amount of GHG emissions resulting from the project; (2) a qualitative analysis or performance based standards; (3) a quantification of the extent to which the project increases GHG emissions as compared to the existing environmental setting; and (4) the extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

To provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents, the SCAQMD Board adopted an Interim CEQA GHG Significance Threshold for Stationary Sources, Rules, and Plans,[94] The Interim Guidance uses a tiered approach to determining significance. Although this Interim Guidance was developed primarily to apply to stationary source/industrial projects where the SCAQMD is the lead agency under CEQA, in absence of more directly applicable policy, the SCAQMD's Interim Guidance is often used as general guidance by local agencies to address the long-term adverse impacts associated with global climate change.

The ~~draft~~final Environmental Impact Report for the C~~c~~ity of Desert Hot Springs, ~~up~~dated ~~on February 14~~May 1,, 2020, ~~states that the SCAQMD identified an interim, tiered approach for evaluating GHG emissions intent on capturing 90 percent of development projects where the SCAQMD is not the lead agency. The following~~summarizes ~~describes~~ the basic structure of the SCAQMD's tiered, interim GHG significance thresholds:[95]

- **Tier 1** consists of evaluating whether or not the project qualifies for applicable CEQA exemptions.
- **Tier 2** consists of determining whether or not a project is consistent with a greenhouse gas reduction plan. If a project is consistent with a greenhouse gas reduction plan, it would not have a significant impact.
- **Tier 3** consists of using screening values at the discretion of the Lead Agency; however, the Lead Agency should be consistent for all projects within its jurisdiction. The following thresholds were proposed for consideration: ~~a.~~ 3,000 $MTCO_2e$/yr for all land use types; or ~~b.~~ 3,500 $MTCO_2e$/yr for residential; 1,400 $MTCO_2e$/yr for commercial; 3,000 $MTCO_2e$/yr for mixed use projects.
- **Tier 4** has three options for projects that exceed the screening values identified in Tier 3:
    - Option 1: Reduce emissions from business-as-usual by a certain percentage (currently undefined).
    - Option 2: Early implementation of applicable AB 32 Scoping Measures.
    - Option 3: For plan-level analyses, analyze a project's emissions against an efficiency value of 6.6 $MTCO_2e$/year/SP by 2020 and 4.1 $MTCO_2e$/year/SP by 2035. For project-

94 SCAQMD, 2008. Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold. South Coast Air Quality Management District. October 2008. http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgattachmente.pdf.

95 Final Environmental Impact Report: Desert Hot Springs General Plan Update and Zoning Amendment. City of Desert Hot Springs, May 1, 2020. Accessed online at https://drive.google.com/file/d/1LdhmTkCxh0Lw3Weyg5UcIYrAuAmxWyvQ/view, on December 14, 2022.

level analyses, analyze a project's emissions against an efficiency value of 4.8 and 3.0 $MTCO_2e$/year/SP for the 2020 and 2035 calendar years, respectively.

For the GHG significance analysis, an efficiency value for the project buildout year (2025) was determined by interpolation to be 4.2 $MTCO_2e$/year/SP.

~~The GPU (General Plan Update) plans for growth through 2040, five years before the SCAQMD's latest Tier 4 interim efficiency target year (2035).~~

~~To provide guidance to local lead agencies on determining significance for GHG emissions in their CEQA documents, the SCAQMD Board adopted an Interim CEQA GHG Significance Threshold for Stationary Sources, Rules, and Plans,[96] The Interim Guidance uses a tiered approach to determining significance. Although this Interim Guidance was developed primarily to apply to stationary source/industrial projects where the SCAQMD is the lead agency under CEQA, in absence of more directly applicable policy, the SCAQMD's Interim Guidance is often used as general guidance by local agencies to address the long-term adverse impacts associated with global climate change.~~

~~The threshold selected for this analysis is **Tier 3 – 90 Percent Capture Rate Emission Thresholds**. A 90% emission capture rate means that 90% of total emissions from all new or modified projects would be subject to CEQA analysis. For Tier 3, the SCAQMD presents lead agencies with two options: Option #1 – separate numerical thresholds for residential projects (3,500 metric tons [MT] CO_2e per year), commercial projects (1,400 $MTCO_2e$ per year), and mixed-use projects (3,000 $MTCO_2e$ per year); and Option #2 – a single numerical threshold for all non-industrial projects of 3,000 MT CO_2e per year.[97] The SCAQMD staff's proposal was to recommend the use of option #2, but to allow lead agencies to choose Option #1 if they prefer that approach.~~

~~The present analysis uses **3,000 MT of CO_2e per year** (option #2) as the significance threshold under the first impact criterion above.~~

~~96 SCAQMD, 2008. Draft Guidance Document – Interim CEQA Greenhouse Gas (GHG) Significance Threshold. South Coast Air Quality Management District. October 2008. http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgattachmente.pdf.~~

~~97 SCAQMD, 2010. Minutes for the GHG CEQA Significance Threshold Stakeholder Working Group #15. September 28, 2010. South Coast Air Quality Management Board. September 28, 2010. http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/year-2008-2009/ghg-meeting-15/ghg-meeting-15-minutes.pdf)~~

5.0 CEQA ANALYSIS

5.1 Air Quality Impacts (Criteria Pollutants and Toxic Air Contaminants)

5.1.1 Construction Impacts

5.1.1.1 Regional Impacts

Table 5.1-1 summarizes the results of the CalEEMod analysis. CalEEMod inputs and results are provided in **Attachment 1**.[98]

Table 5.1-1
MAXIMUM DAILY CONSTRUCTION EMISSIONS

Construction Activity	Maximum Emissions (lbs/day)				
	ROG	NO_x	CO	PM_{10}	$PM_{2.5}$
~~Maximum Emissions, Phase 0~~2023	~~3.4~~2.7	~~34.6~~13.8	~~28.8~~34.8	9.3~~1~~	4.9~~7~~
~~Maximum Emissions, Phase 1~~2024	~~48.6~~9.7	~~27.4~~11.7	~~52.1~~56.3	~~7.2~~6.7	2.0~~3.5~~
~~Maximum Emissions, Phase 2~~2025	~~71.8~~9.5	~~12.4~~11.2	~~13.4~~55.0	~~3.3~~6.6	~~1.6~~2.0
SCAQMD Significance Thresholds	***75***	***100***	***550***	***150***	***55***
Significant? (Yes or No)	**No**	**No**	**No**	**No**	**No**

Source: Calculated by OB-1 Air Analyses with CalEEMod (Version 2020.4.0).

For each criteria pollutant, construction emissions would be below the pollutant's SCAQMD significance threshold.

5.1.1.2 Impacts on Sensitive Receptors

Sensitive receptors are persons who are more susceptible to air pollution than the general population, such as children, athletes, the elderly, and the chronically ill. Examples of land uses where substantial numbers of sensitive receptors are often found are schools, daycare centers, parks, recreational areas, medical facilities, nursing homes, and convalescent care facilities. Residential areas are also considered to be sensitive to air pollution because residents (including children and the elderly) tend to be at home for extended periods of time, resulting in sustained exposure to pollutants.

Construction of the proposed project would generate short-term and intermittent emissions. Following SCAQMD guidance,[99] only onsite construction emissions were considered in the localized significance analysis. Localized significance thresholds for projects in Source Receptor Area 30 were

98 Although these results are from the Mitigated Construction table in the CalEEMod output, they are considered under CEQA to be unmitigated, because they comply with SCAQMD and City of Desert Hot Springs requirements for all construction projects.

99 Chico, T. and J. Koizumi. Final Localized Significance Threshold Methodology: South Coast Air Quality Management District, Diamond Bar, CA. July 2008. URL: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/final-lst-methodology-document.pdf?sfvrsn=2.

obtained from tables in Appendix C of the SCAQMD's *Final Localized Significance Threshold Methodology.*[100] The sensitive receptor nearest the construction activities is 334 feet (102 meters) south of the southern project boundary. For site preparation and grading, the disturbed area was calculated per guidance from the SCAQMD.[101] For other construction phases, the area was assumed to be five acres. **Table 5.1-2** shows the results of the localized significance analysis for each construction phase of the proposed project. Emissions would be less than significant.

Table 5.1-2
RESULTS OF LOCALIZED SIGNIFICANCE ANALYSIS FOR PHASE 0

~~Nearest Sensitive Receptor~~Construction Phase	Maximum Onsite Emissions (pounds/day)			
	NO_x	CO	PM_{10}	$PM_{2.5}$
~~Maximum daily emissions, Phase 0~~Site Preparation	~~19.3~~7.5	~~36.7~~20.4	~~0.2~~9.2	~~0.2~~4.9
SCAQMD LST for 3.5 acres @ 102 meters in SRA 30	***363***	***4,456***	***56.4***	***15.8***
~~Maximum daily emissions, Phase 1~~Grading	~~11.0~~6.0	~~17.7~~32.8	~~0.2~~4.4	~~0.2~~1.9
SCAQMD LST for 3 acres @ 102 meters in SRA 30	***341.5***	***4,132***	***52.6***	***14.7***
~~Maximum daily emissions, Phase 2~~Trenching	~~9.1~~13.8	13.~~6~~5	0.~~2~~9	0.~~2~~8
SCAQMD LST for 1.5 acres @ 102 meters in SRA 30	269.3	3,059	39.5	84.5
Other	6.3	17.3	0.3	0.3
SCAQMD LST for 5 acres @ ~~334~~ 102 meters in SRA 30	***~~69~~442 7.4***	***~~19,530~~5 ,428***	***~~173~~67.9***	***~~66~~19.4***
Significant (Yes or No)	**No**	**No**	**No**	**No**

Formatted: Font: Not Italic

Although sensitive receptors would be exposed to diesel exhaust from construction equipment, which has been associated with lung cancer,[102] the duration of exposure would not be sufficient to result in a significant cancer risk. Carcinogenic health risk assessments are based upon an assumption of 70 years of continuous exposure, while the exposure in the present case would be for about 127 working days for phase 0, 507 working days for phase 1 and 224 working days for phase 2. Therefore, no cancer health risk assessment was necessary. Acute non-cancer risk assessments are based upon one-hour maximum exposures, but acute reference exposure levels (RELs) for diesel

100 Ibid.

101 Fact Sheet for Applying CalEEMod to Localized Significance Thresholds. South Coast Air Quality Management District. URL: http://www.aqmd.gov/docs/default-source/ceqa/handbook/localized-significance-thresholds/caleemod-guidance.pdf. Accessed December 12, 2022.

102 Findings of the Scientific Review Panel on The Report on Diesel Exhaust as Adopted at the Panel's April 22, 1998 Meeting. URL: URL: https://ww2.arb.ca.gov/sites/default/files/classic/toxics/dieseltac/de-fnds.pdf. Accessed on July 7, 2022.

Formatted: Not Superscript/ Subscript

Formatted: Justified

exhaust and diesel particulate matter have not been established by the Office of Environmental Health Hazard Assessment.[103]

5.1.2 Long-Term Impacts

5.1.2.1 Regional Impacts

Operational emissions from the proposed project were estimated using the methods outlined in **Section 4.1.1.2**. Results are presented in **Table 5.1-3**. For each criteria pollutant, operational emissions would be below the pollutant's SCAQMD significance threshold. Therefore, operational criteria pollutant emissions would be less than significant.

103 http://www.oehha.ca.gov/air/allrels.html. Accessed July 7, 2022.

Table 5.1-3
MAXIMUM DAILY PROJECT OPERATIONAL EMISSIONS

Emission Source	Pollutant (lbs/day)				
	ROG	NO_X	CO	PM_{10}	$PM_{2.5}$
Area Sources	~~17.1~~11.6	~~6.2~~0.58	~~52.8~~50.5	0.~~7~~3	0.~~7~~3
Energy	0.4	3.2	1.7	0.3	0.3
Mobile Sources	~~29.8~~31.8	~~31.9~~26.3	~~240.2~~183.1	~~57.8~~34.0	~~15.7~~9.3
Total Operational Emissions	~~47.2~~43.7	~~41.3~~30.1	~~294.7~~235.4	~~58.8~~34.6	~~16.7~~9.8
SCAQMD Significance Thresholds	***~~55~~75***	***~~55~~100***	***550***	***150***	***55***
Significant? (Yes or No)	**No**	**No**	**No**	**No**	**No**

Source: Calculated by OB-1 Air Analyses with CalEEMod (Version 2020.4.0).

Formatted: Left
Formatted Table
Formatted: Left
Formatted: Left
Formatted: Left
Formatted: Left

5.1.2.2 Carbon Monoxide Hotspots

Considering the discussion in **Section 4.2.2.2**, a CO hotspots analysis was not needed and was not performed.

5.1.2.3 Odor Analysis

The aforementioned SCAQMD Air Quality Significance Thresholds define a significant impact for a situation in which a project creates an odor nuisance pursuant to SCAQMD Rule 402 [Nuisance]. Rule 402 broadly defines nuisance odors; in reality, it is imposed only in cases in which (1) complaints are received by the District and (2) an inspector personally observes the offensive odor. The project proposes several farm areas, hydroponics and ~~aquiculture~~aquaculture, which pose the potential to produce odors. ~~Most~~ However, most of the farm areas would be used for growing fruits and vegetables instead of farm animals and thus would not produce the same level of odors as a would a cattle ranch or feedlot~~the odors as a farm with cattle or other animals~~. Furthermore, ~~there would be~~ staff living onsite ~~who~~ would manage these areas and would prevent or contain ~~any~~ odor nuisances quickly. In addition, the project proposes a package wastewater treatment system. Package systems generally use aerobic processes, which prevent formation of reduced sulfur compounds such as mercaptans and hydrogen sulfide, that have offensive odors. Therefore, Rule 402 complaints are unlikely. Given that odor problems are unlikely to arise and, if they do, would be resolved through the SCAQMD's police powers, no mitigation measures are necessary.

5.1.2.4 Screening Health Risk Assessment

Given that the proposed project will not be an important source of toxic air contaminants, and will not be a receptor for significant TAC emissions from offsite sources, impacts from TACs will be less than significant.

5.1.3 Consistency with Air Quality Management Plan

As discussed in **Section 3.1.3.2**, The SCAQMD has established an AQMP that proposes policies and measures to achieve federal and State standards for healthful air quality in the SSAB. The most recently approved AQMP was adopted by the SCAQMD Board of Directors on March 3, 2017.

The AQMP incorporates land use assumptions from local general plans and regional growth projections developed by the SCAG to estimate stationary and mobile air emissions associated with projected population and planned land uses. If the proposed land use is consistent with the local general plan, then the impact of the project is presumed to have been accounted for in the AQMP. This is because the land use and transportation control sections of the AQMP are based on the SCAG regional growth forecasts, which incorporated projections from local general plans.

The project includes an application for approval of the Green Day Village Specific Plan (GDVSP), which would include development of 658 residential units, commercial uses, community facilities such as community rooms and gardens, a detention pond and a seasonal arroyo, drive aisles and parking lots, among other features. Upon approval of the GDVSP by the City of Desert Hot Springs, both the general plan and zoning designations for the site would be Green Day Village Specific Plan. The GDVSP would be consistent with current general plan and zoning designations for the project site.

As is concluded in the IS/MND prepared for this project, the proposed project meets the main objectives of the land use plans and ordinances governing the project site and appropriately balances the requirements of the zoning code with and associated development limitations of the project site.

Another measurement tool in determining consistency with the AQMP is to determine whether a project would generate population and employment growth and, if so, whether that growth would exceed the growth rates forecasted in the AQMP and how the project would accommodate the expected increase in population or employment. The project does propose residential and commercial development, although it would not significantly induce substantial growth in the City of Desert Hot Springs. The project would not indirectly induce growth since no new public infrastructure is proposed or would be required. Therefore, the project would not directly or indirectly induce growth in Los Angeles and would not violate the assumptions of the AQMP.

5.2 Greenhouse Gas Emissions Impacts

5.2.1 Emissions

Each construction phase involves the use of a different mix of construction equipment and therefore has its own distinct GHG emissions characteristics. A schedule for the major phases of construction was supplied by the applicant. CalEEMod defaults were used otherwise. Construction emissions occur both onsite and offsite. Onsite air pollutant emissions consist principally of exhaust emissions from off-road heavy-duty construction equipment. Offsite emissions result from workers commuting to and from the job site, as well as from vendors and visitors to the site.

To be consistent with the guidance from the SCAQMD for calculating criteria pollutants from construction activities, only GHG emissions from onsite construction activities and offsite hauling and construction worker commuting are considered as project-generated. As explained by the California

Air Pollution Control Officers Association (CAPCOA) in its 2008 white paper,[104] the information needed to characterize GHG emissions from manufacture, transport, and end-of-life of construction materials would be speculative at the CEQA analysis level. CEQA does not require an evaluation of speculative impacts (*CEQA Guidelines* § 15145). Therefore, the construction analysis does not consider such GHG emissions, but does consider non-speculative onsite construction activities, and offsite hauling and construction worker trips. All GHG emissions are identified on an annual basis.

CalEEMod estimated construction GHG emissions for all phases combined to be ~~1,850~~1,168 MT of CO_2e. The 30-year amortized value is ~~61.7~~38.9 MT of CO_2e per year. **Table 5.2-1** summarizes the results of the GHG emissions analysis for both construction and operations.

Table 5.2-1
UNMITIGATED ANNUAL GHG EMISSIONS, 2025 AND BEYOND

~~**(Emissions in metric tons, or MT)**~~

Category	Emissions (metric tons per year)~~CO_2e (MT/year)~~			
	CO_2	CH_4	N_2O	CO_2e
Direct – (Amortized Construction)				~~61.7~~38.9
Direct – Mobile (Operational)	4,538.1	0.37	0.30	~~7,409.5~~4,635.8
Direct – Purchased Natural Gas	671.7	0.013	0.012	~~663.5~~675.7
Direct – Area Source	7.4	0.0071	0.0000	~~277.3~~7.6
Indirect – Purchased Electricity (Power)	506.7	0.043	0.0052	~~675.8~~509.3
Indirect – Purchased Electricity (Water)	189.5	1.65	0.040	~~236.4~~243.6
Direct – Fugitive – Solid Waste	111.6	6.6	0.0000	~~500.2~~276.4
~~TOTAL~~Totals	**6,025**	**8.7**	**0.36**	~~9,824.4~~6,386

Total unmitigated operational CO_2e emissions from the project would be ~~9,763~~6,347 **MT** of CO_2e per year. Mobile sources account for about ~~76~~73% of these emissions.

With the addition of the amortized construction emissions, the total project GHG emissions would be ~~6,386 9,824.4~~ **MT** of CO_2e per year. The service population (SP) for the project comprises 1,681 residents and 158 employees, for a total SP of 1,839. The ratio of emissions to service population is therefore **3.47** $MTCO_2e$/year/SP. As discussed in **Section 4.3.2**, the significance threshold for this project in the project buildout year (2025) was determined by interpolation to be 4.2 $MTCO_2e$/year/SP. Since the project's ratio is below this, GHG emissions will be less than significant.~~which exceeds the significance threshold of 3,000 MT of CO_2e per year. However, the project has a large number of design features that reduce GHG emissions. The County of Riverside has developed a screening tool that assigns points to design features in proportion to their efficacy~~

104 CEQA & Climate Change. Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act. January. URL: http://www.capcoa.org/wp-content/uploads/2012/03/CAPCOA-White-Paper.pdf.

Formatted: Space After: 6 pt
Formatted: Subscript
Formatted: Subscript
Formatted: Centered, Right: 0", Space Before: 0 pt, After: 0 pt
Formatted: Centered, Right: 0", Space Before: 0 pt, After: 0 pt
Formatted Table
Formatted: Centered, Right: 0", Space Before: 0 pt, After: 0 pt
Formatted: Centered, Right: 0", Space Before: 0 pt, After: 0 pt
Formatted: Centered, Right: 0", Space Before: 0 pt, After: 0 pt
Formatted: Centered, Right: 0", Space Before: 0 pt, After: 0 pt
Formatted: Centered, Right: 0", Space Before: 0 pt, After: 0 pt
Formatted: Font: Bold
Formatted: Font: Bold
Formatted: Font: Bold

in emissions reduction.[105] Projects that garner at least 100 points will be consistent with the reduction quantities anticipated in the County's Climate Action Plan Update. Such projects would be determined to have a less than significant cumulative impact for GHG emissions.

Attachment 2 shows how the proposed project was evaluated against the screening tables. It qualifies for 162 points for the residential portion and 184 points for the commercial portion. The screening document also provides a means of estimating the reduction in GHG per earned point. The emission savings rates are:

- Residential: 0.068 MT CO_2E per point per residential unit.
- Commercial: 0.031 MT CO_2E per point per 1,000 square feet of commercial space

Table 5.2-2 shows the calculation of GHG emissions reductions. The total reduction would be 7,186 MT CO_2e. The resulting net emissions due to the project would be 2,638.4 MT CO_2e per year, which would be below the threshold of 3,000 MT CO_2e per year. GHG emissions under this criterion would therefore be less than significant.

Table 5.2-2
ESTIMATED GHG EMISSIONS AVOIDED BY PROJECT DESIGN FEATURES

5.2.2 Project Portion	5.2.3 Rating Factor	5.2.4 Points	5.2.5 Reduction 5.2.6 MT CO_2e/point/unit	5.2.7 GHG Reduction 5.2.8 MT CO_2e
5.2.9 Residential	5.2.10 612 housing units	5.2.11 162	5.2.12 0.068	5.2.13 6,741
5.2.14 Commercial	5.2.15 77.971 square feet	5.2.16 184	5.2.17 0.031	5.2.18 445
5.2.19 Total Reduction				5.2.20 7,186

5.2.215.2.2 Consistency With GHG Reduction Plans

GHGs are regulated at the national, state, and air basin level; each agency has a different degree of control. The United States Environmental Protection Agency (USEPA) regulates at the national level; the California Air Resources Board (ARB) regulates at the state level; and the South Coast Air Quality

105 Greenhouse Gas Emissions Screening Tables, County of Riverside, California. Prepared by Atkins, San Bernardino, for County of Riverside. July 17, 2018, In County of Riverside Climate Action Plan Update, Appendix D. Internet: https://planning.rctlma.org/Portals/14/CAP/2019/2019_CAP_Update_Full.pdf. Accessed July 12, 2022.

Formatted: No bullets or numbering

Formatted: Indent: Left: 0.25", No bullets or numbering

Formatted: Justified

Management District (SCAQMD) regulates at the air basin level in the project area. the GHG reduction plan most relevant to the proposed project is the Climate Action Plan (CAP), which was introduced in **Section 3.1.4**.

The CAP uses a GHG emission inventory from the Year 2010 to establish the City's baseline emissions for the purposes of assessing future GHG reduction goals and forecasting GHG emissions in the future. ~~In the Year 2010, t~~The CAP estimated that the city's community-wide GHG emissions in 2010 were approximately 100,654 metric tons of carbon dioxide equivalents~~s~~ ($MTCO_2e$). Based on this historical emissions profile, the CAP established its ~~annual Year~~ 2020 annual GHG emissions ~~reduction~~ goal to be 64,047 $MTCO_2e$, which would require an approximately 48,769 MTCO2e decrease from its ~~BAU~~business-as-usual forecasted scenario for ~~the Year~~ 2020. The CAP includes 80 specific measures to reduce the City's GHG emissions. **Table 5.2-1** evaluates the project against the potentially relevant CAP measures.

Formatted: Subscript

Formatted: Subscript

Table 5.2-2 ~~The GPU contains numerous policies that are consistent with the CAP and the proposed General Plan's planned type of growth is consistent with the CAP's policies.~~

Formatted: Centered, Space After: 0 pt

PROJECT CONSISTENCY WITH GHG REDUCTION MEASURES IN THE CAP

Sector	CAP Measures to Reduce Greenhouse Gas Emissions	Project Compliance with Measure
Sphere – "Where We Live"		
Solid Waste	Solid Waste Diversion: Increase solid waste diversion rate by 5% to 68.1% by 2015 potentially through use of tiered rate structure.	Consistent. The proposed project will comply with all local and state diversion requirements.
Solid Waste	Solid Waste Diversion: Increase solid waste diversion rate by an additional 10% to 78.1% by 2020 potentially through awareness programs, recognition, tiered rate structures, and other financial instruments.	Consistent. The proposed project will be required to comply with AB 341 which includes recycling programs that reduce waste to landfills by up to 75% by 2020.
Sphere – "Where We Work"		
Commercial Buildings	Peak Demand Reduction: Collaborate with SCE and encourage 100 businesses to enroll in Energy Efficiency and Demand Response programs such as the Summer Discount Program.	Consistent. This is a city-based measure. If the proposed project is mandated by the City to be one of the 100 businesses that are to enroll in an Energy Efficiency and Demand Response program then the project will comply as needed.
Commercial Buildings	Energy-Efficient, Commercial-Sector Lighting: Promote and leverage existing incentives for efficient lighting and educate and locally incent building owners to eliminate any remaining T-12 lamps in commercial/industrial buildings.	Consistent. The proposed project will comply with current Title 24 requirements for installation of energy-efficient lighting.
Commercial Buildings	"The Temperature Club": Promote community partnership through policies to adjust indoor	Consistent. This is a city-based measure. If the project is mandated by the City to

Sector	CAP Measures to Reduce Greenhouse Gas Emissions	Project Compliance with Measure
	temperatures to save/degree reaching out to 100 businesses.	be one of the 100 businesses in the "Temperature Club," the project will comply as needed.
Commercial Buildings	Integrated Lighting Systems: Promote SCE's Energy Management Solutions' energy-efficient lighting linked to building controls and occupancy sensors in minimum of one million square feet of commercial/industrial space.	Consistent. This is a city-based measure. If the If the project or the previously approved cultivation use are mandated by the City to be part of the one million square feet of commercial/industrial space that is to have energy-efficient lighting linked to building controls and occupancy sensors, then the project will comply as needed.
Government initiatives	Water Efficient Landscaping Ordinance: Build on and exceed current Water Efficient Landscaping Ordinance in the commercial/industrial sector by 15% community-wide by 2020.	Consistent. The propose project's landscape design complies with the City's landscaping standards and accommodates the surrounding desert landscape
Sphere – "How We Build"		
Commercial Buildings	Sustainable Parking Lots: Program to reduce the heat island effect through the promotion of parking lot coverings and coatings and semi permeable surfaces for new construction to achieve 20% of existing parking lots, and 80% of new parking lots.	Consistent. The proposed project includes the planting of trees in the parking lot that would provide shade and reduce the heat island effect and semi-permeable paving will be used as required by the City.
Commercial Buildings	"Cool Roofs": Promote the installation of reflective roofing on commercial/industrial properties in the community with recognition for first ten early adopters.	Consistent. The project will comply with current Title 24 prescriptive cool roof requirements to meet energy compliance.
Government Initiatives	Green Building Program: Promote the voluntary Green Building Program to prepare for enhanced Title 24 requirements and green building standards.	Consistent: The Proposed Project will comply with the California Green Building Standards Code.
Water	Stormwater Capture: Promote storm water capture and retention for exterior landscape use (cisterns, rain barrels).	Consistent. The proposed project includes two onsite recharge basins. These areas will reduce the runoff from the project site to its pre-developed rate and meet water quality requirements.

In addition, the General Plan Update has several GHG policies whose implementation would reduce GHG emissions. These are presented in **Attachment 2**.

~~Local Regulations~~

~~In California, AB 32, SB 375, and other State laws require that the City of Desert Hot Springs take actions to reduce local greenhouse gas (GHG) emissions toward State reduction goals. State legislation is intended to address climate change caused by human activity. Alone, the population of~~

Formatted: Justified

Formatted: Font color: Auto

Formatted: Normal

~~the City of Desert Hot Springs could have little impact on any potential change in the overall climate of the planet. However, the GHG reduction laws mandate all Californians to work together to effect change on a larger scale. State legislation set out goals to reduce emissions to 1990 levels by 2020, with this target date subject to change based on measured progress.[106]~~

~~In conjunction with land use planning, the Mobility Plan bolsters City compliance with AB 32 (Global Warming Solutions Act) and SB 375 (Sustainable Communities and Climate Protection Act) to reduce the City's contribution to greenhouse gases (GHGs) that cause anthropogenic climate change. Vehicles on the roadway that rely on fossil fuels are one of the City's main generators of GHGs. Reduction of GHGs will be achieved holistically by a robust Complete Streets strategy, including support for pedestrians and bicycling systems and sustainability policies that reduce the reliance on fossil fuel energy.[107]~~

~~The State legislature has adopted several laws focused on reducing greenhouse gases to address climate change. California Assembly Bill (AB) 1358 (Complete Streets Act), AB 32 (Global Warming Solutions Act), and California Senate Bill (SB) 375 (Sustainable Communities and Climate Protection Act) form the basis of greenhouse gas reduction policies and establish requirements that link land use(s) and transportation policy planning.[108]~~

The project does not conflict with any of these state or local plans. Impacts would be less than significant.

~~106 Desert Hot Springs, City of. 2020a. Mobility and Infrastructure Element. Accessed online at: https://storage.googleapis.com/proudcity/deserthotspringsca/uploads/2021/11/Desert-Hot-Springs-General-Plan-Adopted-07-2020-Small.pdf, on June 24, 2022.~~

~~107 Ibid., MI-29~~

~~108 Ibid., MI-3~~

ATTACHMENTS

ATTACHMENT 1
CALEEMOD OUTPUT

ATTACHMENT 2
CITY OF DESERT HOT SPRINGS GENERAL PLAN UPDATE - GHG REDUCTION POLICIES

CITY OF DESERT HOT SPRINGS GENERAL PLAN UPDATE – GHG REDUCTION POLICIES

The City's General Plan supports the goals of the Climate Action Plan (CAP) and Energy Action Plan (EAP) with policies that promote energy conservation in new development projects (Policy OS-4.1), solar energy systems in commercial uses (Policy OS-4.4), and green building/sustainable construction (Policies OS-6.1 and OS-6.2). The City enforces the 2019 Title 24 Building Code during design review and project approval processes in support of the CAP and EAP. Compliance with the 2019 Title 24 requirements will ensure that the Project will not conflict with any plan, policy, or regulation for GHG reduction, and Project impacts will be less than significant

Table 4.6-3
GENERAL PLAN UPDATE GHG POLICY CONSISTENCY

Policy	Consistency Analysis
Desert Hot Springs General Plan Update – Land Use and Community Design Element	
Policy LU-1.4: Sustainability. Promote sustainable land uses and building practices that promote efficient energy use and resource sustainability.	**Consistent:** The project would be required to implement and adhere to Title 24 Energy Efficiency Standards for Residential and Nonresidential Buildings (24 CCR Part 6), and CALGreen Building Standards Code (24 CCR, Part 11). Therefore, the project is consistent with General Plan Policy LU-1.4.
Policy LU-1.5: Reduce Vehicular Trips and Miles Traveled. Coordinate land use patterns with the Mobility and Infrastructure Element to improve and protect air quality, reduce vehicular trips and promote active transportation modes and transit use.	**Consistent:** The project design includes carpools and vanpools with guaranteed ride home programs and bike lockers and secure racks that will reduce the vehicular trips and miles traveled. There is a Sunline Transit Agency bus stop within 0.25 mile south of the project. Therefore, the project is consistent with General Plan Policy LU-1.5.
Policy LU-7.1: Mixed-Use Commercial Component. Require that new mixed-use development projects include a substantial viable, commercial component. Consider innovative incentives improve long-term longevity of commercial uses.	**Consistent:** Even this is a City obligation, the project has a significant commercial component.
Policy LU-13.11: Trees and Landscaping. Encourage visually attractive residential neighborhoods by expanding desert appropriate street trees and other types of streetscapes and hardscape, and by encouraging the use of attractive and appropriate drought-tolerant landscaping.	**Consistent:** The project design eliminates conventional turf from landscaping. The project's landscape design is required to comply with the City's landscaping standards and accommodate the surrounding desert landscape. Therefore, the project is consistent with General Plan Policy LU-13.11.
Policy LU-15.2: Compliance. Encourage voluntary compliance with the Municipal Code and other applicable laws and regulations; maintain a respectful and satisfactory relationship between the City and the community.	**Consistent:** The project would be required to comply with the Municipal Code and other applicable laws and regulations. Therefore, the project is consistent with General Plan Policy LU-15.2.

Policy	Consistency Analysis
Desert Hot Springs General Plan Update – Mobility and Infrastructure Element	
Policy MI-1.1: Transportation Network Improvements. Establish and maintain a multimodal mobility plan which sets forth improvement plans and project prioritization for a variety of modes and users of the transportation network.	**Not Applicable:** This is a City responsibility.
Policy MI-1.3: Multi-Modal. Aim to develop a multimodal and/or multipurpose approach when implementing infrastructure outlined in the Mobility Plan.	**Not Applicable:** This is a City responsibility.
Policy MI-1.5: Roadways in Planning Communities. Roadways in Planning Communities. Require—as appropriate that roadways and other transportation facilities within planned communities be installed and maintained as private rights-of-way. Require—as appropriate that private roadways be developed in accordance the standards with the City's adopted design standards and guidelines.	**Not Applicable:** This is a City responsibility.
Policy MI-2.1: Complete Streets. Implement complete street strategies to accommodate all users of different ages and abilities.	**Not Applicable:** This is a City responsibility.
Policy MI-2.2: Balanced Transportation System. Implement a balanced transportation system using complete streets principles to ensure the safety and mobility of all users.	**Not Applicable:** This is a City responsibility.
Policy MI-3.6: Traffic Calming. Use traffic-calming techniques such as roundabouts and sidewalk extensions, more frequent and innovative crosswalks, pedestrian signals, and clearly marked bicycle lanes.	**Not Applicable:** This is a City responsibility.
Policy MI-4.3: Connectivity. Require that new developments increase connectivity through direct and safe pedestrian and bicycling connections to the established network.	**Not Applicable:** This is a City responsibility.
Policy MI-5.1: Reduce Vehicle Miles Traveled. Implement development and transportation improvements that help reduce greenhouse gas emissions by reducing per capita Vehicle Miles Traveled (VMT), reducing impacts on the City's transportation network, and maintaining the desired service levels for all modes of transportation.	**Consistent:** The project design includes carpools and vanpools with guaranteed ride home programs and bike lockers and secure racks that will reduce the vehicular trips and miles traveled. There is a Sunline Transit Agency bus stop within 0.25 mile south of the project. Therefore, the project is consistent with General Plan Policy MI-5.1.

Policy	Consistency Analysis
Policy MI-5.2: Sustainable Transportation and Land Use Strategies. Implement sustainable transportation and land use strategies that can effectively reduce vehicle miles traveled. Consider using vehicle daily trips as the benchmark demand for determining potential levels of parking and vehicular congestion.	**Not Applicable:** This is a City responsibility.
Policy MI-5.3: Clean Vehicles. Support the development of a network of public and private clean and/or carbon neutral fuel vehicle charging and fueling stations.	**Consistent:** The project design includes installation of two electric vehicle charging stations per garage/parking area in the commercial buildings. Therefore, the project is consistent with General Plan Policy MI-5.3.
Policy MI-5.4: Traffic Mitigation. Consider a locally collected and administered traffic mitigation fee program to guarantee that new development pays for its fair share toward improvements resulting in reductions in air pollutant and GHG emissions and traffic impacts generated by the development.	**Not Applicable:** This is a City responsibility.
Policy MI-5.6: Repaving and Repairing. Consider the use of sustainable and carbon-neutral material when repaving, repairing, or constructing streets and other transportation facilities.	**Consistent:** The project is required to comply with applicable laws and regulations pertaining to use of sustainable and carbon-neutral material when constructing streets. Therefore, the project is consistent with General Plan Policy MI-5.6.
Policy MI-7.1: Bus Service. Improve the performance and reliability of existing and future bus service.	**Consistent:** The project contractor would be required to consult with the Sunline Transit Agency to discuss the performance and reliability of existing and future bus service. Therefore, the project is consistent with General Plan Policy MI-7.1.
Policy MI-7.2: Transit Expansion. Encourage expansion of the service area and the ridership of the public transit systems operated by the Sunline Transit Agency, Native American tribes, and other external providers within the city.	**Not Applicable:** This is a City responsibility.
Policy MI-7.3: Transit Facilities. Require that development projects include amenities to support public transit use, such as bus stop shelters, space for transit vehicles, and pedestrian amenities such as trash receptacles, signage, seating, shelters, and lighting.	**Not Applicable:** This is a City responsibility.
Policy MI-9.1: Intelligent transportation Systems. Implement intelligent transportation systems strategies such as adaptive signal controls, fiber optic communication equipment, closed circuit television cameras, real time transit information, and real time parking availability information.to reduce traffic delays, lower greenhouse gas emissions, improve	**Not Applicable:** This is a City responsibility.

Policy	Consistency Analysis
travel times, and enhance safety for drivers, pedestrians, and cyclists.	
Policy MI-9.3: Funding Sources. Pursue grants and other innovative funding sources to pay for transportation improvements.	**Not Applicable:** This is a City responsibility.
Policy MI-10.2: Expand Funding. Prioritize funding to improve the built environment for people who walk, bike, take transit and for other vulnerable roadway users, where fiscally prudent.	**Not Applicable:** This is a City responsibility.
Policy MI-10.3: Impact Fees. Ensure that impact fees provide adequate funding for necessary transportation improvements that will benefit all travel modes, while also incentivizing development that is less dependent on expensive, new transportation.	**Not Applicable:** This is a City responsibility.
Policy MI-10.4: Mitigation Fees. Continue to support programs that allow for traffic mitigation fees. Seek to adjust mitigation fee programs when needed so that developments pay fair-share contributions toward improvements that result in reductions in air pollutant and GHG emissions and traffic impacts generated by the development.	**Not Applicable:** This is a City responsibility.
Policy MI 11.11 Reduce Energy. Implement regulations and provide incentives that require public and private developments to reduce energy use over the long term.	**Consistent:** The project would be required to implement and adhere to Title 24 Energy Efficiency Standards for Residential and Nonresidential Buildings (24 CCR Part 6), and CALGreen Building Standards Code (24 CCR, Part 11). Therefore, the project is consistent with General Plan Policy MI 11.11.
Policy MI 11.12 Energy Efficiency. Encourage energy-efficient design of all new projects (public and private), including appropriate structure orientation and the use of shade trees to maximize cooling and reduce fossil fuel consumption for heating and cooling.	**Consistent:** The project would be required to implement and adhere to Title 24 Energy Efficiency Standards for Residential and Nonresidential Buildings (24 CCR Part 6), and CALGreen Building Standards Code (24 CCR, Part 11). Therefore, the project is consistent with General Plan Policy MI 11.12.
Policy MI-11.17: Minimize Solid Waste Streams. Reduce the solid waste stream taken to landfills through recycling efforts, waste diversion, and zero-waste programs.	**Consistent:** The project design includes two recycling centers at central locations for collection truck pick-up, that fulfills an onsite goal of 80% diversion of solid waste**.** The project will be required to comply with AB 341, which includes recycling programs that reduce waste to landfills by up to 75% by 2020. Therefore, the project is consistent with General Plan Policy MI-11.17.

Policy	Consistency Analysis
Desert Hot Springs General Plan Update – Open Space and Natural Resources Element	
Policy OS-2.1: Air Pollution Reduction. Seek to reduce air pollution through the implementation of existing regulations and the creation of new regulations where needed.	**Not Applicable:** This is a City responsibility.
Policy OS-2.2: Climate Change Laws. Find creative means to comply with State laws addressing climate change.	**Not Applicable:** This is a City responsibility.
Policy OS-2.4: Air Quality Goals. Ensure that land use and transportation plans support air quality goals, with new development projects reducing vehicle miles traveled and vehicle trips.	**Not Applicable:** This is a City responsibility.
Policy OS-3.1: Water Conservation. Require water conservation measures in new development, equivalent to CalGreen Tier One or similar standards.	**Consistent:** The project design includes water efficient showerheads, faucets, toilets, dishwashers. The project will be designed to meet all Mission Springs Water District and Water Conservation Standards and guidelines, and Title 24 Energy Efficiency Standards for Residential and Nonresidential Buildings (24 CCR Part 6), and CALGreen Building Standards Code (24 CCR, Part 11). Therefore, the project is consistent with General Plan Policy OS-3.1.
Policy OS-3.5: Water District Consultation. Continue to consult with Mission Springs Water District (MSWD) on water conservation efforts, policies, and demonstration projects, such as expansion of a recycled water system.	**Consistent:** The project contractor would be required to consult with Mission Springs Water District (MSWD) on water conservation efforts, policies, and demonstration projects, such as expansion of a recycled water system. Therefore, the project is consistent with General Plan Policy OS-3.5.
Policy OS-3.6: Landscaping. Require climate-appropriate landscaping for new development, and limit turf to be used as accent only.	**Consistent:** The project design eliminates conventional turf from landscaping. It includes low to medium water use shrubs and trees. The project's landscape design is required to comply with the City's landscaping standards and accommodate the surrounding desert landscape. Therefore, the project is consistent with General Plan Policy OS-3.6.
Policy OS-3.7: Grey Water. Encourage and allow for the use of gray water systems in new and existing developments for reuse of onsite water from washbasins, showers, and tubs to be used in toilet flushing and irrigation.	**Consistent:** The project's landscape irrigation will make use of any grey water produced by the residential units and the community buildings/spaces. Grey water will be captured, filtered, treated and circulated to deliver a water source for the landscape that would otherwise be discarded. Therefore, the project is consistent with General Plan Policy OS-3.7.
Policy OS-3.8: Recycled Water. Where feasible, require new industrial and commercial developments to install a dual pipe water system to hook up to future	**Consistent:** The project's irrigation system will be designed to be fully automatic and will include the use of flow sensors, master valves, weather-based

Policy	Consistency Analysis
Mission Springs Water District recycled water supply when available for common area irrigation and for individual property's irrigation.	smart controllers, bubbler heads, low flow spray heads, and emitters**.** The project is required to meet Mission Springs Water District and Water Conservation standards and guidelines. Therefore, the project is consistent with General Plan Policy OS-3.8.
Policy OS-4.1: Energy Conservation. Seek to incorporate energy conservation measures into new development projects.	**Consistent:** The project design includes Enhanced Insulation (rigid wall insulation R-13, roof/attic R-38, Enhanced Window Insulation (15%> Title 24), Enhanced Cool Roof (CRRC Rated 0.2 aged solar reflectance, 0.75 thermal emittance), Air barrier applied to exterior walls, calking, and visual inspection such as the HERS Verified Quality Insulation Installation (QII or equivalent), High Efficiency HVAC (EER 15/72% AFUE or 8.5 HSPF), High Efficiency Water Heater (0.72 Energy Factor), Efficient Lights (25% of in-unit fixtures considered high efficacy, Energy Star Appliances. The project would be required to implement and adhere to Title 24 Energy Efficiency Standards for Residential and Nonresidential Buildings (24 CCR Part 6), and CALGreen Building Standards Code (24 CCR, Part 11). Therefore, the project is consistent with General Plan Policy OS-4.1.
Policy OS-4.4: Solar Energy Systems. Encourage the use of solar energy systems or any other technologies that similarly reduce the use of power from the grid in residential and commercial uses.	**Consistent:** The project design includes installation of solar photovoltaic panels and wind turbines. The project would be required to implement and adhere to CALGreen Building Standards Code (24 CCR, Part 11). Therefore, the project is consistent with General Plan Policy OS-4.4.
Policy OS-4.7: Alternative Electricity Options. Continue to explore, assist, and encourage alternative electricity options such as wind or small-scale solar energy facilities.	**Consistent:** The project design includes installation of solar photovoltaic panels and wind turbines**.** The project would be required to implement and adhere to Title 24 Energy Efficiency Standards for Residential and Nonresidential Buildings (24 CCR Part 6), and CALGreen Building Standards Code (24 CCR, Part 11). Therefore, the project is consistent with General Plan Policy OS-4.7.
Policy OS-5.2: Waste Reduction. Continue to require strict construction waste reduction through programs, education, and regulations.	**Consistent:** The project will recycle 75% of Construction/Demolition Debris. The project would be required to comply with applicable laws and regulations for waste reduction. Therefore, the project is consistent with General Plan Policy OS-5.2.
Policy OS-6.1: Sustainable Construction. Encourage sustainable construction practices and the use of energy-saving technology within buildings.	**Consistent:** The project would be required to implement and adhere to Title 24 Energy Efficiency Standards for Residential and Nonresidential

Policy	Consistency Analysis
Consider establishing a green building program that draws from the LEED (Leadership in Energy & Environmental Design) standards.	Buildings (24 CCR Part 6), and CALGreen Building Standards Code (24 CCR, Part 11). Therefore, the project is consistent with General Plan Policy OS-6.1.
Policy OS-6.2: Green Building. Require LEED or similar building efficiency certifications for all new public facilities and buildings. Encourage similar green building certifications for private development projects.	**Consistent:** The project would be required to implement and adhere to Title 24 Energy Efficiency Standards for Residential and Nonresidential Buildings (24 CCR Part 6), and CALGreen Building Standards Code (24 CCR, Part 11). Therefore, the project is consistent with General Plan Policy OS-6.2.
Policy OS-7.4: Street Trees. Encourage new public street tree plantings in established neighborhoods, and require all new development to provide climate-appropriate street trees.	**Consistent:** The project design includes low to medium water use shrubs and trees. The project's landscape design is required to comply with the City's landscaping standards and accommodate the surrounding desert landscape. The project's landscape design is required to comply with the City's landscaping standards and accommodate the surrounding desert landscape. Therefore, the project is consistent with General Plan Policy OS-7.4.

APPENDIX C1

BIOLOGICAL RESOURCES EVALUATION REPORT

DRAFT
BIOLOGICAL RESOURCES EVALUATION REPORT
FOR THE
GREEN DAY VILLAGE SPECIFIC PLAN
RIVERSIDE COUNTY, CALIFORNIA



Prepared for:	*In Support of the CEQA Analysis Prepared for:*
LA World Construction 2029 Century Park East, Ste. 400 Century City, CA 90067	**City of Desert Hot Springs** 11999 Palm Drive Desert Hot Springs, CA 92240

Prepared by:

16431 Scientific Way
Irvine, CA 92618
Phone: (949) 788-4900, Fax: (949) 788-4901

UltraSystems Project No. 7129a
Assessor Parcel Number: 657280003

July 2022

REVISED NOVEMBER 2022

This page intentionally left blank.

TABLE OF CONTENTS

TABLE OF CONTENTS i

ACRONYMS AND ABBREVIATIONS vi

EXECUTIVE SUMMARY viii

Soils ix
Land Cover Types ix
Listed Endangered, Threatened, Candidate and State Rare Plants ix
Sensitive Plants ix
Listed Endangered, Threatened, and Candidate Wildlife ix
Sensitive Wildlife ix
Jurisdictional Waters and Riparian/Riverine Areas ix
Critical Habitat x
Wildlife Corridors x
Impacts x
Conclusion x

1.0 INTRODUCTION 1-1
1.1 BRE Purpose 1-1
1.2 Project Location 1-2
1.3 Project Background 1-3

2.0 PROJECT DESCRIPTION 2-1

3.0 REGULATORY CONTEXT 3-1
3.1 Federal Statues, Regulations and Executive Orders 3-1
3.1.1 Clean Water Act (CWA) 3-1
3.1.2 Endangered Species Act (ESA) 3-2
3.1.3 Migratory Bird Treaty Act (MBTA) 3-4
3.1.4 National Environmental Policy Act (NEPA) 3-4
3.1.5 Prevention and Control of Invasive Species - Executive Order 13112 3-4
3.2 State Statutes and Regulations 3-5
3.2.1 California Environmental Quality Act (CEQA) 3-5
3.2.2 California Endangered Species Act (CESA) 3-5
3.2.3 Fully Protected Species - California Fish and Game Code § 3511, § 4700, § 5050 and § 5515 3-6
3.2.4 Bird Nests and Eggs - California Fish and Game Code § 3503 3-6
3.2.5 Birds of Prey and their Eggs – California Fish and Game Code § 3503.5 3-7
3.2.6 Migratory Birds – California Fish and Game Code § 3513 3-7
3.2.7 Native Plant Protection Act (NPPA) – California Fish and Game Code §§ 1900-1913 3-7
3.2.8 Porter-Cologne Water Quality Control Act 3-8
3.2.9 State Water Resources Control Board Resolution No. 2019-0015 3-8
3.2.10 Natural Community Conservation Planning Act of 2003 (NCCP Act) 3-10
3.3 Regional and Local Ordinances, Plans and Policies 3-11
3.3.1 City of Desert Hot Springs General Plan 3-11
3.3.2 Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP) 3-11

Deleted: November 2022

4.0 STUDY METHODS 4-1
4.1 Literature Review 4-1
4.1.1 Topography and Physical Features 4-1
4.1.2 Soils 4-1
4.1.3 Sensitive Plant Communities and Special-Status Plant and Wildlife Species 4-1
4.1.4 Jurisdictional Waters 4-4
4.1.5 Critical Habitat 4-5
4.1.6 Wildlife Corridors 4-5
4.2 Field Survey Methods 4-6
4.2.1 Habitat Assessment and Land Cover Type Mapping 4-7
4.2.2 General Plant Surveys 4-7
4.2.3 General Wildlife Surveys 4-8
4.2.4 Jurisdictional Assessment and Delineation 4-9
4.2.5 Wildlife Movement Evaluation 4-10

5.0 RESULTS 5-1
5.1 Environmental Setting 5-1
5.1.1 Land Use 5-2
5.1.2 Local Climate 5-2
5.1.3 Soils 5-2
5.2 Land Cover Types 5-3
5.2.1 Fourwing Saltbush Scrub (*Atriplex canescens* Shrubland Alliance) 5-5
5.2.2 Creosote Bush - White Bursage Scrub (*Larrea tridentata - Ambrosia dumosa* Shrubland Alliance) 5-6
5.2.3 Unconsolidated Streambed 5-6
5.2.4 Stabilized Desert Dunes 5-6
5.2.5 Disturbed 5-7
5.2.6 Tamarisk Thickets (*Tamarix* spp. Semi-Natural Shrubland Alliance) 5-7
5.2.7 Developed/Ornamental 5-7
5.2.8 Date Palm – California Fan Palm Groves (*Phoenix dactylifera – Washingtonia filifera* Forest & Woodland Semi-Natural Alliance) 5-7
5.3 Plants 5-8
5.3.1 Plant Species Recorded During the Field Surveys 5-8
5.3.2 Non-native Plants 5-8
5.3.3 Listed Endangered, Threatened, Candidate, and State Rare Plants 5-9
5.3.4 Sensitive Plants 5-10
5.4 Wildlife 5-11
5.4.1 Wildlife Species Recorded During the Field Surveys 5-11
5.4.2 Listed Endangered, Threatened, and Candidate Wildlife 5-12
5.4.3 Sensitive Wildlife 5-14
5.5 Waters of the U.S. and State (Including Wetlands) 5-17
5.6 Critical Habitat 5-18
5.7 Wildlife Corridors: Cores and Linkages in BSA Proximity 5-18

6.0 POTENTIAL IMPACTS OF THE PROJECT 6-1
6.1 Thresholds of Significance 6-1
6.2 Potential Impacts to Plant Communities 6-3
6.2.1 Direct Impacts 6-3

Deleted: November 2022

6.2.2 Indirect Impacts 6-4
6.2.3 Mitigation Measures 6-5
6.2.4 Impact Determination 6-5
6.3 Potential Impacts to Special-Status Plants 6-6
6.3.1 Direct Impacts 6-6
6.3.2 Indirect Impacts 6-7
6.3.3 Mitigation Measures 6-7
6.3.4 Impact Determination 6-8
6.4 Potential Impacts to Special-Status Wildlife 6-8
6.4.1 Direct Impacts 6-9
6.4.2 Mitigation Measures 6-13
6.4.3 Impact Determination 6-15
6.5 Potential Impacts to Breeding Birds 6-15
6.5.1 Direct Impacts 6-15
6.5.2 Indirect Impacts 6-15
6.5.3 Mitigation Measures 6-16
6.5.4 Impact Determination 6-16
6.6 Potential Impacts to Jurisdictional Waters, Including Wetlands 6-16
6.6.1 Direct Impacts 6-16
6.6.2 Indirect Impacts 6-16
6.6.3 Mitigation Measures 6-17
6.6.4 Impact Determination 6-17
6.7 Potential Impacts to Critical Habitat 6-17
6.7.1 Direct and Indirect Impacts 6-17
6.7.2 Mitigation Measures 6-17
6.7.3 Impact Determination 6-18
6.8 Potential Impacts to Fish or Wildlife Movement or Native Wildlife Nursery Sites 6-18
6.8.1 Direct Impacts 6-18
6.8.2 Indirect Impacts 6-18
6.8.3 Mitigation Measures 6-19
6.8.4 Impact Determination 6-19
6.9 Potential Impacts to Local Policies Protecting Biological Resources 6-19
6.9.1 Direct Impacts 6-19
6.9.2 Indirect Impacts 6-20
6.9.3 Impact Determination 6-20
6.10 Potential Impacts to HCPs or NCCPs 6-20
6.10.1 Mitigation Measures 6-22
6.10.2 Impact Determination 6-22

7.0 MSHCP CONSISTENCY ANALYSIS 7-1
7.1 Introduction 7-1
7.1.1 Project Location within the MSHCP Boundary 7-1
7.1.2 Project Description 7-2
7.1.3 General Setting 7-2
7.2 MSHCP Section 4.2 – *MSHCP Reserve System Assembly* 7-3
7.3 Vegetation Mapping 7-3
7.3.1 MSHCP Birds 7-3
7.4 MSHCP Species Survey Analysis 7-4

Deleted: November 2022

7.5 MSHCP Section 7.5.2, *Guidelines for Construction of Wildlife Crossings* 7-4
7.6 MSHCP Section 7.5.3, *Land Use Adjacency Guidelines* 7-4
7.7 Memorandum of Understanding 7-4

8.0 MITIGATION MEASURES 8-1
8.1 BIO-1: Rare Plant Surveys 8-1
BIO-2: Desert Tortoise Take Avoidance Survey 8-1
8.2 8-1
8.3 BIO-3: Burrowing Owl Surveys and Compensatory Mitigation 8-2
8.3.1 BIO-3.1: Burrowing Owl Survey No More Than 14 Days Prior to Ground Disturbance 8-2
8.3.2 BIO-3.2: Burrowing Owl Survey Within 24 Hours of Initiation of Ground Disturbance 8-2
8.3.3 BIO-3.3: BUOW Compensatory Mitigation 8-2
8.4 BIO-4: Pre-Construction Breeding Bird Survey 8-2
8.5 BIO-5: Worker Environmental Awareness Program (WEAP) 8-3
8.6 BIO-6: Biological Monitor 8-4
8.7 BIO-7: Construction Best Management Practices 8-4
8.8 BIO-8: Project Limits and Designated Areas 8-5
8.9 BIO-9: General Vegetation and Wildlife Avoidance and Protection Measures 8-6
8.10 BIO-10: MSHCP Section 4.5 Land Use Adjacency Guidelines 8-8

9.0 POTENTIAL FEDERAL, STATE AND LOCAL BIOLOGICAL PERMITS, AND APPOROVALS 9-1
9.1 Local Development Mitigation Fee 9-1
9.2 Jurisdictional Areas 9-1

10.0 LITERATURE CITED AND REFERENCES 10-1

TABLES

Table 4.1-1 - CNDDB Sensitive Habitat Within Ten Miles of the Project Site 4-2
Table 5.0-1 - Field Survey Information 5-1
Table 5.1-1 - Summary of Soil Mapping Units 5-3
Table 5.2-2 - Acreage of Mapped Land Cover Types Within the BSA 5-4
Table 5.3-1 - Recorded Invasive Plant Species With A CAL IPC Rating 5-9
Table 6.3-1 - Acreage of Direct Impacts to Land Cover Types 6-3
Table 7.1-1 - MSHCP Project Review Checklist 7-1

APPENDICES

Appendix A Figures
- *Figure 1: Regional Overview*
- *Figure 2: Project Vicinity*
- *Figure 3: Project Location and Biological Study Area (BSA)*
- *Figure 4: USGS Topographic Quadrangle Map*
- *Figure 5: CNDDB Known Occurrences Plant Species and Habitat*

Deleted: TABLE OF CONTENTS i¶
ACRONYMS AND ABBREVIATIONS vi¶
EXECUTIVE SUMMARY viii¶
Soils ix¶
Land Cover Types ix¶
Listed Endangered, Threatened, Candidate and State Rare Plants ix¶
Sensitive Plants ix¶
Listed Endangered, Threatened, and Candidate Wildlife ix¶
Sensitive Wildlife ix¶
Jurisdictional Waters and Riparian/Riverine Areas ix¶
Critical Habitat x¶
Wildlife Corridors x¶
Impacts x¶
Conclusion x¶
1.0 INTRODUCTION 1-1¶
1.1 BRE Purpose 1-1¶
1.2 Project Location 1-2¶
1.3 Project Background 1-3¶
2.0 PROJECT DESCRIPTION 2-1¶
3.0 REGULATORY CONTEXT 3-1¶
3.1 Federal Statues, Regulations and Executive Orders 3-1¶
3.1.1 Clean Water Act (CWA) 3-1¶
3.1.2 Endangered Species Act (ESA) 3-2¶
3.1.3 Migratory Bird Treaty Act (MBTA) 3-4¶
3.1.4 National Environmental Policy Act (NEPA) 3-4¶
3.1.5 Prevention and Control of Invasive Species - Executive Order 13112 3-4¶
3.2 State Statutes and Regulations 3-5¶
3.2.1 California Environmental Quality Act (CEQA) 3-5¶
3.2.2 California Endangered Species Act (CESA) 3-5¶
3.2.3 Fully Protected Species - California Fish and Game Code § 3511, § 4700, § 5050 and § 5515 3-6¶
3.2.4 Bird Nests and Eggs - California Fish and Game Code § 3503 3-6¶
3.2.5 Birds of Prey and their Eggs – California Fish and Game Code § 3503.5 3-7¶
3.2.6 Migratory Birds – California Fish and Game Code § 3513 3-7¶
3.2.7 Native Plant Protection Act (NPPA) – California Fish and Game Code §§ 1900-1913 3-7¶
3.2.8 Porter-Cologne Water Quality Control Act 3-8¶
3.2.9 State Water Resources Control Board Resolution No. 2019-0015 3-8¶
3.2.10 Natural Community Conservation Planning Act of 2003 (NCCP Act) 3-10¶
3.3 Regional and Local Ordinances, Plans and Policies 3-11¶
3.3.1 City of Desert Hot Springs General Plan 3-11¶
3.3.2 Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP) 3-11¶
4.0 STUDY METHODS 4-1¶
4.1 Literature Review 4-1¶
4.1.1 Topography and Physical Features 4-1¶
4.1.2 Soils 4-1¶
4.1.3 Sensitive Plant Communities and Special-Status Plant and Wildlife Species 4-1¶
4.1.4 Jurisdictional Waters 4-4¶
4.1.5 Critical Habitat 4-5¶
4.1.6 Wildlife Corridors 4-5¶
4.2 Field Survey Methods 4-6¶
4.2.1 Habitat Assessment and Land Cover Type Mapping 4-7¶
...

Deleted: November 2022

- *Figure 6: CNDDB Known Occurrences Wildlife Species*
- *Figure 7: USDA Soils*
- *Figure 8: Land Cover Types*
- *Figure 9: USGS Surface Waters and Watersheds*
- *Figure 10: Jurisdictional Waters*
- *Figure 11: USFWS Critical Habitat*
- *Figure 12: CDFW Wildlife Corridors*
- *Figure 13: CVMSHCP Conservation Areas and Corridors and Linkages*
- *Figure 14: CVMSHCP Plant and Wildlife Species*

Appendix B Project Drawings (Site Plan)

Appendix C Field Data Sheets

Appendix D Site Photographs

Appendix E Soils Report

Appendix F Special Status Species Potential Occurrence Determination

Appendix G Plant and Wildlife Species Recorded During the Field Surveys

Appendix H Jurisdictional Delineation Report

Appendix I Drainage Study

Deleted: November 2022

ACRONYMS AND ABBREVIATIONS

Acronym/Abbreviation	Term
amsl	above mean sea level
AOU	American Ornithological Union
APHIS	Animal and Plant Health Inspection Service
APN	Assessor's Parcel Number
BMPs	best management practices
BRE	Biological Resources Evaluation Report
BSA	Biological Study Area
BUOW	burrowing owl
Cal-IPC	California Invasive Plant Council
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
City	City of Desert Hot Springs
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
County	Riverside County
County EPD	Riverside County Environmental Programs Department
CRPR	California Rare Plant Rank
CWA	Clean Water Act
DBESP	Determination of Biologically Equivalent or Superior Preservation
ESA	Endangered Species Act
°F	degrees Fahrenheit
GIS	Geographic Information System
GPS	Global Positioning System
HCP	Habitat Conservation Plan
HMMP	Compensatory Habitat Mitigation and Monitoring Plan
IPaC	Information, Planning, and Conservation System
ISA	International Society of Arboriculture
LBV	least Bell's vireo
MBTA	Migratory Bird Treaty Act
MOU	Memorandum of Understanding
NCCP	Natural Community Conservation Plan
NCCP Act	California Natural Community Conservation Planning Act
NEPA	National Environmental Policy Act
NHD	National Hydrography Dataset
NMFS	National Marine Fisheries Service
NPDES	National Pollutant Discharge Elimination System
NPPA	Native Plant Protection Act

Deleted: November 2022

Acronym/Abbreviation	Term
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OHWM	ordinary high water mark
Porter-Cologne	Porter-Cologne Water Quality Control Act
project	Green Day Village Specific Plan
Rapanos	*Rapanos v. United States*
RCHCA	Riverside County Habitat Conservation Authority
RWQCB	Regional Water Quality Control Board
Arid West Supplement	*Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*
SWANCC	*Solid Waste Agency of Northern Cook County* vs. *United States Army Corps of Engineers*
SWFL	southwestern willow flycatcher
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
UltraSystems	UltraSystems Environmental, Inc.
U.S.	United States
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
1987 Manual	*Corps of Engineers Wetlands Delineation Manual*
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
Waters of the U.S.	Waters of the United States
WDRs	Waste Discharge Requirement
WEAP	Worker Environmental Awareness Program
§	Section
§§	Sections

Deleted: November 2022

EXECUTIVE SUMMARY

UltraSystems Environmental Inc. (UltraSystems) was retained by the LA World Construction (project proponent) to conduct biological surveys for the Green Day Village Specific Plan (hereby referred to as the "proposed project" or the "project"). The project proponent proposes to develop multi-use complex on the 38.34-acre property located in the City of Desert Hot Springs (City) in Riverside County (County), California. UltraSystems prepared this Biological Resources Evaluation Report (BRE) for the project.

UltraSystems conducted a literature review and field surveys of the biological resources potentially associated with the project site and areas within a 500-foot zone around the project site; collectively this total area is referred to as the Biological Study Area (BSA) in this BRE. The BSA encompasses approximately 117.5 acres and includes all areas that could potentially be impacted by the project. Surveys did not extend beyond the BSA. The general biological surveys covered all accessible areas of the BSA. Biologists visited the BSA to conduct the following biological surveys:

- Habitat assessment and plant community and land cover type mapping.
- Jurisdictional waters (including wetlands) assessment.
- General plant surveys.
- General wildlife surveys.
- Wildlife movement evaluation.
- Jurisdictional delineation.

This BRE documents the methods and results of the literature review and the field surveys and provides a summary of existing conditions, an assessment of the potential presence of sensitive biological resources, and an analysis of the potential impacts to those resources from project construction and development. It summarizes the biological resources present within the BSA at the time of the field surveys including land cover types, plants and wildlife species, the potential occurrence of special-status plant and wildlife species, jurisdictional waters, critical habitat, and potential wildlife corridors within the BSA. The BRE also identifies and analyzes the potential biological significance of site construction and development in view of federal, state, and local laws, regulations, policies, orders, ordinances and/or management plans, and the project's consistency with local policies and ordinances protecting biological resources. This BRE also analyzes the project's consistency with adopted Habitat Conservations Plans (HCPs), Natural Community Conservation Plans (NCCPs) and other approved local, regional or state habitat conservation plans.

The project site is located in an area covered by the Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community Conservation Plan (hereby referred to as the "MSHCP"); therefore, a MSHCP Consistency Analysis is included in this BRE. The western segment of the BSA overlaps an MSHCP Conservation Area; the project site itself does not. This BSA overlaps portions of the Willow Hole Conservation Area, and these portions of the BSA have been identified in the MSHCP as containing Essential Ecological Processes for sand transport, and Core Habitat for the following covered species: Coachella Valley milkvetch, Coachella Valley round-tailed ground squirrel, Palm Springs Pocket mouse, and Le Conte's thrasher.

This BRE was prepared in support of the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA) review conducted in connection with the project, as well as permits and approvals required for the project by federal and state resource agencies.

Deleted: November 2022

Soils

The BSA contains two soil units, as mapped by the United States Department of Agriculture (USDA) Natural Resources Conservation Service's (NRCS's) Custom Soil Resource Report for Riverside County, Coachella Valley Area, California:

- Myoma fine sand, 0 to 5 percent slopes
- Myoma fine sand, 5 to 15 percent slopes

Both of the soil map units are listed on the State Hydric Soils List as hydric. However, no hydric soils were observed within the project site during the jurisdictional delineation survey.

Land Cover Types

Eight land cover types were observed and mapped within the BSA during the field surveys:

- Fourwing saltbush scrub
- Creosote bush – white bursage scrub
- Stabilized desert dunes
- Unconsolidated streambed
- Disturbed
- Tamarisk thickets
- Developed/ornamental
- Date palm – California fan palm groves

Listed Endangered, Threatened, Candidate and State Rare Plants

No listed plant species were observed within the BSA during the field surveys.

Sensitive Plants

No sensitive plant species were observed within the BSA during the field surveys.

Listed Endangered, Threatened, and Candidate Wildlife

No listed wildlife was observed within the BSA during the field surveys.

Sensitive Wildlife

One sensitive wildlife species was observed within the BSA during the field surveys:

- merlin (*Falco columbarius*) CDFW: WL

Jurisdictional Waters and Riparian/Riverine Areas

The BSA contains jurisdictional waters of the State regulated by the Colorado River Basin Regional Water Quality Control Board (RWQCB) and California Department of Fish and Wildlife (CDFW). These jurisdictional areas include five ephemeral drainages, three associated swales and an associated desert riparian wash, and an isolated playa.

Deleted: November 2022

Critical Habitat

The project site is not located within a designated or proposed United States Fish and Wildlife Service (USFWS)-designated critical habitat for plant or wildlife species.

Wildlife Corridors

The BSA contains areas of open habitat where wildlife movement could occur unimpeded. The BSA is surrounded primarily be open areas, with exception to some existing public roads and a nearby golf club. No native wildlife nursery sites were observed within the BSA. The western segment of the BSA overlaps, and the project site itself is adjacent to, the Willow Hole Conservation Area, and is expected to be used by a variety of wildlife species for both regional and local wildlife movement.

Impacts

The project would result in direct and indirect impacts to biological resources. The project would result in potentially significant impacts to sensitive plant communities, special-status plant and wildlife species, and waters of the State.

Conclusion

Best management practices, avoidance and protection measures, and mitigation measures are recommended in this BRE to minimize or avoid impacts to resources to a less than significant level. The project is consistent with the MSHCP and the state and federal statutes and regulations that protect biological resources.

Deleted: November 2022

1.0 INTRODUCTION

UltraSystems was retained by the project proponent to conduct biological surveys and prepare this BRE for the proposed project, located in the City of Desert Hot Springs (City) in Riverside County (County) (Google Earth, 2022) [See **Appendix A**, *Figures*]. The project would provide housing units and other commercial and recreational spaces on the approximately 38.34-acre site. The project includes the development of 612 residential units in addition to associated community and recreational facilities, residential parking areas, and commercial facilities. Refer to **Appendix B**, *Project Drawings* (*Site Plans*), for detailed plans of the project. The project is in compliance with the County's General Plan and Zoning designations and therefore no General Plan Amendment or Zone Change is required. The City is the Lead Agency for the purposes of the CEQA.

UltraSystems conducted a literature review and surveys (general and jurisdictional delineation) of the biological resources potentially associated with the project site of 38.34 acres and an additional 500-foot buffer area around the project site; collectively this total area is referred to as the BSA, which comprises a 117.5-acre area. The BSA includes all areas that could potentially be impacted by development of the project. Surveys did not extend beyond the BSA. The general biological surveys covered all accessible areas of the BSA. Biologists visited the BSA to conduct the following biological surveys:

- Habitat assessment, plant community and land cover type mapping.
- Jurisdictional waters (including wetlands) assessment.
- General plant surveys.
- General wildlife surveys.
- Wildlife movement evaluation.
- Jurisdictional delineation.

1.1 BRE Purpose

This BRE documents the methods and results of the literature review and the general and focused field surveys and provides a summary of existing conditions, an assessment of the potential presence of sensitive biological resources, and an analysis of the potential impacts to those resources from project construction and development. It summarizes the biological resources present within the BSA at the time of the field surveys including plant communities, plants, and wildlife; and the potential occurrence of special-status plant and wildlife species, jurisdictional waters, critical habitat, and potential wildlife corridors within the BSA. Plant and wildlife species protected by federal agencies, state agencies, and local conservation agencies and organizations, such as the California Native Plant Society (CNPS), are collectively referred to as "special-status species" in this BRE. Avian species protected by the Migratory Bird Treaty Act are not considered special-status species. Some of these plant and wildlife species are afforded special legal or management protection because they are limited in population size, and typically have a limited geographic range and/or limited habitat. The BRE also identifies and analyzes the potential biological significance of site construction and development in view of federal, state, and local laws, regulations, policies, orders, ordinances and/or management plans, and the project's consistency with local policies and ordinances protecting biological resources. Finally, it recommends, as appropriate, mitigation measures, including best management practices (BMPs), avoidance and protection measures, and mitigation measures, to avoid, eliminate and minimize impacts to biological resources that may be significantly impacted by development of the project to below a level of significance.

Deleted: November 2022

This BRE was prepared in support of the CEQA and the NEPA review conducted in connection with the project, as well as permits and approvals required for the project by federal and state resource agencies.

The project site is located within areas covered by the MSHCP; therefore, a Coachella Valley MSHCP Consistency Analysis is included in this BRE.

Figures for this BRE can be found in **Appendix A**, *Figures*. Since common names of plants and wildlife vary between references, scientific names are included upon initial mention of each species, and then the common names are used thereafter. Plant nomenclature within this BRE is based on CNPS' *Inventory of Rare and Endangered Plants of California* (online; CNPS, 2022a) and *The Jepson Manual: Vascular Plants of California*, second edition (Baldwin et al., 2012). Common plant names, when not available from this source, were taken from the CNPS website.

1.2 Project Location

The project site is located in Riverside County, California (**Appendix A**, Figure 1, *Regional Overview*). The northeast corner of the property is located west of Palm Drive and approximately 0.25 mile south of 18th Avenue, in the City of Desert Hot Springs. It is located approximately 1.1 miles northeast of Highway 10 (Santa Monica Freeway) [Google Earth, 2022]. The project site is relatively near to the San Bernardino National Forest, which occurs approximately 5.5 miles southwest of the project site at the point of nearest proximity. Other areas of the San Bernardino National Forest occur approximately 12 miles northwest of the project site (see **Appendix A**, Figure 2, *Project Vicinity* and Figure 3 *Project Location and Biological Study Area*). The BSA is located on the United States Geological Survey (USGS) 7.5-Minute Topographic Map *Desert Hot Springs* Quadrangle, and occupies Section 18 of Township 3 South, and Range 5 East. (**Appendix A**, Figure 4, *USGS Topographic Quadrangle Map*). The existing surface elevation at the subject property ranges from approximately 745 to 764 feet above mean sea level (amsl).

The project site is located within the USGS Whitewater River Watershed (HUC 18100201), in the Garnet Wash sub-watershed. (USGS HUC 1810020104; CWIP, 2022). Under existing conditions, surface drainage in the project vicinity occurs by sheetflow, generally to the south onto an adjacent site.

The project site is located northwest of the intersection of Palm Drive and 20th Avenue in the City of Desert Hot Springs (Google Earth, 2022). The subject property is approximately 38.34 acres, identified as Assessor's Parcel Number (APN): 657-280-003.

The project site is located in the Coachella Valley in the Riverside County, California. which is under the jurisdiction of the following resource agency field offices:

- **United States Fish and Wildlife Service (USFWS): Palm Springs Fish and Wildlife Office (as part of the Carlsbad Fish and Wildlife Office)**
  777 E. Tahquitz Canyon Way, Suite 208
  Palm Springs, CA 92262
  Phone: (760) 322-2070

- **California Department of Fish and Wildlife (CDFW): Inland Desert Region 6**
  3602 Inland Empire Boulevard, Suite C-220
  Ontario, CA 91764

Deleted: November 2022

Phone: (909) 484-0167
Fax: (909) 941-7364

- **United States Army Corps of Engineers (USACE): Los Angeles District**
  915 Wilshire Boulevard, Suite 980
  Los Angeles, CA 90017
  Phone: (213) 452-3908/3333
  Fax: (213) 452-4209

- **RWQCB: Colorado River Basin Region (7)**
  73-720 Fred Waring Drive, Suite 100
  Palm Desert, CA 92260
  Phone: (760)346-7491

- **Riverside County Planning Department: Environmental Programs Division (County EPD)**
  4080 Lemon Street, 12th Floor
  P.O. Box 1409, Riverside, CA 92502-1409
  Phone: (951) 955-3200
  Fax: (951) 955-3157

- **Coachella Valley Conservation Commission**
  73710 Fred Waring Drive, #200
  Palm Desert, CA 92260
  Phone: (760) 346-1127

1.3 Project Background

The proposed project would provide a total of 612 residential units. In addition to the housing units, the project will include the development of commercial spaces offering food and entertainment, medical offices, an outdoor entertainment facility, and other amenities. The proposed project is in compliance with the City's General Plan and Zoning designations and therefore no General Plan amendment or Zone Change is required. The City is the Lead Agency for the purposes of the CEQA. The County's General Plan Land Use Map designates the project site as Community Development (RCTLMA, 2015a, b; 2021). The General Plan Land Use Designations of the project site are Mixed Use Corridor (MU-C) [eastern half of project area] and Residential-High (R-H) [western half of the project area] (City of Desert Hot Springs, 2020) The Foundation Component for the project site is Mixed-Use and Commercial Corridors, therefore the BSA is not designated as "open space" according to the General Plan. The Mixed-Use and Commercial Corridors allow for the creation of commercial businesses and mixed-use corridors. The R-H designation allows for multiple unit developments between 20.0 and 30.0 units per acre. Developments are restricted to a maximum height of four stories, and quality design is encouraged to achieve long-term sustainability. The MU-C designation allows for a mix of compatible residential and commercial developments (City of Desert Hot Springs, 2020).

Deleted: November 2022

2.0 PROJECT DESCRIPTION

The project proposes the construction of housing units and other commercial and recreational spaces on the approximately 38.34-acre site. The project includes the development of 612 residential units in addition to associated community and recreational facilities, parking areas, and commercial facilities. Refer to **Appendix B**, *Project Drawings* (*Site Plans*), for detailed plans of the proposed project. Some of the proposed amenities include a community center, five community houses, a farm equipment building, and four farming areas. Proposed commercial spaces in the eastern part of the project site include medical offices, and food services and retail facilities.

Deleted: November 2022

3.0 REGULATORY CONTEXT

The project is subject to several federal, state, and local regulations designed to protect and promote environmental quality, and to protect biological resources because of their ecological importance. These regulations are summarized below and are addressed throughout the document in the appropriate subsections.

3.1 Federal Statues, Regulations and Executive Orders

3.1.1 Clean Water Act (CWA)

Section 401 – Clean Water Act

Although the Clean Water Act (CWA) is a federal law, Section 401 of that law recognizes that states have the primary authority and responsibility for setting surface water quality standards, and requires the U.S. Army Corps of Engineers to obtain a state certification that their permits for discharge or dredge and fill material do not violate state water quality standards. Section 401 of the CWA requires every applicant for a Section 404 permit resulting in any discharge of dredge or fill material into Waters of the U.S. to provide a certification that any discharges will comply with the applicable state water quality standards set pursuant to the CWA and applicable state law.

Section 401 is implemented through a Water Quality Certification (WQC) process. In the State of California, the State Water Resources Control Board (SWRCB) has given the responsibility for issuing Section 401 WQCs to the RWQCBs, unless a discharge of dredged or fill material is proposed within more than one region. In the event that a project proposes discharges of dredged or fill material in more than one region, responsibility for issuance of a Section 401 WQC will lie either with the SWRCB, or, upon agreement of the RWQCBs for the affected regions, with the RWQCB chosen in the discretion of the RWQCBs. Cal. Water Code, § 13160; Cal. Code Regs., tit. 23, § 3838. Certification must be based on a finding that the proposed discharge will comply with water quality standards, which include numeric and narrative water quality objectives applicable to identified surface waters in the Water Quality Control Plan for the region (Basin Plan) in which a discharge of fill is proposed.

Section 404 – Clean Water Act

Section 404 CWA requires authorization from the Secretary of the Army, acting through the Corps of Engineers, for the discharge of dredged or fill material into all waters of the United States, including wetlands. Authorizations are conducted through the issuance of Nationwide (or General) Permits, for activities that would cause only minimal permanent individual (between 0.1 and 0.5 acre) and cumulative impacts; through Individual (or Standard) Permits for activities that are likely to have more than a minimal permanent (greater than 0.5 acre) or cumulative impact to aquatic resources; and through Letters of Permission (LOPs) which are a type of individual permit issued through an abbreviated process that includes coordination with federal and state fish and wildlife agencies and a public interest evaluation, but without the 30-day permit notice period that is required for Individual Permits. The Los Angeles District of the USACE will provide review and permitting services for this project.

The United States Environmental Protection Agency (USEPA) and the Department of the Army (as the Corps of Engineers, or USACE) published *The Navigable Waters Protection Rule: Definition of "Waters of the United States"* (85 FR 22250), effective on June 22, 2020, defining the scope of waters federally regulated under the CWA Code of Federal Regulations (CFR) (33 CFR 328.3 and 40 CFR

Deleted: November 2022

120.2). The USEPA and the USACE (collectively, "the agencies") published the Navigable Waters Protection Rule defining the scope of waters subject to federal regulation under the CWA, in light of the U.S. Supreme Court cases in *United States v. Riverside Bayview Homes* (*Riverside Bayview*), *Solid Waste Agency of Northern Cook County v. United States* (*SWANCC*), and *Rapanos v. United States* (*Rapanos*), and consistent with Executive Order 13778, signed on February 28, 2017 (USACE and USEPA, 2020).

As a baseline concept, this final rule recognizes that waters of the United States are waters within the ordinary meaning of the term, such as oceans, rivers, streams, lakes, ponds, and wetlands, and that not all waters are waters of the United States. for example, a ''tributary'' is defined in the final rule as a river, stream, or similar naturally occurring surface water channel that contributes surface water flow to a territorial sea or traditional navigable water in a typical year either directly or indirectly through other tributaries, jurisdictional lakes, ponds, or impoundments, or adjacent wetlands. A tributary must be perennial or intermittent in a typical year. The alteration or relocation of a tributary does not modify its jurisdictional status as long as it continues to be perennial or intermittent and contributes surface water flow to a traditional navigable water or territorial sea in a typical year.

A tributary does not lose its jurisdictional status if it contributes surface water flow to a downstream jurisdictional water in a typical year through a channelized non-jurisdictional surface water feature, through a subterranean river, through a culvert, dam, tunnel, or other similar artificial feature, or through a debris pile, boulder field, or similar natural feature. The term ''tributary'' includes a ditch that either relocates a tributary, is constructed in a tributary, or is constructed in an adjacent wetland as long as the ditch is perennial or intermittent and contributes surface water flow to a traditional navigable water or territorial sea in a typical year (USACE and USEPA, 2020).

Wetlands and other waters that do not meet the definition of waters of the U.S. are not covered by the CWA; however, they are regulated by the State of California though the Porter-Cologne Water Quality Control Act (Porter-Cologne) and SWRCB Resolution No. 2019-0015 for California (SWRCB, 2019a; see **Section 3.2.8**).

3.1.2 Endangered Species Act (ESA)

The federal Endangered Species Act of 1973 (Title 16, United States Code [U.S.C.] Sections 1531-1543) (ESA), as amended, designates and provides for protection of listed threatened and endangered plant and animal species, and their critical habitat (USEPA, 2022a; USFWS, 2022a, USFWS, 2022b). The USFWS, in the Department of the Interior, and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NMFS), in the Department of Commerce, share responsibility for administration of the ESA. These responsibilities include listing and delisting species, designating critical habitat, and formulating recovery plans. The USFWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NMFS are mainly marine wildlife.

The ESA is divided into 18 Sections that are intended to work together to prevent species from going extinct by helping to stabilize populations, reduce the threats to their survival, and helping species recover to the point that they no longer require federal protection.

Deleted: November 2022

Section 4 (Determination of Endangered Species and Threatened Species)

Section 4 of the ESA addresses listing of species in need of the ESA's protection. Species are listed as either endangered or threatened under Section 4 of the ESA. A federally-endangered species is one that is facing extinction throughout all or a significant portion of its range. A federally-threatened species is one likely to become endangered within the foreseeable future throughout all or a significant portion of its range. Under Section 4, actions needed to recover those species and conserve their habitat are also identified, along with a process for reaching recovery goals that allow for a species' removal from federal protection. The presence on a project site of any fish or wildlife species that is federally listed as endangered or threatened generally imposes constraints on development to the extent that development is likely to result in a prohibited "take" of the species or substantial adverse modification of its habitat as described in Section 3.1.3.3, *Section 9 (Prohibited Acts)*, below.

Section 7 (Interagency Cooperation)

Two sections of the ESA (§7 and § 10) authorize incidental take. Section 7 of the ESA regulates take associated with federal projects or projects that require a federal permit. It also requires federal agencies to use their authority to carry out conservation programs to benefit endangered and threatened species. Under § 7, federal agencies are required to consult with the USFWS or the NMFS to ensure that any action they carry out, including those they fund or authorize (such as through a permit) will not likely jeopardize the continued existence of listed species, or result in the destruction or adverse modification of proposed or designated critical habitat of such species. Under § 7, consultations can either be informal or formal.

Section 9 (Prohibited Acts)

Once a species is listed, Section 9 of the ESA makes it unlawful for any person, including private and public entities, to "take species listed as endangered or without a permit issued pursuant to Section 10 or an incidental take statement issued pursuant to Section 7. Section 9 defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct." The term "harm" is defined as "an act which actually kills or injures wildlife. Such an act may include substantial habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering."

ESA Section 9s take prohibitions apply to listed wildlife and fish species, but not to plants. Endangered plants are not protected from take, although it is unlawful to remove, possess, or maliciously damage or destroy them on federal lands. Removing or damaging listed plants on state and private lands in knowing violation of state law, or in the course of violating a state criminal trespass law, also is illegal under the ESA.

Section 10 (Incidental Take Permits and Habitat Conservation Plans)

An incidental take permit pursuant to Section 10(a)(1)(B) is required when non-Federal, otherwise lawful activities, including lawful project development, will result in take of threatened or endangered wildlife. Under this provision, the USFWS and/or NMFS may, where appropriate, authorize the taking of federally listed wildlife or fish if such taking occurs incidentally during otherwise legal activities. Section 10(a)(2)(B) requires an application for an incidental take permit to include a HCP. The purpose of the habitat conservation planning process associated with the permit is to ensure there is adequate avoidance, minimization and mitigation measures to address the effects of the authorized incidental take. Section 10 provides a clear regulatory mechanism to

Deleted: November 2022

permit the incidental take of federally listed fish and wildlife species by private interests and non-Federal governmental agencies.

The County is a Permittee pursuant to the MSHCP and related Section 10(a)(b)(1) permit (see **Section 3.3.4 of this BRE**). Payment of the development mitigation fee and compliance with the requirements of the MSHCP are intended to provide full mitigation under CEQA, the National Environmental Policy Act (NEPA), the ESA and the California Endangered Species Act (CESA) for the impacts to the species and habitat covered by the MSHCP (MSHCP, Vol. I, p. 6-3; CVCC, 2016).

3.1.3 Migratory Bird Treaty Act (MBTA)

The Migratory Bird Treaty Act (MBTA) of 1918 (Title 16, U.S.C. Sections 703 - 712), as amended, implements various treaties and conventions between the United States (U.S.) and Canada, Japan, Mexico and the former Soviet Union for the protection of migratory birds (USFWS, 2022c). The MBTA makes it unlawful to pursue, hunt, take, capture, kill, possess, sell, purchase, barter, import, export, or transport any migratory bird, or any part, nest, or egg or any such bird, unless authorized under a permit issued by the Secretary of the Interior. Some regulatory exceptions apply. Take is defined in regulations implementing the MBTA as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to carry out these activities." The MBTA prohibits the collection and destruction of a migratory bird, its nest, and birds or eggs contained in the nest. The USFWS' Migratory Bird Permit Memorandum (MBPM-2) dated April 15, 2003, clarifies that destruction of most *unoccupied* bird nests is permissible under the MBTA; exceptions include nests of federally listed threatened or endangered migratory birds, bald eagles, and golden eagles. Take under the MBTA does not include habitat destruction or alteration, as long as there is not a direct taking of birds, nests, eggs, or parts thereof. The USFWS has statutory authority and responsibility for enforcing the MBTA.

3.1.4 National Environmental Policy Act (NEPA)

The National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. §§ 4321) requires federal agencies carrying out, funding, or permitting projects, or implementing any other major federal action that significantly adversely affects the quality of the human environment to prepare a detailed environmental impact analysis for the major Federal action. The analysis, known as the Environmental Impact Statement or an Environmental Assessment, must address the adverse environmental impacts of the proposed action, any adverse environmental effects which cannot be avoided should the proposal be implemented, alternatives to the proposed action, the relationship between local short-term uses of man's environment and the maintenance and enhancement of long-term productivity, and any irreversible and irretrievable commitments of resources which would be involved in the proposed action should it be implemented. The Council on Environmental Quality (CEQ) has promulgated regulations for implementing NEPA's requirements. (40 C.F.R. §§ 1502 et seq.) Pursuant to state and federal law, NEPA evaluations may be prepared in combination with, or may rely upon environmental analyses prepared under the California Environmental Quality Act 40 C.F.R. §§ 1506.2, 1506.4.

3.1.5 Prevention and Control of Invasive Species - Executive Order 13112

Executive Order 13112 (February 3, 1999) directs all federal agencies to work cooperatively to prevent and control the introduction of invasive non-native species in a cost-effective and environmentally sound manner to minimize their economic, ecological, and human health impacts. Executive Order 11312 established a national Invasive Species Council made up of federal agencies and departments and a supporting Invasive Species Advisory Committee composed of state, local,

Deleted: November 2022

and private entities. The Invasive Species Council and Advisory Committee oversee and facilitate implementation of the Executive Order, including preparation of a National Invasive Species Management Plan.

3.2 State Statutes and Regulations

3.2.1 California Environmental Quality Act (CEQA)

The California Environmental Quality Act of 1970 (Title 14, California Code of Regulations, §§ 15002-15387) (CEQA) is California's broadest environmental law (AEP, 2021). CEQA applies to certain activities of state and local public agencies. It requires lead agencies - that is, those making land use decisions – as well as any other responsible state agencies issuing discretionary permits, to evaluate and disclose the significance of all potential environmental impacts of a project. The lead agency is also responsible for identifying, negotiating and implementing feasible impact avoidance, minimization, or mitigation measures that reduce and compensate for significant environmental impacts with the goal of reducing those impacts to less than significant levels. Lead agencies determine significance on a project-by-project basis because they must consider all potential risk, including cumulative impacts, within a local and regional context, as well as evaluate unique factors particular to the project area when exercising their discretion to approve or disapprove a project.

The CEQA Guidelines specify that a project has a significant impact to the environment if, among other things, it has the potential to "substantially degrade the quality of the environment; substantially reduce the habitat of a fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or an animal community; substantially reduce the number or restrict the range of an endangered, rare or threatened species…." [CEQA Guidelines § 15065(a)(1)] (AEP, 2022).

The purpose of CEQA is to:

- Disclose to the public the significant environmental impacts of a proposed discretionary project, through the preparation of an Initial Study, Negative Declaration, or Environmental Impact Report.
- Prevent or minimize damage to the environment through development of project alternatives, mitigation measures, and mitigation monitoring.
- Disclose to the public the agency decision making process utilized to approve discretionary projects through findings and statements of overriding consideration.
- Enhance public participation in the environmental review process through scoping meetings, public notice, public review, hearings, and the judicial process.
- Improve interagency coordination through early consultations, scoping meetings, notices of preparation, and State Clearinghouse review.

3.2.2 California Endangered Species Act (CESA)

The California Endangered Species Act (CESA) (California Fish and Game Code §§ 2050-2089) was enacted in 1984 to parallel the federal ESA and allows the Fish and Game Commission to designate species, including plants, as "threatened" or "endangered" (California Legislative Information, 2022). The CESA states that all native species of fishes, amphibians, reptiles, birds, mammals, and plants, and their habitat, threatened with extinction and those experiencing a significant decline which, if

Deleted: November 2022

not halted, would lead to a threatened or endangered designation, will be protected or preserved. Unlike the ESA, the CESA does not include listing provisions for invertebrate species.

CESA makes it illegal to import, export, take, possess, purchase, sell, or attempt to do any of those actions to species that are designated as threatened, endangered, or candidates for listing, unless permitted by CDFW. Section 2080 of the California Fish and Game Code prohibits take of any species that the Commission determines to be an endangered species or a threatened species. "Take" is defined in Section 86 of the California Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."

Under Section 2081 of CESA, CDFW may permit take or possession of threatened, endangered, or candidate species for scientific, educational, or management purposes, and may also permit take of these species that is incidental to otherwise lawful activities if certain conditions are met. Some of the conditions for issuance of permits allowing incidental take are that the adverse effects of the take must be minimized and fully mitigated, adequate funding must be ensured for implementation of identified mitigation, and that the activity shall not jeopardize the continued existence of the listed species. CESA emphasizes early consultation to avoid potential impacts to candidate and listed endangered and threatened species, and to develop appropriate mitigation to offset project-caused losses of listed species populations and their essential habitat.

3.2.3 Fully Protected Species - California Fish and Game Code § 3511, § 4700, § 5050 and § 5515

The classification of fully protected was the State of California's initial effort in the 1960s to identify and provide additional protection to those animals that were rare or faced possible extinction. Lists were created for birds (§ 3511), mammals (§ 4700), amphibians and reptiles (§ 5050), and fish (§ 5515). Fully protected animal species may not be taken or possessed at any time and no licenses or permits may be issued for their take, except for collecting these species for scientific research and relocation of the species for certain purposes. "Take" is defined in Section 86 of the California Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Under Section 2835 of the Fish and Game Code, CDFW may only issue permits allowing incidental take of fully protected species if a NCCP is prepared that provides for the protection of that species in accordance with the requirements and standards applicable to NCCPs (Fish and Game Code Sections 2800-2835). Alternatively, avoidance measures sufficient to prevent incidental take of fully protected species must be incorporated into project design, and construction plans and operations. The MSHCP is a HCP and a NCCP, and includes incidental take authorization pursuant to Fish and Game Code Section 2085, but the MSHCP does not authorize take of fully protected species.

3.2.4 Bird Nests and Eggs - California Fish and Game Code § 3503

California Fish and Game Code § 3503 states that it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by this code or any regulation made pursuant thereto. Disturbance that causes nest abandonment and/or loss of reproductive effort (e.g., killing or abandonment of eggs or young) may be considered take. Avoidance measures sufficient to prevent incidental take of bird nests and eggs protected by this statute must be incorporated into project design, and construction plans and operations.

Deleted: November 2022

3.2.5 Birds of Prey and their Eggs – California Fish and Game Code § 3503.5

The word "raptor" is the term used for a group of birds consisting of hawks, falcons, kites, eagles, vultures and owls. Raptors, also referred to as "birds of prey," are a valuable resource to the State of California. More than 30 species of raptors inhabit California at some point in their life cycle. California Fish and Game Code § 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (raptors) or to take, possess, or destroy the nest or eggs of any such birds except as otherwise provided by this code or any regulation adopted pursuant thereto. The order Falconiformes is comprised of four families with around 311 species. These are the birds of prey (falcons, hawks, eagles, vultures, and ospreys). The order Strigiformes, comprised solely of owls, contains two families and over 130 species. All raptors and their nests are protected under § 3503.5. Avoidance measures sufficient to prevent incidental take of these species, their eggs and their nests protected by this statute must be incorporated into project design, and construction plans and operations.

3.2.6 Migratory Birds – California Fish and Game Code § 3513

California Fish and Game Code § 3513 protects California's migratory birds by making it unlawful to take or possess any migratory non-game bird as designated by the MBTA, except as authorized in regulations adopted by the federal government under provisions of the MBTA. Except as permitted by USFWS under the MSHCP, avoidance measures sufficient to prevent incidental take of these species, their eggs and their nests protected by this statute must be incorporated into project design, and construction plans and operations

3.2.7 Native Plant Protection Act (NPPA) – California Fish and Game Code §§ 1900-1913

The Native Plant Protection Act (NPPA), enacted in 1977, allows the Fish and Game Commission to designate native plants as state "endangered" or "rare," mirroring the designations created for animal species by the CESA of 1970. The NPPA, administered by CDFW, requires all state agencies to utilize their authority to preserve, protect and enhance endangered or rare native plants of California. Section 1908 of the NPPA prohibits the take, possession, propagation, import, export, or sale of any native plant that the Fish and Game Commission determines to be an endangered or rare native plant, except when the take is incidental to agricultural and nursery operations, emergencies, or the possession or sale of real property on which the plant is growing.

CDFW may authorize the take, possession, import, or export of some plants that are protected by the NPPA. It may also authorize take and possession for scientific, educational or management purposes, or authorize take that is incidental to otherwise lawful activities if certain conditions are met. CDFW issues most of these permits to individuals to identify, document and voucher listed plant species, typically during botanical surveys, and may also issue permits to individuals or organizations for other scientific, educational or management purposes, most typically research or recovery actions for state-listed plant species. Section 1913(c) further provides that where the owner of land has been notified by CDFW that native plant listed as rare or endangered is growing on such land, the owner shall notify CDFW at least 10 days in advance of changing the land use to allow for salvage of the listed plant(s) subject to the notification. The failure by CDFW to salvage such plant within 10 days of notification of change in land use shall entitle the owner of the land to proceed with the change.

Deleted: November 2022

3.2.8 Porter-Cologne Water Quality Control Act

Porter-Cologne defines water quality objectives as the allowable "limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisances within a specific area." Thus, water quality objectives are intended to protect the public health and welfare, and to maintain or enhance water quality in relation to the existing and/or potential beneficial uses of the water. Water quality objectives apply to both waters of the U.S. and waters of the State. In the State of California, Porter-Cologne is administered in concurrence with the § 401 CWA WQC. As with § 401 CWA, the Colorado River Basin RWQCB (Region 7) would provide review and WQC for Porter-Cologne

3.2.9 State Water Resources Control Board Resolution No. 2019-0015

The California Code of Regulations, Title 23, Section 3831(w) states that "[a]ll waters of the United States are also 'waters of the state.'" This regulation has remained in effect despite Supreme Court decisions such as Rapanos and SWANCC, which added limitations to what could be considered a water of the U.S. Because the interpretation of waters of the U.S. in place at the time § 3831(w) was adopted was broader than any post-Rapanos or post-SWANCC regulatory definitions that incorporated more limitations into the scope of federal jurisdiction, it is consistent with the Water Boards' intent to include both historic and current definitions of waters of the U.S. into the SWRCBs wetland jurisdictional framework.

As set forth in Resolution No. 2009-0026, although the state of California has historically relied primarily on requirements in the Clean Water Act to protect wetlands, U.S. Supreme Court rulings reducing the jurisdiction of the Clean Water Act over wetland areas by limiting the definition of "waters of the United States" necessitated the use of California's independent authorities under Porter-Cologne to protect these vital resources.

The inclusion of both current and historic definitions of "waters of the U.S." ensures some regulatory stability in an area that has otherwise been in flux. The status of a water of the U. S. may only be used to establish that a wetland or water qualifies as a water of the State; it cannot be used to exclude a wetland or water from qualifying as a water of the State. In other words, wetlands that are categorically excluded from qualifying as a water of the U.S. may nevertheless qualify as waters of the State under another jurisdictional category. Examples of waters of the State include (but are not limited to) ephemeral streams and isolated wetlands.

On April 2, 2019, the SWRCB adopted **Resolution No. 2019-0015**, *Amendment to the Water Quality Control Plan for Ocean Waters of California and the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California to Establish a State Wetland Definition and Procedures for Discharges of Discharges of Dredged or Fill Material to Waters of the State* (Procedures). for inclusion in the forthcoming Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California (SWRCB, 2019a). As they apply to this project, the Procedures provide the SWRCB and its nine RWQCBs to approve a project only if the applicant has demonstrated the following:

- A sequence of actions has been taken to first avoid, then to minimize, and lastly, compensate for adverse impacts that cannot be practicably avoided or minimized to waters of the state;

Deleted: November 2022

- The potential impacts will not contribute to a net loss of the overall abundance, diversity, and condition of aquatic resources in a watershed (or multiple watersheds when compensatory mitigation is permitted in another watershed);

- The discharge of dredged or fill material will not violate water quality standards and will be consistent with all applicable water quality control plans and policies for water quality control; and

- The discharge of dredged or fill material will not cause or contribute to significant degradation of the waters of the state.

On January 26, 2021, the Superior Court in *San Joaquin Tributaries Authority v. California State Water Resources Control Board* issued a judgment upholding the adoption of the Procedures as part of the (1) California Ocean Plan and (2) Inland Surface Waters and Enclosed Bays and Estuaries Water Quality Control Plan (ISWEBE Plan) for "waters of the United States" as defined by the Clean Water Act.

On April 6, 2021, the SWRCB issued **Resolution No. 2021-0012** confirming that the "State Wetland Definition and Procedures for Discharges of Dredged or Fill Material to Waters of the State" (1) are in effect as state policy for water quality control for all waters of the State and (2) shall be applied via the inland surface waters and enclosed bays and estuaries plan to only waters of the United States. (SWRCB, 2022)

The SWRCB and its nine RWQCBs have the authority to regulate the discharge of dredged or fill material under § 401 CWA and Porter-Cologne. Dischargers that obtain a federal permit or license that authorizes impacts to waters of the U.S. (i.e., waters that are within federal jurisdiction), such as § 404 CWA and § 10 of the Safe Rivers and Harbors Act, must obtain certification from the SWRCB or a RWQCB to ensure that the discharge does not violate state water quality standards or any other appropriate requirement of State law. When a discharge is proposed to waters outside of federal jurisdiction, the SWRCB and the RWQCBs regulate the discharge under Porter-Cologne through the issuance of Waste Discharge Requirements (WDRs). CWA § 401 WQCs, WDRs, and waivers of WDRs are referred to as orders or permits.

The Colorado River Basin RWQCB (Region **7**) will provide review and certification/permitting for this project.

Basin Plans.

The SWRCB requires its nine RWQCBs to develop water quality control plans (Basin Plans) designed to preserve and enhance water quality and protect the beneficial uses of all Regional waters. Specifically, Basin Plans designate beneficial uses for surface waters and groundwater, set narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State antidegradation policy, and describe implementation programs to protect all waters in the Regions. In addition, Basin Plans incorporate by reference all applicable State and Regional Board plans and policies, and other pertinent water quality policies and regulations. This project is under the jurisdiction of the Colorado River Basin RWQCB.

Deleted: November 2022

Construction Stormwater Program.

The SWRCB implements water quality regulations under the federal CWA and Porter-Cologne and requires compliance with the National Pollutant Discharge Elimination System (NPDES) for discharges of stormwater runoff associated with a construction activity.

Dischargers whose projects disturb one acre or more of soil are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 2009-009-DWQ, as amended). Construction Activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP should contain a site map(s) which shows the construction site perimeter, existing and proposed buildings, lots, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns.

The SWRCB will provide Construction General Permit review and permitting for this project.

Lake or Streambed Alteration Agreement.

Sections 1600-1617 FGC of the FGC protect the natural flow and the bed, channel, and bank of any river, stream, or lake designated by the CDFW which is at any time an existing fish or wildlife resource, or a waterbody from which these resources derive benefit. General project plans must be submitted to CDWF in sufficient detail to indicate the nature of the project proposed for construction, if the project would:

- Divert, obstruct, or change a streambed;
- Use material from the streambeds;
- Result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a stream.

The Inland Deserts Region (Region 6) of the CDFW serves the County and would provide LSA Notification Review and Agreement services for this project.

3.2.10 Natural Community Conservation Planning Act of 2003 (NCCP Act)

The California Natural Community Conservation Planning Act (NCCP Act) was enacted to encourage broad-based planning to provide for effective protection and conservation of the State's wildlife resources while continuing to allow appropriate development and growth (California Fish and Game Code §§ 2800 to 2835). NCCPs may be implemented, which identify measures necessary to conserve and manage natural biological diversity within the planning area, while allowing compatible and appropriate economic development, growth, and other human uses. An approved NCCP enables the California Department of Fish and Wildlife to authorize take of species consistent with the NCCP Act and California Fish and Game Code § 2835.

Deleted: November 2022

3.3 Regional and Local Ordinances, Plans and Policies

3.3.1 City of Desert Hot Springs General Plan

The City's General Plan (General Plan) covers the areas within the City boundary and City sphere of influence (RCTLMA, 2021). The Land Use and Community Design Element of the General Plan designates the distribution, location, and extent of land uses within the Plan area. Designations are organized into five foundational elements that guide the context of the Land Use Plan of the General Plan. The General Plan Foundation Components describe the overall nature and intent of each of the five General Plan land uses: Downtown/Arts and Culture District, Mixed-Use and Commercial Corridors, Freeway Commercial, Spa & Resort District, and Open Space.,. These Foundation Components are general in nature and do not determine the specific land use on individual properties located within the boundaries of the Plan. Instead, parcel-specific land uses are located on the individual area plan land use maps.

The General Plan Land Use Designations of the project site are Mixed Use Corridor (MU-C) [eastern half of project area] and Residential-High (R-H) [western half of the project area] (City of Desert Hot Springs, 2020) The Foundation Component for the project site is Mixed-Use and Commercial Corridors, therefore the BSA is not designated as "open space" according to the General Plan. The Mixed-Use and Commercial Corridors allow for the creation of commercial businesses and mixed-use corridors. The R-H designation allows for multiple unit developments between 20.0 and 30.0 units per acre. Developments are restricted to a maximum height of four stories, and quality design is encouraged to achieve long-term sustainability. The MU-C designation allows for a mix of compatible residential and commercial developments (City of Desert Hot Springs, 2020).

3.3.2 Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP)

A 1994 Scoping Study prepared for the Coachella Valley Association of Governments (CVAG) by the Coachella Valley Mountains Conservancy (CVMC) recommended that a Multiple Species Habitat Conservation Plan be prepared for the entire Coachella Valley and surrounding mountains to address current and potential future state and federal Endangered Species Act issues in the Plan Area.
The MSHCP is a comprehensive, multi-jurisdictional regional plan focusing on conservation of species and associated habitat to address biological and ecological diversity conservation needs, while development is simultaneously approved on non-federal lands in the Coachella Valley. The MSHCP serves as a HCP pursuant to § 10(a)(1)(B) of the ESA, as well as a NCCP under the California Natural Community Conservation Planning Act. HCPs came out of an amendment to the ESA allowing "incidental take" by using a planning process that protects listed species while allowing for lawful activities of landowners in the presence of listed species. Rather than deal with endangered species on a one-by-one basis, the MSHCP focuses on the conservation of 146 species and their habitat. The MSHCP establishes a framework and mechanism for projects to comply with state and federal endangered species regulations.

From 1996 to 1997, the Parties to the Planning Agreement approved an amendment that stipulates that the Plan will meet the intent of the NCCP Act as well as the CESA and the FESA, and, further, that the Planning Agreement constitutes an agreement to prepare an NCCP as specified in California Fish and Game Code Section 2810.

The Plan and Final EIR/EIS were released in early 2006 for local jurisdiction approval. In June 2006, the City voted not to approve the Plan. The CVAG Executive Committee then rescinded its approval of the Plan and directed that the Plan be revised to remove Desert Hot Springs as a Permittee and

Deleted: November 2022

reflect other project description modifications that had been suggested during public review. This recirculated Draft Plan implements that direction. Subsequent to the original approved Plan, the City and Mission Springs Water District became Permittees through a Major Amendment.

The Plan is intended to satisfy the legal requirements for the issuance of Permits that will allow the Take of species covered by the Plan in the course of otherwise lawful activities. The Plan will, to the maximum extent feasible, minimize and mitigate the impacts of the Taking and provide for Conservation of the Covered Species.

The Plan has been prepared under direction of CVAG, which contracted with CVMC for preparation of the Plan. A Project Advisory Group (PAG), composed of representatives of the Parties to the Planning Agreement; other public agencies, including CVWD and the University of California (UC); and private sector groups, including the Building Industry Association, the Sierra Club, The Nature Conservancy (TNC), the Center for Natural Lands Management (CNLM), and the County Farm Bureau, has provided a forum for input from an array of interests. All PAG meetings have been public meetings to provide an opportunity for public input. Public forums were held in 1998, 1999, and 2000, and special meetings and contact by mail have provided opportunities for potentially affected landowners to offer input into the planning process. A Scientific Advisory Committee (SAC) provided technical expertise on biological issues. The SAC is made up of biologists from BLM, NPS, USFS, UC, initially TNC and subsequently CNLM, and CVWD, and one non-biologist who provided liaison with the PAG. USFWS and CDFG (Wildlife Agencies) have also attended most SAC meetings. A Geographic Information Systems (GIS) Team, composed of staff from BLM, CVAG, CVMC, and the County, has provided GIS services, including developing data layers, natural communities and species distribution mapping and modeling, gap analysis, and reserve design and corridor mapping. The proposed term of the Permits is 75 years, which is the length of time required to adequately fund the implementation of the Plan. The acquisition program is projected to require 30 years to acquire all the Permittee obligation land. Full funding of the endowment for the Monitoring Program, the Management Program, Adaptive Management, and ongoing administration costs is projected to require 75 years.

Plan Area

The MSHCP plan area encompasses approximately 1.2 million acres (1,966 square miles) in the Coachella Valley and the surrounding mountains of central Riverside County. Indian reservation lands are not included in provisions of the MSHCP, therefore areas covered by the MSHCP total approximately 1.1 million acres The boundaries of the Plan area extend westward to Cabazon at the approximate limit of the Sonoran or Colorado Desert in the San Gorgonio Pass Area. The easternmost limit of the Plan area is proximal to the Little San Bernardino Mountains ridgeline. The Plan area is bounded on the south by either the ridgelines of the San Jacinto and Santa Rosa Mountains or the boundary line with San Diego and Imperial Counties (Google Earth, 2022; CVCC, 2016). The MSHCP divides the plan area into 21 smaller "Conservation Areas" based on a combination of ecological and jurisdictional factors, and for management purposes. Conservation Areas are community planning areas defined in the County's General Plan. For each Conservation Area, objectives and required measures are provided for conserving core Habitat for covered species, essential ecological processes necessary to maintain habitat, biological corridors and linkages as needed, and the less common conserved natural communities. The project area, while within the MSHCP area, does not occur within one of these 21 Conservation Areas. However, the western edge of the project area borders the eastern boundary of the Willow Hole Conservation Area.

Deleted: November 2022

Covered Species

Collectively, 27 individual species and 27 natural communities are addressed under the MSHCP and are referred to as "Covered Species". Permits issued pursuant to the MSHCP provide take authorization for Covered Species identified by the plan and the Implementing Agreement.

The Plan would conserve 27 species indigenous to this area of the County that either have special status designated under the FESA and/or the California Endangered Species Act (CESA) or species that are likely to become listed during the term of the permit. These include species that are listed as "endangered" or "threatened" under the FESA or that have been "proposed" or are "candidates" for listing. Additionally, 27 natural communities are included in the MSHCP. This approach protects general biological diversity in the Plan area, resulting in more functional ecosystems, reduced conflicts with development activities, and reduced potential for any additional species to be proposed for listing in the future. Each Permittee participating in the proposed Plan would be a signatory to the IA. Upon issuance of the Permits, the Permittees would be granted Take Authorization for otherwise lawful actions, such as Development, that may result in Take. Local Permittees would be required to ensure future Development is consistent with the MSHCP. Authority for the issuance of Federal and State Take Authorizations is set forth in Section 10(a)(1)(B) of FESA and Section 2835 of the California Fish and Game Code, respectively.

Reserve System

The Plan includes the establishment of an MSHCP Reserve System that sets conservation objectives to ensure conservation of the covered species and conserved natural communities in the MSHCP Reserve System. The Reserve System is established from lands within 21 Conservation Areas and provides for conservation of approximately 746,100 acres of land supporting the habitat and requirements for the 27 species and their habitat. For each Conservation Area, conservation objectives and required measures are implemented for conserving Core Habitat for Covered Species, Essential Ecological Processes, Biological Corridors and Linkages, and the conserved natural communities. Core Habitat has not been determined for all species, in which case the conservation objectives are stated for either acres of mapped habitat or known occurrences.

MSHCP Section 4.5 *Land Use Adjacency Guidelines*

The objective of providing *Land Use Adjacency Guidelines* is to avoid or minimize indirect effects related to developments adjacent to or within the Conservation Areas. "Adjacent: is defined in the MSHCP as: "*sharing a common boundary with any parcel in a Conservation Area*." Such indirect effects are referred to as "edge effects", which include "*noise, lighting, drainage, intrusion of people, and the introduction of non-native plants and non-native predators such as dogs and cats*". Edge effects will also be addressed through reserve management activities such as fencing. *Land Use Adjacency Guidelines* shall be considered by the Permittees in their review of individual public and private development projects adjacent to or within the MSHCP Conservation Areas to minimize "edge effects". These guidelines are to be implemented where applicable. Refer Section 4.5 Land Use Adjacency Guidelines of the MSHCP (pp. 4-176 – 4-177; CVCC, 2016).

Permittees

The County is a plan participant and a signatory to the Implementing Agreement (2004). The plan participants are Permittees of the Section 10(a) permit issued by the USFWS and the NCCP permit issued by CDFW for "take" of Covered Species in conformance with the MSHCP and the Implementing

Deleted: November 2022

Agreement. The term "permits" refers, collectively, to the Section 10(a)(1)(B) Permit and NCCP Permit issued by USFWS and CDFG, collectively to permittees for Take of Covered Species pursuant to FESA and the NCCP Act and in conformance with the MSHCP and the Implementing Agreement (IA), a contractual obligation between the individual Permittees and the Wildlife Agencies.

Take Authorization to Third Parties

Under the MSHCP, the USFWS and CDFW grants "take authorization" for otherwise lawful actions, such as public and private development that may incidentally take or harm individual species or their habitat, in exchange for the assembly and management of a coordinated MSHCP Conservation Area. Plan participants may integrate projects on the incidental take permit by complying with certain requirements and paying a Local Development Mitigation Fee. Plan participants can issue take authorizations for all Covered Species and their habitat, even federally listed and state-listed species protected by the ESA, CESA, and NPPA. Complying with MSHCP survey requirements, submitting necessary reports and applications, and paying Local Development Mitigation Fees gives plan participants full mitigation under the ESA, CESA, CEQA, and the National Environmental Policy Act for direct, indirect, and cumulative impacts to MSHCP Covered Species and their habitat. However, it is recognized that the MSHCP cannot provide mitigation for projects regulated by entities or agencies not participating in the MSHCP. The purpose of the MSHCP is described as "to obtain Take Authorization (Take Permits) pursuant to FESA and the NCCP Act for Covered Activities in the Coachella Valley while balancing environmental protection with regional economic objectives and simplifying compliance with the State and Federal Endangered Species Acts and other applicable laws and regulations" (CVCC, 2016).

Deleted: November 2022

4.0 STUDY METHODS

This Section describes the study methods used by biologists for evaluating the biological resources within the BSA and the project vicinity. Refer to **Appendix C**, *Field Data Sheets* for field data and **Appendix D**, *Site Photographs* for photographs of site conditions during surveys.

4.1 Literature Review

Prior to their field surveys, biologists conducted a literature review to identify habitat, special-status plant and wildlife species, jurisdictional areas, critical habitat, and wildlife movement corridors potentially associated with the project site. Biologists reviewed relevant literature, databases, agency web sites, reports and management plans, Geographic Information System (GIS) data, maps, and aerial imagery obtained from public domain sources. The review also helped to determine which biological surveys may be required prior to site construction and development.

4.1.1 Topography and Physical Features

To gain a perspective of the topographic and physical features associated with the BSA and project vicinity, biologists reviewed maps such as the USGS 7.5-Minute Topographic Map *Desert Hot Springs Quadrangle* and current aerial imagery (Google Earth, 2022). Information obtained from this review included onsite and offsite locations of city and county boundaries and jurisdictions; valleys, hills, and mountain ranges; park boundaries; natural and man-made drainages, potential wetlands, and open waters (lakes, ponds, etc.); plant community boundaries; land use such as developed land, agriculture, and natural open space; important landmarks; roads, highways, paths, and trails; and potential wildlife movement corridors.

4.1.2 Soils

The Web Soil Survey, operated by the United States Department of Agriculture's (USDA's) Natural Resources Conservation Service (NRCS), was used to create a custom soil resource report for a description of the soils associated with the BSA (Soil Survey Staff, 2022). The Web Soil Survey provides soil data and information produced by the National Cooperative Soil Survey. Refer to **Appendix E**, *Soils Report* for the USDA NRCS custom soil resource report for the BSA.

4.1.3 Sensitive Plant Communities and Special-Status Plant and Wildlife Species

The methods described below were used to research and derive a comprehensive project-specific list of sensitive habitats, and special-status plants and wildlife to target during the field surveys. The literature review and query of the databases for reported locations of special-status species and habitat helped to identify the known locations of these resources in the project region and assisted in identifying the potential for on-site occurrence of such species.

- CDFW's California Natural Diversity Database (CNDDB) was used to identify sensitive plant communities and special-status plant and wildlife species that may exist within the project site and within a ten-mile radius of the site (CNDBB, 2022a, b).

- The USFWS' Information, Planning, and Conservation (IPaC) system was used to identify federal threatened and endangered plant and wildlife species and other natural resources of concern that may exist within the BSA (USFWS, 2022d; USFWS, 2022e).

Deleted: November 2022

- Reports and other information, and databases associated with the MSHCP (CVCC, 2016)

- Previous consultant studies and reports near the project site and project vicinity were reviewed to gain a sense of the existing conditions at the time the studies were conducted.

Although the inventory list of special-status plant and wildlife species was not exhaustive of all species that might be of concern for the project area, it provided a wide range of species that are representative of the habitat in the area.

Sensitive Plant Communities

Sensitive plant communities (sensitive habitat) are communities that are of limited distribution statewide or within a county or region and are often vulnerable to environmental impacts of projects (CDFW, 2018). Sensitive habitats are often threatened with local extirpation and are therefore considered as valuable biological resources. The most current version of CDFW's *California Natural Community List* indicates which natural communities are sensitive given the current state of the California classification (CDFW, 2022a). The *California Natural Community List* (CDFW, 2022a), the MSHCP (CVCC, 2016), *Preliminary Descriptions of the Terrestrial Natural Communities of California. State of California* (Holland, 1986) and *A Manual of California Vegetation, Second Edition* (Sawyer et al., 2009) were all referenced for ranking the conservation status of vegetation communities within the BSA. The *California Natural Community List* includes alliance rankings according to their degree of imperilment. For this BRE, plant communities are considered "sensitive" if they meet any of the following criteria:

- Recognized and considered sensitive by CDFW, USFWS, and/or special interest groups such as the CNPS.
- Habitat is under the jurisdiction of the USACE pursuant to Section 404 of the CWA and/or is under the jurisdiction of the CDFW pursuant to §§ 1600-1612 of the California Fish and Game Code.
- Known or believed to be of high priority for inventory in the CNDDB.
- Considered regionally rare.
- Has undergone a large-scale reduction due to increased encroachment and development.
- Supports special-status plant and/or wildlife species.
- Functions as an important corridor for wildlife movement.

Based on a review of the CNDDB list generated for this project (CNDDB, 2022a), three sensitive habitats have the potential to occur within ten miles of the project site (**Table 4.1-1**, *CNDDB Sensitive Habitat within Ten Miles of the Project Site*).

TABLE 4.1-1
CNDDB SENSITIVE NATURAL COMMUNITIES WITHIN TEN MILES OF THE PROJECT SITE

Holland Natural Community[1]	MSHCP Vegetation Communities Classification[2]	MCV Common Alliance Name[3]	CDFW CA Code[4]
desert fan palm oasis woodland (62300)	Sonoran mixed woody succulent scrub	California fan palm oasis	61.520.00
Mojave riparian forest (61700)	Sonoran mixed woody succulent scrub	-	-
Southern riparian forest	Sonoran mixed woody succulent scrub	-	-

Deleted: November 2022

Holland Natural Community[1]	MSHCP Vegetation Communities Classification[2]	MCV Common Alliance Name[3]	CDFW CA Code[4]

1. The Holland plant community types and codes are taken from Robert F. Holland's *Preliminary Descriptions of the Terrestrial Communities of California* (Holland, 1986).
2. The MSHCP Conserved Natural Communities are provides in Section , Section 10.1.3, Table 10-1, Natural Communities to be Conserved in Conservation Areas (CVCC, 2016).
3. The MCV Common Alliance Name is taken from A Manual of California Vegetation, Second Edition (Sawyer et al., 2009)
4. The CDFW CA Code is taken from the *California Natural Community List* (CDFW, 2022a)

Special-Status Plants

Based on a literature review and query from publicly available databases (USFWS 2022d, e; CNDDB, 2022a) for reported occurrences within a ten-mile radius of the project site, 23 special-status plant species, 3 listed and 20 sensitive, were reported as occurrences. These species were identified by one or more of the following means: reported in the search, recognized as occurring based on previous surveys or knowledge of the area, or observed during the habitat assessment survey; hereafter, all of the special-status plant species identified by the aforementioned means will be referred to as the plant inventory. Of those 23 total species, ten sensitive and two listed plant species were determined to have at least a low potential to occur in the BSA (see **Appendix F,** *Special-Status Species Potential Occurrence Determination*). Refer to **Appendix A**, Figure 5, *CNDDB Known Occurrences Plant Species and Habitat*, for a list of special-status plant species and sensitive plant communities that are reported in the CNDDB database within a two-mile radius of the BSA.

Each special-status plant species was assessed for its potential to occur within the BSA by comparing its habitat, elevation range and distribution obtained from the literature review, the CNPS website (CNPS, 2022a) and other databases with the location and elevation range of the BSA. A species was determined as having "no potential to occur" within the BSA if the BSA is outside the species' known distribution and/or the species' known elevation range. Through this analysis, 11 of the 23 special-status plant species were determined to have no potential to occur within the BSA and were eliminated from further evaluation; these species are listed in **Section 5.3.4** and **Section 5.3.5**. It is anticipated that the project will have no impacts to these species and they are listed but not discussed further in this BRE. The potential to occur analysis of special-status plant species with at least a low potential to occur in the BSA can be found in **Appendix F**, *Special-Status Species Potential Occurrence Determination*).

Special-Status Wildlife

Based on a literature review and query from publicly available databases (USFWS, 2022d, e; CNDDB, 2022a) for reported occurrences within a ten-mile radius of the project site, 49 special-status wildlife species, 15 listed and 34 sensitive, were reported as occurrences. These species were identified by one or more of the following means: reported in the search, recognized as occurring based on previous surveys or knowledge of the area, or observed during the habitat assessment survey; hereafter, all of the special-status wildlife species identified by the aforementioned means will be referred to as the wildlife inventory. Of those 49 total species, 4-listed and 18 sensitive wildlife species were determined to have at least a low potential to occur in the BSA, and one sensitive species was observed onsite (see **Appendix F,** *Special-Status Species Potential Occurrence Determination*). Refer to **Appendix A**, Figure 6, *CNDDB Known Occurrences Wildlife Species*, for a list of special-status

Deleted: six

Deleted: one

Commented [MS1]: Chambers Rd 2: Section 4.1.3, Sensitive Plants, First Paragraph - States that of the 23 total species, six sensitive and one listed plant species have at least a low potential to occur; however, according to Section 6.3 and Appendix F, ten sensitive and two listed species have a potential to occur.

Commented [MS2R1]: Revised.

Deleted: November 2022

plant species and sensitive plant communities that are reported in the CNDDB database within a 2-mile radius of the BSA.

Each special-status wildlife species was assessed for its potential to occur within the BSA by comparing its habitat elevation range and distribution (if known) with the location and elevation range of the BSA. A species was determined as having "no potential to occur" within the BSA if the BSA is outside the species' known distribution and/or the species' known elevation range. Through this analysis, 26 of the 49 special-status wildlife species were determined to have no potential to occur within the BSA and were eliminated from further evaluation; these species are listed in **Section 5.4.2** and **Section 5.4.3**. It is anticipated that the project will have no impacts to these species and they are listed but not discussed further in this BRE. The potential to occur analysis of special-status wildlife species with at least a low potential to occur in the BSA can be found in **Appendix F**, *Special-Status Species Potential Occurrence Determination*.

4.1.4 Jurisdictional Waters

Aerial imagery was reviewed to identify natural and man-made drainages, open water (lakes, ponds, etc.), and other features that may be subject to federal or state jurisdictional authority within the BSA. The USGS 7.5-Minute Topographic Map *Desert Hot Springs* Quadrangle was reviewed to identify potential presence or absence of onsite and offsite watercourses, and topographic features than may be indicative of water features. Topographic maps do not show all drainages that may exist.

The National Wetlands Inventory (NWI) database and maps developed by the USFWS were used as preliminary indicators of potential wetland areas based on changes in vegetation patterns as observed from satellite imagery (USFWS, 2022f). The NWI data were viewed in GIS platforms (Google Earth, 2022), including the USFWS Wetlands Mapper (USFWS 2022f) to identify potentially jurisdictional features within the project area as indicated from topographic changes or visible stream patterns. The digital wetland data for the project vicinity was later ground-truthed during biological surveys.

The USGS National Hydrography Dataset (NHD) was also used to identify hydrologic features such as rivers, streams, canals, lakes, and ponds. (USGS, 2022a).

Additionally, the watershed boundary data set containing the most current 10-digit and 12-digit HUCs was obtained in geodatabase form from the USGS to aid with assessing USACE jurisdiction of waters draining the project site (USGS, 2022b).

The following were also reviewed and consulted:

- *1987 Manual* (i.e., *Corps of Engineers Wetlands Delineation Manual;* Environmental Laboratory, 1987).
- *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE, 2008; referred to as *Arid West Supplement* in this BRE*).*
- *The National Wetland Plant List. version 3.4*: (USACE, 2020a).
- *The National Wetland Plant List.2020 List of Proposed Changes* (USACE, 2020b).
- *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Lichvar and McColley, 2008).
- *Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Curtis and Lichvar, 2010).

Deleted: November 2022

- *United States Department of Agriculture National Resources Conservation Service Hydric Soils List* (USDA-NRCS, 2022a).

The USACE published the 1987 Manual for the identification and delineation of wetlands which have since been superseded and presented in regional supplements. In 2008, the USACE published the Arid West Supplement, which is a supplement to the 1987 Manual that describes wetland indicators, delineation guidance, and other information that is specific to the arid west region (USACE, 2008). The USACE and CDFW's definitions of wetlands are described below.

4.1.5 Critical Habitat

When a species is listed as federal endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. Under the ESA, the Secretary of the Department of the Interior is required to designate "critical habitat" for each species it lists under the ESA. Federal agencies are prohibited from authorizing, funding or carrying out actions that "destroy or adversely modify" critical habitat. Section 3 of the ESA defines critical habitat for a threatened or endangered species as [ESA § 3(5)(A)]:

- The specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the provisions of Section 4 of the ESA, on which are found those physical or biological features essential to the conservation of the species and which may require special management considerations or protection; and
- Specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of Section 4 of the ESA, upon a determination by the Secretary that such areas are essential for the conservation of the species.

Designated critical habitat is described in 50 CFR Parts 17 and 226. Critical habitat may include areas that are not currently occupied by the species, but that will be needed for its recovery. In addition, the USFWS normally excludes developed areas within mapped critical habitat boundaries as critical habitat. The USFWS' Critical Habitat Portal was reviewed to identify federal threatened and endangered species designated final and proposed critical habitat designations within ten miles of the project site (USFWS, 2022g).

4.1.6 Wildlife Corridors

A wildlife corridor is a connection of habitat, generally native vegetation, which joins two or more larger areas of similar habitat that are otherwise separated by natural barriers, changes in vegetation composition, or land permanently altered for human activities (e.g., farms); and infrastructure, including roads, railroads, residential development, or fencing. When native vegetation is cleared, fragmented patches of open space or isolated "islands" of wildlife habitat are created. Fragmentation and habitat loss are the two main contributors to continuing biodiversity decline. The main goal of corridors is to facilitate movement of individuals, through dispersal, seasonal migration, and movement for foraging, breeding, cover, etc. Corridors allow for physical and genetic exchange between isolated wildlife populations and are critical for the maintenance of ecological processes, including allowing for the movement of animals and the continuation of viable populations and higher species diversity.

The habitat within the corridor generally contains biological and physical features that are needed to temporarily support wildlife and allow avian and ground-dwelling wildlife to safely move through it. Wildlife corridors may either be contiguous strips of vegetation and habitat, such as ridgelines or

Deleted: November 2022

riverbeds, or intermittent patches of habitat or physical features spaced closely enough to allow safe travel. Corridors can be natural, such as a riparian corridor, or man-made, such as culverts, tunnels, drainage pipes, walls, underpasses, overpasses, or streets. Man-made corridors are often referred to as "wildlife crossings" and they allow wildlife to pass over, under, or through physical barriers that otherwise hinder movement. Wildlife corridors also vary greatly in size, shape, and composition.

In general, the wider and more safeguarded a wildlife corridor is from adjacent human activities, noise, traffic, and light, the better it functions for the movement of wildlife. To determine the potential for the BSA to contain wildlife corridors, biologists reviewed the USGS 7.5-Minute Topographic Map *Desert Hot Springs* Quadrangle and viewed aerial imagery to search for physical features that might serve as a wildlife corridor. Biologists also used the BIOS Habitat Connectivity Viewer (CDFW, 2022b) to search for CDFW Essential Connectivity Areas, Natural Landscape Blocks, and Interstate Connections within the BSA and vicinity. In addition to reviewing the BIOS Habitat Connectivity Viewer, biologists used GIS software (Google Earth, 2022) and the MSHCP to determine the project site's location in relation to areas protected by the MSHCP that could serve as wildlife corridors including Core or Linkage. The Cores and Linkages for existing and proposed Cores and Linkages were also reviewed (CVCC, 2016). Finally, the literature review also included maps and reports on wildlife home ranges and migration and dispersal patterns (CDFW, 2014; Zeiner et al., 1988-1990).

4.2 Field Survey Methods

This Section describes the field survey methods used by UltraSystems biologists within the BSA during the 2022 field surveys. A reconnaissance-level biological survey was conducted on March 5, 2022. Any protocol-level surveys for special-status plants and wildlife species that are considered necessary as result of the initial survey findings will be discussed in **Section 6.0**. Biologists visited the BSA to conduct the following biological surveys:

- Habitat assessment and plant community and land cover type mapping.
- Jurisdictional waters (including wetlands) assessment.
- General plant surveys.
- General wildlife surveys.
- Wildlife movement evaluation.
- Jurisdictional delineation.

The purpose of the field work was to evaluate the initial results of the literature review and to collect additional data on existing site conditions. The general biological surveys covered all accessible areas of the BSA, including all areas that will be impacted by the project. The surveys were conducted during the daytime on foot by walking slowly across each habitat type, where accessible. For the rare plant and BUOW surveys, biologists only covered those specific habitat areas that are known to provide suitable habitat for the specific species being surveyed. Biologists used binoculars from strategic vantage points whenever direct access was not possible, due to private property with no access rights, chain-linked fences, and locked gates. Observations were also made with aerial imagery for inaccessible areas.

Biologists used pertinent regional flora and fauna field guides, and topographic and aerial maps during field surveys to help direct them in the field, to assist in identifying habitat and physical features, and to identify and record special-status species. In addition, biologists used Global Positioning System (GPS) units and other GIS and survey-related techniques, hardware and software to collect data and populate all attributes required by the relevant agencies. Digital color photographs

Deleted: November 2022

were taken during the field surveys to record site conditions at the time of the field surveys. The methods for each type of biological surveys are described in the following sections.

4.2.1 Habitat Assessment and Land Cover Type Mapping

The general habitat assessment and vegetation mapping survey was conducted by UltraSystems biologist Michael Tuma on March 5, 2022. The project site was surveyed using a meandering search pattern pedestrian survey to obtain 100 percent coverage of the BSA. Offsite areas of the BSA were surveyed with binoculars due to accessibility constraints. During the survey, plant and wildlife species, plant communities, and land cover types were identified.

The biologists characterized the existing habitat and searched for the presence of sensitive plant communities. The purpose of the habitat assessment was to ascertain existing site conditions and identify habitat areas that could be suitable for special-status plant and wildlife species.

The plant communities observed by the biologists were identified and mapped in the field by marking their limits on a color aerial map and/or with the use of a GPS unit. The BSA boundary was digitized by UltraSystems' GIS staff and placed on the aerial map. Descriptions of plant communities, land cover types and habitat within the biological survey areas were based on the dominant perennial plant species or physical features. Generally, classifications of habitat types or plant communities were based on *A Manual of California Vegetation, Second Edition* (Sawyer et al., 2009) with modifications to better represent existing site conditions. Each habitat type identified in Sawyer et al. (2009) was cross-referenced with the following resources and classification systems so that a more accurate characterization of the existing habitat types and plant communities could be identified: *Preliminary Descriptions of the Terrestrial Communities of California* (Holland, 1986), and the CDFW's *California Natural Community List* (CDFW, 2022a).

Topography, soil characteristics, substrates, and disturbed and developed areas were also components of the habitat assessment in order to search for special-status plants and wildlife. Following the field mapping, UltraSystems' GIS staff took the habitat boundaries from the aerial maps, and/or downloaded the data from the GPS units, and/or processed hand-drawn field maps and digitized the boundaries into an ArcGIS file. Once the boundaries were in ArcGIS, the acreage of each land cover feature present within the BSA was calculated.

4.2.2 General Plant Surveys

Prior to the start of field surveys, biologists researched information on the blooming periods and habitat preferences for the special-status plants determined to have potential to occur within the BSA based on distribution and elevation range. UltraSystems biologists then surveyed the BSA for existing habitat, vegetation, and for the presence of special-status plant species on March 5, 2022. Biologists also conducted general plant surveys on March 6, May 26, and May 27, 2022. Protocol-level surveys for special-status plant and wildlife species were not conducted during the surveys, and recommendations for such surveys are discussed in **Section 6.0**. They focused on areas that appeared to provide suitable habitat for special-status plant species. Plant species were identified in the field and also in the office, when necessary, using plant field guides and taxonomical guides, such as *The Jepson Manual: Vascular Plants of California*, second edition (Baldwin et al., 2012). All identifiable plant species encountered during the field surveys were recorded in field notes.

After the initial field surveys and mapping of the plant communities within the BSA was complete, an additional evaluation was conducted in the office for each special-status plant species identified in

Deleted: November 2022

the CNDDB and USFWS analysis within a 10-mile radius of the project site (CNDDB, 2022a; USFWS, 2022d, e). The evaluation considered whether the BSA contained suitable habitat and soils to support those special-status plant species listed in the analyses. A species was determined to have "no potential to occur" within the BSA if the existing habitat and/or soils on the BSA were absent or unsuitable to support the species. For example, plant species that are only found within desert sand dunes or coastal bluff scrub would be determined to have no potential to occur because those habitats are absent from the BSA. Those special-status plant species determined to have no potential to occur within the BSA are listed in **Section 5.3.4** and **Section 5.3.5**, but are otherwise eliminated from further evaluation and are not discussed further in this BRE. The potential to occur analysis can be found in **Appendix F**, *Special-Status Species Potential Occurrence Determination*.

The literature review, habitat assessment, and general plant surveys concluded that the BSA lacks suitable habitat, soils, and/or other factors to support 11 of the special-status species in the plant inventory. They also concluded that 12 of the special-status species in the plant inventory have at least a low potential to occur within the BSA due to the presence of suitable habitat, soils, and/or other factors to support them; these 12 species are presented in **Appendix F**, *Special-Status Species Potential Occurrence Determination*.

Pedestrian surveys were planned to allow for increased line of sight and for ease of travel, by traversing the project site in transects that crossed the site longitudinally and that were spaced 50 feet apart. Each transect was walked at a pace that allowed careful observations along the transect route and the vicinity. A binocular survey was conducted in inaccessible, fenced areas.

Biologists paid special attention to areas that appeared to provide suitable habitat for special-status species. Special focus was given to jurisdictional sites, such as the onsite desert riparian wash area and ephemeral drainages. Refer to **Section 5.2.1** for a discussion of the desert riparian wash and **Section 5.2.3** and **Section 5.5** for a discussion of the ephemeral drainages. Roads and openings in vegetation, were also surveyed. Plant species were identified using plant field and taxonomical guides, such as *The Jepson Manual: Vascular Plants of California*, second edition (Baldwin et al., 2012). Any special-status plant species that would be encountered during the field surveys would be identified, recorded in field notes, counted (if population was small) or estimated (if population was large), and mapped on an aerial map and/or with a GPS unit. Diagnostic photographs would also be taken of special-status plants where they occurred, as well as representative habitat.

Survey tasks included completion of a list of all taxa identifiable throughout the BSA and subsequent addition of new taxa as they were discovered. Unknown species were identified at a later date using dichotomous keys, high quality photos, and other proprietary identification aids. A complete list of all species documented onsite is in **Appendix G**, *Plant and Wildlife Species Recorded During the Field Surveys*.

4.2.3 General Wildlife Surveys

Prior to conducting field surveys, biologists researched information on the natural history and habitat preferences for the special-status wildlife determined to have potential to occur within the BSA based on known distribution and elevation range. The BSA is within the general distributional range of several special-status vertebrate species.

UltraSystems biologists conducted general wildlife surveys on March 5, March 6, May 26, and May 27, 2022. Protocol-level surveys for special-status plant and wildlife species were not conducted during the surveys, and recommendations for such surveys are discussed in **Section 6.0**. Biologists

Deleted: November 2022

surveyed the BSA for common wildlife and the presence of special-status wildlife species. The purposes of the wildlife surveys were to note those species observed, ascertain general site conditions, and identify areas with habitat that would be suitable for special-status wildlife species.

All wildlife species encountered visually or audibly during the field surveys were identified and recorded in field notes. Biologists also recorded signs of wildlife, including animal tracks, burrows, dens, nests, nest sites, scat, or remains. They also surveyed areas that would potentially serve as roosting habitat and/or hibernacula for bat species.

After the field surveys and mapping of the land cover types were complete, an additional evaluation was conducted in the office for each special-status wildlife species in the wildlife inventory. The evaluation considered whether the BSA contained suitable habitat to support those special-status wildlife species. A species was determined to have "no potential to occur" within the BSA if suitable and adequate biological and physical features that are needed to support the wildlife species are absent from the BSA. Those special-status wildlife species determined to have no potential to occur within the BSA, and therefore will not be affected by the project, are listed in **Section 5.4.2**, *Listed Endangered, Threatened, and Candidate Wildlife,* and **Section 5.4.3**, *Sensitive Wildlife,* but are otherwise eliminated from further evaluation and are not discussed further in this BRE. The potential to occur analysis can be found in **Appendix F**, *Special-Status Species Potential Occurrence Determination*.

4.2.4 Jurisdictional Assessment and Delineation

This section describes the assessment and survey methods of jurisdictional waters (waters of the U.S. and State) for a jurisdictional delineation conducted on March 5 through 6, and May 26 through 27, 2022 by UltraSystems biologist Matthew Sutton. The purpose of the field survey was to field truth results of the literature review and to collect additional data on existing site conditions. A jurisdictional delineation was conducted and focused on areas where drainages or ponding water occurred. These areas were evaluated to determine if they met the criteria of a wetland. (**Appendix H**, *Preliminary Jurisdictional Delineation Report*).

Wetlands

A jurisdictional delineation was conducted to determine if the onsite drainages and ephemeral streams would be considered a wetland area. During this delineation, the biologists evaluated the soils and hydrology associated with the on-site drainages. Findings are presented in a jurisdictional delineation report (see **Appendix H**, *Preliminary Jurisdictional Delineation Report*). In addition, the 2022 *State Hydric Soils List* (USDA-NRCS, 2022a) was consulted to determine hydric status of the on-site mapped soil units.

California Department of Fish and Wildlife Jurisdiction

A jurisdictional delineation was conducted for the areas where drainages and streams occur to determine if these areas would meet the criteria of Sections 1600-1617 of the FGC, which provides protection for the natural flow and the bed, channel, and bank of any river, stream, or lake designated by the CDFW.

Deleted: November 2022

Regional Water Quality Control Board Jurisdiction

A jurisdictional delineation was conducted for the areas where drainages and streams occur to determine if these areas would meet the criteria of wetlands set forth in the Clean Water Act (see **Appendix H**, *Preliminary Jurisdictional Delineation Report*). Both Porter Cologne and the SWRCB's Procedures state that wetlands are waters of the State and are therefore subject to RWQCB protections (SWRCB, 2019b); see sections **3.2.8** and **3.2.9**). On March 5, 2022, a jurisdictional delineation was conducted and it was determined that waters of the State occur within the BSA and project area; therefore, permits would be required from the RWQCB, which are discussed in **Section 9.0**.

4.2.5 Wildlife Movement Evaluation

Biologists conducted an evaluation of potential wildlife movement within the BSA and immediate vicinity through a literature review, field surveys, and by examining aerial imagery and maps. While in the field, biologists searched for potential natural and man-made travel routes that wildlife could use to traverse the site. Biologists assumed wildlife species would use these linear features for travel if they occurred within the site. Biologists also searched for natural and man-made barriers to wildlife movement, such as permanent structures, concrete walls, or fences that would interfere with the movement of wildlife. The mapped wildlife corridors as per the data provided by CDFW in addition to the MSHCP Conservation Area boundaries and the Core Habitats provided (MSHCP § .4.0; CVCC, 2016).

Deleted: November 2022

5.0 RESULTS

This section describes the results of the literature review and the conditions existing within the BSA at the time the biological field surveys were conducted. Photographs that were taken during the field surveys can be found in **Appendix D**, *Site Photographs*. Field surveys were conducted as described in **Table 5.0-1**, *Field Survey Information*.

Table 5.0-1
FIELD SURVEY INFORMATION

Survey Date	Survey Time	Temperature	Weather	Surveyors	Survey Conducted
March 5, 2022	9:10 a.m. – 12:00 p.m.	58° – 64°F	15%-20% Cloud Cover	Michael Tuma	General Plant & Wildlife Survey, General Habitat Assessment
March 5, 2022	7:00 a.m. – 5:00 p.m.	54° – 66°F	15% - 20% cloud cover	Matthew Sutton	Jurisdictional Delineation Survey
March 6, 2022	8:00 a.m. – 6:00 p.m.	54° - 70°F	0% - 5% cloud cover	Matthew Sutton	Jurisdictional Delineation Survey, General Plant & Wildlife Survey
May 26, 2022	6:00 a.m. – 5:00 p.m.	80° - 102°F	Clear	Matthew Sutton & Amir Ayati	Jurisdictional Delineation Survey, General Plant & Wildlife Survey
May 27, 2022	9:00 a.m. – 2:00 p.m.	80° - 99°F	0% - 5% cloud cover a	Matthew Sutton	Jurisdictional Delineation Survey, General Plant & Wildlife Survey

5.1 Environmental Setting

The project site is located in an area that contains primarily undeveloped, open space. The surroundings of the project site include vacant land, sparse residential developments, and a golf club to the east. The undeveloped nature of the project site and its relative surroundings with the presence of fine windblown sands and ephemeral channels results in the presence of suitable habitat to support many special-status species; some of which are rare and endemic to the Coachella Valley.

The topography of the project site can be characterized as arid, generally flat in the northern and western boundaries with north-to-south/southeast slopes. The topography in the eastern section of the project site is relatively heterogeneous. A stabilized desert dune is located at the southeast region of the site. The project site contains open space with native and non-native vegetation. The majority of the project area is covered by creosote bush-white bursage scrub (*Larrea tridentata - Ambrosia dumosa* Shrubland Alliance)[CNPS, 2022b, Baldwin et al., 2022]. The project site also contains unconsolidated streambed, fourwing saltbush scrub (*Atriplex canescens* Shrubland Alliance) [CNPS,

Deleted: November 2022

2022b, Baldwin et al., 2012], tamarisk thickets and disturbed land cover. The project site is currently undeveloped.

The portion of the BSA outside of the project boundary consists primarily of open space, ornamental vegetation, a commercial building, and a segment of Palm Drive. Commercial buildings with some landscaping, parking lots, roads, and other structures are classified as "Disturbed/developed".

The site falls in Flood Zone "AO", which FEMA categorizes as a Special Flood Hazard Area (SFHA). SFHA are defined as "*the area that will be inundated by the flood event having a 1-percent chance of being equaled or exceeded in any given year*." The 1-percent annual chance flood is also referred to as the "base flood" or "100-year flood"(FEMA, 2020, 2022). The project site is slightly sloping with the majority of the slopes between 0.2 to 1.2 percent Drainage from the site flows south to the south-adjacent property.

The hydrology of the area is influenced by a hot interior climate and average annual rainfall is approximately 5.49 inches, falling mostly in the winter months. Surface drainage in the project vicinity occurs by sheetflow, generally to the south onto an adjacent site. There is no existing industrial or sanitary water discharge from the subject property into a sanitary sewer system.

5.1.1 Land Use

UltraSystems biologists have reviewed historic aerial imagery to obtain information about the history of the property. The project site appears to have not been previously developed or used for agricultural purposes. The project site is located within areas covered by the Coachella Valley MSHCP; however, the project site is not located within any MSHCP Conservation Areas.

5.1.2 Local Climate

The City has a hot-arid climate with very little precipitation during the summer months. Most precipitation falls between November and March. Arid climates tend to support sparse, scrubby vegetation. The closest historical climate data station to the project site is US COOP Station 046635 in the City of Palm Springs, California. Based on the monthly climate summary data from the Palm Springs US COOP station, the region near the project site generally receives 5.49 inches of precipitation per year, none of which falls as snow. The July average maximum temperature is 108.2 degrees Fahrenheit (°F) and the January low is 42.3 degrees Fahrenheit (°F; WRCC, 2016).

5.1.3 Soils

The soils found within the BSA can be characterized primarily as moderately alkaline fine and very fine sands. Based on the USDA NRCS Soil Survey (Soil Survey Staff, 2022), the BSA contains two soil map units which are listed in **Table 5.1-1**, *Summary of Soil Mapping Units* (see **Appendix A**, Figure 7, *USDA Soils* and**; Appendix E,** *Soils Report*). Both of the soil map units are listed as hydric soils on the *State Hydric Soils List* (USDA-NRCS, 2022a) because they meet the following criteria from the list:

- *Map unit components that are frequently flooded for long duration or very long duration during the growing season that:*
  - *Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or*
  - *Show evidence that the soils meet the definition of a hydric soil.*

Deleted: November 2022

UltraSystems biologists did not identify hydric soils within the BSA as defined in USACE's Arid West Supplement (USACE, 2008).

Table 5.1-1
SUMMARY OF SOIL MAPPING UNITS

Name	Symbol	Ecological Site	Hydric Status	Total Acreage in BSA (Acres)
Myoma fine sand, 0 to 5 percent slopes	MaB	alluvial fans	Hydric	101.2
Myoma fine sand 5 to 15 percent slopes	MaD	alluvial fans	Hydric	16.3

The BSA contains one soil series. Myoma soils are formed in sand blown from recent alluvium (USDA NRCS, 2015). These well-drained soils within the BSA have a low water holding capacity with rapid permeability and very slow runoff.

According to the field survey data, deep sandy alluvium occur through most of project site. There is a prominent stabilized desert dune in the southeast corner of the project site. Clay-loam soils were observed in the drainages.

5.2 Land Cover Types

This section describes the eight land cover types present within the BSA as determined by the literature review and field surveys and augmented by examining aerial imagery. Eight land cover types were observed and mapped within the BSA, and are presented in **Sections 5.2.1** through **5.2.5**. The approximate acreages of each land cover type within the BSA are reported in **Table 5.2-1**. Refer to **Appendix A**, Figure 8, *Land Cover Types*, for the location and extent of each land cover type within the BSA. Field notes used to identify land cover types are located in **Appendix C**, *Field Data Sheets*, and photographs of different land cover types are located in **Appendix D**, *Site Photographs*. Classifications of the plant communities are based on Holland's *Preliminary Descriptions of the Terrestrial Communities of California* (Holland, 1986), *A Manual of California Vegetation Second Edition* (Sawyer et al., 2009) and the MSHCP (CVCC, 2016) with modifications to better represent existing site conditions.

There is some discrepancy between the County Assessor Parcel map and the County's GIS database for this project site's parcel. The County Assessor Parcel paper map for the project site indicates that parcel is 38.34 acres; however, the County's parcel GIS database has an attribute table associated with this parcel that reports this parcel's acreage as both 38.34 and 39.34 acres. UltraSystems used the GIS data from the County's database for this parcel which represents the parcel as 39.34 acres. Thus, UltraSystems used that GIS data to conduct the analysis of the acreages per land cover type within the project site because there was no GIS data available that showed the project boundary as 38.34 acres.

Deleted: November 2022

Table 5.2-1
ACREAGE OF MAPPED LAND COVER TYPES WITHIN THE BSA

Mapped Land Cover	MCV II Alliance Name[1]	Holland Classification[2]	MSHCP Vegetation Communities Classification[3]	Acreage Mapped within the BSA
Fourwing saltbush scrub	Fourwing saltbush scrub (CA code: 36.310.04)	Desert saltbush scrub (36110)	Desert saltbush scrub	1.00
Creosote bush – white bursage scrub	Creosote bush – white bursage scrub (CA code: 34.140.00.	Sonoran creosote bush scrub (33100)	Sonoran creosote bush scrub	94.46
Stabilized desert dunes	Creosote bush – white bursage scrub (CA code 34.140.00).	Stabilized and partially-stabilized desert dunes (22200)	Stabilized and partially stabilized desert dunes	1.42
Unconsolidated streambed	n/a	n/a	n/a	0.68
Disturbed	n/a	n/a	Developed/ urban	12.22
Tamarisk thickets	Tamarisk thickets (CA code: 63.810.00)	Tamarisk scrub (63810)	Tamarisk scrub	1.18
Developed/ ornamental	n/a	n/a	Developed/ urban	6.46
Date palm – California fan palm groves	Date palm – California fan palm groves (CA code: 79.300.00)	Desert fan palm oasis woodland (62300)	Desert fan palm oasis woodland	0.08
			Total Acreage in the BSA	**117.5**

Legend and Notes

1. MCV II Alliance Name is taken from *A Manual of California Vegetation Second Edition* (Sawyer et al., 2009).
2. Holland Classification (and Holland Element Code) are taken from Robert F. Holland's *Preliminary Descriptions of the Terrestrial Communities of California* (Holland, 1986).
3. MSHCP Vegetation Communities Classification is taken from Section 10.0, Natural Community Accounts and Conservation Measures and Figure 3-1: Natural Communities and Development of the MSHCP (CVCC, 2016) .

Deleted: November 2022

The plant communities and non-vegetated features identified and mapped within the BSA during the literature review and field surveys are not considered sensitive because they do not meet the criteria listed in **Section 4.1.3.1** of this BRE. These plant communities are not considered rare by the CDFW because they have one or more of the following characteristics: they are dominated by non-native species, widespread in the project vicinity, generally considered common enough not to be of concern, and/or exhibit a moderate level of disturbance rendering them less valuable as habitat to support wildlife diversity or special-status species. No special-status plant communities were identified within the BSA.

Characteristics of each plant community and disturbed features are described in the following sections. Plant species associated with the onsite plant communities are also described.

5.2.1 Fourwing Saltbush Scrub (*Atriplex canescens* Shrubland Alliance)

Fourwing saltbush scrub (*Atriplex canescens* shrubland alliance) is typically characterized by the dominance or co-dominance of fourwing saltbush with other species such as cheesebush, creosote bush, white bursage, cattle saltbush (*Atriplex polycarpa*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), and other herbaceous species (CNPS, 2022b). This plant community covers approximately one acre in the southeastern section of the project site where stormwater runoff from Palm Drive overflows the berm adjacent to the roadway margin and fans out, creating an area of higher soil moisture. Fourwing saltbush, cheesebush, creosote bush and white bursage are the dominant shrub species, and broom baccharis (*Baccharis sarothroides*) and bladderpod (*Peritoma arborea*) also occur in the shrub layer. Sahara mustard is the dominant forb, and other non-native forb and grass species such as London rocket (*Sisymbrium irio*), red brome (*Bromus rubens*), Jerusalem thorn (*Parkinsonia aculeata*), and wall barley (*Hordeum murinum*) also occur in the intercanopy spaces, Native forbs that occur in the wash include California croton (*Croton californicus*), jimsonweed (*Datura wrightii*), desert tobacco (*Nicotiana obtusifolia*), and western ragweed (*Ambrosia psilostachya*).

There are a few characteristics of the onsite occurrence of the fourwing saltbush scrub that indicate that this is a desert riparian community. First, the composition of species that occurs in the wash can be further classified to the *Atriplex canescens* Desert Wash association level (Sawyer et al., 2009; Evens et al., 2014; Evens et al., 2020; CDFW, 2022a); however, this association is not listed as sensitive in CDFW's Natural Community List (CDFW, 2022a).

A second indication that this plant community is riparian is that there is enough water entering into and spreading throughout the wash area to form a defined bed, bank and channel near the southeastern part of the wash, where the wash abuts the base of the stabilized dune and the waters channelize into a singular drainage (see **Appendix A**, Figure 8, *Land Cover Types*). There was also evidence of saturated soils throughout the wash area during the May 2021 surveys, well after the rainy season, indicating that waters inundate this wash area and lead to higher soil moisture levels than in the upland areas of the project site. Moreover, there are indicators of repeated inundation and water flow events seen on historic aerial imagery (2006, 2009, 2011, 2013, 2014, 2016, 2017, 2018, 2019, and 2021; Google Earth Pro, 2022).

A third indication that there are some plant species in the wash that are associated with higher soil moisture. Although the dominant species in fourwing saltbush scrub are not hydrophytic, there were some species observed that occur in USACE's *National Wetland Plant List* (NWPL). The following

Deleted: November 2022

plant species had hydrophytic indicators based on USACE's NWPL (USACE, 2020): Jerusalem thorn (FAC[1]), broom baccharis (FACU[2]), desert tobacco (FACU), and western ragweed (FACU).

5.2.2 Creosote Bush - White Bursage Scrub (*Larrea tridentata - Ambrosia dumosa* Shrubland Alliance)

Creosote bush - white bursage scrub (*Larrea tridentata – Ambrosia Dumosa* shrubland alliance) is typically characterized by the dominance or co-dominance of creosote bush (*Larrea tridentata*), white bursage (*Ambrosia dumosa*), cheesebush, spiny saltbush (*Atriplex confertifolia*), sweetbush (*Bebbia juncea*), California croton (*Croton californicus*), and other species (CNPS, 2022b; Baldwin et al., 2012). This plant community covers approximately 94.46 acres of the BSA. and 35.86 acres of the project site, which represents approximately 91 percent of the site. Creosote bush and white bursage scrub are the co-dominant shrub species within the project site, and there are some occurrences of the shrub species fourwing saltbush, white rhatany (*Krameria bicolor*), and Emory's indigo bush (*Psorothamnus emoryi*), mainly along the banks of drainages. There is less than 10 percent cover of forb and grass species such as Fremont pincushion (*Chaenactis fremontii*), desert dandelion (*Malacothrix glabrata*), Sahara mustard (*Brassica tournefortii*), and old han schismus (*Schismus barbatus*). Creosote bush – white bursage scrub is considered to be a secure natural community and is not sensitive.

5.2.3 Unconsolidated Streambed

Areas mapped as unconsolidated streambed are ephemeral channels that receive stormwater flow during rain events. These unconsolidated streambeds are located in the southern half of the BSA and are waters of the State under the jurisdiction of the RWQCB and CDFW (see **Appendix H**, *Preliminary Jurisdictional Delineation Report*). Most of these streambeds appear to drain southward, These streambeds consist primarily of sand in the low-flow channel bottom, with the streambanks and the soil beneath the upper sandy layer of the channel bottom consisting of a mix of sand, silt and clay compressed into a compacted soil matrix. These channels have low cover of annual forbs, and almost no cover of shrub species; shrub species occur along the top of the banks. Surface water was not present during the surveys. Unconsolidated streambed covers 0.68 acre within the BSA, and of that acreage, there is 0.49 acre within the project site.

These unconsolidated streambeds (ephemeral drainages) and their associated swales and desert riparian wash vegetation communities are detailed in **Section 5.5** and in **Appendix H**, *Preliminary Jurisdictional Report*.

5.2.4 Stabilized Desert Dunes

Stabilized desert dunes are sand dunes that have become stabilized by the establishment of shrubs, forbs and grasses. A major distinction of these dunes is consistent vegetative cover over the dunes. These dunes can intergrade with active desert dunes, desert sand fields or sandier occurrences of creosote bush scrub. The plant community that occurs on stabilized desert dunes is characterized by species typical of creosote bush scrub such as creosote bush, fourwing saltbush, California croton and indigo bush. Most of the stabilized and partially stabilized desert dunes that occur within the Coachella Valley plan area occur within the Willow Hole Conservation Area.

[1] Facultative
[2] Facultative Upland

Deleted: November 2022

Stabilized desert dunes were observed in the southeast corner of the project site (see **Appendix A**, Figure 8, *Land Cover Types*) where sands have accumulated and formed a topographically higher land form. The plant community on the onsite dune is creosote bush – white bursage scrub, with a species mix and distribution that is similar to the other onsite areas with this plant community. The ephemeral channel D1 circumnavigates this dune as it flows from its origins just north of the dune and then flows from west to east along the southern boundary of the project site. There are 1.42 acres of stabilized desert dunes on the project site.

5.2.5 Disturbed

The Disturbed land cover type consists of areas that have been disturbed by vehicle traffic, pedestrian, and offroad vehicle traffic. Disturbed land cover within the BSA includes the heavily compacted roadway margins along Palm Drive, tilled fields in the southwestern and southeastern corners of the BSA, and dirt roads and parking areas; there is a nexus of dirt roads in the southwestern corner of the project site with one narrow road in the western side of the site. Approximately 12.22 acres of disturbed land cover was mapped within the BSA, and 0.54 acre within the project site. The disturbed land cover type is not considered a natural community in the MSHJCP.

5.2.6 Tamarisk Thickets (*Tamarix* spp. Semi-Natural Shrubland Alliance)

Dominance of saltcedar (*Tamarix ramosissima*) or another *Tamarix* species in the shrub canopy is characteristic of Tamarisk thickets (*Tamarix* spp. semi-natural shrubland alliance). In areas of low cover, emergent trees, including Fremont cottonwood (*Populus fremontii*) or willow (*Salix* spp.), may occur. This community typically occurs along intermittent streams, in arid areas where high evaporation rates increase the soil salinity. Tamarisk is a phreatophyte; its deep root system and high transpiration rates enable tamarisk to substantially lower the water table to below the root zone of native species, thereby competitively excluding them. Tamarisk may rapidly displace native species within a drainage (Holland, 1986).

There was approximately 1.18 acres of tamarisk thickets mapped in the BSA, and 0.04 acre within the project site. The tamarisk thickets occur in the southwestern corner of the BSA.

5.2.7 Developed/Ornamental

This land cover type is comprised of areas that support developments such as buildings and paved roadways and other vegetated landscapes, dominated by non-native, ornamental plant species. Approximately 6.46 acres of developed/ornamental areas was mapped in the BSA.; these areas include a segment of Palm Drive and a building and its surrounding grounds; both features are located in the eastern part of the BSA. No developed/ornamental areas were mapped within the project area. The developed/ornamental land cover type is not considered a natural community.

5.2.8 Date Palm – California Fan Palm Groves (*Phoenix dactylifera – Washingtonia filifera* Forest & Woodland Semi-Natural Alliance)

Date palm – California fan palm groves (*Phoenix dactylifera – Washingtonia filifera* forest & woodland semi-natural alliance) is typically characterized by dominance or co-dominance of California fan palm (*Washingtonia filifera*) and/or Mexican fan palm (*Washingtonia robusta*), date palm (*Phoenix dactylifera*), and Canary Island date palm (*Phoenix canariensis*). This semi-natural alliance is found in deserts, desert dunes, and coastal scrub. Approximately 0.08 acre Date palm – California fan palm groves was mapped in the BSA, and none was mapped within the project site. Several monotypic

Deleted: November 2022

stands of California fan palm occur in the property south of the project site; no other tree or shrub species were observed within these stands. Date palm – California fan palm groves is considered to be a secure natural community and is not sensitive (CDFW, 2022a).

5.3 Plants

This section describes the plants detected during the field surveys and the special-status plants that have a potential to occur within the BSA as identified by the literature review and field surveys.

5.3.1 Plant Species Recorded During the Field Surveys

Thirty-one plant species from 18 plant families were observed within the BSA during the field surveys conducted on March 5, March 6, May 26, and May 27, 2022. The washout area located in the southeastern section of project site consists of a network of narrow channels and interstitial areas dominated by fourwing saltbush, cheesebush, and Sahara mustard; patches of ruderal desert forbs and low cover of creosote and bursage also occur in this area. The dominant species in the remaining areas of the site are creosote bush and white bursage. A complete list of plant species recorded within the BSA during the field surveys is provided in **Appendix G**, *Plant and Wildlife Species Recorded During the Field Surveys*. Field data of plant species identified during each field survey can be found in **Appendix C**, *Field Data Sheets*.

5.3.2 Non-native Plants

California Invasive Plant Council (Cal-IPC) is a nonprofit organization that is dedicated to protecting California's lands and waters from ecologically-damaging invasive plants through science, education and policy. It maintains an inventory that categorizes non-native invasive plants that threaten the state's wildlands.

Non-native vegetation with a Cal-IPC high rating has severe ecological effects on physical processes, plant and animal communities, and vegetation structure. These exotic species' reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically (Cal-IPC, 2022).

Non-native vegetation with a Cal-IPC moderate rating has substantial and apparent (but generally not severe) ecological effects on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Non-native vegetation species with a Cal-IPC limited rating are invasive, but their ecological effects are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic (Cal-IPC, 2022).

Nine of the 31 observed plant species are non-native. Seven of the nine non-native plant species recorded have a Cal-IPC rating (Cal-IPC, 2022). They include the following listed below in **Table 5.3-1**, *Recorded Invasive Plant Species with a Cal-IPC Rating*.

Deleted: November 2022

Table 5.3-1
RECORDED INVASIVE PLANT SPECIES WITH A CAL-IPC RATING

Scientific Name (=Synonym)	Common Name (=Synonym)	Cal-IPC Rating
Bromus rubens	red brome	high
Sisymbrium irio	London rocket	moderate
Brassica tournefortii	Sahara mustard	high
Erodium cicutarium	redstem filaree	limited
Hordeum murinum	wall barley	moderate
Tamarix ramosissima	salt cedar	high
Schismus barbatus	old han schismus	limited

No federally listed noxious weeds were observed onsite during the field surveys, per the USDA Animal and Plant Health Inspection Service (APHIS) *Federal Noxious Weed List* (USDA, 2010).

5.3.3 Listed Endangered, Threatened, Candidate, and State Rare Plants

No listed plant species were observed within the BSA during the general field surveys conducted in March and May 2022 (see **Appendix G**, *Plant and Wildlife Species Recorded During the Field Surveys*).

Based on a literature review and query of publicly available databases (USFWS 2022d, e; CNDDB 2022a) for recorded observations of listed plant species within a ten-mile radius of the project site, there were three listed plant species identified in the plant inventory. Of those three species, one species was determined to have a low potential to occur, Triple-ribbed milkvetch (*Astragalus tricarinatus*, FE, CRPR: 1B.2, MSHCP: Covered), and another one, Coachella Valley milkvetch (*Astragalus lentiginosus* var. *coachellae*, FE, CRPR: 1B.2, MSHCP: Covered), was determined to have a moderate potential to occur on the project site. These species are listed in **Appendix F**, *Special-Status Species Potential Occurrence Determination*.

Based on an analysis of the biological, physical and environmental conditions necessary for each listed plant species identified in the plant inventory, it was determined that one listed species had no potential to occur in the BSA (Calflora, 2022; CNDDB, 2022a, b, c; CNPS, 2022a, b; Google Earth, 2022 Jepson Flora Project, 2022; Sawyer et al., 2009; Soil Survey Staff, 2022; USDA-NRCS, 2022b; USEPA, 2022b; USFWS, 2022d, e, f). In most cases, species were determined to have no potential to occur because the project site lacks suitable habitat or is outside of a particular species geographic or elevation range.

The following listed species was determined to have no potential to occur in the BSA (see **Appendix F,** *Special-Status Species Potential Occurrence Determination***,** for the descriptions of the status rankings; its respective status as determined by various state, federal, regional and local regulatory agencies is listed next to the species name):

- Parish's daisy (*Erigeron parishii*) SE, CRPR: 1B.2, MSHCP: Covered (a)

Moderate Potential to Occur in the BSA: Listed Plants

Coachella Valley milkvetch

Commented [MS3]: Chambers Rd 2: Section 5.3.3 - The third paragraph states that one listed species has a potential to occur; however Appendix F includes two listed species with a potential to occur. According to Appendix F, triple-ribbed milkvetch has a low potential to occur; however, it was not described in this section like Coachella Valley milkvetch.

Commented [MS4R3]: Revised. We are providing natural history for Coachella Valley milkvetch because it has a moderate potential to occur but not for triple-ribbed milkvetch because it only has a low potential to occur. We have added a sentence regarding its potential to occur.

Deleted: One listed species, Coachella Valley milkvetch (*Astragalus lentiginosus* var. *coachellae*) was determined to have a moderate potential to occur in the BSA and is described below.¶

Deleted: November 2022

Coachella Valley milkvetch is an annual or short-lived perennial forb endemic to the Coachella Valley, Riverside County in the western portion of the Sonoran desert. It occurs in areas with sandy substrates, particularly in low elevation creosote bush scrub. This species typically occurs on aeolian (wind transported) or alluvial (water transported) sands near dunes or flats and along disturbed margins of sandy washes (USFWS, 2004). It also occurs in sandy soils along roadsides, and in areas formerly occupied by undisturbed aeolian dunes. It flowers between February and May.

Although Coachella Valley milkvetch was not observed on the project site during the general surveys, there is suitable habitat for this species to occupy. As mentioned above, Coachella Valley milkvetch typically occurs in creosote bush scrub, which is the dominant plant community within the project site. Refer to **Section 5.2** for a discussion of the creosote bush - white bursage scrub plant community on the project site. Furthermore, this species typically occurs in dunes and there is a prominent stabilized desert dune in the southeastern section of the project site (see **Section 5.2.4 and Appendix A**, Figure 8, *Land Cover Types*). Development of the project would remove all existing vegetation, including habitat for and individuals of this species. Moreover, project operations would disturb all of the project site's substrate, including the seed bank within the substrate, which may contain viable seeds of Coachella Valley milkvetch.

5.3.4 Sensitive Plants

No sensitive plant species were observed within the BSA during the general field surveys conducted in March and May 2022 (**Appendix G**, *Plant and Wildlife Species Recorded During the Field Surveys*).

Based on a literature review and query of publicly available databases (USFWS 2022d, e, CNDDB 2022a) for recorded observations of sensitive plant species within a ten-mile radius of the project site, there were 20 sensitive plant species in the plant inventory. Of those 20 total species, ten were determined to have a low potential to occur. These species are listed in **Appendix F**, *Special-Status Species Potential Occurrence Determination.*

The following 10 sensitive plant species were determined to have no potential to occur in the BSA because the BSA lacks suitable habitat, the BSA is outside of the geographic and elevational range, or other site disturbances mentioned above preclude the establishment of these species (see **Appendix F,** *Special-Status Species Potential Occurrence Determination***,** which includes descriptions of the status rankings):

- desert spike-moss (*Selaginella eremophila*) CRPR: 2B.2, MSHCP: Covered
- mecca-aster (*Xylorhiza cognata*) (=*Machaeranthera cognata*) CRPR: 1B.2, MSHCP: Covered
- cliff spurge (*Euphorbia misera*) CRPR: 2B.2
- Orocopia sage (=lavender sage)(*Salvia greatae*) CRPR: 1B.2, MSHCP: Covered
- desert beardtongue (*Penstemon pseudospectabilis* ssp. *pseudospectabilis*) CRPR: 2B.2,
- San Jacinto linanthus (=San Jacinto prickly phlox) (*Linanthus jaegeri*)(=*Leptodactylon jaegeri*) CRPR: 1B.2
- Latimer's woodlands-gilia (*Saltugilia latimeri*)(=*Gilia latimeri*) CRPR: 1B.2
- Parry's spineflower (*Chorizanthe parryi* var. *parryi*) CRPR: 1B.1
- shaggy-haired alumroot*(Heuchera hirsutissima*) CRPR: 1B.3
- California satintail (*Imperata brevifolia*) CRPR: 2B.1

Deleted: six

Commented [MS5]: Chambers Rd 2: Section 5.3.4 - The second paragraph states that 6 of the 20 sensitive plants have a low potential to occur; however, Appendix F includes 10 sensitive plant species. The third paragraph states that 10 sensitive plant species were determined to have no potential to occur; however, Appendix F includes 11 species. The species list in this section does not match the species with a potential in Appendix F.

Commented [MS6R5]: Revised number with low potential in second paragraph. Appendix F should show ten plant species with no potential to occur. We will confirm that the correct Appendix F was submitted.

Deleted: November 2022

5.4 Wildlife

This section describes the wildlife observed and/or detected during the field surveys and the special-status wildlife that have a potential to occur within the BSA as determined by the literature review and field surveys. In this BRE, wildlife nomenclature and taxonomic sequence are based on the following:

- Amphibians and reptiles: CDFW's *Complete List of Amphibian, Reptile, Bird and Mammal Species in California* (CDFW, 2016).
- Birds: American Ornithological Society (AOS) *Check-list of North American Birds* (online), 7th edition and Supplements (Chesser, et al., 2022).
- Mammals: *Mammal Species of the World* (Wilson and Reeder, 2005).

5.4.1 Wildlife Species Recorded During the Field Surveys

During the field surveys, six mammal, 12 bird, and three invertebrate species or their sign were observed within the BSA and are discussed further below in this section (see also **Appendix G**, *Plant and Wildlife Species Recorded During the Field Surveys)*. Field notes of wildlife species recorded during each field visit can be found in **Appendix C**, *Field Data Sheets*.

Wildlife survey limitations include:

- The biological field surveys were conducted during the daytime to maximize the detection of most wildlife. Birds represent the largest component of the fauna observed because most birds are active in the daytime. In contrast, daytime surveys usually result in few observations of mammals, many of which may only be active at night. Many mammal species may also have been unnoticed due to their subterranean habitat.

- Many species of reptiles, and mammals are secretive in their habits and are difficult for biologists to observe in a walking survey.

- Many wildlife species are wide-ranging and/or they only be present on a seasonal basis; therefore, they may not have been present within the BSA at the time of the surveys.

- Many species are nocturnal, move about a territory, may have become dormant for the season, or are less active during inclement or hot weather.

- Additional wildlife species that likely use the BSA were not observed or indirectly detected during the field surveys due to their scarcity or the need for special survey methods.

Vegetation communities form the basis for wildlife habitat and provide the primary plant productivity upon which wildlife depends, along with nesting and denning sites, escape and movement cover, and protection from adverse weather. Some species are habitat specific for all their life history requirements, while many wildlife species move freely between plant communities to obtain all their life history needs. In general, more complex natural communities with more vegetation layers and more plant species provide higher value wildlife habitat than less complex vegetation communities. More complex communities have more niches for wildlife and usually support more animal species than less complex communities. Although simple communities may support few wildlife species, they may provide habitat for great numbers of those few species.

Deleted: November 2022

Reptiles

Reptilian diversity and abundance typically vary with vegetation type and character. Many species prefer only one or two vegetation types; however, most species will forage in a variety of habitat. Most species occurring in open areas use rodent burrows for cover, protection from predators, and refuge during extreme weather conditions.

No reptile species were observed during the field survey.

Birds

A variety of bird species were observed or are expected to be residents in the survey area. Other species are present only during certain seasons.

Native bird species observed in the survey area include house finch (*Haemorhous mexicanus*), barn swallow (*Hirundo rustica*), yellow-rumped warbler, (*Setophaga coronata*), northern rough-winged swallow (*Stelgidopteryx serripennis*), great egret (*Ardea alba*), white-crowned sparrow (*Zonotrichia leucophrys*), and common raven (*Corvus corax*). The non-native bird species observed in the survey area is rock pigeon (*Columba livia*). All of the abovementioned species are common in southern California and are not listed as threatened or endangered and are not rare.

Raptors (birds of prey) observed in the BSA include red-tailed hawk (*Buteo jamaicensis)*, American kestrel (*Falco sparverius*), merlin (*Falco columbarius*), and turkey vulture(*Cathartes aura*). These three species are common in southern California and are not listed as threatened or endangered, and are not rare; however, merlin is on CDFW's Watch List and is on CNDDB Special Animals List (CNDDB, 2022d) .Merlin is not addressed under the MSHCP. Merlin is the only sensitive wildlife species observed in the BSA.

Mammals

As with other taxonomic groups, the presence of different vegetation types in the BSA offers habitat for some mammals. Small, ground-dwelling mammals or their sign observed in the survey area include desert cottontail rabbit (*Sylvilagus audubonii*), white-tailed antelope squirrel (*Ammospermophilus leucurus*), California ground squirrel (*Otospermophilus beecheyi*), desert pocket mouse (*Chaetodipus penicillatus*) and black-tailed jackrabbit (*Lepus californicus*). In addition, sign of coyote (*Canis latrans*) was also observed. No large mammals were directly observed in the BSA. These species are common in southern California, are not rare, and are not listed as threatened or endangered.

5.4.2 Listed Endangered, Threatened, and Candidate Wildlife

No listed wildlife was observed within the BSA during the field surveys. In addition, the literature review and field surveys concluded that only 2 of the 15 listed species in the wildlife inventory have more than a low potential to occur within the BSA due to a lack of suitable biological and physical features that are needed to support them.

Based on a literature review and query of publicly available databases (USFWS 2022a, b, CNDDB 2022a), 49 special-status wildlife species, 15 listed and 34 sensitive, in the have been reported within 10 miles of the BSA. Of those 49 species, four listed and 18 sensitive wildlife species were determined to have a low or moderate potential to occur in the BSA. One sensitive species was observed onsite

Deleted: November 2022

(see **Section 5.4.3**). All species reported in the literature review are analyzed for their potential to occur in **Appendix F**, *Special-Status Species Potential Occurrence Determination*.

Based on an analysis of the biological, physical and environmental conditions necessary for each of the 15 listed wildlife species identified in the wildlife inventory, it was determined that 11 of the 15 have no potential to occur in the BSA (CNDDB, 2022a, b, d; Cornell Lab of Ornithology, 2022, eBird, 2022; Google Earth, 2022 Sawyer et al., 2009; Soil Survey Staff, 2022; USDA-NRCS, 2022b; USEPA, 2022b; USFWS, d, e, f, g).

In most cases, species were determined to have no potential to occur because the project site lacks suitable habitat or is outside of a particular species geographic or elevation range. Some species for which there is suitable habitat in the BSA were determined to not have a potential to occur for the following reasons:

1. The BSA lacks a water source and is distant from water sources, other than the artificially-maintained water features located at the adjacent golf club. Many special-status wildlife species require access to a nearby water source;
2. The project site is adjacent to developed areas, including roadways and other developments, that could contribute to hazards and/or noise. While noise and traffic in the area is not excessive under existing conditions, these factors may still deter the presence of some wildlife species.
3. The soils of the BSA are primarily fine sand; many species require or prefer soil types other than fine sands.
4. The BSA contains native vegetation, however it lacks complex vegetation communities with high levels of native species richness. In general, more complex natural communities with more vegetation layers and more plant species provide higher value wildlife habitat than less complex vegetation communities. More complex communities contain more niches for wildlife and usually support more animal species than less complex communities.

The following 11 listed species (as determined by various state, federal, regional and local regulatory agencies) were determined to have no potential to occur (see **Appendix F,** *Special-Status Species Potential Occurrence Determination***,** for the descriptions of the status rankings; ranking notations are listed below for each species):

- monarch butterfly (*Danaus plexippus* pop. 1) FC: California overwintering population
- Casey's June beetle (*Dinacoma caseyi*) FE
- desert pupfish (*Cyprinodon macularius*) FE, SE, MSHCP: Covered
- southern mountains yellow-legged frog (*Rana muscosa*) FE, SE, CDFW:WL
- southern rubber boa (*Charina umbratica*) ST
- Yuma rail (=Yuma clapper rail) (*Rallus obsoletus yumanensis*) (=*Rallus longirostris yumanensis*) FE, ST, fully protected, MSHCP: Covered
- southwestern willow flycatcher (*Empidonax traillii extimus*) FE, SE, MSHCP: Covered Season of Concern: nesting
- coastal California gnatcatcher (*Polioptila californica californica*) FT, SSC
- Townsend's big-eared bat (*Corynorhinus townsendii*) SSC
- San Joaquin kit fox (*Vulpes macrotis mutica*) FE, ST
- Peninsular bighorn sheep (Distinct Population Segment) (*Ovis canadensis nelsoni* pop. 2) (=*Ovis canadensis cremnobates*) FE, ST, fully protected

Deleted: November 2022

Moderate Potential to Occur in the BSA: Listed Wildlife

Coachella Valley fringe-toed lizard

Coachella Valley fringe-toed lizard (*Uma inornata*; FT, SE, MSHCP: Covered) is a generally rare reptile, however it may be common within the Coachella Valley. This species is confined to a limited range of Coachella Valley sand dunes; this species requires fine, loose, wind-blown sand. Suitable habitats for this lizard include sand dunes with sparsely distributed desert scrub, alkali scrub, and desert wash habitats. This insectivorous lizard primarily feeds on ants, grasshoppers, beetles, sand-dwelling roaches, spiders, larvae, and caterpillars. During breeding season, which may vary each year depending on precipitation, males will consume ants and vegetation such as flower buds and stems in the morning only. Predators of this species include roadrunners, badgers, loggerhead shrikes, American kestrels, and coyotes. There are some snakes that will also prey on this lizard, including sidewinders, glossy snakes, and coachwhips. To obtain coverage from predators, this species will burrow into sand, often on the lee side of the sand dune in order to avoid losing coverage by the sand in periods of high winds. (Stebbins, 1944, 1954; Norris, 1958; Kaufman 1982; CWHR CDFW 2022).

Desert tortoise

Desert tortoise (*Gopherus agassizii,* FT, ST, MSHCP: Covered), is a widely distributed species, occurring in the Mojave, Sonoran, and Colorado deserts. Suitable habitats for this tortoise include desert scrub, desert wash, and Joshua tree habitats. This species occurs in virtually all desert habitats, except for in areas with precipitous slopes. Diet of this herbivorous species consists of annual forbs and grasses; however forbs are typically preferred. Desert tortoise primarily resides under bushes or overhanging rock formations in burrows that the tortoise has excavated (Marlow, 1979). The majority of tortoise activity occurs between March and June, although they may be active year-round. Adult desert tortoise have few known predators; however juveniles often experience predation by eagles, coyotes, and foxes (Grover and DeFalco, 1995; Marlow, 1979; CWHR CDFW, 2022).

5.4.3 Sensitive Wildlife

One sensitive wildlife species, merlin *(Falco columbarius*; WL, Season of Concern: nesting), was observed within the BSA during the habitat assessment survey conducted on March 5, 2022 (**Appendix G**, *Plant and Wildlife Species Recorded During the Field Surveys*). This species was observed foraging both onsite and offsite within the BSA.

Based on an analysis of the biological, physical and environmental conditions necessary for each of the 34 sensitive wildlife species identified in the wildlife inventory, it was determined that 18 have at least a low potential to occur within the BSA, and one sensitive wildlife species was observed within the BSA. The following 15 sensitive wildlife species were determined to have no potential to occur in the BSA because the BSA lacks suitable habitat, the BSA is outside of the geographic and elevational range, or other site disturbances mentioned above, preclude the establishment of these species (see **Appendix F,** *Special-Status Species Potential Occurrence Determination,* for the descriptions of the status rankings):

- Borrego parnopes cuckoo wasp (*Parnopes borregoensis*) CNDDB Special Animals List
- southern California legless lizard (*Anniella stebbinsi*) SSC
- black swift (*Cypseloides niger*) SSC, BCC, Season of Concern: nesting
- southern California rufous-crowned sparrow(*Aimophila ruficeps canescens*)
- vermillion flycatcher (*Pyrocephalus rubinus*) SSC Season of Concern: nesting

Deleted: 33

Commented [MS7]: Chambers Rd 2: New Comment - Section 5.4.3 - The second paragraph discusses 33 senstivie wildlife species that resulted from the wildlife inventory; however, according to Appendix F, there are 34 species. Or was it not counting merlin and should then say the remaining 33 species?

Commented [MS8R7]: Revised

Deleted: November 2022

- brown-crested flycatcher (*Myiarchus tyrannulus*) WL Season of Concern: nesting
- gray vireo (*Vireo vicinior*) SSC, BCC, MSHCP: Covered Season of Concern: nesting
- yellow warbler (*Setophaga petechia*)(=*Dendroica petechia*) SSC, BCC, MSHCP: Covered Season of Concern: nesting
- yellow-breasted chat (*Icteria virens*) SSC, MSHCP: Covered Season of Concern: nesting
- summer tanager (*Piranga rubra*) SSC, MSHCP: Covered Season of Concern: nesting
- pallid San Diego pocket mouse (*Chaetodipus fallax pallidus*) SSC
- San Diego desert woodrat (*Neotoma lepida intermedia*) SSC
- American badger (*Taxidea taxus*) SSC
- desert bighorn sheep (=Nelson's bighorn sheep) (*Ovis canadensis nelsoni*) fully protected, MSHCP: Covered
- two-striped garter snake (*Thamnophis hammondii*) SSC

Present in the BSA: Sensitive Wildlife

Merlin

Merlin breed in the northwestern United States (including Alaska) and Canada during the summer months, and winter throughout the southern region of the United States (including California) and as far south as Ecuador, from September to May . They occupy habitat ranging from annual grasslands to open ponderosa pine and montane hardwood conifer habitats; coastlines, savannahs, woodlands, lakes, and wetlands. They frequently use dense tree stands for cover and are often close to water bodies (Cornell Lab of Ornithology, 2022).

Moderate Potential to Occur in the BSA: Sensitive Wildlife

Burrowing owl

Burrowing owl (*Athene cunicularia*; SSC, MSHCP: Covered) has a relatively large geographic range, covering open landscape of North and South America. This owl typically occurs in areas of open, dry, flat ground or low rolling hills with sparse vegetation and available burrows. Burrowing owl typically utilizes burrows created by fossorial mammals; however these owls are capable of creating their own burrows in the soft banks of irrigation canals and ditches. This species is also known to utilize artificial structures (e.g., pipes, crevices in rock piles) when natural burrows are not available (CWHR CDFW, 2022; CDFW, 2012).

Prairie falcon

Prairie falcon (*Falco mexicanus*; WL, Season of Concern: nesting) occupy several habitats such as annual grasslands, alpine meadows on open, dry, level or hilly terrain, perennial grasslands, savannahs, rangeland, some agricultural fields, desert scrub areas and even marshland and ocean shores. During the winter they reside in cultivated fields, lakeshores, and desert scrub (Cornell Lab of Ornithology, 2022).

Le Conte's thrasher

Le Conte's thrasher (*Toxostoma lecontei*; SSC, MSHCP: covered)is an uncommon to rare resident of southern California deserts ranging from southern Mono County to northern Mexico and in western and southern areas of San Joaquin Valley. This species typically occurs in sandy areas in open desert

Deleted: November 2022

wash, alkali desert scrub, desert scrub, and desert succulent shrub habitats; it is also found in Joshua tree habitats containing scattered shrubs. Diet of this species consists of primarily insects but may occasionally include small lizards, seeds, and other small invertebrates. Scattered dense shrubs are utilized for cover. Typically, this bird will nest in a dense, spiny shrub or cactus with dense branching (Bent, 1948; Sheppard, 1970).

Loggerhead shrike

Loggerhead shrike (*Lanius ludovicianus*; SSC, Season of Concern: nesting) is a common resident and winter visitor in lowlands throughout California. It frequently occurs in open habitats interspersed with shrubs (Cornell Lab of Ornithology, 2022). Typical habitats include agricultural fields, pastures with fence rows, old orchards, savannas, prairies, mowed roadsides, desert washes, desert scrub, grassland, and other similar habitats. This species feeds upon large insects, but will also hunt small birds, mammals, amphibians, reptiles, and other invertebrates. They build nests in dense canopies of shrubs or trees (Zeiner et al., 1988-1990).

Coachella Valley Jerusalem cricket

Coachella Valley Jerusalem cricket (*Stenopelmatus cahuilaensis*; SSC, MSHCP: Covered) inhabits areas with loose, wind-blown drift sands, dunes, and occasionally sandy vacant lots that contain adequate native vegetation (CVCC, 2016). Occurs in rolling sand dune ridges near the north base of the San Jacinto mountains (Tinkham, 1968). This species is associated with dune shrubbery typical of the Colorado Desert. This species requires high humidity, and are typically observed when soils are moist (Hawks, 1995). During the summer, they retreat to deep burrows during the day and may surface at night (Hawks, 1995). They feed on roots, tubers and detritus (CVCC, 2016).

Flat-tail horned lizard

Flat-tail horned lizard (*Phrynosoma mcallii*; SSC, MSHCP: Covered). The range of this species is confined to sparsely-vegetated areas with fine sand in central Riverside, eastern San Diego, and Imperial Counties. This species most frequently occurs in moderately flat areas of creosote bush, and is found in desert scrub, desert wash, succulent shrub, and alkali scrub habitats. Fine sand is a crucial habitat element, as it is required for burrowing mainly for the purpose of coverage and avoidance of extreme temperatures. Shrubs are also used as a shade source during periods of extreme heat. Ants comprise the primary diet component for all species of horned lizard, however other arthropods may occasionally be consumed (Pianka and Parker 1975; Turner and Medica 1982; CWHR CDFW 2022; Stebbins 1985).

Red diamond rattlesnake

Red diamond rattlesnake (*Crotalus ruber*; SSC) is The geographic range of this venomous pit viper species spans from the southwestern corner of California, southward through most of Mexico's Baja peninsula. This rattlesnake requires rodent burrows or crevasses or cracks in rocks, and other forms of surface cover (Zeiner et al., 1988-1990).

Western yellow bat

Western yellow bat (*Lasiurus xanthinus*; SSC, MSHCP: Covered, WBWG: H) is an uncommon, year-round resident of California that occurs in valley foothill riparian, desert riparian, desert wash, and palm oasis habitats. The western yellow bat is known to occur only in Los Angeles and San

Deleted: November 2022

Bernardino Counties to south to the Mexican border. This bat's diet consists of flying insects. This species typically roosts in trees located in palm oasis and riparian habitats. It forages over water and among trees, and begins periods of activity at dusk. (Barbour and Davis, 1969; CWHR CDFW 2022).

Pallid bat

Pallid bat (*Antrozous pallidus*; SSC) occurs variety of habitats are occupied by pallid bats, including deserts, grasslands, shrublands, woodlands, and forests form sea level up through mixed conifer forests (Zeiner et al., 1988-1990).

5.5 Waters of the U.S. and State (Including Wetlands)

The project site is located within the USGS Morongo Wash hydrologic unit (HU; HU Code 181002010404), as shown in **Appendix A**, Figure 9, *USGS Surface Waters and Watersheds*. The Morongo Wash HU drains an area of approximately 35 square miles (U.C. Davis, 2022a). The Morongo Wash HU is within the larger Little Morongo Creek-Morongo Wash HU, which drains an area of approximately 171 square miles (U.C. Davis, 2022b).

UltraSystems biologists reviewed aerial imagery to identify natural and man-made drainages (rivers, streams, creeks), open water (lakes, ponds, etc.), and other features that may be subject to federal or state jurisdictional authority within watersheds within the BSA. They also reviewed USGS 7.5-Minute Topographic Map for the *Desert Hot Springs* Quadrangle and USFWS National Wetlands Inventory (USFWS, 2022f) to identify potential presence or absence of onsite waterways. Based on these reviews, the biologists did identify jurisdictional waters within the BSA.

UltraSystems biologist Matthew Sutton conducted a jurisdictional assessment on March 5, 2022, during which he evaluated whether there was evidence of hydrologic features such as rivers, streams, canals, lakes, and ponds. During this survey, several hydrologic features were observed. Mr. Sutton commenced a survey of one of the project site's ephemeral drainages on March 5, 2022. He continued delineation surveys on March 6, May 26, and May 27, 2022.

The nearest significant surface water is the Morongo Wash located approximately 0.16-miles west of the project site (Google Earth, 2022).

These surveys resulted in the delineation of the following isolated waters of the State (e.g., jurisdictional features): five drainages, three swales, a desert riparian area, and a playa. Each jurisdictional feature is described below. The characteristics and traits of the jurisdictional waters delineated on the project site are provided in greater detail in **Appendix H**, *Preliminary Jurisdictional Delineation Report*.

The largest drainage, D1, begins on the eastern project boundary, approximately 500 feet north of the southeastern corner of the project site, and continues through the southeastern section of the project site, before heading south of the project site and terminating near a fence on the south-adjacent property (see **Appendix A**, Figure 10, *Jurisdictional Waters*). Drainage D1 is formed by stormwater runoff flowing southward down the western roadway margin of Palm Drive, which overflows a berm on the margin's border with project site, and initially spreads out into a wash before forming a singular channel that continues southwesterly. A desert riparian wash occurs in the relatively level area where D1 begins, where the stormwater initially fans out, after overflowing the berm.

Formatted: Justified

Deleted: November 2022

The vegetation of the desert riparian wash was classified to the *Atriplex canescens* Desert Wash Association level based on A *Manual of California Vegetation, second edition* (Sawyer et al., 2009) and another source that described this association (Evens et al., 2014; Evens et al., 2020). There are also two swales associated with D1, swales D1S2 and D1S3 (see **Appendix A**, Figure 10, *Jurisdictional Waters*). Both of these swales occur where the channel abruptly turns and water overflows the banks and spreads out into the area adjacent to these turning points. Two small drainages, D2 and D3, discharge into D1 along the southern boundary of the project site. The characteristics and traits of the foregoing jurisdictional areas are provided in greater detail in **Appendix H**, *Preliminary Jurisdictional Delineation Report*.

There are four other ephemeral drainages that all occur near the southern boundary of the project site (see **Appendix A**, Figure 10, *Jurisdictional Waters*). Drainage D5 begins near the southwestern corner of the project site and is formed by stormwater flow that flows down from a nexus of dirt roads with sufficient energy to form a bed, bank and channel. This drainage proceeds in an easterly direction until it converges with D1. At the point of this convergence, the waters of both D1 and D5 combine and continue southward along the southmost section of D1. One small drainage, D4, discharges into D5 along the southern boundary of the project site. Drainage D4 is also associated with a small swale, D4S1, in an area where sheetflow pools and then discharges into D4. The characteristics and traits of the foregoing jurisdictional areas are provided in greater detail in **Appendix H**, *Preliminary Jurisdictional Delineation Report*.

One other onsite jurisdictional feature is a playa located in the northeast section of the project site. The onsite desert playa is a large, low-lying area (see **Appendix A**, Figure 10, *Jurisdictional Waters*). This area sits in a mild depression that is approximately three feet lower than the surrounding upland areas. Sheetflow from the surrounding areas, which are at a slightly higher elevation, travels from the higher ground to eventually settle into this playa. The characteristics and traits of this playa are provided in greater detail in **Appendix H**, *Preliminary Jurisdictional Delineation Report*.

5.6 Critical Habitat

The project site is not located within a designated or proposed critical habitat for listed plant or wildlife species (**Appendix A**, Figure 11, *USFWS Critical Habitat*). However, multiple locations of USFWS-designated critical habitat for one plant species, Coachella Valley milkvetch, are located within a 5-mile radius of the BSA. The nearest critical habitat for Coachella Valley milkvetch is located approximately one mile southwest of the project site(see **Appendix A**, Figure 11, *USFWS Critical Habitat*).

5.7 Wildlife Corridors: Cores and Linkages in BSA Proximity

Per the BIOS Habitat Connectivity Viewer, the project site itself is not located within a CDFW-designated Essential Habitat Connectivity Area or a Natural Landscape Block (**Appendix A**, Figure 12, *CDFW Wildlife Corridors*; CDFW, 2022b), but it does border an MSHCP Conservation Area. The western and northwestern portions of the BSA occur in Willow Hole Conservation Area, an MSHCP Conservation Area, and does not occur within an MSHCP Biological Corridor or Linkage. The Willow Hole Conservation Area covers approximately 5,600 acres and contains MSHCP Core Habitat for the Coachella Valley milkvetch, Coachella Valley fringe-toed lizard, the Coachella Valley round-tailed ground squirrel, and Palm Springs pocket mouse. The Morongo Wash passes through The Willow Hole Conservation Area and provides a potential wildlife corridor that connects the conservation area to the CDFW-designated Natural Landscape Block to the north. Because of its adjacency to the

Deleted: November 2022

Willow Hole Conservation Area, the project site is part of a wildlife corridor that may be used by special-status wildlife species such as the four abovementioned MSHCP Covered Species, and more common wildlife species.

The BSA serves as a wildlife corridor because the site is undisturbed and its surroundings include ample open space for various species of mammals and reptiles to traverse. For example, coyote, black-tailed jackrabbit, and desert cottontail were observed on the project site and these mammals likely travel between the project site and the Willow Hole Conservation Area to forage and seek shelter and water.

The nearest CDFW-designated wildlife corridor to the BSA is an Essential Connectivity Area, located approximately 0.5 mile south of the BSA. There are also several CDFW-designated Small Natural Areas within a 2-mile radius of the BSA, and a Large Natural Area within 3.5 miles of the BSA; the nearest is located approximately one mile south and west of the BSA.

It is likely that wildlife use the project site as a wildlife movement corridor to move between the Willow Hole Conservation Area, and CDFW-designated Small Natural Areas, and Essential Connectivity Areas.

Deleted: November 2022

6.0 POTENTIAL IMPACTS OF THE PROJECT

This section discusses potential significant effects or impacts, if any, to the environmental baseline and sensitive biological resources that could result from project construction and development. This is an important step in the CEQA process. Biological resources may be either "directly" or "indirectly" impacted by a project (defined by CEQA Guidelines § 15358). Direct and indirect impacts may be either "permanent" or "temporary" in nature. These impact categories are defined below.

- **Direct impact**: Direct impacts are those that may cause an immediate effect on the species or its habitat and occur at the same time and place. Any loss, alteration, disturbance or destruction of biological resources that could result from project-related activities is a direct impact. Examples include vegetation clearing and loss of habitat, encroaching into wetlands, diverting natural surface water flows, and the loss of individual species.

- **Indirect impact**: As a result of project-related activities, biological resources may also be affected in a manner that is not direct. Indirect impacts are caused by the project and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect or secondary effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems. Indirect impacts can affect biological resources within the project site, adjacent to the project site, or away from the project site. Examples of indirect impacts include increased human activity, elevated noise, light, and dust levels, decreased water quality, soil compaction, erosion created by the removal of vegetation, and the introduction of invasive plants and unnatural predators. Indirect impacts may be both short term and long-term in their extent. Indirect impacts are also referred to as "edge effects."

- **Permanent impacts (long term)**: All impacts that result in the long-term or irreversible removal of biological resources are considered permanent. Examples include constructing a building or permanent road on an area containing biological resources. Permanent impacts cannot be mitigated in-place.

- **Temporary impacts (short term)**: Impacts considered to have reversible impacts to biological resources can be viewed as temporary. Examples include short-term increased vehicle traffic and noise and the generation of fugitive dust during construction; or removing vegetation and either allowing the natural vegetation to recolonize or actively revegetating the impact area. Temporary impacts can be reversed with the implementation of in-place mitigation measures.

6.1 Thresholds of Significance

This section describes the significance criteria used for determining impacts to biological resources. As mentioned in the CEQA Guidelines (§ 15064.7[a]), each public agency is encouraged to develop and publish thresholds of significance (significance criteria) that it uses to determine the significance of environmental impacts. A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental impact, non-compliance with which means the impact will normally be determined to be significant by the agency and compliance with which means the impact normally will be determined to be less than significant.

Deleted: November 2022

Significance criteria serve as benchmarks for determining if a project would result in a significant adverse environmental impact when evaluated against the baseline. CEQA Guidelines § 15065(a) states that a project may have a "significant impact" on the environment if the project has the potential to:

- Substantially degrade the quality of the environment,
- Substantially reduce the habitat of a fish or wildlife species,
- Cause a fish or wildlife population to drop below self-sustaining levels,
- Threaten to eliminate a plant or animal community, or
- Substantially reduce the number or restrict the range of an endangered, rare or threatened species.

The Environmental Checklist Form in Appendix G of the CEQA Statute and Guidelines (2022) was reviewed in order to determine the level of significance of project related impacts to biological resources. Under CEQA Guidelines impacts to biological resources are considered potentially "significant" if one or more of the following thresholds are exceeded with construction and operation of the project.

Threshold 1: The project would have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW and USFWS.

Threshold 2: The project would have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW and USFWS.

Threshold 3: The project would have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

Threshold 4: The project would interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.

Threshold 5: The project would conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

Threshold 6: The project would conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state HCP.

Significant impacts can be reduced to less than significant levels by incorporating off-setting conservation measures, including BMPs, avoidance and protection measures, and/or mitigation measures. Less than significant impacts are those in which impacts would occur, but are not expected to be substantial. Impacts to biological resources that are considered less than significant include impacts to biological resources that are reasonably widespread or exist in a degraded or disturbed state, rendering them less valuable as habitat to support wildlife diversity or special-status species,

Deleted: November 2022

or impacts that do not meet or exceed the significance thresholds defined above. These less than significant impacts do not require conservation measures

6.2 Potential Impacts to Plant Communities

6.2.1 Direct Impacts

No sensitive plant communities were identified within the BSA. UltraSystems biologists identified plant communities observed within the BSA using the classification system of *A Manual of California Vegetation, Second Edition* (Sawyer et al., 2009) as a primary source. In cases where there was a land cover type not clearly described in the aforementioned document, biologists also consulted the MSHCP (CVCC, 2016), and *Preliminary Descriptions of the Terrestrial Natural Communities of California. State of California* (Holland, 1986) to augment the classification of land cover types. Using Sawyer et al. (2009), biologists identified one plant alliance, fourwing saltbush scrub, to an association level, *Atriplex canescens* Desert Wash Association. Although this plant community has hydrological and vegetative characteristics of a riparian community, CDFW does not list it as a sensitive plant community in the *Natural Community List* (CDFW, 2022a). Since riparian habitat is considered a water of the State by CDFW and RWQCB, and protected by those agencies. Development of the project will cause the removal of approximately one acre of fourwing saltbush scrub.

Direct impacts to plant communities have immediate consequences, such as the changes that occur when land is cleared for permanent development and plant communities are altered or removed during project construction activities. Direct permanent impacts include all areas within the limits of construction in the project footprint. **Table 6.3-1** describes the approximate acreages of each plant community and non-vegetated feature that are anticipated to be directly impacted by project activities. Calculations were based on the currently proposed development design in conjunction with vegetation mapping from field surveys and aerial imagery.

Table 6.3-1
ACREAGE OF DIRECT IMPACTS TO LAND COVER TYPES

Land Cover Type	Acreage Mapped within the Project Site	Total Permanent Impact Acreage	Total Temporary Impact Acreage	Total Impact Acreage
Fourwing saltbush scrub	1.00	1.00	0	1.00
Creosote bush – white bursage scrub	35.86	35.86	0	35.86
Unconsolidated streambed	0.49	0.49	0	0.49
Stabilized desert dunes	1.42	1.42	0	1.42
Disturbed	0.54	0.54	0	0.54
Tamarisk thickets	0.04	0.04	0	0.04
Developed/ornamental	0	0	0	0

Deleted: November 2022

Land Cover Type	Acreage Mapped within the Project Site	Total Permanent Impact Acreage	Total Temporary Impact Acreage	Total Impact Acreage
Date palm – California fan palm groves	0	0	0	0
Total Acreage[1]:	**39.34**	**39.34**	**0**	**39.34**

1. The Riverside County Assessor Parcel paper map for the project site indicates that parcel is 38.34 acres; however, Riverside County's parcel GIS database has an attribute table associated with this parcel that reports this parcel's acreage as both 38.34 and 39.34 acres. UltraSystems used the GIS data from the County's database for this parcel which represents the parcel as 39.34 acres. Thus, UltraSystems used that GIS data to conduct the analysis of the acreages per land cover type within the project site because there was no GIS data available that showed the project boundary as 38.34 acres.

Development of the project site will result in direct impacts (permanent loss of vegetation) to plant communities and habitat. Direct impacts to creosote bush – white bursage scrub, unconsolidated streambed, developed/ornamental areas (onsite), and disturbed (onsite) areas are considered less than significant because these communities and non-vegetated features are not considered sensitive or riparian. By contrast, there will be direct impacts to a riparian plant community, fourwing saltbush scrub, which, due its hydrological and vegetative characteristics onsite, functions as a desert riparian community (U.C. Riverside CCB, 2012). Impacts to fourwing saltbush scrub, which occupies an area that has been identified as a desert riparian wash, is also discussed in **Section 6.6** and **Appendix H,** *Preliminary Jurisdictional Delineation Report*. Direct impacts to the non-sensitive and non-riparian plant communities do not meet or exceed significance thresholds, are considered less than significant, and therefore do not require mitigation; however, potential impacts to the fourwing saltbush scrub riparian community would be potentially significant and would require mitigation..

6.2.2 Indirect Impacts

Indirect impacts to plant communities result in secondary consequences and are likely to be temporary. Indirect impacts could occur to plant communities within areas adjacent to the limits of grading in the project footprint. Examples of indirect, temporary impacts include the effects of airborne fugitive dust and mud splatter created by construction activities. Construction-generated fugitive dust and mud splatter can adversely affect plant communities by settling on plant surfaces and inhibiting metabolic processes such as photosynthesis and respiration. Construction-related erosion, runoff, siltation, sedimentation, soil compaction, and alteration of drainage patterns could also affect the vegetation within the BSA.

Ground-disturbing activities will entail the grading and fill of all of the onsite drainages, including D1, which discharges to the south of the project site within 50 feet of the date palm – California fan palm groves plant community that occurs in the BSA (see **Section 6.6** and **Appendix A**, Figure 8, *Land Cover Types*). As a consequence of the removal of these onsite drainages, it is likely that the remaining stretch of D1 that is south of the project site will have a substantially reduced volume of water that it discharges into the area where the fan palm stand occurs. This reduction in water flow may lead to the death or reduced function of the California fan palm trees in this stand. Date palm – California fan palm groves is not listed as a sensitive plant community in CDFW's Natural Community List (CDFW, 2022a). The occurrence of this plant community on the project site is not associated with willow or

Deleted: November 2022

cottonwood and so it does not have the species composition associated with a riparian habitat (U.C. Riverside CCB, 2012). Thus, there are potential indirect impacts to the date palm – California fan palm groves as a result of project development, but because this plant community is neither sensitive nor riparian, impacts would not be considered significant, and mitigation is not required.

Another indirect impact to plant communities would be the potential introduction of non-native plant species, including invasive plant species, during development of the project. In particular, Sahara mustard, an invasive plant species with a high rating on the Cal-IPC Inventory, was observed throughout the project site. Construction vehicles and equipment operated on the project site can spread the seeds of non-native plant species and other propagules into the project site and nearby areas, including the section of the Willow Hole Conservation Area that is adjacent to the project site's western and northern boundary. Weed seeds can transfer from vehicle tires or other surfaces of the vehicles while driving and operating within the project site. Once deposited, the weed seeds can germinate onsite and then spread seed material to surrounding areas; weed seeds can also be spread to nearby areas via fluvial and aeolian processes. There is a potential that dispersed weed seeds can lead to the introduction of novel invasive plant populations into the Willow Hole Conservation Area. Invasive plants can encroach into and potentially displace established sensitive native plant communities in the Willow Hole Conservation Area, and other areas within the BSA.

6.2.3 Mitigation Measures

Development of the project would have a significant direct impact to the fourwing saltbush scrub plant community in the desert riparian wash area. Prior to clearance or any other ground-disturbing activities, the City will consult with RWQCB and CDFW to determine the required avoidance and minimization measures to reduce project impacts to a less than significant level (see **Section 9.0**).

There is the potential for development of the project to introduce invasive plant populations into the BSA, including the Willow Hole Conservation Area. These invasive plant species could adversely impact sensitive plant communities within the BSA. Mitigation measure **BIO-1** requires rare plant surveys to identify sensitive plant communities within the BSA and consultation with CDFW and/or USFWS to determine appropriate avoidance and minimization measures should any sensitive plant communities be observed during those surveys. Implementation of mitigation measure **BIO-1**, would reduce the impacts to these protected communities. Mitigation measure **BIO-9** provides guidelines for workers to implement practices to reduce the spread of weeds. In particular, one guideline requires regular cleaning of vehicles, equipment and tools to reduce the introduction and spread of weed seeds on the project site and in surrounding areas. Impacts of construction and project development to sensitive plant communities would be less than significant with the implementation of mitigation measures **BIO-1** and **BIO-9**.

6.2.4 Impact Determination

Significance criterion*: impacts would be considered significant if the project were to have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW or USFWS.*

Less than Significant Impact With Mitigation Incorporated.

Direct and indirect impacts to sensitive plant communities are not anticipated to occur as a result of construction of the project. Given the relatively small size of the project footprint and availability of

Deleted: November 2022

other habitat within the project vicinity, there are no anticipated direct impacts to sensitive plant communities as a result of construction and project development.

The project is anticipated to have substantial adverse effects to riparian habitat and significant indirect effects to sensitive plant communities in the adjacent Willow Hole Conservation Area. Implementation of minimization and avoidance measures for impacts to riparian habitat based on the requirements of RWQCB and CDFW will bring the project impacts to riparian habitat to a less than significant level (see **Section 9.0**). Implementation of mitigation measures **BIO-1** and **BIO-8** would reduce project impacts to sensitive plant communities to a less than significant level.

6.3 Potential Impacts to Special-Status Plants

Listed Endangered, Threatened, and Candidate Plants

Although no listed plant species were observed within the BSA during the field surveys, one listed species in the plant inventory has a low potential, triple-ribbed milkvetch and one, Coachella Valley milkvetch, has a moderate potential to occur within the BSA.

Sensitive Plants

Although no sensitive plant species were observed within the BSA during the field surveys, ten species reported in the plant inventory have at least a low potential to occur in the project site:

- Little San Bernardino Mountains linanthus (*Linanthus maculatus* [Parish] Milliken ssp. *maculatus*) CRPR: 1B.2, MSHCP: Covered
- singlewhorl burrobrush (*Ambrosia monogyra*) CRPR: 2B.2
- Arizona spurge (*Chamaesyce arizonica*) CRPR: 2B.3
- flat-seeded spurge (*Chamaesyce platysperma*) CRPR 1B.2
- pygmy lotus (*Acmispon haydonii*) CRPR 1B.3
- chaparral sand-verbena (*Abronia villosa* var. *aurita*) CRPR: 1B.1
- purple stemodia (*Stemodia durantifolia*) CRPR 2B.1
- Harwood's woollystar (*Eriastrum harwoodii*) CRPR: 1B.2
- white-bracted spineflower (*Chorizanthe xanti* var. *leucotheca*) CRPR 1B.2
- slender cottonheads (*Nemacaulis denudata* var. *gracilis*) CRPR 2B.2

6.3.1 Direct Impacts

Potential direct impacts to common and special-status plant species occurring within the project site could occur from construction related mortality or injury to mature plants or to seeds within the seed bank as a result of the removal of onsite vegetation and the excavation, movement, and/or grading of existing soils. Project development would cause the mortality of all existing vegetation within the project footprint, and the existing topsoil would be removed and/or covered, removing the conditions needed for germination and establishment. Direct permanent impacts include all areas within the limits of grading in the project footprint.

Ground-disturbing and habitat-altering activities would involve significant disturbance to existing plants and to the seed bank. Examples of ground-disturbing activities include grading, clearing, disking, grubbing, excavation, trenching, paving, mowing, heavy equipment compacting, driving over habitat to access the construction work sites, vegetation removal and other vegetation management

Formatted: Body Text, Space After: 0 pt

Deleted: to occur within the BSA

Deleted: (listed respectively):¶
Triple-ribbed milkvetch (*Astragalus tricarinatus*) FE, CRPR: 1B.2, MSHCP: Covered¶
Coachella Valley milkvetch (*Astragalus lentiginosus* var. *coachellae*) FE, CRPR: 1B.2, MSHCP: Covered

Deleted: November 2022

activities, and use of herbicides and pesticides. Construction of residential and related structures would permanently alter the surfaces such that existing plant communities would not re-establish upon completion of the project.

Listed Endangered, Threatened, and Candidate Plants

Any Coachella Valley milkvetch or triple-ribbed milkvetch that may occur on the project site would be removed as a result of development of the project. Likewise, all seeds of listed species that may occur in the seed bank would not be able to germinate and grow as a result of proposed project activities. Direct impacts would potentially be significant.

Commented [MS9]: Chambers Rd 2: New Comments - Section 6.3.1 - Under the listed species section, only Coachella Valley milkvetch is discussed but according to Appendix F, triple-ribbed milkvetch has a low potential to occur.

Commented [MS10R9]: Revised

Sensitive Plants

It was determined that sensitive plant species have no more than a low potential to occur on the project site, or elsewhere in the BSA; however, ground-disturbing and habitat-altering activities would cause significant impacts to all existing vegetation, including all sensitive plant species that have the potential to occur within the project site. These direct impacts would have a significant effect on the sensitive plant species within the project site.

6.3.2 Indirect Impacts

The same indirect impacts described for plant communities in **Section 6.2** of this BRE may similarly impact individuals and populations of special-status plant species.

Listed Endangered, Threatened, and Candidate Plants

Coachella Valley milkvetch and triple-ribbed milkvetch would potentially be indirectly impacted within the BSA by project construction activities, as discussed in **Section 6.2**. Indirect impacts are potentially significant.

Sensitive Plants

Development of the project would have the same potentially significant indirect impacts to sensitive plant species as it would to listed plant species with a potential to occur within the BSA.

Commented [MS11]: Chambers Rd 2: Section 6.3.2 - Same as above.?

Commented [MS12R11]: Revised

6.3.3 Mitigation Measures

Listed Endangered, Threatened, and Candidate Plants

Because Coachella Valley milkvetch and triple-ribbed milkvetch are covered under the MSHCP, impacts to these species will be covered by payment of the Coachella Valley Association's and Coachella Valley Conservation Commission's (CVAG's and CVCC's) Local Development Mitigation Fee (LDMF); however, additional surveys may be required by USFWS and/or CDFW for listed species.

Sensitive Plants

There are 10 sensitive plant species in the plant inventory that have been designated by CNPS as California Rare Plant Rank (CRPR) 1 or 2 species and that were determined to have a low potential to occur within the BSA; these species are fully protected under CEQA and NPPA. Five of these species are covered under the MSHCP and impacts to them will be covered by payment of the LDMF.

Deleted: November 2022

Development of the project would have significant direct and indirect impacts on the other five species not covered by the MSHCP if these species are determined to be present during forthcoming surveys. As such, implementation of mitigation measure **BIO-1**, which requires botanical surveys of special-status plants and natural communities following CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW 2018), is required to determine if any of these species are present within the BSA. One requirement of mitigation measure **BIO-1** is that consultation with CDFW would occur if any sensitive plant species are observed during the survey. This consultation would lead to the implementation of appropriate minimization and avoidance measures to reduce potential impacts to sensitive plant species.

Mitigation measure **BIO-5** provides for instruction of workers to educate them of potential biological resources such as nests and of ways to avoid adversely impacting such resources. Implementation of mitigation measures **BIO-6 through BIO-10** would minimize the risk of workers unwittingly impacting biological resources. Mitigation measure **BIO-6** provides an onsite Biological Monitor during ground- and habitat-disturbing project activities, who will take steps to protect special-status plant species in adjacent areas of Willow Hole Conservation Area. Mitigation measure **BIO-7** provides for several construction BMPs that are designed to take precautions against contaminating water or soil surfaces with toxic or hazardous liquids that may spill from equipment or machinery. Mitigation measure **BIO-8** will establish project limits for where vehicles, equipment, and machinery can be stored or operated and where work crews can conduct operations. Mitigation measure **BIO-9** provides protections for vegetation and wildlife and guidelines for the introduction and spread of non-native plant species within the BSA. Implementation of mitigation measure **BIO-10** will reduce the disturbances to special-status plants occurring on adjacent lands.

Commented [MS13]: Chambers Rd 2: Section 6.3.2 - Same as above. Section 6.3.3 - The sesitive plant section discusses that a significant impact would occur with development of the project for the sensitive plant species that are not covered under the MSHCP; however, should it include if the species are present?

Commented [MS14R13]: Revised

6.3.4 Impact Determination

Significance criterion: *impacts would be considered significant if the project were to have a substantial adverse effect, either directly or through habitat modifications, to any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.*

Less than Significant Impact With Mitigation Incorporated

Although no sensitive plant species were observed during the general plant surveys, there were five sensitive species reported in the plant inventory that were determined to have at least a low potential to occur within the BSA and that are not covered under the MSHCP. Implementation of mitigation measures **BIO-1** and **BIO-5** through **BIO-10** will reduce project impacts to sensitive plant species to a less than significant level. Payment of the LDMF for the listed and sensitive species in the plant inventory that are covered by the MSHCP would reduce impacts to those species to a less than significant level.

6.4 Potential Impacts to Special-Status Wildlife

Listed Endangered, Threatened, and Candidate Wildlife

No listed wildlife was observed within the BSA during the general biological surveys.

The literature review and field surveys concluded that two listed species in the wildlife inventory have a moderate potential to occur within the BSA (desert tortoise, and Coachella Valley fringe-toed lizard), and two have a low potential to occur within the BSA (least Bell's vireo [LBV; *Vireo bellii*

Deleted: November 2022

pusillus] and Crotch bumble bee [*Bombus crotchii*]). All of the abovementioned species, except for Crotch bumble bee, are covered under the MSHCP. There is suitable habitat within the BSA to support both desert tortoise and Coachella Valley fringe-toed lizard.

Sensitive Wildlife

One sensitive wildlife species, merlin, was observed within the project site during the biological surveys.

In addition, the literature review and field surveys concluded that the following nine sensitive wildlife species have a moderate potential to occur within the BSA: red-diamond rattlesnake, Coachella Valley Jerusalem cricket, BUOW, prairie falcon, loggerhead shrike, Le Conte's thrasher, Palm Spring's pocket mouse, western yellow bat, and pallid bat. Of those nine species, Coachella Valley Jerusalem cricket, BUOW, Le Conte's thrasher, Palm Springs pocket mouse, and western yellow bat are covered under the MSHCP. In addition, it was determined that the following nine sensitive wildlife species have a low potential to occur within the BSA: Coachella giant sand treader cricket (*Macrobaenetes valgum*), Blainville's horned lizard (*Phrynosoma blainvillii*), Cooper's hawk (*Accipiter cooperii*), golden eagle (A*quila chrysaetos*), black-tailed gnatcatcher (*Polioptila melanura*), Crissal thrasher (*Toxostoma crissale*), Palm Springs round-tailed ground squirrel (*Xerospermophilus tereticaudus chlorus*), Palm Springs pocket mouse (*Perognathus longimembris* ssp. *bangsi*), and desert kit fox (*Vulpes macrotis arsipus*). Of those nine species, Crissal thrasher and Palm Springs round-tailed ground squirrel are covered under the MSHCP.

There is suitable habitat within the BSA to support all of the species mentioned in the preceding paragraph. The BSA is surrounded by open space, paved roadways, and an adjacent golf club; creosote-bursage scrub provides foraging and nesting habitat for several species. Additionally, the project site lacks the degree of vegetative cover required by many species in the wildlife inventory.

Merlin was observed foraging in the project site and elsewhere in the BSA during the field survey; however, this species would likely only occur in the BSA occasionally for foraging as this species requires dense tree stands for cover. It is possible that merlin could utilize the water features available within the adjacent golf club It is not anticipated that merlin would nest onsite because merlin nest in the northern regions of North America and are not known to breed south of Oregon.

6.4.1 Direct Impacts

Potential direct impacts to common and special-status wildlife occupying the project site could occur from construction related mortality, injury, or harassment of individuals as a result of permanent development of the project site and from the removal and direct loss of breeding, foraging, and/or sheltering habitat. These impacts could be considered significant and potentially significant. Project development could diminish the habitat available for common and special-status wildlife species from utilizing the onsite habitat. Direct permanent impacts include all areas within the limits of grading in the project footprint.

Ground disturbing and habitat altering activities could involve significant disturbance to common and special-status ground-dwelling animals or nesting birds. Examples include grading, clearing, disking, grubbing, excavation, trenching, paving, mowing, heavy equipment compacting, driving over habitat to access the construction work sites, tree removal and other vegetation management activities, and use of herbicides and pesticides.

Deleted: November 2022

Direct impacts to less mobile fossorial (burrowing) animals that are underground during most of the day or year (e.g., small mammals or lizards) or have a life stage in the soil or on plants could occur from encounters with vehicles or heavy equipment as many of these animals do not run away from construction vehicles/equipment. These species could be expected to experience direct mortality, injury, harassment, and displacement from increased human activity and vehicle/equipment travel if they are present onsite within the project footprint at the time of construction. Individual losses are more likely, especially during clearing activities. The loss of these animals could also affect other common and special-status wildlife that depend on them as prey. Construction-related direct impacts may also be considered significant impacts.

The BSA also supports large trees and other physical features that could potentially provide foraging, nesting, and cover habitat to support a diverse assortment of special-status bird species (year-round residents, seasonal residents, and migrants). It unlawful to take special-status birds, and their nests, eggs, and young. Activities which are most likely to result in take of migratory birds during the breeding bird season when eggs or young are likely to be present include, but are not limited to clearing or grubbing of bird nesting habitat, tree removal, or structure demolition. The project has a potential to directly take individual breeding birds, their nests, young, or eggs.

Listed Endangered, Threatened, and Candidate Wildlife

Based on the results of the literature review and field surveys, it was concluded that desert tortoise and Coachella Valley fringe-toed lizard have a moderate potential to occur throughout the BSA. Crotch bumble bee and LBV have a low potential to occur within the BSA. There is a potential that development of the project will cause direct impacts to these listed wildlife species because there is availability of suitable habitat in the project site, as it and much of its surrounding areas contain loose sand substrate and desert scrub habitat. Excavation and other ground-disturbing activities would potentially lead to take of these species and their habitat. Development of the project would adversely impact these species by removal of their habitat, which may also lead to take of any individuals in burrows or hives that would be disturbed during ground-disturbing activities.

It is unlikely that LBV would be directly impacted because it is not likely to nest or forage in the desert scrub habitat on the project site. Because there is abundant desert scrub habitat with suitable flowering species in the areas surrounding the BSA, it is not anticipated that development of the project will adversely impact Crotch bumble bee as it will be able to find alternative foraging areas nearby. It is not anticipated that there would be significant direct impacts to Coachella Valley fringe-toed lizard because there is not large patches of aeolian sands on the project site, which is where this species typically occurs. In addition, this is a mobile species and it would likely evacuate the project site once ground-disturbing activities initiate. By contrast, there may be significant direct impacts to desert tortoise because ground-disturbing activities would potentially destroy their burrows and lead to the take of individuals occupying those burrows.

There is suitable desert scrub habitat for desert tortoise within the project site. There are several large creosote bushes on the project site under which desert tortoise could form burrows. There is also abundant cover of forb species, especially during the wet season, that could serve as forage for this species. Ground-disturbing activities during excavation would potentially cause direct mortality, injury, harassment, and displacement to this species.

Deleted: November 2022

Sensitive Wildlife

One sensitive wildlife species in the wildlife inventory was observed onsite, eight have a moderate potential to occur, and nine have a low potential to occur within the BSA. Of those 18 species, six are protected under the MSHCP. Several of the sensitive wildlife species in the wildlife inventory, such as the merlin, prairie falcon, black-tailed gnatcatcher, western yellow bat, and pallid bat, would not be anticipated to occur and/or breed on the project site because the project site does not provide suitable foraging and/or breeding habitat for these species. These species would only likely forage on the site and could easily find alternative foraging habitat nearby, and therefore would not be significantly impacted by project activities.

Vegetation removal, excavation and other ground-disturbing activities would potentially adversely impact BUOW, loggerhead shrike, Le Conte's thrasher, Crissal thrasher, Palm Spring's round-tailed ground squirrel, Palm Springs pocket mouse, red diamond rattlesnake, and desert kit fox because suitable foraging, nesting, or burrowing habitat occurs on the project site and that habitat would be destroyed during such activities.

It is not anticipated that development of the project would adversely impact the overall population of most of the sensitive wildlife species with a potential to occur within the BSA because these species, with the exception of BUOW, have substantial populations throughout California. For example, red diamond rattlesnake has extensive populations throughout California. However, the conversion of native habitat to developed land cover would remove habitat that is suitable for several sensitive wildlife species that have a potential to occur in the project site. Nevertheless, direct impacts would be less than significant because the loss of this suitable habitat would not have a significant impact on the overall population of any sensitive wildlife species, with the exception of some bird species such as BUOW.

Loggerhead shrike commonly establish territories in the type of desert scrub habitat that occurs on the project site. This species will form nests in dense woody shrubs such as creosote. Development of the project would directly impact this species by removing all existing vegetation, which would potentially lead to take of their nests and eggs.

Although no BUOW or signs of active BUOW burrows were observed during surveys, there is the potential for BUOW to colonize the site prior to commencement of construction. Potential direct impacts to BUOW are discussed below. One sensitive wildlife species, merlin, was observed foraging in the BSA during field surveys. No potential direct impacts to this species are anticipated because the site does not provide suitable nesting habitat to support this species.

Due to the fact that there are several burrows distributed across the project site that BUOW could occupy and use as nest sites, there is a potential for construction of the project to directly impact BUOW. Ground-disturbing activities associated with the project such as excavation, disking, trenching and soil compaction would directly impact any BUOW that would establish burrows on the project site. With the exception of the soils underneath the canopy of one large tree that will be preserved, all of the ground surfaces would be heavily disturbed and would result in the likely destruction of any existing burrows.

Indirect Impacts

Indirect impacts could occur within areas located adjacent to the limits of construction in the project footprint. Indirect impacts are more subtle than direct ones. Impacts may either be short-term

Deleted: November 2022

related to construction or long-term and may affect populations and habitat quality over an extended period of time, long after construction activities have been completed. Examples of indirect impacts, such as mortality, injury, or harassment of common and special-status wildlife species that could potentially occur from the project include the following.

- The permanent loss of habitat and physical features that would occur from clearing and grading could indirectly impact wildlife species through the loss of foraging, roosting, denning, and/or breeding habitat available. Habitat loss could displace species from existing territories and reduce the home range of those species and impact nearby populations of similar species. Displaced species would then have to compete for and/or find new territories and compete for food with resident species. This could result in delayed nest building, fewer nest attempts, reduced clutch size, and an overall reduction in reproductive output.

- Project construction could result in temporary increased ambient noise levels, dust, vibration, lighting and/or human intrusion in and near habitat. This could disrupt natural foraging, roosting, denning, and/or breeding behavior of wildlife species. Wildlife species stressed by these factors may disperse from habitat in the project site and project vicinity. In addition, increased noise levels could interfere with territorial and mating vocalizations, thereby interfering with wildlife reproduction.

- Project construction could increase fugitive dust, pollution, runoff, siltation, sedimentation, and erosion. This could result in degradation and alteration of habitat and soils. Consequently, the ability of onsite and adjacent plant communities to support wildlife populations may decrease.

- Nighttime construction work and use of artificial lighting could disrupt natural foraging and breeding behaviors and/or alter wildlife movement patterns and migratory routes of nocturnally active species such as mammals and snakes. Most animals would attempt to avoid moving in or near the lighting; however, some animals such as insects, migratory birds, and bats might be attracted to the lighting, increasing construction-related mortalities. Artificial lighting could also indirectly affect wildlife by increasing detection by predators. The new development could also provide an increase in artificial lighting and glare which could disrupt nocturnal wildlife behavior.

- An increase and continuation of human activities within and adjacent to the project site could lead to mortality, injury, or harassment of wildlife species by providing food in the form of trash and litter or water which attracts predators such as the common raven (*Corvus corax*), and coyote.

Listed Endangered, Threatened, and Candidate Wildlife

There may be indirect impacts to endangered, threatened, or candidate wildlife species are anticipated as a result of construction of the project. Dust, noise, and vibration would potentially disturb desert tortoise and Coachella Valley fringe-toed lizard in offsite areas within the BSA. This disturbance may cause desert tortoise to evacuate such burrows and could adversely affect desert tortoise; whereas, Coachella Valley fringe-toed lizard is more mobile and could alter its foraging activity to less disturbed areas.

Deleted: November 2022

Sensitive Wildlife

There are several potential indirect impacts of construction of the project on foraging and/or nesting behavior of sensitive wildlife species. However, highly mobile species can gain access to suitable foraging habitat near the site and thus would not experience significant impacts from loss of foraging habitat due to construction activities. Less mobile fossorial or burrow-dwelling species such as BUOW, palm springs pocket mouse, and Palm Springs round-tailed ground squirrel that could occur in offsite areas of the BSA may be disturbed by dust, noise and vibration generated by project activities.

Indirect impacts to sensitive wildlife would occur as a result of the loss of vegetated areas, which support prey species such as small birds and mammals. Ample suitable breeding and foraging habitat are present in the project vicinity. Another indirect impact would be noise and dust generated by construction activities would indirectly impact the foraging and nesting behavior of some species. In addition, contact with toxic chemicals such as oil or gas that leak from machinery and which could contaminate soil surfaces or temporary onsite water sources may indirectly impact wildlife species. Cooper's hawks or other wildlife species could come into contact with these contaminated soils or waters either through direct contact or by consumption of prey species that have contacted contaminated soils or waters.

6.4.2 Mitigation Measures

Listed Endangered, Threatened, and Candidate Wildlife

Because Coachella Valley fringe-toed lizard, and desert tortoise are covered under the MSHCP, there is habitat that will be acquired by CVCC to provide habitat for these species and offset habitat loss due to development in the region. Thus, some impacts to these species would be covered by payment of the LDMF. The Crotch bumble bee would not be significantly impacted by development of the project because suitable habitat occurs in the nearby surroundings. The project proponent will pay into the LDMF to satisfy mitigation requirements for species that are covered under the MSHCP (see **Section 9.0**).

Because there is the potential for desert tortoise burrows to be destroyed during development of the project, additional mitigation is required to minimize or avoid potential take of this species. Mitigation measure **BIO-2** requires a take avoidance survey to identify any desert tortoise or sign of desert tortoise that may occupy the project site. This mitigation measure also requires consultation with USFWS if desert tortoise are observed on the project site. Mitigation measure **BIO-5** provides for instruction of workers to educate them of potential biological resources such as desert tortoise burrows and of ways to avoid adversely impacting such resources. Mitigation measure **BIO-6** provides an onsite Biological Monitor during ground- and habitat-disturbing project activities, who will take steps to protect desert tortoise and other listed species if found. Implementation of mitigation measures **BIO-2**, **BIO-5**, and **BIO-6**, coupled with payment into the LDMF, would reduce impacts of project development to listed wildlife species to a less than significant level.

Deleted: protocol

Deleted: s

Deleted: be conducted

Sensitive Wildlife

Sensitive wildlife could potentially be impacted by construction and project development, and mitigation is recommended. Implementing the recommended mitigation measures **BIO-1** through **BIO-7** described in **Section 8.0** will help to avoid, eliminate or reduce impacts to sensitive wildlife that could potentially occur within the BSA.

Deleted: November 2022

With the exception of merlin, special-status wildlife species were not observed during the surveys. Several sensitive wildlife species, such as flat-tailed horned lizard, Coachella Valley Jerusalem cricket, Le Conte's thrasher, BUOW, and western yellow bat, in the wildlife inventory that were determined to have a moderate potential to occur, and are covered under the MSHCP. Payment into the LDMF would fund the acquisition of conserved areas that provide suitable habitat for these species. The project proponent will pay into the LDMF to satisfy some of the mitigation requirements for all of the abovementioned species that are covered under the MSHCP (see **Section 9.0**).

Other sensitive wildlife species in the wildlife inventory were either determined to have no more than a low potential to occur or to only forage on the project site. It is not anticipated that development of the project will adversely impact those species and thus no mitigation is recommended for them. There is suitable habitat within the BSA to support nests or burrows of other sensitive wildlife species that were determined to have a moderate potential to occur within the BSA such as BUOW, loggerhead shrike, and red diamond rattlesnake. The various ground-disturbing project operations would remove or disturb the habitat of those three species and mitigation is recommended to minimize or avoid those impacts.

As a result of potential impacts to BUOW and in compliance with the MSHCP, the project proponent will implement mitigation measure **BIO-3** to conduct a sequence of surveys to ascertain the occurrence of established resident populations of BUOW and to reduce the potential for loss of BUOW that might establish residence just prior to project commencement. If any BUOW are observed during the BUOW surveys then the City will confer with CDFW to determine how to minimize impacts to existing BUOW. Implementation of mitigation measure **BIO-3** would reduce impacts to BUOW to less than significant.

Several mitigation measures will be implemented in order to minimize and avoid impacts to loggerhead shrike and other special-status wildlife species that could occur on the project site. Mitigation measure **BIO-4** provides for a pre-construction breeding bird survey in which biologists will take steps to protect nests and breeding behavior of bird species covered under MBTA and the Fish and Game Code. Mitigation measure **BIO-5** provides for instruction of workers to educate them of potential biological resources such as nests and of ways to avoid adversely impacting such resources. Implementation of mitigation measures **BIO-6 through BIO-8** would minimize the risk of workers unwittingly impacting biological resources. Mitigation measure **BIO-6** provides an onsite Biological Monitor during ground- and habitat-disturbing project activities, who will take steps to protect nests and other sensitive biological resources if found.

Several mitigation measures will be implemented to encourage that construction workers implement techniques and practices that limit potential impacts to wildlife species. Mitigation measure **BIO-7** provides for several construction BMPs that are designed to take precautions against contaminating water or soil surfaces with toxic or hazardous liquids that may spill from equipment or machinery. By limiting toxic substances in the project site's soils or runoff, uptake by raptors by direct contact or via consumption of prey species that contact contaminated sources will be minimized. Mitigation measure **BIO-8** will establish project limits for where vehicles, equipment, and machinery can be stored or operated and where work crews can conduct operations. Direct impacts to several special-status wildlife species in offsite areas of the BSA will be reduced or avoided by limiting construction of the project to onsite locations. Mitigation measure **BIO-9** provides protections for vegetation and wildlife. For example, work crews will be prohibited from moving or removing nests or handling any wildlife on the project site. Implementation of mitigation measure **BIO-9** will reduce or avoid impacts to special-status wildlife. Implementation of mitigation measure **BIO-10** will reduce disturbance to

Deleted: November 2022

special-status wildlife occurring in adjacent land. With the implementation of mitigation measures **BIO-3** through **BIO-10,** and payment into the LDMF, the impacts of construction and project operations to sensitive wildlife would be less than significant.

6.4.3 Impact Determination

Significance criterion: *impacts would be considered significant if the project were to have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by CDFW or USFWS.*

Less than Significant Impact with Mitigation Incorporated

The literature review and field surveys determined that there is one sensitive wildlife species that was present in the BSA, and 11 special-status wildlife species with a moderate potential to occur within the BSA. The project is anticipated to have direct or indirect impacts to special-status wildlife. With implementation of mitigation measures **BIO-2** through **BIO-10** described in **Section 8.0**, and by payment into the LDMF described in **Section 9.0**, the project impacts to special-status wildlife species are anticipated to be less than significant.

6.5 Potential Impacts to Breeding Birds

The project area and BSA support tamarisk thickets, shrubs, and other physical features that could potentially provide foraging, nesting, and cover habitat to support a diverse assortment of bird species (year-round residents, seasonal residents, and migrants). Many bird species that could potentially breed within the BSA are protected by the MBTA and by Fish and Game Code § 3503, § 3503.5, and § 3513. These statutes make it unlawful to take native breeding birds, and their nests, eggs, and young. Activities which are most likely to result in take of migratory birds during the breeding bird season when eggs or young are likely to be present include, but are not limited to clearing or grubbing of bird nesting habitat, tree removal, or structure demolition. The project has a potential to directly take individual breeding birds, their nests, young, or eggs.

6.5.1 Direct Impacts

Activities which are most likely to result in take of migratory birds during the breeding bird season when eggs or young are likely to be present include, but are not limited to clearing or grubbing of bird nesting habitat, structure demolition, tree removal, and vegetation trimming or clearing. The project has a potential to directly take individual breeding birds, their nests, young, or eggs; therefore, mitigation is required.

6.5.2 Indirect Impacts

Indirect impacts to breeding birds could occur from increased noise, vibration, lighting and dust during construction, which could adversely affect the breeding behavior of some birds and lead to the loss (take) of eggs and chicks, or nest abandonment. The project has a low potential to indirectly impact individual breeding birds, their nests, young, or eggs; therefore, mitigation is required.

Deleted: November 2022

6.5.3 Mitigation Measures

Implementing the recommended mitigation measures **BIO-**3 through **BIO-**10 described in **Section 8.0** will help to avoid, eliminate or reduce potential impacts to breeding birds, their nests, young, or eggs.

6.5.4 Impact Determination

Less than Significant Impact with Mitigation Incorporated

Project construction is not expected to result in impacts to bird species that only forage at the site or occur as transient visitors. Direct and indirect impacts to breeding birds, their nests, young, or eggs could potentially occur as a result of construction of the project. The minor reduction of suitable nesting habitat; the nature of the disturbance; and the availability of other habitat within the immediate project vicinity, the potential impacts to breeding birds, their nests, young, or eggs would likely be minor. Implementing the recommended mitigation measures **BIO-3** through **BIO-**10 described in **Section 8.0** will help to avoid, eliminate or reduce significant impacts to breeding birds, their nests, young, or eggs to less than significant levels; therefore, it is anticipated that development of the project may impact breeding birds, their nests, young, or eggs, but the impacts will not be significant with mitigation incorporated.

6.6 Potential Impacts to Jurisdictional Waters, Including Wetlands

This section discusses potential impacts to waters of the U.S. and State (including wetlands), and to water quality, water quantity, and aquatic/riparian habitat, that could result from project development (see **Appendix A**, Figure 10, *Jurisdictional Waters*).

6.6.1 Direct Impacts

Direct impacts to waters of the State (including wetlands), water quality, water quantity, and aquatic/riparian habitat have immediate consequences, such as the changes that occur when land is cleared for permanent development and waters are altered or filled in during project construction activities, including the filling of onsite drainages, stockpiling, channelization, bank stabilization, road crossings, or any other permanent drainage modification.

Field investigations for waters of the U.S. or State determined that the project site contains isolated drainages with a definable bed, bank, channel, or evidence of an ordinary high-water mark, a playa, and swales. Because these drainages do not connect with a water of the U.S., they were determined to be isolated waters of the State of California under the jurisdiction of the RWQCB and CDFW (see **Appendix H**, *Preliminary Jurisdictional Delineation Report*). Five ephemeral drainages were observed during the survey (see **Appendix H**, *Preliminary Jurisdictional Delineation Report*). Direct impacts are anticipated to occur to waters of the State as a result of the project construction and, therefore, mitigation is required.

6.6.2 Indirect Impacts

Indirect impacts to waters of the State (including wetlands), water quality, water quantity, and aquatic/riparian habitat result in secondary consequences which are likely to be temporary during construction, but they could also be long-term as a result of impervious surfaces and permanent development. Indirect impacts from project implementation could occur within areas located

Deleted: November 2022

adjacent to the limits of construction and then eventually within areas located adjacent and downstream to the new development. Construction-related pollution, fugitive dust, erosion, runoff, siltation, sedimentation, and soil compaction could adversely affect waters, water quality, and aquatic habitat. Alteration of drainage patterns could affect downstream waters and habitat by redirecting flow and runoff. Indirect impacts include the introduction and spread of invasive, exotic plants which could result in permanent indirect impacts to jurisdictional waters and water quantity.

Ground-disturbing activities will entail the removal of all of the onsite drainages (see **Appendix A**, Figure 10, *Jurisdictional Waters*). As a consequence of the removal of these onsite drainages, it is likely that the remaining stretch of D1, south of the project site, will receive a substantially reduced volume of water. This reduction in water flow may lead to the death or reduced function of downstream vegetation communities.

6.6.3 Mitigation Measures

As there are waters of the State on the project site, implementation of the project would result in direct impacts to those waters as well as to associated riparian areas under the jurisdiction of CDFW. Prior to the issuance of grading permits for the project, and prior to any ground-disturbing activities, the project proponent will obtain required permits and agreements from the RWQCB and CDFW and implement required mitigation measures.

6.6.4 Impact Determination

Less Than Significant Impact with Mitigation Incorporated

Significance criterion: *impacts would be considered significant if the project would have a substantial adverse effect on state or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.*

Surveys determined that the BSA contains waters of the State, including to associated riparian vegetation communities, and is anticipated to have a significant impact to waters of the State under the jurisdiction of CDFW and RWQCB. With the implementation of required mitigation measures determined in consultation with RWQCB and CDFW during the permitting process, development of the project would have less than significant impacts to waters of the State.

6.7 Potential Impacts to Critical Habitat

The project site is not located within or adjacent to designated or proposed critical habitat for listed plant or wildlife species.

6.7.1 Direct and Indirect Impacts

No direct or indirect impacts to critical habitat are anticipated as a result of construction of the project.

6.7.2 Mitigation Measures

Critical habitat is not anticipated to be impacted; therefore, no mitigation measures are required.

Deleted: November 2022

6.7.3 Impact Determination

Significance criterion: *impacts would be considered significant if the project were to have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations, or by CDFW and USFWS.*

No Impact

The BSA is not located within or adjacent to critical habitat, therefore the project is not anticipated to have direct or indirect impacts to critical habitat. No impact will occur and mitigation is not required.

6.8 Potential Impacts to Fish or Wildlife Movement or Native Wildlife Nursery Sites

The literature review and field surveys determined that the project site does not contain designated wildlife corridors such and Essential Habitat Connectivity Area or a Natural Landscape Block (see **Appendix A**, Figure 12, *CDFW Wildlife Corridors*; CDFW, 2022b). In addition, no native wildlife nursery sites were observed.

6.8.1 Direct Impacts

Less than significant direct impacts to wildlife corridors and native wildlife nursery sites are anticipated as a result of this project. UltraSystems biologists observed small mammal species (see **Appendix G** *Plant and Wildlife Species Observed During the Field Surveys*). Several unidentified small mammal burrows were observed on the project site, indicating the presence of fossorial mammal species. Coyote (*Canis latrans*) sign and black-tailed jackrabbit (*Lepus californicus*) were also observed, indicating that mammals use the site as a local wildlife movement corridor.

Although ground-disturbing activities and construction activities would result in permanent impacts to use of the project site as a wildlife movement corridor, wildlife would still have access to the undeveloped areas of Willow Hole Conservation Area, which is directly adjacent to the project site (see **Appendix A**, Figure 13, *CVMSHCP Conservation Areas and Corridors and Linkage*), as well as to other undeveloped areas of the BSA. Development of the project would significantly impact any fossorial species occupying onsite burrows; however, development of the project would not significantly impact wildlife corridors for these species because undeveloped natural areas will remain in the Willow Hole Conservation Area, which is adjacent to the project site. Thus, development of the project would have less than significant direct impacts to wildlife corridors.

6.8.2 Indirect Impacts

Field data indicate the presence of several mammal, reptile and bird species within the BSA, and these species could be indirectly impacted as a result of construction of the project, primarily due to vibration, soil erosion, dust, and general disturbance as related to project activities. The burrows, and ground- and shrub-nesting sites of various wildlife would be indirectly impacted by ground-disturbing activities. Dust generated by heavy machinery may also affect air quality within the burrows. The field survey data indicate that the BSA could potentially provide some areas that create passage routes for wildlife. Because these species are highly mobile and can either leave the project site or dig new burrow complexes and other nesting sites in undisturbed areas of the adjacent conservation area, the indirect impacts to these species are anticipated to be less than significant.

Deleted: November 2022

6.8.3 Mitigation Measures

Wildlife corridors and native nursery sites are anticipated to be impacted to a less than significant degree and therefore, no mitigation measures are required.

6.8.4 Impact Determination

Significance criterion: *impacts would be considered significant if the project were to interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites.*

Less Than Significant Impact

Although there is evidence that wildlife use the project site as a wildlife movement corridor, no significant impacts are anticipated to wildlife corridors. Wildlife nursery sites were not observed during the surveys, and the project site does not support resident or migratory fish species. In regard to the significance criterion, construction of the project is not anticipated to interfere substantially with the movement of native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors. Impacts are anticipated to be less than significant .

6.9 Potential Impacts to Local Policies Protecting Biological Resources

In the City Municipal Ordinance Title 17, Chapter 17.56, Section 17.56.090, *Removal or destruction of trees* (hereafter, tree removal ordinance), states that for any property in which more than five healthy, shade-providing, and aesthetically valuable trees are proposed for removal that a tree removal permit must be obtained by the property owner.

A tamarisk thicket is adjacent to and partly stretching into the southwest corner of the project site (see **Appendix A**, Figure 8, *Land Cover Types*). Four salt cedar (*Tamarix ramosissima*) trees occur on the project site, three of which have canopies that overhang into the site, and one of which is entirely within the site. The occurrence of these four trees in the project site does not necessitate the submission of a tree removal permit because these trees would likely not be considered aesthetically valuable by the City, and thus would not be protected by the ordinance. Furthermore, salt cedar has a high rating on the Cal-IPC Inventory. The CDFW typically requires that invasive plant species with a moderate or high rating on the Cal-IPC Inventory be removed; thus, it would be beneficial to the ecological health of the surrounding areas to remove salt cedar from the project site. Moreover, there is no requirement to submit a tree removal permit because there are fewer than six trees that are proposed for removal. Development of the project would not conflict with local policies protecting biological resources, such as the tree removal ordinance. The trees that are proposed for removal from the project site do not qualify for protection by the City's tree removal ordinance. Potential conflicts with the MSHCP are discussed in the next section.

6.9.1 Direct Impacts

Construction of the project will result in the partial or complete removal of four salt cedar trees located in the southwest corner of the project site.

Deleted: November 2022

6.9.2 Indirect Impacts

Construction of the project may require that up to four salt cedar trees will need to be pruned back to accommodate project activities.

6.9.3 Impact Determination

Significance criterion: *impacts would be considered significant if the project were to conflict with any local policies or ordinances protecting biological resources, such as tree preservation policy or ordinance.*

Less than Significant Impact

Although four trees would be removed from the project site, there is no requirement to mitigate for the removal of fewer than six trees in the City's tree removal ordinance. There are no other local policies protecting biological resources or City ordinances that require mitigation for the removal and/or pruning of the salt cedar trees that occur on the project site.

Commented [MS15]: Chambers Rd 2: New Comment - Salt cedar has a rating of High on the California Invasive Plant Council (CAL-IPC) list, meaning it is considered to have severe ecological impacts. The California Department of Fish and Wildlife typically recommends removal of invasive species rated as moderate to high on CAL-IPC. It is suggested that these deteails be added to support your current discussion.

Commented [MS16R15]: Revised

6.10 Potential Impacts to HCPs or NCCPs

The project site is located within the MSHCP boundary. Please refer to **Section 7.0** for a discussion of project consistency with the MSHCP.

The MSHCP Area comprises a variety of existing and proposed Conservation Areas, Core Habitats, and Linkages. The project site is not located within an existing or proposed Conservation Area; however, the western project boundary abuts the eastern boundary of the Willow Hole Conservation Area, and therefore the western segment of the BSA does occur within the boundary of this Conservation Area.

In the project's MSHCP consistency analysis, a review of all of the potential impacts to biological resources protected by the MSHCP is analyzed in further detail than in this section.

UltraSystems biologists observed natural communities and waters of the State that potentially provide habitat for special-status species protected under the MSHCP; however, the biologists did not observe special-status species that are covered under the MSHCP. Results of the literature study indicate that several species covered by the MSHCP have at least a low potential to occur in the BSA. In addition, the project site is adjacent to the Willow Hole Conservation Area, which could increase the potential for covered wildlife species occurring on-site, and/or using the site for passage or occasional foraging, therefore impacts to these species could occur because project activities would reduce the availability of suitable habitat in the vicinity. Refer to sections **6.3** and **6.4** for a discussion of the potential impacts to covered special-status plant and wildlife species with a potential to occur within the BSA.

The following four MSHCP-covered natural communities were observed within the project site and BSA during the surveys (the names of analogues of these communities shown in **Appendix A**, Figure 8, *Land Cover Types*, which were mostly based on the *Manual of California Vegetation (Second Edition)*, are listed parenthetically): desert saltbush scrub (fourwing saltbush scrub), Sonoran creosote bush scrub (creosote bush-white bursage scrub), stabilized and partially stabilized desert dunes (stabilized desert dunes), and desert fan palm oasis (date palm - California fan palm groves). (see

Deleted: November 2022

Appendix A, Figure 8, *Land Cover*). Refer to Section 5.2 for a more detailed discussion of each of these natural communities.

Desert saltbush scrub and Desert fan palm oasis are both desert wetland indicator communities because they are associated with a higher water table than most of the other natural communities (U.C. Riverside CCB, 2012a). However, neither of these communities that were observed within the BSA meet USACE's criteria of a wetland (USACE, 2008). Fourwing saltbush is the dominant species that occurs in the desert saltbush scrub community . Covered species associated with desert saltbush scrub include flat-tailed horned lizard and Le Conte's thrasher.

Desert fan palm oasis woodland occurs on typically wetter soils than desert saltbush scrub and California fan palm is the dominant species in the stand that occurs in the BSA. Covered species associated with Desert fan palm oasis woodland are Southern yellow bat (*Lasiurus ega*). Riparian birds such as the covered LBV are not anticipated to occur in the Desert fan palm oasis woodland because this stand does not co-occur with cottonwood or willow, which provide preferred habitat for riparian birds. Sonoran creosote scrub is an MSHCP-covered natural community associated with alluvial fans (U.C. Riverside CCB, 2012b). This is the dominant community on the project site. Covered species associated with this community include BUOW, Palm Springs pocket mouse, Le Conte's thrasher, and desert tortoise. The occurrence of Stabilized and partially stabilized desert dunes on the project site is covered with Sonoran creosote bush scrub plant community in which creosote bush and white bursage are co-dominant. Covered species associated with this dune community include Coachella Valley fringe-toed lizard and Coachella Valley round-tailed ground squirrel.

Ground-disturbing activities such as vegetation removal, excavation and grading would remove or substantially alter all of the onsite natural communities. In addition to impacting natural communities, ground-disturbing activities would also directly impact the covered species that directly depend on these communities.

There are several jurisdictional waters that occur on the project site. Refer to sections **5.5** and **6.6** for a discussion of the onsite waters of the State and the potential project impacts to those jurisdictional waters. Development of the project would remove all of the onsite waters of the State. Ground-disturbing activities would entail the removal of onsite drainages, including D1, which discharges to the south of the project site within 50 feet of the Desert fan palm oasis woodland that occurs in the BSA (see **Appendix A**, Figure 8, *Land Cover Types*). As a consequence of the removal of these onsite drainages, it is likely that the remaining stretch of D1 would have a substantially reduced water flow. This reduction may lead to the death or reduced function of the California fan palm trees in this stand. Thus, the three covered natural communities that occur on the project sites, as well as several covered species that have the potential to occur in these communities, would be directly impacted by development of the project.

The adjacency of the project site to eastern boundary of the Willow Hole Conservation Area warrants the adherence to the MSHCP Land Use Adjacency Guidelines, presented in Section 4.5 Land Use Adjacency Guidelines of the MSHCP. The location of the project could result in a conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state HCP; however, impacts would be reduced to a less-than-significant degree with the adherence to the MSHCP land use adjacency guidelines.

Deleted: November 2022

6.10.1 Mitigation Measures

Potential direct and indirect impacts to special-status and/or rare species that are addressed in the MSHCP are anticipated as a result of construction of the project. Direct impacts to covered plant and wildlife species, and natural communities involve the removal or alteration of all onsite vegetation and substrates. The removal of the vegetation would lead to the take of onsite plants, and to wildlife nest and burrow sites. The project proponent is required to pay into the LDMF to mitigate for impacts to covered species and natural communities (see **Section 9.0**).

Project activities would also cause the removal of waters of the State on the project site; however, the MSHCP defers to RWQCB and CDFW for regulation of waters of the State. The City and the project proponent would need to obtain the required permits and agreements from the RWQCB and CDFW and implement mitigation measures required by these agencies.

Indirect impacts to covered biological resources within the adjacent areas of Willow Hole Conservation Areas may occur due to edge effects, as defined in MSHCP Section 4.5 *Land Use Adjacency Guidelines* (CVCC, 2016). These impacts are expected to be less than significant with the implementation of **MM BIO 10** as per *Land Use Adjacency Guidelines* provided in Section 4.5 of the MSHCP (CVCC, 2016).

6.10.2 Impact Determination

Significance criterion: *impacts would be considered significant if the project would conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state HCP.*

Less than Significant With Mitigation Incorporated

As described in **Section 7.0**, the proposed project is consistent with the MSHCP. Implementing mitigation measures **BIO-1** – **BIO-10**, paying the LDMF, and obtaining required permits and agreements from the RWQCB and CDFW, and implementing minimization measures required by these agencies, would maintain consistency with the MSHCP. Development of the project would not conflict with the provisions of an adopted HCP, NCCP, or other approved local, regional, or state HCP.

Deleted: November 2022

7.0 MSHCP CONSISTENCY ANALYSIS

7.1 Introduction

The purpose of this Consistency Analysis (Analysis) report is to summarize the biological data for the proposed project and to document project's consistency with the goals and objectives of the MSHCP.

The project site is located within areas covered by the MSHCP. Each project located within the plan area must be consistent with the MSHCP. This section provides analysis of the project's compliance with the MSHCP. **Table 7.1-1**, *MSHCP Project Review Checklist*, provides a list of MSHCP conditions that were considered for this analysis.

Table 7.1-1
MSHCP PROJECT REVIEW CHECKLIST

MSHCP Conditions	Yes	No
Are riverine/riparian/wetland habitat or vernal pools present?	✓	
Is the project located in an MSHCP Conservation Area?		✓
Is the project located in a Biological Corridor of Linkage?		✓
Is the project located adjacent to MSHCP Conservation Areas?	✓	

7.1.1 Project Location within the MSHCP Boundary

The northeast corner of the subject property is located west of Palm Drive and approximately 0.25 mile south of 18th Avenue, in the City of Desert Hot Springs, Riverside County, APN 657-280-003 (see **Appendix A**, Figure 1, *Regional Overview*). The site is approximately 1.1 miles northeast of Interstate 10. The project site is surrounded by the San Bernardino National Forest to the northwest and southwest. The Coachella Valley Preserve is located approximately 8.2 miles southeast from the project site (see **Appendix A**, Figure 2, *Project Vicinity* and **Appendix A**, Figure 3, *Project Location and Biological Study Area (BSA)*. Surface elevation ranges from approximately 730 to 752 feet amsl.

Currently, all project construction and operations would occur within the 38.34-acre project site; therefore, the project's direct impacts would occur within the project boundaries. As proposed, the project proponent does not currently propose any to offsite areas. There are potential direct impacts to offsite waters of the State that immediately abut the southern boundary of the project site, and mitigation for impacts will be determined in consultation with CDFW and RWQCB. All land cover on the project site will be disturbed during grading and construction activities (see **Table 5.2-1**, *Land Cover Types*). There may also be indirect impacts to offsite areas within the BSA as a result of project activities.

MSHCP Conservation Areas

Biologists used GIS software to determine the project site's location in relation to applicable MSHCP Conservation Areas. Although the project site abuts the eastern boundary of the Willow Hole Conservation Area, the project site is not within a Conservation Area (see **Appendix A**, Figure 13, *CVMSHCP Conservation Areas and Corridors and Linkages*). Therefore, no mitigation measures are

Deleted: A

Deleted: will

Deleted: on

Commented [MS17]: Chambers Rd 2: Revisions were made. The text was revised to say, "the majority of the project's direct impacts will occur within the project boundaries". Does this mean that direct impacts will occur offsite as well?

Commented [MS18R17]: Revised. A discussion of potential impacts to offsite areas has been added.

Deleted: majority of the

Deleted: will

Deleted: November 2022

anticipated to be required for direct impacts to Conservation Areas. Indirect impacts to Conservation Areas would be reduced to a less than significant level with the implementation of mitigation measure **BIO-10**.

This project site is not anticipated to be subject to requirements pertinent to Conservation Areas under the MSHCP; however other requirements, including Land Use Adjacency Guidelines, apply under the plan.

Core Habitat within the MSHCP Conservation Area

The MSHCP Area includes a variety of existing and proposed Cores, Extensions of Existing Cores, Linkages, Constrained Linkages, and Non-contiguous Habitat Blocks. The project site is not located within an MSHCP Linkage.

Essential Ecological Processes, Biological Corridors, Linkages

The project site does not occur within an MSHCP Essential Ecological Processes Area, Biological Corridor, or Linkage. The nearest MSHCP Essential Ecological Processes Area to the project site is an area designated as preserving sand transport, and it is located approximately 0.38 mile from the project site, within the adjacent Willow Hole Conservation Area. UltraSystems biologists reviewed the MSHCP to determine that no focused surveys are required by the MSHCP for the project (see **Appendix A**, Figure 13, *CVMSHCP Conservation Areas and Corridors and Linkages*). However, because special-status species in the plant and wildlife inventories have a potential to occur within the BSA, and to be impacted by development of the project, several focused surveys have been recommended (see **Section 8.0**).

7.1.2 Project Description

The project proposes the construction of a total of 612 residential units. The project site is approximately 38.34-acres. Refer to **Section 2.0** for a more detailed project description.

Existing surface waters on the site generally flow south (see **Appendix I**, *Drainage Study*). The proposed development would maintain existing drainage patterns. Runoff will be diverted into biorientation areas. Flows from larger storms will be collected by proposed onsite storm drains and discharged into proposed underground stormwater detention chamber systems.

7.1.3 General Setting

The project site is located in an area open spaces and rural residences, with a golf course to the east. Suitable habitat occurs for some special-status plant and wildlife species, due to the undeveloped nature of the BSA and surrounding areas. The limited availability of permanent water sources, however, may deter riparian species from establishing on the project site.

According to historic aerial photographs of the site ranging from years 1953 to 2021 (Google Earth, 2022), the project site has not been previously developed or used for agricultural purposes. Much of the ground surfaces are covered with creosote-bur sage scrub and annual grasses and forbs. Burrows are distributed throughout the site, however many of the observed burrows were collapsed or degraded.

Deleted: November 2022

7.2 MSHCP Section 4.2 – *MSHCP Reserve System Assembly*

Projects that are located within a Core Habitat must be evaluated to determine their effect on the Reserve Assembly. The project is not located within a Conservation Area or Core Habitat; therefore, it is not required to meet the objectives of the Reserve Assembly.

7.3 Vegetation Mapping

Eight land cover types were identified and mapped within the BSA, and the determination of land cover types was based on both literature review of descriptions of plant communities and an onsite survey during the habitat assessment. The documents and websites referenced in the literature review included Sawyer et al. (2009), the MSHCP (CVCC, 2016), Holland (1986) CNPS (2022a, b), and CDFW (2022a, b). The methods used to assess land cover types and habitat is described in **Section 4.2.1** of this BRE. Determination of land cover types was augmented by examining aerial imagery (Google Earth, 2022) and field observations.

The following eight land cover types determined to be present within the BSA (see **Appendix A**, Figure 8, *Land Cover Types*):

- Fourwing saltbush scrub
- Creosote bush - white bursage scrub
- Unconsolidated streambed
- Stabilized desert dunes
- Disturbed
- Tamarisk thickets
- Developed/ornamental
- Date palm – California fan palm groves

Each of the land cover types listed above are described in **Section 5.2** of this BRE, and the respective acreages of the land cover types are listed in **Table 5.2-2**.

Fourwing saltbush scrub was determined to be riparian habitat due to its location, hydrological characteristics, and species composition associated with it (see **Sections 5.2** and **6.1**). No covered plant species were observed during any surveys. Each land cover type on the project site will be impacted during grading and construction activities and most ground surfaces will be altered due the proposed development project.

7.3.1 MSHCP Birds

There are eleven covered bird species under the MSHCP. The birds include species that are resident in the Coachella Valley such as burrowing owl, California black rail, crissal thrasher, and Le Conte's thrasher. Many of the species are migratory, occurring in the Coachella Valley primarily during migration or during the nesting season. These migratory species include the gray vireo (*Vulpes macrotis arsipus*), Yuma clapper rail (*Rallus lonirostris yumanensis*), and five riparian bird species: including LBV, southwestern willow flycatcher (*Empidonax traillii extimus*), summer tanager (*Piranga rubra cooperi*), yellow warbler (*Dendroica petechia brewsteri*), and yellow-breasted chat (*Icteria virens*). Since there is desert riparian habitat within the BSA and within half a mile of the BSA, development of the project would potentially impact the abovementioned special status bird species

Deleted: seven

Moved down [1]: <#>Creosote bush - white bursage scrub¶

Moved (insertion) [1]

Commented [MS19]: Chambers Rd 2: New Comments - Section 7.3 - The second paragraph discusses/lists 7 land cover types instead of 8.

Commented [MS20R19]: Revised

Deleted: or

Deleted: potential impacts associated with

Deleted: November 2022

associated with this habitat. Potential impacts to these covered species would be mitigated for by payment into the LDMF (see **Section 9.0**).

The project site is not located within Willow Hole Conservation Area. The MSHCP does not require focused surveys for any of the bird species in the wildlife inventory. However, because BUOW were determined to have a moderate potential to occur within the BSA, and to be impacted by development of the project, focused surveys have been recommended for this species (see **Section 8.2**). Direct impacts to special-status bird species are anticipated as a result of construction of the project; therefore, mitigation for these species is required.

7.4 MSHCP Species Survey Analysis

The MSHCP does not require additional surveys on the project site for rare and/or special-status plants, wildlife, or natural communities. Refer to **Appendix A**, Figure 14, *CVMSHCP Plant and Wildlife Species*, for habitat modeling of where there is suitable habitat conditions to support various MSHCP-covered plant and wildlife species in the nearby vicinity of the BSA.

7.5 MSHCP Section 7.5.2, *Guidelines for Construction of Wildlife Crossings*

Based on a literature review of USFWS' wildlife corridor portal (USFWS, 2022), it was determined that impacts to wildlife crossings within the BSA would be less than significant (see **Section 6.8**). Therefore, no mitigation for impacts to wildlife crossings is proposed.

7.6 MSHCP Section 7.5.3, *Land Use Adjacency Guidelines*

The project proponent will comply with the MSHCP Section 4.5, *Land Use Adjacency Guidelines* by implementing mitigation measure **BIO-8**, which requires compliance with these guidelines. According to the MSHCP, "adjacent" means "*sharing a common boundary with any parcel in a Conservation Area*".

7.7 Memorandum of Understanding

The MSHCP requires that a Biological Assessment be prepared by a biologist who holds a Memorandum of Understanding (MOU) on file with the County. UltraSystems holds a MOU with the County and UltraSystems biologists prepared this BRE pursuant to the MSHCP requirements.

Commented [MS21]: Chambers Rd 2: Section 7.3.1 - The last sentence of the paragrpha on page 7-3 is incomplete.

Commented [MS22R21]: Revised. Additional discussion has been added for potential impacts to MSHCP-covered bird species.

Deleted: such as the above-listed species are anticipated

Deleted: that there will be.

Formatted: Font: Bold

Deleted: .

Deleted: November 2022

8.0 MITIGATION MEASURES

CEQA states that "mitigation measures are not required for effects which are not found to be significant" [§ 15126.4(a)(3)]. Therefore, no mitigation measures are proposed for impacts to biological resources that are less than significant. However; if significant impacts to biological resources are identified, then possible mitigation measures are recommended to avoid, eliminate or reduce the level of the impacts to less than significant levels. There are several forms of mitigation. Under CEQA (§ 15370), "mitigation" includes all of the following:

- "Avoiding" the impact altogether by not taking a certain action or parts of an action.
- "Minimizing" impacts by limiting the degree or magnitude of the action and its implementation.
- "Rectifying" the impact by repairing, rehabilitating, or restoring the impacted environment.
- "Reducing" or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- "Compensating" for the impact by replacing or providing substitute resources or environments.

The following mitigation measures would help to avoid, eliminate or reduce direct or indirect impacts to biological resources to less than significant levels and to comply with all appropriate environmental laws, ordinances, policies, regulations, and management plans.

8.1 BIO-1: Rare Plant Surveys

A floristic-based survey of special status plants and natural communities, following CDFW's *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFW, 2018) shall be performed by a qualified biologist prior to project approval. Surveys will be conducted in the field at appropriate times of the year to coincide with the growing season and different blooming periods and when optimum conditions for identification (generally blooms, fruits, and leaves) are present. Typically, a minimum of two surveys should be conducted during different seasons of the same year to adequately capture the floristic diversity of a site, with a focus on areas that will be directly or indirectly receiving impacts from project activities. Biologists will pay special attention to those habitat areas that appear to provide suitable habitat for special-status species. If any special-status plant species are observed during the surveys, then the qualified biologist shall coordinate with CDFW, and potentially USFWS, to conduct an impact assessment to develop avoidance and minimization measures to be approved by CDFW prior to commencing project activities. Should any state-listed plant species be present in the project site, the project proponent shall obtain an Incidental Take Permit for those species prior to the start of project activities.

8.2 BIO-2: Desert Tortoise Take Avoidance Survey

According to Section 9.6.1.4 of the MSHCP, take avoidance surveys are required for projects located inside and outside of Conservation Areas. No more than 14 calendar days prior to start of project activities, a qualified biologist shall conduct pre-construction surveys for desert tortoise as described in the USFWS *Preparing for Any Action That May Occur Within the Range of the Mojave Desert Tortoise (Gopherus agassizii)* (USFWS 2019). Pre-construction surveys shall be completed using perpendicular survey routes within the project site and 50-foot buffer zone. Pre-construction surveys cannot be combined with other surveys conducted for other species while using the same personnel.

Deleted: s and Compensatory Mitigation¶
BIO-2.1: Desert Tortoise Protocol Surveys¶
Habitat for the desert tortoise was detected onsite during the reconnaissance-level biological surveys. To determine whether desert tortoise is present within the BSA, the project proponent should hire a qualified biologist to perform a small project survey at the project site prior to project approval as per USFWS survey protocol provided in *Preparing for Any Action That May Occur Within the Range of the Mojave Desert Tortoise (Gopherus agassizii)* (USFWS 2019). The goal of the protocol survey is to provide information on whether desert tortoise are likely to be present within the project site. The survey can be completed at any time of the year and the *Desert Tortoise (Mojave Population) Field Manual (Gopherus agassizii)* (USFWS, 2009) should be used to identify sign of desert tortoise. The results of the survey should be provided to the USFWS and CDFW. If desert tortoise are observed within the BSA of the project site, then the project proponent needs to consult with USFWS in accordance with Section 7 of the ESA to obtain an incidental take permit.¶
BIO-2.2: Desert Tortoise Survey No More Than 14 Days Prior to Ground Disturbance

Formatted: Heading 2

Deleted: November 2022

Project activities cannot start until two negative results from consecutive surveys using perpendicular survey routes for desert tortoise are documented. Should desert tortoise presence be confirmed during the survey, then coordination with USFWS may be required. In this case, unforeseen delays to the project may occur.

8.3 BIO-3: Burrowing Owl Surveys and Compensatory Mitigation

8.3.1 BIO-3.1: Burrowing Owl Survey No More Than 14 Days Prior to Ground Disturbance

Although BUOW was not detected onsite during the general wildlife surveys, and even if they are not detected during the breeding and non-breeding season surveys, the BSA contains suitable habitat to potentially support BUOW, including sparsely vegetated open areas with friable soils. It is thus possible that BUOW could colonize the site between the completion of the surveys and the beginning of ground-disturbing work. Therefore, pre-construction BUOW surveys are required to avoid take and to maintain compliance with the MBTA. Pre-construction BUOW surveys shall be conducted no more than 14 days prior to initiating ground-disturbing activities, in accordance with the *Staff Report* (CDFG 2012). Pre-construction surveys should be performed by a qualified biologist following the recommendations and guidelines provided in the *Staff Report on Burrowing Owl Mitigation*. If the pre-construction surveys confirm occupied BUOW habitat, project activities shall be immediately halted. CDFW shall be notified of burrowing owl survey results within 48 hours of detection. The qualified biologist shall coordinate with CDFW, USFWS, and the County EPD to conduct an impact assessment to develop avoidance and minimization measures to be approved by CDFW prior to commencing project activities.

Following the completion of the pre-construction BUOW survey, the biologist would prepare a letter report in accordance with the survey guidelines summarizing the results of the survey. The report would be submitted to CDFW prior to initiating any ground disturbance activities.

If no BUOWs or signs of BUOWs are observed during the survey and concurrence is received from the County and CDFW, project activities may begin and no further mitigation would be required.

8.3.2 BIO-3.2: Burrowing Owl Survey Within 24 Hours of Initiation of Ground Disturbance

Pre-construction BUOW surveys shall be conducted within 24-hours prior to the initiation of ground disturbing activities, in accordance with the *Staff Report on Burrowing Owl Mitigation* (CDFG 2012). This survey will follow the same guidelines described in the 14-day pre-construction survey (i.e., **BIO-1.2**).

8.3.3 BIO-3.3: BUOW Compensatory Mitigation

If BUOW are identified onsite during one or more of the foregoing BUOW surveys, then CDFW will consulted to determine the appropriate mitigation, including but not limited to passive relocation, artificial burrow system installation and monitoring, 5-year reporting, in-lieu fees or payment into mitigation bank.

8.4 BIO-4: Pre-Construction Breeding Bird Survey

To maintain compliance with the MBTA and Fish and Game Code, and to avoid impacts or take of migratory non-game breeding birds, their nests, young, and eggs, the following measures will be

Deleted: the qualified biologist shall immediately notify

Deleted: CDFW and

Deleted: to determine appropriate avoidance, minimization, and mitigation measures

Commented [MS23]: Chambers Rd 2: BIO-2.1 (now in Section 8.2) includes a protocol survey for presence/absence and BIO-2.3 includes a 24-hour survey. According to Section 4.4 of the MSHCP, presence/absence surveys for desert tortoise are required when a project is located within a Conservation Area with modeled desert tortoise habitat. According to Section 9.6.1.4 of the MSHCP, take avoidance (or clearance) surveys are required for projects located both inside and outside of Conservation Areas. It is suggested that only BIO-2.2 be included and if desert toroise is observed, coordination with USFWS may be required.

Commented [MS24R23]: Revised. Now only a take avoidance survey 14 days prior to construction is recommended.

Deleted: ¶
BIO-2.3: Desert Tortoise Survey Within 24 Hours of Initiation of Ground Disturbance¶
No more than 24 hours prior to start of project activities, a qualified biologist shall conduct pre-construction surveys for desert tortoise as described in the USFWS *Preparing for Any Action That May Occur Within the Range of the Mojave Desert Tortoise (Gopherus agassizii)* (USFWS 2019). Pre-construction surveys shall be completed using perpendicular survey routes within the project site and 50-foot buffer zone. Pre-construction surveys cannot be combined with other surveys conducted for other species while using the same personnel. Project activities cannot start until two negative results from consecutive surveys using 10-meter-wide belt transect survey routes for desert tortoise are documented. Should desert tortoise presence be confirmed during the survey, the qualified biologist shall immediately notify CDFW and USFWS to determine appropriate avoidance, minimization, and mitigation measures.¶
BIO-2.4: Desert Tortoise Compensatory Mitigation¶
If desert tortoise are observed within the BSA of the project site, then the project proponent needs to consult with USFWS in accordance with Section 7 of the ESA to obtain an incidental take permit.

Deleted: ¶

Deleted: **<#>BIO-3.1: Breeding and Non-Breeding Season Burrowing Owl Surveys**¶
The project site is located in the known distributional range of the burrowing owl (BUOW) (*Athene cunicularia*) and the site contains suitable habitat to potentially support BUOWs; therefore, BUOW surveys are required by CDFW, in accordance with the guidelines set forth by CDFW in the *Staff Report on Burrowing Owl Mitigation* (*Staff Report*; CDFG, ...

Deleted: **<#>2**

Deleted: **3**

Deleted: **4**

Commented [MS25]: Chambers Rd 2: According to Section 4.4 of the MSHCP, focused surveys for burrowing owl are required for projects located within Conservation Areas. To avid take, the 14-day and 24-hour surveys are required for project ...

Commented [MS26R25]: Revised. Now there is no recommendation for non-breeding and breeding season BUOW surveys.

Deleted: November 2022

implemented. The measures below will help to reduce direct and indirect impacts caused by construction on migratory non-game breeding birds to less than significant levels.

- Project activities that will remove or disturb potential nest sites, such as open ground, trees, shrubs, grasses, burrows, during the breeding season would be a potential significant impact if migratory non-game breeding birds are present. Project activities that will remove or disturb potential nest sites will be scheduled outside the breeding bird season to avoid potential direct impacts to migratory non-game breeding birds protected by the MBTA and Fish and Game Code. The breeding bird nesting season is typically from February 1 through September 1, but can vary slightly from year to year, usually depending on weather conditions. Removing all physical features that could potentially serve as nest sites will also help to prevent birds from nesting within the project site during the breeding season and during construction activities.

- If project activities cannot be avoided during February 1 through September 1, a qualified biologist will conduct a pre-construction breeding bird survey for breeding birds and active nests or potential nesting sites within the limits of project disturbance. The survey will focus on direct and indirect evidence of nesting. The biologist will make every effort to avoid nest predation as a result of survey and monitoring efforts. The survey will be conducted 72 hours prior to the initiation of ground-disturbing activities.

- If no breeding birds or active nests are observed during the pre-construction survey, or they are observed and will not be impacted, project activities may begin and no further mitigation will be required.

- If a breeding bird territory or an active bird nest is located during the pre-construction survey and will potentially be impacted, a Nesting Bird Plan (NBP) shall be prepared and implemented by the qualified avian biologist. At a minimum, the NBP shall include guidelines for addressing active nests, establishing buffers, ongoing monitoring, establishment of avoidance and minimization measures, and reporting.

Deleted: between five to seven days prior to

Deleted: construction activities, including staging and

Deleted: disturbance

Commented [MS27]: Chambers Rd 2: New Comment - typically nesting bird surveys are required within 72 hours of prior to ground disturbing construction activities. Suggest revising.

Commented [MS28R27]: Revised

8.5 BIO-5: Worker Environmental Awareness Program (WEAP)

Prior to project construction activities, a qualified biologist will prepare and conduct a Worker Environmental Awareness Program (WEAP) that will describe the biological constraints of the project. All personnel who will work within the project site will attend the WEAP prior to performing any work. The WEAP will include, but not be limited to the following: results of pre-construction surveys; description of sensitive biological resources potentially present within the project site; legal protections afforded the sensitive biological resources; BMPs for protecting sensitive biological resources (i.e., restrictions, avoidance, protection, and minimization measures); individual responsibilities associated with the project; and, a training on grading to reduce impacts to biological resources. A condition shall be placed on grading permits requiring a qualified biologist to conduct a training session for project personnel prior to grading.

The training shall include a description of the species of concern and its habitat, the general provisions of the Endangered Species Act (Act) and the MSHCP, the need to adhere to the provisions of the Act and the MSHCP, the penalties associated with violating the provisions of the Act, the general measures that are being implemented to conserve the species of concern as they relate to the project, and the access routes to the project site boundaries within which the project activities must be

Deleted: November 2022

accomplished. The program will also include the reporting requirements if workers encounter a sensitive wildlife species, including BUOW and desert tortoise (i.e., notifying the biological monitor or the construction foreman, who will then notify the biological monitor).

Training materials will be language-appropriate for all construction personnel. Upon completion of the WEAP, workers will sign a form stating that they attended the program, understand all protection measures, and will abide all the rules of the WEAP. A record of all trained personnel will be kept with the construction foreman at the project field construction office and will be made available to any resource agency personnel. If new construction personnel are added to the project later, the construction foreman will ensure that new personnel receive training before they start working. The biologist will provide written hard copies of the WEAP and photos of the sensitive biological resources to the construction foreman.

8.6 BIO-6: Biological Monitor

A qualified biologist shall be onsite prior to and during all ground- and habitat-disturbing activities to move out of harm's way wildlife that would otherwise be injured or killed from the project-related activities. Movement of wildlife out of harm's way should be limited to only those individuals that would otherwise by injured or killed, and individuals should be moved only as far a necessary to ensure their safety. Measures shall be taken to prevent wildlife from re-entering the Project site. Only biologists authorized by a Memorandum of Understanding issued by CDFW shall move CESA-listed species.

If special-status wildlife species such as BUOW or nesting bird species are observed and determined present within the project site during the pre-construction breeding bird surveys or the BUOW surveys, a Nesting Bird Plan (NBP) shall be prepared and implemented by the qualified avian biologist. At a minimum, the NBP shall include guidelines for addressing active nests, establishing buffers, ongoing monitoring, establishment of avoidance and minimization measures, and reporting. The biological monitor shall ensure that all BMPs, avoidance, protection and mitigation measures described in the relevant project permits and reports are in place and are adhered to.

The biological monitor shall have the authority to temporarily halt all construction activities and all non-emergency actions if sensitive species and/or nesting birds are identified and would be directly affected. The monitor shall notify the appropriate resource agency and consult if needed. Work can continue at the location if the project proponent and the consulted resource agency determine that the activity will not result in adverse effects on the species.

The appropriate agencies shall be notified if a dead or injured protected species is located within the project site. Written notification shall be made within 15 days of the date and time of the finding or incident (if known) and must include; location of the carcass, a photograph, cause of death (if known), and other pertinent information

8.7 BIO-7: Construction Best Management Practices

Project work crews will be directed to use BMPs where applicable. These measures will be identified prior to construction and incorporated into the construction operations.

Implementation of this mitigation measure will help to avoid, eliminate or reduce impacts to sensitive biological resources, such as special-status terrestrial wildlife species, to less than significant levels.

Deleted: November 2022

- Water pollution and erosion control plans shall be developed and implemented in accordance with RWQCB requirements.

- Equipment storage, fueling, and staging areas shall be located on upland sites with minimal risks of direct drainage into riparian areas or another sensitive habitat. These designated areas shall be located in such a manner as to prevent any runoff from entering sensitive habitat. Necessary precautions shall be taken to prevent the release of cement or other toxic substances into surface waters. Project related spills of hazardous materials shall be reported to appropriate entities including but not limited to applicable jurisdictional agencies, such as the City, USFWS, CDFW, and RWQCB, and shall be cleaned up immediately and contaminated soils removed to approved disposal areas.

- The Permittee shall have the right to access and inspect any sites of approved projects including any restoration/enhancement area for compliance with project approval conditions including these BMPs.

8.8 BIO-8: Project Limits and Designated Areas

To avoid impacts to sensitive biological resources, the project proponent will implement the following measures prior to project construction and commencement of any ground-disturbing activities or vegetation removal.

- Specifications for the project boundary, limits of construction, project-related parking, storage areas, laydown sites, and equipment storage areas will be mapped and clearly marked in the field with temporary fencing, signs, stakes, flags, rope, cord, or other appropriate markers. Construction limits will be fenced with orange snow screen. Exclusion fencing should be maintained until the completion of all construction activities. Employees shall be instructed that their activities are restricted to the construction areas. All markers will be maintained until the completion of activities in that area. Construction employees shall strictly limit their activities, vehicles, equipment, and construction materials to the proposed project footprint and designated staging areas and routes of travel. The construction area(s) shall be the minimal area necessary to complete the project and shall be specified in the construction plans.

- To minimize the amount of disturbance, the construction/laydown areas, parking areas, staging areas, storage areas, spoil areas, and equipment access areas will be restricted to designated areas. To the extent possible, designated areas will comprise, existing disturbed areas (parking lots, access roads, graded areas, etc.).

- Project related work limits will be defined and work crews will be restricted to designated work areas. Disturbance beyond the actual construction zone is prohibited without site specific surveys. If sensitive biological resources are detected in the area to be impacted, then appropriate measures will be implemented to avoid impacts (i.e., flag and avoid, erect orange snow fencing, biological monitor present during work, etc.). However, if avoidance is not possible and the sensitive biological resources will be directly impacted by project activities, the biologist will mark and/or stake the site(s) and map the individuals on an aerial map and with a GPS unit. The biologist will then contact the appropriate resource agencies to develop additional avoidance, minimization and/or mitigation measures prior to commencing project activities.

Deleted: November 2022

- The project proponent will ensure that construction activities will include measures to prevent accidental falls into excavated areas. The construction crew will inspect excavated areas daily to detect the presence of trapped wildlife. All deep or steep-walled excavated areas will be covered with tarp and either be furnished with escape ramps or be surrounded with exclusionary fencing in order to prevent wildlife from entering them. Wildlife found in excavation areas should be trapped and relocated out of harm's way to a suitable habitat outside of the project area, if possible.

8.9 BIO-9: General Vegetation and Wildlife Avoidance and Protection Measures

The project boundary is adjacent to portions of the Willow Hole Conservation Area and measures should be taken to prevent project activities from impacting that area. The project proponent will implement the following general avoidance and protection measures to protect vegetation, wetlands and other jurisdictional areas, and wildlife, to the maximum extent practical:

- Fencing will be installed around the perimeter of the project site, to limit impacts to the nearby Willow Hole Conservation Area as a result of development of the project. To prevent mammals and reptiles attempting to move from the conservation area into the project site, the project proponent will install exclusion fencing around the perimeter of the project site. The appropriate fencing material will be determined by the construction contractor in cooperation with the qualified biologist. Fencing materials such as hardware cloth, silt fencing, Animex wildlife exclusion fencing, Ertec wildlife exclusion fencing, or similar products may be considered exclusion fencing. This fencing will be installed by first trenching and then burying the bottom portions of the fence. Fencing will be angled away from the project site or curved at the top to prevent animals from climbing over the fence. The fencing should be buried to a depth of 12 to 14 inches. Stabilization of the fencing is achieved through the use of 36-inch-long wooden landscape stakes, spaced 5 to 8 feet apart, depending on the stability of the soil. Stakes will be placed into the ground until their tops are approximately even with the top of the fencing.

- Cleared or trimmed vegetation and woody debris will be disposed of in a legal manner at an approved disposal site. Cleared or trimmed non-native, invasive vegetation will be disposed of in a legal manner at an approved disposal site as soon as possible to prevent regrowth and the spread of weeds.

- The removal of native vegetation shall be avoided and minimized to the maximum extent practicable. Temporary impacts shall be returned to pre-existing contours and revegetated with appropriate native species.

- Non-native wildlife species that prey upon or displace target species of concern should be permanently removed from the site to the extent feasible. Only a qualified biologist should remove non-native species.

- During project construction and operation/maintenance, vehicles and all equipment will be washed (including wheels, undercarriages, and bumpers) at an offsite washing facility (e.g., a car wash or truck wash) immediately before project construction begins and prior to leaving the project area each time these items are brought to or removed from the project area. In addition, tools such as chainsaws, hand clippers, pruners, etc. will be washed at an offsite

Deleted: November 2022

washing facility immediately before project construction begins and prior to leaving the project area each time these items are brought to or removed from the project area. In addition, vehicles, tools, and equipment will be washed at an offsite washing facility should these vehicles, tools, and equipment have been used in an area where invasive plants occur and as directed by the biological monitor, prior to entering a project area free of populations of invasive plants. Rumble plates need to be installed at the entrance to the project area. All vehicles entering or leaving the project site must drive over the rumble plates to limit the amount of offsite mud being brought onto the project site and onsite mud being transported off of the project site. Finally, vehicles, tools, and equipment used for maintenance will be washed at an offsite washing facility immediately before each maintenance event. All washing will take place where rinse water is collected and disposed of in either a sanitary sere or landfill; an effort will be made to use wash facilities that use recycled water. When vehicle and equipment washing and cleaning must occur onsite, and the operation cannot be located within a structure or building equipped with appropriate disposal facilities, the outside cleaning area should have the following characteristics: 1) Located away from storm drain inlets, drainage facilities, or watercourses, 2) Paved with concrete or asphalt and bermed to contain wash waters and to prevent run-on and runoff, 3) Configured with a sump to allow collection and disposal of wash water, 4) No discharge of wash waters to storm drains or watercourses, and 5) Used only when necessary.

- To minimize construction-related mortalities of nocturnally active species such as mammals and snakes, it is recommended that all work be conducted during daylight hours. Nighttime work (and use of artificial lighting) will not be permitted unless specifically authorized. If required, night lighting will be directed away from the preserved open space areas to protect species from direct night lighting. All unnecessary lights will be turned off at night to avoid attracting wildlife such as insects, migratory birds, and bats.

- If any wildlife such as BUOW or desert tortoise is encountered during the course of project activities, said wildlife will be allowed to freely leave the area unharmed.

- If wildlife does not move off the site unassisted within less than one hour, then a qualified biologist will be contacted to move the species out of harm's way wildlife if it would otherwise be injured or killed from the project-related activities. Movement of wildlife out of harm's way should be limited to only those individuals that would otherwise by injured or killed, and individuals should be moved only as far a necessary to ensure their safety. Only biologists authorized by a Memorandum of Understanding issued by CDFW shall move FESA- and CESA-listed species such as desert tortoise.

- Wildlife will not be disturbed, captured, harassed, or handled. Animal nests, burrows and dens will not be disturbed without prior survey and authorization from a qualified biologist.

- Active nests of special-status or otherwise protected bird species cannot be removed or disturbed. Nests can be removed or disturbed if determined inactive by a qualified biologist.

- To avoid impacts to wildlife and attracting predators of protected species, the project proponent will comply with all litter and pollution laws and will institute a litter control program throughout project construction. All contractors, subcontractors, and employees will also obey these laws. These covered trash receptacles will be placed at each designated work site and the contents will be properly disposed at least once a week. Trash removal will

Deleted: November 2022

reduce the attractiveness of the area to opportunistic predators such as common ravens and coyotes.

- Contractors, subcontractors, employees, and site visitors will be prohibited from feeding wildlife and collecting plants and wildlife.
- Disturbance near ponded water will be limited during the rainy season. It could serve as potential habitat for amphibians and sensitive invertebrates

8.10 BIO-10: MSHCP Section 4.5 Land Use Adjacency Guidelines

The western boundary of the project area abuts the eastern boundary of the Willow Hole MSHCP Conservation Area; therefore, the Land Use Adjacency Guidelines presented in Section 4.5 of the MSHCP shall be adhered to. The purpose of these guidelines is to avoid or minimize indirect effects from development projects that are adjacent to Conservation Areas. The MSHCP defines "adjacent" as: "*sharing a common boundary with any parcel in a Conservation Area*". These potential indirect effects are referred to as "edge effects". The guidelines provide that edge effects will be addressed through reserve management activities such as fencing. The following Land Use Adjacency Guidelines shall be considered by the Permittees in their review of individual public and private Development projects adjacent to or within the Conservation Areas:

4.5.1 Drainage: Proposed Development adjacent to or within a Conservation Area shall incorporate plans to ensure that the quantity and quality of runoff discharged to the adjacent Conservation Area is not altered in an adverse way when compared with existing conditions. Stormwater systems shall be designed to prevent the release of toxins, chemicals, petroleum products, exotic plant materials or other elements that might degrade or harm biological resources or ecosystem processes within the adjacent Conservation Area.

4.5.2 Toxics: Land uses proposed adjacent to or within a Conservation Area that use chemicals or generate bioproducts such as manure that are potentially toxic or may adversely affect wildlife and plant species, Habitat, or water quality shall incorporate measures to ensure that application of such chemicals does not result in any discharge to the adjacent Conservation Area.

4.5.3 Lighting: For proposed Development adjacent to or within a Conservation Area, lighting shall be shielded and directed toward the developed area. Landscape shielding or other appropriate methods shall be incorporated in project designs to minimize the effects of lighting adjacent to or within the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual.

4.5.4 Noise: Proposed Development adjacent to or within a Conservation Area that generates noise in excess of 75 dBA Leq hourly shall incorporate setbacks, berms, or walls, as appropriate, to minimize the effects of noise on the adjacent Conservation Area in accordance with the guidelines to be included in the Implementation Manual.

4.5.5 Invasives: Invasive, non-native plant species shall not be incorporated in the landscape for land uses adjacent to or within a Conservation Area. Landscape treatments within or adjacent to a Conservation Area shall incorporate native plant materials to the maximum extent Feasible; recommended native species are listed in Table 4-112. The plants listed in Table 4-113 (MSHCP) shall not be used within or adjacent to a Conservation Area. This list may be amended from time to time through a Minor Amendment with Wildlife Agency Concurrence.

Deleted: November 2022

9.0 POTENTIAL FEDERAL, STATE AND LOCAL BIOLOGICAL PERMITS, AND APPOROVALS

Each project must comply with federal, state, and local environmental laws and regulations. Three special-status plant species and twelve special-status wildlife species, covered by the MSHCP, have the potential to occur within the BSA and therefore would potentially be impacted by construction of the project. In addition, three MSHCP-covered natural communities were observed on the project site and would be impacted by project activities. To avoid or minimize impacts to the abovementioned resources, the MSHCP requires payment into the following fund (see Section 9.1):

- Local Development Mitigation Fee (LDMF).

Any project that proposes to fill or otherwise physically alter creeks, wetlands, or other waters requires a number of federal, state and, in some cases, local permits before it can proceed. Permanent impacts are anticipated to the following waters of the State that were identified on the project site: five ephemeral drainages, three associated swales, an associated desert riparian wash, and an isolated playa. Upon consultation with RWQCB and CDFW and prior to project implementation and impacts (permanent or temporary) to jurisdictional waters, the project proponent would likely need to obtain the following federal and/or state biological permits and/or approvals (see Section 9.2):

- General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 2009-009-DWQ, as amended) from the SWRCB;
- Waste Discharge Requirements permit (WDR) from the RWQCB;
- Lake or Streambed Alteration Agreement with CDFW.

The following section describes the process to obtain the necessary permits and approvals.

9.1 Local Development Mitigation Fee

The Local Development Mitigation Fee (LDMF) is a component of the MSHCP to provide fund of the acquisition and long term management of conservation land within the MSHCP area. The Coachella Valley Conservation Commission (CVCC) administers the LDMF program and conserves land on behalf of the MSHCP's local signatories. The project is not located within an MSHCP Conservation Area, and therefore only the LDMF is required to obtain coverage

Prior to construction and issuance of any grading permit, the City shall ensure compliance with the Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP) and its associated Implementing Agreement and shall ensure that payment of the MSHCP Local Development Mitigation Fee for the proposed project is remitted to the Coachella Valley Conservation Commission.

9.2 Jurisdictional Areas

Prior to the issuance of grading permits for the project, and prior to any impacts to jurisdictional areas, and , in consultation with RWQCB, and CDFW, the City would determine necessary avoidance and minimization measures, including but not limited to obtaining permits pursuant to Porter Cologne and the Procedures for impacts to jurisdictional waters of the State and potentially for impacts to waters of the State under the jurisdiction of CDFW.

Deleted: : Two

Deleted: seven

Commented [MS29]: Chambers Rd 2: Section 9 - Should the numbers in the second sentence be three and twelve to include all listed and sensitive speceies with a potential that are also covered?

Commented [MS30R29]: Revised

Deleted: November 2022

Temporary and permanent impacts to Waters of the U.S. will not occur. Accordingly, Nationwide Permit from USACE pursuant to Section 404 of the CWA (404 Permit) will not be required.

Deleted: November 2022

10.0 LITERATURE CITED AND REFERENCES

AEP (Association of Environmental Professionals). 2022. 2022 California Environmental Quality Act (CEQA) Statutes and Guidelines. Available at http://leginfo.legislature.ca.gov/faces/home.xhtmland and http://ccr.oal.ca.gov/.

Baldwin, B. G., et al. 2012. The Jepson Manual: Vascular Plants of California, second edition. University California Press, Berkeley.

Barbour, R. W., and W. H. Davis. 1969. Bats of America. Univ. of Kentucky Press, Lexington. 286pp.

Bent, A. C. 1948. Life histories of North American nuthatches, wrens, thrashers, and their allies. U.S. Natl. Mus. Bull. 195. 475pp.

Calflora, 2022. Information on California plants for education, research and conservation. Observation Search. Available at https://www.calflora.org/entry/observ.html. Accessed on March 1, 2022.

California Legislative Information. 2021a. Fish and Game Code §§ 2050-2089, California Endangered Species Act (CESA). Available at https://leginfo.legislature.ca.gov/faces/codes_displayexpandedbranch.xhtml?tocCode=FGC&division=3.&title=&part=&chapter=1.5.&article=. Accessed on May 17, 2021.

Cal-IPC (California Invasive Plant Council), 2022. *California Invasive Plant Inventory*. Cal-IPC Publication 2006-02. Updated 2022 as *The Cal-IPC Inventory* (web site). California Invasive Plant Council. Berkeley, CA. 44 pp. Available at https://www.cal-ipc.org/plants/inventory/. Accessed on March 6, 2022.

CDFW (California Department of Fish and Wildlife). 2012. Staff Report on Burrowing Owl Mitigation. State of California, Natural Resources Agency, Department of Fish and Game. March 7, 2012.

CDFW (California Department of Fish and Wildlife). 2014. CDFW California Interagency Wildlife Task Group. CWHR version 9.0 personal computer program. Sacramento, CA. Retrieved from https://wildlife.ca.gov/Data/CWHR/Life-History-and-Range. Accessed on March 27, 2022.

CDFW (California Department of Fish and Wildlife). 2016. Complete List of Amphibian, Reptile, Bird and Mammal Species in California. May, 2016. Available at https://wildlife.ca.gov/Data/CWHR/Life-History-and-Range.

CDFW (California Department of Fish and Wildlife). 2018. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. California Natural Resources Agency, Department of Fish and Wildlife. March 20, 2018.

CDFW (California Department of Fish and Game). 2022a. California Natural Community List. July 5, 2022. Retrieved from https://wildlife.ca.gov/Data/VegCAMP/Natural-Communities. Last accessed on July 12, 2022.

CDFW (California Department of Fish and Wildlife) 2022b. BIOS Habitat Connectivity Viewer. Accessed at ftp://ftp.dfg.ca.gov/BDB/GIS/BIOS/Habitat_Connectivity/. Accessed on April 20, 2021.

Deleted: November 2022

Chesser et al. 2022. *Check-list of North American Birds. 7th Edition and Supplements (online)*. American Ornithological Society (AOS), Accessed on July 12, 2022. Available at http://checklist.americanornithology.org/taxa.

City of Desert Hot Springs. 2020. City of Desert Hot Springs General Plan. https://storage.googleapis.com/proudcity/deserthotspringsca/uploads/2021/11/Desert-Hot-Springs-General-Plan-Adopted-07-2020-Small.pdf Accessed on June 26, 2020.

CNDDB (California Natural Diversity Database). 2022a. RareFind 5 (Internet). California Department of Fish and Wildlife (5.2.14).

CNDDB (California Natural Diversity Database). 2022b. State and Federally Listed Endangered, Threatened, and Rare Plants of California. Last updated April 2022. California Department of Fish and Wildlife, Sacramento, CA.

CNDDB. 2022c. Special Vascular Plants, Bryophytes, and Lichens List. July 2022. California Department of Fish and Wildlife. Sacramento, CA. https://wildlife.ca.gov/Data/CNDDB/Plants-and-Animals. Accessed on May 27, 2022.

CNDDB. 2022d. Special Animals List. July 2022. California Department of Fish and Wildlife. Sacramento, CA. https://wildlife.ca.gov/Data/CNDDB/Plants-and-Animals. Accessed on May 27, 2022.

CNPS (California Native Plant Society). 2022a. Rare Plant Program. Inventory of Rare and Endangered Plants (online edition, v8-03 0.39). Retrieved from: http://www.rareplants.cnps.org. Accessed on February 20, 2022.

CNPS (California Native Plant Society). 2022b. A Manual of California Vegetation, Online Edition. California Native Plant Society, CA. 1300 pp. Retrieved from: http://www.cnps.org/cnps/vegetation/. Last accessed on September 26, 2022.

Cornell Lab of Ornithology. 2022. All About Birds. Cornell Lab of Ornithology, Ithaca, New York. Available at https://www.allaboutbirds.org Accessed on May 20, 2022.

Curtis, K.E. and R.W. Lichvar. 2010. Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. Wetland Regulatory Assistance Program. Cold Regions Research and Engineering Laboratory. U.S. Army Engineer Research and Development Center, Hanover, New Hampshire.

CVCC (Coachella Valley Conservation Commission), 2016. Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community Conservation Plan (MSHCP). Some sections of the MSHCP were last amended in 2016. Available at https://cvmshcp.org/plan-documents/. Last accessed on October 20, 2022.

CWHR CDFW (California Wildlife Habitat Relationships System) 2022. Life History and Range Maps. Retrieved from : https://wildlife.ca.gov/Data/CWHR/Life-History-and-Range

eBird, 2022. eBird: An online database of bird distribution and abundance [web application]. eBird, Cornell Lab of Ornithology, Ithaca, New York. Available at https://ebird.org/map. Accessed on February 20, 2022.

Deleted: November 2022

Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Technical Report Y-87-1. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station. Retrieved from: http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf.

Evens, J. M., K. Sikes, D. Hastings, and J. S. Ratchford. 2014. Vegetation alliance descriptions for Lake Mead National Recreation Area, Death Valley National Park, and Mojave National Preserve (revised 2020). Unpublished report submitted to USDI National Park Service, Mojave Desert Network Inventory and Monitoring Program California Native Plant Society. Available at https://www.nps.gov/im/vmi-lake.htm. Accessed on September 26, 2022.

Evens et al. 2020. Field Key to the Vegetation Alliances of Lake Mead National Recreation Area, Death Valley National Park, Mojave National Preserve, and Castle Mountains National Monument. California Native Plant Society Unpublished Report, submitted to USDI, National Park Service, Mojave Desert Network Inventory and Monitoring Program. Sacramento, CA. Available at https://irma.nps.gov/DataStore/Reference/Profile/2177194.

FEMA (Federal Emergency Management Agency). 2020. Flood Zones. Available at: https://www.fema.gov/glossary/flood-zones

FEMA (Federal Emergency Management Agency). 2022. National Flood Hazards Layer (NFHL) Viewer. Available at: https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd. Accessed on March 20, 2022.

Google Earth, 2022. Version 7.3.3.7699. Desert Hot Springs, Riverside County, California. 33°54'39.55" 116°30'16.61". Eye altitude 3,300 feet. Imagery date August 5, 2021. Accessed on March 19, 2022.

Grover, M. C. and L. A. DeFalco. 1995. Desert tortoise (*Gopherus agassizii*): status-of-knowledge outline with references. U.S. Department of Agriculture, Intermountain Research Station, General Technical Report INT-GRT-316. Ogden, Utah. 134 pp.

Hawks, D. 1995. Survey for Sensitive Insects of Concern to the Coachella Valley Multiple Species Habitat Conservation Plan. Unpublished report to the Coachella Valley Association of Governments prepared by Hawks Biological Consulting. 12 October 1995. pp. Ref. 546, Final Recirculated Coachella Valley MSHC–September 2007.

Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. State of California, The Resources Agency, Nongame Heritage Program, California Department of Fish & Game, Sacramento, Calif. 156 pp.

Jepson Flora Project (eds.), 2022. Jepson eFlora, Available at http://ucjeps.berkeley.edu/eflora/. Accessed on March 6, 2022.

Kaufmann, J. S. 1982. Patterns of habitat resource utilization in a population of *Uma scoparia*, the Mojave fringe-toed lizard. M. S. Thesis, Univ. Illinois, Chicago. 78pp.

Lichvar, R., W. Brostoff, and S. Sprecher. 2006. *Surficial Features Associated with Ponded Water on Playas of the Arid Southwestern United States: Indicators for Delineating RegulatedAreas Under*

Deleted: November 2022

the Clean Water Act In Wetlands: The Society of Wetland Scientists. Vol. 26, No. 2, June 2006, pp. 385-399.

Lichvar, R. W and S. M. McColley. 2008. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual. Cold Regions Research and Engineering Laboratory. U.S. Army Engineer Research and Development Center, Hanover, New Hampshire.

Marlow, R. W. 1979. Energy relations in the desert tortoise, *Gopherus agassizii*. Ph.D. Thesis, Univ. California, Berkeley. 155pp.

Neal, J. T. 1975. Playas and Dried Lakes. Dowden, Hutchinson & Ross, Inc., Stroudsberg, PA, USA.

Neal, J. T. and W. S. Motts. 1967. Recent geomorphic changes in playas of the western United States. Journal of Geology 75:511–525.

Norris, K. S. 1958. The evolution and systematics of the iguanid genus Uma and its relation to the evolution of other North American desert reptiles. Am. Mus. Nat. Hist. Bull. 114:151-326.

Pianka, E. R., and W. S. Parker. 1975. Ecology of horned lizards: a review with special reference to Phrynosoma platyrhinos. Copeia 1975:141-162.

RCTLMA (Riverside County Transportation and Land Management Agency), 2015a. Riverside County General Plan, Chapter 2: Vision Statement Available at: https://planning.rctlma.org/Portals/14/genplan/general_plan_2016/elements/Ch02_Vision_120815.pdf?ver=2016-04-01-100746-913

RCTLMA, 2015b. Riverside County General Plan, Appendix B-1: General Planning Principles. Available at: https://planning.rctlma.org/Portals/14/genplan/general_plan_2016/appendices/Appendix%20B_120815.pdf?ver=2016-04-01-141949-710

RCTLMA, 2021. Riverside County General Plan, Area Plan Volume II: Western Coachella Valley Area Plan. Available at: https://planning.rctlma.org/Portals/14/genplan/2021/WCVAP_6.29.21.pdf?ver=2021-07-01-164904-547

Riverside County Watersheds. 2022. Riverside County Watershed Protection. https://rcwatershed.org/watersheds/whitewater-river-watershed/

Sawyer et al., J.O., T. Keeler-Wolf, J.M. Evens. 2009. A Manual of California Vegetation, Second Edition. California Native Plant Society Press. Sacramento, CA. 1300 pp.

Shaw, P. A. and D. S. G. Thomas. 1989. Playas, pans and salt lakes. p. 184–208. In D. S. G. Thomas (ed.) Arid Zone Geomorphology. Belhaven Press, London, UK.

Sheppard, J. M. 1970. A study of the Le Conte's thrasher. Calif. Birds 1:85-94.

Deleted: November 2022

Soil Survey Staff, 2022. Natural Resources Conservation Service, United States Department of Agriculture, Web Soil Survey: Custom Soil Resource Report for Riverside County, California. Available at https://websoilsurvey.sc.egov.usda.gov/. Downloaded on February 23, 2022.

Stebbins, R. C. 1944. Field notes on a lizard, the mountain swift, with special reference to territorial behavior. Ecology 25:233-245.

Stebbins, R. C. 1954. Amphibians and reptiles of western North America. McGraw-Hill, New York. 536pp.

Stebbins, R. C. 1985. A field guide to western reptiles and amphibians. 2nd ed., revised. Houghton Mifflin, Boston. 336pp.

SWRCB (State Water Resources Control Board). 2019a. Resolution No. 2019-0015. https://www.waterboards.ca.gov/water_issues/programs/cwa401/docs/rs2019_0015.pdf.

SWRCB (State Water Resources Control Board). 2019b. Resolution No. 2009-0026. https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/2009/rs2009_0026.pdf

SWRCB (State Water Resources Control Board). 2022. Resolution No. 2021-0012. http://www.waterboards.ca.gov. Accessed on May 18, 2021.

Tinkham, E.R. 1968. Studies in Nearctic desert sand dune Orthoptera: a new arenicolous species of *Stenopelmatus* from Coachella Valley with key and biological notes. Part XI. Great Basin Naturalist: Vol. 28: No. 3, Article 2. Available at: https://www.biodiversitylibrary.org/page/8114021#page/140/mode/1up. Accessed on 9/22/2022.

Turner, F. B., and P.A. Medica. 1982. The distribution and abundance of the flat-tailed horned lizard (*Phrynosoma mcalli*). Copeia 1982:815-823.

U.C. Davis. 2022a. California Water Indicators Portal (Morongo Wash). Available at https://indicators.ucdavis.edu/cwip/huc/181002010404. Accessed on November 8, 2022.

U.C. Davis. 2022b. California Water Indicators Portal (Little Morongo Creek - Morongo Wash). Available at https://indicators.ucdavis.edu/cwip/huc/1810020104. Accessed on November 8, 2022.

U.C. Riverside CCB (University of California Center for Conservation Biology). 2012a. Coachella Valley Multiple Species Habitat Conservation & Natural Community Conservation Plan: Desert Wetlands Communities and Species Monitoring Protocols. Prepared by U.C. Riverside CCB for the Coachella Valley Conservation Commission. Accessed at https://cvmshcp.org/bwg-materials/. Accessed on: October 19, 2022.

U.C. Riverside CCB (University of California Center for Conservation Biology). 2012b. Coachella Valley Multiple Species Habitat Conservation & Natural Community Conservation Plan: Alluvial Fan Communities and Species Monitoring Protocols. Prepared by U.C. Riverside CCB for the Coachella Valley Conservation Commission. Accessed at https://cvmshcp.org/bwg-materials/. Accessed on: October 19, 2022.

Deleted: November 2022

USACE (United States Army Corps of Engineers). 2008. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, and C. V. Noble. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

USACE (United States Army Corp of Engineers). 2020a. National Wetland Plant List, version 3.4. Retrieved from: http://wetland-plants.usace.army.mil/.

USACE (United States Army Corp of Engineers). 2020b. National Wetland Plant List, 2020 List of Proposed Changes. Retrieved from: http://wetland-plants.usace.army.mil/.

USACE and USEPA (United States Army Corps of Engineers and United States Environmental Protection Agency). 1986/1988. Regulatory Definition: Waters of the United States. Available at https://www.epa.gov/wotus/19861988-regulatory-definition-waters-united-states.

USACE and USEPA, 2020. Navigable Waters Protection Rule (85 FR 2250). 93 p. Available at https://www.federalregister.gov/documents/2020/04/21/2020-02500/the-navigable-waters-protection-rule-definition-of-waters-of-the-united-states.

USDA (United States Department of Agriculture). 2010. Federal Noxious Weed List. December 10, 2010. Available at https://www.aphis.usda.gov/plant_health/plant_pest_info/weeds/downloads/weedlist.pdf Accessed on March 10, 2022.

USDA NRCS (United States Department of Agriculture, Natural Resources Soil Conservation Service), 2015. Web Site for Official Soil Series Descriptions and Series Classification: Myoma Series. Revised December, 2015. Accessed at https://soilseries.sc.egov.usda.gov/. Accessed on March 10, 2022.

USDA NRCS, 2022a. Soil Data Access (SDA) Hydric Soils List. Available at https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd1316619.html . Accessed on February 22, 2022.

USDA NRCS. 2022b. Official Soil Series Descriptions, Soil Survey Staff, Natural Resources Conservation Service. Available at: https://www.nrcs.usda.gov/resources/data-and-reports/official-soil-series-descriptions-osd. Accessed on March 10, 2022.

USEPA (United States Environmental Protection Agency) 2022a. Endangered Species Act. Available at http://www2.epa.gov/laws-regulations/summary-endangered-species-act. Accessed on March 4, 2022

USEPA, 2022b. EPA Waters GeoViewer. Available at https://www.epa.gov/waterdata/waters-geoviewer. Accessed on March 14, 2021.

USFWS (United States Fish and Wildlife Service), 2004. Endangered and Threatened Wildlife and Plants for Astagalus lentiginosus var. coachellae (Coachella Valley milkvetch). Federal Register (50 CFR Par 17), Vol: 69, No. 239. December 14, 2004. Available at: fws.gov/species-publication-action/endangered-and-threatened-wildlife-and-plants-proposed-designation-2. Accessed on: July 20, 2022.

Deleted: November 2022

USFWS, 2022a. Endangered Species Act – Section 3. Available at https://www.fws.gov/endangered/laws-policies/Section-3.html. Accessed on March 4, 2022.

USFWS, 2021b. Endangered Species Act – Section 7(a)(2). Available at https://www.fws.gov/midwest/endangered/section7/index.html. Accessed on March 4, 2022.

USFWS, 2022c. Migratory Bird Program's Migratory Bird Treaty Act Summary. Available at https://www.fws.gov/birds/policies-and-regulations/laws-legislations/migratory-bird-treaty-act.php. Accessed on March 17, 2022.

USFWS, 2022d. Information for Planning, and Consultation (IPaC), IPaC Resource List. February 23, 2022. Retrieved from http://ecos.fws.gov/ipac/ Accessed on February 23, 2022.

USFWS, 2022e. Carlsbad Fish and Wildlife Office. Official Species List. Carlsbad, California. Retrieved from http://ecos.fws.gov/ipac/. Accessed on February 23, 2021.

USFWS, 2022f. National Wetlands Inventory (NWI) website, U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. Retrieved from https://www.fws.gov/wetlands/. Accessed on February 25, 2022.

USFWS, 2022g USFWS Critical Habitat Portal: http://ecos.fws.gov/crithab/. Latest database search conducted on February 25, 2022.

USGS (United States Geological Survey). 2022a. National Hydrography Dataset (ver. USGS National Hydrography Dataset Best Resolution (NHD) for Hydrologic Unit (HU) 8. Available at https://www.usgs.gov/core-science-systems/ngp/national-hydrography/access-national-hydrography-products.

USGS, 2022b. Hydrologic Unit Map. Basic Descriptions and Names of Regions, Subregions, Accounting Units and Cataloging Units. Available at https://water.usgs.gov/GIS/huc_name.html#Region18.

Wilson, D.E. and D.M. Reeder (editors). 2005. Mammal Species of the World. A Taxonomic and Geographic Reference (3rd ed), Johns Hopkins University Press. 2,142 pp.

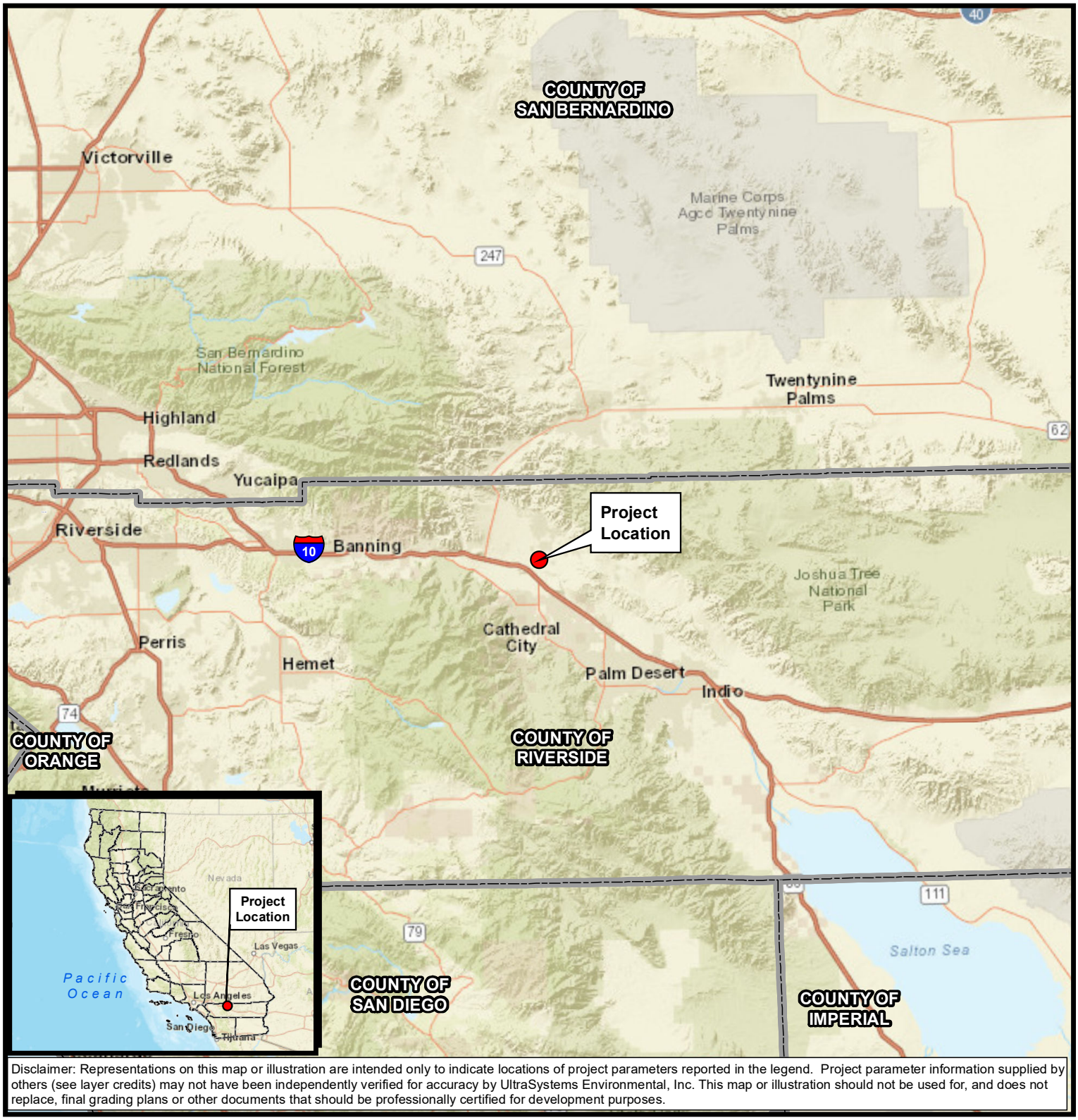
WRCC (Western Regional Climate Center). 2016. Climate Summaries: Palm Springs, California (046635) Available at: https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca6635

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California Department of Fish and Game, Sacramento, California. Updated 2005. Available at https://wildlife.ca.gov/Data/CWHR/Life-History-and-Range. Downloaded September, 2022.

Deleted: November 2022

APPENDIX A

FIGURES



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\7129_Greenday_2_0_Regional_Location_2022_01_10.mxd

January 10, 2022

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community; California Department of Forestry and Fire Protection, 2009; UltraSystems Environmental, Inc., 2021

Scale: 1:887,040

N

0 7 14 Miles

0 7 14 Kilometers

Legend

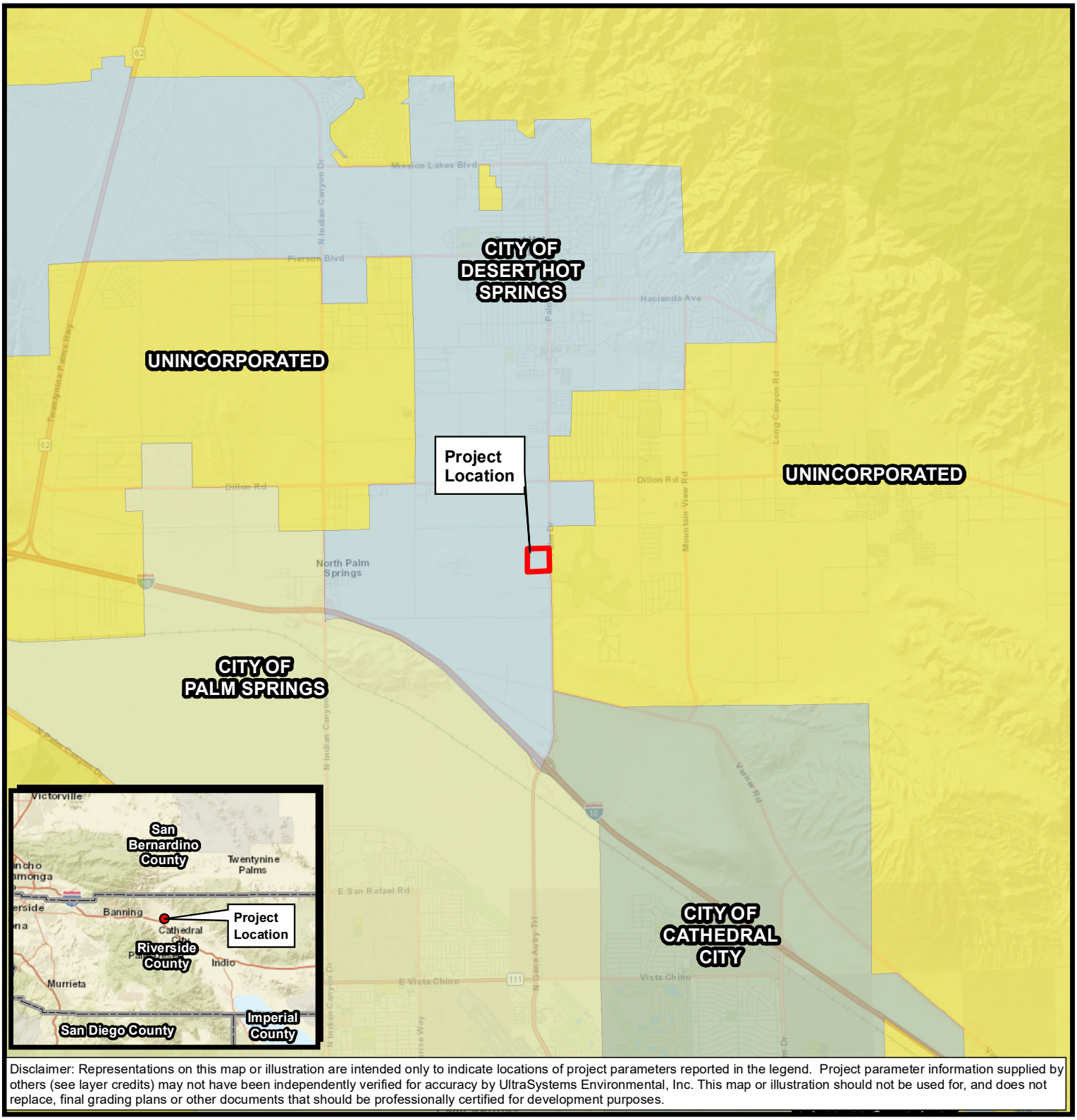
Project Location

County Boundary

Green Day Village Project

Regional Overview
Figure 1

UltraSystems
environmental • management • planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\7129_Greenday_3_0_Project_Vicinity_2022_01_05.mxd

January 10, 2022

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community; SCAG, 2020; UltraSystems Environmental, Inc., 2022

Scale: 1:95,040

N

0 0.75 1.5 Miles

0 0.8 1.6 Kilometers

Legend

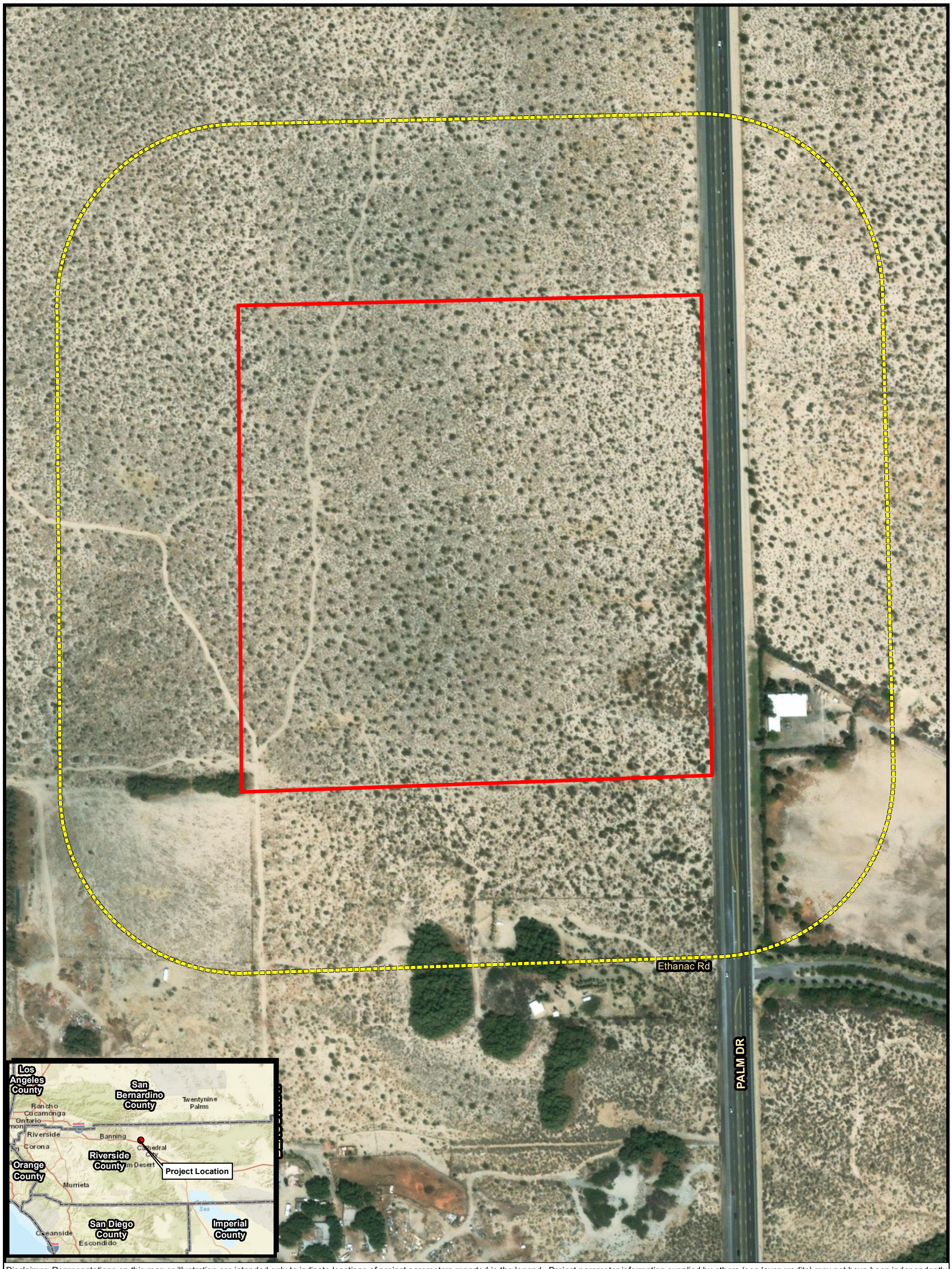
Project Boundary

County Boundary

Green Day Village Project

Project Vicinity
Figure 2

UltraSystems
environmental • management • planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\BIO\7129_Greenday_4_4_Project_Location_BSA_11x17_2022_02_10.mxd

January 10, 2022

Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community; County of Riverside, 2020; UltraSystems Environmental, Inc., 2022

Scale: 1:3,000
1 inch = 250 feet
1 cm = 30 meters

N

0 125 250 Feet

0 30 60 Meters

Legend

Project Boundary

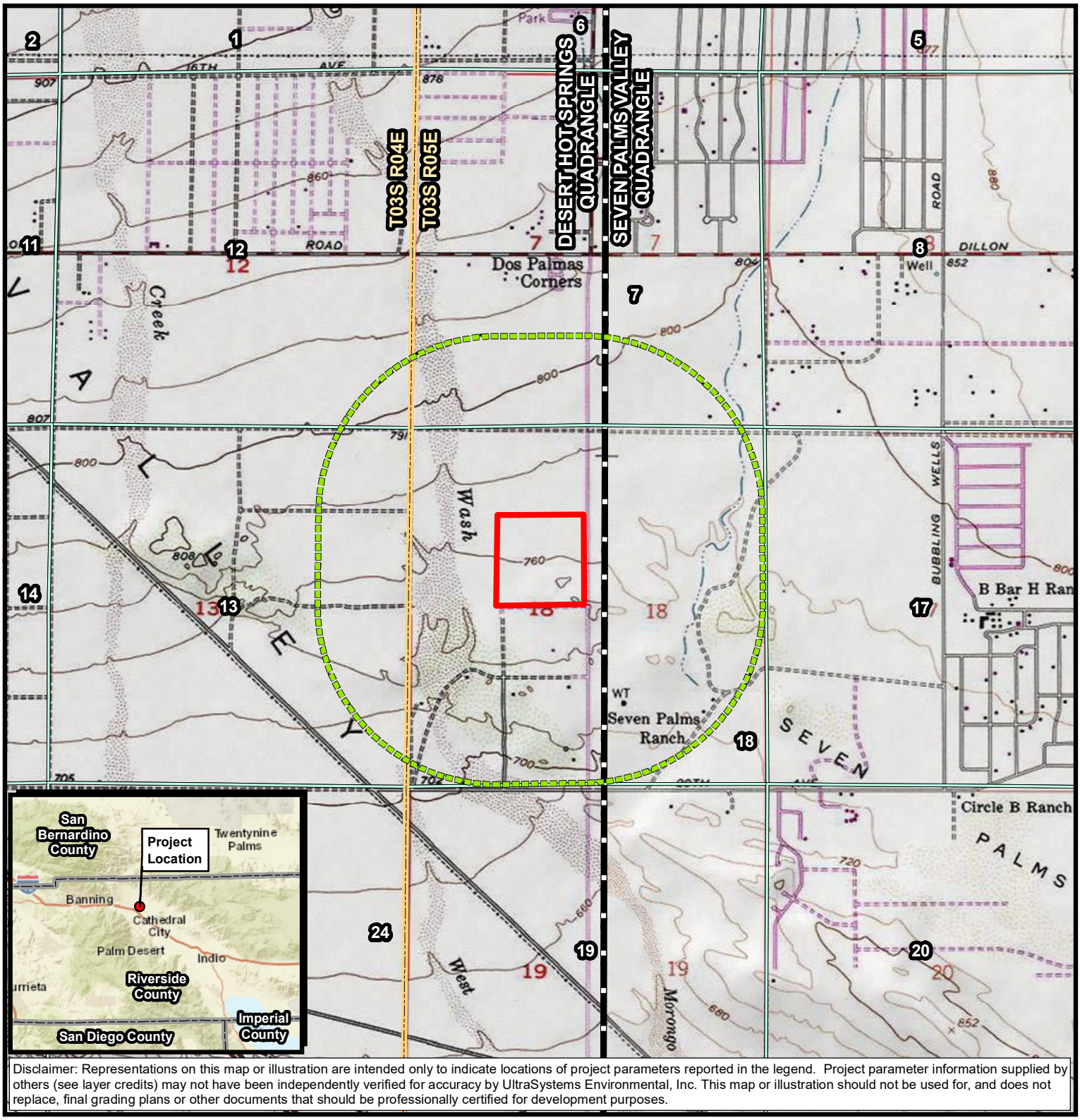
500ft Biological Study Area (BSA)

Green Day Village Project

Project Boundary and Biological Study Area (BSA)

Figure 3

UltraSystems
environmental • management • planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\7129_Greenday_4_5_Cul_Topo_2021_12_09.mxd

December 09, 2021

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Copyright:© 2013 National Geographic Society, i-cubed; Cal-Atlas, 2015; California Department of Conservation, 2019; UltraSystems Environmental, Inc., 2021

Scale: 1:24,000

N

0 1,000 2,000 Feet

0 250 500 Meters

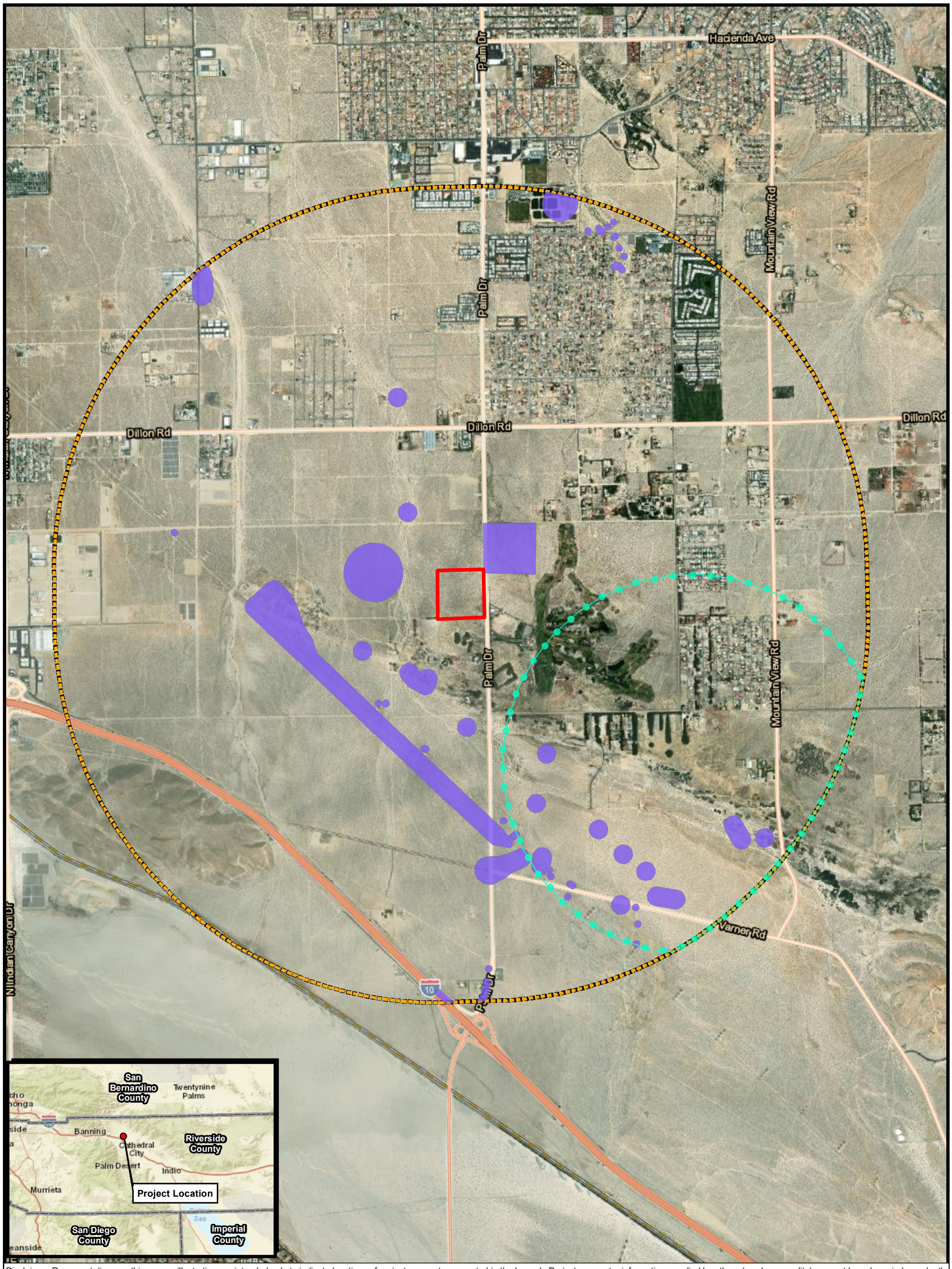
Legend

- Project Boundary
- Half-Mile Radius
- Quadrangle Boundary
- Township Boundary
- Section Boundary

Green Day Village Project

Topographic Map
USGS Quadrangle: Desert Hot Springs
Township: 3S Range: 5E
Section: 18
Figure 4

UltraSystems
environmental • management • planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\BIO\7129_Greenday_4_4_CNDDB_Plant_11x17_2022_01_24.mxd

February 01, 2022

Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors; CDFW, January 2022; UltraSystems Environmental Inc., 2022

Scale: 1:30,000
1 inch = 2,500 feet
1 cm = 300 meters

N

0 1,250 2,500 Feet

0 320 640 Meters

Legend

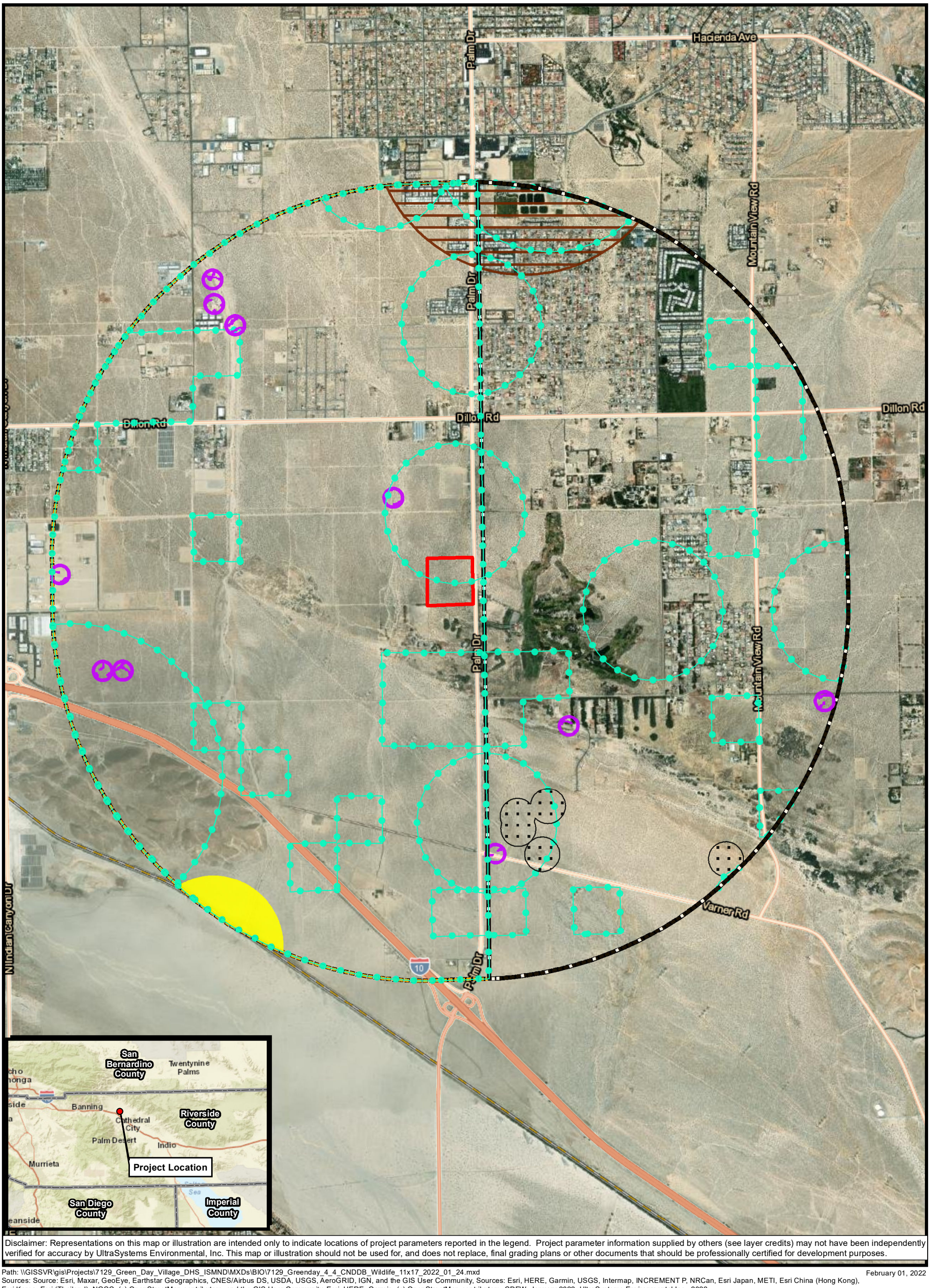
- Project Boundary
- 2-Mile Radius
- **Common Name, Scientific Name**
- Coachella Valley milk-vetch, *Astragalus lentiginosus var. coachellae*
- Desert Fan Palm Oasis Woodland, *Desert Fan Palm Oasis Woodland*

Green Day Village Project

CNDDB Known Occurences
Plant Species and Habitats

Figure 5

UltraSystems
environmental • management • planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\BIO\7129_Greenday_4_4_CNDDB_Wildlife_11x17_2022_01_24.mxd

February 01, 2022

Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors; CDFW, January 2022; UltraSystems Environmental Inc., 2022

Scale: 1:30,000
1 inch = 2,500 feet
1 cm = 300 meters

N

0 1,250 2,500 Feet

0 320 640 Meters

Legend

Project Boundary

2-Mile Radius

Common Name, Scientific Name

Coachella Valley fringe-toed lizard, *Uma inornata*

San Diego desert woodrat, *Neotoma lepida intermedia*

Burrowing owl, *Athene cunicularia*

Flat-tailed horned lizard, *Phrynosoma mcallii*

Prairie falcon, *Falco mexicanus*

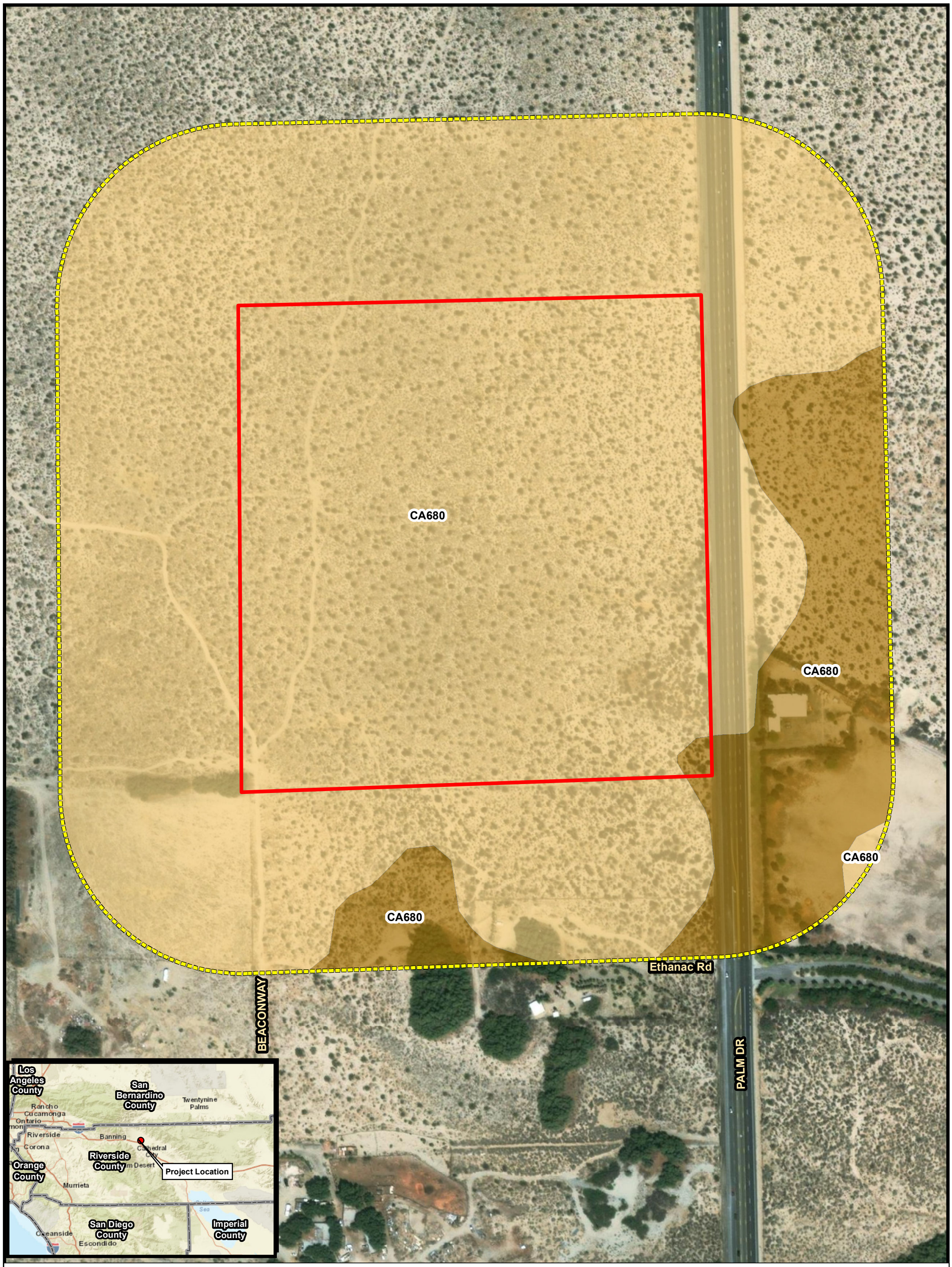
Red-diamond rattlesnake, *Crotalus ruber*

Green Day Village Project

CNDDB Known Occurences
Wildlife Species

Figure 6

UltraSystems
environmental • management • planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\BIO\7129_Greenday_4_4_Soil_11x17_2022_01_25.mxd

February 01, 2022

Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community; USDA 2021; UltraSystems Environmental, Inc., 2022

Scale: 1:3,000
1 inch = 250 feet
1 cm = 30 meters

0 125 250 Feet

0 30 60 Meters

N

Legend

Project Boundary

500ft Biological Study Area (BSA)

USDA Map Unit

MaB-Myoma fine sand, 0 to 5 percent slopes

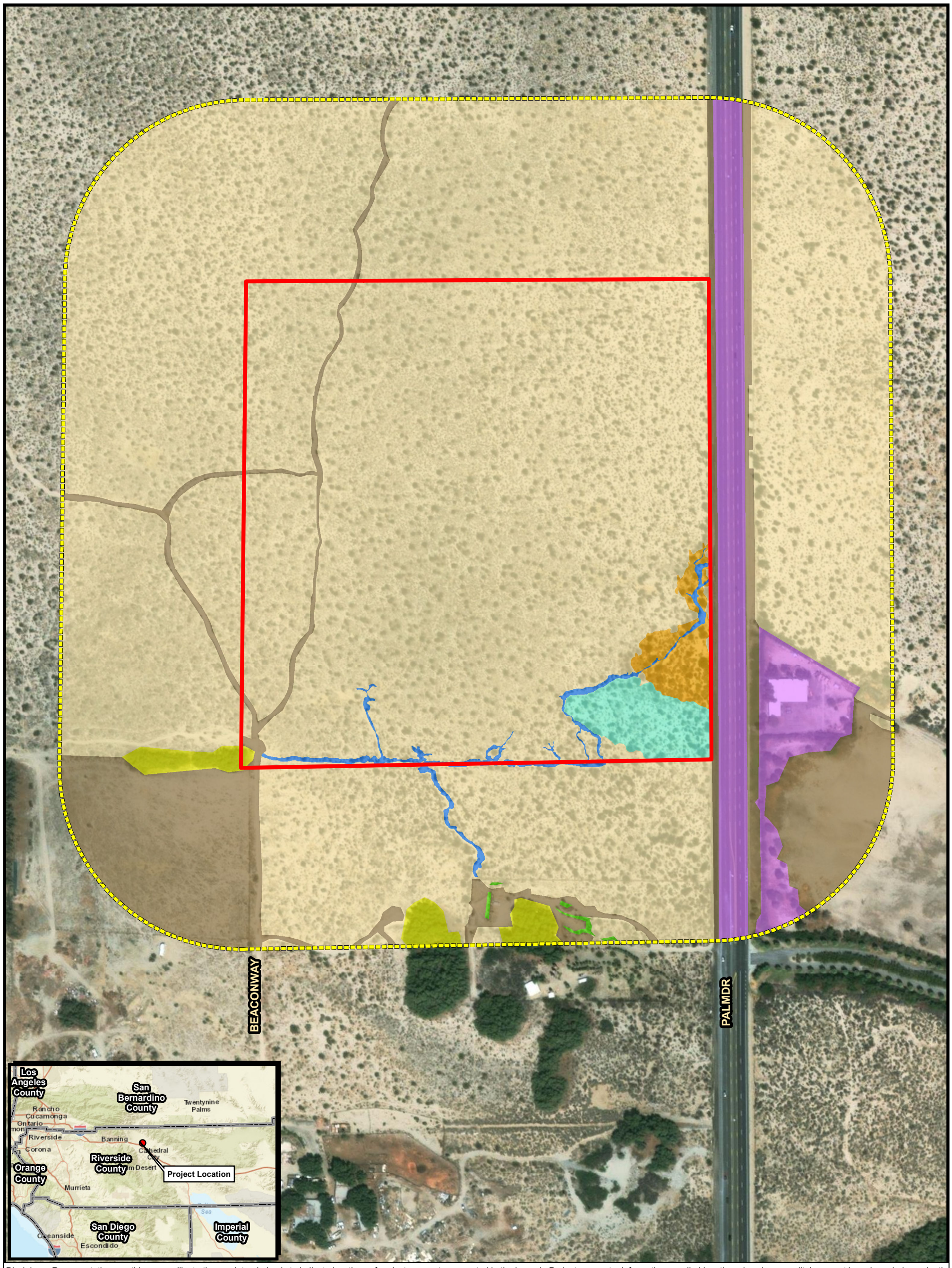
MaD-Myoma fine sand, 5 to 15 percent slopes

Green Day Village Project

USDA Soils

Figure 7

UltraSystems
environmental•management•planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\gissvr\GIS\Projects\7129a_GreenDayVillage_DHS_Technical_Studies_only\MXDs\7129a_Greenday_Land_Cover_2022_10_07.mxd

October 07, 2022

Sources: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; County of Riverside, 2020; UltraSystems Environmental, Inc., 2022

Scale: 1:3,000
1 inch = 250 feet
1 cm = 30 meters

N

0 125 250 Feet

0 30 60 Meters

Legend

- Project Boundary
- 500ft Biological Study Area (BSA)

Land Cover Types

- Creosote bush – white bursage scrub
- Fourwing saltbush scrub
- Date palm - California fan palm groves
- Disturbed
- Developed/Ornamental
- Stabilized desert dunes
- Tamarisk thickets
- Unconsolidated streambed

Green Day Village Project

Land Cover Types

Figure 8

UltraSystems
environmental • management • planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Green Day Village Project

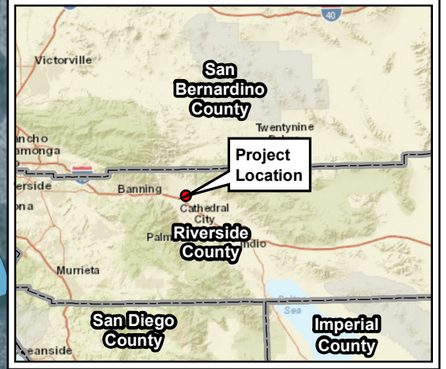
Legend

- Project Boundary
- USGS Stream

HUC12, Name

- 181002010303, Mission Creek
- 181002010404, Morongo Wash
- USGS Waterbody

Key Map



0 300 600 Feet

0 140 Meters

N

Scale: 1:7,200

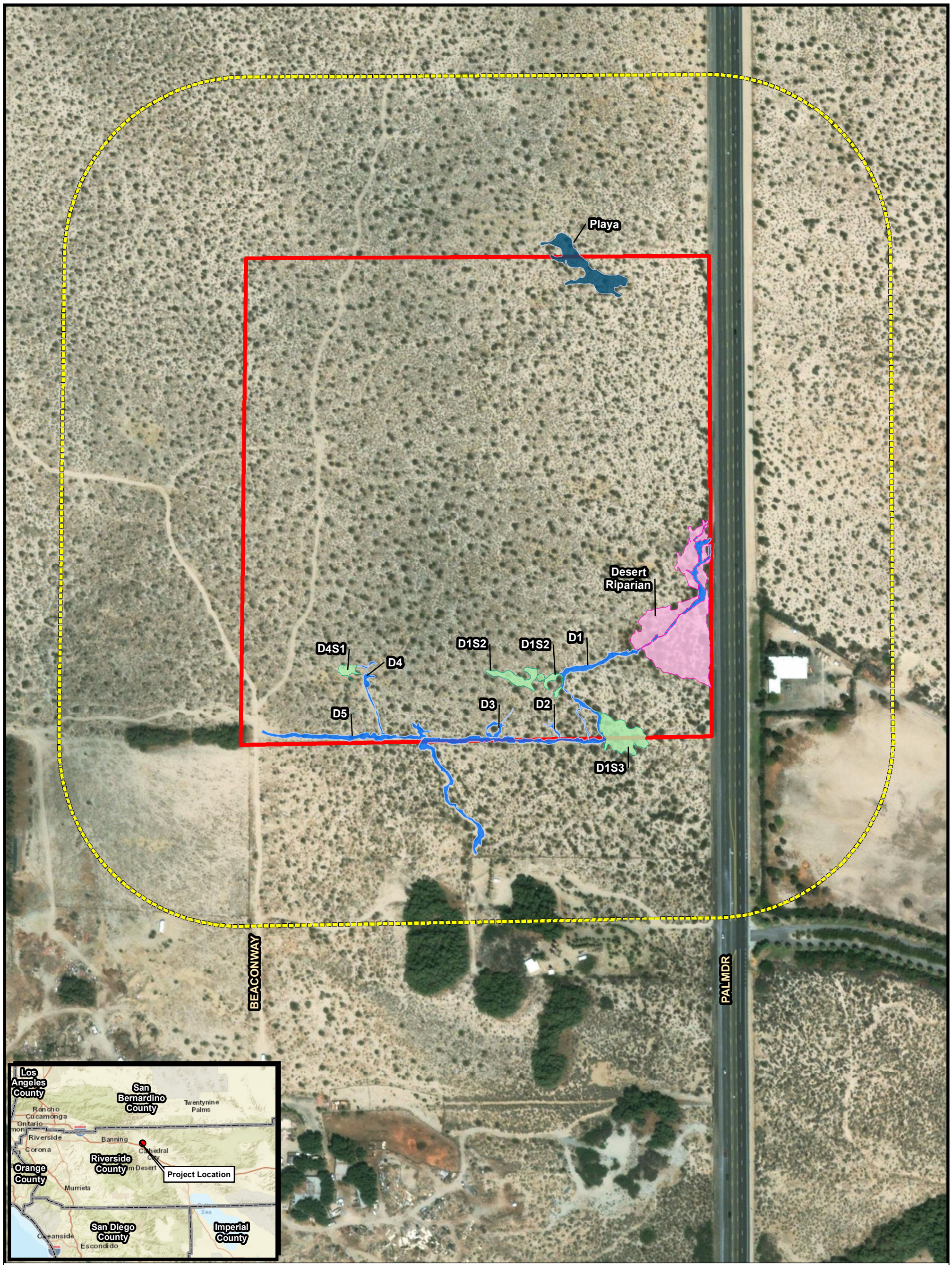
USGS Surface Waters and Watersheds

Figure 9

UltraSystems
environmental • management • planning

Path: \\gissvr\GIS\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\7129_Greenday_4_10_Surface_Waters_11x17_2022_10_19.mxd
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; USGS, 2022; UltraSystems Environmental, Inc., 2022

October 19, 2022



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\gissvr\GIS\Projects\7129a_GreenDayVillage_DHS_Technical_Studies_only\MXDs\7129a_Greenday_JD_2022_10_12.mxd

October 12, 2022

Sources: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; County of Riverside, 2020; UltraSystems Environmental, Inc., 2022

Scale: 1:3,000
1 inch = 250 feet
1 cm = 30 meters

N

0 125 250 Feet

0 30 60 Meters

Legend

- Project Boundary
- 500ft Biological Study Area (BSA)

Jurisdictional Waters

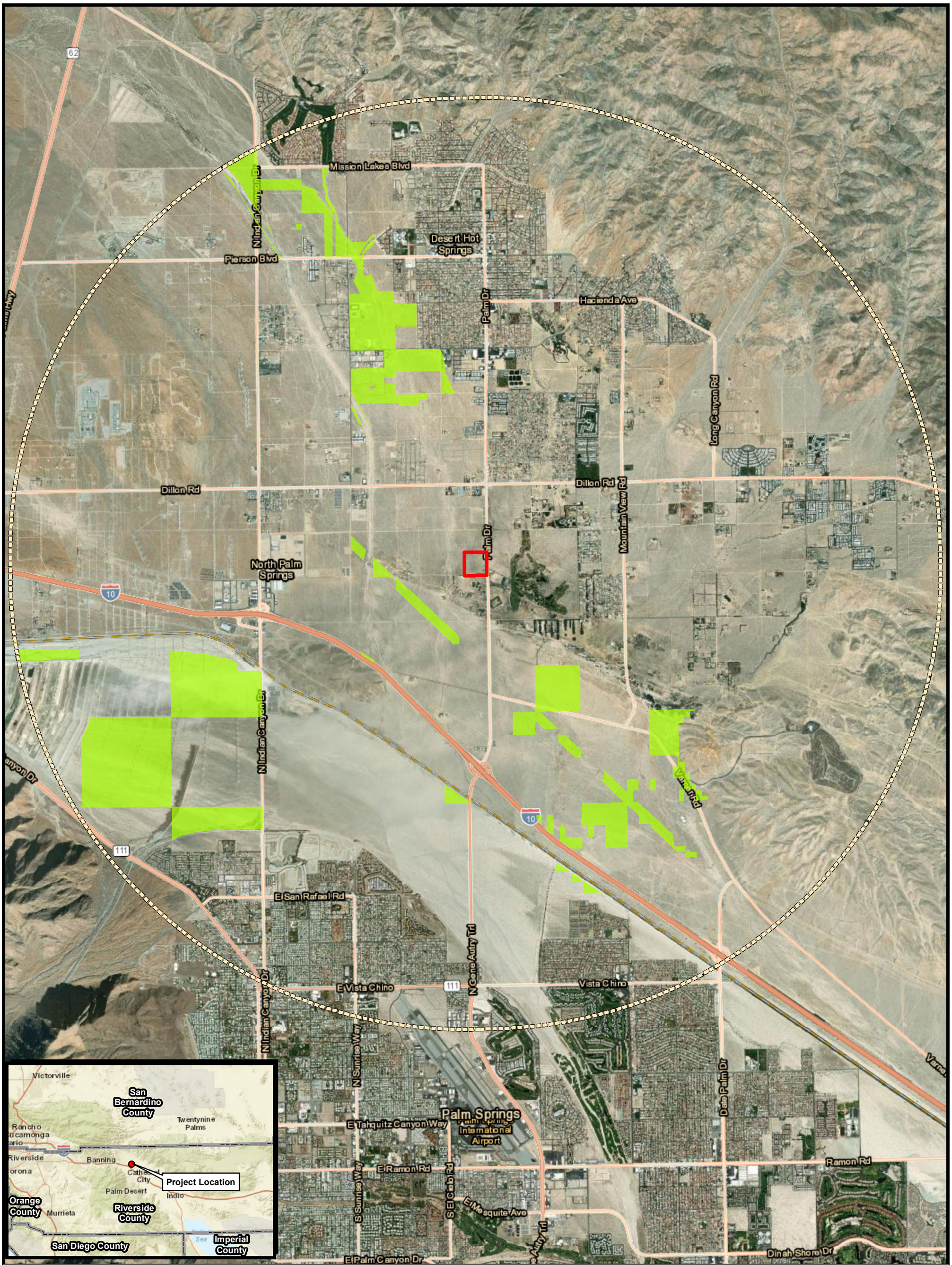
- Waters of the State (CDFW/RWQCB, Desert Riparian)
- Waters of the State (CDFW/RWQCB, Drainage)
- Waters of the State (CDFW/RWQCB, Playa)
- Waters of the State (RWQCB, Swale)

Green Day Village Project

Jurisdictional Waters

Figure 10

UltraSystems
environmental • management • planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\BIO\7129_Greenday_4_4_CritHab_11x17_2022_01_24.mxd

January 24, 2022

Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community; USFWS Critical Habitats, July 2021; UltraSystems Environmental, Inc., 2022

Scale: 1:63,360
1 inch = 1 Miles
1 cm = 0.63 Kilometers

N

0 0.5 1 Miles

0 0.7 1.4 Kilometers

Legend

- Project Boundary
- 5-Mile Radius

USFWS Critical Habitat Name

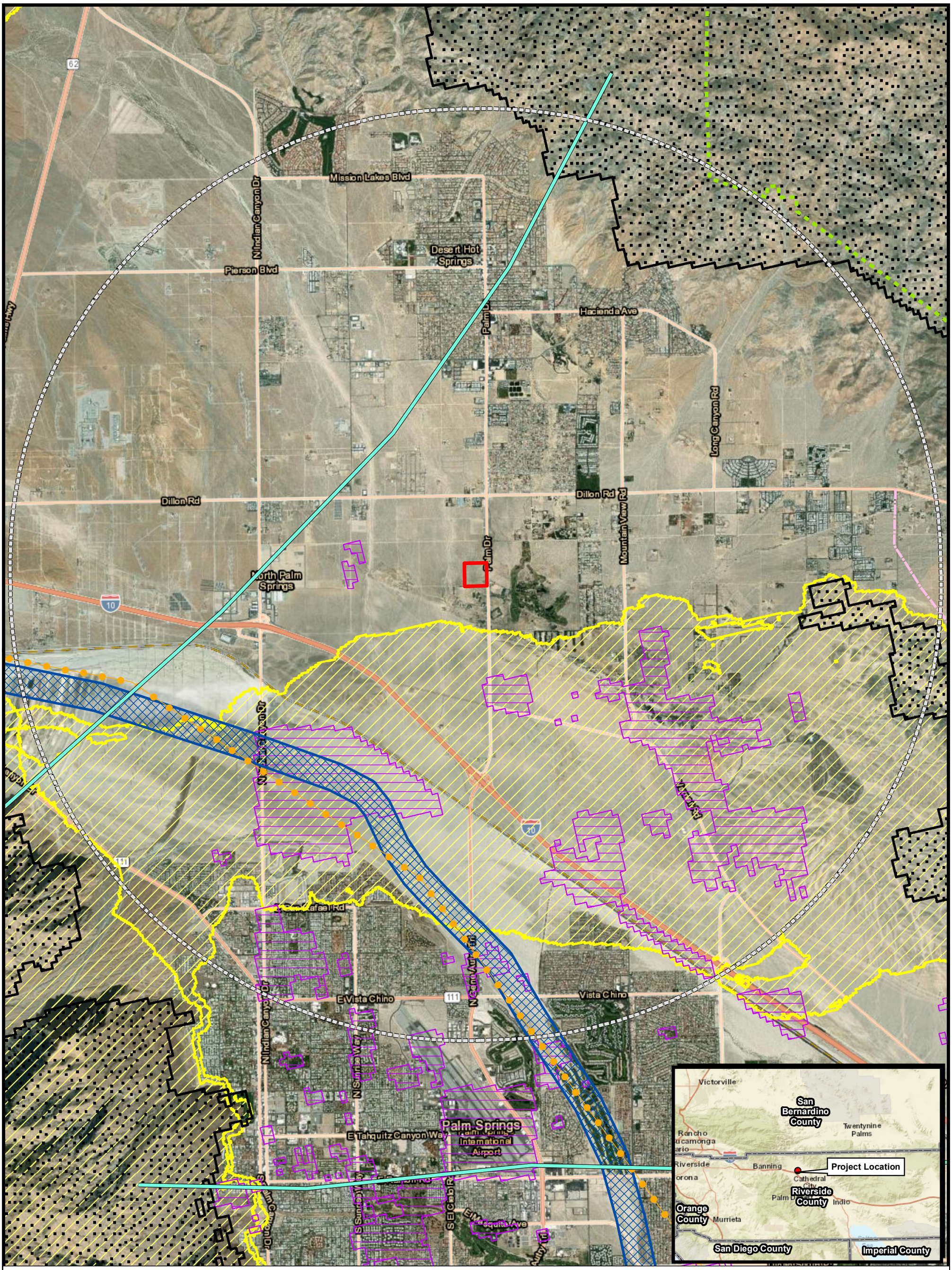
- Coachella Valley milk-vetch

Green Day Village Project

USFWS Critical Habitats

Figure 11

UltraSystems
environmental•management•planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\BIO\7129_Greenday_4_4_WildlifeCorridors_11x17_2022_01_25.mxd

January 25, 2022

Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community; County of Riverside, 2020; Spencer, W.D., P. Beier, K. Penrod, K. Winters, C. Paulman, H. Rustigian-Romsos, J. Strittholt, M. Parisi, and A. Pettler. 2010. California Essential Habitat Connectivity Project: A Strategy for Conserving a Connected California. Prepared for California Department of Transportation, California Department of Fish and Game, and Federal Highways Administration; BIOS , 2008-2019; UltraSystems Environmental, Inc., 2022

Scale: 1:63,360
1 inch = 1 Miles
1 cm = 0.63 Kilometers

0 0.5 1 Miles

0 0.5 1 Kilometers

N

Legend

- Project Boundary
- 5-Mile Radius
- Linkage Network of the California Desert
- Potential Riparian Connections
- Natural Landscape Block
- Small Natural
- Essential Connectivity

LINKAGE TYPE, NAME

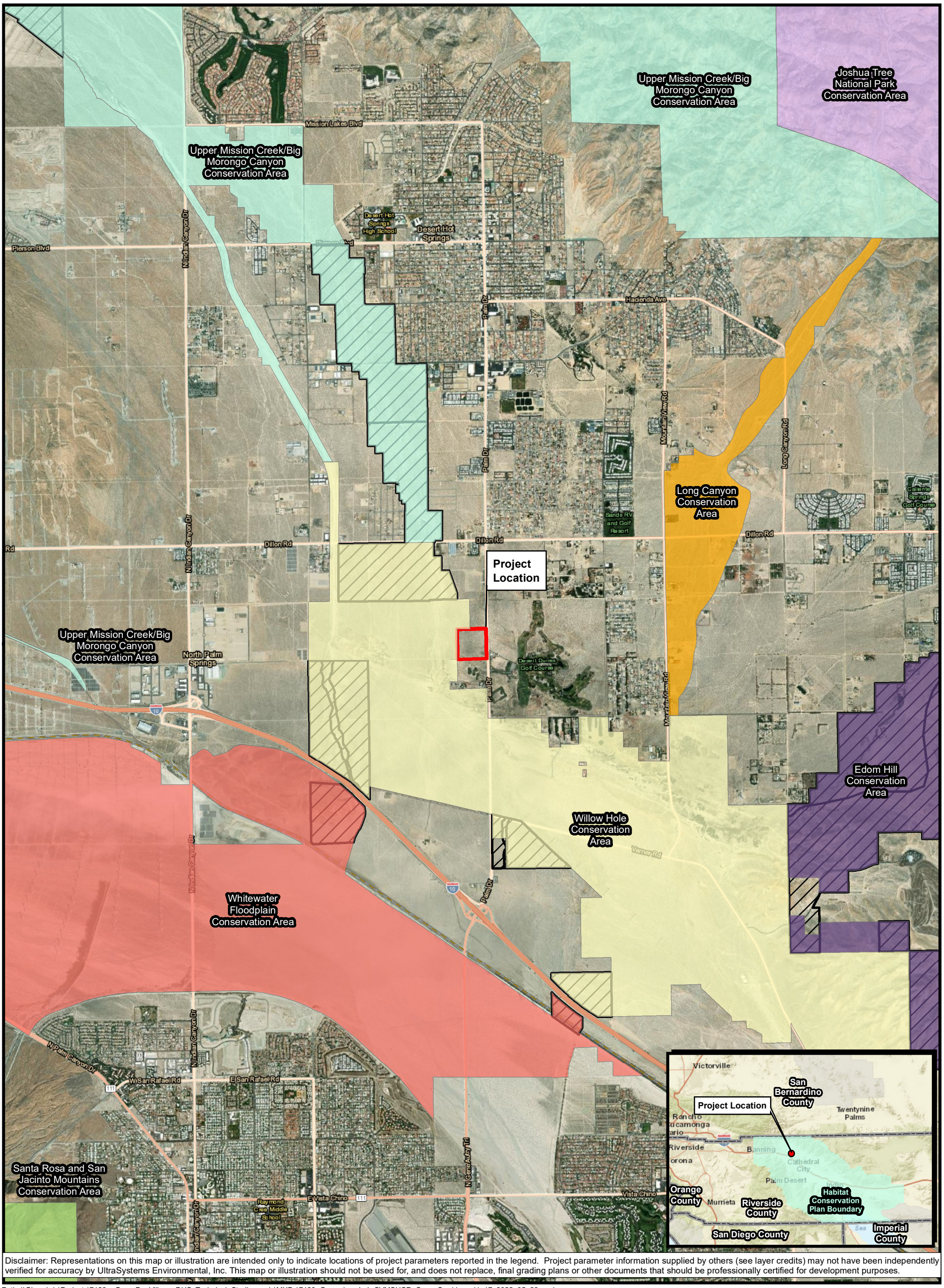
- Landscape Linkage, Coachella Valley Preserve
- Landscape Linkage, Whitewater River
- Missing Link, East West - Imperial - Coachella Valley

Green Day Village Project

CDFW Wildlife Corridors

Figure 12

UltraSystems
environmental•management•planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\Gissvr\gis\Projects\7129a_GreenDayVillage_DHS_Technical_Studies_only\MXDs\7129_Greenday_4_4_CVMSHCP_Cons_Corridors_11x17_2022_05_23.mxd

May 23, 2022

Sources: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; CDFG, 2008; CVCC 2022; UltraSystems Environmental, Inc., 2022

Scale: 1:48,000
1 inch = 4,000 Feet
1 cm = 480 Meters

0 2,000 4,000 Feet

0 700 1,400 Meters

N

Legend

- Project Boundary
- Biological Corridors and Linkages

Conservation Area

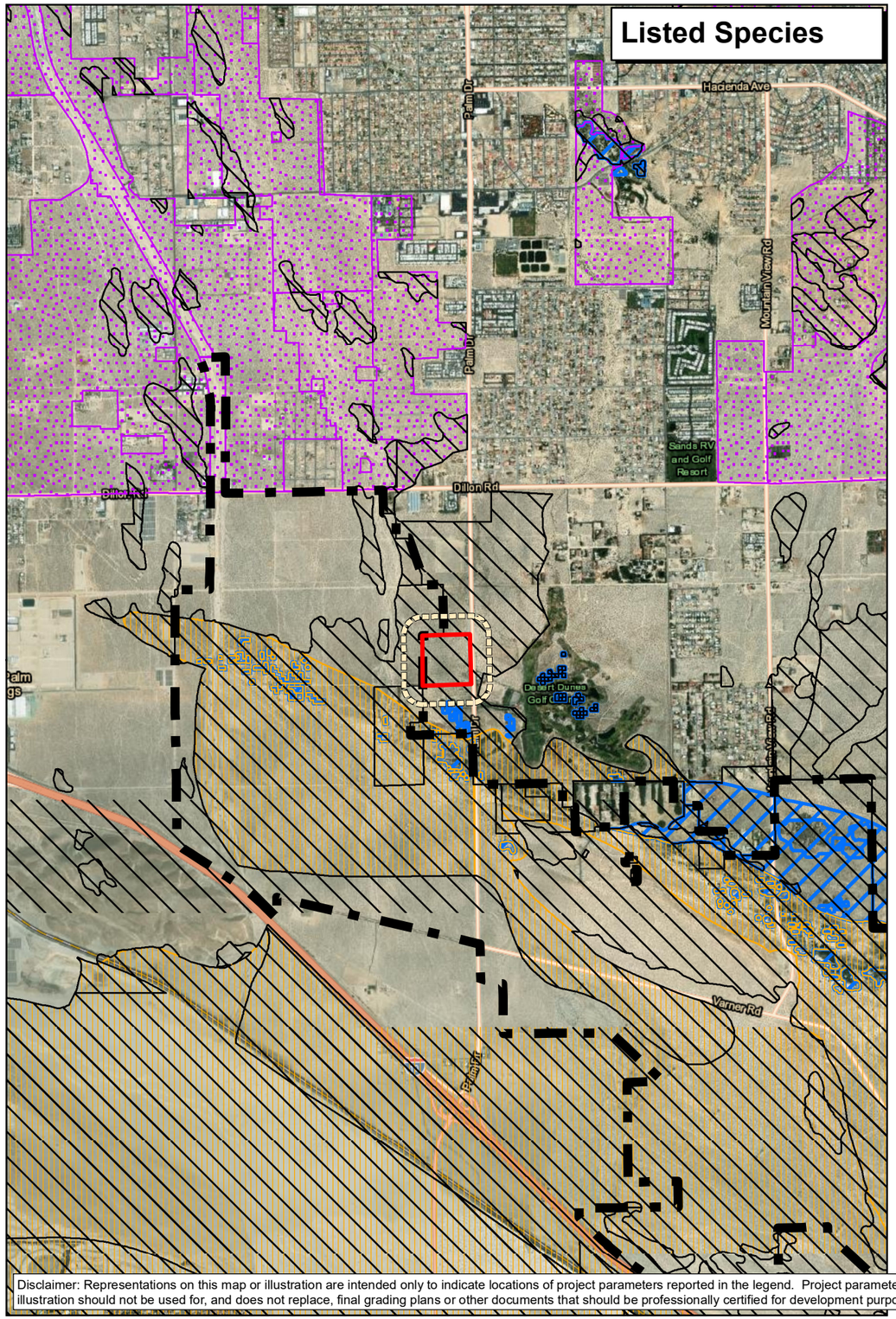
- Edom Hill Conservation
- Joshua Tree National Park Conservation Area
- Long Canyon Conservation
- Santa Rosa and San Jacinto Mountains Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Whitewater Floodplain Conservation Area
- Willow Hole Conservation

Green Day Village Project

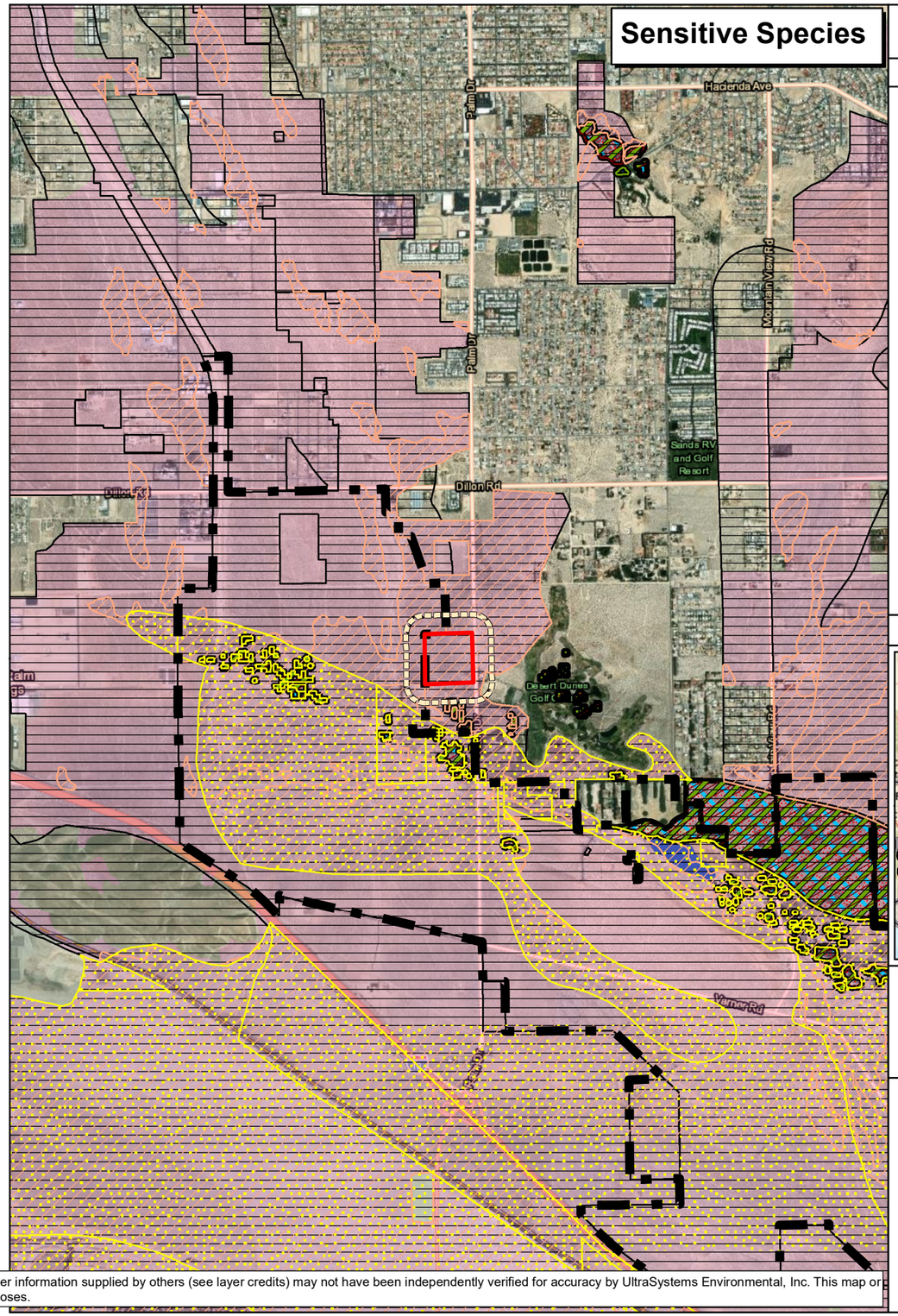
CVMSHCP Conservation Areas and Corridors and Linkages
Figure 13

UltraSystems
environmental•management•planning

Listed Species



Sensitive Species



Green Day Village Project

Legend

- Project Boundary
- Willow Hole Conservation Area
- 500-ft Radius BSA

Listed Species

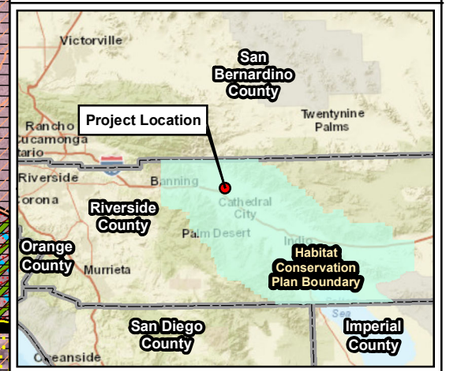
- Coachella Valley Milkvetch*
- Desert Tortoise
- Fringe-toed Lizard*
- Least Bell's Vireo

Sensitive Species

- Coachella Giant Sand Treader Cricket
- Flat-tailed Horned Lizard
- Le Conte's Thrasher*
- Crissal Thrasher
- Yellow Warbler
- Yellow-breasted Chat
- Summer Tanager
- Palm Springs Pocket Mouse
- Southern Yellow Bat

*CVMSHCP Core Habitat within the Willow Hole Conservation Area

Key Map



0 1,750 3,500 Feet

0 1,000 Meters

N

Scale: 1:42,000

CVMSHCP Plant And Wildlife Species

Figure 14

UltraSystems
environmental•management•planning

May 24, 2022

Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\gissvr\GIS\Projects\7129a_GreenDayVillage_DHS_Technical_Studies_only\MXDs\7129_Greenday_4_4_CVMSHCP_Plant_Wildlife_11x17_2022_05_24.mxd

Sources: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; CDFG, 2008; CVCC 2022; UltraSystems Environmental, Inc., 2022

APPENDIX B

PROJECT DRAWINGS (SITE PLANS)



SUMMARY

SITE AREA TOTAL 1,642,186 S.F. OR 37.29 ACRES

TENTATIVE TRACT

PARCEL #1 – COMMERCIAL	62,882 S.F.
PARCEL #2 – COMMERCIAL	167,494 S.F.
PARCEL #3 – COMMERCIAL	157,029 S.F.
PARCEL #4 – RESIDENTIAL	46,654 S.F.
PARCEL #5 – RESIDENTIAL	1,082,263 S.F.

COMMERCIAL

BLDG. 1 – FAST FOOD W/DRIVE-THRU & OUTDOOR SEATING	4,608
BLDG. 2 – RETAIL CONVENIENCE STORE	1,024
BLDG. 3 – RETAIL STORE	20,000
BLDG. 4 – RESTAURANTS	6,144
BLDG. 5 – RETAIL	3,749
BLDG. 6 – RETAIL	2,592
BLDG. 7 – RETAIL	1,920
BLDG. 8 – RETAIL	15,360
BLDG. 9 – MEDICAL OFFICE 2-STORY (10,927 FOOTPRINT)	21,854
BLDG. 10 – RECYCLING CENTER	240
BLDG. 11 – RECYCLING CENTER	480
COMMERCIAL TOTAL SF	77,971

TYPICAL RESIDENTIAL BUILDING (92 BUILDINGS)

UNIT 1 – ADU/STUDIO		208
UNIT 2 – TWO STORY (2 BDR.)		
LOWER LEVEL	388	
EXT. COVERED AREA	123	
UPPER LEVEL	375	
		886
UNIT 3 – TWO STORY (1 BDR.)		
LOWER LEVEL	378	
UPPER LEVEL	252.5	
		630.5
UNIT 4 – 1 BDR.		389
UNIT 5 – TWO STORY (1 BDR.)		
LOWER LEVEL	376	
UPPER LEVEL	252.5	
		628.5
UNIT 6 – TWO STORY (2 BDR.)		
LOWER LEVEL	373	
UPPER LEVEL	389	
		762
LOWER LEVEL TOTAL		2,235
UPPER LEVEL TOTAL		1,269
BUILDING TOTAL		3,504

RESIDENTIAL UNITS

UNIT 1 – ADU'S	92
UNIT 2 – 2-STORY 2-BDR.	92
UNIT 3 – 2-STORY 1-BDR.	92
UNIT 4 – 1-BDR.	92
UNIT 5 – 2-STORY 1-BDR.	92
UNIT 6 – 2-STORY 2-BDR.	92
APT. – 1-BDR. LOFT	60
TOTAL	612

RESIDENTIAL

PHASE A	
BLDGS. A1–A23	80,592
BLDG. AA – POOL HOUSE	1,200
PHASE B	
BLDGS. B1–B23	80,592
BLDG. BA – POOL HOUSE	1,200
PHASE C	
BLDG. C1–C10	35,040
BLDG. CA – BARN	384
BLDG. VILLAGE SERV. BLDG.	1,920
PHASE D	
BLDGS. D1–D14	49,056
BLDG. DA – POOL HOUSE	1,200
BLDG. DB – BARN	384
PHASE E	
BLDGS. E1–E14	49,056
BLDG. EA – POOL HOUSE	1,200
PHASE F	
BLDGS. F1–F8	28,032
BLDG. FA – POOL HOUSE	1,200
OTHERS	
FARM EQUIPMENT	1,620
COMMUNITY CENTER – 2-STORY	8,886
1-BDR LOFT APARTMENTS – 2-STORY+BASEMENT (16,425 FOOTPRINT)	32,850
VEGETABLE STANDS TOTAL OF 4 (72 EACH)	288

PARKING

	REQ. RATIO	REQ. STALLS	PROVIDED
PARCEL #1			
BLDG. 1 (INCLUDES OUTDOOR SEATING)	1/100 + 6 STACK FOR WINDOW	58	61
PARCEL #2			
BLDG. 2	1/250	5	
BLDG. 3	1/250	80	
BLDG. 4	1/75	82	
BLDG. 5	1/250	15	
BLDG. 6	1/250	11	
BLDG. 11	1/300 + 1/10,000 GROSS YARD AREA	3	
	PARCEL #2 SUB-TOTAL	196	199
PARCEL #3			
BLDG. 7	1/250	8	
BLDG. 8	1/250	62	
BLDG. 9	10 FOR FIRST 2,000 + 1/175 OVER 2,000	124	
BLDG. 10	1/300 + 1/10,000 GROSS YARD AREA	2	
	PARCEL #3 SUB-TOTAL	196	218
PARCEL #4			
APARTMENTS	1.5 COVERED +	90	
	1 UNCOVERED GUEST FOR EVERY 5 UNITS	18	
	PARCEL #4 SUB-TOTAL	108	64 (26+38 BSMT.)
R.O.W.			12
PARCEL #5			
PHASE A			115
PHASE B			115
PHASE C (VILLAGE SERV. BLDG.)			7
PHASE C			50
PHASE D			70
PHASE E			75
PHASE F			40
	TOTAL		1,026

LEGEND

- PROPERTY LINE
- NEW PROPERTY LINE
- FH FIRE HYDRANT
- FENCE
- PERIMETER WALL
- SOLAR PANEL CANOPIES @ RESIDENTIAL PARKING BAYS
- TYPICAL TRASH ENCLOSURE @ RESIDENTIAL AREAS
- TE TRASH ENCLOSURE @ COMMERCIAL AREAS

0' 60' 120' 180'

SCALE: 1" = 60'

SRK STEWART ROMBERGER KITE SRK ARCHITECTS INC.

2254 South Figueroa Street

Los Angeles, CA. 90007

Tel. (213) 747-1199

www.srkarchitectsinc.com

DEVELOPER:

LA WORLD CONSTRUCTION

2029 Century Park East #400
Century City, CA. 90067

CONSULTANT:

GREEN DAY VILLAGE
Desert Hot Springs, CA

NOT FOR CONSTRUCTION

DRAWINGS ISSUED

DELTA	DESCRIPTION	DATE
-	ENTITLEMENT SUBMITTAL	6/30/22

LICENSED ARCHITECT BRIAN A. KITE C-11258 DATE 08/31/23 STATE OF CALIFORNIA

Scale: 1" = 60'-0"
Checked by: RH, BK
Drawn by: RH, HC
Project #: 22002.01

6/22/2022

Drawing Title & Number:

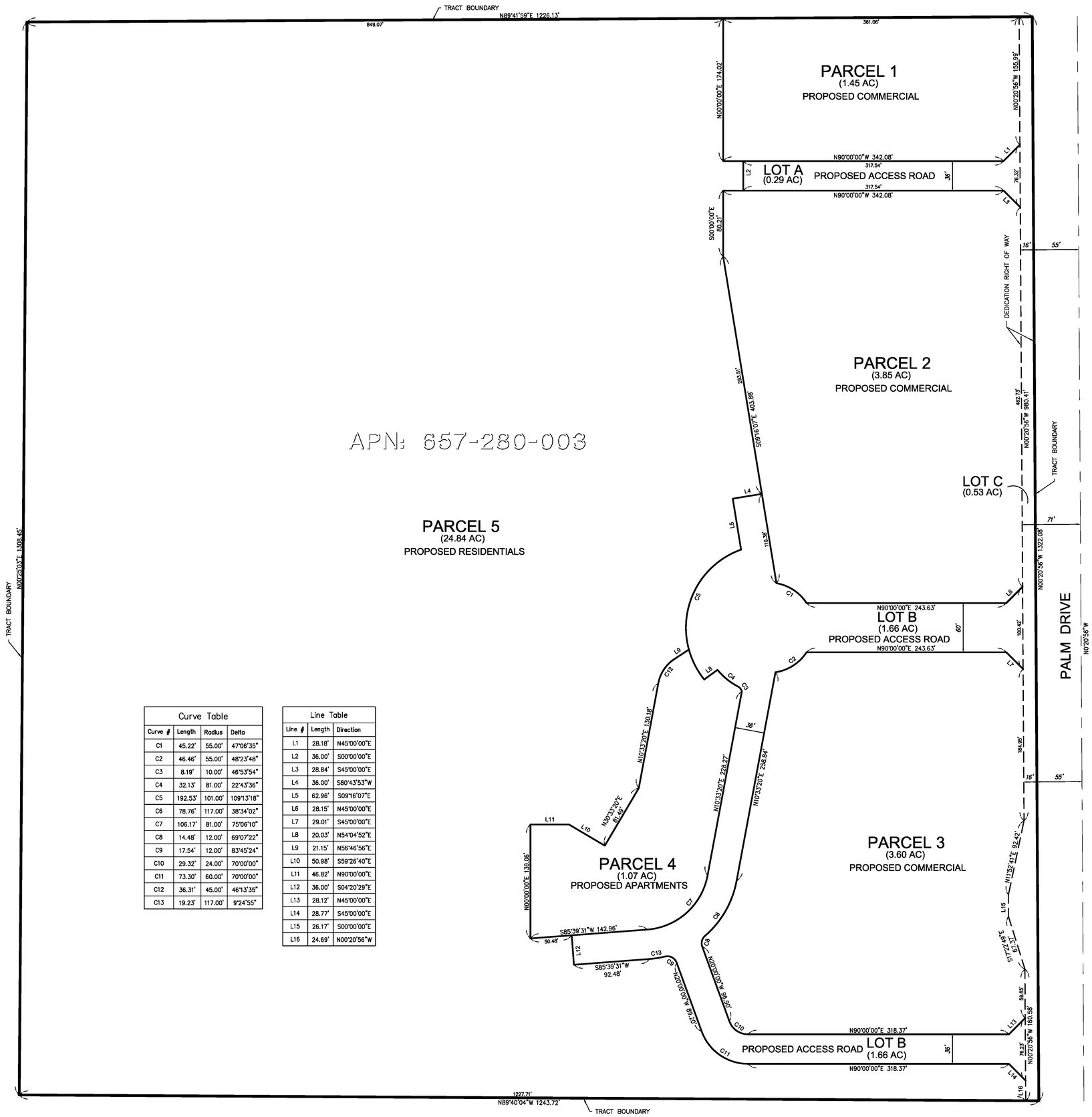
PROPOSED SITE PLAN

A-1.1

© 2022 Ownership and use of documents: All drawings, specifications and copies thereof furnished by Stewart, Romberger & Kite are and shall remain its property. They are to be used in respect to this project and are not to be used on any other project. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the project is not to be construed as publication in derogation of Stewart, Romberger and Associates' common law copyright or other reserved rights.

© SRK Architects Inc. 2022 – 36"x24" Sheet

S:\+SRK ARCHITECTS INC+\+PROJECTS\PROJECTS\22002 - Green Day Village - Desert Hot Springs\00 PRE-DESIGN\A-ARCHITECTURAL\CAD\SP01-02X-SITE_A-1.1.dwg Jun 22, 2022 - 4:15pm



Curve Table			
Curve #	Length	Radius	Delta
C1	45.22'	55.00'	47°06'35"
C2	46.46'	55.00'	48°23'48"
C3	8.19'	10.00'	46°53'54"
C4	32.13'	81.00'	22°43'36"
C5	192.53'	101.00'	109°13'18"
C6	78.76'	117.00'	38°34'02"
C7	106.17'	81.00'	75°06'10"
C8	14.48'	12.00'	69°07'22"
C9	17.54'	12.00'	83°45'24"
C10	29.32'	24.00'	70°00'00"
C11	73.30'	60.00'	70°00'00"
C12	36.31'	45.00'	46°13'35"
C13	19.23'	117.00'	9°24'55"

Line Table		
Line #	Length	Direction
L1	28.18'	N45°00'00"E
L2	36.00'	S00°00'00"E
L3	28.84'	S45°00'00"E
L4	36.00'	S80°43'53"W
L5	62.96'	S09°16'07"E
L6	28.15'	N45°00'00"E
L7	29.01'	S45°00'00"E
L8	20.03'	N54°04'52"E
L9	21.15'	N56°46'56"E
L10	50.98'	S59°26'40"E
L11	46.82'	N90°00'00"E
L12	36.00'	S04°20'29"E
L13	28.12'	N45°00'00"E
L14	28.77'	S45°00'00"E
L15	26.17'	S00°00'00"E
L16	24.69'	N00°20'56"W

APPLICANT / OWNER / DEVELOPER

OWNER:
GREEN DAY VILLAGE DHS LLC

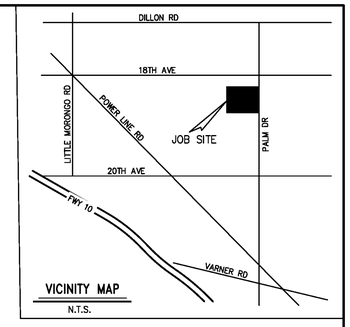
DEVELOPER:
LA WORLD CONSTRUCTION
2029 CENTURY PARK EAST #400
CENTURY CITY, CA 90067

BENCH MARK

ELEV = 250.607 FEET, BM # 603.60 NGS NAVD88,
DESERT HOT SPRINGS QUAD (1978)

BASIS OF BEARING

THE BASIS OF BEARING IS TAKEN AS THE CENTERLINE OF PALM DRIVE PER PARCEL MAP No. 26564, P.M 177-91-93, BEING N00°02'56"W



LEGAL DESCRIPTION

THE SOUTH HALF OF GOVERNMENT LOT 1 OF THE NW ¼ SECTION 18, T 3 S, R 5 E, SBBM COUNTY OF RIVERSIDE, STATE OF CALIFORNIA; EXCEPT EAST 55.00 FEET AS CONVEYED TO THE COUNTY OF RIVERSIDE BY DEED OF RECORDED APRIL 11, 1996, INSTRUMENT NO. 37515 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CA

PARCEL DATA

PROPOSED PARCEL	AREA	USE
PARCEL 1	63,059.27 SF 1.45 AC	COMMERCIAL
PARCEL 2	167,493.95 SF 3.85 AC	COMMERCIAL
PARCEL 3	157,028.80 SF 3.60 AC	COMMERCIAL
PARCEL 4	46,653.77 SF 1.07 AC	APARTMENTS
PARCEL 5	1,082,055.49 SF 24.84 AC	RESIDENTIALS
LOT A	12,559.84 SF 0.29 AC	ACCESS ROAD AND P.U.E.
LOT B	72,115.73 SF 1.66 AC	ACCESS ROAD AND P.U.E.
LOT C	23,219.62 SF 0.53 AC	DEDICATION R/W

PROPERTY AREAS

	NET AREA	GROSS AREA
TOTAL	37.29 AC	37.29 AC

ASSESSOR'S PARCEL NUMBER

657-280-003

ZONING ORDINANCE

RESIDENTIAL HIGH (R-H), MIXED-USE CORRIDOR (MU-C)

FLOOD ZONE:

PROPERTY IS LOCATED IN HAZARD OR WITH RISK OF FLOODING AREA, FEMA ZONE: D

UTILITY COMPANIES:

WATER/SEWER
MISSION SPRINGS WATER DISTRICT
PHONE (760) 329-6448

COUNTY ROADS
RIVERSIDE COUNTY TRANSPORTATION DEP.
PHONE (760) 863-8267

CITY STREETS
CITY OF DESERT HOT SPRINGS
PHONE (760) 329-6411

ELECTRICITY
EDISON INTERNATIONAL
PHONE (800) 655-4555

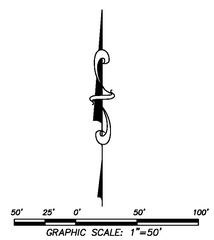
GAS
SOUTHERN CALIFORNIA GAS
PHONE (909) 335-7729

TELEPHONE
VERIZON
PHONE (760) 864-1715

CABLE TV
TIME WARNER CABLE
PHONE (760) 329-6436

FLOOD CONTROL
RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
PHONE (909) 955-1200

UNDERGROUND UTILITIES
UNDERGROUND SERVICE ALERT
PHONE (800) 227-2600



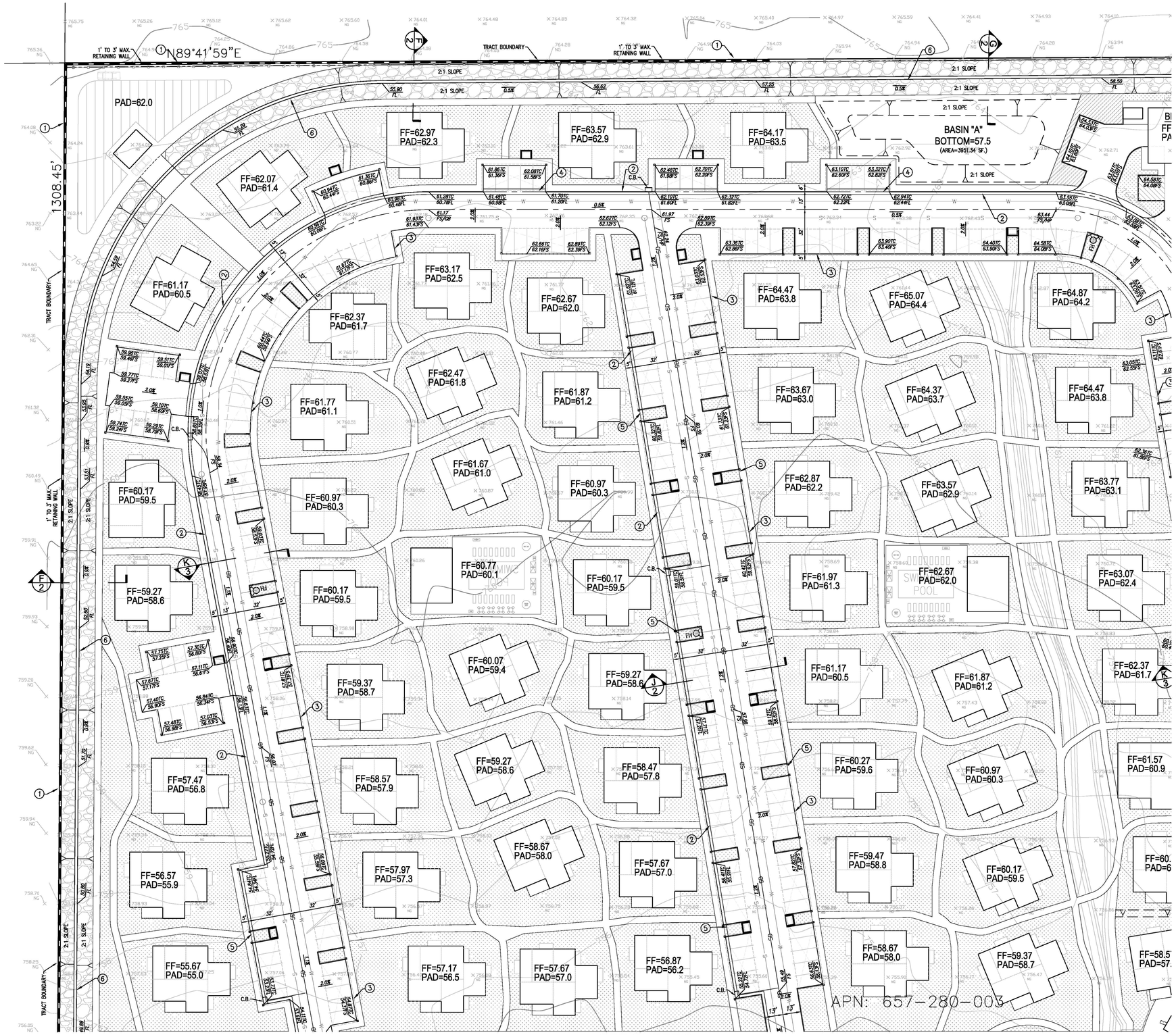
IN THE CITY OF DESERT HOT SPRING
COUNTY OF RIVERSIDE, CALIFORNIA

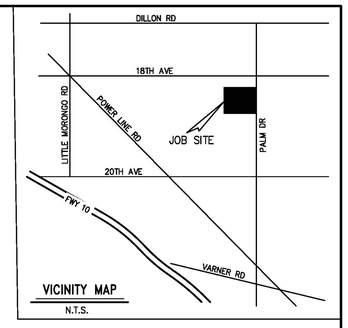
TENTATIVE TRACT MAP NO.

SHEET 1 OF 1

PRELIMINARY GRADING PLAN FOR

GREEN DAY VILLAGE
APN 657-280-003
CITY OF DESSERT HOT SPRING, COUNTY OF RIVERSIDE, CA.





APPLICANT / OWNER / DEVELOPER

OWNER:
GREEN DAY VILLAGE DHS LLC

DEVELOPER:
LA WORLD CONSTRUCTION
2029 CENTURY PARK EAST #400
CENTURY CITY, CA 90067

DISTURBED AREAS

1,642,186 SQ.FT. OR 37.29 ACRES

BENCH MARK

ELEV = 250.607 FEET, BM # 603.60 NGS NAVD88,
DESERT HOT SPRINGS QUAD (1978)

BASIS OF BEARING

THE BASIS OF BEARING IS TAKEN AS THE CENTERLINE OF PALM DRIVE PER PARCEL MAP No. 26564, P.M 177-91-93, BEING N00°02'56"W

LEGAL DESCRIPTION

THE SOUTH HALF OF GOVERNMENT LOT 1 OF THE NW ¼ SECTION 18, T 3 S, R 5 E, SBBM. COUNTY OF RIVERSIDE, STATE OF CALIFORNIA; EXCEPT EAST 55.00 FEET AS CONVEYED TO THE COUNTY OF RIVERSIDE BY DEED OF RECORDED APRIL 11, 1996, INSTRUMENT NO. 37515 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CA

LEGEND

	PROPERTY LINE
	DEDICATION R/W
	CENTER LINE
S	PROPOSED SEWER WITH MANHOLE
W	PROPOSED WATER LINE
FW	PROPOSED FIRE WATER LINE
SD	PROPOSED STORM DRAIN
W	EXIST. WATER LINE
S	EXIST. SEWER LINE WITH MANHOLE
	PROPOSED RETAINING WALL
	LANDSCAPE AREA

TC	TOP OF CURB
HP	HIGH POINT
FG	FINISHED GRADE
FL	FLOW LINE
FS	FINISHED SURFACE
FF	FINISHED FLOOR
PAD	PAD ELEVATION
R/W	RIGHT OF WAY
P.L.	PROPERTY LINE
TW	TOP OF WALL
TF	TOP OF FOOTING
N.A.P.	NOT A PART
EX	EXISTING
HT	WALL HIGH
GB	GRADE BREAK
CB	CATCH BASIN

CONSTRUCTION NOTE:

1. PROPOSED RETAINING WALL
2. PROPOSED 6" CONC. CURB AND GUTTER
3. PROPOSED 6" CONC. CURB
4. PROPOSED 4' WIDE RIBBON GUTTER
5. PROPOSED 2' WIDE CONC. CURB CHANNEL
6. PROPOSED RIPRAP CHANNEL

N

30 15 0 30 60
scale 1"= 30' feet

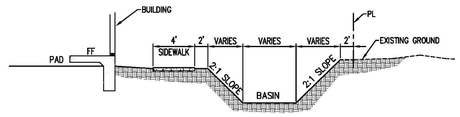
SEE SHEET 1

APN: 657-280-003

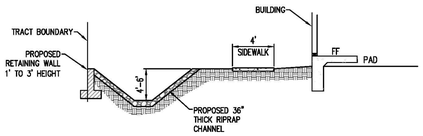
SEE SHEET 4

CONSTRUCTION NOTE:

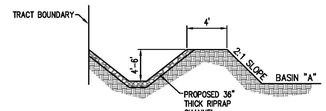
1. PROPOSED RETAINING WALL
2. PROPOSED 6" CONC. CURB AND GUTTER
3. PROPOSED 6" CONC. CURB
4. PROPOSED 4' WIDE RIBBON GUTTER
5. PROPOSED 2' WIDE CONC. CURB CHANNEL
6. PROPOSED RIPRAP CHANNEL



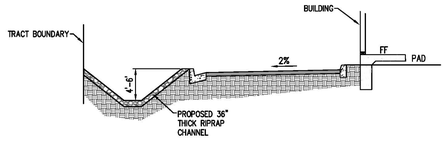
SECTION "E"
NTS



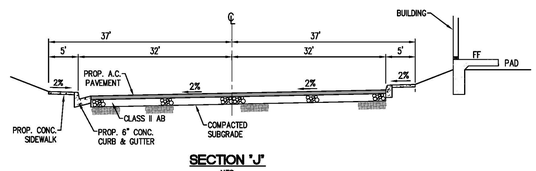
SECTION "F"
NTS



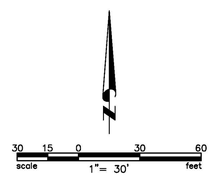
SECTION "G"
NTS

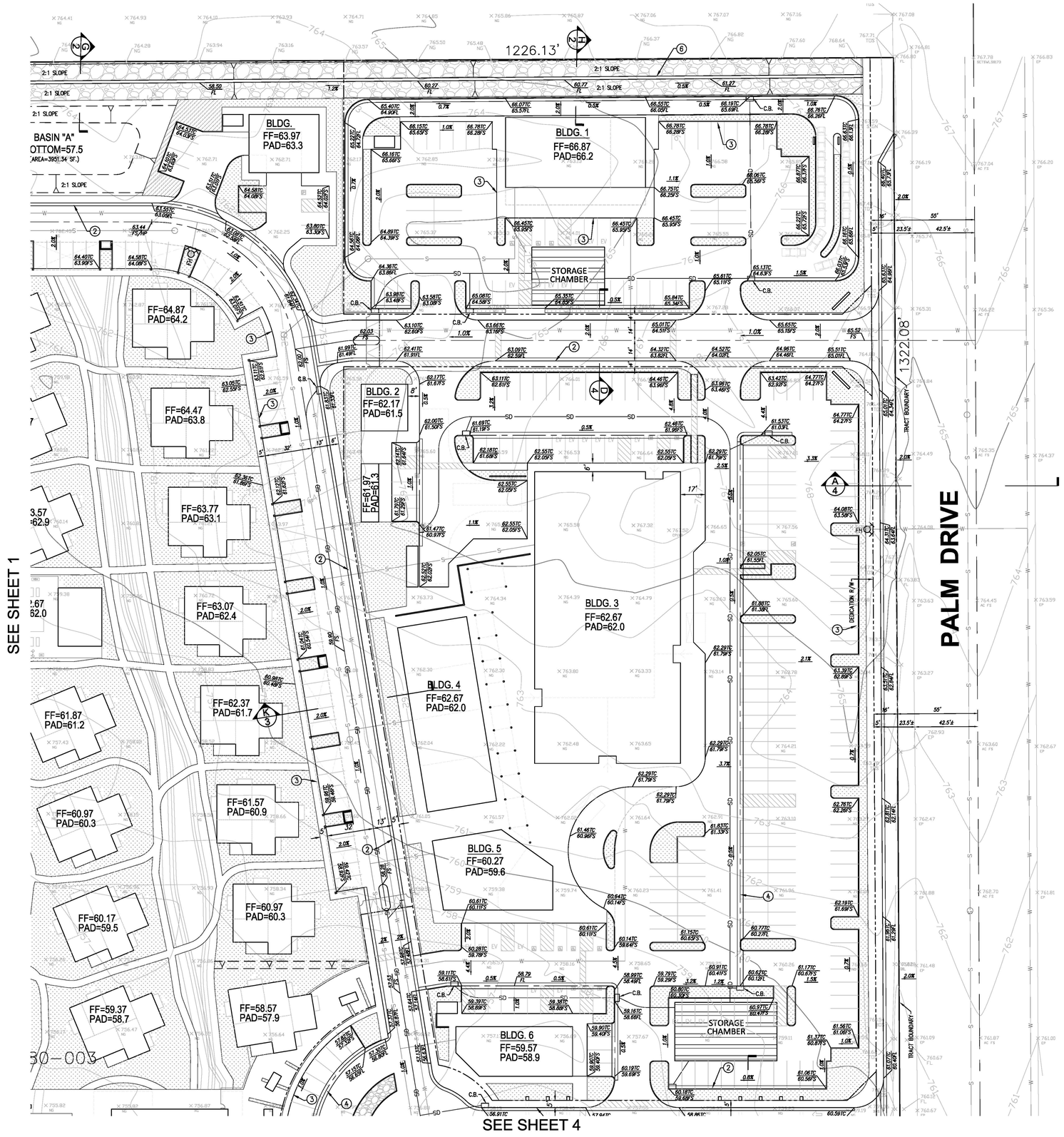


SECTION "H"
NTS



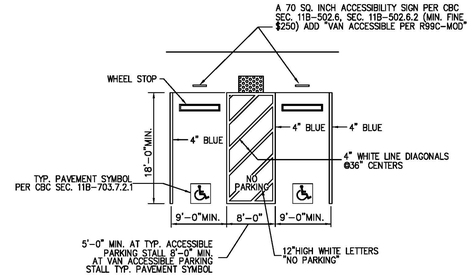
SECTION "J"
NTS



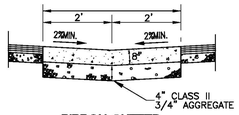


CONSTRUCTION NOTE:

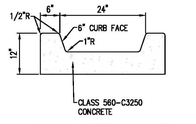
1. PROPOSED RETAINING WALL
2. PROPOSED 6" CONC. CURB AND GUTTER
3. PROPOSED 6" CONC. CURB
4. PROPOSED 4' WIDE RIBBON GUTTER
5. PROPOSED 2' WIDE CONC. CURB CHANNEL
6. PROPOSED RIPRAP CHANNEL



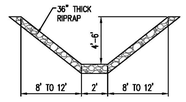
ACCESSIBLE PARKING DETAIL
NOT TO SCALE



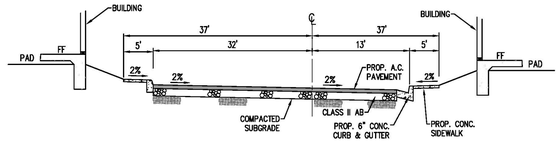
RIBBON GUTTER
NOT TO SCALE



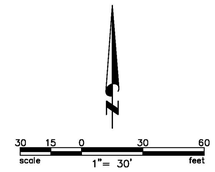
CONC. CURB CHANNEL
NTS



RIPRAP CHANNEL
NTS



SECTION 'K'
NTS

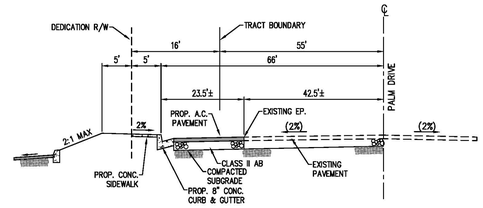


SEE SHEET 3

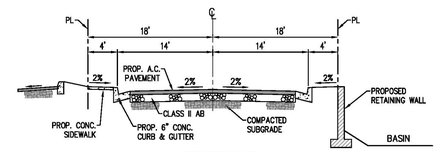
SEE SHEET 2

CONSTRUCTION NOTE:

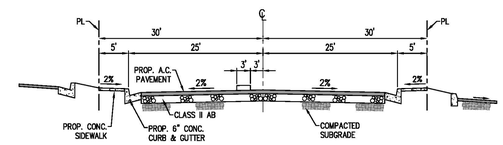
1. PROPOSED RETAINING WALL
2. PROPOSED 6" CONC. CURB AND GUTTER
3. PROPOSED 6" CONC. CURB
4. PROPOSED 4' WIDE RIBBON GUTTER
5. PROPOSED 2' WIDE CONC. CURB CHANNEL
6. PROPOSED RIPRAP CHANNEL



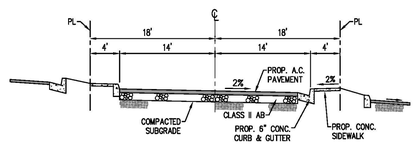
SECTION 'A' PALM DR.
NTS



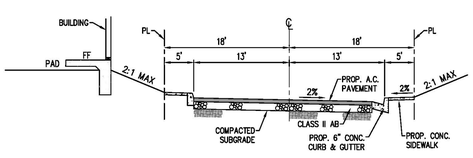
SECTION 'B'
NTS



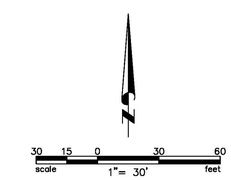
SECTION 'C'
NTS



SECTION 'D'
NTS

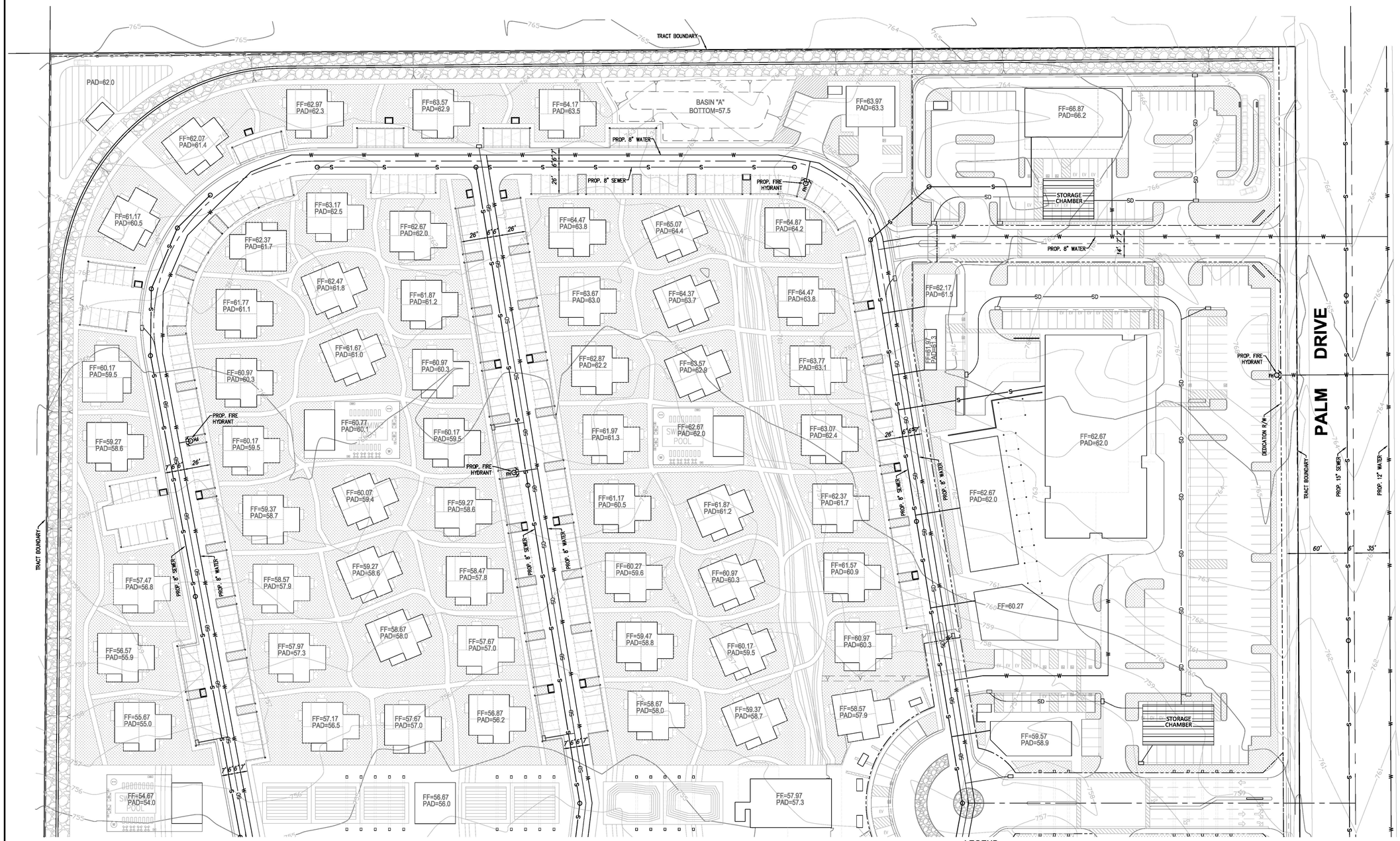


SECTION 'I'
NTS

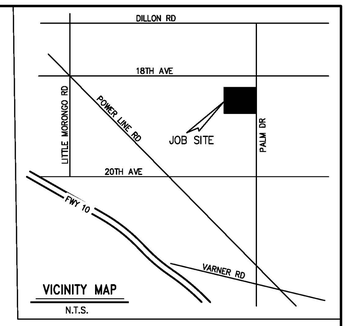


PRELIMINARY SEWER AND WATER PLAN FOR

GREEN DAY VILLAGE
APN 657-280-003
CITY OF DESSERT HOT SPRING, COUNTY OF RIVERSIDE, CA.



SEE SHEET 2



APPLICANT / OWNER / DEVELOPER

OWNER:
GREEN DAY VILLAGE DHS LLC

DEVELOPER:
LA WORLD CONSTRUCTION
2029 CENTURY PARK EAST #400
CENTURY CITY, CA 90067

BENCH MARK

ELEV = 250.607 FEET, BM # 603.60 NGS NAVD88,
DESERT HOT SPRINGS QUAD (1978)

BASIS OF BEARING

THE BASIS OF BEARING IS TAKEN AS THE CENTERLINE OF PALM DRIVE PER PARCEL MAP No. 26564, P.M 177-91-93, BEING N00°02'56"W

LEGAL DESCRIPTION

THE SOUTH HALF OF GOVERNMENT LOT 1 OF THE NW ¼ SECTION 18, T 3 S, R 5 E, SBBM COUNTY OF RIVERSIDE, STATE OF CALIFORNIA; EXCEPT EAST 55.00 FEET AS CONVEYED TO THE COUNTY OF RIVERSIDE BY DEED OF RECORDED APRIL 11, 1996, INSTRUMENT NO. 37515 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CA

UTILITY COMPANIES:

WATER/SEWER
MISSION SPRINGS WATER DISTRICT
PHONE (760) 329-6448

COUNTY ROADS
RIVERSIDE COUNTY TRANSPORTATION DEP.
PHONE (760) 863-8267

CITY STREETS
CITY OF DESERT HOT SPRINGS
PHONE (760) 329-6411

ELECTRICITY
EDISON INTERNATIONAL
PHONE (800) 655-4555

GAS
SOUTHERN CALIFORNIA GAS
PHONE (909) 335-7729

TELEPHONE
VERIZON
PHONE (760) 864-1715

CABLE TV
TIME WARNER CABLE
PHONE (760) 329-6436

FLOOD CONTROL
RIVERSIDE COUNTY FLOOD CONTROL
AND WATER CONSERVATION DISTRICT
PHONE (909) 955-1200

UNDERGROUND UTILITIES
UNDERGROUND SERVICE ALERT
PHONE (800) 227-2600

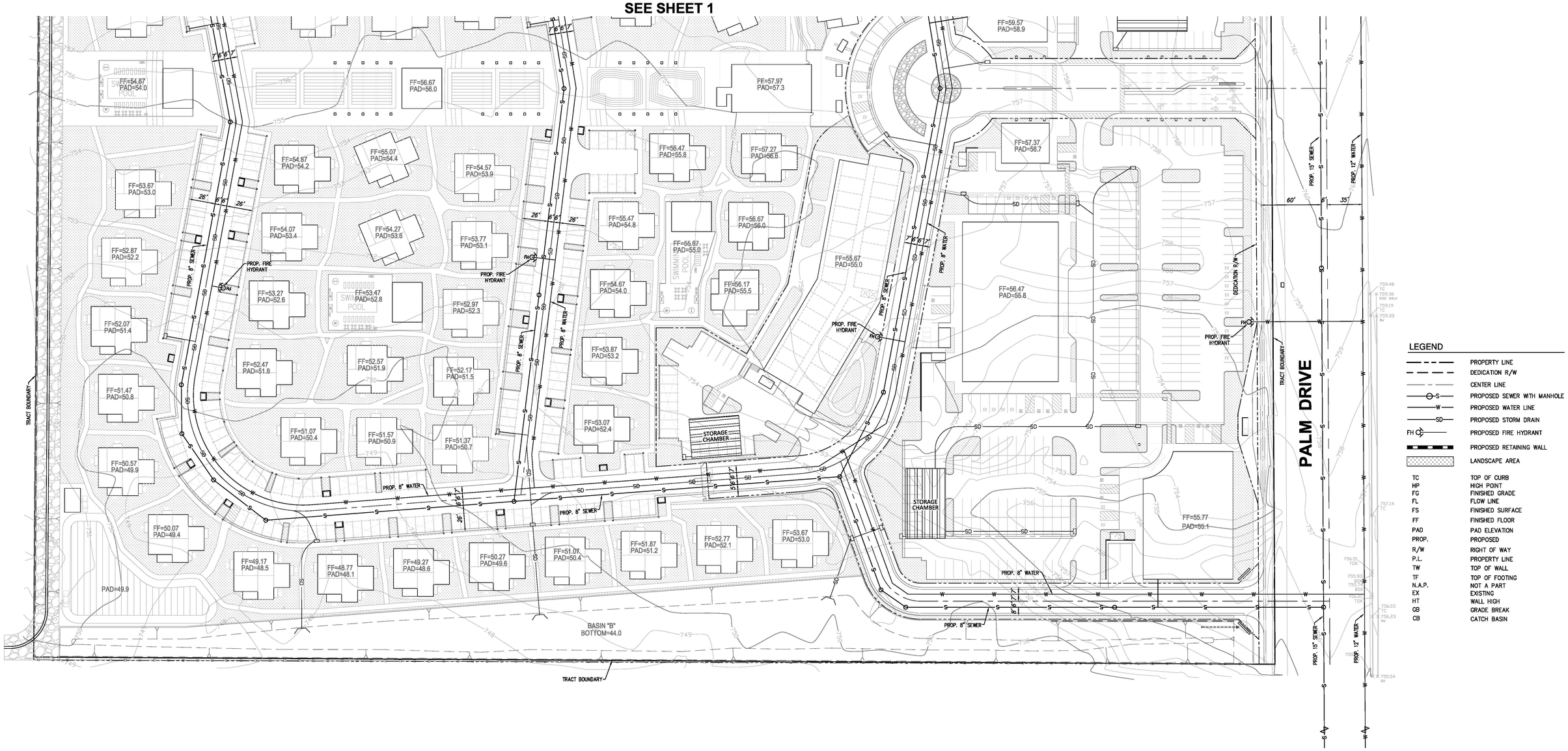
LEGEND

	PROPERTY LINE	TC	TOP OF CURB
	DEDICATION R/W	HP	HIGH POINT
	CENTER LINE	FG	FINISHED GRADE
S	PROPOSED SEWER WITH MANHOLE	FL	FLOW LINE
W	PROPOSED WATER LINE	FS	FINISHED SURFACE
SD	PROPOSED STORM DRAIN	FF	FINISHED FLOOR
		PAD	PAD ELEVATION
FH	PROPOSED FIRE HYDRANT	PROP.	PROPOSED
		R/W	RIGHT OF WAY
	PROPOSED RETAINING WALL	P.L.	PROPERTY LINE
		TW	TOP OF WALL
	LANDSCAPE AREA	TF	TOP OF FOOTING
		N.A.P.	NOT A PART
		EX	EXISTING
		HT	WALL HIGH
		GB	GRADE BREAK
		CB	CATCH BASIN

N

40 20 0 40 80
scale 1"= 40' feet

SEE SHEET 1



LEGEND

	PROPERTY LINE
	DEDICATION R/W
	CENTER LINE
S	PROPOSED SEWER WITH MANHOLE
W	PROPOSED WATER LINE
SD	PROPOSED STORM DRAIN
FH	PROPOSED FIRE HYDRANT
	PROPOSED RETAINING WALL
	LANDSCAPE AREA

TC	TOP OF CURB
HP	HIGH POINT
FG	FINISHED GRADE
FL	FLOW LINE
FS	FINISHED SURFACE
FF	FINISHED FLOOR
PAD	PAD ELEVATION
PROP.	PROPOSED
R/W	RIGHT OF WAY
P.L.	PROPERTY LINE
TW	TOP OF WALL
TF	TOP OF FOOTING
N.A.P.	NOT A PART
EX	EXISTING
HT	WALL HIGH
GB	GRADE BREAK
CB	CATCH BASIN

N

40 20 0 40 80
scale 1"= 40' feet

APPENDIX C

FIELD DATA SHEETS

Green Day survey 3-5-22 Notes, Michael Tuma

Start time: 0910

Start temp: 58 degrees F

Start wind: 4-30 MPH

Start cloud cover: 15 (clouds over San Gorgonio Pass)

End time: 1200

End temp: 64 degrees F

End wind: 2-25 MPH

End cloud cover: 20 (clouds over San Gorgonio Pass and Little San Bernardino, San Jacinto Mountains)

Soils

Deep, sandy alluvium and aeolian dunes over most of project site

Loamy to clayey in drainages and sinks

Veg communities

Creosote-bursage scrub over most of project site and within 500 feet

Cheesebush wash shrubland in wash. Native shrubs include *Atriplex*, *Baccharis*, *Peritoma*; non-native plants dominated by Sahara mustard thickets, London rocket to a lesser extent.

Plants

Perennials

White bursage (*Ambrosia dumosa*)

Cheesebush (*Ambrosia salsola*)

Four-wing saltbush (*Atriplex canescens*)

Desert broom (*Baccharis sarothroides*)

Silver cholla (*Cylindropuntia echinocarpa*)

White ratany (*Krameria bicolor*)

Creosote bush (*Larrea tridentata*)

Jerusalem thorn (*Parkinsonia aculeata*)

Bladderpod (*Peritoma arborea*)

Dyebush (*Psorothamnus emoryi*)

Native annuals

Western ragweed (*Ambrosia psilostachya*)

Pale yellow sun cup (*Camissoniopsis pallida*)

Fremont pincushion (*Chaenactis fremontii*)

Brown-eyed primrose (*Chylismia claviformis*)

California croton (*Croton californicus*)

Rattlesnake weed (*Euphorbia albomarginata*)

Hairy desert sunflower (*Geraea canescens*)

Desert dandelion (*Malacothrix glabrata*)

Desert chicory (*Rafinesquia neomexicana*)

Wirelettuce (*Stephanomeria* sp.)

Hairy sand verbena (*Verbena villosa pubescens*)

Non-native annuals

Pigweed (*Amaranthus* sp.)

Sahara mustard (*Brassica tournefortii*)

Red brome (*Bromus rubens*)

Redstem filaree (*Erodium cicutarium*)

Farmer's foxtail (*Hordeum murinum*)

Mediterranean grass (*Schismus* sp.)

London rocket (*Sisymbrium irio*)

Wildlife

White-tailed antelope squirrel (*Ammospermophilus leucurus*; burrows)

Coyote (*Canis latrans*; scat)

House finch (*Carpodacus mexicanus*)

Turkey vulture (*Cathartes aura*)

Desert pocket mouse (*Chaetodipus penicillatus*; burrows)

Common raven (*Corvus corax*)

Funereal duskywing (*Erynnis funeralis*)

Merlin (*Falco columbarius*)

Barn swallow (*Hirundo rustica*)

Black-tailed jackrabbit (*Lepus californicus*; form, scat)

California ground squirrel (*Otospermophilus beecheyi*; burrow)

Cabbage white (*Pieris rapae*)

Yellow-rumped warbler (*Setophaga coronata*)

Northern rough-winged swallow (*Stelgidopteryx serripennis*)

Desert cottontail (*Sylvilagus audubonii*; tracks)

Painted lady (*Vanessa cardui*)

White-crowned sparrow (*Zonotrichia leucophrys*)

Wildlife within 500 ft (but not on project site)

Great egret (*Ardea alba*)

Red-tailed hawk (*Buteo jamaicensis*)

Rock dove (*Columba livia*)

American kestrel (*Falco sparverius*)

Threats

Road base washed into project site near road. Anthropogenic wash originates from road runoff?

Sahara mustard is widespread, forming thickets in drainage

Some wind-blown trash from road

Some off-road activity near road

Pet dogs

Single track driveway in use by neighbor

Two neighbors on adjacent parcels in single family homes with outbuildings and landscaping within 500 feet

APPENDIX D

SITE PHOTOGRAPHS

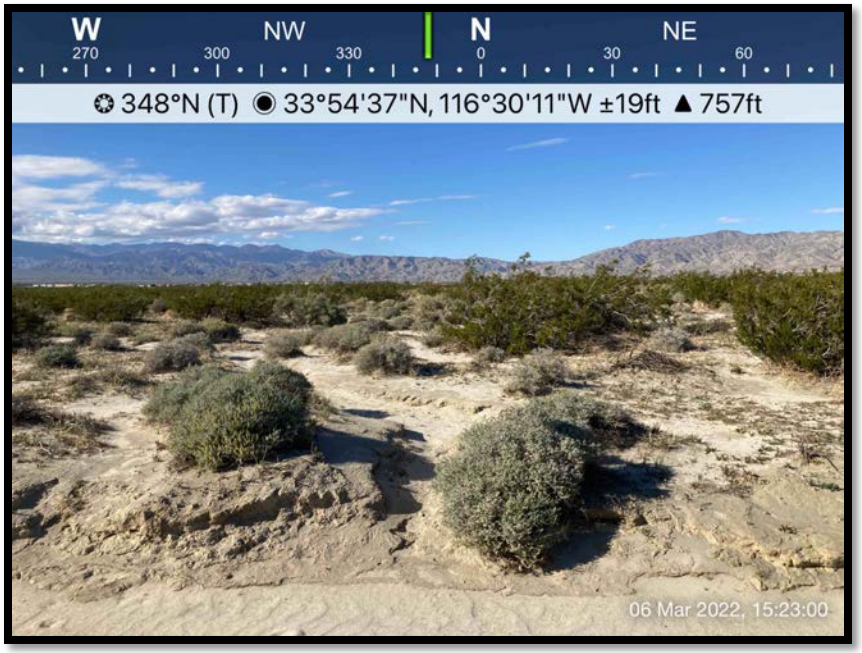


Photo 1: Northwest-facing overview photo taken from the southeastern segment of the project area. Date: March 6, 2022.

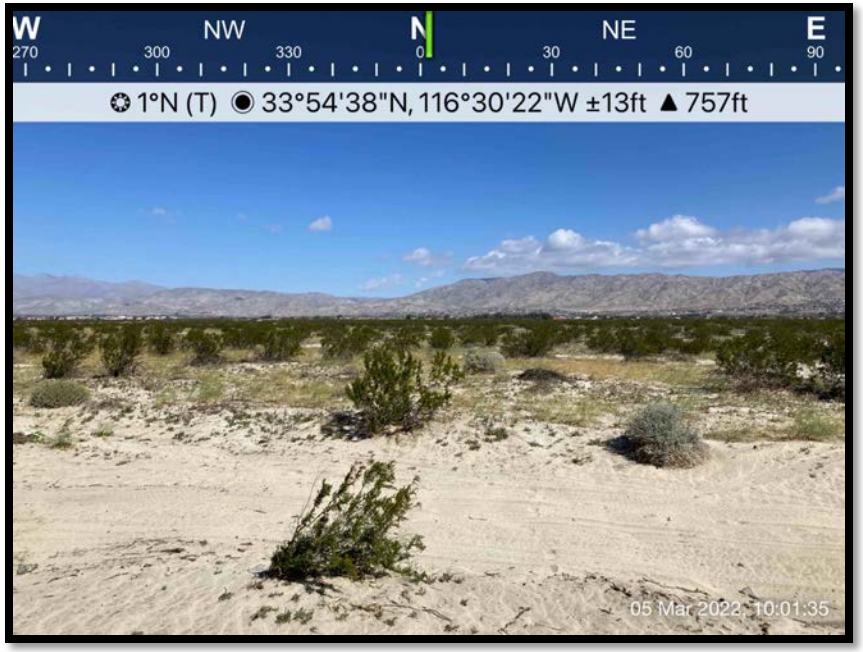


Photo 2:.North-facing photo taken from the southwestern segment of the project area. Date: March 5, 2022.



Photo 3: Northwest-facing photo taken from the northeastern segment of the project area. Date: May 27, 2022.

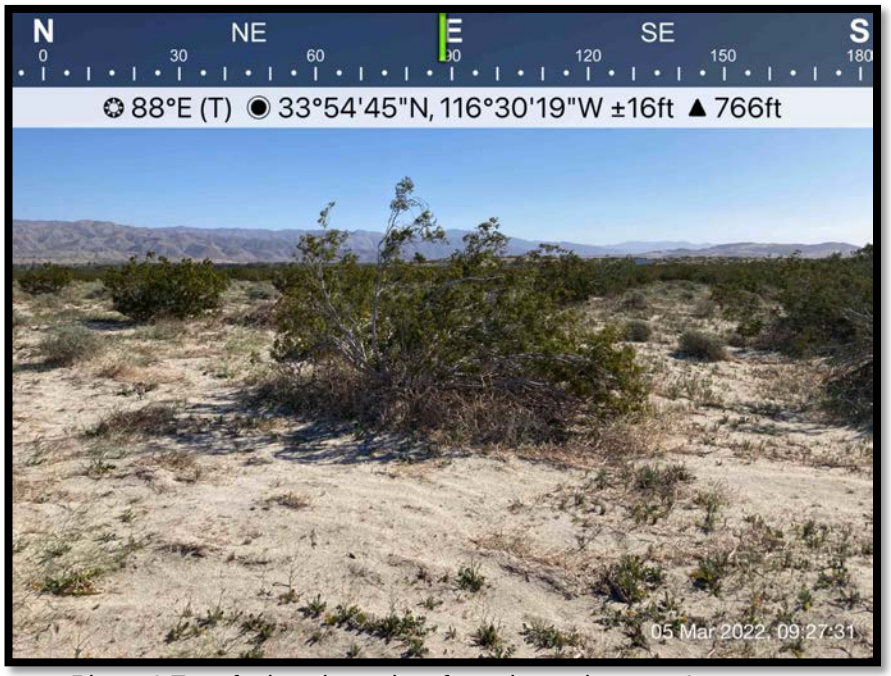


Photo 4:East-facing view taken from the project area's relative central point. Date: March 5, 2022.



Photo 5: West-facing view of the northern edge of the Stabilized desert dune located near the southeastern corner of the project area. Date: March 5, 2022.



Photo 6:.North-facing view from 20th Avenue of areas south of the BSA. Date: May 26, 2022.



Photo 7: North-facing view of areas in the northeastern segment of the BSA. Date: May 27, 2022. .



Photo 8: West-facing photo of Tamarisk thickets in the southwestern corner of the project site. Date: March 5, 2022.

APPENDIX E

SOILS REPORT

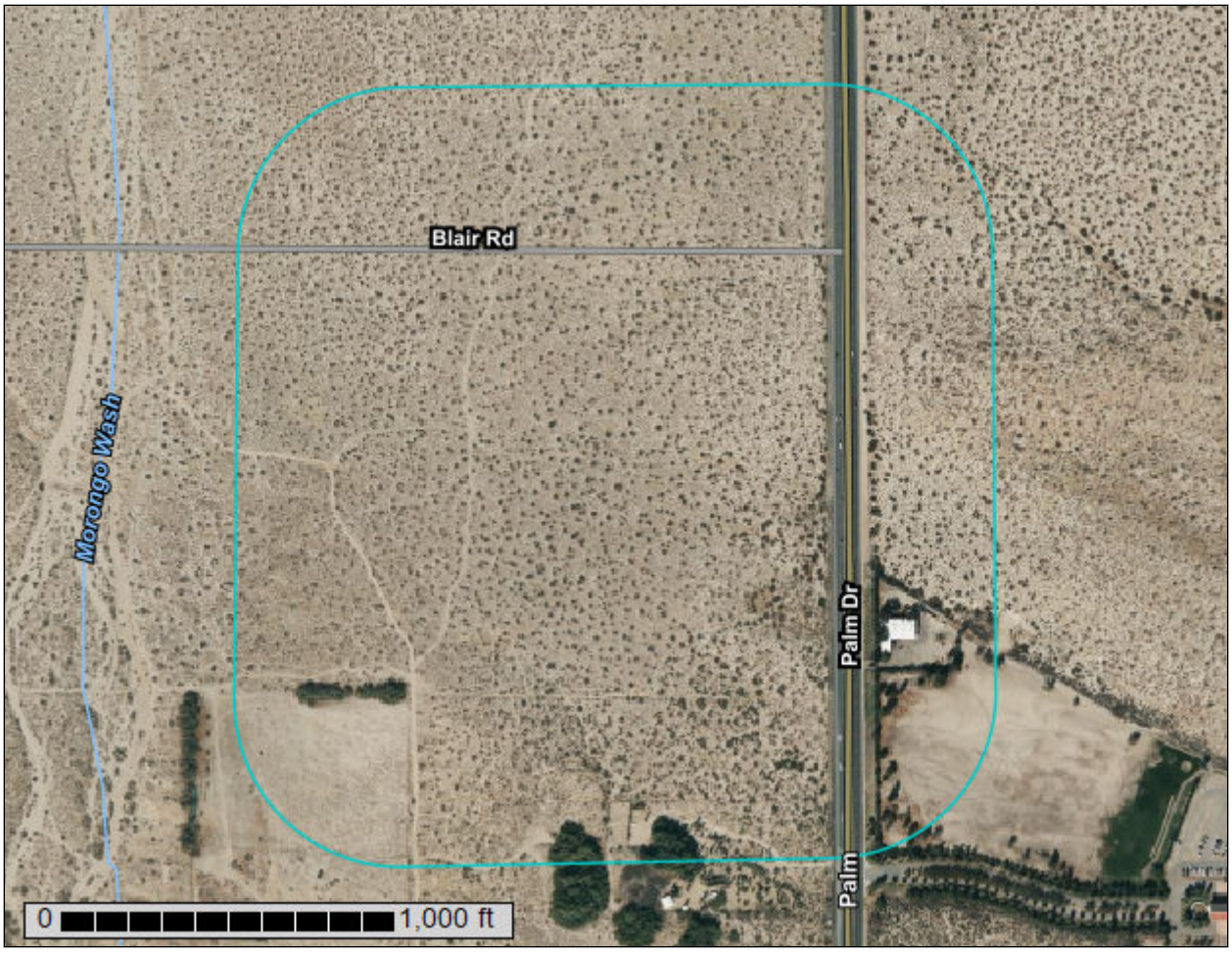
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Riverside County, Coachella Valley Area, California



February 23, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map (Biological Study Area).....9
Legend.....10
Map Unit Legend (Biological Study Area).....12
Map Unit Descriptions (Biological Study Area).....12
Riverside County, Coachella Valley Area, California.....14
MaB—Myoma fine sand, 0 to 5 percent slopes.....14
MaD—Myoma fine sand, 5 to 15 percent slopes.....15
Soil Information for All Uses.....17
Suitabilities and Limitations for Use.....17
Wildlife Management.....17
Desert Tortoise (CA).....17
Soil Properties and Qualities.....24
Soil Chemical Properties.....24
pH (1 to 1 Water).....24
Ecological Sites.....31
All Ecological Sites — 31
Map—Dominant Ecological Site.....32
Legend—Dominant Ecological Site.....33
Table—Ecological Sites by Map Unit Component.....35
References.....36
Glossary.....38

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

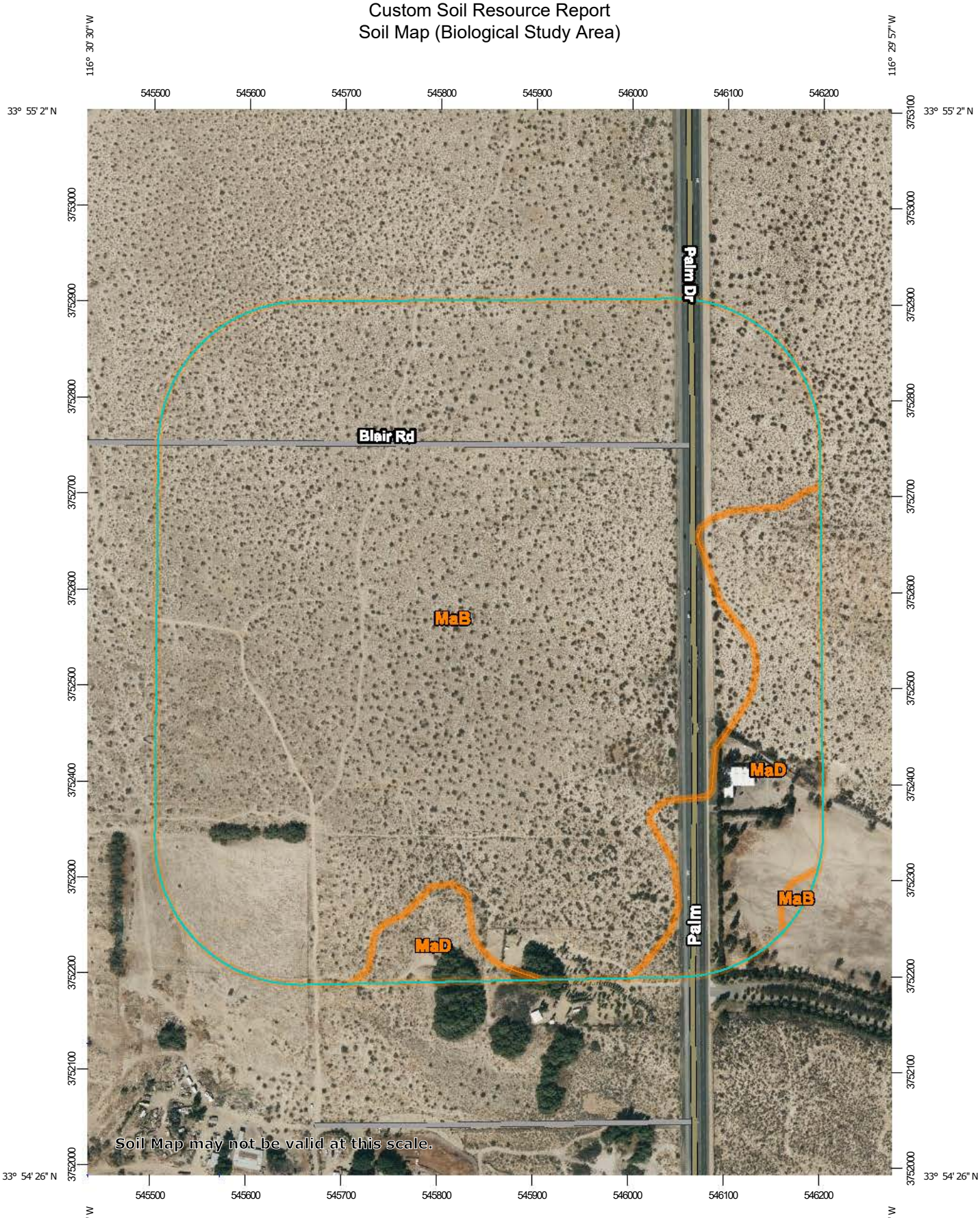
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map (Biological Study Area)



Map Scale: 1:5,420 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 13, Sep 15, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 3, 2021—May 27, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Biological Study Area)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MaB	Myoma fine sand, 0 to 5 percent slopes	101.2	86.2%
MaD	Myoma fine sand, 5 to 15 percent slopes	16.3	13.8%
Totals for Area of Interest		**117.5**	**100.0%**

Map Unit Descriptions (Biological Study Area)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Riverside County, Coachella Valley Area, California

MaB—Myoma fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hkw3
Elevation: -200 to 1,800 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 to 75 degrees F
Frost-free period: 270 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Myoma and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myoma

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind blown sandy alluvium

Typical profile

H1 - 0 to 18 inches: fine sand
H2 - 18 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R031XY007CA - Lacustrine Basin and Large RIver Floodplain
Hydric soil rating: No

Minor Components

Coachella

Percent of map unit: 4 percent

Hydric soil rating: No

Carsitas

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed, noncalcareous soils

Percent of map unit: 4 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Channels
Hydric soil rating: Yes

MaD—Myoma fine sand, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: hkw4
Elevation: -200 to 1,800 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 to 75 degrees F
Frost-free period: 270 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Myoma and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myoma

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind blown sandy alluvium

Typical profile

H1 - 0 to 18 inches: fine sand
H2 - 18 to 60 inches: sand

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R031XY007CA - Lacustrine Basin and Large RIver Floodplain
Hydric soil rating: No

Minor Components

Coachella

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed, calcareous soils

Percent of map unit: 5 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Channels
Hydric soil rating: Yes

Carsitas

Percent of map unit: 2 percent
Hydric soil rating: No

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Wildlife Management

Wildlife Management interpretations are tools for evaluating the suitability of the soil for various components of wildlife habitat, and as habitat of different types or species of wildlife. Example interpretations include crawfish aquaculture, burrowing animals and reptiles, grasses and legumes for food and cover, and freshwater wetland plants.

Desert Tortoise (CA)

This interpretation gives information about the soils as potential habitat for the desert tortoise. It is intended to be used only in those soil survey areas that have the potential for desert tortoise habitat. The soils are rated according to their suitability for burrowing by desert tortoises. Burrows are considered a necessary part of the habitat.

This interpretation is intended to provide guidelines in the identification and selection of sites that have the best potential for preserving, maintaining, or increasing local populations of the desert tortoise. It is of a general nature. It is designed to be used in the planning process to identify areas of concern prior to the application of conservation practices. Based upon the wildlife objectives, these areas can be avoided or practices can be adjusted to minimize damage to the burrow habitat. The guide does not take into account climate or soil temperature, which may influence the presence or distribution patterns of a wildlife species. The presence or absence of a species is determined at the local level.

The interpretation provides suitability ratings and identifies the dominant soil characteristics that influence the suitability of a site for burrowing by desert

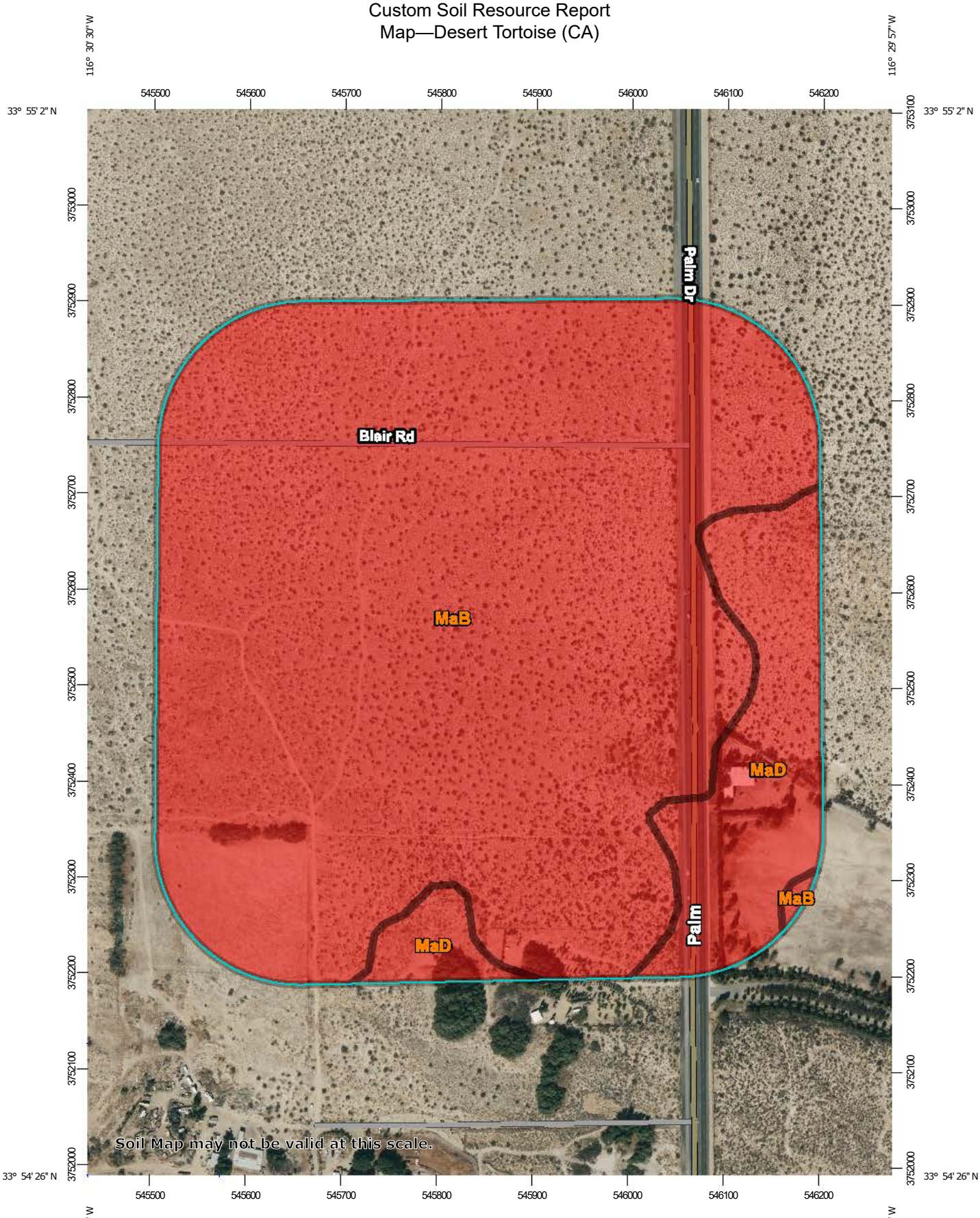
tortoises. This information allows the user to plan and develop alternatives in site selection by identifying the site that best meets the wildlife habitat requirements.

Soils that are rated "well suited" have no restrictions and are favorable for burrowing by desert tortoises. Colonization and population densities may be above average if other habitat factors are not limiting. A rating of "suited" indicates that the soil is suitable for burrowing by desert tortoises and that some restrictive features may limit the use of the habitat. Colonization and population densities may be average if the other habitat requirements are met. A rating of "poorly suited" indicates that the soil characteristics may limit establishment, maintenance, or use of the soil by burrowing species. Colonization and population densities may be restricted by the limiting factors even though all the other species habitat requirements are met.

The final identification and selection of a site for burrowing by desert tortoises are determined by the limitations of the soils that influence excavation, maintenance, and preservation of the burrows. This interpretation identifies the soil-related restricting features that have the most significant effects on the habitat.

The components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as the one shown for the map unit. The percent composition of each component in a particular map unit is given to help the user better understand the extent to which the rating applies to the map unit.

Other components with different ratings may occur in each map unit. The ratings for all components, regardless the aggregated rating of the map unit, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.



Map Scale: 1:5,420 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Poorly suited
- Suited
- Well suited
- Not rated or not available

Soil Rating Lines
- Poorly suited
- Suited
- Well suited
- Not rated or not available

Soil Rating Points
- Poorly suited
- Suited
- Well suited
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 13, Sep 15, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 3, 2021—May 27, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Tables—Desert Tortoise (CA)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
MaB	Myoma fine sand, 0 to 5 percent slopes	Poorly suited	Myoma (85%)	Sands in 0 to 30-inches depth (1.00)	101.2	86.2%
MaD	Myoma fine sand, 5 to 15 percent slopes	Poorly suited	Myoma (85%)	Sands in 0 to 30-inches depth (1.00)	16.3	13.8%
Totals for Area of Interest					**117.5**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Poorly suited	117.5	100.0%
Totals for Area of Interest	**117.5**	**100.0%**

Rating Options—Desert Tortoise (CA)

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

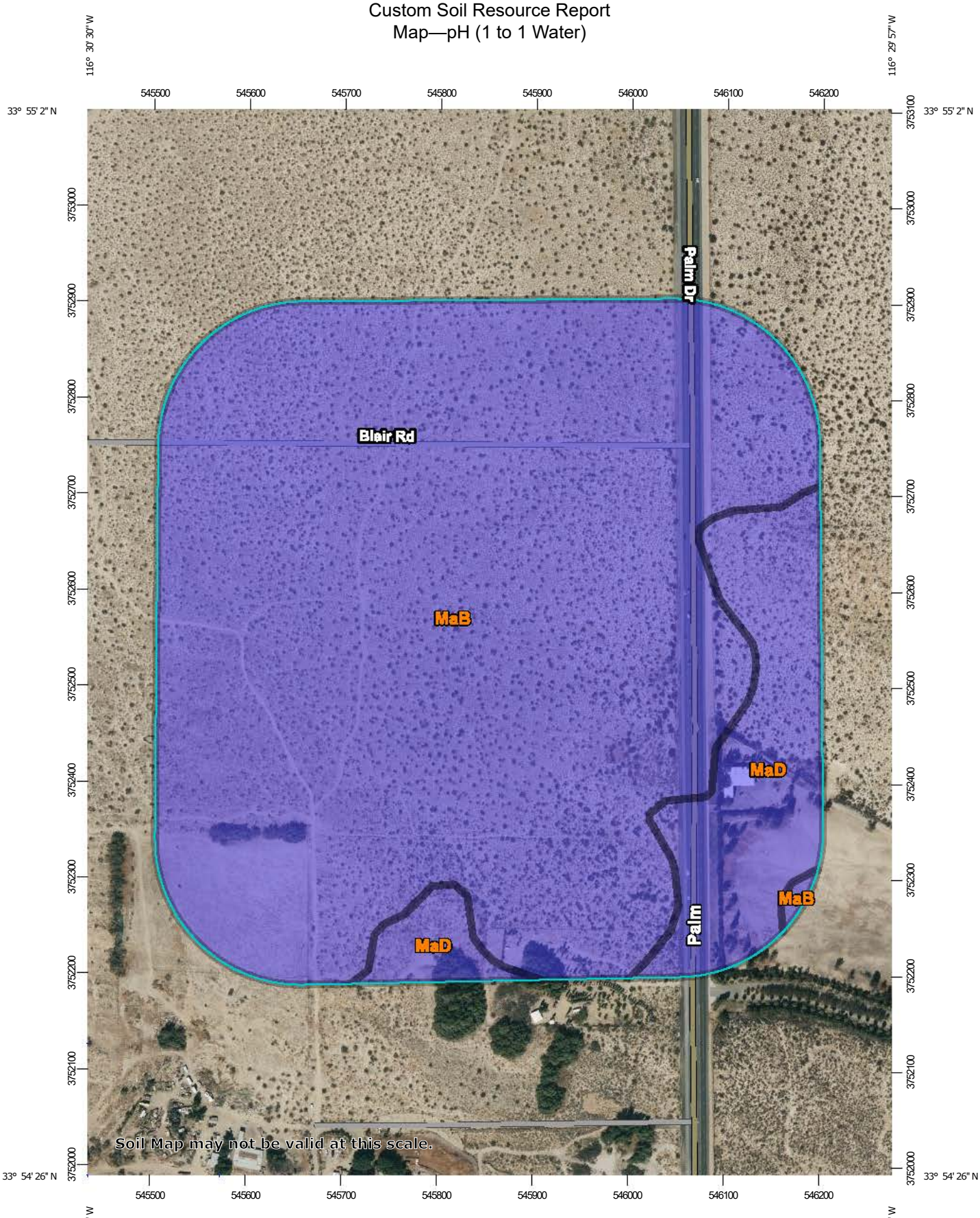
Soil Chemical Properties

Soil Chemical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil chemical properties include pH, cation exchange capacity, calcium carbonate, gypsum, and electrical conductivity.

pH (1 to 1 Water)

Soil reaction is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion. In general, soils that are either highly alkaline or highly acid are likely to be very corrosive to steel. The most common soil laboratory measurement of pH is the 1:1 water method. A crushed soil sample is mixed with an equal amount of water, and a measurement is made of the suspension.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.



Map Scale: 1:5,420 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- Ultra acid (ph < 3.5)
- Extremely acid (pH 3.5 - 4.4)
- Very strongly acid (pH 4.5 - 5.0)
- Strongly acid (pH 5.1 - 5.5)
- Moderately acid (pH 5.6 - 6.0)
- Slightly acid (pH 6.1 - 6.5)
- Neutral (pH 6.6 - 7.3)
- Slightly alkaline (pH 7.4 - 7.8)
- Moderately alkaline (pH 7.9 - 8.4)
- Strongly alkaline (pH 8.5 - 9.0)
- Very strongly alkaline (pH > 9.0)
- Not rated or not available

Soil Rating Lines

- Ultra acid (ph < 3.5)
- Extremely acid (pH 3.5 - 4.4)
- Very strongly acid (pH 4.5 - 5.0)
- Strongly acid (pH 5.1 - 5.5)
- Moderately acid (pH 5.6 - 6.0)
- Slightly acid (pH 6.1 - 6.5)
- Neutral (pH 6.6 - 7.3)
- Slightly alkaline (pH 7.4 - 7.8)
- Moderately alkaline (pH 7.9 - 8.4)
- Strongly alkaline (pH 8.5 - 9.0)
- Very strongly alkaline (pH > 9.0)
- Not rated or not available

Soil Rating Points

- Ultra acid (ph < 3.5)
- Extremely acid (pH 3.5 - 4.4)
- Very strongly acid (pH 4.5 - 5.0)
- Strongly acid (pH 5.1 - 5.5)
- Moderately acid (pH 5.6 - 6.0)
- Slightly acid (pH 6.1 - 6.5)
- Neutral (pH 6.6 - 7.3)
- Slightly alkaline (pH 7.4 - 7.8)
- Moderately alkaline (pH 7.9 - 8.4)
- Strongly alkaline (pH 8.5 - 9.0)
- Very strongly alkaline (pH > 9.0)
- Not rated or not available

Water Features

- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 13, Sep 15, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 3, 2021—May 27, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—pH (1 to 1 Water)

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
MaB	Myoma fine sand, 0 to 5 percent slopes	8.5	101.2	86.2%
MaD	Myoma fine sand, 5 to 15 percent slopes	8.5	16.3	13.8%
Totals for Area of Interest			**117.5**	**100.0%**

Rating Options—pH (1 to 1 Water)

Aggregation Method: Dominant Component

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Component" returns the attribute value associated with the component with the highest percent composition in the map unit. If more than one component shares the highest percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher attribute value should be returned in the case of a percent composition tie. The result returned by this aggregation method may or may not represent the dominant condition throughout the map unit.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Interpret Nulls as Zero: No

This option indicates if a null value for a component should be converted to zero before aggregation occurs. This will be done only if a map unit has at least one component where this value is not null.

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

For an attribute of a soil horizon, a depth qualification must be specified. In most cases it is probably most appropriate to specify a fixed depth range, either in centimeters or inches. The Bottom Depth must be greater than the Top Depth, and the Top Depth can be greater than zero. The choice of "inches" or "centimeters" only applies to the depth of soil to be evaluated. It has no influence on the units of measure the data are presented in.

When "Surface Layer" is specified as the depth qualifier, only the surface layer or horizon is considered when deriving a value for a component, but keep in mind that the thickness of the surface layer varies from component to component.

When "All Layers" is specified as the depth qualifier, all layers recorded for a component are considered when deriving the value for that component.

Whenever more than one layer or horizon is considered when deriving a value for a component, and the attribute being aggregated is a numeric attribute, a weighted average value is returned, where the weighting factor is the layer or horizon thickness.

Top Depth: 1

Bottom Depth: 120

Units of Measure: Inches

Ecological Sites

Individual soil map unit components can be correlated to a particular ecological site. The Ecological Site Assessment section includes ecological site descriptions, plant growth curves, state and transition models, and selected National Plants database information.

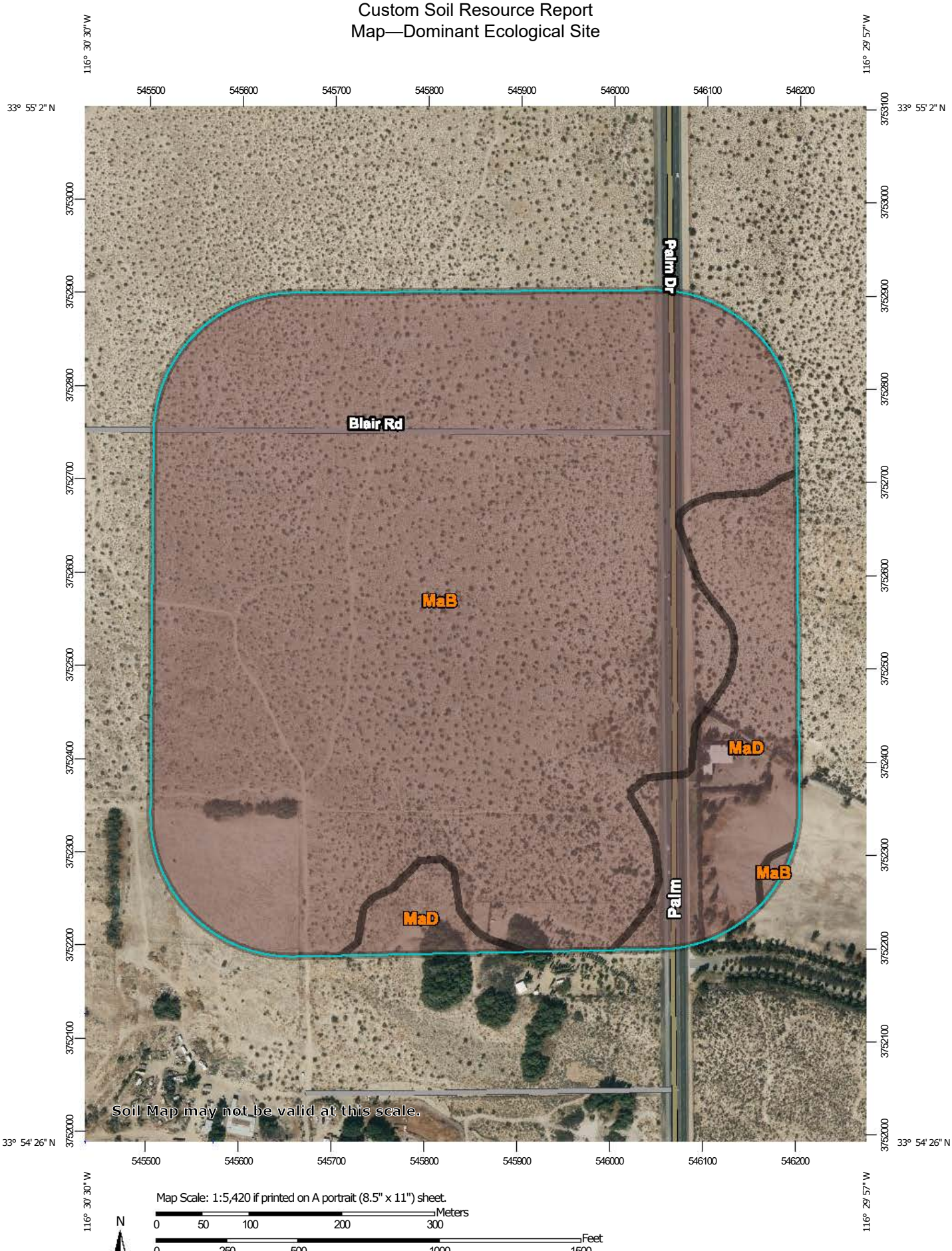
All Ecological Sites —

An "ecological site" is the product of all the environmental factors responsible for its development. It has characteristic soils that have developed over time; a characteristic hydrology, particularly infiltration and runoff, that has developed over time; and a characteristic plant community (kind and amount of vegetation). The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others and influences the development of the others. For example, the hydrology of the site is influenced by development of the soil and plant community. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production.

An ecological site name provides a general description of a particular ecological site. For example, "Loamy Upland" is the name of a rangeland ecological site. An "ecological site ID" is the symbol assigned to a particular ecological site.

The map identifies the dominant ecological site for each map unit, aggregated by dominant condition. Other ecological sites may occur within each map unit. Each map unit typically consists of one or more components (soils and/or miscellaneous areas). Each soil component is associated with an ecological site. Miscellaneous areas, such as rock outcrop, sand dunes, and badlands, have little or no soil material and support little or no vegetation and therefore are not linked to an ecological site. The table below the map lists all of the ecological sites for each map unit component in your area of interest.

Custom Soil Resource Report
Map—Dominant Ecological Site



Map Scale: 1:5,420 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

R031XY007CA

Not rated or not available

Soil Rating Lines

R031XY007CA

Not rated or not available

Soil Rating Points

R031XY007CA

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 13, Sep 15, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 3, 2021—May 27, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Table—Ecological Sites by Map Unit Component

Map unit symbol	Map unit name	Component name (percent)	Ecological site	Acres in AOI	Percent of AOI
MaB	Myoma fine sand, 0 to 5 percent slopes	Myoma (85%)	R031XY007CA — Lacustrine Basin and Large RIver Floodplain	101.2	86.2%
		Carsitas (4%)			
		Coachella (4%)			
		Unnamed, noncalcareous soils (4%)			
		Riverwash (3%)			
MaD	Myoma fine sand, 5 to 15 percent slopes	Myoma (85%)	R031XY007CA — Lacustrine Basin and Large RIver Floodplain	16.3	13.8%
		Coachella (5%)			
		Unnamed, calcareous soils (5%)			
		Riverwash (3%)			
		Carsitas (2%)			
Totals for Area of Interest				**117.5**	**100.0%**

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

Glossary

Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the following National Soil Survey Handbook link: “National Soil Survey Handbook.”

ABC soil

A soil having an A, a B, and a C horizon.

Ablation till

Loose, relatively permeable earthy material deposited during the downwasting of nearly static glacial ice, either contained within or accumulated on the surface of the glacier.

AC soil

A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

Aeration, soil

The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil

Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone

A semiconical type of alluvial fan having very steep slopes. It is higher, narrower, and steeper than a fan and is composed of coarser and thicker layers of material deposited by a combination of alluvial episodes and (to a much lesser degree) landslides (debris flow). The coarsest materials tend to be concentrated at the apex of the cone.

Alluvial fan

A low, outspread mass of loose materials and/or rock material, commonly with gentle slopes. It is shaped like an open fan or a segment of a cone. The material was deposited by a stream at the place where it issues from a narrow mountain valley or upland valley or where a tributary stream is near or at its junction with the main stream. The fan is steepest near its apex, which points upstream, and slopes gently and convexly outward (downstream) with a gradual decrease in gradient.

Alluvium

Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

Alpha,alpha-dipyridyl

A compound that when dissolved in ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction implies reducing conditions and the likely presence of redoximorphic features.

Animal unit month (AUM)

The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Aquic conditions

Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon

A subsoil horizon characterized by an accumulation of illuvial clay.

Arroyo

The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in unconsolidated material. It is usually dry but can be transformed into a temporary watercourse or short-lived torrent after heavy rain within the watershed.

Aspect

The direction toward which a slope faces. Also called slope aspect.

Association, soil

A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity)

The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low: 0 to 3
Low: 3 to 6
Moderate: 6 to 9
High: 9 to 12
Very high: More than 12

Backslope

The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Backswamp

A flood-plain landform. Extensive, marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces.

Badland

A landscape that is intricately dissected and characterized by a very fine drainage network with high drainage densities and short, steep slopes and narrow interfluves. Badlands develop on surfaces that have little or no vegetative cover overlying unconsolidated or poorly cemented materials (clays, silts, or sandstones) with, in some cases, soluble minerals, such as gypsum or halite.

Bajada

A broad, gently inclined alluvial piedmont slope extending from the base of a mountain range out into a basin and formed by the lateral coalescence of a series of alluvial fans. Typically, it has a broadly undulating transverse profile, parallel to the mountain front, resulting from the convexities of component fans. The term is generally restricted to constructional slopes of intermontane basins.

Basal area

The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation

The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope (geomorphology)

A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding plane

A planar or nearly planar bedding surface that visibly separates each successive layer of stratified sediment or rock (of the same or different lithology)

from the preceding or following layer; a plane of deposition. It commonly marks a change in the circumstances of deposition and may show a parting, a color difference, a change in particle size, or various combinations of these. The term is commonly applied to any bedding surface, even one that is conspicuously bent or deformed by folding.

Bedding system

A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock

The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography

A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

Bench terrace

A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum

Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout (map symbol)

A saucer-, cup-, or trough-shaped depression formed by wind erosion on a preexisting dune or other sand deposit, especially in an area of shifting sand or loose soil or where protective vegetation is disturbed or destroyed. The adjoining accumulation of sand derived from the depression, where recognizable, is commonly included. Blowouts are commonly small.

Borrow pit (map symbol)

An open excavation from which soil and underlying material have been removed, usually for construction purposes.

Bottom land

An informal term loosely applied to various portions of a flood plain.

Boulders

Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks

A landscape or tract of steep, rough or broken land dissected by ravines and gullies and marking a sudden change in topography.

Breast height

An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management

Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Butte

An isolated, generally flat-topped hill or mountain with relatively steep slopes and talus or precipitous cliffs and characterized by summit width that is less than the height of bounding escarpments; commonly topped by a caprock of resistant material and representing an erosion remnant carved from flat-lying rocks.

Cable yarding

A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil

A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche

A general term for a prominent zone of secondary carbonate accumulation in surficial materials in warm, subhumid to arid areas. Caliche is formed by both geologic and pedologic processes. Finely crystalline calcium carbonate forms a nearly continuous surface-coating and void-filling medium in geologic (parent) materials. Cementation ranges from weak in nonindurated forms to very strong in indurated forms. Other minerals (e.g., carbonates, silicate, and sulfate) may occur as accessory cements. Most petrocalcic horizons and some calcic horizons are caliche.

California bearing ratio (CBR)

The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy

The leafy crown of trees or shrubs. (See Crown.)

Canyon

A long, deep, narrow valley with high, precipitous walls in an area of high local relief.

Capillary water

Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena

A sequence, or “chain,” of soils on a landscape that formed in similar kinds of parent material and under similar climatic conditions but that have different characteristics as a result of differences in relief and drainage.

Cation

An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity

The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Catsteps

See Terracettes.

Cement rock

Shaly limestone used in the manufacture of cement.

Channery soil material

Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment

Control of unwanted vegetation through the use of chemicals.

Chiseling

Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Cirque

A steep-walled, semicircular or crescent-shaped, half-bowl-like recess or hollow, commonly situated at the head of a glaciated mountain valley or high on the side of a mountain. It was produced by the erosive activity of a mountain glacier. It commonly contains a small round lake (tarn).

Clay

As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay depletions

See Redoximorphic features.

Clay film

A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clay spot (map symbol)

A spot where the surface texture is silty clay or clay in areas where the surface layer of the soils in the surrounding map unit is sandy loam, loam, silt loam, or coarser.

Claypan

A dense, compact subsoil layer that contains much more clay than the overlying materials, from which it is separated by a sharply defined boundary. The layer restricts the downward movement of water through the soil. A claypan is commonly hard when dry and plastic and sticky when wet.

Climax plant community

The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil

Sand or loamy sand.

Cobble (or cobblestone)

A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material

Material that has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility)

See Linear extensibility.

Colluvium

Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (e.g., direct gravitational action) and by local, unconcentrated runoff.

Complex slope

Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil

A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions

See Redoximorphic features.

Conglomerate

A coarse grained, clastic sedimentary rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system

Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Conservation tillage

A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil

Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping

Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section

The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat)

A type of limnic layer composed predominantly of fecal material derived from aquatic animals.

Corrosion (geomorphology)

A process of erosion whereby rocks and soil are removed or worn away by natural chemical processes, especially by the solvent action of running water, but also by other reactions, such as hydrolysis, hydration, carbonation, and oxidation.

Corrosion (soil survey interpretations)

Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

Cover crop

A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management

Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system

Growing crops according to a planned system of rotation and management practices.

Cross-slope farming

Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown

The upper part of a tree or shrub, including the living branches and their foliage.

Cryoturbate

A mass of soil or other unconsolidated earthy material moved or disturbed by frost action. It is typically coarser than the underlying material.

Cuesta

An asymmetric ridge capped by resistant rock layers of slight or moderate dip (commonly less than 15 percent slopes); a type of homocline produced by differential erosion of interbedded resistant and weak rocks. A cuesta has a long, gentle slope on one side (dip slope) that roughly parallels the inclined beds; on the other side, it has a relatively short and steep or clifflike slope (scarp) that cuts through the tilted rocks.

Culmination of the mean annual increment (CMAI)

The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave

The walls of excavations tend to cave in or slough.

Decreasers

The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing

Postponing grazing or resting grazing land for a prescribed period.

Delta

A body of alluvium having a surface that is fan shaped and nearly flat; deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer

A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depression, closed (map symbol)

A shallow, saucer-shaped area that is slightly lower on the landscape than the surrounding area and that does not have a natural outlet for surface drainage.

Depth, soil

Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Desert pavement

A natural, residual concentration or layer of wind-polished, closely packed gravel, boulders, and other rock fragments mantling a desert surface. It forms where wind action and sheetwash have removed all smaller particles or where rock fragments have migrated upward through sediments to the surface. It typically protects the finer grained underlying material from further erosion.

Diatomaceous earth

A geologic deposit of fine, grayish siliceous material composed chiefly or entirely of the remains of diatoms.

Dip slope

A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

Diversion (or diversion terrace)

A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming

A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural)

Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface

Runoff, or surface flow of water, from an area.

Drainageway

A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at some time move concentrated water and either do not have a defined channel or have only a small defined channel.

Draw

A small stream valley that generally is shallower and more open than a ravine or gulch and that has a broader bottom. The present stream channel may appear inadequate to have cut the drainageway that it occupies.

Drift

A general term applied to all mineral material (clay, silt, sand, gravel, and boulders) transported by a glacier and deposited directly by or from the ice or transported by running water emanating from a glacier. Drift includes unstratified material (till) that forms moraines and stratified deposits that form outwash plains, eskers, kames, varves, and glaciofluvial sediments. The term is generally applied to Pleistocene glacial deposits in areas that no longer contain glaciers.

Drumlin

A low, smooth, elongated oval hill, mound, or ridge of compact till that has a core of bedrock or drift. It commonly has a blunt nose facing the direction from which the ice approached and a gentler slope tapering in the other direction. The longer axis is parallel to the general direction of glacier flow. Drumlins are products of streamline (laminar) flow of glaciers, which molded the subglacial floor through a combination of erosion and deposition.

Duff

A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune

A low mound, ridge, bank, or hill of loose, windblown granular material (generally sand), either barren and capable of movement from place to place or covered and stabilized with vegetation but retaining its characteristic shape.

Earthy fill

See Mine spoil.

Ecological site

An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

Eluviation

The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Endosaturation

A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian deposit

Sand-, silt-, or clay-sized clastic material transported and deposited primarily by wind, commonly in the form of a dune or a sheet of sand or loess.

Ephemeral stream

A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Episaturation

A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

Erosion

The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (accelerated)

Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion (geologic)

Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion pavement

A surficial lag concentration or layer of gravel and other rock fragments that remains on the soil surface after sheet or rill erosion or wind has removed the finer soil particles and that tends to protect the underlying soil from further erosion.

Erosion surface

A land surface shaped by the action of erosion, especially by running water.

Escarpment

A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Most commonly applied to cliffs produced by differential erosion. Synonym: scarp.

Escarpment, bedrock (map symbol)

A relatively continuous and steep slope or cliff, produced by erosion or faulting, that breaks the general continuity of more gently sloping land surfaces. Exposed material is hard or soft bedrock.

Escarpment, nonbedrock (map symbol)

A relatively continuous and steep slope or cliff, generally produced by erosion but in some places produced by faulting, that breaks the continuity of more gently sloping land surfaces. Exposed earthy material is nonsoil or very shallow soil.

Esker

A long, narrow, sinuous, steep-sided ridge of stratified sand and gravel deposited as the bed of a stream flowing in an ice tunnel within or below the ice (subglacial) or between ice walls on top of the ice of a wasting glacier and left

behind as high ground when the ice melted. Eskers range in length from less than a kilometer to more than 160 kilometers and in height from 3 to 30 meters.

Extrusive rock

Igneous rock derived from deep-seated molten matter (magma) deposited and cooled on the earth's surface.

Fallow

Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan remnant

A general term for landforms that are the remaining parts of older fan landforms, such as alluvial fans, that have been either dissected or partially buried.

Fertility, soil

The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat)

The least decomposed of all organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity

The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope

A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil

Sandy clay, silty clay, or clay.

Firebreak

An area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom

An obsolete, informal term loosely applied to the lowest flood-plain steps that are subject to regular flooding.

Flaggy soil material

Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.

Flagstone

A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain

The nearly level plain that borders a stream and is subject to flooding unless protected artificially.

Flood-plain landforms

A variety of constructional and erosional features produced by stream channel migration and flooding. Examples include backswamps, flood-plain splays, meanders, meander belts, meander scrolls, oxbow lakes, and natural levees.

Flood-plain splay

A fan-shaped deposit or other outspread deposit formed where an overloaded stream breaks through a levee (natural or artificial) and deposits its material (commonly coarse grained) on the flood plain.

Flood-plain step

An essentially flat, terrace-like alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface still actively modified by fluvial scour and/or deposition. May occur individually or as a series of steps.

Fluvial

Of or pertaining to rivers or streams; produced by stream or river action.

Foothills

A region of steeply sloping hills that fringes a mountain range or high-plateau escarpment. The hills have relief of as much as 1,000 feet (300 meters).

Footslope

The concave surface at the base of a hillslope. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

Forb

Any herbaceous plant not a grass or a sedge.

Forest cover

All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type

A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragipan

A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Genesis, soil

The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai

Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Glaciofluvial deposits

Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur in the form of outwash plains, valley trains, deltas, kames, eskers, and kame terraces.

Glaciolacustrine deposits

Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are bedded or laminated.

Gleyed soil

Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Graded stripcropping

Growing crops in strips that grade toward a protected waterway.

Grassed waterway

A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel

Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravel pit (map symbol)

An open excavation from which soil and underlying material have been removed and used, without crushing, as a source of sand or gravel.

Gravelly soil material

Material that has 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Gravelly spot (map symbol)

A spot where the surface layer has more than 35 percent, by volume, rock fragments that are mostly less than 3 inches in diameter in an area that has less than 15 percent rock fragments.

Green manure crop (agronomy)

A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water

Water filling all the unblocked pores of the material below the water table.

Gully (map symbol)

A small, steep-sided channel caused by erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage whereas a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock

Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to reclaim

Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Hardpan

A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head slope (geomorphology)

A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

Hemic soil material (mucky peat)

Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops

Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill

A generic term for an elevated area of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline. Slopes are generally more than 15 percent. The distinction between a hill and a mountain is arbitrary and may depend on local usage.

Hillslope

A generic term for the steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of a hill.

Horizon, soil

A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the “Soil Survey Manual.” The major horizons of mineral soil are as follows:

O horizon: An organic layer of fresh and decaying plant residue.

L horizon: A layer of organic and mineral limnic materials, including coprogenous earth (sedimentary peat), diatomaceous earth, and marl.

A horizon: The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon: The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon: The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon: The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon: Soft, consolidated bedrock beneath the soil.

R layer: Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

M layer: A root-limiting subsoil layer consisting of nearly continuous, horizontally oriented, human-manufactured materials.

W layer: A layer of water within or beneath the soil.

Humus

The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups

Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties include depth to a seasonal high water table, the infiltration rate, and depth to a layer that significantly restricts the downward movement of water. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock

Rock that was formed by cooling and solidification of magma and that has not been changed appreciably by weathering since its formation. Major varieties include plutonic and volcanic rock (e.g., andesite, basalt, and granite).

Illuviation

The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil

A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers

Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration

The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity

The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate

The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate

The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Very low: Less than 0.2
Low: 0.2 to 0.4
Moderately low: 0.4 to 0.75
Moderate: 0.75 to 1.25
Moderately high: 1.25 to 1.75
High: 1.75 to 2.5
Very high: More than 2.5

Interfluve

A landform composed of the relatively undissected upland or ridge between two adjacent valleys containing streams flowing in the same general direction. An elevated area between two drainageways that sheds water to those drainageways.

Interfluve (geomorphology)

A geomorphic component of hills consisting of the uppermost, comparatively level or gently sloping area of a hill; shoulders of backwearing hillslopes can narrow the upland or can merge, resulting in a strongly convex shape.

Intermittent stream

A stream, or reach of a stream, that does not flow year-round but that is commonly dry for 3 or more months out of 12 and whose channel is generally below the local water table. It flows only during wet periods or when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders

On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Iron depletions

See Redoximorphic features.

Irrigation

Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin: Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Border: Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Controlled flooding: Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation: Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle): Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow: Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler: Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation: Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding: Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame

A low mound, knob, hummock, or short irregular ridge composed of stratified sand and gravel deposited by a subglacial stream as a fan or delta at the margin of a melting glacier; by a supraglacial stream in a low place or hole on the surface of the glacier; or as a ponded deposit on the surface or at the margin of stagnant ice.

Karst (topography)

A kind of topography that formed in limestone, gypsum, or other soluble rocks by dissolution and that is characterized by closed depressions, sinkholes, caves, and underground drainage.

Knoll

A small, low, rounded hill rising above adjacent landforms.

Ksat

See Saturated hydraulic conductivity.

Lacustrine deposit

Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain

A nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lake terrace

A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Landfill (map symbol)

An area of accumulated waste products of human habitation, either above or below natural ground level.

Landslide

A general, encompassing term for most types of mass movement landforms and processes involving the downslope transport and outward deposition of soil and rock materials caused by gravitational forces; the movement may or may not involve saturated materials. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones

Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Lava flow (map symbol)

A solidified, commonly lobate body of rock formed through lateral, surface outpouring of molten lava from a vent or fissure.

Leaching

The removal of soluble material from soil or other material by percolating water.

Levee (map symbol)

An embankment that confines or controls water, especially one built along the banks of a river to prevent overflow onto lowlands.

Linear extensibility

Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^{1}/_{3}$- or $^{1}/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit

The moisture content at which the soil passes from a plastic to a liquid state.

Loam

Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess

Material transported and deposited by wind and consisting dominantly of silt-sized particles.

Low strength

The soil is not strong enough to support loads.

Low-residue crops

Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Marl

An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal proportions; formed primarily under freshwater lacustrine conditions but also formed in more saline environments.

Marsh or swamp (map symbol)

A water-saturated, very poorly drained area that is intermittently or permanently covered by water. Sedges, cattails, and rushes are the dominant vegetation in marshes, and trees or shrubs are the dominant vegetation in swamps. Not used in map units where the named soils are poorly drained or very poorly drained.

Mass movement

A generic term for the dislodgment and downslope transport of soil and rock material as a unit under direct gravitational stress.

Masses

See Redoximorphic features.

Meander belt

The zone within which migration of a meandering channel occurs; the flood-plain area included between two imaginary lines drawn tangential to the outer bends of active channel loops.

Meander scar

A crescent-shaped, concave or linear mark on the face of a bluff or valley wall, produced by the lateral erosion of a meandering stream that impinged upon and undercut the bluff.

Meander scroll

One of a series of long, parallel, close-fitting, crescent-shaped ridges and troughs formed along the inner bank of a stream meander as the channel migrated laterally down-valley and toward the outer bank.

Mechanical treatment

Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil

Very fine sandy loam, loam, silt loam, or silt.

Mesa

A broad, nearly flat topped and commonly isolated landmass bounded by steep slopes or precipitous cliffs and capped by layers of resistant, nearly horizontal rocky material. The summit width is characteristically greater than the height of the bounding escarpments.

Metamorphic rock

Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement at depth in the earth’s crust. Nearly all such rocks are crystalline.

Mine or quarry (map symbol)

An open excavation from which soil and underlying material have been removed and in which bedrock is exposed. Also denotes surface openings to underground mines.

Mine spoil

An accumulation of displaced earthy material, rock, or other waste material removed during mining or excavation. Also called earthy fill.

Mineral soil

Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage

Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area

A kind of map unit that has little or no natural soil and supports little or no vegetation.

Miscellaneous water (map symbol)

Small, constructed bodies of water that are used for industrial, sanitary, or mining applications and that contain water most of the year.

Moderately coarse textured soil

Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil

Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon

A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.

Moraine

In terms of glacial geology, a mound, ridge, or other topographically distinct accumulation of unsorted, unstratified drift, predominantly till, deposited primarily by the direct action of glacial ice in a variety of landforms. Also, a general term for a landform composed mainly of till (except for kame moraines, which are composed mainly of stratified outwash) that has been deposited by a glacier. Some types of moraines are disintegration, end, ground, kame, lateral, recessional, and terminal.

Morphology, soil

The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil

Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain

A generic term for an elevated area of the land surface, rising more than 1,000 feet (300 meters) above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can

occur as a single, isolated mass or in a group forming a chain or range. Mountains are formed primarily by tectonic activity and/or volcanic action but can also be formed by differential erosion.

Muck

Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mucky peat

See Hemic soil material.

Mudstone

A blocky or massive, fine grained sedimentary rock in which the proportions of clay and silt are approximately equal. Also, a general term for such material as clay, silt, claystone, siltstone, shale, and argillite and that should be used only when the amounts of clay and silt are not known or cannot be precisely identified.

Munsell notation

A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natric horizon

A special kind of argillic horizon that contains enough exchangeable sodium to have an adverse effect on the physical condition of the subsoil.

Neutral soil

A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules

See Redoximorphic features.

Nose slope (geomorphology)

A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent. Nose slopes consist dominantly of colluvium and slope-wash sediments (for example, slope alluvium).

Nutrient, plant

Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter

Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low: Less than 0.5 percent
Low: 0.5 to 1.0 percent
Moderately low: 1.0 to 2.0 percent
Moderate: 2.0 to 4.0 percent
High: 4.0 to 8.0 percent
Very high: More than 8.0 percent

Outwash

Stratified and sorted sediments (chiefly sand and gravel) removed or “washed out” from a glacier by meltwater streams and deposited in front of or beyond the end moraine or the margin of a glacier. The coarser material is deposited nearer to the ice.

Outwash plain

An extensive lowland area of coarse textured glaciofluvial material. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace

An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

Pan

A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material

The unconsolidated organic and mineral material in which soil forms.

Peat

Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped

An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedisediment

A layer of sediment, eroded from the shoulder and backslope of an erosional slope, that lies on and is being (or was) transported across a gently sloping erosional surface at the foot of a receding hill or mountain slope.

Pedon

The smallest volume that can be called “a soil.” A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation

The movement of water through the soil.

Perennial water (map symbol)

Small, natural or constructed lakes, ponds, or pits that contain water most of the year.

Permafrost

Ground, soil, or rock that remains at or below 0 degrees C for at least 2 years. It is defined on the basis of temperature and is not necessarily frozen.

pH value

A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil

A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

Piping

Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting

Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plastic limit

The moisture content at which a soil changes from semisolid to plastic.

Plasticity index

The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plateau (geomorphology)

A comparatively flat area of great extent and elevation; specifically, an extensive land region that is considerably elevated (more than 100 meters) above the adjacent lower lying terrain, is commonly limited on at least one side by an abrupt descent, and has a flat or nearly level surface. A comparatively large part of a plateau surface is near summit level.

Playa

The generally dry and nearly level lake plain that occupies the lowest parts of closed depressions, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff. Playa deposits are fine grained and may or may not have a high water table and saline conditions.

Plinthite

The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan

A compacted layer formed in the soil directly below the plowed layer.

Ponding

Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded

Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Pore linings

See Redoximorphic features.

Potential native plant community

See Climax plant community.

Potential rooting depth (effective rooting depth)

Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning

Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil

The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil

A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use

Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and

promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland

Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil

A measure of acidity or alkalinity of a soil, expressed as pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid: Less than 3.5
Extremely acid: 3.5 to 4.4
Very strongly acid: 4.5 to 5.0
Strongly acid: 5.1 to 5.5
Moderately acid: 5.6 to 6.0
Slightly acid: 6.1 to 6.5
Neutral: 6.6 to 7.3
Slightly alkaline: 7.4 to 7.8
Moderately alkaline: 7.9 to 8.4
Strongly alkaline: 8.5 to 9.0
Very strongly alkaline: 9.1 and higher

Red beds

Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redoximorphic concentrations

See Redoximorphic features.

Redoximorphic depletions

See Redoximorphic features.

Redoximorphic features

Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:
   A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*
   B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*
   C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.
2. Redoximorphic depletions.—These are zones of low chroma (chromas less than those in the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:
   A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*
   B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletans).
3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

Reduced matrix

See Redoximorphic features.

Regolith

All unconsolidated earth materials above the solid bedrock. It includes material weathered in place from all kinds of bedrock and alluvial, glacial, eolian, lacustrine, and pyroclastic deposits.

Relief

The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

Residuum (residual soil material)

Unconsolidated, weathered or partly weathered mineral material that accumulated as bedrock disintegrated in place.

Rill

A very small, steep-sided channel resulting from erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. A rill generally is not an obstacle to wheeled vehicles and is shallow enough to be smoothed over by ordinary tillage.

Riser

The vertical or steep side slope (e.g., escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.

Road cut

A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments

Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop (map symbol)

An exposure of bedrock at the surface of the earth. Not used where the named soils of the surrounding map unit are shallow over bedrock or where “Rock outcrop” is a named component of the map unit.

Root zone

The part of the soil that can be penetrated by plant roots.

Runoff

The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil

A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Saline spot (map symbol)

An area where the surface layer has an electrical conductivity of 8 mmhos/cm more than the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has an electrical conductivity of 2 mmhos/cm or less.

Sand

As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone

Sedimentary rock containing dominantly sand-sized particles.

Sandy spot (map symbol)

A spot where the surface layer is loamy fine sand or coarser in areas where the surface layer of the named soils in the surrounding map unit is very fine sandy loam or finer.

Sapric soil material (muck)

The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saturated hydraulic conductivity (Ksat)

The ease with which pores of a saturated soil transmit water. Formally, the proportionality coefficient that expresses the relationship of the rate of water movement to hydraulic gradient in Darcy's Law, a law that describes the rate of water movement through porous media. Commonly abbreviated as "Ksat." Terms describing saturated hydraulic conductivity are:

Very high: 100 or more micrometers per second (14.17 or more inches per hour)

High: 10 to 100 micrometers per second (1.417 to 14.17 inches per hour)

Moderately high: 1 to 10 micrometers per second (0.1417 inch to 1.417 inches per hour)

Moderately low: 0.1 to 1 micrometer per second (0.01417 to 0.1417 inch per hour)

Low: 0.01 to 0.1 micrometer per second (0.001417 to 0.01417 inch per hour)

Very low: Less than 0.01 micrometer per second (less than 0.001417 inch per hour).

To convert inches per hour to micrometers per second, multiply inches per hour by 7.0572. To convert micrometers per second to inches per hour, multiply micrometers per second by 0.1417.

Saturation

Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

Scarification

The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Sedimentary rock

A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the earth under normal low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

Sequum

A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil

A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Severely eroded spot (map symbol)

An area where, on the average, 75 percent or more of the original surface layer has been lost because of accelerated erosion. Not used in map units in which “severely eroded,” “very severely eroded,” or “gullied” is part of the map unit name.

Shale

Sedimentary rock that formed by the hardening of a deposit of clay, silty clay, or silty clay loam and that has a tendency to split into thin layers.

Sheet erosion

The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Short, steep slope (map symbol)

A narrow area of soil having slopes that are at least two slope classes steeper than the slope class of the surrounding map unit.

Shoulder

The convex, erosional surface near the top of a hillslope. A shoulder is a transition from summit to backslope.

Shrink-swell

The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Shrub-coppice dune

A small, streamlined dune that forms around brush and clump vegetation.

Side slope (geomorphology)

A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.

Silica

A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio

The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt

As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone

An indurated silt having the texture and composition of shale but lacking its fine lamination or fissility; a massive mudstone in which silt predominates over clay.

Similar soils

Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

Sinkhole (map symbol)

A closed, circular or elliptical depression, commonly funnel shaped, characterized by subsurface drainage and formed either by dissolution of the surface of underlying bedrock (e.g., limestone, gypsum, or salt) or by collapse of underlying caves within bedrock. Complexes of sinkholes in carbonate-rock terrain are the main components of karst topography.

Site index

A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides (pedogenic)

Grooved, striated, and/or glossy (shiny) slip faces on structural peds, such as wedges; produced by shrink-swell processes, most commonly in soils that have a high content of expansive clays.

Slide or slip (map symbol)

A prominent landform scar or ridge caused by fairly recent mass movement or descent of earthy material resulting from failure of earth or rock under shear stress along one or several surfaces.

Slope

The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope alluvium

Sediment gradually transported down the slopes of mountains or hills primarily by nonchannel alluvial processes (i.e., slope-wash processes) and characterized by particle sorting. Lateral particle sorting is evident on long slopes. In a profile sequence, sediments may be distinguished by differences in size and/or specific gravity of rock fragments and may be separated by stone lines. Burnished peds and sorting of rounded or subrounded pebbles or cobbles distinguish these materials from unsorted colluvial deposits.

Slow refill

The slow filling of ponds, resulting from restricted water transmission in the soil.

Slow water movement

Restricted downward movement of water through the soil. See Saturated hydraulic conductivity.

Sodic (alkali) soil

A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodic spot (map symbol)

An area where the surface layer has a sodium adsorption ratio that is at least 10 more than that of the surface layer of the named soils in the surrounding map unit. The surface layer of the surrounding soils has a sodium adsorption ratio of 5 or less.

Sodicity

The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium adsorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to $Ca^{++} + Mg^{++}$. The degrees of sodicity and their respective ratios are:

Slight: Less than 13:1
Moderate: 13-30:1
Strong: More than 30:1

Sodium adsorption ratio (SAR)

A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock

Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil

A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief and by the passage of time.

Soil separates

Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand: 2.0 to 1.0
Coarse sand: 1.0 to 0.5
Medium sand: 0.5 to 0.25
Fine sand: 0.25 to 0.10
Very fine sand: 0.10 to 0.05
Silt: 0.05 to 0.002
Clay: Less than 0.002

Solum

The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Spoil area (map symbol)

A pile of earthy materials, either smoothed or uneven, resulting from human activity.

Stone line

In a vertical cross section, a line formed by scattered fragments or a discrete layer of angular and subangular rock fragments (commonly a gravel- or cobble-sized lag concentration) that formerly was draped across a topographic surface and was later buried by additional sediments. A stone line generally caps material that was subject to weathering, soil formation, and erosion before burial. Many stone lines seem to be buried erosion pavements, originally formed by sheet and rill erosion across the land surface.

Stones

Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony

Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stony spot (map symbol)

A spot where 0.01 to 0.1 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surrounding soil has no surface stones.

Strath terrace

A type of stream terrace; formed as an erosional surface cut on bedrock and thinly mantled with stream deposits (alluvium).

Stream terrace

One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream; represents the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of fluvial erosion or deposition.

Stripcropping

Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion and water erosion.

Structure, soil

The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are:

Platy: Flat and laminated

Prismatic: Vertically elongated and having flat tops

Columnar: Vertically elongated and having rounded tops

Angular blocky: Having faces that intersect at sharp angles (planes)

Subangular blocky: Having subrounded and planar faces (no sharp angles)

Granular: Small structural units with curved or very irregular faces

Structureless soil horizons are defined as follows:

Single grained: Entirely noncoherent (each grain by itself), as in loose sand

Massive: Occurring as a coherent mass

Stubble mulch

Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil

Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling

Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum

The part of the soil below the solum.

Subsurface layer

Any surface soil horizon (A, E, AB, or EB) below the surface layer.

Summer fallow

The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Summit

The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

Surface layer

The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the “plow layer,” or the “Ap horizon.”

Surface soil

The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

Talus

Rock fragments of any size or shape (commonly coarse and angular) derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts

Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terminal moraine

An end moraine that marks the farthest advance of a glacier. It typically has the form of a massive arcuate or concentric ridge, or complex of ridges, and is underlain by till and other types of drift.

Terrace (conservation)

An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field

generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geomorphology)

A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

Terracettes

Small, irregular steplike forms on steep hillslopes, especially in pasture, formed by creep or erosion of surficial materials that may be induced or enhanced by trampling of livestock, such as sheep or cattle.

Texture, soil

The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying “coarse,” “fine,” or “very fine.”

Thin layer

Otherwise suitable soil material that is too thin for the specified use.

Till

Dominantly unsorted and nonstratified drift, generally unconsolidated and deposited directly by a glacier without subsequent reworking by meltwater, and consisting of a heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders; rock fragments of various lithologies are embedded within a finer matrix that can range from clay to sandy loam.

Till plain

An extensive area of level to gently undulating soils underlain predominantly by till and bounded at the distal end by subordinate recessional or end moraines.

Tilth, soil

The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope

The gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

Topsoil

The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements

Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread

The flat to gently sloping, topmost, laterally extensive slope of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural steplike landforms, such as successive stream terraces.

Tuff

A generic term for any consolidated or cemented deposit that is 50 percent or more volcanic ash.

Upland

An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Valley fill

The unconsolidated sediment deposited by any agent (water, wind, ice, or mass wasting) so as to fill or partly fill a valley.

Variegation

Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve

A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Very stony spot (map symbol)

A spot where 0.1 to 3.0 percent of the soil surface is covered by rock fragments that are more than 10 inches in diameter in areas where the surface of the surrounding soil is covered by less than 0.01 percent stones.

Water bars

Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering

All physical disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth's surface by atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered material.

Well graded

Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wet spot (map symbol)

A somewhat poorly drained to very poorly drained area that is at least two drainage classes wetter than the named soils in the surrounding map unit.

Wilting point (or permanent wilting point)

The moisture content of soil, on an ovendry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow

The uprooting and tipping over of trees by the wind.

APPENDIX F

SPECIAL-STATUS SPECIES POTENTIAL OCCURRENCE DETERMINATION

APPENDIX F
Special-Status Species Potential Occurrence Determination

Table 1, Potential Occurrence Determination of Special-Status Plants contains the plant inventory which is a complete listing of special-status plant species that was identified through the literature review. Table 1 also provides the results of the potential to occur analysis within the BSA.

Table 1
Potential Occurrence Determination of Special-Status Plants

Scientific Name (=Synonym)	Common Name (=Synonym)	Status	General Habitat Description in California	Plant Elevation Range (feet amsl)	BSA Contains Potential Suitable Habitats	BSA is Located Within the Plant Species' Known:		Potential for Occurrence in the BSA
						Elevation Range	General Distribution	
Listed Endangered, Threatened, Candidate and State Rare Plants: Plants with official status under the federal Endangered Species Act (ESA), the California Endangered Species Act (CESA), and/or the Native Plant Protection Act (NPPA). A species may have other sensitive designations in addition to their federal or state listing.								
Erigeron parishii	Parish's daisy (=Parish's fleabane)	FT, CRPR: 1B.1	Lifeform: perennial herb Habitats: Mojavean desert scrub, Joshua tree woodlands and pinyon and juniper woodlands Soils: whitish, strongly saline soils associated with pale limestone outcrops and dry washes Bloom Period: May to August	2,624 – 6,560	No	No	No	**No potential to occur.** The BSA does not contain suitable soils to support this species. Furthermore, this plant grows at an elevation range that is higher than the elevation range of the BSA.
Astragalus lentiginosus var. *coachellae*	Coachella Valley milkvetch	FE, CRPR: 1B.2, CVMSHCP: Covered	Lifeform: annual / perennial herb Habitats: strongly affiliated with sandy substrates, sandy substrates in low elevation Sonoran desert scrub (creosote bush scrub) Soils: dunes and sandy flats, along the disturbed margins of sandy washes, and in sandy soils along roadsides, in areas formerly occupied by undisturbed sand dunes Bloom Period: February to May	131 – 2,148	Yes	Yes	Yes	**Moderate potential to occu**r. There is critical habitat for this species located approximately one mile from the project site. There are also other areas designated as critical habitat within a 5-mile radius of the project site. The BSA contains sandy soil on a site that is relatively flat, creating a strongly suitable habitat to support this plant.
Astragalus tricarinatus	triple-ribbed milk-vetch	FE, CRPR: 1B.2, CVMSHCP: Covered	Lifeform: perennial herb Habitats: on hot, rocky slopes in canyons and along boulder strewn, dry, sandy desert washes with creosote and encelia species in Joshua tree woodlands Soils: sandy/gravelly soils in Sonoran desert scrub/creosote desert scrub Bloom Period: February to May	1,476 – 3,903	Yes	No	Yes	**Low potential to occur**. The BSA occurs within a sandy desert wash, however it lacks rocky slopes with the presence of boulders. The BSA is outside of the elevation range of this species. The BSA only offers low-quality habitat for this particular species.
Sensitive Plants: These plants have no official status under the ESA, the CESA, and/or the NPPA; however they are designated as sensitive or locally important by federal agencies, state agencies, and/or local conservation agencies and organizations.								
Selaginella eremophila	desert spike-moss (desert moss fern)	CRPR: 2B.2	Lifeform: perennial rhizomatous herb Habitats: sonoran desert, chaparral Soils: scrub on rocky and sandy slopes, in open rock or crevices or in gravelly soils Bloom Period: May to July	656 – 2,952	No	Yes	Yes	**No potential to occur.** The soils of the BSA are fine sand. This species grows in gravelly soils on slopes, neither of which are present in the BSA.
Ambrosia monogyra	singlewhorl burrobrush	CRPR: 2B.2	Lifeform: perennial shrub Habitats: chaparral and Sonoran desert scrub Soils: sandy soils, desert washes and ravines Bloom Period: August to November	33 – 1,640	Yes	Yes	Yes	**Low potential to occur.** The BSA does contain sandy soils which may provide suitable habitat to support this species.
Xylorhiza cognata (=Machaeranthera cognata)	Mecca-aster	CRPR: 1B.2, CVMSHCP: Covered	Lifeform: perennial herb Habitats: fluvial mud hills in washes and along lower slopes Soils: sandstone or rocky alkali/gypsum clays Wetlands, Drainages, or Seeps: Yes Bloom Period: January to June	66 – 1,312	No	Yes	Yes	**No potential to occur.** The BSA does not contain fluvial mud hills or gypsum clay soils. The soils in the BSA are not of the types that are preferred by this species.
Chamaesyce arizonica (=Euphorbia arizonica)	Arizona spurge	CRPR: 2B.3	Lifeform: perennial herb Habitats: Sonoran desert scrub Soils: sandy soils Bloom Period: March to April	164 – 984	Yes	Yes	Yes	**Low potential to occur.** The BSA does contain sandy soils, which could potentially provide suitable substrate for this plant. However, Calflora does not display observation sites within an approximate 13-mile radius of the project site.

Scientific Name (=Synonym)	Common Name (=Synonym)	Status	General Habitat Description in California	Plant Elevation Range (feet amsl)	BSA Contains Potential Suitable Habitats	BSA is Located Within the Plant Species' Known:		Potential for Occurrence in the BSA
						Elevation Range	General Distribution	
Chamaesyce platysperma (=Euphorbia platyspermum)	flat-seeded spurge	CRPR: 1B.2	Lifeform: annual herb Habitats: shifting desert dunes and also in Sonoran desert scrub Soils: sandy places Bloom Period: February to September	213 – 328	Yes	No	Yes	**Low potential to occur.** There is a reported occurrence data approximately 2.5 miles southwest of the BSA from a 1964 observation (Calflora, 2022). Although there is suitable habitat, the BSA is outside of this species elevation range (Jepson Flora Project, 2022).
Euphorbia misera	cliff spurge	CRPR: 2B.2	Lifeform: perennial shrub Habitats: Mojavean desert scrub, coastal bluff scrub, and coastal scrub Soils: rocky sites Bloom Period: December to October	33 – 1,640	No	Yes	Yes	**No potential to occur.** The BSA is not particularly rocky. It also does not contain coastal bluff scrub or coastal scrub which are suitable habitat types for this species.
Acmispon haydonii	pygmy lotus	CRPR: 1B.3	Lifeform: perennial herb Habitats: deserts in creosote-bush scrub and pinyon-juniper woodlands, particulaly in eastern San Diego County and Baja California Soils: sandy and/or rocky soils Bloom Period: January to June	1,675 - 2,690	Yes	No	Yes	**Low potential to occur.** There are no recent occurrences (<20 years) within 10 miles of the BSA. The BSA does contain sandy soils, potentially providing suitable habitat for this species. In addition, the project site is outside of this species known elevation range.
Salvia greatae	Orocopia sage (=lavender sage)	CRPR: 1B.3, CVMSHCP: Covered	Lifeform: perennial evergreen shrub Habitats: Mojavean desert scrub and Sonoran desert scrub Soils: gravelly or rocky soils, alluvial terraces and sandy or rocky benches Bloom Period: March to April	- 131 – 2,800	No	Yes	Yes	**No potential to occur.** The BSA does not contain gravelly rocky soils, nor does it contain rocky beaches. The nearest observation of this species to the project site occurs around the Salton Sea, approximately 40 miles from the project.
Abronia villosa var. *aurita*	chaparral sand-verbena	CRPR: 1B.1	Lifeform: annual herb Habitats: chaparral, coastal scrub, and desert dunes Soils: sandy soils Bloom Period: January to September	262 – 5,248	Yes	Yes	Yes	**Low potential to occur.** The BSA provides sandy soils that could create suitable habitat to support this species. There is a recent observation (<20 years) within 5 miles of the BSA (Calflora, 2022). Although there is no chaparral or coastal scrub on the project site, there is a partially stabilized dune on the project site that could provide suitable habitat. Moreover, hairy sand verbena, a congeneric species that also occurs in sandy soils, was observed on the project site**.**
Penstemon pseudospectabilis ssp. *pseudospectabilis*	desert beardtongue	CRPR: 2B.2	Lifeform: perennial herb Habitats: creosote bush scrub and juniper/pinyon woodlands Soils: sandy, gravelly or rocky desert washes Wetlands, Drainages, or Seeps: Yes Bloom Period: January to May	262 – 6,347	Yes	No	No	**No potential to occur.** While the BSA does contain sandy soils, the geographic range of this species is not consistent with the BSA, as this species is typically observed in Inyo and Kern Counties**.**
Stemodia durantifolia	purple stemodia	CRPR: 2B.1	Lifeform: perennial herb Habitats: Sonoran desert scrub (often mesic) Soils: sandy Bloom Period: (Jan) April, June to December	590 - 984	Yes	Yes	Yes	**Low potential to occur.** The BSA contains sandy soils, however this species is considered extirpated from Riverside County (CNPS, 2022a).
Eriastrum harwoodii	Harwood's woollystar (=Harwood eriastrum and =Harwood phlox)	CRPR: 1B.2	Lifeform: annual herb Habitats: desert dunes; sand dunes in creosote bush scrub Bloom Period: March to June	410 – 3,001	Yes	Yes	Yes	**Low potential to occur.** There are no recent occurrences (<20 years) reported in CNDDB (CNDDB, 2022a). The BSA does contains partially stabilized sand dunes, which may create suitable habitat for this species.
Linanthus jaegeri (=Leptodactylon jaegeri)	San Jacinto linanthus (=San Jacinto prickly phlox)	CRPR: 1B.2	Lifeform: perennial herb Habitats: subalpine coniferous forests and upper montane coniferous forests Soils: rocky granitic outcrops and sheer Bloom Period: July to September	7,200 – 10,004	No	No	No	**No potential to occur.** The BSA does not contain subalpine or upper montane coniferous forests. The soils of the BSA are not rocky granitic soils and therefore would be unsuitable to support this species.

Scientific Name (=Synonym)	Common Name (=Synonym)	Status	General Habitat Description in California	Plant Elevation Range (feet amsl)	BSA Contains Potential Suitable Habitats	BSA is Located Within the Plant Species' Known:		Potential for Occurrence in the BSA
						Elevation Range	General Distribution	
Linanthus maculatus (Parish) Milliken ssp. *maculatus (=Gilia maculata)*	Little San Bernardino Mountains linanthus (=Little San Bernardino Mountains gilia)	CRPR: 1B.2, CVMSHCP: Covered	Lifeform: annual herb Habitats: desert dunes, Joshua tree woodlands, Mojavean desert scrub and Sonoran desert scrub Soils/Micro-habitats: sandy, sandy washes, flats Wetlands, Drainages, or Seeps: Yes Bloom Period: March to May	460 - 4,005	Yes	Yes	Yes	**Low potential to occur.** There are recent occurrences (<20 years) within a 3-mile radius of the BSA. The BSA contains suitable habitat such as Mojavean desert scrub with sandy soils and a sandy wash.
Saltugilia latimeri (=Gilia latimeri)	Latimer's woodlands-gilia	CRPR: 1B.2	Lifeform: annual herb Habitats: chaparral, Mojavean desert scrub, and pinyon and juniper woodlands Soils: coarse sandy to rocky soils, often granitic, alluvial soils Bloom Period: March to June	1,312 – 6,232	No	No	No	**No potential to occur.** The BSA does not contain coarse sandy to rocky soils and does not contain pinyon juniper woodlands, which would create a suitable habitat for this species.
Chorizanthe parryi var. *parryi*	Parry's spineflower	CRPR: 1B.1	Lifeform: annual herb Habitats: coastal scrub, chaparral, cismontane woodlands, and valley and foothill grasslands Soils: sandy or rocky soils Bloom Period: April to June	902 – 4,002	No	Yes	No	**No potential to occur.** The BSA does not contain grasslands, coastal scrub, chaparral, or cismontane woodlands; all of which are preferred habitats for this species.
Chorizanthe xanti var. *leucotheca*	white-bracted spineflower	CRPR: 1B.2	Lifeform: annual herb Habitats: coastal scrub (alluvial fans), Mojavean desert scrub, and pinyon and juniper woodlands Soils: sandy or gravelly substrates Bloom Period: April to June	984 – 3,936	Yes	Yes	No	**Low potential to occur.** The BSA contains Mojavean desert scrub and sandy soils, which is suitable habitat for this species However, there are no observations in the CNDDB database within a 4-mile radius of the BSA and the BSA is outside of the elevation range of this species.
Nemacaulis denudata var. *gracilis*	slender cottonheads (=slender woolly-heads)	CRPR: 2B.2	Lifeform: annual herb Habitats: dunes or sand of desert dunes, Sonoran desert scrub, and coastal dunes, desert or rarely coastal beaches Bloom Period: March to May	164 – 1,312	Yes	Yes	Yes	**Low potential to occur.** The BSA contains partially stabilized dunes that could create a suitable habitat for this species.
Heuchera hirsutissima	shaggy-haired alumroot	CRPR: 1B.3	Lifeform: perennial rhizomatous herb Habitats: subalpine coniferous forests and upper montane coniferous forests often near large rocks Bloom Period: May to July	4,986 – 11,480	No	No	Yes	**No potential to occur.** The BSA does not occur within this plant's elevation range. In addition, the BSA lacks subalpine coniferous forests and upper montane coniferous forests. This species has been observed within 20 miles of the project site, but only at areas of significant elevation relative to the region.
Imperata brevifolia	California satintail	CRPR: 2B.1	Lifeform: perennial rhizomatous herb Habitats: mesic sites within chaparral, coastal scrub, Mojavean desert scrub, meadows and seeps (often alkali), and riparian scrub Wetlands, Drainages, or Seeps: Yes Bloom Period: September to May	0 – 3,985	No	Yes	Yes	**No potential to occur.** There are no recent observations of this species within a 2-mile radius of the BSA.
Legend and Notes								

Scientific Name (=Synonym)	Common Name (=Synonym)	Status	General Habitat Description in California	Plant Elevation Range (feet amsl)	BSA Contains Potential Suitable Habitats	BSA is Located Within the Plant Species' Known:		Potential for Occurrence in the BSA
						Elevation Range	General Distribution	

Federal Endangered Species Act (ESA) Listing Codes: the ESA is administered by the USFWS and NMFS. The USFWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NMFS are mainly marine wildlife such as whales and anadromous fish such as salmon. For the purposes of the ESA, Congress defined species to include subspecies, varieties, and, for vertebrates, distinct population segments. The official federal listing of Endangered and Threatened plants is published in 50 CFR § 17.12.

- **FE** = federally listed as endangered: any species of plant or animal that is in danger of extinction throughout all or a significant portion of their range.
- **FT** = federally listed as threatened: any species of plant or animal that is considered likely to become endangered throughout all or a significant portion of its range within the foreseeable future.
- **FC** = federal candidate for listing: candidate species are plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them for listing as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by higher priority listing actions to address species in greater need. A proposed regulation has not yet been published in the Federal Register for these species.
- **FPE** = federally proposed for listing as endangered: a candidate species that has been proposed by USFWS for listing as endangered and the proposed rule, but not a final rule, to list has been published in the Federal Register.
- **FPT** = federally proposed for listing as threatened: a candidate species that has been proposed by USFWS for listing as threatened and the proposed rule, but not a final rule, to list has been published in the Federal Register.
- **FPD** = federally proposed for delisting: a species that has been proposed by USFWS for delisting (or down listing from endangered to threatened) and the proposed rule to delist has been published in the Federal Register.

California Endangered Species Act (CESA) and California Native Plant Protection Act (NPPA) Listing Codes: *tth* e CESA and NPPA are administered by CDFW. The official listing of Plants of California Declared to Be Endangered, Threatened or Rare is contained in the California Code of Regulations, Title 14, § 670.2. Species, subspecies and varieties of California native plants are declared to be endangered, threatened as defined by § 2062 and § 2067 of the Fish and Game Code or rare as defined by § 1901 of the Fish and Game Code.

- **SE = state-listed as endangered**: "endangered species" means a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease (Fish and Game Code § 2062).
- **ST = state-listed as threatened:** "threatened species" means a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts (Fish and Game Code § 2067).
- **SCE = state candidate for listing as endangered**: a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the Fish and Game Commission has formally noticed published in the California Regulatory Notice Register as being under review by CDFW for addition to the list of endangered species, or a species for which the Fish and Game Commission has published a notice of proposed regulation to add the species to the list (Fish and Game Code § 2068).
- **SCT = state candidate for listing as threatened**: a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the Fish and Game Commission has formally noticed published in the California Regulatory Notice Register as being under review by CDFW for addition to the list of threatened species, or a species for which the Fish and Game Commission has published a notice of proposed regulation to add the species to the list (Fish and Game Code § 2068).

California Rare Plant Ranks (Formerly known as CNPS Lists): the CNPS is a statewide, nonprofit organization that maintains, with CDFW, an Inventory of Rare and Endangered Plants of California. In the spring of 2011, CNPS and CDFW officially changed the name "CNPS List" or "CNPS Ranks" to "California Rare Plant Rank" (or CPRP). This was done to reduce confusion over the fact that CNPS and CDFW jointly manage the Rare Plant Status Review Groups and the rank assignments are the product of a collaborative effort and not solely a CNPS assignment.

- **CRPR: 1A** = California Rare Plant Rank 1A - plants presumed extirpated in California and either rare or extinct elsewhere: the plants with a CRPA of 1A are presumed extirpated because they have not been seen or collected in the wild in California for many years. This rank includes plants that are both presumed extinct as well as those plants which are presumed extirpated in California. All of the plants constituting CRPR 1A meet the definitions of § 2062 and § 2067 (CESA) of the Fish and Game Code, and are eligible for state listing. Should these taxa be rediscovered, it is mandatory that they be fully considered during preparation of environmental documents relating to CEQA.
- **CRPR 1B** = California Rare Plant Rank 1B - plants rare, threatened, or endangered in California and elsewhere: plants with a CRPR of 1B are rare throughout their range with the majority of them endemic to California. Most of the plants that are ranked 1B have declined significantly over the last century. All of the plants constituting CRPR 1B meet the definitions of § 2062 and § 2067 (CESA) of the Fish and Game Code, and are eligible for state listing. It is mandatory that they be fully considered during preparation of environmental documents relating to CEQA.
- **CRPR 2A** = California Rare Plant Rank 2A - plants presumed extirpated in California, but more common elsewhere: the plant taxa of CRPR 2A are presumed extirpated because they have not been observed or documented in California for many years. This list includes only those plant taxa that are presumed extirpated in California, but more common elsewhere in their range. All of the plants on List 2A meet the definitions of § 2062 and § 2067 (CESA) of the Fish and Game Code, and are eligible for state listing. Should these taxa be rediscovered, it is mandatory that they be fully considered during preparation of environmental documents relating to CEQA.
- **CRPR 2B** = California Rare Plant Rank 2B - plants rare, threatened, or endangered in California, but more common elsewhere: except for being common beyond the boundaries of California, plants with a CRPR of 2B would have been ranked 1B. From the federal perspective, plants common in other states or countries are not eligible for consideration under the provisions of the ESA. All of the plants constituting CRPR 2B meet the definitions of § 2062 and § 2067 (CESA) of the Fish and Game Code, and are eligible for state listing. It is mandatory that they be fully considered during preparation of environmental documents relating to CEQA.
- **CRPR 3** = California Rare Plant Rank 3 - plants about which more information is needed - a review list: the plants that comprise CRPR 3 are united by one common theme – CNPS and CDFW lack the necessary information to assign them to one of the other ranks or to reject them. Nearly all of the plants constituting CRPR 3 are taxonomically problematic. Some of the plants constituting CRPR 3 meet the definitions of § 2062 and § 2067 (CESA) of the Fish and Game Code, and are eligible for state listing. CNPS strongly recommends that CRPR 3 plants be evaluated for consideration during preparation of environmental documents relating to CEQA.
- **CRPR 4** = California Rare Plant Rank 4 - plants of limited distribution - a watch list: the plants in this category are of limited distribution or infrequent throughout a broader area in California. While CNPS and CDFW cannot call these plants "rare" from a statewide perspective, they are uncommon enough that their status should be monitored regularly. Should the degree of endangerment or rarity of a CRPR 4 plant change, CNPS and CDFW will transfer it to a more appropriate rank. Some of the plants constituting CRPR 4 meet the definitions of § 2062 and § 2067 (CESA) of the Fish and Game Code, and few, if any, are eligible for state listing. Nevertheless, many of them are significant locally, and CNPS strongly recommends that CRPR 4 plants be evaluated for consideration during preparation of environmental documents relating to CEQA.
- **Considered But Rejected** = plants that have been considered for inclusion into the CNPS Inventory, but were not included for various reasons.

California Native Plant Society (CNPS) Threat Ranks: The CNPS Threat Rank is an extension added onto the California Rare Plant Rank (CRPR) (as a decimal code) and designates the level of threats by a 1 to 3 ranking with 1 being the most threatened and 3 being the least threatened. A Threat Rank is present for all CRPR 1B's, 2B's, 4's, and the majority of CRPR 3's. CRPR 4 plants are seldom assigned a Threat Rank of .1, as they generally have large enough populations to not have significant threats to their continued existence in California; however, certain conditions exist to make the plant a species of concern and hence be assigned a CRPR. In addition, all CRPR 1A and 2A (presumed extirpated in California), and some CRPR 3 (need more information) plants, which lack threat information, do not have a Threat Rank extension.

- **.1** = seriously threatened in California (over 80% of occurrences threatened / high degree and immediacy of threat)
- **.2** = moderately threatened in California (20-80% occurrences threatened / moderate degree and immediacy of threat)
- **.3** = not very threatened in California (<20% of occurrences threatened / low degree and immediacy of threat or no current threats known)

Scientific Name (=Synonym)	Common Name (=Synonym)	Status	General Habitat Description in California	Plant Elevation Range (feet amsl)	BSA Contains Potential Suitable Habitats	BSA is Located Within the Plant Species' Known:		Potential for Occurrence in the BSA
						Elevation Range	General Distribution	

Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community Conservation Plan (CVMSHCP):

The CVMSHCP provides regulatory coverage for a total of 27 individual species. Under the CVMSHCP, regulatory coverage means that future incidental take of these species would be permitted for new development and that no additional mitigation under the CESA or ESA would be required over the mitigation provided for by the plan.

- ***CVMSHCP: Covered:*** *species is identified as a "Covered Species" by the CVMSHCP and the Implementing Agreement. The CVMSHCP permits would provide take authorization for Covered Species.*

Notes:

The existing surface elevation at the subject property ranges from approximately 745 to 764 feet above mean sea level (amsl).
No potential to occur = represents species that were deemed to have no potential to occur in the project site and/or BSA.
Low potential to occur = represents species with a moderate potential to occur in the project site and/or BSA
Moderate potential to occur = represents species with a moderate potential to occur in the project site and/or BSA.
A CNPS elevation range is provided for each taxon in feet. The stated range is for the California portion of a plant's range only (if the taxon also occurs outside the state). These CNPS elevation range data are accumulated from literature, herbarium specimens, and field survey information.

Resources

- *The Jepson Desert Manual (Baldwin et al., 2002);*
- *The Jepson Manual: Vascular Plants of California, second edition (Baldwin et al., 2012);*
- *The Final Environmental Impact Report and Statement (Final EIR/S) for the West Mojave Plan (BLM, 2005);*
- *Final Environmental Impact Statement. Proposed Northern and Eastern Colorado Desert Coordinated Management Plan (NECO) (BLM and CDFG, 2002);*
- *(Calflora website);*
- *The Status of Rare, Threatened, and Endangered Plants and Animals of California, 2000–2004 (CDFG, 2005);*
- *CNDDB ;*
- *Special Vascular Plants, Bryophytes, and Lichens List (CDFW, 2016);*
- *State and Federally Listed Endangered, Threatened, and Rare Plants of California (CDFW, 2016);*
- *(CNPS website);*
- *(eFloras.org website);*
- *(NatureServe Explorer website);*
- *Rare Plants of San Diego County (Reiser, 2001);*
- *USDA Forest Service, Pacific Southwest Region, Sensitive Plant Species List by Forest (USFS, 2013).*
- *UltraSystems in-house records.*

APPENDIX F
Special-Status Species Potential Occurrence Determination

Table 2, Potential Occurrence Determination of Special-Status Wildlife contains the wildlife inventory which is a complete listing of special-status plant species that was identified through the literature review. Table 2 also provides the results of the potential to occur analysis within the BSA.

Table 2
Potential Occurrence Determination of Special-Status Wildlife

Scientific Name (=Synonym)	**Common Name (=Synonym)**	**Status**	**General Habitat Descriptions in California**	**The BSA:**		**Potential For Occurrence in the BSA**
				Located Within Species' Distribution and/or Elevation Range (if known)	**Contains Suitable Foraging, Roosting, and/or Breeding Habitats**	
Listed Endangered, Threatened, and Candidate Wildlife: Wildlife with official status under the federal Endangered Species Act (ESA) and/or the California Endangered Species Act (CESA). A species may have other sensitive designations in addition to their federal or state listing.						
Listed Invertebrates						
Dinacoma caseyi	Casey's June beetle	FE	Soils: carsitas gravelly sand series soils associated with alluvial fans, requires soil it can readily dig into, neither too dense (clayey) nor too rocky or cemented	Yes	No	**No** potential to occur. The BSA does not contain gravelly soils as they are fine sand.
Bombus crotchii	Crotch bumble bee	SCE	Habitats: grasslands and shrublands. Hotter and drier environment than other bumblebee species. Prefers milkweeds, dusty maidens, lupines, medics, phacelias, sages, clarkias, poppies, and wild buckwheats: This species occurs primarily in California, including the Mediterranean region, Pacific Coast, Western Desert, Great Valley, and adjacent foothills through most of southwestern California. It has also been documented in southwest Nevada, near the California border.	Yes	No	**Low** potential to occur. The BSA does not contain grasslands. It does contain some desert scrub but there are insufficient larval host plants, or food sources to support this bee. In addition, there are no recent (<15 years) CNDDB-recorded occurrences of this species within a 2-mile radius of the project site.
Danaus plexippus pop. 1	monarch butterfly	FC: California overwintering population	Habitats: wind-protected tree groves (eucalyptus [Eucalyptus sp.], Monterey pine [Pinus radiata], cypress), with nectar and water sources nearby	Yes	No	**No** potential to occur. The BSA does not occir within a protected grove and does not contain a diverse array of plant species that would provide this butterfly with nectar.
Listed Fish						
Cyprinodon macularius	desert pupfish	FE, SE, CVMSHCP: Covered	Habitats: isolated seeps, desert ponds, salty marshes, desert hot springs, streams, and saline pools, fish are found in still, soft bottomed pools less than 2 feet deep Characteristics: does not tolerate large numbers of introduced predatory or competing fishes	Yes	No	**No** potential to occur. The BSA does not contain suitable aquatic habitats to support this fish.
Listed Amphibians						
Rana muscosa	southern mountain yellow-legged frog	FE, SE, CDFW:WL,	Habitats: sunny riverbanks, meadow streams, isolated pools, lake borders, and rocky stream courses in the mountains of Southern California Characteristics: prefer open stream and lake margins that gently slope	No	No	**No** potential to occur. does not contain suitable aquatic breeding habitats within Ponderosa pine, montane hardwood-conifer, and montane riparian habitats to support this frog. This frog requires a permanent water source, which is not present in the BSA.
Listed Reptiles						
Gopherus agassizii	desert tortoise (=Mohave desert tortoise)	FT, ST, CVMSHCP: Covered	Habitats: desert scrub, creosote bush scrub, Mojave-saltscale scrub, desert wash, Joshua tree habitats and flat desert having sandy or gravelly soil, but occurs in almost every desert habitat except on the most precipitous slopes Characteristics: avoid plateaus, playas, sand dunes, steep slopes and areas with many obstacles to free movement	Yes	Yes	**Moderate** potential to occur. The project site contains friable soils and food sources within desert scrub habitats to support this species. The relatively level topography of the project site is consistent with the topography where this species occur. The project site is both within the range and within the predicted suitable habitat as modeled by CDFW (CDFW, 2020; CDFW, 2016); however, there are no CNDDB-recorded observations of this species within a 5-mile radius. It is possible that desert tortoise have been extirpated from this region of Desert Hot Springs.
Uma inornata	Coachella Valley fringe-toed lizard	FT, SE, CVMSHCP: Covered	Habitats: fine, windblown sand deposits in the sandy plains, sand hummocks, and mesquite dunes and it occurs wherever there are large patches of the appropriate substrate Characteristics: associated with sparse desert scrub, alkali scrub, and desert wash habitats	Yes	Yes	**Moderate** potential to occur. The BSA contains fine sandy soils in a desert flat with sparse vegetation, creating a suitable habitat to support this lizard. In addition, there are several CNDDB-recorded recent (<15 years) observations of this species at the project site and within the surrounding areas extending 2 miles.
Charina umbratica	southern rubber boa	ST	Habitats: moist oak-conifer and mixed-conifer coniferous forests and woodland habitats, large grassy fields or other open areas Characteristics: require loose, moist soil for burrowing, rock outcrops serve as hibernacula	Yes	No	**No** potential to occur. The BSA does not contain moist oak-conifer, woodland habitats, large grassy fields, or any other suitable habitat types to support this boa. The BSA is located in a region that is too arid for this species to occur. Based on occurrences and range data, this boa seems to prefer areas of higher elevation than that of the BSA.
Listed Birds						
Rallus obsoletus yumanensis (=Rallus longirostris yumanensis)	Yuma rail (=Yuma clapper rail)	FE, ST, fully protected, CVMSHCP: Covered	Habitats: freshwater marshes, areas of open water and drier upland habitat Characteristics: prefer mature stands along margins of shallow ponds with stable water levels	Yes	No	**No** potential to occur. The BSA does not contain suitable breeding freshwater marsh habitat and aquatic mudflat foraging habitats to support this species. There is insufficient vegetative cover to support this species. The nearest observation of this species (BIOS) to the BSA is near the Salton Sea, approximately 40 miles souteast of the BSA (Google Earth)
Empidonax traillii extimus	southwestern willow flycatcher	FE, SE, CVMSHCP: Covered Season of Concern: nesting	Habitats: dense riparian tree and shrub communities associated with rivers, swamps, and other wetlands, including lakes, surface water, saturated soil, or herbaceous wetland plants present during the early summer months; woody riparian vegetation is present	Yes	No	**No** potential to occur. The BSA does not contain suitable breeding and foraging dense riparian and aquatic habitats to support this species. The BSA is located in a region of arid climate, and does not contain the aquatic habitats. The SWFL arrives in spring usually in early May and in the fall, the adults depart mainly during the last half of August. Juveniles remain later in September, but all have departed by 1 October.
Vireo bellii pusillus	least Bell's vireo	FE, SE, CVMSHCP: Covered Season of Concern: nesting	Habitats: dry, intermittent streams, on the desert slopes mesquite (Prosopis sp.) and sandbar willow in canyon locations, willow-dominated riverine riparian habitats with well-developed overstories, understories, and low densities of aquatic and herbaceous cover	Yes	Yes	**Low** potential to occur. The BSA does not contain suitable desert riparian habitat to support this species, however adjacent areas may contain desert slopes, mesquite. Sandbar willow occurs in the vicinity of the project site, however it does not occur frequently. Occurrence of this species would likely be restricted to passage.
Polioptila californica californica	coastal California gnatcatcher	FT, SSC	Habitats: small, non-migratory, permanent resident of coastal sage scrub, small, non-migratory, permanent resident of coastal sage scrub	No	No	**No** potential to occur. The BSA does not contain suitable breeding and foraging coastal sage scrub habitats to support this species. In addition, the BSA is located outside of the geographic range of this species.
Listed Mammals						
Corynorhinus townsendii	Townsend's big-eared bat	SSC	Habitats: subalpine and alpine habitats, coastal conifer and broad-leaf forests, oak and conifer woodlands, arid grasslands and deserts, and high-elevation forests and meadows	Yes	No	**No** potential to occur. This bat is most likely to occur in areas of higher elevation than the BSA. In addition, the BSA lacks many of the preferred habitats of this bat, with the exception of desert.
Vulpes macrotis mutica	San Joaquin kit fox	FE, ST	Habitats: grasslands and other sparsely vegetated, shrubby habitats Soil: loose, friable soils, high clay content, on all soil	Yes	No	**No** potential to occur. The BSA does not contain suitable grasslands. While the site areas are sparsely vegetated, there is a lack of available den sites and quality shrubby habitat to support this species. This fox can utilize virtually all friable soil types, however the lack of clay components in the soils on the project site decrease the likelihood this fox would occur. Additionally, there are no CNDDB-recorded recent (<15 years) observations of this species within a 10-mile radius of the project.
Ovis canadensis nelsoni pop. 2 (=Ovis canadensis cremnobates)	Peninsular bighorn sheep (Distinct Population Segment)	FE, ST, fully protected	Habitats: desert mountains, arid, rocky, sparsely vegetated lands, steep walled canyons and ridges bisected by rocky or sandy washes	Yes	No	**No** potential to occur. While the BSA is located in a desert with sparse vegetative cover, it lacks the steep-walled canyons and ridges that are commonly utilized by this sheep.

Scientific Name (=Synonym)	**Common Name (=Synonym)**	**Status**	**General Habitat Descriptions in California**	**The BSA:**		**Potential For Occurrence in the BSA**
				Located Within Species' Distribution and/or Elevation Range (if known)	**Contains Suitable Foraging, Roosting, and/or Breeding Habitats**	
Sensitive Wildlife: These animals have no official status under the ESA and/or the CESA; however they are designated as sensitive or locally important by federal agencies, state agencies, and/or local conservation agencies and organizations						
Sensitive Invertebrates						
Parnopes borregoensis	Borrego parnopes cuckoo wasp	SA		Yes	Yes	**No** potential to occur. There are no recent observations of this species within a 2-mile radius of the projet site.
Macrobaenetes valgum	Coachella giant sand treader cricket	CVMSHCP: Covered	Habitats: active sand hummocks and dunes in the Coachella Valley, windblown environments is dominated by perennial shrubs including creosote bush (Larrea tridentata), burrobush, honey mesquite (Prosopis glandulosa var. torreyanna), Mormon tea, desert willow, and sandpaper bush	Yes	Yes	**Low** potential to occur. The soils of the project site are fine samdy. The area of the project does experience high winds and frequent winds, so the fine substrate can often be windblown.
Stenopelmatus cahuilaensis	Coachella Valley Jerusalem cricket	CVMSHCP: Covered	Habitats: sandy to somewhat gravelly sandy soils and have been called an obligate sand species, loose wind blown drift sands, dunes, and sand in vacant lots if native vegetation exists Characteristics: prefer cool, moist conditions	Yes	Yes	**Moderate** potential to occur. There are suitable substrates because the area of the project does experience high winds and frequent winds, so the fine substrate can often be windblown. However, the area of the project site is warmer and drier than areas where this species is known to occur in the western Coachella Valley. The project site also lacks a similar assemblage of native species associated with this species such as desert willow and Mormon tea. No individuals have been observed during previous surveys conducted in the Willow Hole Conservation Area.
Sensitive Reptiles						
Anniella stebbinsi	southern California legless lizard	SSC	Habitats: coastal sand dunes and a variety of interior habitats, including sandy washes and alluvial fans. Population occurs in Piute and Tehachapi mountains at elevation of 400-900 m in oak woodland and mixed conifer forest	No	No	**No** potential to occur. The project area is outside of the geographic range of this species and does not contain woodland or mixed conifer. . The project does not occur in a coastal dune geographic setting.
Phrynosoma mcallii	flat-tail horned lizard	SSC, CVMSHCP: Covered	Habitats: sand-dweller seen in areas with shifting sand substrate to forage, fine, wind-blown sand deposits and sparse vegetation in desert washes and desert flats and ants as its prey, desert scrub, wash, succulent shrub, and alkali scrub habitats	Yes	Yes	**Moderate** potential to occur. The BSA contains fine sandy soils in a desert flat with sparse vegetation, creating a suitable habitat to support this lizard. In addition, there are CNDDB-recorded recent (<15 years) observations of this species within a 2-mile radius of the project site.
Phrynosoma blainvillii (=Phrynosoma coronatum) (=Phrynosoma coronatum blainvillei)	Blainville's horned lizard (=coast horned lizard) (=San Diego horned lizard)	SSC	Habitats: wide variety of vegetation types including coastal sage scrub, annual grassland, chaparral, oak woodland, riparian woodland and coniferous forest, habitats are loose, fine soils with a high sand fraction; an abundance of native ants or other insects; and open areas with limited overstory for basking and low	Yes	Yes	**Low** potential to occur. This species occurs in fine, sandy soils. The project site area contains fine sandy soils however it lacks grassland, chaparral oak woodland, riparian woodland and coniferous forest. All of the abovementioned habitat types are suitable for this lizard. Therefore, there is only low-quality habitat available for this lizard due only to the fine, sandy nature of the on-site soils. This lizard could still occur because it may access suitable areas in the east adjacent Desert Dunes Golf Club, such as areas containing ornamental grasses and other vegetation as maintained by the Golf Club. This species may occur in the project area, but most likely for passage to other nearby suitable areas.
Crotalus ruber	red diamond rattlesnake	SSC	Habitats: desert, through dense chaparral in the foothills (it avoids the mountains above around 4,000 feet), to warm inland mesas and valleys, all the way to the cool ocean shore Characteristics: need rodent burrows, cracks in rocks or surface cover objects	Yes	Yes	**Moderate** potential to occur. There are no CNDDB-recorded recent (<15 years) observations of this species within a 2-mile radius of the project site. Small mammal burrows were observed onsite, which could serve as potential prey source.
Thamnophis hammondii	two-striped garter snake	SSC	Habitats: aquatic and it is rarely found far from water, permanent or semi-permanent bodies of freshwater and adjacent riparian habitat, oak woodlands, chaparral and coniferous forests on the coastal slopes of mountains and foothills to sea level	Yes	No	**No** potential to occur. The BSA does not contain suitable aquatic habitats, vegetation, or basking sites to support this snake.
Sensitive Birds						
Accipiter cooperii	Cooper's hawk	WL, Season of Concern: nesting	Habitats: broken woodland and habitat edges Characteristics: tolerant of human activities near the nest and is seen more often nesting in urban/residential areas	Yes	Yes	**Low** potential to occur. The BSA does not contain woodland. Cooper's unlikely to occur other than passage. The surrounding San Bernardino National Forest and San Jacinto/Santa Rosa Mountains have a high probability of providing suitable foraging + nesting. Coopers could frequently fly over Coachella Valley to access these woodlands and surrounding residential/developed communities that could also provide suitable areas. It is also possible that Cooper's hawk could utilize structures and trees located in the east adjacent Desert Dunes Golf Club, however would still most likely only occur in the BSA during passage to other nearby, more-suitable areas.
Aquila chrysaetos	golden eagle	fully protected, WL,, BCC, Season of Concern: nesting and wintering	Habitats: mountainous canyon land, rimrock terrain of open desert and grassland areas, open rolling foothills of grasslands, oak savannas, oak and juniper woodlands, chaparral, mountain areas, and desert, open habitats including grasslands, deserts, savannahs, and shrublands Characteristics: hilly or mountainous country, deeply cut canyons rising to open mountain slopes and crags are ideal habitat	Yes	Yes	**Low** potential to occur. This eagle has been previously observed in southern California desert regions, however the BSA lacks suitable grasslands, foothills, oak savannas, juniper woodlands, and chaparral to support this species. There are suitable habitats for this species
Athene cunicularia	burrowing owl	SSC, BCC, CVMSHCP: Covered Season of Concern: burrowing sites and some wintering sites	Habitats: open, dry, flat ground or low rolling hills with sparse vegetation and available burrows Characteristics: dig their own burrows in the soft banks of irrigation canals and ditches	Yes	No	**Moderate** potential to occur. The BSA lacks rolling hills and banks, however it does contain relatively flat ground with sparse vegetation. The BSA soils are friable, and could offer suitable habitat to support this owl. Furthermore, there are several CNDDB-recorded recent (<15 years) observations of this species within a 2-mile radius of the project site.
Cypseloides niger	black swift	SSC, BCC, Season of Concern: nesting	Habitats: small colonies in moist crevices or caves on sea cliffs above the surf, or on cliffs behind, or adjacent to, waterfalls in deep canyons Characteristics: lives where there are rocky cliffs available for its somewhat specialized nest site	No	No	**No** potential to occur. The BSA does not contain moist environments and does not does not contain suitable breeding rock habitats near aquatic sites to support this species.
Falco columbarius	merlin	WL, Season of Concern: nesting	Habitats: Alaska and Canada, Merlins winter in California from September to May , annual grasslands to open ponderosa pine and montane hardwood-conifer habitats, and coastlines, savannahs, woodlands, lakes, and wetlands Characteristics: dense tree stands may be used for cover and are frequently close to bodies of water	Yes	Yes	**Present** in the project site and other areas of the BSA.
Falco mexicanus	prairie falcon	WL, BCC, Season of Concern: nesting	Habitats: annual grasslands to alpine meadows on open, dry, level or hilly terrain, perennial grasslands, savannahs, rangeland, some agricultural fields, desert scrub areas and even marshland and ocean shores Characteristics: during the winter- reside in cultivated fields, lakeshores, desert scrub	Yes	Yes	**Moderate** potential to occur. Observations of this species have been previously recorded at the project site as well as the 2-mile surrounding radius. The BSA does contain suitable habitat for this falcon, as it is able to successfully adapt to a wide variety of habitats and settings.
Pyrocephalus rubinus	vermilion flycatcher	SSC Season of Concern: nesting	Habitats: cottonwood (Populus sp.), willow (Salix sp.), mesquite (Prosopis sp.), and other dense desert riparian trees in desert riparian habitat adjacent to irrigated fields, irrigation ditches, pastures and other open, mesic areas in isolated patches throughout central southern California	Yes	No	**No** potential to occur. The BSA is located in the desert, however it lacks adequate desert-riparian habitats to support this species. Furthermore, there are no CNDDB-recorded recent (<15 years) observations of this species within a 2-mile radius of the project site.
Myiarchus tyrannulus	brown-crested flycatcher	WL Season of Concern: nesting	Habitats: desert riparian habitat along the Colorado River Characteristics: require thickets, trees, snags, and shrubs	Yes	Yes	**No** potential to occur. The BSA does not contain dense riparian habitats to support this species. Furthermore, recorded observations of this species are primarily concentrated along the Colorado River.

Scientific Name (=Synonym)	**Common Name (=Synonym)**	**Status**	**General Habitat Descriptions in California**	**The BSA:**		**Potential For Occurrence in the BSA**
				Located Within Species' Distribution and/or Elevation Range (if known)	**Contains Suitable Foraging, Roosting, and/or Breeding Habitats**	
Lanius ludovicianus	loggerhead shrike	SSC, BCC, Season of Concern: nesting	Habitats: agricultural fields, pastures with fence rows, old orchards, savannas, prairies mowed roadsides, cemeteries, golf courses, riparian areas, open woodland, agricultural fields, desert washes, desert scrub, grassland, broken chaparral and beach with scattered shrubs Characteristics: nest in isolated trees or large shrubs	Yes	Yes	**Moderate** potential to occur**.** The project site provides suitable habitat to support this species (desert wash)**.**
Vireo vicinior	gray vireo	SSC, BCC, CVMSHCP: Covered Season of Concern: nesting	Habitats: arid, shrub-covered slopes in pinyon-juniper, juniper, and chamise-redshank chaparral habitats on foothills and mesas Characteristics: they forage, nest, and sing in areas formed by a continuous growth of twigs, 1-5 feet above ground	Yes	No	**No** potential to occur. The BSA does not contain shrub-covered slopes in pinyon juniper or chamise-redshank chaparral habitat to support this species. Furthermore, there are no CNDDB-recorded recent (<15 years) observations of this species within a 2-mile radius of the project site.
Polioptila melanura	black-tailed gnatcatcher	WL	Habitats: wooded desert wash habitat, but also occurs sparingly in desert scrub habitat Characteristics: nest site is in a low shrub, usually in a vertical fork less than 5' above the ground	Yes	Yes	**Low** potential to occur. The BSA does occur in desert wash habitat, however it is not a wooded area. This species occurs only sparingly in desert scrub habitat like that of the BSA. Furthermore, there are no CNDDB-recorded recent (<15 years) observations of this species.
Toxostoma lecontei	Le Conte's thrasher	SSC, BCC, CVMSHCP: Covered	Habitats: open desert wash, desert scrub, alkali desert scrub, and desert succulent shrub, Joshua tree habitats with scattered shrubs, open desert flats, washes and alluvial fans with sandy and/or alkaline soil Characteristics: usually does not occur in areas of monotypic creosote bush scrub	Yes	Yes	**Moderate** potential to occur. The BSA does contain suitable desert scrub habitat with sandy soil to support this species. There are no CNDDB-recorded recent (<15 years) observations of this species within a 2-mile radius of the project site, however the site conditions are deemed suitable based on results of the literature study and field survey.
Toxostoma crissale	Crissal thrasher	SSC, CVMSHCP: Covered	Habitats: wide variety of desert riparian and scrub habitats, Mojave Desert, upper reaches of desert scrub vegetation and below the piñon-juniper foothill woodland Characteristics: nests are most often placed in the densest por-tions of shrubs	Yes	Yes	**Low** potential to occur. The BSA does not contain shrubs that are adequately dense, however the adjacent golf course located east of the BSA may contain shrubs that could be utilized by this species, and therefore it may be present in the BSA during passage only.
Setophaga petechia (=Dendroica petechia)	yellow warbler	SSC, BCC, CVMSHCP: Covered Season of Concern: nesting	Habitats: deciduous trees of the riparian woodland from coastal desert woodlands to the Sierra Nevada – willows (Salix sp.), cottonwoods (Populus sp.), aspens (Populus sp.), California sycamores (Platanus racemosa), and alders (Alnus sp.) Characteristics: nests are deep cups, placed in an upright fork in a deciduous sapling or shrub, typically 2 to 16 feet high	Yes	No	**No** potential to occur. The BSA does not contain suitable breeding and foraging riparian, montane chaparral, or mixed conifer habitats to support this species. Yellow warblers occur principally as a migrant and summer resident in California from late March through early October and breeds from April to late July. There are no CNDDB-recorded recent (<15 years) observations of this species within a 2-mile radius of the project.
Icteria virens	yellow-breasted chat	SSC, , CVMSHCP: Covered Season of Concern: nesting	Habitats: dense riparian thickets of willows, vines, and brush associated with streams and other wetland habitats Characteristics: nest is an open cup placed in dense shrubs or thickets within 3 to 8 feet above ground along a stream or river	Yes	No	**No** potential to occur. The BSA does not contain suitable breeding and foraging riparian habitats with adequate strata to support breeding yellow-breasted chats. In California, the yellow-breasted chat occur as a migrant and summer resident primar-ily from late March to late September and breeds from late April through early August.
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	WL	Habitats: dry, steep sloping land and hillsides with a moderate density of low, scattered shrubs, coastal sage scrub, interspersed with grasses and forbs and occasional rock outcrops for song perches Characteristics: nests are placed in small depressions on the ground	Yes	No	**No** potential to occur. The BSA does not contain suitable breeding and foraging habitats with low shrub cover interspersed with grasses/forbs and rock outcrops. Furthermore, the BSA does not contain steep-sloping hillsides that are typically preferred by this bird.
Piranga rubra	summer tanager	SSC, CVMSHCP: Covered Season of Concern: nesting	Habitats: desert riparian habitat, mature, dense, desert riparian habitat dominated by cottonwoods (Populus sp.) and willows (Salix sp.) along streams and rivers	Yes	No	**No** potential to occur. The BSA does not contain adequate riparian habitat and does not contain cottonwoods or willows typically utilized by this species. Furthermore, there are insufficient water sources within the BSA. The water features present in the adjacent golf club could provide a water source for this bird, but still there are no CNDDB-recorded recent (<15 years) observations of this species.
Sensitive Mammals						
Xerospermophilus tereticaudus chlorus (=Spermophilus tereticaudus chlorus)	Palm Springs round-tailed ground squirrel	SSC, CVMSHCP: Covered	Habitats: open, flat, grassy areas in fine-textured, sandy soil within desert succulent scrub, desert wash, desert scrub, alkali scrub, and levees in croplands Characteristics: may occur in areas of more coarse sands, associated with washes	Yes	No	**Low** potential to occur. The BSA contains fine sandy soil, however there are no grassy areas or desert succulent scrub. The BSA offers available desert scrub habitat, however there are no CNDDB-recorded recent (<15 years) observations of this species.
Chaetodipus fallax pallidus	pallid San Diego pocket mouse	SSC	Habitats: sandy herbaceous areas, usually in association with rocks or coarse gravel in southwestern California Characteristics: mainly in arid coastal and desert border areas	Yes	No	**No** potential to occur. The sandy soils of the BSA are fine textured, and typically this mouse will utilize areas of sandy soils that are more coarse-textured and gravelly. Furthermore, there are no CNDDB-recorded recent (<15 years) observations of this species.
Perognathus longimembris ssp. *bangsi*	Palm Springs pocket mouse	SSC, CVMSHCP: Covered	Habitats: gently sloping topography, sparse to moderate vegetative cover, and loosely packed or sandy soils, desert riparian, desert scrub, desert wash and sagebrush habitats Characteristics: rarely found on rocky sites and occurs in all canopy coverage classes	Yes	Yes	**Low** potential to occur. Based on a habitat model generated by the Coachella Valley Conservation Commission, the entire BSA contains suitable habitat for this species (CVCC, 2022). The loose, friable sands on the site are suitable to support this mouse.
Neotoma lepida intermedia	San Diego desert woodrat	SSC	Habitats: variety of shrub and desert habitats primarily associated with rock outcroppings, boulders, cacti, or areas of dense undergrowth Characteristics: cactus patches are also a favorite den site	Yes	No	**No** potential to occur. The BSA does not contain adequate desert-riparian habitats to support this species. The BSA does not contain areas of dense undergrowth. Presence of this species would likely be imited to flyover.
Lasiurus xanthinus	western yellow bat	SSC, CVMSHCP: Covered, WBWG:H	Habitats: valley foothill riparian, desert riparian, desert wash, and palm oasis habitats Characteristics: occurs year-round in California	Yes	Yes	**Moderate** potential to occur. The BSA is located within this bat's distribution and contains suitable desert habitat. The BSA is proximal to palm oasis.
Antrozous pallidus	pallid bat	SSC	Habitats: variety of habitats are occupied by pallid bats, including deserts, grasslands, shrublands, woodlands, and forests form sea level up through mixed conifer forests Characteristics: night roosts may be in more open sites, such as porches and open buildings	Yes	Yes	**Moderate** potential to occur. The BSA is located within this bat's distribution and contains suitable desert habitat. The BSA is proximal to palm oasis.
Vulpes macrotis arsipus	desert kit fox	Protected by Section 460 of the California Code of Regulations [CCR], Title 14	Habitats: sparsely vegetated scrub habitats and native or annual grasslands, alkali sink scrub, saltbush scrub, and chenopod scrub, although oak woodlands, vernal pools, alkali meadows and playas also provide habitat Characteristics: located on gradual west to northwest facing slopes, with characteristically deep, light-textured and virtually stoneless soils	Yes	Yes	**Low** potential to occur. The BSA contains suitable soils and intermittent channels. There are no recent (<15 years) recorded observations of this species within a 2-mile radius of the project site.
Taxidea taxus	American badger	SSC	Habitats: alpine meadows to elevations as low as Death Valley Characteristics: requirements - sufficient food, friable soils, and relatively open, uncultivated ground	Yes	No	**No** potential to occur. The BSA does contain friable soils, however does not contain alpine meadows, which are the preferred habitat of this species. Furthermore, there are no CNDDB-recorded recent (<15 years) observations of this species.
Ovis canadensis nelsoni	desert bighorn sheep (=Nelson's bighorn sheep)	fully protected, CVMSHCP: Covered	Habitats: desert mountains, arid, rocky, sparsely vegetated lands, steep walled canyons and ridges bisected by rocky or sandy washes, with available water Characteristics: graze along open slopes, washes and alluvial fans where they can see approaching predators	No	No	**No** potential to occur. The BSA does not contain accessible steep rocky slopes to support this bighorn sheep. There are no CNDDB-recorded recent (<15 years) observations of this species
Legend and Notes						

Scientific Name (=Synonym)	**Common Name (=Synonym)**	**Status**	**General Habitat Descriptions in California**	**The BSA:**		**Potential For Occurrence in the BSA**
				Located Within Species' Distribution and/or Elevation Range (if known)	**Contains Suitable Foraging, Roosting, and/or Breeding Habitats**	

Federal Endangered Species Act (ESA) Listing Codes: the ESA is administered by the USFWS and NMFS. The USFWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NMFS are mainly marine wildlife such as whales and anadromous fish such as salmon. For the purposes of the ESA, Congress defined species to include subspecies, varieties, and, for vertebrates, distinct population segments. The official federal listing of Endangered and Threatened animals is published in 50 CFR § 17.11.

- **FE** = federally listed as endangered: any species of plant or animal that is in danger of extinction throughout all or a significant portion of their range.
- **FT** = federally listed as threatened: any species of plant or animal that is considered likely to become endangered throughout all or a significant portion of its range within the foreseeable future.
- **FC** = federal candidate for listing: candidate species are plants and animals for which the USFWS has sufficient information on their biological status and threats to propose them for listing as endangered or threatened under the ESA, but for which development of a proposed listing regulation is precluded by higher priority listing actions to address species in greater need. A proposed regulation has not yet been published in the Federal Register for these species.

California Endangered Species Act (CESA) Listing Codes: the CESA is administered by CDFW. The official listing of Animals of California Declared To Be Endangered or Threatened is contained in the California Code of Regulations, Title 14, § 670.5. Species and subspecies of California native animals are declared to be endangered or threatened as defined by §§ 2062 and 2067 of the Fish and Game Code.

- **SE** = state-listed as endangered: "endangered species" means a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant which is in serious danger of becoming extinct throughout all, or a significant portion, of its range due to one or more causes, including loss of habitat, change in habitat, overexploitation, predation, competition, or disease (Fish and Game Code § 2062).
- **ST** = state-listed as threatened: "threatened species" means a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that, although not presently threatened with extinction, is likely to become an endangered species in the foreseeable future in the absence of the special protection and management efforts (Fish and Game Code § 2067).
- **SCE** = state candidate for listing as endangered: a native species or subspecies of a bird, mammal, fish, amphibian, reptile, or plant that the Fish and Game Commission has formally noticed published in the California Regulatory Notice Register as being under review by CDFW for addition to the list of endangered species, or a species for which the Fish and Game Commission has published a notice of proposed regulation to add the species to the list (Fish and Game Code § 2068).

California Natural Diversity Database :The CNDDB includes data on "special status taxa" tracked by the CNDDB program, regardless of their legal protection status.

- **SA =** present on CNDDB Special Animals List: any species of plant or animal that appears on most current CNDDB Special Animals List, as issued by California Department of Fish and Wildlife.

California Department of Fish and Wildlife (CDFW) Designations:

For some wildlife species, the CNDDB is only concerned with specific portions of the life history, such as roosts, rookeries, or nesting colonies. For many species of birds, the primary emphasis is on the breeding population in California. For some species which do not breed in California but winter here, emphasis is on wintering range. The SSC designation thus may include a comment regarding the specific protection provided such as nesting or wintering

- **SSC = species of special concern**: a species of special concern is a species, subspecies, or distinct population of an animal (fish, amphibian, reptile, bird and mammal) native to California that currently satisfies one or more of the following (not necessarily mutually exclusive) criteria: is extirpated from the state or, in the case of birds, in its primary seasonal or breeding role; is listed as federally-, but not state-, threatened or endangered; meets the state definition of threatened or endangered, but has not formally been listed; is experiencing, or formerly experienced, serious (noncyclical) population declines or range retractions (not reversed) that, if continued or resumed, could qualify it for state threatened or endangered status; has naturally small populations exhibiting high susceptibility to risk from any factor(s), that if realized, could lead to declines that would qualify it for state threatened or endangered status.
- **Fully protected:** fully protected animal species may not be taken or possessed at any time and no licenses or permits may be issued for their take except for collecting these species for necessary scientific research and relocation of the bird species for the protection of livestock. Lists were created for fish (Fish and Game Code § 5515), amphibians and reptiles (Fish and Game Code § 5050), birds (Fish and Game Code § 3511) and mammals (Fish and Game Code § 4700).
- **WL = watch list**: this list includes birds identified in the California Bird Species of Special Concern (Shuford and Gardali, 2008) report and are not on the current CDFW species of special concern list, but were on previous lists and they have not been state-listed under CESA; were previously state or federally listed and now are on neither list; or are on the list of fully protected species.
- **Special Animals List**: the CESA does not allow listing of insects, so despite the insect's precarious status, the insect has no protection under state legislation. CDFW includes this insect on its Special Animals List.
- California Fish and Game Code §§ 4800 – 4810: The mountain lion (genus Puma) is a specially protected mammal under the laws of California. It is unlawful to take, injure, possess, transport, import, or sell any mountain lion or any part or product thereof, except as specifically provided in California Fish and Game Code §§ 4800 - 4810.
- Protected by § 460 of the California Code of Regulations [CCR], Title 14

United States Fish and Wildlife Service (USFWS) Designations:

- **BCC = bird of conservation concern**: a bird of conservation concern is listed in the USFWS' 2008 Birds of Conservation Concern report. The report identifies species, subspecies, and populations of all migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that, without additional conservation actions, are likely to become candidates for listing under the ESA. While all of the bird species included in the report is priorities for conservation action, the list makes no finding with regard to whether they warrant consideration for ESA listing.

Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community Conservation Plan (CVMSHCP):

The CVMSHCP provides regulatory coverage for a total of 27 individual species. Under the CVMSHCP, regulatory coverage means that future incidental take of these species would be permitted for new development and that no additional mitigation under the CESA or ESA would be required over the mitigation provided for by the plan.

- **CVMSHCP: *Covered:*** species is identified as a "Covered Species" by the CVMSHCP and the Implementing Agreement. The CVMSHCP permits would provide take authorization for Covered Species

Western Bat Working Group (WBWG) Designations:

The WBWG is composed of agencies, organizations, and individuals interested in bat research, management, and conservation from 13 western states and provinces. Species are ranked as High, Medium, or Low Priority in each of 10 regions in western North America.

- **H = High Priority:** These species are considered the highest priority for funding, planning, and conservation actions, Information about status and hreats to most species could result in effective conservation actions being implemented should a commitment to management exist. These species are imperiled or are at high risk of imperilment.
- **M = Medium Priority:** These species warrant closer evaluation, more research, and conservation actions of both the species and possible threats. A lack of meaningful information is a major obstacle in adequately assessing these species' status and should be considered a threat.

Resources

- *Check-List of North American Birds, 7th edition (AOU, 1998);*
- *(AOU website);*
- *Amphibian species accounts (Amphibiaweb website);*
- *Mammals of North America (Bowers et al., 2004);*
- *Special Status Animals in California, Including BLM Designated Sensitive Species (BLM, 2010);*
- *Life History Accounts and Range Maps (CDFG, 1988a and updates; CDFG, 1988b and updates; CDFG, 1988c and updates);*
- *The Status of Rare, Threatened, and Endangered Plants and Animals of California, 2000–2004 (CDFG, 2005);*
- *Atlas of the Biodiversity of California (CDFG, 2003);*
- *RareFind, CDFW, California Natural Diversity Database (CNDDB);*
- *State & Federally Listed Endangered & Threatened Animals of California (CDFW, 2022);*
- *Special Animals List (CDFW, 2022);*
- *CDFW's California Wildlife Habitat Relationships: Online Life History Accounts and Range Maps ;*
- *California Herps website ;*
- *California Partners in Flight website ;*
- *CNAH website ;*
- *AOU supplement (Chesser et al., 2015);*
- *A Field Guide to Hawks of North America, Second Edition (Clark and Wheeler, 2001);*
- *Mammals of California (Eder, 2005);*
- *Studies in Nearctic desert sand dune Orthoptera: a new arenicolous species of Stenopelmatus from Coachella Valley with key and biological notes. Part XI. (Tinkham, 1968);*
- *Section 9.3.2 of the CVMSHCP: Coachella Valley Jerusalem Cricket Stenopelmatus cahuilaensis (CVMSHCP, 2007);*
- *Coachella Valley Jerusalem Cricket Biological Monitoring Report: (CVCC, 2014);*

Scientific Name (=Synonym)	**Common Name (=Synonym)**	**Status**	**General Habitat Descriptions in California**	**The BSA:**		**Potential For Occurrence in the BSA**
				Located Within Species' Distribution and/or Elevation Range (if known)	**Contains Suitable Foraging, Roosting, and/or Breeding Habitats**	

• Amphibian and Reptile Species of Special Concern in California (Jennings and Hayes, 1994);
• Reference Atlas to the Birds of North America (National Geographic Society, 2003);
• Complete Birds of North America (National Geographic Society, 2006);
• Field Guide to the Birds of North America, 4th Ed (National Geographic Society, 2002);
• Shorebirds of North America. The Photographic Guide (Paulson, 2005);
• A Field Guide to Mammals of North America North of Mexico. Fourth Edition (Reid, 2006);
• A Natural History of California (Schoenherr, 1992);
• California Bird Species of Special Concern: A ranked assessment of species, subspecies, and distinct populations of birds of immediate conservation concern in California (Shuford and Gardali, 2008);
• National Audubon Society, The Sibley Guide to Birds (Sibley, 2000);
• A Field Guide to Western Reptiles and Amphibians, Third Edition (Stebbins, 2003);
• (The Birds of North America Online website);
• Mammal Species of the World (Wilson and Reeder, 2005);
• UltraSystems in-house records.

Notes:
*•**Yes** = the BSA is located within the wildlife species' known distribution, elevation range, and/or the BSA contains suitable habitats or conditions to support the species. The wildlife species has a potential to occur within the BSA. Further evaluation is needed.*
*•**No** = the BSA is located outside the wildlife species' known distribution, elevation range, and/or the BSA lacks suitable habitats or conditions to support the species. It is highly unlikely for the wildlife species to have a potential to occur within the BSA. No further evaluation is needed.*
*•**Present** = observed within the BSA during surveys.*
*•**DPS = distinct population segment** : A DPS, or a distinct population segment, is a vertebrate population or group of populations that is discrete from other populations of the species and significant in relation to the entire species. The ESA provides for listing species, subspecies, or distinct population segments of vertebrate species.*
• The existing surface elevation at the subject property ranges from approximately 745 to 764 feet above mean sea level (amsl).

APPENDIX G

PLANT AND WILDLIFE SPECIES RECORDED DURING THE FIELD SURVEYS

Table 1 contains the list of vascular plant taxa recorded during the biological field surveys conducted within the BSA. Plant nomenclature and taxonomic order is based on *The Jepson Manual: Vascular Plants of California, s*econd Edition (Baldwin et al., 2012) and/or the Calflora website (Calflora, 2022).

Table 1
Plant Species Observed during the Field Surveys

Scientific Name	Common Name
Amaranthaceae	**Amaranth Family**
Amaranthus sp. *	pigweed
Aricaceae	**Palm Family**
Washingtonia filifera	California fan palm
Asteraceae	**Sunflower Family**
Ambrosia dumosa	white-bursage
Ambrosia psilostachya	western ragweed
Ambrosia salsola	cheesebrush
Baccharis sarothroides	broom baccharis
Chaenactis fremontii	Fremont pincushion
Geraea canescens	hairy desert sunflower
Malacothrix glabrata	desert dandelion
Rafinesquia neomexicana	desert chicory
Stephanomeria sp.	wirelettuce
Brassicaceae	**Mustard Family**
*Sisymbrium irio**	London rocket
*Brassica tournefortii**	Sahara mustard
Cactaceae	**Cactus Family**
Cylindropuntia echinocarpa	silver cholla
Chenopodiaceae	**Goosefoot Family**
Atriplex canescens	fourwing saltbush
Cleomaceae	**Cleome Family**
Peritoma arborea	bladderpod
Euphorbiaceae	**Spurge Family**
Euphorbia albomarginata	rattlesnake sandmat
Croton californicus	desert croton

Scientific Name	Common Name
Fabaceae	**Legume Family**
Psorothamnus emoryi	Emory's indigo bush
*Parkinsonia aculeata**	Jerusalem thorn
Geraniaceae	**Geranium Family**
*Erodium cicutarium**	redstem filaree
Krameriaceae	**Rhattany Family**
Krameria bicolor	white rhatany
Loasaceae	**Loasaceae Family**
Petalonyx thurberi ssp. *thurberi*	Thurber's sandpaper plant
Nyctaginaceae	**Four o'clock Family**
Abronia villosa	hairy sand verbena
Onagraceae	**Evening Primrose Family**
Camissoniopsis pallida	pale yellow sun cup
Chylismia claviformis	brown-eyed primrose
Poaceae	**Grasses Family**
*Hordeum murinum**	wall barley
*Schismus barbatus**	old han schismus
*Bromus rubens**	red brome
Solanaceae	**Nightshade Family**
Nicotiana obtusifolia	desert tobacco
Datura wrightii	jimsonweed
Tamaricaceae	**Tamarisk Family**
*Tamarix ramosissima**	salt cedar
Zygophyllaceae	**Zygophyllaceae Family**
Larrea tridentata	creosote bush
*Non-native species	

Table 2 contains the list of wildlife species observed and/or detected during the biological field surveys. Wildlife nomenclature and taxonomic order is based on the following treatments according to class of species:

- **Birds.** *Check-list of North American Birds. S*eventh Edition and Supplements (Chesser et al., 2022)
- **Mammals**. *Complete List of Amphibian, Reptile, Bird and Mammal Species in California* (CDFW, 2016).

Table 2
Wildlife Species Observed/Detected during the Field Surveys

Scientific Name	Common Name
Accipitridae	
Buteo jamaicensis	red-tailed hawk
Ardeidae	
Ardea alba	great egret
Cathartidae	
Cathartes aura	turkey vulture
Columbidae	
*Columba livia**	rock pigeon
Corvidae	
Corvus corax	common raven
Falconidae	
Falco columbarius	merlin
Falco sparverius	American kestrel
Fringillidae	
Haemorhous mexicanus	house finch
Hirundinidae	
Stelgidopteryx serripennis	northern rough-winged swallow

Scientific Name	Common Name
Hirundo rustica	barn swallow
Parulidae	
Setophaga coronata	yellow-rumped warbler
Passerellidae	
Zonotrichia leucophrys	white-crowned sparrow
Canidae	
*Canis latrans**	coyote
Heteromyidae	
Chaetodipus penicillatus	desert pocket mouse
Leporidae	
Lepus californicus	black-tailed jackrabbit
Sylvilagus audubonii	desert cottontail
Sciuridae	
Ammospermophilus leucurus	white-tailed antelope squirrel
Otospermophilus beecheyi	California ground squirrel
Hesperiidae	
Erynnis funeralis	funereal duskywing
Pieridae	
Pieris rapae	cabbage white
Nymphalidae	
Vanessa cardui	painted lady
*Non-native species	

APPENDIX H

JURISDICTIONAL DELINEATION REPORT

PRELIMINARY JURISDICTIONAL DELINEATION REPORT
FOR
GREEN DAY VILLAGE PROJECT
PROJECT NO. 7129
CITY OF DESERT HOT SPRINGS
RIVERSIDE COUNTY, CA



Prepared for:

Prepared for:	***In Support of the CEQA Analysis Prepared for:***
LA World Construction 2029 Century Park East, Ste. 400 Century City, CA 90067	**City of Desert Hot Springs** 11999 Palm Drive Desert Hot Springs, CA 92240

Prepared by:

UltraSystems Environmental Inc.
16431 Scientific Way
Irvine, CA 92618
Phone: (949) 788-4900
Fax: (949) 788-4901

July 2022

This page intentionally left blank.

TABLE OF CONTENTS

List of Abbreviations and Acronyms ..... **iii**

Executive Summary **1**

1.0 Introduction **1-1**
1.1 Project Location 1-1

2.0 Project Description **2-1**

3.0 Regulatory Framework **3-1**
3.1 Federal 3-1
3.2 State 3-3

4.0 Methodology **4-5**

5.0 Data Review Results **5-1**
5.1 Climate and Hydrological Data 5-1
5.2 Soils 5-1
5.3 National Wetland Inventory 5-2
5.4 Land Use 5-3
5.5 Local Hydrology 5-3
5.6 Vegetation 5-3

6.0 Field Investigation Results **6-1**
6.1 Ephemeral Drainages On-Site 6-1
6.2 Desert Riparian Area On-Site 6-3
6.3 Observed Jurisdictional Status 6-3

7.0 Potential Impacts of the Project **7-1**
7.1 Direct Impacts 7-1
7.2 Indirect Impacts 7-2

8.0 Mitigation Measures **8-1**
8.1.1 Temporary Impact Mitigation 8-3
8.1.2 Permanent Impact Mitigation 8-3

9.0 Potential Federal, State, and Local Biological Permits and Approvals **9-1**
9.1 Compensatory Habitat Mitigation and Monitoring Plan (HMMP) 9-1
9.2 Section 401 WQC Permit 9-1
9.3 Lake or Streambed Alteration Agreement (LSAA) 9-2

10.0 Literature Cited and References **10-3**

TABLES

Table 5.1-1 - Temperature and Precipitation Statistics for Riverside Fire Station No. 3 (1893 - 2012) 5-1

Table 5.2-1 - Summary of Soil Mapping Units 5-2
Table 5.3-1 - NWI Attributes of R4SBA Wetlands 5-2
Table 6.0-1 - Total Project Acreage of Potential Impacts to Jurisdictional Waters 6-1

APPENDICES

Appendix A Figures
- *Figure 1: Regional Overview*
- *Figure 2: Project Vicinity*
- *Figure 3: Project Boundary and Biological Study Area*
- *Figure 4: USGS Topographic Map: Desert Hot Springs Quadrangle*
- *Figure 5: Management Plan and Land Designation Areas*
- *Figure 6: USDA Soils*
- *Figure 7: USGS Surface Waters and Watersheds*
- *Figure 8: USFWS National Wetlands Inventory*
- *Figure 9:Jurisdictional Waters*

Appendix B Project Drawings
Appendix C Site Photographs
Appendix D Climate Data
Appendix E Soils Report
Appendix F Field Data Sheets
Appendix G Plant and Wildlife Species Observed

LIST OF ABBREVIATIONS AND ACRONYMS

Acronym/Abbreviation	Term
BMPs	best management practices
BSA	Biological Study Area
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
District	Riverside County Flood Control & Water Conservation District
EPD	Environmental Programs Department
FGC	Fish and Game Code
GIS	Geographic Information System
GPS	Global Positioning System
HMMP	Habitat Mitigation and Monitoring Plan
LSA	Lake or Streambed Alteration
NHD	National Hydrography Dataset
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OHWM	ordinary high water mark
PCN	Pre-Construction Notification
Porter-Cologne	Porter-Cologne Water Quality Control Act
project	Green Day Village Project
Rapanos	*Rapanos* vs. *United States* and *Carabell* vs. *U.S. Army Corps of Engineers*
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SWANCC	*Solid Waste Agency of Northern Cook County* vs. *United States Army Corps of Engineers*
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USACE Manual	*Corps of Engineers Wetlands Delineation Manual*
UltraSystems	UltraSystems Environmental Inc.
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WCD	Water Conservation District
WDRs	Waste Discharge Requirements

Acronym/Abbreviation	Term
WQC	Water Quality Certification
CVMSHCP	Coachella Valley Multiple Species Habitat Conservation Plan
WRCC	Western Regional Climate Center
§	Section
§§	Sections

EXECUTIVE SUMMARY

UltraSystems Environmental Inc. (UltraSystems) prepared this jurisdictional delineation report for the proposed Green Day Village project (project), located in the City of Desert Hot Springs, Riverside County, California.

UltraSystems biologists conducted a jurisdictional assessment and delineation of the project site and the immediate area surrounding the site. The survey was conducted to determine the presence and extent of federal or state wetlands, waters, and habitats that are potentially subject to the jurisdictional authority of the United States Army Corps of Engineers (USACE), the California State Water Resources Control Board (SWRCB) as represented by the Colorado River Basin Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife (CDFW).

Prior to conducting the jurisdictional delineation, UltraSystems biologists first conducted a reconnaissance-level field survey of the biological resources potentially associated with the project site and within a zone 500 feet out from the project site; these define the Biological Study Area (BSA). The BSA includes all areas that could potentially be directly, indirectly, or cumulatively impacted by the project. This survey confirmed the potential presence of federal and/or state waters and habitats located within the BSA.

On March 5 and 6 and May 26 and 27, 2022, five ephemeral drainages and four associated swales were assessed for jurisdictional status.

Prior to project construction, the project may need to obtain the following federal and state biological permits, certifications, agreements, and/or approvals:

- Clean Water Act § 401 Water Quality Certification (WQC) from the RWQCB,
- California Fish and Game Code § 1602 Lake or Streambed Alteration Agreement (LSAA) with CDFW, and

To offset impacts to jurisdictional waters, the applicant proposes to compensate through one or more of the following methods: (1) onsite compensatory mitigation lands (at a ratio of at least 1:1) and Habitat Mitigation and Monitoring Plan (HMMP) implementation; (2) offsite compensatory mitigation lands (at a ratio of 3:1) and HMMP implementation; (3) contribution to a mitigation bank or in-lieu fee program as necessary to fund replacement, restoration and conservation of equivalent habitat outside the BSA at a ratio of 3:1 and as approved by County Environmental Programs Department (EPD).

The project is anticipated to have significant impacts to jurisdictional waters. For those resources that could potentially be impacted by the project, Best management practices (BMPs), as appropriate, have been recommended to reduce those potential impacts below the level of significance. These measures will be incorporated into the project design as appropriate.

1.0 INTRODUCTION

UltraSystems prepared this jurisdictional delineation report for the proposed Green Day Village project(project) located in City of Desert Hot Springs, Riverside County, California. The project proposes the construction of housing units and other commercial and recreational spaces on the approximately 30.34-acre site. The project includes the development of 622 mixed-use residential, duplex residential and 6-plex residential units in addition to recreational and commercial facilities. Refer to **Appendix B**, *Project Drawings (Site Plan),* for detailed plans of the proposed project. Some of the proposed amenities include tennis and basketball courts, community pool, and walking trail. Proposed commercial spaces include medical offices, food services, and retail.

UltraSystems biologists conducted a jurisdictional assessment and delineation of the project site and the immediate area surrounding the site. The survey was conducted to determine the presence and extent of waters and habitats that are potentially subject to the jurisdictional authority of the USACE, the Colorado River Basin Region of RWQCB, CDFW, and the CVMSHCP. This report documents the methods and results of the survey and provides an analysis of the potential impacts to jurisdictional areas from site construction and development in view of federal and state laws and regulations. The results presented in this report are preliminary since the USACE, RWQCB, and CDFW will make the final determination of jurisdiction in accordance with their regulatory authority. Finally, the report recommends, as appropriate, BMPs to minimize or avoid potential impacts to less than significant levels. The report was prepared based upon results of a literature review and field survey, and the report will support permits required by the project from federal and state resource agencies.

1.1 Project Location

The project site is located within the City of Desert Hot Springs in Riverside County, California (GoogleEarth, 2022; **Appendix A**, Figure 1*: Regional Overview*, and Figure 2: *Project Vicinity*). The project site is located on the United States Geological Survey (USGS) 7.5-Minute Topographic Map *Desert Hot Springs* Quadrangle, within Township 3S, Range 5E, and Section 18 (**Appendix A**, Figure 4: *USGS Topographic Map*). The approximate center of the project site is located at latitude 33°54'44.98"N°, longitude 116°30'15.45"W°. The project site is generally between 745 to 764 feet above mean sea level, from north to south, respectively.

Access to the project site is provided from Interstate 10 (I-10). The northeast corner of the property is located west of Palm Drive and approximately 0.25 mile south of 18th Avenue, in the City of Desert Hot Springs. It is located approximately 1.1 miles northeast of Highway 10 (Google Earth, 2022). The alignment is assigned Assessor's Parcel Number 657-280-003.

The project is located in an area that contains primarily undeveloped, open space. The surroundings of the project site include vacant land, sparse residential developments, and a golf club to the east. The San Bernardino National Forest is located to the northwest and southwest of the project. Coachella Valley Preserve is approximately 8.2 miles southeast from the project (GoogleEarth, 2022).

The project site is located within areas covered by the CVMSHCP (MSHCP); however, it does not fall within any MSHCP Conservation Areas, wildlife movement corridors or linkage (**Appendix A**, Figure 5: *Management Plan Areas*).

The project site is under the jurisdiction of the following resource agency field offices:

- **USACE - Los Angeles District**

915 Wilshire Blvd., Suite 980
Los Angeles, CA 90017
Phone: (213) 452-3908/3333
Fax: (213) 452-4209

United States Fish and Wildlife Service (USFWS): Palm Springs Fish and Wildlife Office (as part of the Carlsbad Fish and Wildlife Office)
777 E. Tahquitz Canyon Way, Suite 208
Palm Springs, CA 92262
Phone: (760) 322-2070

Riverside County Planning Department: Environmental Programs Division (County EPD)
4080 Lemon Street, 12th Floor
P.O. Box 1409, Riverside, CA 92502-1409
Phone: (951) 955-3200
Fax: (951) 955-3157

- **RWQCB – Colorado River Basin Region (Region 7)**
  73-720 Fred Waring Drive, Suite 100
  Palm Desert, CA 92260
  Phone: (760)346-7491

- **CDFW - Inland Desert Region 6 [**Heather Pert, Joanna Gibson, Carly Beck, Eric Chan]
  3602 Inland Empire Boulevard, Suite C-220
  Ontario, CA 91764
  Phone: (909) 484-0167
  Fax: (909) 481-2945

2.0 PROJECT DESCRIPTION

The project proposes the construction of housing units and other commercial and recreational spaces on the approximately 30.34-acre site. The project includes the development of 612 mixed-use residential, duplex residential and 6-plex residential units in addition to recreational and commercial facilities. Refer to **Appendix B**, *Project Drawings (Site Plan*), for detailed plans of the proposed project. Some of the proposed amenities include tennis and basketball courts, community pool, and walking trail. Proposed commercial spaces include medical offices, food services, and retail.

3.0 REGULATORY FRAMEWORK

Each project must comply with federal, state, and local environmental laws, regulations, ordinances, and policies. These provide a potential regulatory constraint to development and construction and are the regulatory drivers that require biological and water resource surveys and associated permits. This section summarizes the major applicable federal and state laws that apply to protecting jurisdictional wetlands, waters, water quality, water quantity, and aquatic/riparian habitats from impacts from the projects and which may be relevant and applicable to the project.

In California, the USACE, RWQCBs, and CDFW regulate activities within inland streams, coastal streams, wetlands, and other waters. These agencies enforce the many federal and state laws, regulations, and policies that prevent further impacts to jurisdictional wetlands and waters. The USACE regulates the discharge of dredged or fill material in Waters of the United States (waters of the U.S.) (defined below) pursuant to Section 404 of the federal Clean Water Act (CWA). The RWQCBs regulate activities pursuant to Section 401(a)(1) of the CWA. The RWQCBs also have jurisdiction over waters of the State (defined below) under the Porter-Cologne Water Quality Control Act (Porter-Cologne). CDFW regulates water resources under Sections (§§) 1600-1616 of the California Fish and Game Code (FGC).

3.1 Federal

Section 401 Clean Water Act. Pursuant to § 401 of the CWA, a water quality certification is required for § 404 activities. The USEPA has empowered the California SWRCB and its nine Regional Water Quality Control Boards (RWQCB) to certify that 404 discharges comply with federal and state water quality standards and ensure that there is no net loss of wetlands through impact avoidance, minimization, and mitigation. The Colorado River Basin Regional Water Quality Control Board (Region 7) will provide review and water quality certification services for this project.

Section 404 Clean Water Act. Section 404 CWA requires authorization from the Secretary of the Army, acting through the Corps of Engineers, for the discharge of dredged or fill material into all waters of the United States, including wetlands. Authorizations are conducted through the issuance of Nationwide (or General) Permits, for activities that would cause only minimal permanent individual (between 0.1 and 0.5 acre) and cumulative impacts; through Individual (or Standard) Permits for activities that are likely to have more than a minimal permanent (greater than 0.5 acre) or cumulative impact on aquatic resources; and through Letters of Permission (LOPs) which are a type of individual permit issued through an abbreviated process that includes coordination with federal and state fish and wildlife agencies and a public interest evaluation, but without the 30-day permit notice period that is required for Individual Permits. The Los Angeles District of the USACE will provide review and permitting services for this project.

The USEPA and USACE are in receipt of the U.S. District Court for the District of Arizona's August 30, 2021, order vacating and remanding the Navigable Waters Protection Rule in the case of Pascua Yaqui Tribe v. U.S. Environmental Protection Agency. Consequently, the agencies have halted implementation of the Navigable Waters Protection Rule ("NWPR") nationwide and are interpreting "waters of the United States" consistent with the pre-2015 regulatory text until further notice.

On November 18, 2021, the EPA and USACE announced the ruling to revise the definition of "waters of the United States.", and will now implement the pre-2015 definition of "waters of the United States," updated to reflect consideration of Supreme Court decisions. This familiar approach would support a stable implementation of "waters of the United States" while the EPA and USACE continue to consult with states, tribes, local governments, and a broad array of stakeholders in both the current implementation and future regulatory actions.

The agencies are interpreting "waters of the United States" consistent with the pre-2015 regulatory regime until further update.

40 CFR 230.3(s)

- *All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide*

- *All interstate waters including interstate wetlands;*

- *All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters: a) Which are or could be used by interstate or foreign travelers for recreational or other purposes; b) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or which are used or could be used for industrial purposes by industries in interstate commerce*

- *All impoundments of waters otherwise defined as waters of the United States under this definition*

- *Tributaries of waters identified above*

- *The territorial sea*

- *Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States*

Wetlands and other waters that do not meet the definition of waters of the U.S. are not covered by the CWA; however, they are regulated by the State of California though the Porter-Cologne Water Quality Control Act (Porter-Cologne) and SWRCB Resolution No. 2019-0015 for California (see **Section 3.2**).

3.2 State

Porter-Cologne Water Quality Control Act. The Porter-Cologne Water Quality Control Act (Porter-Cologne) defines "water quality objectives" as the allowable "*limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisances within a specific area*." Thus, water quality objectives are intended to protect the public health and welfare, and to maintain or enhance water quality in relation to the existing and/or potential beneficial uses of the water. Water quality objectives apply to both waters of the U.S. and waters of the State. In the State of California, the Porter-Cologne Water Quality Control Act is administered in concurrence with the § 401 CWA Water Quality Certification. As with § 401 CWA, the Colorado River Basin RWQCB will provide review and water quality certification for Porter-Cologne.

State Water Resources Control Board Resolution No. 2019-0015. The California Code of Regulations, title 23, Section 3831(w) states that "[a]ll waters of the United States are also 'waters of the state.'" This regulation has remained in effect despite Supreme Court decisions such as *Rapanos* and *SWANCC*, which added limitations to what could be considered a water of the U.S. Because the interpretation of waters of the U.S. in place at the time § 3831(w) was adopted was broader than any post-*Rapanos* or post-*SWANCC* regulatory definitions that incorporated more limitations into the scope of federal jurisdiction, it is consistent with the Water Boards' intent to include both historic and current definitions of waters of the United States into the SWRCBs wetland jurisdictional framework.

As set forth in Resolution No. 2009-0026, although the state of California has historically relied primarily on requirements in the Clean Water Act to protect wetlands, U.S. Supreme Court rulings reducing the jurisdiction of the Clean Water Act over wetland areas by limiting the definition of "waters of the United States" necessitated the use of California's independent authorities under the Porter-Cologne Act to protect these vital resources.

The inclusion of both current and historic definitions of "waters of the U.S." ensures some regulatory stability in an area that has otherwise been in flux. The status of a water of the U. S. may only be used to establish that a wetland or water qualifies as a water of the State; it cannot be used to exclude a wetland or water from qualifying as a water of the State. In other words, wetlands that are categorically excluded from qualifying as a water of the U.S. may nevertheless qualify as waters of the State under another jurisdictional category. Examples of waters of the State include (but are not limited to: ephemeral streams, streams, rivers, lakes, wetlands, mudflats, vernal pools, and other aquatic sites and isolated wetlands.

On April 2, 2019, the SWRCB adopted **Resolution No. 2019-0015**, *Amendment to the Water Quality Control Plan for Ocean Waters of California and the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California to Establish a State Wetland Definition and Procedures for Discharges of Discharges of Dredged or Fill Material to Waters of the State* (Procedures). for inclusion in the forthcoming Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California. As they apply to this project, the Procedures provide the SWRCB and its nine RWQCBs to approve a project only if the applicant has demonstrated the following:

- A sequence of actions has been taken to first avoid, then to minimize, and lastly, compensate for adverse impacts that cannot be practicably avoided or minimized to waters of the state;

- The potential impacts will not contribute to a net loss of the overall abundance, diversity, and condition of aquatic resources in a watershed (or multiple watersheds when compensatory mitigation is permitted in another watershed);

- The discharge of dredged or fill material will not violate water quality standards and will be consistent with all applicable water quality control plans and policies for water quality control; and

- The discharge of dredged or fill material will not cause or contribute to significant degradation of the waters of the state.

The SWRCB and the RWQCBs have the authority to regulate the discharge of dredged or fill material under § 401 CWA and Porter-Cologne. When a discharge is proposed to waters outside of federal jurisdiction, the SWRCB and the RWQCBs regulate the discharge under Porter-Cologne through the issuance of Waste Discharge Requirements (WDRs). CWA § 401 Water Quality Certifications, WDRs, and waivers of WDRs are referred to as orders or permits.

The Colorado River Basin RWQCB (Region 7) will provide review and certification/permitting for this project.

Basin Plans. The SWRCB requires its nine RWQCBs to develop water quality control plans (Basin Plans) designed to preserve and enhance water quality and protect the beneficial uses of all Regional waters. Specifically, Basin Plans designate beneficial uses for surface waters and groundwater, set narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State antidegradation policy, and describe implementation programs to protect all waters in the Regions. In addition, Basin Plans incorporate by reference all applicable State and Regional Board plans and policies, and other pertinent water quality policies and regulations. This project is under the jurisdiction of the Colorado River Basin RWQCB.

Construction Stormwater Program. The SWRCB implements water quality regulations under the federal CWA and California Porter-Cologne Water Quality Control Act and require compliance with the National Pollutant Discharge Elimination System (NPDES) for discharges of stormwater runoff associated with a construction activity.

Dischargers whose projects disturb one acre or more of soil are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 2009-009-DWQ, as amended). Construction Activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP should contain a site map(s) which shows the construction site perimeter, existing and proposed buildings, lots, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns.

The SWRCB will provide Construction General Permit review and permitting for this project.

Lake or Streambed Alteration Agreement. Sections 1600-1616 FGC of the FGC protect the natural flow and the bed, channel, and bank of any river, stream, or lake designated by the CDFW which is at

any time an existing fish or wildlife resource, or a waterbody from which these resources derive benefit. General project plans must be submitted to CDWF in sufficient detail to indicate the nature of the project proposed for construction, if the project would:

- Divert, obstruct, or change a streambed;
- Use material from the streambeds;
- Result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a stream.

The Inland Deserts Region (Region 6) of the CDFW serves Riverside County and will provide LSA Notification Review and Agreement services for this project.

4.0 METHODOLOGY

Prior to conducting the onsite field investigation, a review of readily available data relevant to the project was performed and the results were compiled from federal, state, and regional agency websites, databases, and management plans; aerial imagery, USGS topographic maps, National Wetland Inventory (NWI) maps, data from the U.S. Environmental Protection Agency's Watershed Assessment, Tracking, & Environmental Results System (WATERS), and Natural Resources Conservation Service (NRCS) soil surveys to determine areas of potential USACE, RWQCB, and CDFW jurisdiction, e.g. the location of any potential waters of the U.S. and State, including wetlands. UltraSystems biologist Matthew Sutton then conducted a reconnaissance-level field survey of the biological resources potentially associated with the project site and within a zone 500 feet out from the project site; these define the BSA (**Appendix A**, Figure 3, *Site Plan Overview*). The BSA includes all areas that could potentially be directly, indirectly, or cumulatively impacted by the project.

Areas of potential jurisdiction to the USACE were evaluated and delineated in accordance with the methodology set forth in the USACE 1987 *Wetland Delineation Manual* (*Manual*), The *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (*Arid West Supplement*; 2008), and *the Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (*OHWM Supplement*; 2010). Only those potentially jurisdictional features in and along the bed and banks near the project impact area and within a 500-foot buffer that comprised the Biological Study Area (BSA) were investigated and delineated.

On March 5, 2022 UltraSystems biologist Matthew Sutton conducted a survey of potentially jurisdictional features within the project site and continued their survey 500 feet upstream and downstream of the project footprint. Wetlands and other waters of the U.S. and State that are located outside of this segment of the BSA and not within known or anticipated areas of project-related ground disturbance will not be affected by the project and were therefore, not delineated. Results of the delineation surveys are provided in **Section 6.0**.

On March 5-6 and May 26-27, 2022, Mr. Sutton conducted a jurisdictional delineation survey within the project area and BSA. Representative photographs of the project site taken during the field surveys can be found in **Appendix C**, *Site Photographs*.

Biologists also used field guides, topographic maps, and aerial maps (scale is one inch = approximately 100 feet) during the field survey to assist in identifying and characterizing physical features. In addition, biologists used Global Positioning System (GPS) units and other GIS and survey-related techniques, hardware and software to collect data and populate any attributes required by

the relevant agencies. Digital color photographs were taken during the field survey to record existing site conditions.

Biologists surveyed the project site to determine the extent of waters and wetlands subject to jurisdiction of the United States Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), CDFW and/or the County of Riverside within the BSA; however, these agencies make the final determination of jurisdiction in accordance with their regulatory authority. Biologists also noted the surrounding environment, topography, land uses, substrates, and vegetation within and adjacent to each drainage. At each potential jurisdictional area, biologists searched for the presence of wetland hydrology, hydric soils, hydrophytic vegetation, signs of an OHWM, the presence of a well-defined bed and bank, and evidence of recent water flow and areas of scour. All drainages identified in the BSA were examined for connectivity, or lack of connectivity, to larger drainages. Vegetation along the drainages was also identified and any potential indicators of wetland conditions were recorded on data sheets and in field notes. Each potential jurisdictional area was assigned a name/number for identification.

The drainage boundaries and jurisdictional areas were delineated using a hand-held GPS unit and 100-meter measuring tape to collect width measurements between the observed OHWM (federal) and bank with associated riparian vegetation (state) on each side of the drainages. Widths were estimated when access was not possible. Width measurements were collected where the channel or associated vegetation width appeared to change. Those points were collected using a hand-held GPS unit and/or marked on aerial maps. Following the field mapping, UltraSystems GIS staff digitized the jurisdictional boundaries into an ArcGIS file. GIS lengths, widths, acreages, and boundaries for each agency's jurisdiction were then calculated.

5.0 DATA REVIEW RESULTS

5.1 Climate and Hydrological Data

Desert Hot Springs has a hot-arid climate with very little precipitation during the summer months. Most precipitation falls between November and March. Arid climates tend to support sparse, scrubby vegetation. The closest historical climate data station to the project site is US COOP Station 046635 in the City of Palm Springs, California. and it is located approximately 7 miles south of the project site. Based on the monthly climate summary data from the Palm Springs US COOP station, the region near the project site generally receives 5.49 inches of rain per year. Snowfall is 0 inches. The July average maximum temperature is 108.2 degrees Fahrenheit (°F) and the January low is 42.3 degrees Fahrenheit (°F) (WRCC, 2016)[see **Appendix D**, *Climate Data*].
Monthly temperature and precipitation averages and extremes recorded at this station 2006 to 2022 are presented in **Table 5.1-1** (WRCC, 2020).

Table 5.1-1
TEMPERATURE AND PRECIPITATION STATISTICS FOR PALM SPRINGS STATION 046635 (1927-2005)

Calendar Month	Monthly Averages			
	Temperature (°F)			Precipitation (inches)
	Max	Min	Mean	Mean
January	69.9	42.3	56.1	1.14
February	73.7	45.6	59.6	1,02
March	79.3	48.8	64.05	0.59
April	86.7	54.1	70.4	0.17
May	94.5	60.4	77.5	0.05
June	103.0	67.0	85.0	0.06
July	108.2	75.2	91.7	0.20
August	106.8	74.3	90.6	0.30
September	101.7	68.1	84.9	0.34
October	91.4	59.4	75.4	0.26
November	78.7	49.2	64.0	0.47
December	69.8	42.3	56,0	0.93
Annual	**88.6**	**57.2**	**72.9**	**5.53**

5.2 Soils

Based on the USDA NRCS Web Soil Survey for Riverside County, Coachella Valley Area, California (Soil Survey Staff 2022), the BSA contains two soil map units (shown in **Appendix A**, Figure 6: *USDA Soils*, and described in **Appendix E**, *Soils Report*), which are presented in **Table 5.2-1**, *Soils Mapped Within the BSA*. Both mapped soil units are listed on the State Soil Data Access Hydric Soils List (USDA-NRCD 2022).

Table 5.2-1
SUMMARY OF SOIL MAPPING UNITS

Name	Symbol	Ecological Site	Hydric Status	Acreage in BSA
Myoma fine sand, 0 to 5 percent slopes	MaB	Lacustrine Basin and Large River Floodplain	Hydric	101.2
Myoma fine sand 5 to 15 percent slopes	MaD	Lacustrine Basin and Large River Floodplain	Hydric	16.3
			Total	**117.5**

5.3 National Wetland Inventory

The U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) has mapped freshwater ponds within the golf club property located east of the project site and at some residential developed areas located southwest of the intersection of Dillon Road and Mountain View Road. These freshwater ponds are artificial water features located approximately 0.6 mile east and northeast of the project site. In addition, there is an NWI-mapped riverine area located approximately 0.25 mile east from the project site. This Riverine area does not occur within the BSA (see **Appendix A**, Figure xx: *National Wetlands Inventory*).

Neither freshwater ponds, riverine, nor other wetlands were mapped within the BSA or the project site.

Multiple Riverine areas have been mapped in the project vicinity by the NWI. The NWI has not mapped any of the jurisdictional features that were surveyed.

The NWI describes these areas as Riverine wetland (R4SBA). The Riverine System and individual attributes (i.e., 4, S, B, and A) are described in **Table 5.3-1.**

Table 5.3-1
NWI ATTRIBUTES OF R4SBA WETLANDS

Classification	Code	Description
System **Riverine**	**R**	All wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts of 0.5 ppt or greater. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water.
Subsystem **Intermittent**	**4**	Includes channels that contain flowing water only part of the year. When the water is not flowing, it may remain in isolated pools or surface water may be absent.
Class **Streambed**	**SB**	Includes all wetlands contained within the Intermittent Subsystem of the Riverine System and all channels of the Estuarine System or of the

		Tidal Subsystem of the Riverine System that are completely dewatered at low tide.
Water Regime **Temporary Flooded**	**A**	Surface water is present for brief periods (from a few days to a few weeks) during the growing season, but the water table usually lies well below the ground surface for the most of the season.

5.4 Land Use

The project is located in the Mojave Desert Major Land Resource Area (MRLA) Region 30 of the California Subtropical Fruit, Truck, and Specialty Crop Region (USDA, 2006). MRLAs are geographically associated land resource units delineated by the Natural Resources Conservation Service and are the basic units for delineating statewide patterns of soils, climate, water resources, and land use by analyzing elevations, topography, and rainfall data (effective amount, timing, kind, and distribution).

Land uses of Region 30 include grassland (78%), forest (2%), urban development (4%) water (3%), and other uses (13%). Major concerns within this MLRA is the absence of soil sustainability, resulting in no soil loss tolerance within this extremely arid environment. Other resource concerns include the decline of water tables and salt accumulation in the soils used for crops. Efficiently using the limited water supply is an important management concern.

The wind and water erosion hazard is considered to be severe within this MRLA, particularly on areas used intensively for recreation and vehicle traffic including the use of off-road vehicles. The major soil resource concerns are the productivity and sustainability of the soils and the hazards of erosion (USDA, 2006, pp.86-87).

.

The majority of the project site is surrounded by open space. There is a golf club located east of the project site.

5.5 Local Hydrology

The project site is located on an alluvial fan within the Whitewater River Watershed (HU; HU Code 18100201), which drains approximately 1,645 square miles.

Surface waters in the project area flow south and through the project vicinity (see **Appendix A**; Figure 7, *Surface Waters and Watersheds*) to the Coachella Valley Stormwater Channel. The surface waters continue to flow southeast to the Salton Sea, which is a terminal lake with no outlet to the ocean Water entering the Salton Sea can only depart through evaporation.

A groundwater monitoring well (CASGEM Well ID: 50683) located along Little Morongo Road, approximately 0.47 mile north of 20th Avenue ,which recorded a groundwater depth of 540.9 feet below ground surface on December 6, 2021. The groundwater level recorded at this well was 542 feet below ground surface on December 2, 2020 (CASGEM 2022).

5.6 Vegetation

Ephemeral Drainage D1 consists of two connected drainages that receive their waters primarily from the location at which sheet flow overflows the roadway berm of Palm Drive on the eastern

project boundary. These connected drainages are collectively referred to as D1. One drainage is located in the southeast quadrant of the project site, approximately 100 feet north of the southern project boundary; the other is on the southern project boundary with an east-to-west orientation .

The dominant vegetation at the top of the banks and in the active floodplain is white bursage with approximately 25 percent cover. There is also a five percent cover of creosote bush and five percent cover of fourwing saltbush (*Atriplex canescens*). Scattered herbaceous cover occurs within the low-flow channel bottom and along the banks and consists of Sahara mustard, desert dandelion, and desert pincushion. There is also the occurrence of cheesebush.

At the low terrace boundary, D1 is dominated by creosote bush with approximately 20 percent cover. The sub-dominant shrub is white bursage. There is an approximately 25 percent cover of herbaceous species, dominated by Sahara mustard, with a low cover of desert pincushion and desert dandelion. The low terrace of this ephemeral drainage contains coarse sand soils. *Preliminary Descriptions of the Terrestrial Communities of California* (Holland, 1986) classifies this species assemblage as Sonoran Creosote Bush Scrub (Element Code: 33100). *A Manual of California Vegetation Second Edition* (Sawyer et al., 2009) classifies this species assemblage among the *Larrea tridentata - Ambrosia dumosa* Shrubland Alliance (creosote bush – white bursage scrub). Creosote bush – white bursage scrub). This community is designated by NatureServe as a secure (G5 and S5) natural community.

At this channel's eastern extent, there is a large washout area where stormwater runoff overflows the roadway margin berm on western sided of Palm Drive and enters into the eastern boundary of the project site approximately 550 feet north of the southern boundary. These waters fan out in a series of micro-channels until they reach the base of an aeolian dune in the southwestern corner of the project site.

There is a desert riparian plant community associated with this washout area, which is discussed in **Section 6.2**, formed at two points where stormwater runoff overflows the roadway berm. This washout area is characterized by moist soils, indicated by the presence of cracked mud.

In addition to the washout area described above, there are two swales associated with D1. Swale (D1S2) has a radius of approximately 50 feet and occurs where D1 bends southeasterly around the base of the aeolian dune, approximately 100 feet west of the washout area. Sheet flow from the aeolian dune located immediately east of the swale appears to contribute to the formation of this swale.

Lastly, another swale (D1S3) occurs at the at the southern boundary of the project site where D1 turns sharply and proceeds along the southern boundary in an east to west alignment. This swale is formed by a combination of two sources of water flow. One fluvial contributor is water that overflows the banks of D1 as it bends sharply from a north to south alignment to an east to west alignment at the southern boundary. Another fluvial contributor to Swale D1S3 is stormwater runoff that flows down the southern slopes of the aeolian dune and settles in the flat bottom area that comprises D1S3.

Ephemeral Drainage D2 is a non-vegetated channel, measuring approximately 150 feet in length. It is located approximately 102 feet west of the location where D1 bends sharply at the southern boundary of the project site. D2 discharges into D1. The vegetation density is higher in the active floodplain than in the low-flow channel or at OHWM. The low terrace is at a higher elevation than the OHWM and active floodplain. It is dominated by shrubs such as creosote bush and white bursage. Vegetation density is greater at the low terrace than in the active floodplain. Soils in the low terrace consist of medium sand.

On the active floodplain, D2 is dominated by white bursage, with approximately 20 percent cover. Sahara mustard is the dominant forb. There is also occurrence of desert dandelion and desert pincushion. The low terrace, which is characterized by a greater vegetative density than that of the active floodplain, contains desert sunflower, desert pincushion as the dominant plant species. There is also the occurrence of Sahara mustard, creosote bush, and white bursage. *Preliminary Descriptions of the Terrestrial Communities of California* (Holland, 1986) classifies this species assemblage as Sonoran Creosote Bush Scrub (Element Code: 33100). *A Manual of California Vegetation Second Edition* (Sawyer et al., 2009) classifies this species assemblage among the *Larrea tridentata - Ambrosia dumosa* Shrubland Alliance (creosote bush – white bursage scrub). Creosote bush – white bursage scrub). has been designated by NatureServe as a secure (G5 and S5) natural community.

Ephemeral Drainage D3 is a vegetated channel on an active floodplain, measuring approximately 150 feet in length. It is located approximately 300 feet west of D5, and discharges into larger channel at the southern project boundary. Soils within the delineated streambed are comprised of coarse sands and granules. soils

D3 contains an approximate cover of 20 percent herbaceous cover with desert pincushion and desert dandelion as the co-dominant species. Sahara mustard, white bursage, and creosote bush also occur at low cover in the active floodplain. The low terrace is characterized by a greater vegetation density than the active floodplain. Desert dandelion and desert pincushion are the co-dominant species. In the shrub layer, creosote bush and white bursage occur as co-dominant species. There is also the occurrence of Sahara mustard. *Preliminary Descriptions of the Terrestrial Communities of California* (Holland, 1986) classifies this species assemblage as Sonoran Creosote Bush Scrub (Element Code: 33100). A Manual of California Vegetation Second Edition (Sawyer et al., 2009) classifies this species assemblage among the *Larrea tridentata - Ambrosia dumosa* Shrubland Alliance (creosote bush – white bursage scrub). Creosote bush – white bursage scrub). has been designated by NatureServe as a secure (G5 and S5) natural community.

Ephemeral Drainage D4 is a channel on an active floodplain, measuring approximately 150 feet in length. It has a north-to-south orientation and discharges into another channel that approximately 500 feet from the southwestern project boundary. The banks contain relatively dense herbaceous vegetation. There are areas in the channel bottom that support ponded water, forming mud-cracked surfaces in several areas.

There are areas where water settles into a group of interconnected swales at the upstream extremity of this channel. The area of the swale appears to be low-lying and receives water through sheet flow and/or other indistinct drainages from surrounding areas that may be at slightly higher elevations. Several of the low-lying areas contain cracked sediment and contain very sparse vegetation The shrubs dominant surrounding the swales include creosote bush and white bursage.

Ephemeral Drainage D5 is a vegetated channel on an active floodplain, measuring approximately 150 feet in length. It begins at the nexus of dirt roads located at the southwestern corner of the project site.

The channel bottom of D5 is dominated by Sahara mustard (*Brassica tournefortii*). Red-stemmed filaree (*Erodium cicutarium*), white bursage (*Ambrosia dumosa*), cheesebush (*Ambrosia salsola*) and creosote bush (*Larrea tridentata*) are also present in the channel bottom. There is also desert pincushion (*Chaenactis fremontii*) and desert dandelion (*Malacothrix glabrata*). This community is classified as non-native grassland (Element Code: 42200) in *Preliminary Descriptions of the Terrestrial Communities of California* (Holland, 1986*). A Manual of California Vegetation Second*

Edition (Sawyer et al., 2009) classifies this species assemblage among *Brassica tournefortii - Malcolmia africana* Provisional Herbaceous Semi-natural Alliance(Tournefort's mustard and other ruderal desert forb patches). Creosote bush – white bursage scrub has been designated by NatureServe as a secure (G5 and S5) natural community. Secure communities are common, widespread, and abundant in the state. This community is considered low priority for inventory by CDFW and is not considered sensitive.

Swale Sink North (S1) is a large, low-lying area located in the northeast quadrant of the project site. This area functions as a swale. There is a large cluster of creosote bush located in the relative center of the swale. The density of the vegetative cover, particularly the creosote bush, is relatively low in comparison to surrounding areas. There is also an approximate 20 percent forb cover consisting of white bursage. *Preliminary Descriptions of the Terrestrial Communities of California* (Holland, 1986) classifies this species assemblage as Sonoran Creosote Bush Scrub (Element Code: 33100). *A Manual of California Vegetation Second Edition* (Sawyer et al., 2009) classifies this species assemblage among the *Larrea tridentata - Ambrosia dumosa* Shrubland Alliance (creosote bush – white bursage scrub). Creosote bush – white bursage scrub). has been designated by NatureServe as a secure (G5 and S5) natural community.

See **Appendix G** for a list of plant and wildlife species observed.

6.0 FIELD INVESTIGATION RESULTS

The field investigation resulted in the delineation of ten water features within the project site; six ephemeral drainages and four swales associated with these ephemeral drainages. (see **Appendix A**, Figure 9, *Jurisdictional Waters*).

The combined potential impacts of waters under the jurisdictions of the RWQCB and CDFW resulting from construction of the project are summarized in **Table 6.0-1**. The extent of the aforementioned jurisdictional waters within the project site are shown in **Appendix A**, Figure 9, *Jurisdictional Waters*.

Table 6.0-1
TOTAL ACREAGE OF POTENTIAL IMPACTS TO JURISDICTIONAL WATERS

Agency Jurisdiction	Total in Project Area	Total Permanent Impact Acreage	Total Temporary Impact Acreage	Total Impact Acreage
Waters of the State (RWQCB OHWM)	0.491599	0.491599	0.491599	**0.491599**
Waters of the State (RWQCB – Swale)	0.449995	0.449995	0.449995	**0.449995**
Waters of the State (CDFW/RWQCB – Desert Riparian)	0.997491	0.997491	0.997491	**0.997491**
Waters of the State (CDFW Bank-to-Bank)	0.491599	0.491599	0.491599	**0.491599**
Total Waters of the State (RWQCB)	1.939085	1.939085	1.939085	1.939085
Total Waters of the State (CDFW)	1.48909	1.48909	1.48909	1.48909

The jurisdictional areas include the following ephemeral drainages and associated swales.

6.1 Ephemeral Drainages On-Site

Ephemeral Drainage D1 meets the definition of a water of the State as set forth in §§1602 – 1616 FGC, and will also be under the jurisdiction of CDFW and the RWQCB**.**

D1 consists of two connected drainages that are that receive their waters primarily from the location at which sheet flow overflows the roadway berm of Palm Drive on the eastern project boundary. At this point of intersection, both channels combine and waters then flow to the south onto the south-adjacent property These connected drainages are collectively referred to as D1. One drainage is located in the southeast quadrant of the project site, approximately 100 feet north of the southern project boundary; the other is on the southern project boundary with an east-to-west orientation. This drainage discharges into the channel at the southern project boundary.

One side of the active floodplain and OHWM occur at the top of the bank as primary flow occurs within that side of the banks. The OHWM is indistinct at areas where the bank slope is gradual and the slope angle does not significantly change at the point of intersection with the low terrace. In these areas, the OHWM was determined mainly by change in the textures of the sediment from coarse to finer. There is a network of small channels that occur in the active floodplain. At the time of the survey, the soils of the active floodplain are very coarse sand. Several tributaries feed into this channel. The water does not continue to flow south due to the presence of dunes with slopes that would impede the flow of water past this point.

The desert riparian washout area occurs at the headwaters of D1 where stormwater runoff from Palm Drive overflows the roadway berm. This area is located on the north side of the aeolian dune.

This area consists of a network of micro-channels that flow in a southerly to southwesterly direction until they meet the base of the aeolian dune. At this point the waters combine into a main channel, D1, and bend around the dune. The dominant plant species of this swale are fourwing saltbush (*Atriplex canescens*), Sahara mustard, and creosote bush. This desert riparian habitat meets the definition of a water of the State as set forth in §§1602 – 1616 FGC, and will also be under the jurisdiction of CDFW and the RWQCB.

Swales D1S2 and D1S3 are described above and are also associated with D1. Both of these swales meet the definition of a water of the State as set forth in §§1602 – 1616 FGC, and will also be under the jurisdiction of the RWQCB.

Ephemeral Drainage D2 meets the definition of a water of the State as set forth in §§1602 – 1616 FGC, and will also be under the jurisdiction of CDFW and the RWQCB.

D2 is a tributary that extends approximately 75 feet upstream before eventually dissipating into a sheet flow with no definable features. There deposition of sand in the low flow channel bottom, particularly in the 26 foot section of the downstream portion. The upstream portion is supplied by sheet flow.

Ephemeral Drainage D3 meets the definition of a water of the State as set forth in §§1602 – 1616 FGC, and will also be under the jurisdiction of CDFW and the RWQCB.

D3 is channel that flows north to south and discharges into the larger D1 at the southern property boundary channel. This channel is located about 300 feet west of D1 and discharges at the southern project boundary. The OHWM was determined at the top of the bank at a point in which the bank was visible. Points at which the bank was not identifiable, the point at which vegetation density increases and a break in the bank slope were used as indicators of the OHWM. D3 shares the same OHWM near the point of discharge at each channel. The active floodplain was determined to be at the top of the bank. The topography of the floodplain gently slopes in the direction of the channel. The low terrace lies at a slightly higher elevation than the active floodplain. The low-flow channel is identifiable by the deposition of granules and the presence of incised banks toward the terminus of this channel's downstream reach. (see **Appendix A**, *Figure 9*, *Jurisdictional Areas*).

Ephemeral Drainage D4 meets the definition of a water of the State as set forth in §§1602 – 1616 FGC, and will also be under the jurisdiction of CDFW and the RWQCB.

D4 is a channel on an active floodplain, measuring approximately 150 feet in length. It has a north-to-south orientation and discharges into another channel that approximately 500 feet from the southwestern project boundary. The banks contain relatively dense herbaceous vegetation. There are areas in the channel bottom that support ponded water, forming mud-cracked surfaces in several areas.

There are areas where water settles into an area (D4S1) at the upstream extremity of this channel. The area of the swale appears to be low-lying and receives water through sheet flow and/or other indistinct drainages from surrounding areas that may be at slightly higher elevations.

Ephemeral Drainage D5 meets the definition of a water of the State as set forth in §§1602 – 1616 FGC, and will also be under the jurisdiction of CDFW.

D5 is a channel located at the southern edge of the project site, approximately 500 feet from the southwestern corner. This ephemeral drainage begins at the nexus of some dirt roads located at the southwest corner of the project site. There are no banks at the beginning of the channel, and banks develop between 200 and 500 feet east of the beginning of the channel. Then, the banks dissipate into unidentifiable features with signs of ponding water such as cracked mud that proceeds for approximately 200 feet until a point at which another tributary discharges into this channel.

The base substrate present in the low-flow channel is fine sand, with the top quarter-inch containing coarse granules. Sections of the channel for which there was no definable bank were mapped based on surface relief and soil color in addition to changes in vegetative cover. Soil color was used as an indicator of the active floodplain because there was a rain event that occurred during the week preceding the jurisdictional delineation survey, therefore many areas exhibited water flow and ponding.

The active floodplain is within the channel banks. There is very limited evidence that the water level in the channel exceeds the banks, however there are sections of the channel that do not exhibit definable banks In these areas, the floodplain widens in northern and southern directions. At these points, soil color was used as the main indicator of the floodplain limits. There was no clear evidence of low terrace above the banks of this channel

Swale Sink North (S1) meets the definition of a water of the State as set forth in §§1602 – 1616 FGC, and will also be under the jurisdiction of the RWQCB. It is a large, low-lying area located in the northeast quadrant of the project site. This area functions as a swale. Sheet flow from the surrounding areas, which are at a slightly higher elevation, travels from the higher ground to eventually settle into this swale. There are no clearly-defined channels that discharge into the swale. The swale is characterized by fine sands with cracked surfaces in areas of higher moisture.

Potential permanent and temporary impacts to waters of the State (RWQCB and CDFW) are provided in **Table 6.0-1.**

6.2 Desert Riparian Area On-Site

There is a desert riparian area associated with D1S1 that occurs in the southeastern segment of the project area. The riparian vegetation that occurs in this swale is considered jurisdictional by the CDFW, and the Colorado River Basin RWQCB because it is considered to be desert riparian vegetation.

6.3 Observed Jurisdictional Status

Using the results of the field investigation described in **Sections 6.1** and **6.2** of this document, the preliminary determination was made that the ephemeral drainages and associated swales are waters of the State. The drainages and are jurisdictional to the Colorado River Basin RWQCB under § 401 of the CWA, as well as the California Porter-Cologne Water Quality Control Act. The waters on the project site and in the BSA are considered isolated ephemeral drainages because they do not appear to connect to a stream that discharges into the Salton Sea or the Pacific Ocean as all of the water seems to pool in the property located south of the project area because the large dunes located south of this mentioned property would inhibit any additional southward movement of water from D1. Therefore, the drainages and swales are considered to be Waters of the State, however not Waters of the U.S.

The ephemeral drainages and swales on the project site were determined to be waters of the State under the jurisdiction of the RWQCB and CDFW in that

1. Pursuant to SWRCB Resolution No. 2019-0015, all waters in the State of California are waters of the State; and

2. Five ephemeral drainages, within the limits of the BSA, meet the definition of a watercourse as "a body of water that flows perennially or episodically and that is defined by the area in which water currently flows, or has flowed, over a given course during the historic hydrologic course regime, and where the width of its course can reasonably be identified by physical or biological indicators" as provided by Brady and Vyverberg (2013).

Project-related impacts are anticipated to occur to these Waters of the State, and are discussed further in **Section 7.0**.

Final jurisdictional status will be provided by the RWQCB, and CDFW. **Appendix A** *Figure 9, Jurisdictional Waters* depicts the jurisdictional boundaries of the waters of the State that were delineated within the affected portion of the BSA.

Photographs of the project area are located in **Appendix C** *Site Photographs* For supporting documentation pertaining to the observed jurisdictional status, please refer to **Appendix F** *Field Data Sheets.*

7.0 POTENTIAL IMPACTS OF THE PROJECT

Project-related permanent impacts resulting from the excavation and/filling of waters of the State are detailed in **Section 6.0**, *Field Investigation Results*. This section discusses potential effects or impacts, if any, to water quality, water quantity, and aquatic/riparian habitats (environmental resources) that could result from project development. Environmental resources may be either directly or indirectly impacted by a project (defined by California Environmental Quality Act [CEQA] Guidelines § 15358). Direct and indirect impacts may be either permanent or temporary in nature. These impact categories are defined below.

- **Direct impact**: Direct impacts caused by construction of the project are impacts that may cause an immediate effect on environmental resources (e.g., water quality, water quantity, and aquatic/riparian habitats) and occur at the same time and place. Any loss, alteration, disturbance or destruction of environmental resources that will result from project-related activities is a direct impact. Examples include vegetation clearing, encroaching into riparian habitat, diverting natural surface water flows, and the loss of habitats. Direct impacts are long-term.

- **Indirect impact**: As a result of project-related activities, water quality, water quantity, and aquatic/riparian habitats may also be affected in a manner that is not direct. Indirect impacts caused by the project occur later in time or farther removed in distance, but are still reasonably foreseeable. Indirect or secondary effects may include growth-inducing effects and other effects related to induced changes in the pattern of land use, population density, or growth rate, and related effects on air and water and other natural systems, including ecosystems. Examples of indirect impacts include increased human activity, elevated dust levels, decreased water quality, soil compaction, erosion created by the removal of vegetation, and the introduction of invasive plants. These indirect impacts may be both short term and long-term in their extent.

- **Permanent impacts**: All impacts that result in the long-term or irreversible removal of environmental resources are considered permanent. Examples include constructing a building or permanent road on an area containing jurisdictional areas.

- **Temporary impacts**: Any impacts considered to have reversible effects on environmental resources can be viewed as temporary. Examples include short-term increased vehicle traffic and the generation of fugitive dust during construction; or removing vegetation and either allowing the natural vegetation to recolonize or actively revegetating the impact area.

7.1 Direct Impacts

Direct impacts to environmental resources have immediate consequences, such as the changes that occur when land is cleared for permanent development and environmental resources are altered or removed during project construction activities. Examples of potential direct impacts which could directly impact environmental resources include any ground-disturbing activities, such as grading, clearing, disking, grubbing, excavation, trenching, paving, or heavy equipment compacting that will permanently remove or alter riparian or aquatic habitat. Other examples of potential direct impacts to environmental resources include stockpiling, channelization, bank stabilization, road crossings, or any other permanent drainage or habitat modification.

Direct permanent impacts include areas within the limits of grading of the project footprint where concrete or other permanent change will occur that prevents regrowth of vegetation. Within these areas, all the vegetation within the drainages would be permanently removed and the drainages will be permanently filled during construction-related activities.

To meet the project's purpose and need, and after incorporating avoidance and minimization measures, project implementation will result in unavoidable impacts to environmental resources. **Appendix A Figure 9**, *Jurisdictional Waters* depicts the location and area of impacts to waters and riparian habitats. **Table 6.0-1**, *Total Acreage of Potential Impacts to Jurisdictional Waters,* presents the approximate total acreages of aquatic/riparian habitat that will be directly impacted by project activities. Calculations were based on the currently proposed development design in conjunction with the jurisdictional delineation map created using GPS data from the field surveys.

Direct, permanent impacts to environmental resources are anticipated as a result of implementation of the project. As a result, mitigation and consultation with the Colorado River Basin RWQCB, and CDFW will be required. Implementing the recommended conservation measures described in **Section 8.0** will help to reduce potential direct, permanent impacts to jurisdictional areas to less than significant levels. **Section 8.0** describes the necessary federal and state biological permits and/or approvals that will be required for project approval.

7.2 Indirect Impacts

Indirect impacts to environmental resources result in secondary consequences and are likely to be temporary during construction, but they could also be long-term as a result of impervious surfaces and permanent development. Indirect impacts from project implementation could occur within areas located adjacent to the limits of construction and then eventually within areas located adjacent and downstream to the new development. Construction-related pollution, airborne fugitive dust, erosion, runoff, siltation, sedimentation, and soil compaction could adversely affect environmental resources such as water quality, and aquatic habitats. Alteration of drainage patterns could affect downstream environmental resources by redirecting flow from downstream areas and sediment-laden runoff to receiving waters. Another example of indirect impacts includes the introduction and spread of invasive, exotic plants which could result in permanent indirect impacts to environmental resources.

Project could result in indirect impacts to adjacent or downstream environmental resources that are not directly impacted by construction. Mitigation and consultation with the CDFW and the RWQCB is required. Implementing the recommended conservation measures described in **Section 8.0** will minimize or avoid potential indirect impacts to environmental resources.

8.0 MITIGATION MEASURES

CEQA states that "mitigation measures are not required for effects which are not required for effects which are not found to be significant" (§ 15126.4[a][3]). Therefore, no mitigation measures are proposed for impacts to biological resources that are less than significant. However; if significant impacts to biological resources are identified, then possible mitigation measures are recommended to eliminate or reduce the level of the impacts to less than significant levels. There are several forms of mitigation. Under CEQA (§ 15370), "mitigation" includes all of the following:

- "Avoiding" the impact altogether by not taking a certain action or parts of an action.
- "Minimizing" impacts by limiting the degree or magnitude of the action and its implementation.
- "Rectifying" the impact by repairing, rehabilitating, or restoring the impacted environment.
- "Reducing" or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- "Compensating" for the impact by replacing or providing substitute resources or environments.

Generally, it is best to first avoid any adverse impacts by modifying the project footprint or location; however, this may be undesirable to the City of Desert Hot Springs. Minimizing, rectifying, or reducing adverse project impacts are the next best mitigation alternatives. Compensation will only be considered as the last alternative. Compensation includes mitigation undertaken to replace lost or adversely impacted habitat with habitat having similar functions of equal or greater ecological value.

BIO-6 Worker Environmental Awareness Program

Prior to project construction activities, a qualified biologist will prepare and conduct a WEAP that will describe the biological constraints of the project. All personnel who will work within the project site will attend the WEAP prior to performing any work. The WEAP will include, but not be limited to the following: results of pre-construction surveys; description of sensitive biological resources potentially present within the project site; legal protections afforded the sensitive biological resources; BMPs for protecting sensitive biological resources (i.e., restrictions, avoidance, protection, and minimization measures); and individual responsibilities associated with the project. The program will also include the reporting requirements if workers encounter a "sensitive" wildlife species (i.e., notifying the biological monitor or the construction foreman, who will then notify the biological monitor).

Training materials will be language-appropriate for all construction personnel. Upon completion of the WEAP, workers will sign a form stating that they attended the program, understand all protection measures, and will abide by all the rules of the WEAP. A record of all trained personnel will be kept with the construction foreman at the project field construction office and will be made available to any resource agency personnel. If new construction personnel are added to the project later, the construction foreman will ensure that new personnel receive training before they start working. The biologist will provide written hard copies of the WEAP and photos of the sensitive biological resources to the construction foreman.

BIO-7 Biological Monitor

A biological monitor will be onsite to monitor activities that result in the clearing or grading of areas known to contain sensitive biological resources, such as riparian habitat, as well as ground-disturbing activities in jurisdictional areas to ensure that impacts do not exceed the limits of construction and to minimize the likelihood of inadvertent impacts to listed species and other wildlife species. The biological monitor will ensure that all biological mitigation measures, BMPs, avoidance and protection measures described in the relevant project permits and reports are in place and are adhered to. Monitoring will cease when the sensitive habitats and jurisdictional areas have been cleared or impacted.

The biological monitor will have the authority to halt all construction activities and all non-emergency actions if listed species are identified and will be directly impacted. The monitor will notify the appropriate resource agency and consult if needed. If needed and possible, the monitoring biologist will relocate the individual outside of the work area where it will not be harmed. Work can continue at the location if the City of Desert Hot Springs Valley and the consulted resource agency determine that the activity will not result in impacts to the species.

BIO-8: Construction Best Management Practices

Project work crews will be directed to use standard Stormwater Construction BMPs where applicable. These measures will be identified prior to construction and incorporated into the construction operations.

The City of Desert Hot Springs will ensure that construction activities will include BMPs to prevent accidental falls of wildlife into excavated areas. The construction crew will inspect excavated areas daily to detect the presence of trapped wildlife. All deep or steep-walled excavated areas will be covered with tarp and either be furnished with escape ramps or be surrounded with exclusionary fencing in order to prevent wildlife from entering them. Wildlife found in excavation areas should be relocated out of harm's way to a suitable habitat outside of the project area, if possible.

BIO-9: Project Limits and Designated Areas

To avoid impacts to sensitive biological resources including jurisdictional areas, the City of Desert Hot Springs will implement the following measures prior to project construction and commencement of any ground-disturbing activities or vegetation removal.

- Specifications for the project boundary, limits of construction, project-related parking, storage areas, laydown sites, and equipment storage areas will be mapped and clearly marked in the field with temporary fencing, signs, stakes, flags, rope, cord, or other appropriate markers. All markers will be maintained until the completion of activities in that area.

- To minimize the amount of disturbance, the construction/laydown areas, parking areas, staging areas, storage areas, spoil areas, and equipment access areas will be restricted to designated areas. Designated areas will comprise existing disturbed areas (parking lots, access roads, graded areas, etc.) to the extent possible.

- Project-related work limits will be defined and work crews will be restricted to designated work areas. Disturbance beyond the actual construction zone is prohibited without

site-specific surveys. If sensitive biological resources are detected in the area to be impacted, then appropriate measures will be implemented to avoid impacts (i.e., flag and avoid, erect orange snow fencing, biological monitor present during work, etc.). However, if avoidance is not possible and the sensitive biological resources will be directly impacted by project activities, the biologist will mark and/or stake the site(s) and map the individuals on an aerial map and with a GPS unit. The biologist will then contact the appropriate resource agencies to develop additional avoidance, minimization and/or mitigation measures prior to commencing project activities.

BIO-12 Mitigation for Impacts to Jurisdictional Waters

Prior to the issuance of grading permits for the project, and prior to any impacts to jurisdictional areas, the City of Desert Hot Springs will obtain permits pursuant to Section 401 of the CWA for impacts to jurisdictional waters of the U.S. and pursuant to the California Porter-Cologne Water Quality Control Act, §§ 1600-1616 of the California Fish and Game for impacts to CDFW jurisdictional areas. These permits are described in detail within **Section 9.0** of the *Biological Resources Evaluation for the Green Day Village Project*, UltraSystems. The permits will mandate BMPs, avoidance and protection measures, and compensatory mitigation measures for impacts to jurisdictional waters. All measures to protect waters, water quality, fish, and wildlife resources will be incorporated into the project design as appropriate. Specific mitigation details to offset impacts to jurisdictional areas will be finalized during the permitting process with USACE, RWQCB, and CDFW.

8.1.1 Temporary Impact Mitigation

All impacts to jurisdictional areas as a result of project activities are anticipated to be permanent; therefore, no temporary impacts will occur as a result of the project.

8.1.2 Permanent Impact Mitigation

The project is anticipated to permanently impact the following:

- CDFW/RWQCB OHWM Jurisdictional Areas: 0.491599 acre
- RWQCB Swale Jurisdictional Areas: 0.449995 acre
- CDFW Bank-to-Bank Jurisdictional Areas: 0.491599
- CDFW/RWQCB Desert Riparian Jurisdictional Areas: 0.997491 acre

CDFW and/or RWQCB may require compensatory mitigation for impacts to waters of the State.

9.0 POTENTIAL FEDERAL, STATE, AND LOCAL BIOLOGICAL PERMITS AND APPROVALS

Each project must comply with federal, state, and local environmental laws and regulations. Any project that proposes to fill or otherwise physically alter creeks, wetlands, or other waters requires a number of federal, state and, in some cases, local permits before it can proceed. Both permanent and temporary impacts will require permits. Prior to project implementation and impacts (permanent or temporary) to jurisdictional waters, the project may need to obtain the following federal and state biological permits and/or approvals:

- CWA Section 401 Water Quality Certification from the RWQCB. (RWQCB will process the Section 401 WQC application as an application for Waste Discharge Requirements (WDR) under the authority of Porter-Cologne)
- LSA Agreement with CDFW.

9.1 Compensatory Habitat Mitigation and Monitoring Plan (HMMP)

The USACE and State of California have set a goal to prevent further decline of wetlands through a "no net loss" approach. Projects are required to be in compliance with wetland laws and regulations and to implement the State and federal policies of no net loss of wetlands. As a result, project related impacts to jurisdictional waters and wetlands require mitigation through the creation, restoration, enhancement, and/or preservation of wetlands within a project site or offsite.

A draft HMMP, if required by the regulatory agencies, will need to be prepared and submitted along with the permit packages and applications (described in the following sections) to the appropriate resource agencies. The HMMP will describe the mitigation, monitoring, and management of waters and habitat provided as mitigation, as required by all the resource agencies (USACE, RWQCB, CDFW). This may include onsite or offsite preservation, restoration, and enhancement. The objective of the compensatory mitigation is to replace functions and values lost by impacts to jurisdictional waters and sensitive habitats after avoidance and minimization has been achieved to the maximum extent practicable. The format of the plan will follow the regulation set forth in the USACE's Los Angeles District Mitigation Guidelines and Monitoring Requirements, dated April 19, 2004, as amended, and the Mitigation Rule (33 CFR part 332; 73 FR 19670-19687 [April 10, 2008]). In compliance with the 2008 regulations (33 CFR 332.4[c]), the HMMP will address the following items: objectives, site selection, site protection instrument, baseline information, determination of credits, mitigation work plan, maintenance plan, performance standards, monitoring requirements, long-term management plan, adaptive management plan, and financial assurances. No work in jurisdictional areas will be authorized until the City of Desert Hot Springs receives, in writing (by letter or email), USACE approval of the final HMMP.

9.2 Section 401 WQC Permit

The City of Desert Hot Springs will prepare and submit a Section 401WQC application permit package to the RWQCB. The RWQCB will process the Section 401 WQC application as an application for Waste Discharge Requirements (WDR) under the authority of Porter-Cologne.

When a discharge is proposed to waters outside of federal jurisdiction, the SWRCB and the RWQCBs regulate the discharge under Porter-Cologne through the issuance of WDRs. SWRCB Resolution

No. 2019-0015 (Procedures) allow SWRCB and its nine RWQCBs to approve a project only if the applicant has demonstrated the following:

- A sequence of actions has been taken to first avoid, then to minimize, and lastly compensate for adverse impacts that cannot be practicably avoided or minimized to waters of the state;

- The potential impacts will not contribute to a net loss of the overall abundance, diversity, and condition of aquatic resources in a watershed (or multiple watersheds when compensatory mitigation is permitted in another watershed;

- The discharge of dredged or fill material will not violate water quality standards and will be consistent with all applicable water quality control plans and policies for water quality control; and

- The discharge of dredged or fill material will not cause or contribute to significant degradation of the waters of the state.

9.3 Lake or Streambed Alteration Agreement (LSAA)

The project site contains waters of the State that will be unavoidably impacted by the project (2.430684 acre); therefore, pursuant to §§ 1600-1616 FGC the project will require an LSA Agreement (Agreement) from CDFW. CDFW generally regulates waters and riparian areas through its Lake and Streambed Alteration Program, which requires execution of an agreement with CDFW before any activity substantially modifies a river, stream or lake. It is not legal to alter the bed or bank of a stream or lake or their natural water flow without an Agreement from CDFW. The California Fish and Game Code § 1602 requires an entity to notify CDFW of any proposed activity that may substantially modify a perennial, intermittent, and ephemeral river, stream, or lake in the state. The notification requirement applies to any work undertaken in or near a river, stream, or lake that flows at least intermittently through a bed or channel. This includes ephemeral streams, desert washes, and watercourses with a subsurface flow. It may also apply to work undertaken within the flood plain of a body of water.

It is anticipated that the City of Desert Hot Springs will need an Agreement for the project. Prior to the issuance of grading or building permits for the project, and prior to impacts to CDFW jurisdictional waters, the City of Desert Hot Springs will notify CDFW by submitting a complete notification permit package. The draft LSA notification package will include avoidance, minimization and/or mitigation measures (conditions) to protect fish, wildlife, and plant resources while conducting the project.

The Agreement will mandate BMPs, avoidance and protection measures, and compensatory mitigation measures for impacts to waters of the State under the jurisdiction of CDFW. Impacts and mitigation related to CDFW jurisdictional waters will be defined by the conditions of the Agreement between the City of Desert Hot Springs and the CDFW. All measures to protect fish and wildlife resources required by the SAA should be incorporated into the project design or operating procedures as appropriate. Compliance with the requirements of the Agreement and implementation of mitigation measures required by the permit, should offset the loss of waters of the State and associated riparian communities.

10.0 LITERATURE CITED AND REFERENCES

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. *The Jepson Manual: Vascular Plants of California,* second edition. University California Press, Berkeley.

CIMIS (California Irrigation Management Information System). 2022. Monthly Report for Station 200 (Indio) from June 2006 through May 2022. Available at https://cimis.water.ca.gov/. Accessed on June 3, 2022.

Curtis, K.E. and R.W. Lichvar. 2010. Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. Wetland Regulatory Assistance Program. Cold Regions Research and Engineering Laboratory. U.S. Army Engineer Research and Development Center, Hanover, New Hampshire.

Department of the Army, Corps of Engineers. 2017. Issuance and Reissuance of Nationwide Permits, Final Rule. https://www.federalregister.gov/d/2016-31355. Accessed on May 2, 2022.

Environmental Laboratory. 1987. *Corps of Engineers wetlands delineation manual*. Technical Report Y-87-1. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station. Retrieved from: http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf

Google Earth Pro. Version 7.3.3.7699. Desert Hot Springs, Riverside County, California. 33°54'39.55" 116°30'16.61". Eye altitude 3,300 feet. Imagery date August 5, 2021. Accessed on March 19, 2022.

Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. State of California, The Resources Agency, Nongame Heritage Program, California Department of Fish & Game, Sacramento, Calif. 156 pp.

Kollmorgen Corporation. 2000. Munsell Soil Color Charts. Macbeth Division of Kollmorgen Corporation, New Windsor, NY.

Lichvar, R. W and S. M. McColley. 2008. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual. Cold Regions Research and Engineering Laboratory. U.S. Army Engineer Research and Development Center, Hanover, New Hampshire.

Lichvar, R.W., M. Butterwick, N.C. Melvin, and W.N. Kirchner. 2016. *The National Wetland Plant List*: 2016 Update of Wetland Ratings. Phytoneuron 2016-30: 1-17.

NRCS. 2006. *Field indicators of hydric soils in the United States, Version 6.0*. ed. G. W. Hurt and L. M. Vasilas. Fort Worth, TX: USDA NRCS in cooperation with the National Technical Committee for Hydric Soils. Retrieved from: http://soils.usda.gov/use/hydric/.

Sawyer, J.O., T. Keeler-Wolf, J.M. Evens. 2009. *A Manual of California Vegetation, Second Edition*. California Native Plant Society Press. Sacramento, CA.

Soil Science Division Staff. 2017. Examination and description of soil profiles. In C. Ditzler, K. Scheffe, and H.C. Monger (eds.) Soil survey manual, USDA Handbook 18, Government Printing Office, Washington, D.C., pp. 83–233.

Soil Survey Staff. 2022. Web Soil Survey: Custom Soil Resource Report for Coachella Valley Area, Riverside County, California Available at https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed on April 16, 2012.

The Navigable Waters Protection Rule: Definition of "Waters of the United States". 85 *Federal Register* (21 Apr 2020). To be codified in 33 CFR 328.3 and 40 CFR 120.2.

UltraSystems. 2022. Draft Biological Resources Assessment for the Green Day Village Project Riverside County, California. June 2022.

UNL (University of Nebraska - Lincoln). 2022. The National Drought Mitigation Center, National Drought Monitor. Data Tables for the Years 2021 - .2022. Available at https://droughtmonitor.unl.edu/Data/DataTables.aspx. Accessed on June 26, 2022.

USACE (United States Army Corp of Engineers). 2016. National Wetland Plant List, version 3.3. Retrieved from: http://wetland_plants.usace.army.mil/.

USDA NRCS (United States Department of Agriculture, Natural Resources Soil Conservation Service). 2020. Soil Data Access (SDA) California State Hydric Soils List. Available at: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd1389479.html Accessed on March 17, 2022.

USDA NRCS (United States Department of Agriculture, Natural Resources Soil Conservation Service). 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin.) U.S. Department of Agriculture Handbook 296.

USDA NRCS (United States Department of Agriculture, Natural Resources Conservation Service). 2010. *Field Indicators of Hydric Soils in the United States*, Version 7.0. L.M. Vasilas, G.W. Hurt, and C.V. Noble (eds.). USDA, NRCS, in cooperation with the National Technical Committee for Hydric Soils.

USEPA (U.S. Environmental Protection Agency). 2022. WATERS (Watershed Assessment, Tracking & Environmental Results System). Available at https://www.epa.gov/waterdata/waters-watershed-assessment-tracking-environmental-results-system. Accessed on March 30, 2022.

Wakely, J.S., R.W. Lichvar, and C.V. Noble (eds). 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0).* ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

WRCC (Western Regional Climate Center). 2022. Monthly Climate Summaries for Palm Springs Station 046635 for the Period of Record 1906 – 2016. Available at https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca6635. Accessed on April 25, 2022.

APPENDIX I

DRAINAGE STUDY

PRELIMINARY DRAINAGE STUDY FOR TENTATIVE PARCEL MAP NO. TBD GREEN DAY VILLAGE PROJECT CITY OF DESERT HOT SPRINGS

Date: July 8, 2022

Prepared for:
LA World Construction
2029 Century Park East #400
Century City CA 90067

Revision History	
Date	Comment

Prepared by:
ASAP Consulting
6533 Cattleman Drive
Eastvale CA 92880

Engineer of Work/ Contact Person:
Prasad Kasturi, P.E.
Phone: 951-234-3435

SECTION 1 – INTRODUCTION

1.1 BACKGROUND

ASAP Consulting has been retained by LA World Construction to prepare Entitlement engineering for a new Residential/Commercial development known as Green Day Village, Tentative Parcel Map No. XXXXX with parking lot improvements and proposed private streets which requires a drainage report to show how storm water runoff from the 100 year storm shall be handled on-site for proper storm water handling and safety to the general public.

The project site is located in the City of Desert Hot Springs, California along Palm Drive across the Desert Dunes Golf Course with APN 657-280-003 and approximately 38.34 acres. Figure 1 shows the general vicinity of the project location.

The site is vacant and undeveloped and currently lies within a FEMA mapped flood plain Zone AO, Depth 3 foot. Existing land cover consists mostly of desert shrubbery and blow sand. There are no existing utilities on-site but will be designed and connected to the proposed wet utilities proposed in Palm Drive along the project frontage and storm water infrastructure onsite will discharge to onsite storm water basins for infiltration.

1.2 OBJECTIVE

1.) The objective of this drainage study is to determine the 100-year onsite discharges in accordance with the criteria and procedures described in the Riverside County Flood Control & Water Conservation District (RCFCD&WCD) Hydrology Manual. The included calculations have been prepared so as to show the required storage volume for on-site retention.

2.) As of June 15, 2009, developers must comply with the Colorado River Basin Regional Water Quality Control Board (CRBRWCB) requiring the preparation, approval, and implementation of a project-specific WQMP for discretionary New Developments and Redevelopment projects that fall into four (4) of the eight (8) Priority Development Project categories. This project falls into Category 3; “Commercial or Industrial ≥ 100,000 sq. ft., Category 6; “Restaurant disturbing > 5,000 sq. ft., Category 7; “Home subdivision ≥ 10 housing units, and Category 8; “Parking lots of 5,000 square feet or more of impervious surface exposed to storm water”. A separate submittal will be made for the Final project-specific WQMP.

SECTION 2 – HYDROLOGY

2.1 APPROACH AND METHODOLOGY

The hydrologic analysis described in this report was performed in accordance with the criteria and procedures outlined in the Riverside County Flood Control and Water Conservation District Hydrology Manual dated April 1978, referred to hereafter as “Hydrology Manual”.

The websoil survey (NRCS) Soil Map, shows the site lies entirely within hydrologic soil type “A”. A copy of the report is included in the appendix.

Precipitation data used in this study was taken from NOAA atlas 14 precipitation data at the site locations and a copy of that is included in the appendix as well.

The developed site will consist lot of impervious area and were analyzed with appropriate runoff coefficients for the residential and commercial land uses of the project. See RCFC&WCD hydrology manual E Plates included in Appendix A.

The design of the retention basins and other facilities as required in this drainage study shall be designed and installed per City of Desert Hot Springs and Riverside County Hydrology Manual requirements.

2.2 RATIONAL METHOD HYDROLOGY RESULTS

The peak 100-year discharges will be calculated using the rational method, as prescribed by the RCFC&WCD Hydrology Manual. Detailed calculations will be provided in the next submittal. For entitlements, unit hydrograph calculations are provided to make sure the storm water basins are sized adequately to store the 100-year storm runoff.

2.3 STORAGE VOLUMES

The project is required to retain 100% of the Q100 storm event onsite. A spreadsheet based on the Shortcut Method Synthetic Unit Hydrograph approach as prescribed by the RCFC&WCD Hydrology Manual has been utilized to perform the calculations. Basin storage capacity is modeled based on manual integration of the basin area at 1 foot contour intervals. Rainfall input data for the 100 year, 3, 6, and 24 hour storms is input per said Hydrology Manual. Basin Inflow is modeled in 5 minute intervals for the 3 and 6 hour storms, and 15 minute intervals for the 24 hour storm, based on the design storm unit hydrographs presented in the manual.

The full calculations can be found in the Synthetic Unit Hydrograph Calculations Section of this Report. A brief summary is provided below:

Basin Name: Basin “A”
Top (WSE): 347.27
Depth: 4 Feet
Area @ top: 46,870 sq ft
Available Volume: 153,579 Cu Ft
Required Flood Volume: 117,655 Cu Ft
100 Year Water Surface: 3 Hour: 346.88 6 Hour: 347.27 24 Hour: 346.57

Basin Name: Basin “B”
Top (WSE): 349.99
Depth: 4 feet
Area @ top: 2,200 sq ft
Available Volume: 7,038 Cu Ft
Required Flood Volume: 5,979 Cu Ft
100 Year Water Surface: 3 Hour: 349.99 6 Hour: 349.82 24 Hour: 349.74

Basin Name: Basin “C”
Top (WSE): 362.74
Depth: 4 foot
Area @ top: 2,200 sq ft
Available Volume: 15,446 Cu Ft
Required Flood Volume: 8,559 Cu Ft
100 Year Water Surface: 3 Hour: 362.56 6 Hour: 362.69 24 Hour: 362.74

Basin Name: Basin “D”
Top (WSE): 356.57
Depth: 5 feet
Area @ top: 6,000 sq ft
Available Volume: 43,956 Cu Ft
Required Flood Volume: 28,240 Cu Ft
100 Year Water Surface: 3 Hour: 356.12 6 Hour: 356.34 24 Hour: 356.57

Basin Name: Basin “E”
Top (WSE): 349.13
Depth: 5 feet
Area @ top: 6,000 sq ft
Available Volume: 44,842 Cu Ft
Required Flood Volume: 25,623 Cu Ft
100 Year Water Surface: 3 Hour: 248.82 6 Hour: 348.99 24 Hour: 349.13

2.4 DEVELOPMENT TYPE

The proposed development is based upon residential and commercial land use.

2.5 DRAINAGE AREA AND FLOW PATTERNS

The proposed development provides for 5 different retention locations on the site. Therefore, the proposed site grading contains a series of high points and low point collection locations carefully planned to proportionately collect and convey runoff to different portions of the site. Please see the Exhibit “A” (Hydrology map) for the Synthetic Unit Hydrograph Calculations as they clearly detail the various subareas and collection systems to be employed.

2.6 MANNING’S EQUATION “N” VALUES

Manning’s “N” values for asphalt with a smooth texture are typically taken as 0.015. N values for troweled finished Concrete Gutter are typically taken as 0.013. It was considered appropriate to utilize a manning’s value of 0.013 for all curb/gutter/pavement cross sections.

SECTION 3 – CONCLUSION

Methodology used in this study is in compliance with the Riverside County Flood Control and Water Conservation District criteria.

The Hydrology report contained herein does not account for any off-site runoff entering and being stored on-site. At the date of the preparation of this Preliminary Hydrology Report, upstream storm water mitigation measures are being prepared to drastically reduce the storm flows coming from the north which, may have an impact on the project site. As part of the upstream measures, a storm water channel is proposed along the north and west property lines to divert any offsite storm water impacting the site.

The pad and finish floor elevations that are shown on the Preliminary Grading plans which is also part of this report may need to be raised or lowered once the upstream mitigations have been conditionally approved and off-site storm water runoff flows can be modeled so that the final design will mitigate the off-site flows.

There are no anticipated negative downstream or upstream impacts.

SECTION 4 – REFERENCES

1. Riverside County Flood Control and Water Conservation District Hydrology Manual, 1978.
2. City of Desert Hot Springs Standard Details and Specifications
3. Civil Design – Rational Method calculation software
4. Hydraflow Express Extension for Civil 3D, Hydraulic sizing/calculation program

VICINITY MAP



VICINITY MAP

SYNTHETIC UNIT HYDROGRAPH CALCULATIONS

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN A		
10	AREA DESIGNATION	SUBAREAS A		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE	24.88		
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN	1.46		
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	52%		
27				
28	LENGTH OF WATERCOURSE (L)	1926		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	1400		
30				
31	ELEVATION OF HEADWATER	363.44		
32	ELEVATION OF CONCENTRATION POINT	345		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		344	28168	
45		345	32805	
46		346	37469	
47		347	42157	
48		348	46870	
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN A
[2] AREA DESIGNATION	SUBAREAS A
[3] AREA - ACRES	26.340
[4] L-FEET	1926
[5] L-MILES	0.365
[6] La-FEET	1400
[7] La-MILES	0.265
[8] ELEVATION OF HEADWATER	363.44
[9] ELEVATION OF CONCENTRATION POINT	345
[10] H-FEET	18.44
[11] S-FEET/MILE	50.6
[12] S^0.5	7.11
[13] L*LCA/S^0.5	0.01360
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.070
[16] LAG TIME-MINUTES	4.22
[17] 25% OF LAG-MINUTES	1.05
[18] 40% OF LAG-MINUTES	1.69
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	1.63

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	26.340	1.00	2.42	3.13	26.340	1.00	3.13	5.06	26.340	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	26.34	SUM [7]	2.42	SUM [9]	26.34	SUM [11]	3.13	SUM [13]	26.34	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.25	1.61	2.06
FLOOD VOLUME	(cu-ft)	119,267	153,579	196,746
	(acre-ft)	2.74	3.53	4.52
REQUIRED STORAGE	(cu-ft)	102,270	117,655	89,748
	(acre-ft)	2.35	2.70	2.06
PEAK FLOW	(cfs)	51.68	44.36	8.62
MAXIMUM WSEL	(ft)	346.88	347.27	346.57

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN A
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
	COMMERCIAL			90%	0.00	0.00	0.000	0.0000
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
A	SF - 1/4 ACRE	32	0.74	50%	0.41	24.88	0.945	0.3844
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
	MF - APARTMENTS			80%	0.00	0.00	0.000	0.0000
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
A	RETENTION BASINS	44	0.63	0%	0.63	1.46	0.055	0.0349
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	26.34	SUM	0.4194

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.209680334

C= 0.00388

Ft=C(24-(T/60))^1.55 = 0.00388 (24-(T/60))^1.55 + 0.21 in/hr

LOW LOSS RATE (80-90 PERCENT) = 52%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN A

BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	26.34
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	4.22
UNIT TIME-PERCENT OF LAG	118.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.42
CONSTANT LOSS RATE-in/hr	0.42
LOW LOSS RATE - PERCENT	52%

TOTAL PERCOLATION RATE (cfs) 1.63 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.42	0.20	0.180	4.75	937.07
2	10	0.17	1.3	0.378	0.42	0.20	0.180	4.75	937.07
3	15	0.25	1.1	0.319	0.42	0.17	0.153	4.02	717.77
4	20	0.33	1.5	0.436	0.42	0.23	0.016	0.43	0.00
5	25	0.42	1.5	0.436	0.42	0.23	0.016	0.43	0.00
6	30	0.50	1.8	0.523	0.42	0.27	0.103	2.72	328.38
7	35	0.58	1.5	0.436	0.42	0.23	0.016	0.43	0.00
8	40	0.67	1.8	0.523	0.42	0.27	0.103	2.72	328.38
9	45	0.75	1.8	0.523	0.42	0.27	0.103	2.72	328.38
10	50	0.83	1.5	0.436	0.42	0.23	0.016	0.43	0.00
11	55	0.92	1.6	0.465	0.42	0.24	0.045	1.19	0.00
12	60	1.00	1.8	0.523	0.42	0.27	0.103	2.72	328.38
13	65	1.08	2.2	0.639	0.42	0.33	0.220	5.78	1246.27
14	70	1.17	2.2	0.639	0.42	0.33	0.220	5.78	1246.27
15	75	1.25	2.2	0.639	0.42	0.33	0.220	5.78	1246.27
16	80	1.33	2.0	0.581	0.42	0.30	0.161	4.25	787.33
17	85	1.42	2.6	0.755	0.42	0.39	0.336	8.84	2164.17
18	90	1.50	2.7	0.784	0.42	0.41	0.365	9.61	2393.64
19	95	1.58	2.4	0.697	0.42	0.36	0.278	7.31	1705.22
20	100	1.67	2.7	0.784	0.42	0.41	0.365	9.61	2393.64
21	105	1.75	3.3	0.958	0.42	0.50	0.539	14.20	3770.49
22	110	1.83	3.1	0.900	0.42	0.47	0.481	12.67	3311.54
23	115	1.92	2.9	0.842	0.42	0.44	0.423	11.14	2852.59
24	120	2.00	3.0	0.871	0.42	0.45	0.452	11.90	3082.07
25	125	2.08	3.1	0.900	0.42	0.47	0.481	12.67	3311.54
26	130	2.17	4.2	1.220	0.42	0.64	0.800	21.08	5835.76
27	135	2.25	5.0	1.452	0.42	0.76	1.033	27.20	7671.55
28	140	2.33	3.5	1.016	0.42	0.53	0.597	15.73	4229.44
29	145	2.42	6.8	1.975	0.42	1.03	1.555	40.97	11802.08
30	150	2.50	7.3	2.120	0.42	1.11	1.701	44.79	12949.45
31	155	2.58	8.2	2.381	0.42	1.24	1.962	51.68	15014.72
32	160	2.67	5.9	1.713	0.42	0.89	1.294	34.08	9736.81
33	165	2.75	2.0	0.581	0.42	0.30	0.161	4.25	787.33
34	170	2.83	1.8	0.523	0.42	0.27	0.103	2.72	328.38
35	175	2.92	1.8	0.523	0.42	0.27	0.103	2.72	328.38
36	180	3.00	0.6	0.174	0.42	0.09	0.083	2.19	169.53
							14.968		102269.90

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.25
FLOOD VOLUME (acft)	2.74
FLOOD VOLUME (cuft)	119266.53
REQUIRED STORAGE (acft)	2.35
REQUIRED STORAGE (cuft)	102269.90
PEAK FLOW RATE (cfs)	51.68

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN A BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	26.34		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	4.22		
UNIT TIME-PERCENT OF LAG	118.5		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.419		
LOW LOSS RATE - PERCENT	52%	TOTAL PERCOLATION RATE (cfs)	1.63 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.188	0.42	0.10	0.09	2.36	220.73
2	10	0.17	0.6	0.225	0.42	0.12	0.11	2.84	362.55
3	15	0.25	0.6	0.225	0.42	0.12	0.11	2.84	362.55
4	20	0.33	0.6	0.225	0.42	0.12	0.11	2.84	362.55
5	25	0.42	0.6	0.225	0.42	0.12	0.11	2.84	362.55
6	30	0.50	0.7	0.263	0.42	0.14	0.13	3.31	504.37
7	35	0.58	0.7	0.263	0.42	0.14	0.13	3.31	504.37
8	40	0.67	0.7	0.263	0.42	0.14	0.13	3.31	504.37
9	45	0.75	0.7	0.263	0.42	0.14	0.13	3.31	504.37
10	50	0.83	0.7	0.263	0.42	0.14	0.13	3.31	504.37
11	55	0.92	0.7	0.263	0.42	0.14	0.13	3.31	504.37
12	60	1.00	0.8	0.300	0.42	0.16	0.14	3.78	646.18
13	65	1.08	0.8	0.300	0.42	0.16	0.14	3.78	646.18
14	70	1.17	0.8	0.300	0.42	0.16	0.14	3.78	646.18
15	75	1.25	0.8	0.300	0.42	0.16	0.14	3.78	646.18
16	80	1.33	0.8	0.300	0.42	0.16	0.14	3.78	646.18
17	85	1.42	0.8	0.300	0.42	0.16	0.14	3.78	646.18
18	90	1.50	0.8	0.300	0.42	0.16	0.14	3.78	646.18
19	95	1.58	0.8	0.300	0.42	0.16	0.14	3.78	646.18
20	100	1.67	0.8	0.300	0.42	0.16	0.14	3.78	646.18
21	105	1.75	0.8	0.300	0.42	0.16	0.14	3.78	646.18
22	110	1.83	0.8	0.300	0.42	0.16	0.14	3.78	646.18
23	115	1.92	0.8	0.300	0.42	0.16	0.14	3.78	646.18
24	120	2.00	0.9	0.338	0.42	0.18	0.16	4.25	788.00
25	125	2.08	0.8	0.300	0.42	0.16	0.14	3.78	646.18
26	130	2.17	0.9	0.338	0.42	0.18	0.16	4.25	788.00
27	135	2.25	0.9	0.338	0.42	0.18	0.16	4.25	788.00
28	140	2.33	0.9	0.338	0.42	0.18	0.16	4.25	788.00
29	145	2.42	0.9	0.338	0.42	0.18	0.16	4.25	788.00
30	150	2.50	0.9	0.338	0.42	0.18	0.16	4.25	788.00
31	155	2.58	0.9	0.338	0.42	0.18	0.16	4.25	788.00
32	160	2.67	0.9	0.338	0.42	0.18	0.16	4.25	788.00
33	165	2.75	1.0	0.376	0.42	0.20	0.18	4.73	929.82
34	170	2.83	1.0	0.376	0.42	0.20	0.18	4.73	929.82
35	175	2.92	1.0	0.376	0.42	0.20	0.18	4.73	929.82
36	180	3.00	1.0	0.376	0.42	0.20	0.18	4.73	929.82
37	185	3.08	1.0	0.376	0.42	0.20	0.18	4.73	929.82
38	190	3.17	1.1	0.413	0.42	0.22	0.20	5.20	1071.64
39	195	3.25	1.1	0.413	0.42	0.22	0.20	5.20	1071.64
40	200	3.33	1.1	0.413	0.42	0.22	0.20	5.20	1071.64
41	205	3.42	1.2	0.451	0.42	0.24	0.03	0.83	0.00
42	210	3.50	1.3	0.488	0.42	0.25	0.07	1.82	56.23
43	215	3.58	1.4	0.526	0.42	0.27	0.11	2.80	353.03
44	220	3.67	1.4	0.526	0.42	0.27	0.11	2.80	353.03
45	225	3.75	1.5	0.563	0.42	0.29	0.14	3.79	649.83
46	230	3.83	1.5	0.563	0.42	0.29	0.14	3.79	649.83
47	235	3.92	1.6	0.601	0.42	0.31	0.18	4.78	946.63
48	240	4.00	1.6	0.601	0.42	0.31	0.18	4.78	946.63
49	245	4.08	1.7	0.639	0.42	0.33	0.22	5.77	1243.43
50	250	4.17	1.8	0.676	0.42	0.35	0.26	6.76	1540.23
51	255	4.25	1.9	0.714	0.42	0.37	0.29	7.75	1837.03
52	260	4.33	2.0	0.751	0.42	0.39	0.33	8.74	2133.83
53	265	4.42	2.1	0.789	0.42	0.41	0.37	9.73	2430.63
54	270	4.50	2.1	0.789	0.42	0.41	0.37	9.73	2430.63
55	275	4.58	2.2	0.826	0.42	0.43	0.41	10.72	2727.42
56	280	4.67	2.3	0.864	0.42	0.45	0.44	11.71	3024.22

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN A BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	26.34		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	4.22		
UNIT TIME-PERCENT OF LAG	118.5		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.419		
LOW LOSS RATE - PERCENT	52%	TOTAL PERCOLATION RATE (cfs)	1.63 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.901	0.42	0.47	0.48	12.70	3321.02
58	290	4.83	2.4	0.901	0.42	0.47	0.48	12.70	3321.02
59	295	4.92	2.5	0.939	0.42	0.49	0.52	13.69	3617.82
60	300	5.00	2.6	0.977	0.42	0.51	0.56	14.68	3914.62
61	305	5.08	3.1	1.164	0.42	0.61	0.74	19.62	5398.62
62	310	5.17	3.6	1.352	0.42	0.71	0.93	24.57	6882.61
63	315	5.25	3.9	1.465	0.42	0.76	1.05	27.54	7773.01
64	320	5.33	4.2	1.578	0.42	0.82	1.16	30.51	8663.41
65	325	5.42	4.7	1.765	0.42	0.92	1.35	35.45	10147.40
66	330	5.50	5.6	2.103	0.42	1.10	1.68	44.36	12818.59
67	335	5.58	1.9	0.714	0.42	0.37	0.29	7.75	1837.03
68	340	5.67	0.9	0.338	0.42	0.18	0.16	4.25	788.00
69	345	5.75	0.6	0.225	0.42	0.12	0.11	2.84	362.55
70	350	5.83	0.5	0.188	0.42	0.10	0.09	2.36	220.73
71	355	5.92	0.3	0.113	0.42	0.06	0.05	1.42	0.00
72	360	6.00	0.2	0.075	0.42	0.04	0.04	0.95	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.61
FLOOD VOLUME (acft)	3.53
FLOOD VOLUME (cuft)	153578.76
REQUIRED STORAGE (acft)	2.70
REQUIRED STORAGE (cuft)	117654.63
PEAK FLOW RATE (cfs)	44.36

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN A
BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	26.340	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.4194
LAG TIME - MINUTES	4.22	MINIMUM LOSS RATE (for var. loss) - in/hr	0.210
UNIT TIME-PERCENT OF LAG	355.5	LOW LOSS RATE - DECIMAL	0.52
TOTAL ADJUSTED STORM RAIN-INCHES	5.06	C	0.00388
		PERCOLATION RATE (cfs)	1.63

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.040	0.741	0.021	0.019	0.51	0.00
2	30	0.50	0.3	0.061	0.732	0.032	0.029	0.76	0.00
3	45	0.75	0.3	0.061	0.723	0.032	0.029	0.76	0.00
4	60	1.00	0.4	0.081	0.715	0.042	0.039	1.02	0.00
5	75	1.25	0.3	0.061	0.706	0.032	0.029	0.76	0.00
6	90	1.50	0.3	0.061	0.698	0.032	0.029	0.76	0.00
7	105	1.75	0.3	0.061	0.690	0.032	0.029	0.76	0.00
8	120	2.00	0.4	0.081	0.681	0.042	0.039	1.02	0.00
9	135	2.25	0.4	0.081	0.673	0.042	0.039	1.02	0.00
10	150	2.50	0.4	0.081	0.665	0.042	0.039	1.02	0.00
11	165	2.75	0.5	0.101	0.657	0.053	0.048	1.27	0.00
12	180	3.00	0.5	0.101	0.649	0.053	0.048	1.27	0.00
13	195	3.25	0.5	0.101	0.641	0.053	0.048	1.27	0.00
14	210	3.50	0.5	0.101	0.633	0.053	0.048	1.27	0.00
15	225	3.75	0.5	0.101	0.625	0.053	0.048	1.27	0.00
16	240	4.00	0.6	0.121	0.617	0.063	0.058	1.53	0.00
17	255	4.25	0.6	0.121	0.609	0.063	0.058	1.53	0.00
18	270	4.50	0.7	0.142	0.601	0.074	0.068	1.78	139.76
19	285	4.75	0.7	0.142	0.594	0.074	0.068	1.78	139.76
20	300	5.00	0.8	0.162	0.586	0.085	0.077	2.04	369.03
21	315	5.25	0.6	0.121	0.578	0.063	0.058	1.53	0.00
22	330	5.50	0.7	0.142	0.571	0.074	0.068	1.78	139.76
23	345	5.75	0.8	0.162	0.563	0.085	0.077	2.04	369.03
24	360	6.00	0.8	0.162	0.556	0.085	0.077	2.04	369.03
25	375	6.25	0.9	0.182	0.549	0.095	0.087	2.29	598.30
26	390	6.50	0.9	0.182	0.541	0.095	0.087	2.29	598.30
27	405	6.75	1.0	0.202	0.534	0.106	0.097	2.55	827.56
28	420	7.00	1.0	0.202	0.527	0.106	0.097	2.55	827.56
29	435	7.25	1.0	0.202	0.520	0.106	0.097	2.55	827.56
30	450	7.50	1.1	0.223	0.513	0.116	0.106	2.80	1056.83
31	465	7.75	1.2	0.243	0.506	0.127	0.116	3.06	1286.09
32	480	8.00	1.3	0.263	0.499	0.137	0.126	3.31	1515.36
33	495	8.25	1.5	0.304	0.492	0.159	0.145	3.82	1973.89
34	510	8.50	1.5	0.304	0.485	0.159	0.145	3.82	1973.89
35	525	8.75	1.6	0.324	0.478	0.169	0.155	4.08	2203.16
36	540	9.00	1.7	0.344	0.471	0.180	0.164	4.33	2432.43
37	555	9.25	1.9	0.385	0.465	0.201	0.184	4.84	2890.96
38	570	9.50	2.0	0.405	0.458	0.211	0.193	5.09	3120.23
39	585	9.75	2.1	0.425	0.451	0.222	0.203	5.35	3349.49
40	600	10.00	2.2	0.445	0.445	0.233	0.000	0.01	0.00
41	615	10.25	1.5	0.304	0.439	0.159	0.145	3.82	1973.89
42	630	10.50	1.5	0.304	0.432	0.159	0.145	3.82	1973.89
43	645	10.75	2.0	0.405	0.426	0.211	0.193	5.09	3120.23
44	660	11.00	2.0	0.405	0.420	0.211	0.193	5.09	3120.23
45	675	11.25	1.9	0.385	0.414	0.201	0.184	4.84	2890.96
46	690	11.50	1.9	0.385	0.407	0.201	0.184	4.84	2890.96
47	705	11.75	1.7	0.344	0.401	0.180	0.164	4.33	2432.43
48	720	12.00	1.8	0.364	0.395	0.190	0.174	4.59	2661.69
49	735	12.25	2.5	0.506	0.390	0.264	0.116	3.07	1296.56
50	750	12.50	2.6	0.526	0.384	0.275	0.143	3.76	1914.66
51	765	12.75	2.8	0.567	0.378	0.296	0.189	4.97	3010.95
52	780	13.00	2.9	0.587	0.372	0.306	0.215	5.66	3625.79
53	795	13.25	3.4	0.688	0.367	0.359	0.322	8.47	6158.21
54	810	13.50	3.4	0.688	0.361	0.359	0.327	8.62	6289.90
55	825	13.75	2.3	0.466	0.356	0.243	0.110	2.90	1142.00
56	840	14.00	2.3	0.466	0.350	0.243	0.115	3.04	1270.29
57	855	14.25	2.7	0.546	0.345	0.285	0.202	5.31	3316.08
58	870	14.50	2.6	0.526	0.340	0.275	0.187	4.92	2961.08
59	885	14.75	2.6	0.526	0.334	0.275	0.192	5.05	3084.12
60	900	15.00	2.5	0.506	0.329	0.264	0.177	4.66	2725.56

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN A BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			26.340	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.4194		
LAG TIME - MINUTES			4.22	MINIMUM LOSS RATE (for var. loss) - in/hr			0.210		
UNIT TIME-PERCENT OF LAG			355.5	LOW LOSS RATE - DECIMAL			0.52		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00388		
				PERCOLATION RATE (cfs)			1.63		
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
61	915	15.25	2.4	0.486	0.324	0.254	0.162	4.26	2365.18
62	930	15.50	2.3	0.466	0.319	0.243	0.146	3.85	2002.97
63	945	15.75	1.9	0.385	0.314	0.201	0.070	1.85	199.47
64	960	16.00	1.9	0.385	0.310	0.201	0.075	1.98	313.32
65	975	16.25	0.4	0.081	0.305	0.042	0.039	1.02	0.00
66	990	16.50	0.4	0.081	0.300	0.042	0.039	1.02	0.00
67	1005	16.75	0.3	0.061	0.296	0.032	0.029	0.76	0.00
68	1020	17.00	0.3	0.061	0.291	0.032	0.029	0.76	0.00
69	1035	17.25	0.5	0.101	0.287	0.053	0.048	1.27	0.00
70	1050	17.50	0.5	0.101	0.282	0.053	0.048	1.27	0.00
71	1065	17.75	0.5	0.101	0.278	0.053	0.048	1.27	0.00
72	1080	18.00	0.4	0.081	0.274	0.042	0.039	1.02	0.00
73	1095	18.25	0.4	0.081	0.270	0.042	0.039	1.02	0.00
74	1110	18.50	0.4	0.081	0.266	0.042	0.039	1.02	0.00
75	1125	18.75	0.3	0.061	0.262	0.032	0.029	0.76	0.00
76	1140	19.00	0.2	0.040	0.259	0.021	0.019	0.51	0.00
77	1155	19.25	0.3	0.061	0.255	0.032	0.029	0.76	0.00
78	1170	19.50	0.4	0.081	0.251	0.042	0.039	1.02	0.00
79	1185	19.75	0.3	0.061	0.248	0.032	0.029	0.76	0.00
80	1200	20.00	0.2	0.040	0.245	0.021	0.019	0.51	0.00
81	1215	20.25	0.3	0.061	0.241	0.032	0.029	0.76	0.00
82	1230	20.50	0.3	0.061	0.238	0.032	0.029	0.76	0.00
83	1245	20.75	0.3	0.061	0.235	0.032	0.029	0.76	0.00
84	1260	21.00	0.2	0.040	0.232	0.021	0.019	0.51	0.00
85	1275	21.25	0.3	0.061	0.230	0.032	0.029	0.76	0.00
86	1290	21.50	0.2	0.040	0.227	0.021	0.019	0.51	0.00
87	1305	21.75	0.3	0.061	0.225	0.032	0.029	0.76	0.00
88	1320	22.00	0.2	0.040	0.222	0.021	0.019	0.51	0.00
89	1335	22.25	0.3	0.061	0.220	0.032	0.029	0.76	0.00
90	1350	22.50	0.2	0.040	0.218	0.021	0.019	0.51	0.00
91	1365	22.75	0.2	0.040	0.216	0.021	0.019	0.51	0.00
92	1380	23.00	0.2	0.040	0.214	0.021	0.019	0.51	0.00
93	1395	23.25	0.2	0.040	0.213	0.021	0.019	0.51	0.00
94	1410	23.50	0.2	0.040	0.212	0.021	0.019	0.51	0.00
95	1425	23.75	0.2	0.040	0.211	0.021	0.019	0.51	0.00
96	1440	24.00	0.2	0.040	0.210	0.021	0.019	0.51	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	2.06
FLOOD VOLUME (acft)	4.52
FLOOD VOLUME (cuft)	196745.52
REQUIRED STORAGE (acft)	2.06
REQUIRED STORAGE (cuft)	89748.43
PEAK FLOW (cfs)	8.62

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN A

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
344	0	0		28168	0	0	0.00
345	1	1	4637	32805	30487	30487	0.70
346	1	2	4664	37469	35137	65624	1.51
347	1	3	4688	42157	39813	105437	2.42
348	1	4	4713	46870	44514	149950	3.44

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	1.62789	cfs

MAXWELL IV DRYWELLS

NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		1.62789	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	110301	cu ft (100-yr 6-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	1.62789	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**19**	hrs < 36 hrs

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	4.75	1,425	1,425	488	937	344.03	937	0.02
2	10	4.75	1,425	2,363	488	1,874	344.06	1,874	0.04
3	15	4.02	1,206	3,080	488	2,592	344.09	2,592	0.06
4	20	0.43	128	2,720	488	2,232	344.07	2,232	0.05
5	25	0.43	128	2,360	488	1,872	344.06	1,872	0.04
6	30	2.72	817	2,689	488	2,200	344.07	2,200	0.05
7	35	0.43	128	2,329	488	1,840	344.06	1,840	0.04
8	40	2.72	817	2,657	488	2,169	344.07	2,169	0.05
9	45	2.72	817	2,985	488	2,497	344.08	2,497	0.06
10	50	0.43	128	2,625	488	2,137	344.07	2,137	0.05
11	55	1.19	358	2,495	488	2,006	344.07	2,006	0.05
12	60	2.72	817	2,823	488	2,335	344.08	2,335	0.05
13	65	5.78	1,735	4,069	488	3,581	344.12	3,581	0.08
14	70	5.78	1,735	5,316	488	4,827	344.16	4,827	0.11
15	75	5.78	1,735	6,562	488	6,073	344.20	6,073	0.14
16	80	4.25	1,276	7,349	488	6,861	344.23	6,861	0.16
17	85	8.84	2,653	9,513	488	9,025	344.30	9,025	0.21
18	90	9.61	2,882	11,907	488	11,419	344.37	11,419	0.26
19	95	7.31	2,194	13,612	488	13,124	344.43	13,124	0.30
20	100	9.61	2,882	16,006	488	15,518	344.51	15,518	0.36
21	105	14.20	4,259	19,776	488	19,288	344.63	19,288	0.44
22	110	12.67	3,800	23,088	488	22,600	344.74	22,600	0.52
23	115	11.14	3,341	25,940	488	25,452	344.83	25,452	0.58
24	120	11.90	3,570	29,023	488	28,534	344.94	28,534	0.66
25	125	12.67	3,800	32,334	488	31,846	345.04	31,846	0.73
26	130	21.08	6,324	38,170	488	37,681	345.20	37,681	0.87
27	135	27.20	8,160	45,841	488	45,353	345.42	45,353	1.04
28	140	15.73	4,718	50,071	488	49,582	345.54	49,582	1.14
29	145	40.97	12,290	61,873	488	61,385	345.88	61,385	1.41
30	150	44.79	13,438	74,822	488	74,334	346.22	74,334	1.71
31	155	51.68	15,503	89,837	488	89,349	346.60	89,349	2.05
32	160	34.08	10,225	99,574	488	99,086	346.84	99,086	2.27
33	165	4.25	1,276	100,361	488	99,873	346.86	99,873	2.29
34	170	2.72	817	100,690	488	100,201	346.87	100,201	2.30
35	175	2.72	817	101,018	488	100,530	346.88	100,530	2.31
36	180	2.19	658	101,188	488	100,699	346.88	100,699	2.31

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	2.36	709	709	488	221	344.01	221	0.01
2	10	2.84	851	1,072	488	583	344.02	583	0.01
3	15	2.84	851	1,434	488	946	344.03	946	0.02
4	20	2.84	851	1,797	488	1,308	344.04	1,308	0.03
5	25	2.84	851	2,159	488	1,671	344.05	1,671	0.04
6	30	3.31	993	2,664	488	2,175	344.07	2,175	0.05
7	35	3.31	993	3,168	488	2,680	344.09	2,680	0.06
8	40	3.31	993	3,672	488	3,184	344.10	3,184	0.07
9	45	3.31	993	4,177	488	3,688	344.12	3,688	0.08
10	50	3.31	993	4,681	488	4,193	344.14	4,193	0.10
11	55	3.31	993	5,185	488	4,697	344.15	4,697	0.11
12	60	3.78	1,135	5,832	488	5,343	344.18	5,343	0.12
13	65	3.78	1,135	6,478	488	5,989	344.20	5,989	0.14
14	70	3.78	1,135	7,124	488	6,636	344.22	6,636	0.15
15	75	3.78	1,135	7,770	488	7,282	344.24	7,282	0.17
16	80	3.78	1,135	8,416	488	7,928	344.26	7,928	0.18
17	85	3.78	1,135	9,063	488	8,574	344.28	8,574	0.20
18	90	3.78	1,135	9,709	488	9,220	344.30	9,220	0.21
19	95	3.78	1,135	10,355	488	9,867	344.32	9,867	0.23
20	100	3.78	1,135	11,001	488	10,513	344.34	10,513	0.24
21	105	3.78	1,135	11,647	488	11,159	344.37	11,159	0.26
22	110	3.78	1,135	12,293	488	11,805	344.39	11,805	0.27
23	115	3.78	1,135	12,940	488	12,451	344.41	12,451	0.29
24	120	4.25	1,276	13,728	488	13,239	344.43	13,239	0.30
25	125	3.78	1,135	14,374	488	13,886	344.46	13,886	0.32
26	130	4.25	1,276	15,162	488	14,674	344.48	14,674	0.34
27	135	4.25	1,276	15,950	488	15,462	344.51	15,462	0.35
28	140	4.25	1,276	16,738	488	16,250	344.53	16,250	0.37
29	145	4.25	1,276	17,526	488	17,038	344.56	17,038	0.39
30	150	4.25	1,276	18,314	488	17,826	344.58	17,826	0.41
31	155	4.25	1,276	19,102	488	18,614	344.61	18,614	0.43
32	160	4.25	1,276	19,890	488	19,402	344.64	19,402	0.45
33	165	4.73	1,418	20,820	488	20,331	344.67	20,331	0.47
34	170	4.73	1,418	21,750	488	21,261	344.70	21,261	0.49
35	175	4.73	1,418	22,679	488	22,191	344.73	22,191	0.51
36	180	4.73	1,418	23,609	488	23,121	344.76	23,121	0.53
37	185	4.73	1,418	24,539	488	24,051	344.79	24,051	0.55
38	190	5.20	1,560	25,611	488	25,122	344.82	25,122	0.58
39	195	5.20	1,560	26,682	488	26,194	344.86	26,194	0.60
40	200	5.20	1,560	27,754	488	27,266	344.89	27,266	0.63
41	205	0.83	248	27,513	488	27,025	344.89	27,025	0.62
42	210	1.82	545	27,570	488	27,081	344.89	27,081	0.62
43	215	2.80	841	27,923	488	27,434	344.90	27,434	0.63
44	220	2.80	841	28,276	488	27,787	344.91	27,787	0.64
45	225	3.79	1,138	28,925	488	28,437	344.93	28,437	0.65
46	230	3.79	1,138	29,575	488	29,087	344.95	29,087	0.67
47	235	4.78	1,435	30,522	488	30,034	344.99	30,034	0.69
48	240	4.78	1,435	31,469	488	30,980	345.01	30,980	0.71
49	245	5.77	1,732	32,712	488	32,224	345.05	32,224	0.74
50	250	6.76	2,029	34,252	488	33,764	345.09	33,764	0.78
51	255	7.75	2,325	36,089	488	35,601	345.15	35,601	0.82
52	260	8.74	2,622	38,223	488	37,735	345.21	37,735	0.87
53	265	9.73	2,919	40,654	488	40,165	345.28	40,165	0.92
54	270	9.73	2,919	43,084	488	42,596	345.34	42,596	0.98
55	275	10.72	3,216	45,812	488	45,323	345.42	45,323	1.04

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	11.71	3,513	48,836	488	48,348	345.51	48,348	1.11
57	285	12.70	3,809	52,157	488	51,669	345.60	51,669	1.19
58	290	12.70	3,809	55,478	488	54,990	345.70	54,990	1.26
59	295	13.69	4,106	59,096	488	58,607	345.80	58,607	1.35
60	300	14.68	4,403	63,010	488	62,522	345.91	62,522	1.44
61	305	19.62	5,887	68,409	488	67,921	346.06	67,921	1.56
62	310	24.57	7,371	75,292	488	74,803	346.23	74,803	1.72
63	315	27.54	8,261	83,065	488	82,576	346.43	82,576	1.90
64	320	30.51	9,152	91,728	488	91,240	346.64	91,240	2.09
65	325	35.45	10,636	101,876	488	101,387	346.90	101,387	2.33
66	330	44.36	13,307	114,694	488	114,206	347.20	114,206	2.62
67	335	7.75	2,325	116,531	488	116,043	347.24	116,043	2.66
68	340	4.25	1,276	117,319	488	116,831	347.26	116,831	2.68
69	345	2.84	851	117,682	488	117,193	347.26	117,193	2.69
70	350	2.36	709	117,902	488	117,414	347.27	117,414	2.70
71	355	1.42	425	117,840	488	117,351	347.27	117,351	2.69
72	360	0.95	284	117,635	488	117,146	347.26	117,146	2.69

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.51	459	459	1465	-	344.00	-	0.00
2	30	0.76	688	688	1465	-	344.00	-	0.00
3	45	0.76	688	688	1465	-	344.00	-	0.00
4	60	1.02	917	917	1465	-	344.00	-	0.00
5	75	0.76	688	688	1465	-	344.00	-	0.00
6	90	0.76	688	688	1465	-	344.00	-	0.00
7	105	0.76	688	688	1465	-	344.00	-	0.00
8	120	1.02	917	917	1465	-	344.00	-	0.00
9	135	1.02	917	917	1465	-	344.00	-	0.00
10	150	1.02	917	917	1465	-	344.00	-	0.00
11	165	1.27	1,146	1,146	1465	-	344.00	-	0.00
12	180	1.27	1,146	1,146	1465	-	344.00	-	0.00
13	195	1.27	1,146	1,146	1465	-	344.00	-	0.00
14	210	1.27	1,146	1,146	1465	-	344.00	-	0.00
15	225	1.27	1,146	1,146	1465	-	344.00	-	0.00
16	240	1.53	1,376	1,376	1465	-	344.00	-	0.00
17	255	1.53	1,376	1,376	1465	-	344.00	-	0.00
18	270	1.78	1,605	1,605	1465	140	344.00	140	0.00
19	285	1.78	1,605	1,745	1465	280	344.01	280	0.01
20	300	2.04	1,834	2,114	1465	649	344.02	649	0.01
21	315	1.53	1,376	2,024	1465	559	344.02	559	0.01
22	330	1.78	1,605	2,164	1465	699	344.02	699	0.02
23	345	2.04	1,834	2,533	1465	1,068	344.04	1,068	0.02
24	360	2.04	1,834	2,902	1465	1,437	344.05	1,437	0.03
25	375	2.29	2,063	3,500	1465	2,035	344.07	2,035	0.05
26	390	2.29	2,063	4,099	1465	2,633	344.09	2,633	0.06
27	405	2.55	2,293	4,926	1465	3,461	344.11	3,461	0.08
28	420	2.55	2,293	5,754	1465	4,289	344.14	4,289	0.10
29	435	2.55	2,293	6,581	1465	5,116	344.17	5,116	0.12
30	450	2.80	2,522	7,638	1465	6,173	344.20	6,173	0.14
31	465	3.06	2,751	8,924	1465	7,459	344.24	7,459	0.17
32	480	3.31	2,980	10,440	1465	8,974	344.29	8,974	0.21
33	495	3.82	3,439	12,413	1465	10,948	344.36	10,948	0.25
34	510	3.82	3,439	14,387	1465	12,922	344.42	12,922	0.30
35	525	4.08	3,668	16,590	1465	15,125	344.50	15,125	0.35
36	540	4.33	3,898	19,023	1465	17,558	344.58	17,558	0.40
37	555	4.84	4,356	21,914	1465	20,449	344.67	20,449	0.47
38	570	5.09	4,585	25,034	1465	23,569	344.77	23,569	0.54
39	585	5.35	4,815	28,384	1465	26,918	344.88	26,918	0.62
40	600	0.01	7	26,925	1465	25,460	344.84	25,460	0.58
41	615	3.82	3,439	28,899	1465	27,434	344.90	27,434	0.63
42	630	3.82	3,439	30,873	1465	29,408	344.96	29,408	0.68
43	645	5.09	4,585	33,993	1465	32,528	345.06	32,528	0.75
44	660	5.09	4,585	37,114	1465	35,648	345.15	35,648	0.82
45	675	4.84	4,356	40,004	1465	38,539	345.23	38,539	0.88
46	690	4.84	4,356	42,895	1465	41,430	345.31	41,430	0.95
47	705	4.33	3,898	45,328	1465	43,863	345.38	43,863	1.01
48	720	4.59	4,127	47,990	1465	46,524	345.46	46,524	1.07
49	735	3.07	2,762	49,286	1465	47,821	345.49	47,821	1.10
50	750	3.76	3,380	51,201	1465	49,736	345.55	49,736	1.14
51	765	4.97	4,476	54,212	1465	52,747	345.63	52,747	1.21
52	780	5.66	5,091	57,838	1465	56,372	345.74	56,372	1.29
53	795	8.47	7,623	63,996	1465	62,531	345.91	62,531	1.44
54	810	8.62	7,755	70,286	1465	68,821	346.08	68,821	1.58
55	825	2.90	2,607	71,428	1465	69,963	346.11	69,963	1.61
56	840	3.04	2,735	72,698	1465	71,233	346.14	71,233	1.64
57	855	5.31	4,781	76,014	1465	74,549	346.22	74,549	1.71
58	870	4.92	4,426	78,975	1465	77,510	346.30	77,510	1.78

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	5.05	4,549	82,059	1465	80,594	346.38	80,594	1.85
60	900	4.66	4,191	84,785	1465	83,320	346.44	83,320	1.91
61	915	4.26	3,830	87,150	1465	85,685	346.50	85,685	1.97
62	930	3.85	3,468	89,153	1465	87,688	346.55	87,688	2.01
63	945	1.85	1,665	89,352	1465	87,887	346.56	87,887	2.02
64	960	1.98	1,778	89,666	1465	88,201	346.57	88,201	2.02
65	975	1.02	917	89,118	1465	87,653	346.55	87,653	2.01
66	990	1.02	917	88,570	1465	87,105	346.54	87,105	2.00
67	1005	0.76	688	87,792	1465	86,327	346.52	86,327	1.98
68	1020	0.76	688	87,015	1465	85,550	346.50	85,550	1.96
69	1035	1.27	1,146	86,696	1465	85,231	346.49	85,231	1.96
70	1050	1.27	1,146	86,377	1465	84,912	346.48	84,912	1.95
71	1065	1.27	1,146	86,059	1465	84,594	346.48	84,594	1.94
72	1080	1.02	917	85,511	1465	84,046	346.46	84,046	1.93
73	1095	1.02	917	84,963	1465	83,498	346.45	83,498	1.92
74	1110	1.02	917	84,415	1465	82,950	346.44	82,950	1.90
75	1125	0.76	688	83,637	1465	82,172	346.42	82,172	1.89
76	1140	0.51	459	82,631	1465	81,166	346.39	81,166	1.86
77	1155	0.76	688	81,853	1465	80,388	346.37	80,388	1.85
78	1170	1.02	917	81,305	1465	79,840	346.36	79,840	1.83
79	1185	0.76	688	80,528	1465	79,063	346.34	79,063	1.82
80	1200	0.51	459	79,522	1465	78,056	346.31	78,056	1.79
81	1215	0.76	688	78,744	1465	77,279	346.29	77,279	1.77
82	1230	0.76	688	77,967	1465	76,502	346.27	76,502	1.76
83	1245	0.76	688	77,190	1465	75,724	346.25	75,724	1.74
84	1260	0.51	459	76,183	1465	74,718	346.23	74,718	1.72
85	1275	0.76	688	75,406	1465	73,941	346.21	73,941	1.70
86	1290	0.51	459	74,399	1465	72,934	346.18	72,934	1.67
87	1305	0.76	688	73,622	1465	72,157	346.16	72,157	1.66
88	1320	0.51	459	72,615	1465	71,150	346.14	71,150	1.63
89	1335	0.76	688	71,838	1465	70,373	346.12	70,373	1.62
90	1350	0.51	459	70,831	1465	69,366	346.09	69,366	1.59
91	1365	0.51	459	69,825	1465	68,360	346.07	68,360	1.57
92	1380	0.51	459	68,818	1465	67,353	346.04	67,353	1.55
93	1395	0.51	459	67,812	1465	66,347	346.02	66,347	1.52
94	1410	0.51	459	66,805	1465	65,340	345.99	65,340	1.50
95	1425	0.51	459	65,799	1465	64,333	345.96	64,333	1.48
96	1440	0.51	459	64,792	1465	63,327	345.93	63,327	1.45

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN B		
10	AREA DESIGNATION	SUBAREA B (APARTMENTS)		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS	1.07		
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	26%		
27				
28	LENGTH OF WATERCOURSE (L)	410		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	200		
30				
31	ELEVATION OF HEADWATER	355.67		
32	ELEVATION OF CONCENTRATION POINT	352.68		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		347	2000	
45		348	2000	
46		349	2000	
47		350	2000	
48		351	2000	
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN B
[2] AREA DESIGNATION	SUBAREA B (APARTMENTS)
[3] AREA - ACRES	1.070
[4] L-FEET	410
[5] L-MILES	0.078
[6] La-FEET	200
[7] La-MILES	0.038
[8] ELEVATION OF HEADWATER	355.67
[9] ELEVATION OF CONCENTRATION POINT	352.68
[10] H-FEET	2.99
[11] S-FEET/MILE	38.5
[12] S^0.5	6.21
[13] L*LCA/S^0.5	0.00047
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.020
[16] LAG TIME-MINUTES	1.18
[17] 25% OF LAG-MINUTES	0.29
[18] 40% OF LAG-MINUTES	0.47
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.09

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	1.070	1.00	2.42	3.13	1.070	1.00	3.13	5.06	1.070	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	1.07	SUM [7]	2.42	SUM [9]	1.07	SUM [11]	3.13	SUM [13]	1.07	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.81	1.94	3.06
FLOOD VOLUME	(cu-ft)	7,038	7,549	11,873
	(acre-ft)	0.16	0.17	0.27
REQUIRED STORAGE	(cu-ft)	5,979	5,667	5,584
	(acre-ft)	0.14	0.13	0.13
PEAK FLOW	(cfs)	2.33	2.03	0.55
MAXIMUM WSEL	(ft)	349.99	349.82	349.74

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN B
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
	COMMERCIAL			90%	0.00	0.00	0.000	0.0000
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
	SF - 1/4 ACRE			50%	0.00	0.00	0.000	0.0000
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
A	MF - APARTMENTS	32	0.74	80%	0.21	1.07	1.000	0.2072
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
	RETENTION BASINS			0%	0.00	0.00	0.000	0.0000
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	1.07	SUM	0.2072

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.1036
C= 0.00192

Ft=C(24-(T/60))^1.55 = 0.00192 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 26%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 3 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.07		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.18		
UNIT TIME-PERCENT OF LAG	424.3		
TOTAL ADJUSTED STORM RAIN-INCHES	2.42		
CONSTANT LOSS RATE-in/hr	0.21		
LOW LOSS RATE - PERCENT	26%	TOTAL PERCOLATION RATE (cfs)	0.09 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.21	0.10	0.170	0.18	26.89
2	10	0.17	1.3	0.378	0.21	0.10	0.170	0.18	26.89
3	15	0.25	1.1	0.319	0.21	0.08	0.112	0.12	8.25
4	20	0.33	1.5	0.436	0.21	0.11	0.228	0.24	45.54
5	25	0.42	1.5	0.436	0.21	0.11	0.228	0.24	45.54
6	30	0.50	1.8	0.523	0.21	0.14	0.316	0.34	73.50
7	35	0.58	1.5	0.436	0.21	0.11	0.228	0.24	45.54
8	40	0.67	1.8	0.523	0.21	0.14	0.316	0.34	73.50
9	45	0.75	1.8	0.523	0.21	0.14	0.316	0.34	73.50
10	50	0.83	1.5	0.436	0.21	0.11	0.228	0.24	45.54
11	55	0.92	1.6	0.465	0.21	0.12	0.257	0.28	54.86
12	60	1.00	1.8	0.523	0.21	0.14	0.316	0.34	73.50
13	65	1.08	2.2	0.639	0.21	0.17	0.432	0.46	110.79
14	70	1.17	2.2	0.639	0.21	0.17	0.432	0.46	110.79
15	75	1.25	2.2	0.639	0.21	0.17	0.432	0.46	110.79
16	80	1.33	2.0	0.581	0.21	0.15	0.374	0.40	92.15
17	85	1.42	2.6	0.755	0.21	0.20	0.548	0.59	148.08
18	90	1.50	2.7	0.784	0.21	0.20	0.577	0.62	157.40
19	95	1.58	2.4	0.697	0.21	0.18	0.490	0.52	129.44
20	100	1.67	2.7	0.784	0.21	0.20	0.577	0.62	157.40
21	105	1.75	3.3	0.958	0.21	0.25	0.751	0.80	213.33
22	110	1.83	3.1	0.900	0.21	0.23	0.693	0.74	194.69
23	115	1.92	2.9	0.842	0.21	0.22	0.635	0.68	176.04
24	120	2.00	3.0	0.871	0.21	0.23	0.664	0.71	185.37
25	125	2.08	3.1	0.900	0.21	0.23	0.693	0.74	194.69
26	130	2.17	4.2	1.220	0.21	0.32	1.012	1.08	297.23
27	135	2.25	5.0	1.452	0.21	0.38	1.245	1.33	371.80
28	140	2.33	3.5	1.016	0.21	0.26	0.809	0.87	231.98
29	145	2.42	6.8	1.975	0.21	0.51	1.768	1.89	539.60
30	150	2.50	7.3	2.120	0.21	0.55	1.913	2.05	586.21
31	155	2.58	8.2	2.381	0.21	0.62	2.174	2.33	670.10
32	160	2.67	5.9	1.713	0.21	0.45	1.506	1.61	455.70
33	165	2.75	2.0	0.581	0.21	0.15	0.374	0.40	92.15
34	170	2.83	1.8	0.523	0.21	0.14	0.316	0.34	73.50
35	175	2.92	1.8	0.523	0.21	0.14	0.316	0.34	73.50
36	180	3.00	0.6	0.174	0.21	0.05	0.129	0.14	13.61
							21.743		5979.41

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.81
FLOOD VOLUME (acft)	0.16
FLOOD VOLUME (cuft)	7037.60
REQUIRED STORAGE (acft)	0.14
REQUIRED STORAGE (cuft)	5979.41
PEAK FLOW RATE (cfs)	2.33

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.07		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.18		
UNIT TIME-PERCENT OF LAG	424.3		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.207		
LOW LOSS RATE - PERCENT	26%	TOTAL PERCOLATION RATE (cfs)	0.09 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.188	0.21	0.05	0.14	0.15	16.83
2	10	0.17	0.6	0.225	0.21	0.06	0.02	0.02	0.00
3	15	0.25	0.6	0.225	0.21	0.06	0.02	0.02	0.00
4	20	0.33	0.6	0.225	0.21	0.06	0.02	0.02	0.00
5	25	0.42	0.6	0.225	0.21	0.06	0.02	0.02	0.00
6	30	0.50	0.7	0.263	0.21	0.07	0.06	0.06	0.00
7	35	0.58	0.7	0.263	0.21	0.07	0.06	0.06	0.00
8	40	0.67	0.7	0.263	0.21	0.07	0.06	0.06	0.00
9	45	0.75	0.7	0.263	0.21	0.07	0.06	0.06	0.00
10	50	0.83	0.7	0.263	0.21	0.07	0.06	0.06	0.00
11	55	0.92	0.7	0.263	0.21	0.07	0.06	0.06	0.00
12	60	1.00	0.8	0.300	0.21	0.08	0.09	0.10	2.17
13	65	1.08	0.8	0.300	0.21	0.08	0.09	0.10	2.17
14	70	1.17	0.8	0.300	0.21	0.08	0.09	0.10	2.17
15	75	1.25	0.8	0.300	0.21	0.08	0.09	0.10	2.17
16	80	1.33	0.8	0.300	0.21	0.08	0.09	0.10	2.17
17	85	1.42	0.8	0.300	0.21	0.08	0.09	0.10	2.17
18	90	1.50	0.8	0.300	0.21	0.08	0.09	0.10	2.17
19	95	1.58	0.8	0.300	0.21	0.08	0.09	0.10	2.17
20	100	1.67	0.8	0.300	0.21	0.08	0.09	0.10	2.17
21	105	1.75	0.8	0.300	0.21	0.08	0.09	0.10	2.17
22	110	1.83	0.8	0.300	0.21	0.08	0.09	0.10	2.17
23	115	1.92	0.8	0.300	0.21	0.08	0.09	0.10	2.17
24	120	2.00	0.9	0.338	0.21	0.09	0.13	0.14	14.22
25	125	2.08	0.8	0.300	0.21	0.08	0.09	0.10	2.17
26	130	2.17	0.9	0.338	0.21	0.09	0.13	0.14	14.22
27	135	2.25	0.9	0.338	0.21	0.09	0.13	0.14	14.22
28	140	2.33	0.9	0.338	0.21	0.09	0.13	0.14	14.22
29	145	2.42	0.9	0.338	0.21	0.09	0.13	0.14	14.22
30	150	2.50	0.9	0.338	0.21	0.09	0.13	0.14	14.22
31	155	2.58	0.9	0.338	0.21	0.09	0.13	0.14	14.22
32	160	2.67	0.9	0.338	0.21	0.09	0.13	0.14	14.22
33	165	2.75	1.0	0.376	0.21	0.10	0.17	0.18	26.28
34	170	2.83	1.0	0.376	0.21	0.10	0.17	0.18	26.28
35	175	2.92	1.0	0.376	0.21	0.10	0.17	0.18	26.28
36	180	3.00	1.0	0.376	0.21	0.10	0.17	0.18	26.28
37	185	3.08	1.0	0.376	0.21	0.10	0.17	0.18	26.28
38	190	3.17	1.1	0.413	0.21	0.11	0.21	0.22	38.34
39	195	3.25	1.1	0.413	0.21	0.11	0.21	0.22	38.34
40	200	3.33	1.1	0.413	0.21	0.11	0.21	0.22	38.34
41	205	3.42	1.2	0.451	0.21	0.12	0.24	0.26	50.39
42	210	3.50	1.3	0.488	0.21	0.13	0.28	0.30	62.45
43	215	3.58	1.4	0.526	0.21	0.14	0.32	0.34	74.51
44	220	3.67	1.4	0.526	0.21	0.14	0.32	0.34	74.51
45	225	3.75	1.5	0.563	0.21	0.15	0.36	0.38	86.56
46	230	3.83	1.5	0.563	0.21	0.15	0.36	0.38	86.56
47	235	3.92	1.6	0.601	0.21	0.16	0.39	0.42	98.62
48	240	4.00	1.6	0.601	0.21	0.16	0.39	0.42	98.62
49	245	4.08	1.7	0.639	0.21	0.17	0.43	0.46	110.68
50	250	4.17	1.8	0.676	0.21	0.18	0.47	0.50	122.73
51	255	4.25	1.9	0.714	0.21	0.19	0.51	0.54	134.79
52	260	4.33	2.0	0.751	0.21	0.20	0.54	0.58	146.85
53	265	4.42	2.1	0.789	0.21	0.21	0.58	0.62	158.90
54	270	4.50	2.1	0.789	0.21	0.21	0.58	0.62	158.90
55	275	4.58	2.2	0.826	0.21	0.21	0.62	0.66	170.96
56	280	4.67	2.3	0.864	0.21	0.22	0.66	0.70	183.02

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.07
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.18
UNIT TIME-PERCENT OF LAG	424.3
TOTAL ADJUSTED STORM RAIN-INCHES	3.13
CONSTANT LOSS RATE-in/hr	0.207
LOW LOSS RATE - PERCENT	26%

TOTAL PERCOLATION RATE (cfs) 0.09 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.901	0.21	0.23	0.69	0.74	195.07
58	290	4.83	2.4	0.901	0.21	0.23	0.69	0.74	195.07
59	295	4.92	2.5	0.939	0.21	0.24	0.73	0.78	207.13
60	300	5.00	2.6	0.977	0.21	0.25	0.77	0.82	219.19
61	305	5.08	3.1	1.164	0.21	0.30	0.96	1.02	279.47
62	310	5.17	3.6	1.352	0.21	0.35	1.14	1.23	339.75
63	315	5.25	3.9	1.465	0.21	0.38	1.26	1.35	375.92
64	320	5.33	4.2	1.578	0.21	0.41	1.37	1.47	412.09
65	325	5.42	4.7	1.765	0.21	0.46	1.56	1.67	472.38
66	330	5.50	5.6	2.103	0.21	0.55	1.90	2.03	580.89
67	335	5.58	1.9	0.714	0.21	0.19	0.51	0.54	134.79
68	340	5.67	0.9	0.338	0.21	0.09	0.13	0.14	14.22
69	345	5.75	0.6	0.225	0.21	0.06	0.02	0.02	0.00
70	350	5.83	0.5	0.188	0.21	0.05	0.14	0.15	16.83
71	355	5.92	0.3	0.113	0.21	0.03	0.08	0.09	0.00
72	360	6.00	0.2	0.075	0.21	0.02	0.06	0.06	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.94
FLOOD VOLUME (acft)	0.17
FLOOD VOLUME (cuft)	7549.40
REQUIRED STORAGE (acft)	0.13
REQUIRED STORAGE (cuft)	5667.01
PEAK FLOW RATE (cfs)	2.03

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES 1.070 UNIT TIME-MINUTES 15 LAG TIME - MINUTES 1.18 UNIT TIME-PERCENT OF LAG 1273.0 TOTAL ADJUSTED STORM RAIN-INCHES 5.06					CONSTANT LOSS RATE-in/hr n/a VARIABLE LOSS RATE (AVG) in/hr 0.2072 MINIMUM LOSS RATE (for var. loss) - in/hr 0.104 LOW LOSS RATE - DECIMAL 0.26 C 0.00192 PERCOLATION RATE (cfs) 0.09				
Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.040	0.366	0.011	0.030	0.03	0.00
2	30	0.50	0.3	0.061	0.362	0.016	0.045	0.05	0.00
3	45	0.75	0.3	0.061	0.357	0.016	0.045	0.05	0.00
4	60	1.00	0.4	0.081	0.353	0.021	0.060	0.06	0.00
5	75	1.25	0.3	0.061	0.349	0.016	0.045	0.05	0.00
6	90	1.50	0.3	0.061	0.345	0.016	0.045	0.05	0.00
7	105	1.75	0.3	0.061	0.341	0.016	0.045	0.05	0.00
8	120	2.00	0.4	0.081	0.337	0.021	0.060	0.06	0.00
9	135	2.25	0.4	0.081	0.333	0.021	0.060	0.06	0.00
10	150	2.50	0.4	0.081	0.329	0.021	0.060	0.06	0.00
11	165	2.75	0.5	0.101	0.325	0.026	0.075	0.08	0.00
12	180	3.00	0.5	0.101	0.321	0.026	0.075	0.08	0.00
13	195	3.25	0.5	0.101	0.317	0.026	0.075	0.08	0.00
14	210	3.50	0.5	0.101	0.313	0.026	0.075	0.08	0.00
15	225	3.75	0.5	0.101	0.309	0.026	0.075	0.08	0.00
16	240	4.00	0.6	0.121	0.305	0.032	0.090	0.10	3.21
17	255	4.25	0.6	0.121	0.301	0.032	0.090	0.10	3.21
18	270	4.50	0.7	0.142	0.297	0.037	0.105	0.11	17.63
19	285	4.75	0.7	0.142	0.293	0.037	0.105	0.11	17.63
20	300	5.00	0.8	0.162	0.290	0.042	0.120	0.13	32.05
21	315	5.25	0.6	0.121	0.286	0.032	0.090	0.10	3.21
22	330	5.50	0.7	0.142	0.282	0.037	0.105	0.11	17.63
23	345	5.75	0.8	0.162	0.278	0.042	0.120	0.13	32.05
24	360	6.00	0.8	0.162	0.275	0.042	0.120	0.13	32.05
25	375	6.25	0.9	0.182	0.271	0.047	0.135	0.14	46.48
26	390	6.50	0.9	0.182	0.267	0.047	0.135	0.14	46.48
27	405	6.75	1.0	0.202	0.264	0.053	0.150	0.16	60.90
28	420	7.00	1.0	0.202	0.260	0.053	0.150	0.16	60.90
29	435	7.25	1.0	0.202	0.257	0.053	0.150	0.16	60.90
30	450	7.50	1.1	0.223	0.253	0.058	0.165	0.18	75.32
31	465	7.75	1.2	0.243	0.250	0.063	0.180	0.19	89.75
32	480	8.00	1.3	0.263	0.246	0.068	0.017	0.02	0.00
33	495	8.25	1.5	0.304	0.243	0.079	0.061	0.06	0.00
34	510	8.50	1.5	0.304	0.240	0.079	0.064	0.07	0.00
35	525	8.75	1.6	0.324	0.236	0.084	0.088	0.09	1.07
36	540	9.00	1.7	0.344	0.233	0.089	0.111	0.12	23.76
37	555	9.25	1.9	0.385	0.230	0.100	0.155	0.17	65.92
38	570	9.50	2.0	0.405	0.226	0.105	0.178	0.19	88.56
39	585	9.75	2.1	0.425	0.223	0.111	0.202	0.22	111.16
40	600	10.00	2.2	0.445	0.220	0.116	0.225	0.24	133.74
41	615	10.25	1.5	0.304	0.217	0.079	0.087	0.09	0.36
42	630	10.50	1.5	0.304	0.214	0.079	0.090	0.10	3.39
43	645	10.75	2.0	0.405	0.210	0.105	0.194	0.21	103.84
44	660	11.00	2.0	0.405	0.207	0.105	0.197	0.21	106.80
45	675	11.25	1.9	0.385	0.204	0.100	0.180	0.19	90.25
46	690	11.50	1.9	0.385	0.201	0.100	0.183	0.20	93.15
47	705	11.75	1.7	0.344	0.198	0.089	0.146	0.16	57.04
48	720	12.00	1.8	0.364	0.195	0.095	0.169	0.18	79.37
49	735	12.25	2.5	0.506	0.192	0.132	0.314	0.34	218.62
50	750	12.50	2.6	0.526	0.190	0.137	0.337	0.36	240.88
51	765	12.75	2.8	0.567	0.187	0.147	0.380	0.41	282.61
52	780	13.00	2.9	0.587	0.184	0.153	0.403	0.43	304.81
53	795	13.25	3.4	0.688	0.181	0.179	0.507	0.54	404.94
54	810	13.50	3.4	0.688	0.178	0.179	0.510	0.55	407.59
55	825	13.75	2.3	0.466	0.176	0.121	0.290	0.31	195.79
56	840	14.00	2.3	0.466	0.173	0.121	0.293	0.31	198.37
57	855	14.25	2.7	0.546	0.170	0.142	0.376	0.40	278.87
58	870	14.50	2.6	0.526	0.168	0.137	0.358	0.38	261.89
59	885	14.75	2.6	0.526	0.165	0.137	0.361	0.39	264.36
60	900	15.00	2.5	0.506	0.163	0.132	0.343	0.37	247.30

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.070	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2072
LAG TIME - MINUTES	1.18	MINIMUM LOSS RATE (for var. loss) - in/hr	0.104
UNIT TIME-PERCENT OF LAG	1273.0	LOW LOSS RATE - DECIMAL	0.26
TOTAL ADJUSTED STORM RAIN-INCHES	5.06	C	0.00192
		PERCOLATION RATE (cfs)	0.09

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
61	915	15.25	2.4	0.486	0.160	0.126	0.326	0.35	230.20
62	930	15.50	2.3	0.466	0.158	0.121	0.308	0.33	213.07
63	945	15.75	1.9	0.385	0.155	0.100	0.229	0.25	137.43
64	960	16.00	1.9	0.385	0.153	0.100	0.232	0.25	139.72
65	975	16.25	0.4	0.081	0.151	0.021	0.060	0.06	0.00
66	990	16.50	0.4	0.081	0.148	0.021	0.060	0.06	0.00
67	1005	16.75	0.3	0.061	0.146	0.016	0.045	0.05	0.00
68	1020	17.00	0.3	0.061	0.144	0.016	0.045	0.05	0.00
69	1035	17.25	0.5	0.101	0.142	0.026	0.075	0.08	0.00
70	1050	17.50	0.5	0.101	0.140	0.026	0.075	0.08	0.00
71	1065	17.75	0.5	0.101	0.137	0.026	0.075	0.08	0.00
72	1080	18.00	0.4	0.081	0.135	0.021	0.060	0.06	0.00
73	1095	18.25	0.4	0.081	0.133	0.021	0.060	0.06	0.00
74	1110	18.50	0.4	0.081	0.132	0.021	0.060	0.06	0.00
75	1125	18.75	0.3	0.061	0.130	0.016	0.045	0.05	0.00
76	1140	19.00	0.2	0.040	0.128	0.011	0.030	0.03	0.00
77	1155	19.25	0.3	0.061	0.126	0.016	0.045	0.05	0.00
78	1170	19.50	0.4	0.081	0.124	0.021	0.060	0.06	0.00
79	1185	19.75	0.3	0.061	0.123	0.016	0.045	0.05	0.00
80	1200	20.00	0.2	0.040	0.121	0.011	0.030	0.03	0.00
81	1215	20.25	0.3	0.061	0.119	0.016	0.045	0.05	0.00
82	1230	20.50	0.3	0.061	0.118	0.016	0.045	0.05	0.00
83	1245	20.75	0.3	0.061	0.116	0.016	0.045	0.05	0.00
84	1260	21.00	0.2	0.040	0.115	0.011	0.030	0.03	0.00
85	1275	21.25	0.3	0.061	0.113	0.016	0.045	0.05	0.00
86	1290	21.50	0.2	0.040	0.112	0.011	0.030	0.03	0.00
87	1305	21.75	0.3	0.061	0.111	0.016	0.045	0.05	0.00
88	1320	22.00	0.2	0.040	0.110	0.011	0.030	0.03	0.00
89	1335	22.25	0.3	0.061	0.109	0.016	0.045	0.05	0.00
90	1350	22.50	0.2	0.040	0.108	0.011	0.030	0.03	0.00
91	1365	22.75	0.2	0.040	0.107	0.011	0.030	0.03	0.00
92	1380	23.00	0.2	0.040	0.106	0.011	0.030	0.03	0.00
93	1395	23.25	0.2	0.040	0.105	0.011	0.030	0.03	0.00
94	1410	23.50	0.2	0.040	0.105	0.011	0.030	0.03	0.00
95	1425	23.75	0.2	0.040	0.104	0.011	0.030	0.03	0.00
96	1440	24.00	0.2	0.040	0.104	0.011	0.030	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	3.06
FLOOD VOLUME (acft)	0.27
FLOOD VOLUME (cuft)	11873.23
REQUIRED STORAGE (acft)	0.13
REQUIRED STORAGE (cuft)	5584.27
PEAK FLOW (cfs)	0.55

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN B

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
347	0	0		2000	0	0	0.00
348	1	1	0	2000	2000	2000	0.05
349	1	2	0	2000	2000	4000	0.09
350	1	3	0	2000	2000	6000	0.14
351	1	4	0	2000	2000	8000	0.18

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	0.09259	cfs
MAXWELL IV DRYWELLS			
NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		0.09259	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	5979	cu ft (100-yr 3-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	0.09259	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**18**	hrs < 36 hrs

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.18	55	55	28	27	347.01	27	0.00
2	10	0.18	55	82	28	54	347.03	54	0.00
3	15	0.12	36	90	28	62	347.03	62	0.00
4	20	0.24	73	135	28	108	347.05	108	0.00
5	25	0.24	73	181	28	153	347.08	153	0.00
6	30	0.34	101	254	28	227	347.11	227	0.01
7	35	0.24	73	300	28	272	347.14	272	0.01
8	40	0.34	101	373	28	346	347.17	346	0.01
9	45	0.34	101	447	28	419	347.21	419	0.01
10	50	0.24	73	492	28	465	347.23	465	0.01
11	55	0.28	83	547	28	520	347.26	520	0.01
12	60	0.34	101	621	28	593	347.30	593	0.01
13	65	0.46	139	732	28	704	347.35	704	0.02
14	70	0.46	139	842	28	815	347.41	815	0.02
15	75	0.46	139	953	28	925	347.46	925	0.02
16	80	0.40	120	1,045	28	1,018	347.51	1,018	0.02
17	85	0.59	176	1,193	28	1,166	347.58	1,166	0.03
18	90	0.62	185	1,351	28	1,323	347.66	1,323	0.03
19	95	0.52	157	1,480	28	1,453	347.73	1,453	0.03
20	100	0.62	185	1,638	28	1,610	347.80	1,610	0.04
21	105	0.80	241	1,851	28	1,823	347.91	1,823	0.04
22	110	0.74	222	2,046	28	2,018	348.01	2,018	0.05
23	115	0.68	204	2,222	28	2,194	348.10	2,194	0.05
24	120	0.71	213	2,407	28	2,379	348.19	2,379	0.05
25	125	0.74	222	2,602	28	2,574	348.29	2,574	0.06
26	130	1.08	325	2,899	28	2,871	348.44	2,871	0.07
27	135	1.33	400	3,271	28	3,243	348.62	3,243	0.07
28	140	0.87	260	3,503	28	3,475	348.74	3,475	0.08
29	145	1.89	567	4,042	28	4,015	349.01	4,015	0.09
30	150	2.05	614	4,629	28	4,601	349.30	4,601	0.11
31	155	2.33	698	5,299	28	5,271	349.64	5,271	0.12
32	160	1.61	483	5,754	28	5,727	349.86	5,727	0.13
33	165	0.40	120	5,847	28	5,819	349.91	5,819	0.13
34	170	0.34	101	5,920	28	5,892	349.95	5,892	0.14
35	175	0.34	101	5,994	28	5,966	349.98	5,966	0.14
36	180	0.14	41	6,007	28	5,979	349.99	5,979	0.14

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.15	45	45	28	17	347.01	17	0.00
2	10	0.02	6	23	28	-	347.00	-	0.00
3	15	0.02	6	6	28	-	347.00	-	0.00
4	20	0.02	6	6	28	-	347.00	-	0.00
5	25	0.02	6	6	28	-	347.00	-	0.00
6	30	0.06	18	18	28	-	347.00	-	0.00
7	35	0.06	18	18	28	-	347.00	-	0.00
8	40	0.06	18	18	28	-	347.00	-	0.00
9	45	0.06	18	18	28	-	347.00	-	0.00
10	50	0.06	18	18	28	-	347.00	-	0.00
11	55	0.06	18	18	28	-	347.00	-	0.00
12	60	0.10	30	30	28	2	347.00	2	0.00
13	65	0.10	30	32	28	4	347.00	4	0.00
14	70	0.10	30	34	28	6	347.00	6	0.00
15	75	0.10	30	36	28	9	347.00	9	0.00
16	80	0.10	30	39	28	11	347.01	11	0.00
17	85	0.10	30	41	28	13	347.01	13	0.00
18	90	0.10	30	43	28	15	347.01	15	0.00
19	95	0.10	30	45	28	17	347.01	17	0.00
20	100	0.10	30	47	28	19	347.01	19	0.00
21	105	0.10	30	49	28	22	347.01	22	0.00
22	110	0.10	30	52	28	24	347.01	24	0.00
23	115	0.10	30	54	28	26	347.01	26	0.00
24	120	0.14	42	68	28	40	347.02	40	0.00
25	125	0.10	30	70	28	42	347.02	42	0.00
26	130	0.14	42	84	28	57	347.03	57	0.00
27	135	0.14	42	99	28	71	347.04	71	0.00
28	140	0.14	42	113	28	85	347.04	85	0.00
29	145	0.14	42	127	28	99	347.05	99	0.00
30	150	0.14	42	141	28	113	347.06	113	0.00
31	155	0.14	42	155	28	128	347.06	128	0.00
32	160	0.14	42	170	28	142	347.07	142	0.00
33	165	0.18	54	196	28	168	347.08	168	0.00
34	170	0.18	54	222	28	194	347.10	194	0.00
35	175	0.18	54	249	28	221	347.11	221	0.01
36	180	0.18	54	275	28	247	347.12	247	0.01
37	185	0.18	54	301	28	273	347.14	273	0.01
38	190	0.22	66	339	28	312	347.16	312	0.01
39	195	0.22	66	378	28	350	347.17	350	0.01
40	200	0.22	66	416	28	388	347.19	388	0.01
41	205	0.26	78	466	28	439	347.22	439	0.01
42	210	0.30	90	529	28	501	347.25	501	0.01
43	215	0.34	102	603	28	576	347.29	576	0.01
44	220	0.34	102	678	28	650	347.33	650	0.01
45	225	0.38	114	765	28	737	347.37	737	0.02
46	230	0.38	114	851	28	823	347.41	823	0.02
47	235	0.42	126	950	28	922	347.46	922	0.02
48	240	0.42	126	1,048	28	1,021	347.51	1,021	0.02
49	245	0.46	138	1,159	28	1,131	347.57	1,131	0.03
50	250	0.50	151	1,282	28	1,254	347.63	1,254	0.03
51	255	0.54	163	1,417	28	1,389	347.69	1,389	0.03
52	260	0.58	175	1,563	28	1,536	347.77	1,536	0.04
53	265	0.62	187	1,722	28	1,694	347.85	1,694	0.04
54	270	0.62	187	1,881	28	1,853	347.93	1,853	0.04
55	275	0.66	199	2,052	28	2,024	348.01	2,024	0.05

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	0.70	211	2,235	28	2,207	348.10	2,207	0.05
57	285	0.74	223	2,430	28	2,402	348.20	2,402	0.06
58	290	0.74	223	2,625	28	2,598	348.30	2,598	0.06
59	295	0.78	235	2,832	28	2,805	348.40	2,805	0.06
60	300	0.82	247	3,052	28	3,024	348.51	3,024	0.07
61	305	1.02	307	3,331	28	3,303	348.65	3,303	0.08
62	310	1.23	368	3,671	28	3,643	348.82	3,643	0.08
63	315	1.35	404	4,047	28	4,019	349.01	4,019	0.09
64	320	1.47	440	4,459	28	4,431	349.22	4,431	0.10
65	325	1.67	500	4,931	28	4,903	349.45	4,903	0.11
66	330	2.03	609	5,512	28	5,484	349.74	5,484	0.13
67	335	0.54	163	5,647	28	5,619	349.81	5,619	0.13
68	340	0.14	42	5,661	28	5,633	349.82	5,633	0.13
69	345	0.02	6	5,639	28	5,611	349.81	5,611	0.13
70	350	0.15	45	5,656	28	5,628	349.81	5,628	0.13
71	355	0.09	27	5,655	28	5,627	349.81	5,627	0.13
72	360	0.06	18	5,645	28	5,617	349.81	5,617	0.13

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.03	29	29	83	-	347.00	-	0.00
2	30	0.05	43	43	83	-	347.00	-	0.00
3	45	0.05	43	43	83	-	347.00	-	0.00
4	60	0.06	58	58	83	-	347.00	-	0.00
5	75	0.05	43	43	83	-	347.00	-	0.00
6	90	0.05	43	43	83	-	347.00	-	0.00
7	105	0.05	43	43	83	-	347.00	-	0.00
8	120	0.06	58	58	83	-	347.00	-	0.00
9	135	0.06	58	58	83	-	347.00	-	0.00
10	150	0.06	58	58	83	-	347.00	-	0.00
11	165	0.08	72	72	83	-	347.00	-	0.00
12	180	0.08	72	72	83	-	347.00	-	0.00
13	195	0.08	72	72	83	-	347.00	-	0.00
14	210	0.08	72	72	83	-	347.00	-	0.00
15	225	0.08	72	72	83	-	347.00	-	0.00
16	240	0.10	87	87	83	3	347.00	3	0.00
17	255	0.10	87	90	83	6	347.00	6	0.00
18	270	0.11	101	107	83	24	347.01	24	0.00
19	285	0.11	101	125	83	42	347.02	42	0.00
20	300	0.13	115	157	83	74	347.04	74	0.00
21	315	0.10	87	160	83	77	347.04	77	0.00
22	330	0.11	101	178	83	95	347.05	95	0.00
23	345	0.13	115	210	83	127	347.06	127	0.00
24	360	0.13	115	242	83	159	347.08	159	0.00
25	375	0.14	130	288	83	205	347.10	205	0.00
26	390	0.14	130	335	83	252	347.13	252	0.01
27	405	0.16	144	396	83	313	347.16	313	0.01
28	420	0.16	144	457	83	373	347.19	373	0.01
29	435	0.16	144	518	83	434	347.22	434	0.01
30	450	0.18	159	593	83	510	347.25	510	0.01
31	465	0.19	173	683	83	599	347.30	599	0.01
32	480	0.02	16	616	83	532	347.27	532	0.01
33	495	0.06	58	591	83	507	347.25	507	0.01
34	510	0.07	62	569	83	486	347.24	486	0.01
35	525	0.09	84	570	83	487	347.24	487	0.01
36	540	0.12	107	594	83	510	347.26	510	0.01
37	555	0.17	149	660	83	576	347.29	576	0.01
38	570	0.19	172	748	83	665	347.33	665	0.02
39	585	0.22	194	859	83	776	347.39	776	0.02
40	600	0.24	217	993	83	910	347.45	910	0.02
41	615	0.09	84	994	83	910	347.46	910	0.02
42	630	0.10	87	997	83	914	347.46	914	0.02
43	645	0.21	187	1,101	83	1,017	347.51	1,017	0.02
44	660	0.21	190	1,208	83	1,124	347.56	1,124	0.03
45	675	0.19	174	1,298	83	1,214	347.61	1,214	0.03
46	690	0.20	176	1,391	83	1,308	347.65	1,308	0.03
47	705	0.16	140	1,448	83	1,365	347.68	1,365	0.03
48	720	0.18	163	1,527	83	1,444	347.72	1,444	0.03
49	735	0.34	302	1,746	83	1,663	347.83	1,663	0.04
50	750	0.36	324	1,987	83	1,904	347.95	1,904	0.04
51	765	0.41	366	2,270	83	2,186	348.09	2,186	0.05
52	780	0.43	388	2,574	83	2,491	348.25	2,491	0.06
53	795	0.54	488	2,979	83	2,896	348.45	2,896	0.07
54	810	0.55	491	3,387	83	3,304	348.65	3,304	0.08
55	825	0.31	279	3,583	83	3,499	348.75	3,499	0.08
56	840	0.31	282	3,781	83	3,698	348.85	3,698	0.08
57	855	0.40	362	4,060	83	3,977	348.99	3,977	0.09
58	870	0.38	345	4,322	83	4,238	349.12	4,238	0.10

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.39	348	4,586	83	4,503	349.25	4,503	0.10
60	900	0.37	331	4,833	83	4,750	349.38	4,750	0.11
61	915	0.35	314	5,064	83	4,980	349.49	4,980	0.11
62	930	0.33	296	5,277	83	5,193	349.60	5,193	0.12
63	945	0.25	221	5,414	83	5,331	349.67	5,331	0.12
64	960	0.25	223	5,554	83	5,471	349.74	5,471	0.13
65	975	0.06	58	5,528	83	5,445	349.72	5,445	0.12
66	990	0.06	58	5,503	83	5,419	349.71	5,419	0.12
67	1005	0.05	43	5,463	83	5,379	349.69	5,379	0.12
68	1020	0.05	43	5,422	83	5,339	349.67	5,339	0.12
69	1035	0.08	72	5,411	83	5,328	349.66	5,328	0.12
70	1050	0.08	72	5,400	83	5,317	349.66	5,317	0.12
71	1065	0.08	72	5,389	83	5,305	349.65	5,305	0.12
72	1080	0.06	58	5,363	83	5,280	349.64	5,280	0.12
73	1095	0.06	58	5,338	83	5,254	349.63	5,254	0.12
74	1110	0.06	58	5,312	83	5,229	349.61	5,229	0.12
75	1125	0.05	43	5,272	83	5,188	349.59	5,188	0.12
76	1140	0.03	29	5,217	83	5,134	349.57	5,134	0.12
77	1155	0.05	43	5,177	83	5,094	349.55	5,094	0.12
78	1170	0.06	58	5,152	83	5,068	349.53	5,068	0.12
79	1185	0.05	43	5,112	83	5,028	349.51	5,028	0.12
80	1200	0.03	29	5,057	83	4,974	349.49	4,974	0.11
81	1215	0.05	43	5,017	83	4,934	349.47	4,934	0.11
82	1230	0.05	43	4,977	83	4,894	349.45	4,894	0.11
83	1245	0.05	43	4,937	83	4,854	349.43	4,854	0.11
84	1260	0.03	29	4,882	83	4,799	349.40	4,799	0.11
85	1275	0.05	43	4,842	83	4,759	349.38	4,759	0.11
86	1290	0.03	29	4,788	83	4,705	349.35	4,705	0.11
87	1305	0.05	43	4,748	83	4,664	349.33	4,664	0.11
88	1320	0.03	29	4,693	83	4,610	349.30	4,610	0.11
89	1335	0.05	43	4,653	83	4,570	349.28	4,570	0.10
90	1350	0.03	29	4,599	83	4,515	349.26	4,515	0.10
91	1365	0.03	29	4,544	83	4,461	349.23	4,461	0.10
92	1380	0.03	29	4,490	83	4,406	349.20	4,406	0.10
93	1395	0.03	29	4,435	83	4,352	349.18	4,352	0.10
94	1410	0.03	29	4,381	83	4,297	349.15	4,297	0.10
95	1425	0.03	29	4,326	83	4,243	349.12	4,243	0.10
96	1440	0.03	29	4,272	83	4,188	349.09	4,188	0.10

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN C		
10	AREA DESIGNATION	SUBAREA C (DRIVE-THRU)		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL	1.24		
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	18%		
27				
28	LENGTH OF WATERCOURSE (L)	334		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	160		
30				
31	ELEVATION OF HEADWATER	366		
32	ELEVATION OF CONCENTRATION POINT	364.58		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		359	2200	
45		360	2200	
46		361	2200	
47		362	2200	
48		363	2200	
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN C
[2] AREA DESIGNATION	SUBAREA C (DRIVE-THRU)
[3] AREA - ACRES	1.240
[4] L-FEET	334
[5] L-MILES	0.063
[6] La-FEET	160
[7] La-MILES	0.030
[8] ELEVATION OF HEADWATER	366
[9] ELEVATION OF CONCENTRATION POINT	364.58
[10] H-FEET	1.42
[11] S-FEET/MILE	22.4
[12] S^0.5	4.74
[13] L*LCA/S^0.5	0.00040
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.018
[16] LAG TIME-MINUTES	1.11
[17] 25% OF LAG-MINUTES	0.28
[18] 40% OF LAG-MINUTES	0.44
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.10

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	1.240	1.00	2.42	3.13	1.240	1.00	3.13	5.06	1.240	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	1.24	SUM [7]	2.42	SUM [9]	1.24	SUM [11]	3.13	SUM [13]	1.24	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	2.00	2.31	3.43
FLOOD VOLUME	(cu-ft)	8,994	10,384	15,446
	(acre-ft)	0.21	0.24	0.35
REQUIRED STORAGE	(cu-ft)	7,838	8,132	8,559
	(acre-ft)	0.18	0.19	0.20
PEAK FLOW	(cfs)	2.78	2.43	0.70
MAXIMUM WSEL	(ft)	362.56	362.69	362.74

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN C
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
A	COMMERCIAL	32	0.74	90%	0.14	1.24	1.000	0.1406
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
	SF - 1/4 ACRE			50%	0.00	0.00	0.000	0.0000
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
	MF - APARTMENTS			80%	0.00	0.00	0.000	0.0000
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
	RETENTION BASINS			0%	0.00	0.00	0.000	0.0000
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	1.24	SUM	0.1406

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.0703
C= 0.00130

Ft=C(24-(T/60))^1.55 = 0.00130 (24-(T/60))^1.55 + 0.07 in/hr

LOW LOSS RATE (80-90 PERCENT) = 18%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN C
BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.24
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.11
UNIT TIME-PERCENT OF LAG	450.7
TOTAL ADJUSTED STORM RAIN-INCHES	2.42
CONSTANT LOSS RATE-in/hr	0.14
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.10 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.14	0.07	0.237	0.29	57.58
2	10	0.17	1.3	0.378	0.14	0.07	0.237	0.29	57.58
3	15	0.25	1.1	0.319	0.14	0.06	0.179	0.22	35.97
4	20	0.33	1.5	0.436	0.14	0.08	0.295	0.37	79.18
5	25	0.42	1.5	0.436	0.14	0.08	0.295	0.37	79.18
6	30	0.50	1.8	0.523	0.14	0.09	0.382	0.47	111.59
7	35	0.58	1.5	0.436	0.14	0.08	0.295	0.37	79.18
8	40	0.67	1.8	0.523	0.14	0.09	0.382	0.47	111.59
9	45	0.75	1.8	0.523	0.14	0.09	0.382	0.47	111.59
10	50	0.83	1.5	0.436	0.14	0.08	0.295	0.37	79.18
11	55	0.92	1.6	0.465	0.14	0.08	0.324	0.40	89.99
12	60	1.00	1.8	0.523	0.14	0.09	0.382	0.47	111.59
13	65	1.08	2.2	0.639	0.14	0.11	0.498	0.62	154.80
14	70	1.17	2.2	0.639	0.14	0.11	0.498	0.62	154.80
15	75	1.25	2.2	0.639	0.14	0.11	0.498	0.62	154.80
16	80	1.33	2.0	0.581	0.14	0.10	0.440	0.55	133.20
17	85	1.42	2.6	0.755	0.14	0.14	0.614	0.76	198.02
18	90	1.50	2.7	0.784	0.14	0.14	0.643	0.80	208.82
19	95	1.58	2.4	0.697	0.14	0.13	0.556	0.69	176.41
20	100	1.67	2.7	0.784	0.14	0.14	0.643	0.80	208.82
21	105	1.75	3.3	0.958	0.14	0.17	0.818	1.01	273.64
22	110	1.83	3.1	0.900	0.14	0.16	0.760	0.94	252.03
23	115	1.92	2.9	0.842	0.14	0.15	0.702	0.87	230.42
24	120	2.00	3.0	0.871	0.14	0.16	0.731	0.91	241.23
25	125	2.08	3.1	0.900	0.14	0.16	0.760	0.94	252.03
26	130	2.17	4.2	1.220	0.14	0.22	1.079	1.34	370.86
27	135	2.25	5.0	1.452	0.14	0.26	1.311	1.63	457.29
28	140	2.33	3.5	1.016	0.14	0.18	0.876	1.09	295.24
29	145	2.42	6.8	1.975	0.14	0.36	1.834	2.27	651.74
30	150	2.50	7.3	2.120	0.14	0.38	1.979	2.45	705.75
31	155	2.58	8.2	2.381	0.14	0.43	2.241	2.78	802.98
32	160	2.67	5.9	1.713	0.14	0.31	1.573	1.95	554.51
33	165	2.75	2.0	0.581	0.14	0.10	0.440	0.55	133.20
34	170	2.83	1.8	0.523	0.14	0.09	0.382	0.47	111.59
35	175	2.92	1.8	0.523	0.14	0.09	0.382	0.47	111.59
36	180	3.00	0.6	0.174	0.14	0.03	0.034	0.04	0.00
							23.978		7838.01

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.00
FLOOD VOLUME (acft)	0.21
FLOOD VOLUME (cuft)	8994.33
REQUIRED STORAGE (acft)	0.18
REQUIRED STORAGE (cuft)	7838.01
PEAK FLOW RATE (cfs)	2.78

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN C

BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.24
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.11
UNIT TIME-PERCENT OF LAG	450.7
TOTAL ADJUSTED STORM RAIN-INCHES	3.13
CONSTANT LOSS RATE-in/hr	0.141
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.10 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.188	0.14	0.03	0.05	0.06	0.00
2	10	0.17	0.6	0.225	0.14	0.04	0.08	0.11	0.98
3	15	0.25	0.6	0.225	0.14	0.04	0.08	0.11	0.98
4	20	0.33	0.6	0.225	0.14	0.04	0.08	0.11	0.98
5	25	0.42	0.6	0.225	0.14	0.04	0.08	0.11	0.98
6	30	0.50	0.7	0.263	0.14	0.05	0.12	0.15	14.95
7	35	0.58	0.7	0.263	0.14	0.05	0.12	0.15	14.95
8	40	0.67	0.7	0.263	0.14	0.05	0.12	0.15	14.95
9	45	0.75	0.7	0.263	0.14	0.05	0.12	0.15	14.95
10	50	0.83	0.7	0.263	0.14	0.05	0.12	0.15	14.95
11	55	0.92	0.7	0.263	0.14	0.05	0.12	0.15	14.95
12	60	1.00	0.8	0.300	0.14	0.05	0.16	0.20	28.92
13	65	1.08	0.8	0.300	0.14	0.05	0.16	0.20	28.92
14	70	1.17	0.8	0.300	0.14	0.05	0.16	0.20	28.92
15	75	1.25	0.8	0.300	0.14	0.05	0.16	0.20	28.92
16	80	1.33	0.8	0.300	0.14	0.05	0.16	0.20	28.92
17	85	1.42	0.8	0.300	0.14	0.05	0.16	0.20	28.92
18	90	1.50	0.8	0.300	0.14	0.05	0.16	0.20	28.92
19	95	1.58	0.8	0.300	0.14	0.05	0.16	0.20	28.92
20	100	1.67	0.8	0.300	0.14	0.05	0.16	0.20	28.92
21	105	1.75	0.8	0.300	0.14	0.05	0.16	0.20	28.92
22	110	1.83	0.8	0.300	0.14	0.05	0.16	0.20	28.92
23	115	1.92	0.8	0.300	0.14	0.05	0.16	0.20	28.92
24	120	2.00	0.9	0.338	0.14	0.06	0.20	0.24	42.89
25	125	2.08	0.8	0.300	0.14	0.05	0.16	0.20	28.92
26	130	2.17	0.9	0.338	0.14	0.06	0.20	0.24	42.89
27	135	2.25	0.9	0.338	0.14	0.06	0.20	0.24	42.89
28	140	2.33	0.9	0.338	0.14	0.06	0.20	0.24	42.89
29	145	2.42	0.9	0.338	0.14	0.06	0.20	0.24	42.89
30	150	2.50	0.9	0.338	0.14	0.06	0.20	0.24	42.89
31	155	2.58	0.9	0.338	0.14	0.06	0.20	0.24	42.89
32	160	2.67	0.9	0.338	0.14	0.06	0.20	0.24	42.89
33	165	2.75	1.0	0.376	0.14	0.07	0.24	0.29	56.86
34	170	2.83	1.0	0.376	0.14	0.07	0.24	0.29	56.86
35	175	2.92	1.0	0.376	0.14	0.07	0.24	0.29	56.86
36	180	3.00	1.0	0.376	0.14	0.07	0.24	0.29	56.86
37	185	3.08	1.0	0.376	0.14	0.07	0.24	0.29	56.86
38	190	3.17	1.1	0.413	0.14	0.07	0.27	0.34	70.84
39	195	3.25	1.1	0.413	0.14	0.07	0.27	0.34	70.84
40	200	3.33	1.1	0.413	0.14	0.07	0.27	0.34	70.84
41	205	3.42	1.2	0.451	0.14	0.08	0.31	0.38	84.81
42	210	3.50	1.3	0.488	0.14	0.09	0.35	0.43	98.78
43	215	3.58	1.4	0.526	0.14	0.09	0.39	0.48	112.75
44	220	3.67	1.4	0.526	0.14	0.09	0.39	0.48	112.75
45	225	3.75	1.5	0.563	0.14	0.10	0.42	0.52	126.73
46	230	3.83	1.5	0.563	0.14	0.10	0.42	0.52	126.73
47	235	3.92	1.6	0.601	0.14	0.11	0.46	0.57	140.70
48	240	4.00	1.6	0.601	0.14	0.11	0.46	0.57	140.70
49	245	4.08	1.7	0.639	0.14	0.11	0.50	0.62	154.67
50	250	4.17	1.8	0.676	0.14	0.12	0.54	0.66	168.64
51	255	4.25	1.9	0.714	0.14	0.13	0.57	0.71	182.62
52	260	4.33	2.0	0.751	0.14	0.14	0.61	0.76	196.59
53	265	4.42	2.1	0.789	0.14	0.14	0.65	0.80	210.56
54	270	4.50	2.1	0.789	0.14	0.14	0.65	0.80	210.56
55	275	4.58	2.2	0.826	0.14	0.15	0.69	0.85	224.53
56	280	4.67	2.3	0.864	0.14	0.16	0.72	0.90	238.50

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN C BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.24		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.11		
UNIT TIME-PERCENT OF LAG	450.7		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.141		
LOW LOSS RATE - PERCENT	18%	TOTAL PERCOLATION RATE (cfs)	0.10 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.901	0.14	0.16	0.76	0.94	252.48
58	290	4.83	2.4	0.901	0.14	0.16	0.76	0.94	252.48
59	295	4.92	2.5	0.939	0.14	0.17	0.80	0.99	266.45
60	300	5.00	2.6	0.977	0.14	0.18	0.84	1.04	280.42
61	305	5.08	3.1	1.164	0.14	0.21	1.02	1.27	350.28
62	310	5.17	3.6	1.352	0.14	0.24	1.21	1.50	420.14
63	315	5.25	3.9	1.465	0.14	0.26	1.32	1.64	462.06
64	320	5.33	4.2	1.578	0.14	0.28	1.44	1.78	503.98
65	325	5.42	4.7	1.765	0.14	0.32	1.62	2.01	573.84
66	330	5.50	5.6	2.103	0.14	0.38	1.96	2.43	699.59
67	335	5.58	1.9	0.714	0.14	0.13	0.57	0.71	182.62
68	340	5.67	0.9	0.338	0.14	0.06	0.20	0.24	42.89
69	345	5.75	0.6	0.225	0.14	0.04	0.08	0.11	0.98
70	350	5.83	0.5	0.188	0.14	0.03	0.05	0.06	0.00
71	355	5.92	0.3	0.113	0.14	0.02	0.09	0.11	3.82
72	360	6.00	0.2	0.075	0.14	0.01	0.06	0.08	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.31
FLOOD VOLUME (acft)	0.24
FLOOD VOLUME (cuft)	10384.38
REQUIRED STORAGE (acft)	0.19
REQUIRED STORAGE (cuft)	8132.16
PEAK FLOW RATE (cfs)	2.43

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN C BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			1.240	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.1406		
LAG TIME - MINUTES			1.11	MINIMUM LOSS RATE (for var. loss) - in/hr			0.070		
UNIT TIME-PERCENT OF LAG			1352.0	LOW LOSS RATE - DECIMAL			0.18		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00130		
				PERCOLATION RATE (cfs)			0.10		
Unit Time Period	Time		Pattern	Storm	Loss Rate		Effective	Flood	Required
	Minutes	Hours	Percent	Rain in/hr	in/hr		Rain	Hydrograph Flow	Storage
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.040	0.248	0.007	0.033	0.04	0.00
2	30	0.50	0.3	0.061	0.245	0.011	0.050	0.06	0.00
3	45	0.75	0.3	0.061	0.243	0.011	0.050	0.06	0.00
4	60	1.00	0.4	0.081	0.240	0.015	0.066	0.08	0.00
5	75	1.25	0.3	0.061	0.237	0.011	0.050	0.06	0.00
6	90	1.50	0.3	0.061	0.234	0.011	0.050	0.06	0.00
7	105	1.75	0.3	0.061	0.231	0.011	0.050	0.06	0.00
8	120	2.00	0.4	0.081	0.228	0.015	0.066	0.08	0.00
9	135	2.25	0.4	0.081	0.226	0.015	0.066	0.08	0.00
10	150	2.50	0.4	0.081	0.223	0.015	0.066	0.08	0.00
11	165	2.75	0.5	0.101	0.220	0.018	0.083	0.10	0.94
12	180	3.00	0.5	0.101	0.218	0.018	0.083	0.10	0.94
13	195	3.25	0.5	0.101	0.215	0.018	0.083	0.10	0.94
14	210	3.50	0.5	0.101	0.212	0.018	0.083	0.10	0.94
15	225	3.75	0.5	0.101	0.210	0.018	0.083	0.10	0.94
16	240	4.00	0.6	0.121	0.207	0.022	0.100	0.12	19.47
17	255	4.25	0.6	0.121	0.204	0.022	0.100	0.12	19.47
18	270	4.50	0.7	0.142	0.202	0.026	0.116	0.14	37.99
19	285	4.75	0.7	0.142	0.199	0.026	0.116	0.14	37.99
20	300	5.00	0.8	0.162	0.196	0.029	0.133	0.16	56.51
21	315	5.25	0.6	0.121	0.194	0.022	0.100	0.12	19.47
22	330	5.50	0.7	0.142	0.191	0.026	0.116	0.14	37.99
23	345	5.75	0.8	0.162	0.189	0.029	0.133	0.16	56.51
24	360	6.00	0.8	0.162	0.186	0.029	0.133	0.16	56.51
25	375	6.25	0.9	0.182	0.184	0.033	0.149	0.19	75.03
26	390	6.50	0.9	0.182	0.181	0.033	0.001	0.00	0.00
27	405	6.75	1.0	0.202	0.179	0.036	0.023	0.03	0.00
28	420	7.00	1.0	0.202	0.177	0.036	0.026	0.03	0.00
29	435	7.25	1.0	0.202	0.174	0.036	0.028	0.03	0.00
30	450	7.50	1.1	0.223	0.172	0.040	0.051	0.06	0.00
31	465	7.75	1.2	0.243	0.170	0.044	0.073	0.09	0.00
32	480	8.00	1.3	0.263	0.167	0.047	0.096	0.12	15.41
33	495	8.25	1.5	0.304	0.165	0.055	0.139	0.17	63.18
34	510	8.50	1.5	0.304	0.163	0.055	0.141	0.17	65.74
35	525	8.75	1.6	0.324	0.160	0.058	0.164	0.20	90.87
36	540	9.00	1.7	0.344	0.158	0.062	0.186	0.23	115.98
37	555	9.25	1.9	0.385	0.156	0.069	0.229	0.28	163.65
38	570	9.50	2.0	0.405	0.154	0.073	0.251	0.31	188.71
39	585	9.75	2.1	0.425	0.151	0.077	0.274	0.34	213.75
40	600	10.00	2.2	0.445	0.149	0.080	0.296	0.37	238.77
41	615	10.25	1.5	0.304	0.147	0.055	0.157	0.19	83.05
42	630	10.50	1.5	0.304	0.145	0.055	0.159	0.20	85.43
43	645	10.75	2.0	0.405	0.143	0.073	0.262	0.32	200.73
44	660	11.00	2.0	0.405	0.141	0.073	0.264	0.33	203.06
45	675	11.25	1.9	0.385	0.139	0.069	0.246	0.30	182.78
46	690	11.50	1.9	0.385	0.137	0.069	0.248	0.31	185.06
47	705	11.75	1.7	0.344	0.135	0.062	0.210	0.26	142.15
48	720	12.00	1.8	0.364	0.133	0.066	0.232	0.29	166.97
49	735	12.25	2.5	0.506	0.131	0.091	0.375	0.47	327.29
50	750	12.50	2.6	0.526	0.129	0.095	0.398	0.49	352.06
51	765	12.75	2.8	0.567	0.127	0.102	0.440	0.55	399.39
52	780	13.00	2.9	0.587	0.125	0.106	0.462	0.57	424.11
53	795	13.25	3.4	0.688	0.123	0.124	0.565	0.70	539.16
54	810	13.50	3.4	0.688	0.121	0.124	0.567	0.70	541.24
55	825	13.75	2.3	0.466	0.119	0.084	0.346	0.43	294.82
56	840	14.00	2.3	0.466	0.117	0.084	0.348	0.43	296.85
57	855	14.25	2.7	0.546	0.116	0.098	0.431	0.53	389.20
58	870	14.50	2.6	0.526	0.114	0.095	0.412	0.51	368.58
59	885	14.75	2.6	0.526	0.112	0.095	0.414	0.51	370.52
60	900	15.00	2.5	0.506	0.110	0.091	0.396	0.49	349.85

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN C BY: PK DATE: 7/4/2022				

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.240	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1406
LAG TIME - MINUTES	1.11	MINIMUM LOSS RATE (for var. loss) - in/hr	0.070
UNIT TIME-PERCENT OF LAG	1352.0	LOW LOSS RATE - DECIMAL	0.18
TOTAL ADJUSTED STORM RAIN-INCHES	5.06	C	0.00130
		PERCOLATION RATE (cfs)	0.10

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
61	915	15.25	2.4	0.486	0.109	0.087	0.377	0.47	329.14
62	930	15.50	2.3	0.466	0.107	0.084	0.358	0.44	308.41
63	945	15.75	1.9	0.385	0.105	0.069	0.279	0.35	219.89
64	960	16.00	1.9	0.385	0.104	0.069	0.281	0.35	221.68
65	975	16.25	0.4	0.081	0.102	0.015	0.066	0.08	0.00
66	990	16.50	0.4	0.081	0.101	0.015	0.066	0.08	0.00
67	1005	16.75	0.3	0.061	0.099	0.011	0.050	0.06	0.00
68	1020	17.00	0.3	0.061	0.098	0.011	0.050	0.06	0.00
69	1035	17.25	0.5	0.101	0.096	0.018	0.005	0.01	0.00
70	1050	17.50	0.5	0.101	0.095	0.018	0.006	0.01	0.00
71	1065	17.75	0.5	0.101	0.093	0.018	0.008	0.01	0.00
72	1080	18.00	0.4	0.081	0.092	0.015	0.066	0.08	0.00
73	1095	18.25	0.4	0.081	0.091	0.015	0.066	0.08	0.00
74	1110	18.50	0.4	0.081	0.089	0.015	0.066	0.08	0.00
75	1125	18.75	0.3	0.061	0.088	0.011	0.050	0.06	0.00
76	1140	19.00	0.2	0.040	0.087	0.007	0.033	0.04	0.00
77	1155	19.25	0.3	0.061	0.085	0.011	0.050	0.06	0.00
78	1170	19.50	0.4	0.081	0.084	0.015	0.066	0.08	0.00
79	1185	19.75	0.3	0.061	0.083	0.011	0.050	0.06	0.00
80	1200	20.00	0.2	0.040	0.082	0.007	0.033	0.04	0.00
81	1215	20.25	0.3	0.061	0.081	0.011	0.050	0.06	0.00
82	1230	20.50	0.3	0.061	0.080	0.011	0.050	0.06	0.00
83	1245	20.75	0.3	0.061	0.079	0.011	0.050	0.06	0.00
84	1260	21.00	0.2	0.040	0.078	0.007	0.033	0.04	0.00
85	1275	21.25	0.3	0.061	0.077	0.011	0.050	0.06	0.00
86	1290	21.50	0.2	0.040	0.076	0.007	0.033	0.04	0.00
87	1305	21.75	0.3	0.061	0.075	0.011	0.050	0.06	0.00
88	1320	22.00	0.2	0.040	0.074	0.007	0.033	0.04	0.00
89	1335	22.25	0.3	0.061	0.074	0.011	0.050	0.06	0.00
90	1350	22.50	0.2	0.040	0.073	0.007	0.033	0.04	0.00
91	1365	22.75	0.2	0.040	0.072	0.007	0.033	0.04	0.00
92	1380	23.00	0.2	0.040	0.072	0.007	0.033	0.04	0.00
93	1395	23.25	0.2	0.040	0.071	0.007	0.033	0.04	0.00
94	1410	23.50	0.2	0.040	0.071	0.007	0.033	0.04	0.00
95	1425	23.75	0.2	0.040	0.071	0.007	0.033	0.04	0.00
96	1440	24.00	0.2	0.040	0.070	0.007	0.033	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	3.43
FLOOD VOLUME (acft)	0.35
FLOOD VOLUME (cuft)	15445.60
REQUIRED STORAGE (acft)	0.20
REQUIRED STORAGE (cuft)	8559.12
PEAK FLOW (cfs)	0.70

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN C

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
359	0	0		2200	0	0	0.00
360	1	1	0	2200	2200	2200	0.05
361	1	2	0	2200	2200	4400	0.10
362	1	3	0	2200	2200	6600	0.15
363	1	4	0	2200	2200	8800	0.20

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	0.10185	cfs
MAXWELL IV DRYWELLS			
NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		0.10185	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	8559	cu ft (100-yr 24-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	0.10185	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**23**	hrs < 36 hrs

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.29	88	88	31	58	359.03	58	0.00
2	10	0.29	88	146	31	115	359.05	115	0.00
3	15	0.22	67	182	31	151	359.07	151	0.00
4	20	0.37	110	261	31	230	359.10	230	0.01
5	25	0.37	110	340	31	309	359.14	309	0.01
6	30	0.47	142	452	31	421	359.19	421	0.01
7	35	0.37	110	531	31	500	359.23	500	0.01
8	40	0.47	142	642	31	612	359.28	612	0.01
9	45	0.47	142	754	31	723	359.33	723	0.02
10	50	0.37	110	833	31	803	359.36	803	0.02
11	55	0.40	121	923	31	893	359.41	893	0.02
12	60	0.47	142	1,035	31	1,004	359.46	1,004	0.02
13	65	0.62	185	1,190	31	1,159	359.53	1,159	0.03
14	70	0.62	185	1,344	31	1,314	359.60	1,314	0.03
15	75	0.62	185	1,499	31	1,469	359.67	1,469	0.03
16	80	0.55	164	1,632	31	1,602	359.73	1,602	0.04
17	85	0.76	229	1,830	31	1,800	359.82	1,800	0.04
18	90	0.80	239	2,039	31	2,009	359.91	2,009	0.05
19	95	0.69	207	2,216	31	2,185	359.99	2,185	0.05
20	100	0.80	239	2,424	31	2,394	360.09	2,394	0.05
21	105	1.01	304	2,698	31	2,668	360.21	2,668	0.06
22	110	0.94	283	2,950	31	2,920	360.33	2,920	0.07
23	115	0.87	261	3,181	31	3,150	360.43	3,150	0.07
24	120	0.91	272	3,422	31	3,391	360.54	3,391	0.08
25	125	0.94	283	3,674	31	3,643	360.66	3,643	0.08
26	130	1.34	401	4,045	31	4,014	360.82	4,014	0.09
27	135	1.63	488	4,502	31	4,471	361.03	4,471	0.10
28	140	1.09	326	4,797	31	4,767	361.17	4,767	0.11
29	145	2.27	682	5,449	31	5,418	361.46	5,418	0.12
30	150	2.45	736	6,155	31	6,124	361.78	6,124	0.14
31	155	2.78	834	6,958	31	6,927	362.15	6,927	0.16
32	160	1.95	585	7,512	31	7,482	362.40	7,482	0.17
33	165	0.55	164	7,645	31	7,615	362.46	7,615	0.17
34	170	0.47	142	7,757	31	7,726	362.51	7,726	0.18
35	175	0.47	142	7,869	31	7,838	362.56	7,838	0.18
36	180	0.04	13	7,851	31	7,820	362.55	7,820	0.18

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.06	18	18	31	-	359.00	-	0.00
2	10	0.11	32	32	31	1	359.00	1	0.00
3	15	0.11	32	33	31	2	359.00	2	0.00
4	20	0.11	32	33	31	3	359.00	3	0.00
5	25	0.11	32	34	31	4	359.00	4	0.00
6	30	0.15	46	49	31	19	359.01	19	0.00
7	35	0.15	46	64	31	34	359.02	34	0.00
8	40	0.15	46	79	31	49	359.02	49	0.00
9	45	0.15	46	94	31	64	359.03	64	0.00
10	50	0.15	46	109	31	79	359.04	79	0.00
11	55	0.15	46	124	31	94	359.04	94	0.00
12	60	0.20	59	153	31	123	359.06	123	0.00
13	65	0.20	59	182	31	151	359.07	151	0.00
14	70	0.20	59	211	31	180	359.08	180	0.00
15	75	0.20	59	240	31	209	359.10	209	0.00
16	80	0.20	59	269	31	238	359.11	238	0.01
17	85	0.20	59	298	31	267	359.12	267	0.01
18	90	0.20	59	327	31	296	359.13	296	0.01
19	95	0.20	59	355	31	325	359.15	325	0.01
20	100	0.20	59	384	31	354	359.16	354	0.01
21	105	0.20	59	413	31	383	359.17	383	0.01
22	110	0.20	59	442	31	412	359.19	412	0.01
23	115	0.20	59	471	31	441	359.20	441	0.01
24	120	0.24	73	514	31	484	359.22	484	0.01
25	125	0.20	59	543	31	512	359.23	512	0.01
26	130	0.24	73	586	31	555	359.25	555	0.01
27	135	0.24	73	629	31	598	359.27	598	0.01
28	140	0.24	73	672	31	641	359.29	641	0.01
29	145	0.24	73	715	31	684	359.31	684	0.02
30	150	0.24	73	757	31	727	359.33	727	0.02
31	155	0.24	73	800	31	770	359.35	770	0.02
32	160	0.24	73	843	31	813	359.37	813	0.02
33	165	0.29	87	900	31	870	359.40	870	0.02
34	170	0.29	87	957	31	926	359.42	926	0.02
35	175	0.29	87	1,014	31	983	359.45	983	0.02
36	180	0.29	87	1,071	31	1,040	359.47	1,040	0.02
37	185	0.29	87	1,128	31	1,097	359.50	1,097	0.03
38	190	0.34	101	1,198	31	1,168	359.53	1,168	0.03
39	195	0.34	101	1,269	31	1,239	359.56	1,239	0.03
40	200	0.34	101	1,340	31	1,310	359.60	1,310	0.03
41	205	0.38	115	1,425	31	1,394	359.63	1,394	0.03
42	210	0.43	129	1,524	31	1,493	359.68	1,493	0.03
43	215	0.48	143	1,636	31	1,606	359.73	1,606	0.04
44	220	0.48	143	1,749	31	1,719	359.78	1,719	0.04
45	225	0.52	157	1,876	31	1,845	359.84	1,845	0.04
46	230	0.52	157	2,003	31	1,972	359.90	1,972	0.05
47	235	0.57	171	2,143	31	2,113	359.96	2,113	0.05
48	240	0.57	171	2,284	31	2,253	360.02	2,253	0.05
49	245	0.62	185	2,439	31	2,408	360.09	2,408	0.06
50	250	0.66	199	2,607	31	2,577	360.17	2,577	0.06
51	255	0.71	213	2,790	31	2,759	360.25	2,759	0.06
52	260	0.76	227	2,987	31	2,956	360.34	2,956	0.07
53	265	0.80	241	3,197	31	3,167	360.44	3,167	0.07
54	270	0.80	241	3,408	31	3,377	360.54	3,377	0.08
55	275	0.85	255	3,632	31	3,602	360.64	3,602	0.08

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	0.90	269	3,871	31	3,840	360.75	3,840	0.09
57	285	0.94	283	4,123	31	4,093	360.86	4,093	0.09
58	290	0.94	283	4,376	31	4,345	360.98	4,345	0.10
59	295	0.99	297	4,642	31	4,612	361.10	4,612	0.11
60	300	1.04	311	4,923	31	4,892	361.22	4,892	0.11
61	305	1.27	381	5,273	31	5,242	361.38	5,242	0.12
62	310	1.50	451	5,693	31	5,662	361.57	5,662	0.13
63	315	1.64	493	6,155	31	6,124	361.78	6,124	0.14
64	320	1.78	535	6,659	31	6,628	362.01	6,628	0.15
65	325	2.01	604	7,233	31	7,202	362.27	7,202	0.17
66	330	2.43	730	7,932	31	7,902	362.59	7,902	0.18
67	335	0.71	213	8,115	31	8,084	362.67	8,084	0.19
68	340	0.24	73	8,158	31	8,127	362.69	8,127	0.19
69	345	0.11	32	8,159	31	8,128	362.69	8,128	0.19
70	350	0.06	18	8,146	31	8,115	362.69	8,115	0.19
71	355	0.11	34	8,150	31	8,119	362.69	8,119	0.19
72	360	0.08	23	8,142	31	8,112	362.69	8,112	0.19

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	37	37	92	-	359.00	-	0.00
2	30	0.06	56	56	92	-	359.00	-	0.00
3	45	0.06	56	56	92	-	359.00	-	0.00
4	60	0.08	74	74	92	-	359.00	-	0.00
5	75	0.06	56	56	92	-	359.00	-	0.00
6	90	0.06	56	56	92	-	359.00	-	0.00
7	105	0.06	56	56	92	-	359.00	-	0.00
8	120	0.08	74	74	92	-	359.00	-	0.00
9	135	0.08	74	74	92	-	359.00	-	0.00
10	150	0.08	74	74	92	-	359.00	-	0.00
11	165	0.10	93	93	92	1	359.00	1	0.00
12	180	0.10	93	94	92	2	359.00	2	0.00
13	195	0.10	93	94	92	3	359.00	3	0.00
14	210	0.10	93	95	92	4	359.00	4	0.00
15	225	0.10	93	96	92	5	359.00	5	0.00
16	240	0.12	111	116	92	24	359.01	24	0.00
17	255	0.12	111	135	92	44	359.02	44	0.00
18	270	0.14	130	173	92	82	359.04	82	0.00
19	285	0.14	130	211	92	120	359.05	120	0.00
20	300	0.16	148	268	92	176	359.08	176	0.00
21	315	0.12	111	287	92	196	359.09	196	0.00
22	330	0.14	130	325	92	234	359.11	234	0.01
23	345	0.16	148	382	92	290	359.13	290	0.01
24	360	0.16	148	438	92	347	359.16	347	0.01
25	375	0.19	167	513	92	422	359.19	422	0.01
26	390	0.00	1	422	92	331	359.15	331	0.01
27	405	0.03	26	357	92	265	359.12	265	0.01
28	420	0.03	29	294	92	202	359.09	202	0.00
29	435	0.03	31	234	92	142	359.06	142	0.00
30	450	0.06	57	199	92	107	359.05	107	0.00
31	465	0.09	82	189	92	97	359.04	97	0.00
32	480	0.12	107	204	92	113	359.05	113	0.00
33	495	0.17	155	267	92	176	359.08	176	0.00
34	510	0.17	157	333	92	241	359.11	241	0.01
35	525	0.20	183	424	92	332	359.15	332	0.01
36	540	0.23	208	540	92	448	359.20	448	0.01
37	555	0.28	255	704	92	612	359.28	612	0.01
38	570	0.31	280	892	92	801	359.36	801	0.02
39	585	0.34	305	1,106	92	1,014	359.46	1,014	0.02
40	600	0.37	330	1,345	92	1,253	359.57	1,253	0.03
41	615	0.19	175	1,428	92	1,336	359.61	1,336	0.03
42	630	0.20	177	1,513	92	1,422	359.65	1,422	0.03
43	645	0.32	292	1,714	92	1,622	359.74	1,622	0.04
44	660	0.33	295	1,917	92	1,826	359.83	1,826	0.04
45	675	0.30	274	2,100	92	2,008	359.91	2,008	0.05
46	690	0.31	277	2,285	92	2,193	360.00	2,193	0.05
47	705	0.26	234	2,427	92	2,335	360.06	2,335	0.05
48	720	0.29	259	2,594	92	2,502	360.14	2,502	0.06
49	735	0.47	419	2,921	92	2,830	360.29	2,830	0.06
50	750	0.49	444	3,273	92	3,182	360.45	3,182	0.07
51	765	0.55	491	3,673	92	3,581	360.63	3,581	0.08
52	780	0.57	516	4,097	92	4,005	360.82	4,005	0.09
53	795	0.70	631	4,636	92	4,544	361.07	4,544	0.10
54	810	0.70	633	5,177	92	5,086	361.31	5,086	0.12
55	825	0.43	386	5,472	92	5,381	361.45	5,381	0.12
56	840	0.43	389	5,769	92	5,677	361.58	5,677	0.13
57	855	0.53	481	6,158	92	6,067	361.76	6,067	0.14
58	870	0.51	460	6,527	92	6,435	361.93	6,435	0.15

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.51	462	6,897	92	6,806	362.09	6,806	0.16
60	900	0.49	442	7,247	92	7,156	362.25	7,156	0.16
61	915	0.47	421	7,576	92	7,485	362.40	7,485	0.17
62	930	0.44	400	7,885	92	7,793	362.54	7,793	0.18
63	945	0.35	312	8,105	92	8,013	362.64	8,013	0.18
64	960	0.35	313	8,326	92	8,235	362.74	8,235	0.19
65	975	0.08	74	8,309	92	8,217	362.74	8,217	0.19
66	990	0.08	74	8,291	92	8,199	362.73	8,199	0.19
67	1005	0.06	56	8,255	92	8,163	362.71	8,163	0.19
68	1020	0.06	56	8,219	92	8,127	362.69	8,127	0.19
69	1035	0.01	6	8,133	92	8,041	362.66	8,041	0.18
70	1050	0.01	7	8,049	92	7,957	362.62	7,957	0.18
71	1065	0.01	9	7,966	92	7,874	362.58	7,874	0.18
72	1080	0.08	74	7,948	92	7,856	362.57	7,856	0.18
73	1095	0.08	74	7,931	92	7,839	362.56	7,839	0.18
74	1110	0.08	74	7,913	92	7,821	362.56	7,821	0.18
75	1125	0.06	56	7,877	92	7,785	362.54	7,785	0.18
76	1140	0.04	37	7,822	92	7,731	362.51	7,731	0.18
77	1155	0.06	56	7,786	92	7,694	362.50	7,694	0.18
78	1170	0.08	74	7,769	92	7,677	362.49	7,677	0.18
79	1185	0.06	56	7,732	92	7,641	362.47	7,641	0.18
80	1200	0.04	37	7,678	92	7,586	362.45	7,586	0.17
81	1215	0.06	56	7,642	92	7,550	362.43	7,550	0.17
82	1230	0.06	56	7,606	92	7,514	362.42	7,514	0.17
83	1245	0.06	56	7,570	92	7,478	362.40	7,478	0.17
84	1260	0.04	37	7,515	92	7,423	362.37	7,423	0.17
85	1275	0.06	56	7,479	92	7,387	362.36	7,387	0.17
86	1290	0.04	37	7,424	92	7,333	362.33	7,333	0.17
87	1305	0.06	56	7,388	92	7,296	362.32	7,296	0.17
88	1320	0.04	37	7,333	92	7,242	362.29	7,242	0.17
89	1335	0.06	56	7,297	92	7,206	362.28	7,206	0.17
90	1350	0.04	37	7,243	92	7,151	362.25	7,151	0.16
91	1365	0.04	37	7,188	92	7,096	362.23	7,096	0.16
92	1380	0.04	37	7,133	92	7,042	362.20	7,042	0.16
93	1395	0.04	37	7,079	92	6,987	362.18	6,987	0.16
94	1410	0.04	37	7,024	92	6,933	362.15	6,933	0.16
95	1425	0.04	37	6,970	92	6,878	362.13	6,878	0.16
96	1440	0.04	37	6,915	92	6,823	362.10	6,823	0.16

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN D		
10	AREA DESIGNATION	SUBAREA D (ANCHOR STORE)		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL	3.85		
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	18%		
27				
28	LENGTH OF WATERCOURSE (L)	610		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	420		
30				
31	ELEVATION OF HEADWATER	361.67		
32	ELEVATION OF CONCENTRATION POINT	358.66		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		352	6000	
45		353	6000	
46		354	6000	
47		355	6000	
48		356	6000	
49		357	6000	
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN D
[2] AREA DESIGNATION	SUBAREA D (ANCHOR STORE)
[3] AREA - ACRES	3.850
[4] L-FEET	610
[5] L-MILES	0.116
[6] La-FEET	420
[7] La-MILES	0.080
[8] ELEVATION OF HEADWATER	361.67
[9] ELEVATION OF CONCENTRATION POINT	358.66
[10] H-FEET	3.01
[11] S-FEET/MILE	26.1
[12] S^0.5	5.10
[13] L*LCA/S^0.5	0.00180
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.033
[16] LAG TIME-MINUTES	1.96
[17] 25% OF LAG-MINUTES	0.49
[18] 40% OF LAG-MINUTES	0.78
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.28

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	3.850	1.00	2.42	3.13	3.850	1.00	3.13	5.06	3.850	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	3.85	SUM [7]	2.42	SUM [9]	3.85	SUM [11]	3.13	SUM [13]	3.85	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	2.00	2.31	3.43
FLOOD VOLUME	(cu-ft)	27,926	32,242	47,956
	(acre-ft)	0.64	0.74	1.10
REQUIRED STORAGE	(cu-ft)	24,740	26,045	28,240
	(acre-ft)	0.57	0.60	0.65
PEAK FLOW	(cfs)	8.63	7.56	2.18
MAXIMUM WSEL	(ft)	356.12	356.34	356.57

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN D
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
A	COMMERCIAL	32	0.74	90%	0.14	3.85	1.000	0.1406
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
	SF - 1/4 ACRE			50%	0.00	0.00	0.000	0.0000
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
	MF - APARTMENTS			80%	0.00	0.00	0.000	0.0000
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
	RETENTION BASINS			0%	0.00	0.00	0.000	0.0000
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	3.85	SUM	0.1406

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.0703

C= 0.00130

Ft=C(24-(T/60))^1.55 = 0.00130 (24-(T/60))^1.55 + 0.07 in/hr

LOW LOSS RATE (80-90 PERCENT) = 18%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN D
BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.85
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.96
UNIT TIME-PERCENT OF LAG	255.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.42
CONSTANT LOSS RATE-in/hr	0.14
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.14	0.07	0.237	0.91	190.31
2	10	0.17	1.3	0.378	0.14	0.07	0.237	0.91	190.31
3	15	0.25	1.1	0.319	0.14	0.06	0.179	0.69	123.23
4	20	0.33	1.5	0.436	0.14	0.08	0.295	1.14	257.39
5	25	0.42	1.5	0.436	0.14	0.08	0.295	1.14	257.39
6	30	0.50	1.8	0.523	0.14	0.09	0.382	1.47	358.02
7	35	0.58	1.5	0.436	0.14	0.08	0.295	1.14	257.39
8	40	0.67	1.8	0.523	0.14	0.09	0.382	1.47	358.02
9	45	0.75	1.8	0.523	0.14	0.09	0.382	1.47	358.02
10	50	0.83	1.5	0.436	0.14	0.08	0.295	1.14	257.39
11	55	0.92	1.6	0.465	0.14	0.08	0.324	1.25	290.93
12	60	1.00	1.8	0.523	0.14	0.09	0.382	1.47	358.02
13	65	1.08	2.2	0.639	0.14	0.11	0.498	1.92	492.18
14	70	1.17	2.2	0.639	0.14	0.11	0.498	1.92	492.18
15	75	1.25	2.2	0.639	0.14	0.11	0.498	1.92	492.18
16	80	1.33	2.0	0.581	0.14	0.10	0.440	1.69	425.10
17	85	1.42	2.6	0.755	0.14	0.14	0.614	2.37	626.34
18	90	1.50	2.7	0.784	0.14	0.14	0.643	2.48	659.89
19	95	1.58	2.4	0.697	0.14	0.13	0.556	2.14	559.26
20	100	1.67	2.7	0.784	0.14	0.14	0.643	2.48	659.89
21	105	1.75	3.3	0.958	0.14	0.17	0.818	3.15	861.13
22	110	1.83	3.1	0.900	0.14	0.16	0.760	2.92	794.05
23	115	1.92	2.9	0.842	0.14	0.15	0.702	2.70	726.97
24	120	2.00	3.0	0.871	0.14	0.16	0.731	2.81	760.51
25	125	2.08	3.1	0.900	0.14	0.16	0.760	2.92	794.05
26	130	2.17	4.2	1.220	0.14	0.22	1.079	4.15	1163.00
27	135	2.25	5.0	1.452	0.14	0.26	1.311	5.05	1431.33
28	140	2.33	3.5	1.016	0.14	0.18	0.876	3.37	928.22
29	145	2.42	6.8	1.975	0.14	0.36	1.834	7.06	2035.08
30	150	2.50	7.3	2.120	0.14	0.38	1.979	7.62	2202.78
31	155	2.58	8.2	2.381	0.14	0.43	2.241	8.63	2504.65
32	160	2.67	5.9	1.713	0.14	0.31	1.573	6.06	1733.20
33	165	2.75	2.0	0.581	0.14	0.10	0.440	1.69	425.10
34	170	2.83	1.8	0.523	0.14	0.09	0.382	1.47	358.02
35	175	2.92	1.8	0.523	0.14	0.09	0.382	1.47	358.02
36	180	3.00	0.6	0.174	0.14	0.03	0.034	0.13	0.00
							23.978		24739.53

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.00
FLOOD VOLUME (acft)	0.64
FLOOD VOLUME (cuft)	27925.95
REQUIRED STORAGE (acft)	0.57
REQUIRED STORAGE (cuft)	24739.53
PEAK FLOW RATE (cfs)	8.63

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN D

BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.85
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.96
UNIT TIME-PERCENT OF LAG	255.5
TOTAL ADJUSTED STORM RAIN-INCHES	3.13
CONSTANT LOSS RATE-in/hr	0.141
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.188	0.14	0.03	0.05	0.18	0.00
2	10	0.17	0.6	0.225	0.14	0.04	0.08	0.33	14.56
3	15	0.25	0.6	0.225	0.14	0.04	0.08	0.33	14.56
4	20	0.33	0.6	0.225	0.14	0.04	0.08	0.33	14.56
5	25	0.42	0.6	0.225	0.14	0.04	0.08	0.33	14.56
6	30	0.50	0.7	0.263	0.14	0.05	0.12	0.47	57.95
7	35	0.58	0.7	0.263	0.14	0.05	0.12	0.47	57.95
8	40	0.67	0.7	0.263	0.14	0.05	0.12	0.47	57.95
9	45	0.75	0.7	0.263	0.14	0.05	0.12	0.47	57.95
10	50	0.83	0.7	0.263	0.14	0.05	0.12	0.47	57.95
11	55	0.92	0.7	0.263	0.14	0.05	0.12	0.47	57.95
12	60	1.00	0.8	0.300	0.14	0.05	0.16	0.62	101.33
13	65	1.08	0.8	0.300	0.14	0.05	0.16	0.62	101.33
14	70	1.17	0.8	0.300	0.14	0.05	0.16	0.62	101.33
15	75	1.25	0.8	0.300	0.14	0.05	0.16	0.62	101.33
16	80	1.33	0.8	0.300	0.14	0.05	0.16	0.62	101.33
17	85	1.42	0.8	0.300	0.14	0.05	0.16	0.62	101.33
18	90	1.50	0.8	0.300	0.14	0.05	0.16	0.62	101.33
19	95	1.58	0.8	0.300	0.14	0.05	0.16	0.62	101.33
20	100	1.67	0.8	0.300	0.14	0.05	0.16	0.62	101.33
21	105	1.75	0.8	0.300	0.14	0.05	0.16	0.62	101.33
22	110	1.83	0.8	0.300	0.14	0.05	0.16	0.62	101.33
23	115	1.92	0.8	0.300	0.14	0.05	0.16	0.62	101.33
24	120	2.00	0.9	0.338	0.14	0.06	0.20	0.76	144.71
25	125	2.08	0.8	0.300	0.14	0.05	0.16	0.62	101.33
26	130	2.17	0.9	0.338	0.14	0.06	0.20	0.76	144.71
27	135	2.25	0.9	0.338	0.14	0.06	0.20	0.76	144.71
28	140	2.33	0.9	0.338	0.14	0.06	0.20	0.76	144.71
29	145	2.42	0.9	0.338	0.14	0.06	0.20	0.76	144.71
30	150	2.50	0.9	0.338	0.14	0.06	0.20	0.76	144.71
31	155	2.58	0.9	0.338	0.14	0.06	0.20	0.76	144.71
32	160	2.67	0.9	0.338	0.14	0.06	0.20	0.76	144.71
33	165	2.75	1.0	0.376	0.14	0.07	0.24	0.90	188.09
34	170	2.83	1.0	0.376	0.14	0.07	0.24	0.90	188.09
35	175	2.92	1.0	0.376	0.14	0.07	0.24	0.90	188.09
36	180	3.00	1.0	0.376	0.14	0.07	0.24	0.90	188.09
37	185	3.08	1.0	0.376	0.14	0.07	0.24	0.90	188.09
38	190	3.17	1.1	0.413	0.14	0.07	0.27	1.05	231.47
39	195	3.25	1.1	0.413	0.14	0.07	0.27	1.05	231.47
40	200	3.33	1.1	0.413	0.14	0.07	0.27	1.05	231.47
41	205	3.42	1.2	0.451	0.14	0.08	0.31	1.19	274.86
42	210	3.50	1.3	0.488	0.14	0.09	0.35	1.34	318.24
43	215	3.58	1.4	0.526	0.14	0.09	0.39	1.48	361.62
44	220	3.67	1.4	0.526	0.14	0.09	0.39	1.48	361.62
45	225	3.75	1.5	0.563	0.14	0.10	0.42	1.63	405.00
46	230	3.83	1.5	0.563	0.14	0.10	0.42	1.63	405.00
47	235	3.92	1.6	0.601	0.14	0.11	0.46	1.77	448.38
48	240	4.00	1.6	0.601	0.14	0.11	0.46	1.77	448.38
49	245	4.08	1.7	0.639	0.14	0.11	0.50	1.92	491.76
50	250	4.17	1.8	0.676	0.14	0.12	0.54	2.06	535.15
51	255	4.25	1.9	0.714	0.14	0.13	0.57	2.21	578.53
52	260	4.33	2.0	0.751	0.14	0.14	0.61	2.35	621.91
53	265	4.42	2.1	0.789	0.14	0.14	0.65	2.50	665.29
54	270	4.50	2.1	0.789	0.14	0.14	0.65	2.50	665.29
55	275	4.58	2.2	0.826	0.14	0.15	0.69	2.64	708.67
56	280	4.67	2.3	0.864	0.14	0.16	0.72	2.78	752.06

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN D BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.85		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.96		
UNIT TIME-PERCENT OF LAG	255.5		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.141		
LOW LOSS RATE - PERCENT	18%	TOTAL PERCOLATION RATE (cfs)	0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.901	0.14	0.16	0.76	2.93	795.44
58	290	4.83	2.4	0.901	0.14	0.16	0.76	2.93	795.44
59	295	4.92	2.5	0.939	0.14	0.17	0.80	3.07	838.82
60	300	5.00	2.6	0.977	0.14	0.18	0.84	3.22	882.20
61	305	5.08	3.1	1.164	0.14	0.21	1.02	3.94	1099.11
62	310	5.17	3.6	1.352	0.14	0.24	1.21	4.66	1316.02
63	315	5.25	3.9	1.465	0.14	0.26	1.32	5.10	1446.16
64	320	5.33	4.2	1.578	0.14	0.28	1.44	5.53	1576.31
65	325	5.42	4.7	1.765	0.14	0.32	1.62	6.26	1793.22
66	330	5.50	5.6	2.103	0.14	0.38	1.96	7.56	2183.65
67	335	5.58	1.9	0.714	0.14	0.13	0.57	2.21	578.53
68	340	5.67	0.9	0.338	0.14	0.06	0.20	0.76	144.71
69	345	5.75	0.6	0.225	0.14	0.04	0.08	0.33	14.56
70	350	5.83	0.5	0.188	0.14	0.03	0.05	0.18	0.00
71	355	5.92	0.3	0.113	0.14	0.02	0.09	0.36	23.39
72	360	6.00	0.2	0.075	0.14	0.01	0.06	0.24	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.31
FLOOD VOLUME (acft)	0.74
FLOOD VOLUME (cuft)	32241.83
REQUIRED STORAGE (acft)	0.60
REQUIRED STORAGE (cuft)	26045.07
PEAK FLOW RATE (cfs)	7.56

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN D BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES 3.850 UNIT TIME-MINUTES 15 LAG TIME - MINUTES 1.96 UNIT TIME-PERCENT OF LAG 766.6 TOTAL ADJUSTED STORM RAIN-INCHES 5.06					CONSTANT LOSS RATE-in/hr n/a VARIABLE LOSS RATE (AVG) in/hr 0.1406 MINIMUM LOSS RATE (for var. loss) - in/hr 0.070 LOW LOSS RATE - DECIMAL 0.18 C 0.00130 PERCOLATION RATE (cfs) 0.28				
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.040	0.248	0.007	0.033	0.13	0.00
2	30	0.50	0.3	0.061	0.245	0.011	0.050	0.19	0.00
3	45	0.75	0.3	0.061	0.243	0.011	0.050	0.19	0.00
4	60	1.00	0.4	0.081	0.240	0.015	0.066	0.26	0.00
5	75	1.25	0.3	0.061	0.237	0.011	0.050	0.19	0.00
6	90	1.50	0.3	0.061	0.234	0.011	0.050	0.19	0.00
7	105	1.75	0.3	0.061	0.231	0.011	0.050	0.19	0.00
8	120	2.00	0.4	0.081	0.228	0.015	0.066	0.26	0.00
9	135	2.25	0.4	0.081	0.226	0.015	0.066	0.26	0.00
10	150	2.50	0.4	0.081	0.223	0.015	0.066	0.26	0.00
11	165	2.75	0.5	0.101	0.220	0.018	0.083	0.32	37.54
12	180	3.00	0.5	0.101	0.218	0.018	0.083	0.32	37.54
13	195	3.25	0.5	0.101	0.215	0.018	0.083	0.32	37.54
14	210	3.50	0.5	0.101	0.212	0.018	0.083	0.32	37.54
15	225	3.75	0.5	0.101	0.210	0.018	0.083	0.32	37.54
16	240	4.00	0.6	0.121	0.207	0.022	0.100	0.38	95.05
17	255	4.25	0.6	0.121	0.204	0.022	0.100	0.38	95.05
18	270	4.50	0.7	0.142	0.202	0.026	0.116	0.45	152.56
19	285	4.75	0.7	0.142	0.199	0.026	0.116	0.45	152.56
20	300	5.00	0.8	0.162	0.196	0.029	0.133	0.51	210.06
21	315	5.25	0.6	0.121	0.194	0.022	0.100	0.38	95.05
22	330	5.50	0.7	0.142	0.191	0.026	0.116	0.45	152.56
23	345	5.75	0.8	0.162	0.189	0.029	0.133	0.51	210.06
24	360	6.00	0.8	0.162	0.186	0.029	0.133	0.51	210.06
25	375	6.25	0.9	0.182	0.184	0.033	0.149	0.58	267.57
26	390	6.50	0.9	0.182	0.181	0.033	0.001	0.00	0.00
27	405	6.75	1.0	0.202	0.179	0.036	0.023	0.09	0.00
28	420	7.00	1.0	0.202	0.177	0.036	0.026	0.10	0.00
29	435	7.25	1.0	0.202	0.174	0.036	0.028	0.11	0.00
30	450	7.50	1.1	0.223	0.172	0.040	0.051	0.20	0.00
31	465	7.75	1.2	0.243	0.170	0.044	0.073	0.28	4.24
32	480	8.00	1.3	0.263	0.167	0.047	0.096	0.37	82.47
33	495	8.25	1.5	0.304	0.165	0.055	0.139	0.53	230.76
34	510	8.50	1.5	0.304	0.163	0.055	0.141	0.54	238.73
35	525	8.75	1.6	0.324	0.160	0.058	0.164	0.63	316.75
36	540	9.00	1.7	0.344	0.158	0.062	0.186	0.72	394.70
37	555	9.25	1.9	0.385	0.156	0.069	0.229	0.88	542.72
38	570	9.50	2.0	0.405	0.154	0.073	0.251	0.97	620.53
39	585	9.75	2.1	0.425	0.151	0.077	0.274	1.05	698.27
40	600	10.00	2.2	0.445	0.149	0.080	0.296	1.14	775.94
41	615	10.25	1.5	0.304	0.147	0.055	0.157	0.60	292.48
42	630	10.50	1.5	0.304	0.145	0.055	0.159	0.61	299.87
43	645	10.75	2.0	0.405	0.143	0.073	0.262	1.01	657.84
44	660	11.00	2.0	0.405	0.141	0.073	0.264	1.02	665.08
45	675	11.25	1.9	0.385	0.139	0.069	0.246	0.95	602.12
46	690	11.50	1.9	0.385	0.137	0.069	0.248	0.95	609.20
47	705	11.75	1.7	0.344	0.135	0.062	0.210	0.81	475.95
48	720	12.00	1.8	0.364	0.133	0.066	0.232	0.89	553.02
49	735	12.25	2.5	0.506	0.131	0.091	0.375	1.45	1050.80
50	750	12.50	2.6	0.526	0.129	0.095	0.398	1.53	1127.71
51	765	12.75	2.8	0.567	0.127	0.102	0.440	1.69	1274.67
52	780	13.00	2.9	0.587	0.125	0.106	0.462	1.78	1351.41
53	795	13.25	3.4	0.688	0.123	0.124	0.565	2.18	1708.61
54	810	13.50	3.4	0.688	0.121	0.124	0.567	2.18	1715.06
55	825	13.75	2.3	0.466	0.119	0.084	0.346	1.33	949.99
56	840	14.00	2.3	0.466	0.117	0.084	0.348	1.34	956.27
57	855	14.25	2.7	0.546	0.116	0.098	0.431	1.66	1243.00
58	870	14.50	2.6	0.526	0.114	0.095	0.412	1.59	1178.99
59	885	14.75	2.6	0.526	0.112	0.095	0.414	1.59	1185.01
60	900	15.00	2.5	0.506	0.110	0.091	0.396	1.52	1120.82

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT				PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN D BY: PK DATE: 7/4/2022					
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			3.850	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.1406		
LAG TIME - MINUTES			1.96	MINIMUM LOSS RATE (for var. loss) - in/hr			0.070		
UNIT TIME-PERCENT OF LAG			766.6	LOW LOSS RATE - DECIMAL			0.18		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00130		
				PERCOLATION RATE (cfs)			0.28		
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
61	915	15.25	2.4	0.486	0.109	0.087	0.377	1.45	1056.55
62	930	15.50	2.3	0.466	0.107	0.084	0.358	1.38	992.18
63	945	15.75	1.9	0.385	0.105	0.069	0.279	1.07	717.32
64	960	16.00	1.9	0.385	0.104	0.069	0.281	1.08	722.90
65	975	16.25	0.4	0.081	0.102	0.015	0.066	0.26	0.00
66	990	16.50	0.4	0.081	0.101	0.015	0.066	0.26	0.00
67	1005	16.75	0.3	0.061	0.099	0.011	0.050	0.19	0.00
68	1020	17.00	0.3	0.061	0.098	0.011	0.050	0.19	0.00
69	1035	17.25	0.5	0.101	0.096	0.018	0.005	0.02	0.00
70	1050	17.50	0.5	0.101	0.095	0.018	0.006	0.03	0.00
71	1065	17.75	0.5	0.101	0.093	0.018	0.008	0.03	0.00
72	1080	18.00	0.4	0.081	0.092	0.015	0.066	0.26	0.00
73	1095	18.25	0.4	0.081	0.091	0.015	0.066	0.26	0.00
74	1110	18.50	0.4	0.081	0.089	0.015	0.066	0.26	0.00
75	1125	18.75	0.3	0.061	0.088	0.011	0.050	0.19	0.00
76	1140	19.00	0.2	0.040	0.087	0.007	0.033	0.13	0.00
77	1155	19.25	0.3	0.061	0.085	0.011	0.050	0.19	0.00
78	1170	19.50	0.4	0.081	0.084	0.015	0.066	0.26	0.00
79	1185	19.75	0.3	0.061	0.083	0.011	0.050	0.19	0.00
80	1200	20.00	0.2	0.040	0.082	0.007	0.033	0.13	0.00
81	1215	20.25	0.3	0.061	0.081	0.011	0.050	0.19	0.00
82	1230	20.50	0.3	0.061	0.080	0.011	0.050	0.19	0.00
83	1245	20.75	0.3	0.061	0.079	0.011	0.050	0.19	0.00
84	1260	21.00	0.2	0.040	0.078	0.007	0.033	0.13	0.00
85	1275	21.25	0.3	0.061	0.077	0.011	0.050	0.19	0.00
86	1290	21.50	0.2	0.040	0.076	0.007	0.033	0.13	0.00
87	1305	21.75	0.3	0.061	0.075	0.011	0.050	0.19	0.00
88	1320	22.00	0.2	0.040	0.074	0.007	0.033	0.13	0.00
89	1335	22.25	0.3	0.061	0.074	0.011	0.050	0.19	0.00
90	1350	22.50	0.2	0.040	0.073	0.007	0.033	0.13	0.00
91	1365	22.75	0.2	0.040	0.072	0.007	0.033	0.13	0.00
92	1380	23.00	0.2	0.040	0.072	0.007	0.033	0.13	0.00
93	1395	23.25	0.2	0.040	0.071	0.007	0.033	0.13	0.00
94	1410	23.50	0.2	0.040	0.071	0.007	0.033	0.13	0.00
95	1425	23.75	0.2	0.040	0.071	0.007	0.033	0.13	0.00
96	1440	24.00	0.2	0.040	0.070	0.007	0.033	0.13	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	3.43
FLOOD VOLUME (acft)	1.10
FLOOD VOLUME (cuft)	47956.10
REQUIRED STORAGE (acft)	0.65
REQUIRED STORAGE (cuft)	28240.23
PEAK FLOW (cfs)	2.18

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN D

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
352	0	0		6000	0	0	0.00
353	1	1	0	6000	6000	6000	0.14
354	1	2	0	6000	6000	12000	0.28
355	1	3	0	6000	6000	18000	0.41
356	1	4	0	6000	6000	24000	0.55
357	1	5	0	6000	6000	30000	0.69

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	0.27778	cfs
MAXWELL IV DRYWELLS			
NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		0.27778	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	28240	cu ft (100-yr 3-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	0.27778	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**28**	hrs < 26 hrs

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.91	274	274	83	190	352.03	190	0.00
2	10	0.91	274	464	83	381	352.06	381	0.01
3	15	0.69	207	587	83	504	352.08	504	0.01
4	20	1.14	341	845	83	761	352.13	761	0.02
5	25	1.14	341	1,102	83	1,019	352.17	1,019	0.02
6	30	1.47	441	1,460	83	1,377	352.23	1,377	0.03
7	35	1.14	341	1,717	83	1,634	352.27	1,634	0.04
8	40	1.47	441	2,075	83	1,992	352.33	1,992	0.05
9	45	1.47	441	2,433	83	2,350	352.39	2,350	0.05
10	50	1.14	341	2,691	83	2,607	352.43	2,607	0.06
11	55	1.25	374	2,982	83	2,898	352.48	2,898	0.07
12	60	1.47	441	3,340	83	3,256	352.54	3,256	0.07
13	65	1.92	576	3,832	83	3,749	352.62	3,749	0.09
14	70	1.92	576	4,324	83	4,241	352.71	4,241	0.10
15	75	1.92	576	4,816	83	4,733	352.79	4,733	0.11
16	80	1.69	508	5,241	83	5,158	352.86	5,158	0.12
17	85	2.37	710	5,868	83	5,784	352.96	5,784	0.13
18	90	2.48	743	6,528	83	6,444	353.07	6,444	0.15
19	95	2.14	643	7,087	83	7,004	353.17	7,004	0.16
20	100	2.48	743	7,747	83	7,663	353.28	7,663	0.18
21	105	3.15	944	8,608	83	8,525	353.42	8,525	0.20
22	110	2.92	877	9,402	83	9,319	353.55	9,319	0.21
23	115	2.70	810	10,129	83	10,046	353.67	10,046	0.23
24	120	2.81	844	10,889	83	10,806	353.80	10,806	0.25
25	125	2.92	877	11,683	83	11,600	353.93	11,600	0.27
26	130	4.15	1,246	12,846	83	12,763	354.13	12,763	0.29
27	135	5.05	1,515	14,278	83	14,194	354.37	14,194	0.33
28	140	3.37	1,012	15,206	83	15,123	354.52	15,123	0.35
29	145	7.06	2,118	17,241	83	17,158	354.86	17,158	0.39
30	150	7.62	2,286	19,444	83	19,361	355.23	19,361	0.44
31	155	8.63	2,588	21,949	83	21,865	355.64	21,865	0.50
32	160	6.06	1,817	23,682	83	23,598	355.93	23,598	0.54
33	165	1.69	508	24,107	83	24,024	356.00	24,024	0.55
34	170	1.47	441	24,465	83	24,382	356.06	24,382	0.56
35	175	1.47	441	24,823	83	24,740	356.12	24,740	0.57
36	180	0.13	39	24,778	83	24,695	356.12	24,695	0.57

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.18	55	55	83	-	352.00	-	0.00
2	10	0.33	98	98	83	15	352.00	15	0.00
3	15	0.33	98	112	83	29	352.00	29	0.00
4	20	0.33	98	127	83	44	352.01	44	0.00
5	25	0.33	98	142	83	58	352.01	58	0.00
6	30	0.47	141	200	83	116	352.02	116	0.00
7	35	0.47	141	257	83	174	352.03	174	0.00
8	40	0.47	141	315	83	232	352.04	232	0.01
9	45	0.47	141	373	83	290	352.05	290	0.01
10	50	0.47	141	431	83	348	352.06	348	0.01
11	55	0.47	141	489	83	406	352.07	406	0.01
12	60	0.62	185	591	83	507	352.08	507	0.01
13	65	0.62	185	692	83	609	352.10	609	0.01
14	70	0.62	185	793	83	710	352.12	710	0.02
15	75	0.62	185	895	83	811	352.14	811	0.02
16	80	0.62	185	996	83	913	352.15	913	0.02
17	85	0.62	185	1,097	83	1,014	352.17	1,014	0.02
18	90	0.62	185	1,199	83	1,115	352.19	1,115	0.03
19	95	0.62	185	1,300	83	1,217	352.20	1,217	0.03
20	100	0.62	185	1,401	83	1,318	352.22	1,318	0.03
21	105	0.62	185	1,503	83	1,419	352.24	1,419	0.03
22	110	0.62	185	1,604	83	1,521	352.25	1,521	0.03
23	115	0.62	185	1,705	83	1,622	352.27	1,622	0.04
24	120	0.76	228	1,850	83	1,767	352.29	1,767	0.04
25	125	0.62	185	1,951	83	1,868	352.31	1,868	0.04
26	130	0.76	228	2,096	83	2,013	352.34	2,013	0.05
27	135	0.76	228	2,241	83	2,157	352.36	2,157	0.05
28	140	0.76	228	2,385	83	2,302	352.38	2,302	0.05
29	145	0.76	228	2,530	83	2,447	352.41	2,447	0.06
30	150	0.76	228	2,675	83	2,591	352.43	2,591	0.06
31	155	0.76	228	2,820	83	2,736	352.46	2,736	0.06
32	160	0.76	228	2,964	83	2,881	352.48	2,881	0.07
33	165	0.90	271	3,152	83	3,069	352.51	3,069	0.07
34	170	0.90	271	3,340	83	3,257	352.54	3,257	0.07
35	175	0.90	271	3,528	83	3,445	352.57	3,445	0.08
36	180	0.90	271	3,717	83	3,633	352.61	3,633	0.08
37	185	0.90	271	3,905	83	3,821	352.64	3,821	0.09
38	190	1.05	315	4,136	83	4,053	352.68	4,053	0.09
39	195	1.05	315	4,368	83	4,284	352.71	4,284	0.10
40	200	1.05	315	4,599	83	4,516	352.75	4,516	0.10
41	205	1.19	358	4,874	83	4,791	352.80	4,791	0.11
42	210	1.34	402	5,192	83	5,109	352.85	5,109	0.12
43	215	1.48	445	5,554	83	5,470	352.91	5,470	0.13
44	220	1.48	445	5,915	83	5,832	352.97	5,832	0.13
45	225	1.63	488	6,320	83	6,237	353.04	6,237	0.14
46	230	1.63	488	6,725	83	6,642	353.11	6,642	0.15
47	235	1.77	532	7,174	83	7,090	353.18	7,090	0.16
48	240	1.77	532	7,622	83	7,539	353.26	7,539	0.17
49	245	1.92	575	8,114	83	8,031	353.34	8,031	0.18
50	250	2.06	618	8,649	83	8,566	353.43	8,566	0.20
51	255	2.21	662	9,228	83	9,144	353.52	9,144	0.21
52	260	2.35	705	9,850	83	9,766	353.63	9,766	0.22
53	265	2.50	749	10,515	83	10,431	353.74	10,431	0.24
54	270	2.50	749	11,180	83	11,097	353.85	11,097	0.25
55	275	2.64	792	11,889	83	11,805	353.97	11,805	0.27

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	2.78	835	12,641	83	12,558	354.09	12,558	0.29
57	285	2.93	879	13,436	83	13,353	354.23	13,353	0.31
58	290	2.93	879	14,232	83	14,148	354.36	14,148	0.32
59	295	3.07	922	15,071	83	14,987	354.50	14,987	0.34
60	300	3.22	966	15,953	83	15,869	354.64	15,869	0.36
61	305	3.94	1,182	17,052	83	16,969	354.83	16,969	0.39
62	310	4.66	1,399	18,368	83	18,285	355.05	18,285	0.42
63	315	5.10	1,529	19,814	83	19,731	355.29	19,731	0.45
64	320	5.53	1,660	21,390	83	21,307	355.55	21,307	0.49
65	325	6.26	1,877	23,184	83	23,100	355.85	23,100	0.53
66	330	7.56	2,267	25,367	83	25,284	356.21	25,284	0.58
67	335	2.21	662	25,946	83	25,862	356.31	25,862	0.59
68	340	0.76	228	26,090	83	26,007	356.33	26,007	0.60
69	345	0.33	98	26,105	83	26,022	356.34	26,022	0.60
70	350	0.18	55	26,076	83	25,993	356.33	25,993	0.60
71	355	0.36	107	26,100	83	26,016	356.34	26,016	0.60
72	360	0.24	71	26,087	83	26,004	356.33	26,004	0.60

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.13	115	115	250	-	352.00	-	0.00
2	30	0.19	173	173	250	-	352.00	-	0.00
3	45	0.19	173	173	250	-	352.00	-	0.00
4	60	0.26	230	230	250	-	352.00	-	0.00
5	75	0.19	173	173	250	-	352.00	-	0.00
6	90	0.19	173	173	250	-	352.00	-	0.00
7	105	0.19	173	173	250	-	352.00	-	0.00
8	120	0.26	230	230	250	-	352.00	-	0.00
9	135	0.26	230	230	250	-	352.00	-	0.00
10	150	0.26	230	230	250	-	352.00	-	0.00
11	165	0.32	288	288	250	38	352.01	38	0.00
12	180	0.32	288	325	250	75	352.01	75	0.00
13	195	0.32	288	363	250	113	352.02	113	0.00
14	210	0.32	288	400	250	150	352.03	150	0.00
15	225	0.32	288	438	250	188	352.03	188	0.00
16	240	0.38	345	533	250	283	352.05	283	0.01
17	255	0.38	345	628	250	378	352.06	378	0.01
18	270	0.45	403	780	250	530	352.09	530	0.01
19	285	0.45	403	933	250	683	352.11	683	0.02
20	300	0.51	460	1,143	250	893	352.15	893	0.02
21	315	0.38	345	1,238	250	988	352.16	988	0.02
22	330	0.45	403	1,391	250	1,141	352.19	1,141	0.03
23	345	0.51	460	1,601	250	1,351	352.23	1,351	0.03
24	360	0.51	460	1,811	250	1,561	352.26	1,561	0.04
25	375	0.58	518	2,078	250	1,828	352.30	1,828	0.04
26	390	0.00	2	1,831	250	1,581	352.26	1,581	0.04
27	405	0.09	81	1,661	250	1,411	352.24	1,411	0.03
28	420	0.10	89	1,501	250	1,251	352.21	1,251	0.03
29	435	0.11	98	1,348	250	1,098	352.18	1,098	0.03
30	450	0.20	176	1,274	250	1,024	352.17	1,024	0.02
31	465	0.28	254	1,278	250	1,028	352.17	1,028	0.02
32	480	0.37	332	1,361	250	1,111	352.19	1,111	0.03
33	495	0.53	481	1,592	250	1,342	352.22	1,342	0.03
34	510	0.54	489	1,830	250	1,580	352.26	1,580	0.04
35	525	0.63	567	2,147	250	1,897	352.32	1,897	0.04
36	540	0.72	645	2,542	250	2,292	352.38	2,292	0.05
37	555	0.88	793	3,085	250	2,835	352.47	2,835	0.07
38	570	0.97	871	3,705	250	3,455	352.58	3,455	0.08
39	585	1.05	948	4,403	250	4,153	352.69	4,153	0.10
40	600	1.14	1,026	5,179	250	4,929	352.82	4,929	0.11
41	615	0.60	542	5,472	250	5,222	352.87	5,222	0.12
42	630	0.61	550	5,772	250	5,522	352.92	5,522	0.13
43	645	1.01	908	6,430	250	6,180	353.03	6,180	0.14
44	660	1.02	915	7,095	250	6,845	353.14	6,845	0.16
45	675	0.95	852	7,697	250	7,447	353.24	7,447	0.17
46	690	0.95	859	8,306	250	8,056	353.34	8,056	0.18
47	705	0.81	726	8,782	250	8,532	353.42	8,532	0.20
48	720	0.89	803	9,335	250	9,085	353.51	9,085	0.21
49	735	1.45	1,301	10,386	250	10,136	353.69	10,136	0.23
50	750	1.53	1,378	11,513	250	11,263	353.88	11,263	0.26
51	765	1.69	1,525	12,788	250	12,538	354.09	12,538	0.29
52	780	1.78	1,601	14,140	250	13,890	354.31	13,890	0.32
53	795	2.18	1,959	15,848	250	15,598	354.60	15,598	0.36
54	810	2.18	1,965	17,563	250	17,313	354.89	17,313	0.40
55	825	1.33	1,200	18,513	250	18,263	355.04	18,263	0.42
56	840	1.34	1,206	19,469	250	19,219	355.20	19,219	0.44
57	855	1.66	1,493	20,712	250	20,462	355.41	20,462	0.47
58	870	1.59	1,429	21,891	250	21,641	355.61	21,641	0.50

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	1.59	1,435	23,076	250	22,826	355.80	22,826	0.52
60	900	1.52	1,371	24,197	250	23,947	355.99	23,947	0.55
61	915	1.45	1,307	25,254	250	25,004	356.17	25,004	0.57
62	930	1.38	1,242	26,246	250	25,996	356.33	25,996	0.60
63	945	1.07	967	26,963	250	26,713	356.45	26,713	0.61
64	960	1.08	973	27,686	250	27,436	356.57	27,436	0.63
65	975	0.26	230	27,666	250	27,416	356.57	27,416	0.63
66	990	0.26	230	27,646	250	27,396	356.57	27,396	0.63
67	1005	0.19	173	27,569	250	27,319	356.55	27,319	0.63
68	1020	0.19	173	27,491	250	27,241	356.54	27,241	0.63
69	1035	0.02	18	27,259	250	27,009	356.50	27,009	0.62
70	1050	0.03	23	27,031	250	26,781	356.46	26,781	0.61
71	1065	0.03	27	26,809	250	26,559	356.43	26,559	0.61
72	1080	0.26	230	26,789	250	26,539	356.42	26,539	0.61
73	1095	0.26	230	26,769	250	26,519	356.42	26,519	0.61
74	1110	0.26	230	26,749	250	26,499	356.42	26,499	0.61
75	1125	0.19	173	26,671	250	26,421	356.40	26,421	0.61
76	1140	0.13	115	26,536	250	26,286	356.38	26,286	0.60
77	1155	0.19	173	26,459	250	26,209	356.37	26,209	0.60
78	1170	0.26	230	26,439	250	26,189	356.36	26,189	0.60
79	1185	0.19	173	26,362	250	26,112	356.35	26,112	0.60
80	1200	0.13	115	26,227	250	25,977	356.33	25,977	0.60
81	1215	0.19	173	26,149	250	25,899	356.32	25,899	0.59
82	1230	0.19	173	26,072	250	25,822	356.30	25,822	0.59
83	1245	0.19	173	25,994	250	25,744	356.29	25,744	0.59
84	1260	0.13	115	25,859	250	25,609	356.27	25,609	0.59
85	1275	0.19	173	25,782	250	25,532	356.26	25,532	0.59
86	1290	0.13	115	25,647	250	25,397	356.23	25,397	0.58
87	1305	0.19	173	25,569	250	25,319	356.22	25,319	0.58
88	1320	0.13	115	25,434	250	25,184	356.20	25,184	0.58
89	1335	0.19	173	25,357	250	25,107	356.18	25,107	0.58
90	1350	0.13	115	25,222	250	24,972	356.16	24,972	0.57
91	1365	0.13	115	25,087	250	24,837	356.14	24,837	0.57
92	1380	0.13	115	24,952	250	24,702	356.12	24,702	0.57
93	1395	0.13	115	24,817	250	24,567	356.09	24,567	0.56
94	1410	0.13	115	24,682	250	24,432	356.07	24,432	0.56
95	1425	0.13	115	24,547	250	24,297	356.05	24,297	0.56
96	1440	0.13	115	24,412	250	24,162	356.03	24,162	0.55

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN E		
10	AREA DESIGNATION	SUBAREA E (OFFICE BLDG)		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL	3.6		
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	18%		
27				
28	LENGTH OF WATERCOURSE (L)	598		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	410		
30				
31	ELEVATION OF HEADWATER	357.1		
32	ELEVATION OF CONCENTRATION POINT	352.2		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		345	6000	
45		346	6000	
46		347	6000	
47		348	6000	
48		349	6000	
49		350	6000	
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN E
[2] AREA DESIGNATION	SUBAREA E (OFFICE BLDG)
[3] AREA - ACRES	3.600
[4] L-FEET	598
[5] L-MILES	0.113
[6] La-FEET	410
[7] La-MILES	0.078
[8] ELEVATION OF HEADWATER	357.1
[9] ELEVATION OF CONCENTRATION POINT	352.2
[10] H-FEET	4.9
[11] S-FEET/MILE	43.3
[12] S^0.5	6.58
[13] L*LCA/S^0.5	0.00134
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.029
[16] LAG TIME-MINUTES	1.75
[17] 25% OF LAG-MINUTES	0.44
[18] 40% OF LAG-MINUTES	0.70
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.28

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	3.600	1.00	2.42	3.13	3.600	1.00	3.13	5.06	3.600	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	3.6	SUM [7]	2.42	SUM [9]	3.60	SUM [11]	3.13	SUM [13]	3.60	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	2.00	2.31	3.43
FLOOD VOLUME	(cu-ft)	26,113	30,148	44,842
	(acre-ft)	0.60	0.69	1.03
REQUIRED STORAGE	(cu-ft)	22,944	23,980	25,623
	(acre-ft)	0.53	0.55	0.59
PEAK FLOW	(cfs)	8.07	7.07	2.04
MAXIMUM WSEL	(ft)	348.82	348.99	349.13

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN E
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
A	COMMERCIAL	32	0.74	90%	0.14	3.60	1.000	0.1406
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
	SF - 1/4 ACRE			50%	0.00	0.00	0.000	0.0000
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
	MF - APARTMENTS			80%	0.00	0.00	0.000	0.0000
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
	RETENTION BASINS			0%	0.00	0.00	0.000	0.0000
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	3.6	SUM	0.1406

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.0703
C= 0.00130

Ft=C(24-(T/60))^1.55 = 0.00130 (24-(T/60))^1.55 + 0.07 in/hr

LOW LOSS RATE (80-90 PERCENT) = 18%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period, T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 3 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN E BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.75
UNIT TIME-PERCENT OF LAG	286.1
TOTAL ADJUSTED STORM RAIN-INCHES	2.42
CONSTANT LOSS RATE-in/hr	0.14
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.14	0.07	0.237	0.85	172.54
2	10	0.17	1.3	0.378	0.14	0.07	0.237	0.85	172.54
3	15	0.25	1.1	0.319	0.14	0.06	0.179	0.64	109.81
4	20	0.33	1.5	0.436	0.14	0.08	0.295	1.06	235.27
5	25	0.42	1.5	0.436	0.14	0.08	0.295	1.06	235.27
6	30	0.50	1.8	0.523	0.14	0.09	0.382	1.38	329.36
7	35	0.58	1.5	0.436	0.14	0.08	0.295	1.06	235.27
8	40	0.67	1.8	0.523	0.14	0.09	0.382	1.38	329.36
9	45	0.75	1.8	0.523	0.14	0.09	0.382	1.38	329.36
10	50	0.83	1.5	0.436	0.14	0.08	0.295	1.06	235.27
11	55	0.92	1.6	0.465	0.14	0.08	0.324	1.17	266.63
12	60	1.00	1.8	0.523	0.14	0.09	0.382	1.38	329.36
13	65	1.08	2.2	0.639	0.14	0.11	0.498	1.79	454.81
14	70	1.17	2.2	0.639	0.14	0.11	0.498	1.79	454.81
15	75	1.25	2.2	0.639	0.14	0.11	0.498	1.79	454.81
16	80	1.33	2.0	0.581	0.14	0.10	0.440	1.58	392.08
17	85	1.42	2.6	0.755	0.14	0.14	0.614	2.21	580.26
18	90	1.50	2.7	0.784	0.14	0.14	0.643	2.32	611.63
19	95	1.58	2.4	0.697	0.14	0.13	0.556	2.00	517.54
20	100	1.67	2.7	0.784	0.14	0.14	0.643	2.32	611.63
21	105	1.75	3.3	0.958	0.14	0.17	0.818	2.94	799.80
22	110	1.83	3.1	0.900	0.14	0.16	0.760	2.73	737.08
23	115	1.92	2.9	0.842	0.14	0.15	0.702	2.53	674.35
24	120	2.00	3.0	0.871	0.14	0.16	0.731	2.63	705.71
25	125	2.08	3.1	0.900	0.14	0.16	0.760	2.73	737.08
26	130	2.17	4.2	1.220	0.14	0.22	1.079	3.88	1082.07
27	135	2.25	5.0	1.452	0.14	0.26	1.311	4.72	1332.98
28	140	2.33	3.5	1.016	0.14	0.18	0.876	3.15	862.53
29	145	2.42	6.8	1.975	0.14	0.36	1.834	6.60	1897.52
30	150	2.50	7.3	2.120	0.14	0.38	1.979	7.13	2054.33
31	155	2.58	8.2	2.381	0.14	0.43	2.241	8.07	2336.60
32	160	2.67	5.9	1.713	0.14	0.31	1.573	5.66	1615.25
33	165	2.75	2.0	0.581	0.14	0.10	0.440	1.58	392.08
34	170	2.83	1.8	0.523	0.14	0.09	0.382	1.38	329.36
35	175	2.92	1.8	0.523	0.14	0.09	0.382	1.38	329.36
36	180	3.00	0.6	0.174	0.14	0.03	0.034	0.12	0.00
							23.978		22943.67

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.00
FLOOD VOLUME (acft)	0.60
FLOOD VOLUME (cuft)	26112.58
REQUIRED STORAGE (acft)	0.53
REQUIRED STORAGE (cuft)	22943.67
PEAK FLOW RATE (cfs)	8.07

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN E

BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.75
UNIT TIME-PERCENT OF LAG	286.1
TOTAL ADJUSTED STORM RAIN-INCHES	3.13
CONSTANT LOSS RATE-in/hr	0.141
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.188	0.14	0.03	0.05	0.17	0.00
2	10	0.17	0.6	0.225	0.14	0.04	0.08	0.31	8.21
3	15	0.25	0.6	0.225	0.14	0.04	0.08	0.31	8.21
4	20	0.33	0.6	0.225	0.14	0.04	0.08	0.31	8.21
5	25	0.42	0.6	0.225	0.14	0.04	0.08	0.31	8.21
6	30	0.50	0.7	0.263	0.14	0.05	0.12	0.44	48.77
7	35	0.58	0.7	0.263	0.14	0.05	0.12	0.44	48.77
8	40	0.67	0.7	0.263	0.14	0.05	0.12	0.44	48.77
9	45	0.75	0.7	0.263	0.14	0.05	0.12	0.44	48.77
10	50	0.83	0.7	0.263	0.14	0.05	0.12	0.44	48.77
11	55	0.92	0.7	0.263	0.14	0.05	0.12	0.44	48.77
12	60	1.00	0.8	0.300	0.14	0.05	0.16	0.58	89.34
13	65	1.08	0.8	0.300	0.14	0.05	0.16	0.58	89.34
14	70	1.17	0.8	0.300	0.14	0.05	0.16	0.58	89.34
15	75	1.25	0.8	0.300	0.14	0.05	0.16	0.58	89.34
16	80	1.33	0.8	0.300	0.14	0.05	0.16	0.58	89.34
17	85	1.42	0.8	0.300	0.14	0.05	0.16	0.58	89.34
18	90	1.50	0.8	0.300	0.14	0.05	0.16	0.58	89.34
19	95	1.58	0.8	0.300	0.14	0.05	0.16	0.58	89.34
20	100	1.67	0.8	0.300	0.14	0.05	0.16	0.58	89.34
21	105	1.75	0.8	0.300	0.14	0.05	0.16	0.58	89.34
22	110	1.83	0.8	0.300	0.14	0.05	0.16	0.58	89.34
23	115	1.92	0.8	0.300	0.14	0.05	0.16	0.58	89.34
24	120	2.00	0.9	0.338	0.14	0.06	0.20	0.71	129.90
25	125	2.08	0.8	0.300	0.14	0.05	0.16	0.58	89.34
26	130	2.17	0.9	0.338	0.14	0.06	0.20	0.71	129.90
27	135	2.25	0.9	0.338	0.14	0.06	0.20	0.71	129.90
28	140	2.33	0.9	0.338	0.14	0.06	0.20	0.71	129.90
29	145	2.42	0.9	0.338	0.14	0.06	0.20	0.71	129.90
30	150	2.50	0.9	0.338	0.14	0.06	0.20	0.71	129.90
31	155	2.58	0.9	0.338	0.14	0.06	0.20	0.71	129.90
32	160	2.67	0.9	0.338	0.14	0.06	0.20	0.71	129.90
33	165	2.75	1.0	0.376	0.14	0.07	0.24	0.85	170.47
34	170	2.83	1.0	0.376	0.14	0.07	0.24	0.85	170.47
35	175	2.92	1.0	0.376	0.14	0.07	0.24	0.85	170.47
36	180	3.00	1.0	0.376	0.14	0.07	0.24	0.85	170.47
37	185	3.08	1.0	0.376	0.14	0.07	0.24	0.85	170.47
38	190	3.17	1.1	0.413	0.14	0.07	0.27	0.98	211.03
39	195	3.25	1.1	0.413	0.14	0.07	0.27	0.98	211.03
40	200	3.33	1.1	0.413	0.14	0.07	0.27	0.98	211.03
41	205	3.42	1.2	0.451	0.14	0.08	0.31	1.12	251.60
42	210	3.50	1.3	0.488	0.14	0.09	0.35	1.25	292.16
43	215	3.58	1.4	0.526	0.14	0.09	0.39	1.39	332.73
44	220	3.67	1.4	0.526	0.14	0.09	0.39	1.39	332.73
45	225	3.75	1.5	0.563	0.14	0.10	0.42	1.52	373.29
46	230	3.83	1.5	0.563	0.14	0.10	0.42	1.52	373.29
47	235	3.92	1.6	0.601	0.14	0.11	0.46	1.66	413.86
48	240	4.00	1.6	0.601	0.14	0.11	0.46	1.66	413.86
49	245	4.08	1.7	0.639	0.14	0.11	0.50	1.79	454.42
50	250	4.17	1.8	0.676	0.14	0.12	0.54	1.93	494.99
51	255	4.25	1.9	0.714	0.14	0.13	0.57	2.06	535.55
52	260	4.33	2.0	0.751	0.14	0.14	0.61	2.20	576.11
53	265	4.42	2.1	0.789	0.14	0.14	0.65	2.33	616.68
54	270	4.50	2.1	0.789	0.14	0.14	0.65	2.33	616.68
55	275	4.58	2.2	0.826	0.14	0.15	0.69	2.47	657.24
56	280	4.67	2.3	0.864	0.14	0.16	0.72	2.60	697.81

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN E BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.75		
UNIT TIME-PERCENT OF LAG	286.1		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.141		
LOW LOSS RATE - PERCENT	18%	TOTAL PERCOLATION RATE (cfs)	0.28 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.901	0.14	0.16	0.76	2.74	738.37
58	290	4.83	2.4	0.901	0.14	0.16	0.76	2.74	738.37
59	295	4.92	2.5	0.939	0.14	0.17	0.80	2.87	778.94
60	300	5.00	2.6	0.977	0.14	0.18	0.84	3.01	819.50
61	305	5.08	3.1	1.164	0.14	0.21	1.02	3.69	1022.33
62	310	5.17	3.6	1.352	0.14	0.24	1.21	4.36	1225.15
63	315	5.25	3.9	1.465	0.14	0.26	1.32	4.77	1346.85
64	320	5.33	4.2	1.578	0.14	0.28	1.44	5.17	1468.54
65	325	5.42	4.7	1.765	0.14	0.32	1.62	5.85	1671.36
66	330	5.50	5.6	2.103	0.14	0.38	1.96	7.07	2036.45
67	335	5.58	1.9	0.714	0.14	0.13	0.57	2.06	535.55
68	340	5.67	0.9	0.338	0.14	0.06	0.20	0.71	129.90
69	345	5.75	0.6	0.225	0.14	0.04	0.08	0.31	8.21
70	350	5.83	0.5	0.188	0.14	0.03	0.05	0.17	0.00
71	355	5.92	0.3	0.113	0.14	0.02	0.09	0.33	16.46
72	360	6.00	0.2	0.075	0.14	0.01	0.06	0.22	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.31
FLOOD VOLUME (acft)	0.69
FLOOD VOLUME (cuft)	30148.21
REQUIRED STORAGE (acft)	0.55
REQUIRED STORAGE (cuft)	23980.45
PEAK FLOW RATE (cfs)	7.07

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN E BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			3.600	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.1406		
LAG TIME - MINUTES			1.75	MINIMUM LOSS RATE (for var. loss) - in/hr			0.070		
UNIT TIME-PERCENT OF LAG			858.4	LOW LOSS RATE - DECIMAL			0.18		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00130		
				PERCOLATION RATE (cfs)			0.28		
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.040	0.248	0.007	0.033	0.12	0.00
2	30	0.50	0.3	0.061	0.245	0.011	0.050	0.18	0.00
3	45	0.75	0.3	0.061	0.243	0.011	0.050	0.18	0.00
4	60	1.00	0.4	0.081	0.240	0.015	0.066	0.24	0.00
5	75	1.25	0.3	0.061	0.237	0.011	0.050	0.18	0.00
6	90	1.50	0.3	0.061	0.234	0.011	0.050	0.18	0.00
7	105	1.75	0.3	0.061	0.231	0.011	0.050	0.18	0.00
8	120	2.00	0.4	0.081	0.228	0.015	0.066	0.24	0.00
9	135	2.25	0.4	0.081	0.226	0.015	0.066	0.24	0.00
10	150	2.50	0.4	0.081	0.223	0.015	0.066	0.24	0.00
11	165	2.75	0.5	0.101	0.220	0.018	0.083	0.30	18.87
12	180	3.00	0.5	0.101	0.218	0.018	0.083	0.30	18.87
13	195	3.25	0.5	0.101	0.215	0.018	0.083	0.30	18.87
14	210	3.50	0.5	0.101	0.212	0.018	0.083	0.30	18.87
15	225	3.75	0.5	0.101	0.210	0.018	0.083	0.30	18.87
16	240	4.00	0.6	0.121	0.207	0.022	0.100	0.36	72.64
17	255	4.25	0.6	0.121	0.204	0.022	0.100	0.36	72.64
18	270	4.50	0.7	0.142	0.202	0.026	0.116	0.42	126.42
19	285	4.75	0.7	0.142	0.199	0.026	0.116	0.42	126.42
20	300	5.00	0.8	0.162	0.196	0.029	0.133	0.48	180.19
21	315	5.25	0.6	0.121	0.194	0.022	0.100	0.36	72.64
22	330	5.50	0.7	0.142	0.191	0.026	0.116	0.42	126.42
23	345	5.75	0.8	0.162	0.189	0.029	0.133	0.48	180.19
24	360	6.00	0.8	0.162	0.186	0.029	0.133	0.48	180.19
25	375	6.25	0.9	0.182	0.184	0.033	0.149	0.54	233.96
26	390	6.50	0.9	0.182	0.181	0.033	0.001	0.00	0.00
27	405	6.75	1.0	0.202	0.179	0.036	0.023	0.08	0.00
28	420	7.00	1.0	0.202	0.177	0.036	0.026	0.09	0.00
29	435	7.25	1.0	0.202	0.174	0.036	0.028	0.10	0.00
30	450	7.50	1.1	0.223	0.172	0.040	0.051	0.18	0.00
31	465	7.75	1.2	0.243	0.170	0.044	0.073	0.26	0.00
32	480	8.00	1.3	0.263	0.167	0.047	0.096	0.35	60.88
33	495	8.25	1.5	0.304	0.165	0.055	0.139	0.50	199.55
34	510	8.50	1.5	0.304	0.163	0.055	0.141	0.51	206.99
35	525	8.75	1.6	0.324	0.160	0.058	0.164	0.59	279.95
36	540	9.00	1.7	0.344	0.158	0.062	0.186	0.67	352.84
37	555	9.25	1.9	0.385	0.156	0.069	0.229	0.82	491.24
38	570	9.50	2.0	0.405	0.154	0.073	0.251	0.90	564.00
39	585	9.75	2.1	0.425	0.151	0.077	0.274	0.99	636.69
40	600	10.00	2.2	0.445	0.149	0.080	0.296	1.07	709.32
41	615	10.25	1.5	0.304	0.147	0.055	0.157	0.56	257.25
42	630	10.50	1.5	0.304	0.145	0.055	0.159	0.57	264.16
43	645	10.75	2.0	0.405	0.143	0.073	0.262	0.94	598.89
44	660	11.00	2.0	0.405	0.141	0.073	0.264	0.95	605.66
45	675	11.25	1.9	0.385	0.139	0.069	0.246	0.89	546.78
46	690	11.50	1.9	0.385	0.137	0.069	0.248	0.89	553.41
47	705	11.75	1.7	0.344	0.135	0.062	0.210	0.75	428.81
48	720	12.00	1.8	0.364	0.133	0.066	0.232	0.83	500.87
49	735	12.25	2.5	0.506	0.131	0.091	0.375	1.35	966.33
50	750	12.50	2.6	0.526	0.129	0.095	0.398	1.43	1038.24
51	765	12.75	2.8	0.567	0.127	0.102	0.440	1.58	1175.66
52	780	13.00	2.9	0.587	0.125	0.106	0.462	1.66	1247.43
53	795	13.25	3.4	0.688	0.123	0.124	0.565	2.03	1581.43
54	810	13.50	3.4	0.688	0.121	0.124	0.567	2.04	1587.46
55	825	13.75	2.3	0.466	0.119	0.084	0.346	1.25	872.06
56	840	14.00	2.3	0.466	0.117	0.084	0.348	1.25	877.94
57	855	14.25	2.7	0.546	0.116	0.098	0.431	1.55	1146.05
58	870	14.50	2.6	0.526	0.114	0.095	0.412	1.48	1086.19
59	885	14.75	2.6	0.526	0.112	0.095	0.414	1.49	1091.83
60	900	15.00	2.5	0.506	0.110	0.091	0.396	1.42	1031.81

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN E BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			3.600	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.1406		
LAG TIME - MINUTES			1.75	MINIMUM LOSS RATE (for var. loss) - in/hr			0.070		
UNIT TIME-PERCENT OF LAG			858.4	LOW LOSS RATE - DECIMAL			0.18		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00130		
				PERCOLATION RATE (cfs)			0.28		
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
61	915	15.25	2.4	0.486	0.109	0.087	0.377	1.36	971.71
62	930	15.50	2.3	0.466	0.107	0.084	0.358	1.29	911.52
63	945	15.75	1.9	0.385	0.105	0.069	0.279	1.01	654.51
64	960	16.00	1.9	0.385	0.104	0.069	0.281	1.01	659.73
65	975	16.25	0.4	0.081	0.102	0.015	0.066	0.24	0.00
66	990	16.50	0.4	0.081	0.101	0.015	0.066	0.24	0.00
67	1005	16.75	0.3	0.061	0.099	0.011	0.050	0.18	0.00
68	1020	17.00	0.3	0.061	0.098	0.011	0.050	0.18	0.00
69	1035	17.25	0.5	0.101	0.096	0.018	0.005	0.02	0.00
70	1050	17.50	0.5	0.101	0.095	0.018	0.006	0.02	0.00
71	1065	17.75	0.5	0.101	0.093	0.018	0.008	0.03	0.00
72	1080	18.00	0.4	0.081	0.092	0.015	0.066	0.24	0.00
73	1095	18.25	0.4	0.081	0.091	0.015	0.066	0.24	0.00
74	1110	18.50	0.4	0.081	0.089	0.015	0.066	0.24	0.00
75	1125	18.75	0.3	0.061	0.088	0.011	0.050	0.18	0.00
76	1140	19.00	0.2	0.040	0.087	0.007	0.033	0.12	0.00
77	1155	19.25	0.3	0.061	0.085	0.011	0.050	0.18	0.00
78	1170	19.50	0.4	0.081	0.084	0.015	0.066	0.24	0.00
79	1185	19.75	0.3	0.061	0.083	0.011	0.050	0.18	0.00
80	1200	20.00	0.2	0.040	0.082	0.007	0.033	0.12	0.00
81	1215	20.25	0.3	0.061	0.081	0.011	0.050	0.18	0.00
82	1230	20.50	0.3	0.061	0.080	0.011	0.050	0.18	0.00
83	1245	20.75	0.3	0.061	0.079	0.011	0.050	0.18	0.00
84	1260	21.00	0.2	0.040	0.078	0.007	0.033	0.12	0.00
85	1275	21.25	0.3	0.061	0.077	0.011	0.050	0.18	0.00
86	1290	21.50	0.2	0.040	0.076	0.007	0.033	0.12	0.00
87	1305	21.75	0.3	0.061	0.075	0.011	0.050	0.18	0.00
88	1320	22.00	0.2	0.040	0.074	0.007	0.033	0.12	0.00
89	1335	22.25	0.3	0.061	0.074	0.011	0.050	0.18	0.00
90	1350	22.50	0.2	0.040	0.073	0.007	0.033	0.12	0.00
91	1365	22.75	0.2	0.040	0.072	0.007	0.033	0.12	0.00
92	1380	23.00	0.2	0.040	0.072	0.007	0.033	0.12	0.00
93	1395	23.25	0.2	0.040	0.071	0.007	0.033	0.12	0.00
94	1410	23.50	0.2	0.040	0.071	0.007	0.033	0.12	0.00
95	1425	23.75	0.2	0.040	0.071	0.007	0.033	0.12	0.00
96	1440	24.00	0.2	0.040	0.070	0.007	0.033	0.12	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	3.43
FLOOD VOLUME (acft)	1.03
FLOOD VOLUME (cuft)	44842.06
REQUIRED STORAGE (acft)	0.59
REQUIRED STORAGE (cuft)	25623.26
PEAK FLOW (cfs)	2.04

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN E

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
345	0	0		6000	0	0	0.00
346	1	1	0	6000	6000	6000	0.14
347	1	2	0	6000	6000	12000	0.28
348	1	3	0	6000	6000	18000	0.41
349	1	4	0	6000	6000	24000	0.55
350	1	5	0	6000	6000	30000	0.69

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	0.27778	cfs
MAXWELL IV DRYWELLS			
NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		0.27778	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	25623	cu ft (100-yr 24-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	0.27778	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**26**	hrs < 36 hrs

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.85	256	256	83	173	345.03	173	0.00
2	10	0.85	256	428	83	345	345.06	345	0.01
3	15	0.64	193	538	83	455	345.08	455	0.01
4	20	1.06	319	773	83	690	345.12	690	0.02
5	25	1.06	319	1,009	83	925	345.15	925	0.02
6	30	1.38	413	1,338	83	1,255	345.21	1,255	0.03
7	35	1.06	319	1,573	83	1,490	345.25	1,490	0.03
8	40	1.38	413	1,903	83	1,819	345.30	1,819	0.04
9	45	1.38	413	2,232	83	2,149	345.36	2,149	0.05
10	50	1.06	319	2,467	83	2,384	345.40	2,384	0.05
11	55	1.17	350	2,734	83	2,651	345.44	2,651	0.06
12	60	1.38	413	3,063	83	2,980	345.50	2,980	0.07
13	65	1.79	538	3,518	83	3,435	345.57	3,435	0.08
14	70	1.79	538	3,973	83	3,890	345.65	3,890	0.09
15	75	1.79	538	4,428	83	4,344	345.72	4,344	0.10
16	80	1.58	475	4,820	83	4,737	345.79	4,737	0.11
17	85	2.21	664	5,400	83	5,317	345.89	5,317	0.12
18	90	2.32	695	6,012	83	5,928	345.99	5,928	0.14
19	95	2.00	601	6,529	83	6,446	346.07	6,446	0.15
20	100	2.32	695	7,141	83	7,058	346.18	7,058	0.16
21	105	2.94	883	7,941	83	7,857	346.31	7,857	0.18
22	110	2.73	820	8,678	83	8,594	346.43	8,594	0.20
23	115	2.53	758	9,352	83	9,269	346.54	9,269	0.21
24	120	2.63	789	10,058	83	9,975	346.66	9,975	0.23
25	125	2.73	820	10,795	83	10,712	346.79	10,712	0.25
26	130	3.88	1,165	11,877	83	11,794	346.97	11,794	0.27
27	135	4.72	1,416	13,210	83	13,127	347.19	13,127	0.30
28	140	3.15	946	14,073	83	13,989	347.33	13,989	0.32
29	145	6.60	1,981	15,970	83	15,887	347.65	15,887	0.36
30	150	7.13	2,138	18,024	83	17,941	347.99	17,941	0.41
31	155	8.07	2,420	20,361	83	20,278	348.38	20,278	0.47
32	160	5.66	1,699	21,976	83	21,893	348.65	21,893	0.50
33	165	1.58	475	22,368	83	22,285	348.71	22,285	0.51
34	170	1.38	413	22,698	83	22,614	348.77	22,614	0.52
35	175	1.38	413	23,027	83	22,944	348.82	22,944	0.53
36	180	0.12	36	22,980	83	22,897	348.82	22,897	0.53

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	51	51	83	-	345.00	-	0.00
2	10	0.31	92	92	83	8	345.00	8	0.00
3	15	0.31	92	100	83	16	345.00	16	0.00
4	20	0.31	92	108	83	25	345.00	25	0.00
5	25	0.31	92	116	83	33	345.01	33	0.00
6	30	0.44	132	165	83	82	345.01	82	0.00
7	35	0.44	132	214	83	130	345.02	130	0.00
8	40	0.44	132	262	83	179	345.03	179	0.00
9	45	0.44	132	311	83	228	345.04	228	0.01
10	50	0.44	132	360	83	277	345.05	277	0.01
11	55	0.44	132	409	83	325	345.05	325	0.01
12	60	0.58	173	498	83	415	345.07	415	0.01
13	65	0.58	173	587	83	504	345.08	504	0.01
14	70	0.58	173	677	83	593	345.10	593	0.01
15	75	0.58	173	766	83	683	345.11	683	0.02
16	80	0.58	173	855	83	772	345.13	772	0.02
17	85	0.58	173	945	83	861	345.14	861	0.02
18	90	0.58	173	1,034	83	951	345.16	951	0.02
19	95	0.58	173	1,123	83	1,040	345.17	1,040	0.02
20	100	0.58	173	1,213	83	1,129	345.19	1,129	0.03
21	105	0.58	173	1,302	83	1,219	345.20	1,219	0.03
22	110	0.58	173	1,392	83	1,308	345.22	1,308	0.03
23	115	0.58	173	1,481	83	1,398	345.23	1,398	0.03
24	120	0.71	213	1,611	83	1,527	345.25	1,527	0.04
25	125	0.58	173	1,700	83	1,617	345.27	1,617	0.04
26	130	0.71	213	1,830	83	1,747	345.29	1,747	0.04
27	135	0.71	213	1,960	83	1,877	345.31	1,877	0.04
28	140	0.71	213	2,090	83	2,006	345.33	2,006	0.05
29	145	0.71	213	2,220	83	2,136	345.36	2,136	0.05
30	150	0.71	213	2,350	83	2,266	345.38	2,266	0.05
31	155	0.71	213	2,479	83	2,396	345.40	2,396	0.06
32	160	0.71	213	2,609	83	2,526	345.42	2,526	0.06
33	165	0.85	254	2,780	83	2,697	345.45	2,697	0.06
34	170	0.85	254	2,950	83	2,867	345.48	2,867	0.07
35	175	0.85	254	3,121	83	3,037	345.51	3,037	0.07
36	180	0.85	254	3,291	83	3,208	345.53	3,208	0.07
37	185	0.85	254	3,462	83	3,378	345.56	3,378	0.08
38	190	0.98	294	3,673	83	3,589	345.60	3,589	0.08
39	195	0.98	294	3,884	83	3,800	345.63	3,800	0.09
40	200	0.98	294	4,095	83	4,011	345.67	4,011	0.09
41	205	1.12	335	4,346	83	4,263	345.71	4,263	0.10
42	210	1.25	375	4,639	83	4,555	345.76	4,555	0.10
43	215	1.39	416	4,971	83	4,888	345.81	4,888	0.11
44	220	1.39	416	5,304	83	5,221	345.87	5,221	0.12
45	225	1.52	457	5,677	83	5,594	345.93	5,594	0.13
46	230	1.52	457	6,051	83	5,967	345.99	5,967	0.14
47	235	1.66	497	6,464	83	6,381	346.06	6,381	0.15
48	240	1.66	497	6,878	83	6,795	346.13	6,795	0.16
49	245	1.79	538	7,333	83	7,249	346.21	7,249	0.17
50	250	1.93	578	7,828	83	7,744	346.29	7,744	0.18
51	255	2.06	619	8,363	83	8,280	346.38	8,280	0.19
52	260	2.20	659	8,939	83	8,856	346.48	8,856	0.20
53	265	2.33	700	9,556	83	9,473	346.58	9,473	0.22
54	270	2.33	700	10,173	83	10,089	346.68	10,089	0.23
55	275	2.47	741	10,830	83	10,747	346.79	10,747	0.25

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	2.60	781	11,528	83	11,444	346.91	11,444	0.26
57	285	2.74	822	12,266	83	12,183	347.03	12,183	0.28
58	290	2.74	822	13,005	83	12,921	347.15	12,921	0.30
59	295	2.87	862	13,783	83	13,700	347.28	13,700	0.31
60	300	3.01	903	14,603	83	14,520	347.42	14,520	0.33
61	305	3.69	1,106	15,625	83	15,542	347.59	15,542	0.36
62	310	4.36	1,308	16,850	83	16,767	347.79	16,767	0.38
63	315	4.77	1,430	18,197	83	18,114	348.02	18,114	0.42
64	320	5.17	1,552	19,666	83	19,583	348.26	19,583	0.45
65	325	5.85	1,755	21,337	83	21,254	348.54	21,254	0.49
66	330	7.07	2,120	23,374	83	23,290	348.88	23,290	0.53
67	335	2.06	619	23,909	83	23,826	348.97	23,826	0.55
68	340	0.71	213	24,039	83	23,956	348.99	23,956	0.55
69	345	0.31	92	24,047	83	23,964	348.99	23,964	0.55
70	350	0.17	51	24,015	83	23,932	348.99	23,932	0.55
71	355	0.33	100	24,031	83	23,948	348.99	23,948	0.55
72	360	0.22	67	24,015	83	23,931	348.99	23,931	0.55

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.12	108	108	250	-	345.00	-	0.00
2	30	0.18	161	161	250	-	345.00	-	0.00
3	45	0.18	161	161	250	-	345.00	-	0.00
4	60	0.24	215	215	250	-	345.00	-	0.00
5	75	0.18	161	161	250	-	345.00	-	0.00
6	90	0.18	161	161	250	-	345.00	-	0.00
7	105	0.18	161	161	250	-	345.00	-	0.00
8	120	0.24	215	215	250	-	345.00	-	0.00
9	135	0.24	215	215	250	-	345.00	-	0.00
10	150	0.24	215	215	250	-	345.00	-	0.00
11	165	0.30	269	269	250	19	345.00	19	0.00
12	180	0.30	269	288	250	38	345.01	38	0.00
13	195	0.30	269	307	250	57	345.01	57	0.00
14	210	0.30	269	325	250	75	345.01	75	0.00
15	225	0.30	269	344	250	94	345.02	94	0.00
16	240	0.36	323	417	250	167	345.03	167	0.00
17	255	0.36	323	490	250	240	345.04	240	0.01
18	270	0.42	376	616	250	366	345.06	366	0.01
19	285	0.42	376	742	250	492	345.08	492	0.01
20	300	0.48	430	923	250	673	345.11	673	0.02
21	315	0.36	323	995	250	745	345.12	745	0.02
22	330	0.42	376	1,122	250	872	345.15	872	0.02
23	345	0.48	430	1,302	250	1,052	345.18	1,052	0.02
24	360	0.48	430	1,482	250	1,232	345.21	1,232	0.03
25	375	0.54	484	1,716	250	1,466	345.24	1,466	0.03
26	390	0.00	2	1,468	250	1,218	345.20	1,218	0.03
27	405	0.08	76	1,294	250	1,044	345.17	1,044	0.02
28	420	0.09	83	1,127	250	877	345.15	877	0.02
29	435	0.10	91	969	250	719	345.12	719	0.02
30	450	0.18	165	883	250	633	345.11	633	0.01
31	465	0.26	238	871	250	621	345.10	621	0.01
32	480	0.35	311	932	250	682	345.11	682	0.02
33	495	0.50	450	1,131	250	881	345.15	881	0.02
34	510	0.51	457	1,338	250	1,088	345.18	1,088	0.02
35	525	0.59	530	1,618	250	1,368	345.23	1,368	0.03
36	540	0.67	603	1,971	250	1,721	345.29	1,721	0.04
37	555	0.82	741	2,462	250	2,212	345.37	2,212	0.05
38	570	0.90	814	3,026	250	2,776	345.46	2,776	0.06
39	585	0.99	887	3,663	250	3,413	345.57	3,413	0.08
40	600	1.07	959	4,372	250	4,122	345.69	4,122	0.09
41	615	0.56	507	4,630	250	4,380	345.73	4,380	0.10
42	630	0.57	514	4,894	250	4,644	345.77	4,644	0.11
43	645	0.94	849	5,493	250	5,243	345.87	5,243	0.12
44	660	0.95	856	6,098	250	5,848	345.97	5,848	0.13
45	675	0.89	797	6,645	250	6,395	346.07	6,395	0.15
46	690	0.89	803	7,198	250	6,948	346.16	6,948	0.16
47	705	0.75	679	7,627	250	7,377	346.23	7,377	0.17
48	720	0.83	751	8,128	250	7,878	346.31	7,878	0.18
49	735	1.35	1,216	9,094	250	8,844	346.47	8,844	0.20
50	750	1.43	1,288	10,133	250	9,883	346.65	9,883	0.23
51	765	1.58	1,426	11,308	250	11,058	346.84	11,058	0.25
52	780	1.66	1,497	12,556	250	12,306	347.05	12,306	0.28
53	795	2.03	1,831	14,137	250	13,887	347.31	13,887	0.32
54	810	2.04	1,837	15,725	250	15,475	347.58	15,475	0.36
55	825	1.25	1,122	16,597	250	16,347	347.72	16,347	0.38
56	840	1.25	1,128	17,475	250	17,225	347.87	17,225	0.40
57	855	1.55	1,396	18,621	250	18,371	348.06	18,371	0.42
58	870	1.48	1,336	19,707	250	19,457	348.24	19,457	0.45

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	1.49	1,342	20,799	250	20,549	348.42	20,549	0.47
60	900	1.42	1,282	21,831	250	21,581	348.60	21,581	0.50
61	915	1.36	1,222	22,802	250	22,552	348.76	22,552	0.52
62	930	1.29	1,162	23,714	250	23,464	348.91	23,464	0.54
63	945	1.01	905	24,368	250	24,118	349.02	24,118	0.55
64	960	1.01	910	25,028	250	24,778	349.13	24,778	0.57
65	975	0.24	215	24,993	250	24,743	349.12	24,743	0.57
66	990	0.24	215	24,958	250	24,708	349.12	24,708	0.57
67	1005	0.18	161	24,870	250	24,620	349.10	24,620	0.57
68	1020	0.18	161	24,781	250	24,531	349.09	24,531	0.56
69	1035	0.02	16	24,547	250	24,297	349.05	24,297	0.56
70	1050	0.02	21	24,318	250	24,068	349.01	24,068	0.55
71	1065	0.03	26	24,094	250	23,844	348.97	23,844	0.55
72	1080	0.24	215	24,059	250	23,809	348.97	23,809	0.55
73	1095	0.24	215	24,024	250	23,774	348.96	23,774	0.55
74	1110	0.24	215	23,989	250	23,739	348.96	23,739	0.54
75	1125	0.18	161	23,901	250	23,651	348.94	23,651	0.54
76	1140	0.12	108	23,758	250	23,508	348.92	23,508	0.54
77	1155	0.18	161	23,669	250	23,419	348.90	23,419	0.54
78	1170	0.24	215	23,634	250	23,384	348.90	23,384	0.54
79	1185	0.18	161	23,546	250	23,296	348.88	23,296	0.53
80	1200	0.12	108	23,403	250	23,153	348.86	23,153	0.53
81	1215	0.18	161	23,315	250	23,065	348.84	23,065	0.53
82	1230	0.18	161	23,226	250	22,976	348.83	22,976	0.53
83	1245	0.18	161	23,137	250	22,887	348.81	22,887	0.53
84	1260	0.12	108	22,995	250	22,745	348.79	22,745	0.52
85	1275	0.18	161	22,906	250	22,656	348.78	22,656	0.52
86	1290	0.12	108	22,764	250	22,514	348.75	22,514	0.52
87	1305	0.18	161	22,675	250	22,425	348.74	22,425	0.51
88	1320	0.12	108	22,533	250	22,283	348.71	22,283	0.51
89	1335	0.18	161	22,444	250	22,194	348.70	22,194	0.51
90	1350	0.12	108	22,301	250	22,051	348.68	22,051	0.51
91	1365	0.12	108	22,159	250	21,909	348.65	21,909	0.50
92	1380	0.12	108	22,017	250	21,767	348.63	21,767	0.50
93	1395	0.12	108	21,874	250	21,624	348.60	21,624	0.50
94	1410	0.12	108	21,732	250	21,482	348.58	21,482	0.49
95	1425	0.12	108	21,589	250	21,339	348.56	21,339	0.49
96	1440	0.12	108	21,447	250	21,197	348.53	21,197	0.49

EXHIBIT “A”

PROPOSED CONDITION HYDROLOGY MAP

DRAINAGE BOUNDARY

X
3.85

DRNG AREA ID

AREA IN ACRES

CATCH BASIN

SD

STORM DRAIN

A
26.34

B
1.07

C
1.24

D
3.85

E
3.60

STORAGE CHAMBER

BASIN "A"
BOTTOM=57.5
(AREA=3051.34 SF.)

BASIN "B"
BOTTOM=44.0
(AREA=28167.66 SF.)

TRACT BOUNDARY

1' TO 3' MAX. RETAINING WALL

4' RETAINING WALL

HEADWALL OUTLET STRUCTURE

2:1 SLOPE

SWIMMING POOL

Drive

Palm

N

0 20' 40' 80'
SCALE: 1"=40'

UNIT HYDROGRAPH
HYDROLOGY EXHIBIT
GREEN DAY VILLAGE, DHS CA

APPENDIX A
Rainfall and Soil Data and E Plates

NOAA Atlas 14, Volume 6, Version 2
Location name: Desert Hot Springs, California, USA*
Latitude: 33.9134°, Longitude: -116.5046°
Elevation: 767.88 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.079 (0.066-0.096)	0.115 (0.095-0.139)	0.168 (0.139-0.204)	0.215 (0.177-0.265)	0.288 (0.229-0.367)	0.351 (0.273-0.457)	0.422 (0.320-0.563)	0.503 (0.371-0.690)	0.627 (0.444-0.896)	0.737 (0.503-1.09)
10-min	0.113 (0.094-0.137)	0.164 (0.137-0.200)	0.240 (0.199-0.293)	0.309 (0.253-0.379)	0.413 (0.328-0.526)	0.504 (0.392-0.654)	0.606 (0.459-0.806)	0.722 (0.532-0.988)	0.899 (0.636-1.29)	1.06 (0.722-1.56)
15-min	0.137 (0.114-0.166)	0.199 (0.165-0.242)	0.290 (0.241-0.354)	0.373 (0.307-0.459)	0.500 (0.397-0.636)	0.609 (0.474-0.791)	0.732 (0.556-0.975)	0.873 (0.643-1.20)	1.09 (0.769-1.55)	1.28 (0.873-1.89)
30-min	0.212 (0.177-0.258)	0.309 (0.257-0.376)	0.451 (0.374-0.550)	0.580 (0.476-0.713)	0.777 (0.617-0.988)	0.947 (0.736-1.23)	1.14 (0.863-1.52)	1.36 (1.00-1.86)	1.69 (1.20-2.42)	1.99 (1.36-2.94)
60-min	0.308 (0.256-0.374)	0.448 (0.372-0.544)	0.654 (0.542-0.797)	0.840 (0.690-1.03)	1.13 (0.894-1.43)	1.37 (1.07-1.78)	1.65 (1.25-2.20)	1.97 (1.45-2.69)	2.45 (1.73-3.50)	2.88 (1.97-4.26)
2-hr	0.423 (0.352-0.513)	0.597 (0.496-0.726)	0.852 (0.706-1.04)	1.08 (0.889-1.33)	1.43 (1.14-1.82)	1.73 (1.34-2.25)	2.06 (1.56-2.74)	2.44 (1.80-3.34)	3.00 (2.12-4.29)	3.49 (2.38-5.16)
3-hr	0.512 (0.426-0.622)	0.718 (0.596-0.873)	1.02 (0.843-1.24)	1.29 (1.06-1.58)	1.69 (1.34-2.15)	2.04 (1.59-2.65)	2.42 (1.84-3.23)	2.86 (2.11-3.91)	3.51 (2.48-5.01)	4.06 (2.78-6.01)
6-hr	0.670 (0.558-0.814)	0.939 (0.780-1.14)	1.33 (1.10-1.62)	1.68 (1.38-2.06)	2.20 (1.75-2.79)	2.64 (2.05-3.43)	3.13 (2.37-4.17)	3.68 (2.71-5.04)	4.50 (3.18-6.43)	5.20 (3.55-7.70)
12-hr	0.817 (0.680-0.992)	1.17 (0.973-1.42)	1.68 (1.39-2.05)	2.13 (1.75-2.62)	2.81 (2.23-3.57)	3.38 (2.63-4.39)	4.01 (3.04-5.34)	4.71 (3.48-6.46)	5.77 (4.08-8.24)	6.67 (4.55-9.86)
24-hr	0.963 (0.853-1.11)	1.42 (1.26-1.64)	2.08 (1.84-2.41)	2.66 (2.33-3.11)	3.53 (2.99-4.25)	4.25 (3.53-5.23)	5.06 (4.10-6.36)	5.95 (4.70-7.70)	7.29 (5.53-9.82)	8.44 (6.19-11.8)
2-day	1.06 (0.935-1.22)	1.59 (1.41-1.84)	2.37 (2.09-2.74)	3.05 (2.66-3.55)	4.05 (3.43-4.88)	4.90 (4.07-6.02)	5.83 (4.73-7.34)	6.87 (5.42-8.89)	8.42 (6.38-11.3)	9.74 (7.14-13.6)
3-day	1.10 (0.972-1.26)	1.67 (1.48-1.93)	2.51 (2.21-2.90)	3.24 (2.83-3.78)	4.32 (3.66-5.20)	5.23 (4.34-6.43)	6.23 (5.05-7.84)	7.35 (5.80-9.50)	9.01 (6.83-12.1)	10.4 (7.64-14.5)
4-day	1.13 (1.00-1.31)	1.74 (1.54-2.01)	2.62 (2.31-3.04)	3.40 (2.97-3.96)	4.54 (3.85-5.47)	5.51 (4.57-6.77)	6.56 (5.32-8.26)	7.74 (6.11-10.0)	9.49 (7.19-12.8)	11.0 (8.04-15.3)
7-day	1.24 (1.10-1.43)	1.94 (1.72-2.24)	2.95 (2.60-3.41)	3.84 (3.36-4.48)	5.16 (4.37-6.21)	6.26 (5.19-7.69)	7.46 (6.05-9.38)	8.79 (6.93-11.4)	10.7 (8.15-14.5)	12.4 (9.09-17.3)
10-day	1.31 (1.16-1.50)	2.06 (1.82-2.37)	3.14 (2.77-3.64)	4.10 (3.59-4.79)	5.53 (4.68-6.66)	6.72 (5.58-8.25)	8.01 (6.49-10.1)	9.44 (7.45-12.2)	11.5 (8.75-15.5)	13.3 (9.75-18.5)
20-day	1.43 (1.27-1.65)	2.28 (2.02-2.63)	3.53 (3.11-4.08)	4.63 (4.05-5.40)	6.28 (5.32-7.56)	7.65 (6.35-9.40)	9.15 (7.42-11.5)	10.8 (8.52-14.0)	13.2 (10.00-17.8)	15.2 (11.1-21.2)
30-day	1.61 (1.42-1.85)	2.56 (2.27-2.96)	3.98 (3.51-4.60)	5.23 (4.58-6.10)	7.11 (6.03-8.57)	8.69 (7.21-10.7)	10.4 (8.43-13.1)	12.3 (9.68-15.9)	15.0 (11.4-20.2)	17.3 (12.7-24.0)
45-day	1.77 (1.57-2.04)	2.83 (2.50-3.26)	4.39 (3.88-5.08)	5.80 (5.07-6.76)	7.92 (6.71-9.53)	9.70 (8.05-11.9)	11.6 (9.43-14.6)	13.7 (10.8-17.8)	16.8 (12.7-22.6)	19.3 (14.2-26.9)
60-day	1.94 (1.72-2.24)	3.09 (2.73-3.56)	4.80 (4.23-5.55)	6.34 (5.55-7.39)	8.66 (7.34-10.4)	10.6 (8.82-13.1)	12.8 (10.4-16.1)	15.1 (11.9-19.5)	18.5 (14.0-24.9)	21.2 (15.6-29.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

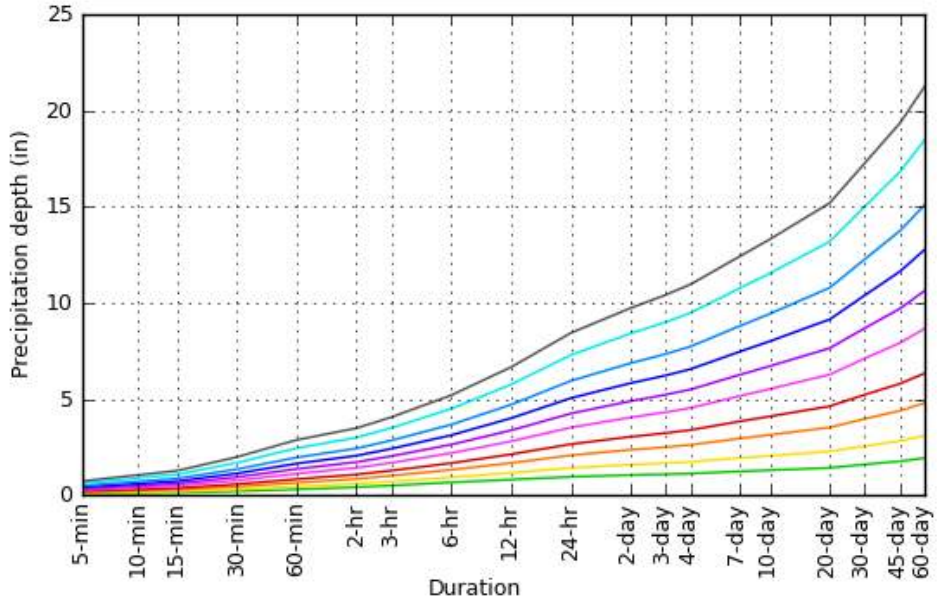
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

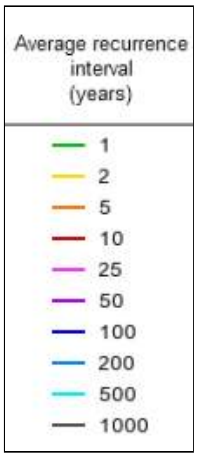
Please refer to NOAA Atlas 14 document for more information.

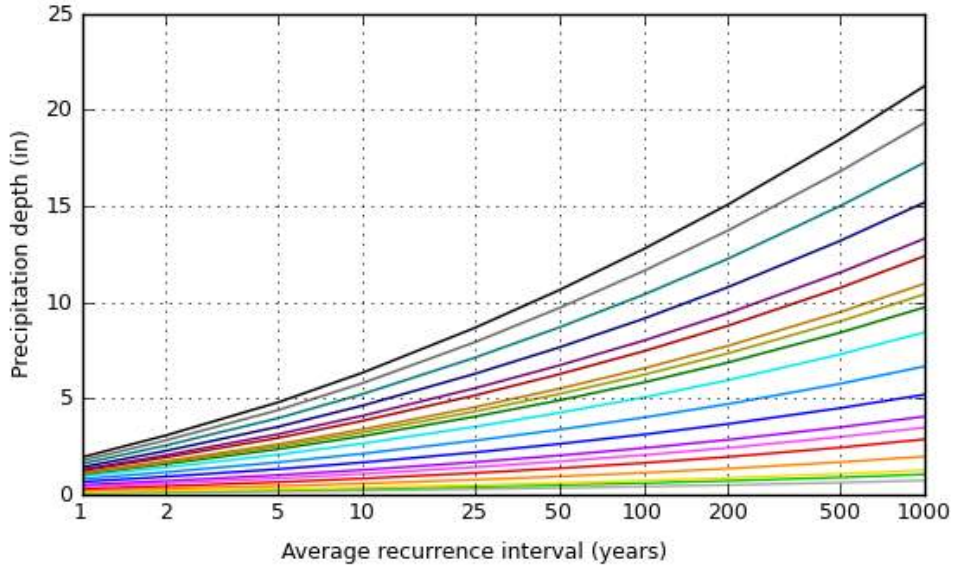
Back to Top

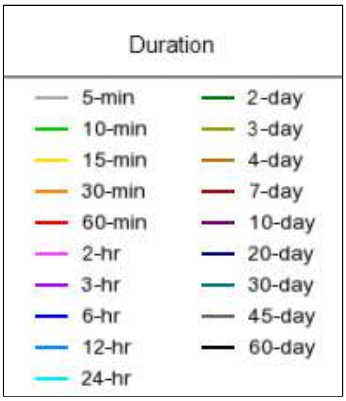
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.9134°, Longitude: -116.5046°









NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Mon Jun 13 02:24:57 2022

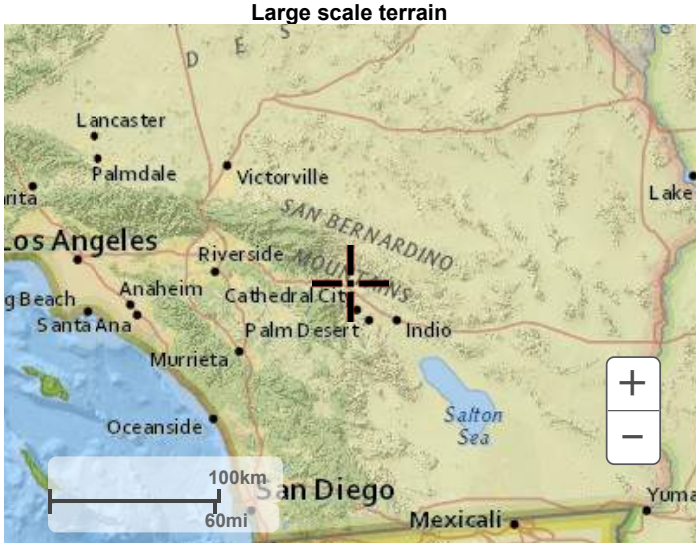
Back to Top

Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

United States Department of Agriculture

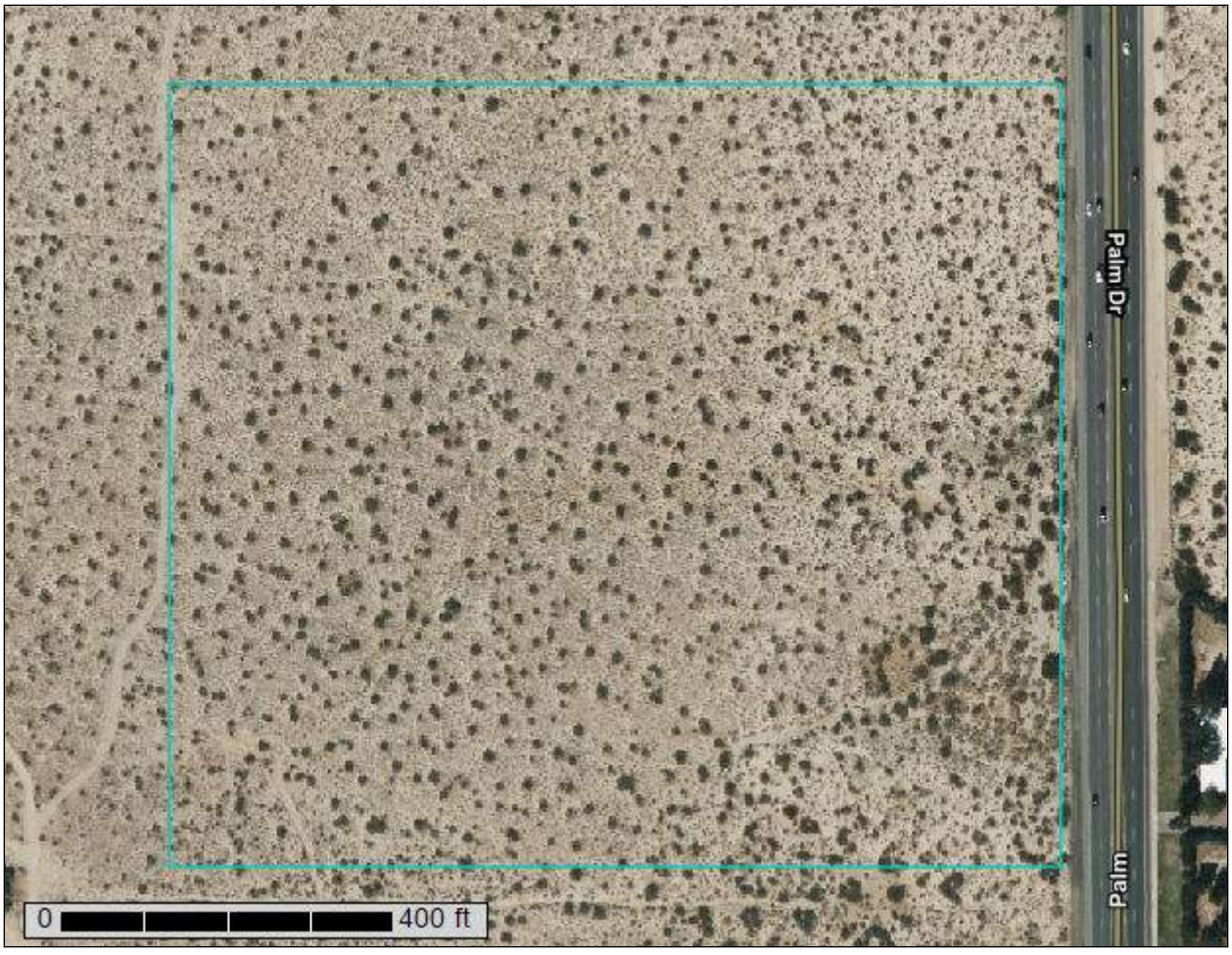
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Riverside County, Coachella Valley Area, California

Green day Village



June 12, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....12
Map Unit Descriptions.....12
Riverside County, Coachella Valley Area, California.....14
MaB—Myoma fine sand, 0 to 5 percent slopes.....14
MaD—Myoma fine sand, 5 to 15 percent slopes.....15
References.....17

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:2,430 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 13, Sep 15, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 3, 2021—May 27, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MaB	Myoma fine sand, 0 to 5 percent slopes	23.2	99.5%
MaD	Myoma fine sand, 5 to 15 percent slopes	0.1	0.5%
Totals for Area of Interest		**23.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Riverside County, Coachella Valley Area, California

MaB—Myoma fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hkw3
Elevation: -200 to 1,800 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 to 75 degrees F
Frost-free period: 270 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Myoma and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myoma

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind blown sandy alluvium

Typical profile

H1 - 0 to 18 inches: fine sand
H2 - 18 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R031XY007CA - Lacustrine Basin and Large RIver Floodplain
Hydric soil rating: No

Minor Components

Coachella

Percent of map unit: 4 percent

Hydric soil rating: No

Carsitas

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed, noncalcareous soils

Percent of map unit: 4 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Channels
Hydric soil rating: Yes

MaD—Myoma fine sand, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: hkw4
Elevation: -200 to 1,800 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 to 75 degrees F
Frost-free period: 270 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Myoma and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myoma

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind blown sandy alluvium

Typical profile

H1 - 0 to 18 inches: fine sand
H2 - 18 to 60 inches: sand

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R031XY007CA - Lacustrine Basin and Large RIver Floodplain
Hydric soil rating: No

Minor Components

Coachella

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed, calcareous soils

Percent of map unit: 5 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Channels
Hydric soil rating: Yes

Carsitas

Percent of map unit: 2 percent
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

RCFC & WCD
HYDROLOGY MANUAL

RUNOFF INDEX NUMBERS FOR PERVIOUS AREAS

PLATE E-6.1 (1 of 2)

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

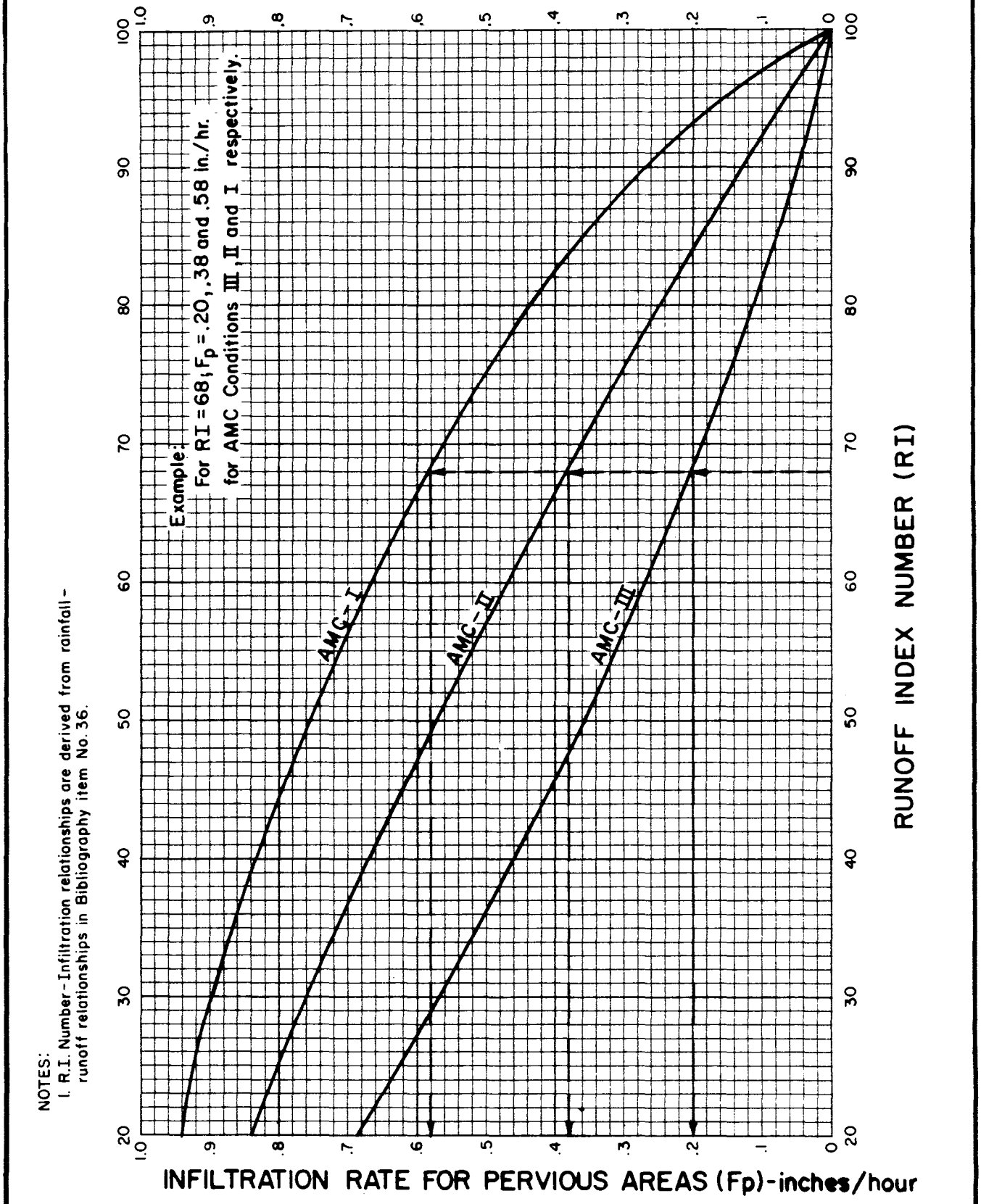
1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.

2. Quality of cover definitions:
   Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.

3. See Plate C-2 for a detailed description of cover types.

4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.

5. Reference Bibliography item 17.



NOTES:
1. R.I. Number-Infiltration relationships are derived from rainfall-runoff relationships in Bibliography item No. 36.

RCFC & WCD

HYDROLOGY MANUAL

INFILTRATION RATE FOR PERVIOUS AREAS VERSUS RUNOFF INDEX NUMBERS

PLATE E-6.2

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent(2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. (½ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.

3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

RCFC & WCD
HYDROLOGY MANUAL

IMPERVIOUS COVER FOR DEVELOPED AREAS

PLATE E-6.3

APPENDIX C2

JURISDICTIONAL DELINEATION REPORT

PRELIMINARY JURISDICTIONAL DELINEATION REPORT
FOR
GREEN DAY VILLAGE SPECIFIC PLAN
PROJECT NO. 7129
CITY OF DESERT HOT SPRINGS
RIVERSIDE COUNTY, CA



Prepared for:

Prepared for: **LA World Construction** 2029 Century Park East, Ste. 400 Century City, CA 90067	***In Support of the CEQA Analysis Prepared for:*** **City of Desert Hot Springs** 11999 Palm Drive Desert Hot Springs, CA 92240

Prepared by:

UltraSystems Environmental Inc.
16431 Scientific Way
Irvine, CA 92618
Phone: (949) 788-4900
Fax: (949) 788-4901

July 2022
Revised November 2022

This page intentionally left blank.

TABLE OF CONTENTS

List of Abbreviations and Acronyms ..... **iii**

Executive Summary **1**

1.0 Introduction **1-1**
1.1 Project Location 1-1

2.0 Project Description **2-1**

3.0 Regulatory Framework **3-1**
3.1 Federal 3-1
3.2 State 3-3

4.0 Methodology **4-1**

5.0 Data Review Results **5-1**
5.1 Climate and Hydrological Data 5-1
5.2 Soils 5-1
5.3 National Wetland Inventory 5-2
5.4 Land Use 5-3
5.5 Local Hydrology 5-3

6.0 Field Investigation Results **6-1**
6.1 Vegetation 6-1
6.2 Ephemeral Drainages and Associated Jurisdictional Features OnSite 6-2
6.2.1 Ephemeral Drainage D1 and Associated Jurisdictional Areas 6-2
6.2.2 Ephemeral Drainage D2 6-2
6.2.3 Ephemeral Drainage D3 6-3
6.2.4 Ephemeral Drainage D4 and Associated Jurisdictional Area 6-3
6.2.5 Ephemeral Drainage D5 6-4
6.3 Desert Playa 6-4
6.4 Observed Jurisdictional Status 6-5

7.0 Potential Impacts of the Project **7-1**
7.1 Permanent Impacts 7-1
7.2 Temporary Impacts 7-2

8.0 Potential Federal, State, and Local Biological Permits and Approvals **8-1**

9.0 Literature Cited and References **9-1**

TABLES

Table 5.1-1 - Temperature and Precipitation Statistics for Riverside Fire Station No. 3 (1893 - 2012) 5-1
Table 5.2-1 - Summary of Soil Mapping Units 5-2
Table 5.3-1 - NWI Attributes of R4SBA Wetlands 5-2

Table 6.0-1 - Total Project Acreage of Potential Impacts to Jurisdictional Waters 6-1
Table 6.2-1 – Summary of Attributes of Onsite Jurisdictional Features 6-1

APPENDICES

Appendix A Figures
- *Figure 1: Regional Overview*
- *Figure 2: Project Vicinity*
- *Figure 3: Project Boundary and Biological Study Area (BSA)*
- *Figure 4: USGS Topographic Map: Desert Hot Springs Quadrangle*
- *Figure 5: Management Plan and Land Designation Areas*
- *Figure 6: CVMSHCP Conservation Areas and Corridors and Linkages*
- *Figure 7: USDA Soils*
- *Figure 8: USFWS National Wetlands Inventory*
- *Figure 9: USGS Surface Waters and Watersheds*
- *Figure 10: Jurisdictional Waters*
- *Figure 11: Land Cover Types*

Appendix B Project Drawings
Appendix C Site Photographs
Appendix D Climate Data
Appendix E Soils Report
Appendix F Field Data Sheets
Appendix G Plant and Wildlife Species Observed
Appendix H Percolation Testing
Appendix I Drainage Study

LIST OF ABBREVIATIONS AND ACRONYMS

Acronym/Abbreviation	Term
BMPs	best management practices
BSA	Biological Study Area
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CWA	Clean Water Act
District	Riverside County Flood Control & Water Conservation District
EPD	Environmental Programs Department
FGC	Fish and Game Code
GIS	Geographic Information System
GPS	Global Positioning System
HMMP	Habitat Mitigation and Monitoring Plan
LSA	Lake or Streambed Alteration
NHD	National Hydrography Dataset
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NWI	National Wetlands Inventory
OHWM	ordinary high water mark
PCN	Pre-Construction Notification
Porter-Cologne	Porter-Cologne Water Quality Control Act
project	Green Day Village Specific Plan
Rapanos	*Rapanos* vs. *United States* and *Carabell* vs. *U.S. Army Corps of Engineers*
RWQCB	Regional Water Quality Control Board
SAA	Streambed Alteration Agreement
SWANCC	*Solid Waste Agency of Northern Cook County* vs. *United States Army Corps of Engineers*
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
U.S.C.	United States Code
USACE	United States Army Corps of Engineers
USACE Manual	*Corps of Engineers Wetlands Delineation Manual*
UltraSystems	UltraSystems Environmental Inc.
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WCD	Water Conservation District
WDRs	Waste Discharge Requirements

Acronym/Abbreviation	Term
WQC	Water Quality Certification
MSHCP	Coachella Valley Multiple Species Habitat Conservation Plan
WRCC	Western Regional Climate Center
§	Section
§§	Sections

EXECUTIVE SUMMARY

UltraSystems Environmental Inc. (UltraSystems) prepared this jurisdictional delineation report for the proposed Green Day Village Specific Plan (project), located in the City of Desert Hot Springs, Riverside County, California.

UltraSystems biologists conducted a jurisdictional assessment and delineation of the project site and the immediate area surrounding the site. The survey was conducted to determine the presence and extent of federal or state wetlands, waters, and habitats that are potentially subject to the jurisdictional authority of the United States Army Corps of Engineers (USACE), the California State Water Resources Control Board (SWRCB) as represented by the Colorado River Basin Regional Water Quality Control Board (RWQCB), and the California Department of Fish and Wildlife (CDFW). Although the project is within the plan area of the Coachella Valley Multiple Species Habitat Conservation Plan and Natural Community Conservation Plan (hereby referred to as the "MSHCP"), which provides protections for various biological resources within the plan area, regulation of jurisdictional waters (including wetlands) is deferred to regulatory agencies such as RWQCB and CDFW.

Prior to conducting the jurisdictional delineation, UltraSystems biologists first conducted a reconnaissance-level field survey of the biological resources potentially associated with the project site and within a zone 500 feet out from the project site; these define the Biological Study Area (BSA). The BSA includes all areas that could potentially be directly, indirectly, or cumulatively impacted by the project. This survey confirmed the potential presence of federal and/or state waters and habitats located within the BSA.

On March 5 and 6 and May 26 and 27, 2022, five ephemeral drainages, three associated swales, an associated desert riparian wash, and an isolated playa were assessed for jurisdictional status and determined to be waters of the State. The project is anticipated to have significant impacts to all of these onsite waters of the State.

Upon consultation with RWQCB and CDFW, and prior to project construction, the project proponent may need to obtain the following federal and state biological permits, certifications, agreements, and/or approvals:

- Clean Water Act § 401 Water Quality Certification (WQC) from the RWQCB,
- California Fish and Game Code § 1602 Lake or Streambed Alteration Agreement (LSAA) with CDFW

1.0 INTRODUCTION

UltraSystems prepared this jurisdictional delineation report for the proposed Green Day Village Specific Plan (project) located in City of Desert Hot Springs, Riverside County, California. The project proposes the construction of housing units and other commercial and recreational spaces on the approximately 38.34-acre site. The project includes the development of 612 residential units in addition to associated community and recreational facilities, parking areas, and commercial facilities. Some of the proposed amenities include a community center, five community pool houses, a farm equipment building, and four farming areas. Proposed commercial spaces in the eastern part of the project site include medical offices, food services, and retail facilities.

UltraSystems biologists conducted a jurisdictional assessment and delineation of the project site and the immediate area surrounding the site. The survey was conducted to determine the presence and extent of waters and habitats that are potentially subject to the jurisdictional authority of the USACE, the Colorado River Basin Region of RWQCB, CDFW, and the MSHCP. This report documents the methods and results of the survey and provides an analysis of the potential impacts to jurisdictional areas from site construction and development in view of federal and state laws and regulations. The results presented in this report are preliminary since the USACE, RWQCB, and CDFW will make the final determination of jurisdiction in accordance with their regulatory authority. Finally, the report recommends, as appropriate, BMPs to minimize or avoid potential impacts to less than significant levels. The report was prepared based upon results of a literature review and field survey, and the report will support permits required by the project from federal and state resource agencies.

1.1 Project Location

The project site is located within the City of Desert Hot Springs in Riverside County, California (Google Earth, 2022; **Appendix A**, Figure 1*: Regional Overview*, Figure 2: *Project Vicinity*, and Figure 3, *Project Boundary and Biological Study Area*). The project site is located on the United States Geological Survey (USGS) 7.5-Minute Topographic Map *Desert Hot Springs* Quadrangle, within Township 3S, Range 5E, and Section 18 (**Appendix A**, Figure 4: *USGS Topographic Map*). The approximate center of the project site is located at latitude 33°54'44.98"N°, longitude 116°30'15.45"W°. The project site is generally between 745 to 764 feet above mean sea level, from north to south, respectively.

Access to the project site is provided from Interstate 10 (I-10). The northeast corner of the property is located west of Palm Drive and approximately 0.25 mile south of 18th Avenue, in the City of Desert Hot Springs. It is located approximately 1.1 miles northeast of I-10 (Google Earth, 2022). The alignment is assigned Assessor's Parcel Number 657-280-003.

The project is located in an area that contains primarily undeveloped open space. Land uses surrounding the project site include open space, rural residential developments, and a golf club to the east. The San Bernardino National Forest is located to the northwest and southwest of the project. Coachella Valley Preserve is approximately 8.2 miles southeast from the project (Google Earth, 2022), and the Willow Hole Conservation Area abuts the western border of the project site.

The project site is located within the MSHCP boundary; however, it does not fall within any MSHCP Conservation Areas, wildlife movement corridors or linkages, which are areas that receive greater protection under the MSHCP (**Appendix A**, Figure 5: *Management Plan and Land Designation Areas*, and Figure 6, *CVMSHCP Conservation Areas and Corridors and Linkages*).

The project site is under the jurisdiction of the following resource agency field offices:

- **USACE - Los Angeles District**
  915 Wilshire Blvd., Suite 980
  Los Angeles, CA 90017
  Phone: (213) 452-3908/3333
  Fax: (213) 452-4209

  United States Fish and Wildlife Service (USFWS): Palm Springs Fish and Wildlife Office (as part of the Carlsbad Fish and Wildlife Office)
  777 E. Tahquitz Canyon Way, Suite 208
  Palm Springs, CA 92262
  Phone: (760) 322-2070

  Coachella Valley Conservation Commission (CVCC)
  73710 Fred Waring Drive, #200
  Palm Desert, CA 92260
  Phone: (760) 346-1127

- **RWQCB – Colorado River Basin Region (Region 7)**
  73-720 Fred Waring Drive, Suite 100
  Palm Desert, CA 92260
  Phone: (760)346-7491

- **CDFW - Inland Desert Region 6 [**Heather Pert, Joanna Gibson, Carly Beck, Eric Chan]
  3602 Inland Empire Boulevard, Suite C-220
  Ontario, CA 91764
  Phone: (909) 484-0167
  Fax: (909) 481-2945

2.0 PROJECT DESCRIPTION

The project proposes the construction of housing units and other commercial and recreational spaces on the approximately 30.34-acre site. The project includes the development of 612 mixed-use residential, duplex residential and 6-plex residential units in addition to recreational and commercial facilities. Refer to **Appendix B**, *Project Drawings (Site Plan*), for detailed plans of the proposed project. Some of the proposed amenities include tennis and basketball courts, community pool, and walking trail. Proposed commercial spaces include medical offices, food services, and retail.

3.0 REGULATORY FRAMEWORK

Each project must comply with federal, state, and local environmental laws, regulations, ordinances, and policies. These provide a potential regulatory constraint to development and construction and are the regulatory drivers that require biological and water resource surveys and associated permits. This section summarizes the major applicable federal and state laws that apply to protecting jurisdictional wetlands, waters, water quality, water quantity, and aquatic/riparian habitats from impacts from the projects and which may be relevant and applicable to the project.

In California, the USACE, RWQCBs, and CDFW regulate activities within inland streams, coastal streams, wetlands, and other waters. These agencies enforce the many federal and state laws, regulations, and policies that prevent further impacts to jurisdictional wetlands and waters. The USACE regulates the discharge of dredged or fill material in Waters of the United States (waters of the U.S.) (defined below) pursuant to Section 404 of the federal Clean Water Act (CWA). The RWQCBs regulate activities pursuant to Section 401(a)(1) of the CWA. The RWQCBs also have jurisdiction over waters of the State (defined below) under the Porter-Cologne Water Quality Control Act (Porter-Cologne). CDFW regulates water resources under Sections (§§) 1600-1616 of the California Fish and Game Code (FGC).

3.1 Federal

Section 401 Clean Water Act. Pursuant to § 401 of the CWA, a water quality certification is required for § 404 activities. The USEPA has empowered the California SWRCB and its nine Regional Water Quality Control Boards (RWQCB) to certify that 404 discharges comply with federal and state water quality standards and ensure that there is no net loss of wetlands through impact avoidance, minimization, and mitigation. The Colorado River Basin Regional Water Quality Control Board (Region 7) will provide review and water quality certification services for this project.

Section 404 Clean Water Act. Section 404 CWA requires authorization from the Secretary of the Army, acting through the Corps of Engineers, for the discharge of dredged or fill material into all waters of the United States, including wetlands. Authorizations are conducted through the issuance of Nationwide (or General) Permits, for activities that would cause only minimal permanent individual (between 0.1 and 0.5 acre) and cumulative impacts; through Individual (or Standard) Permits for activities that are likely to have more than a minimal permanent (greater than 0.5 acre) or cumulative impact to aquatic resources; and through Letters of Permission (LOPs) which are a type of individual permit issued through an abbreviated process that includes coordination with federal and state fish and wildlife agencies and a public interest evaluation, but without the 30-day permit notice period that is required for Individual Permits. The Los Angeles District of the USACE will provide review and permitting services for this project.

The USEPA and USACE are in receipt of the U.S. District Court for the District of Arizona's August 30, 2021, order vacating and remanding the Navigable Waters Protection Rule in the case of Pascua Yaqui Tribe v. U.S. Environmental Protection Agency. Consequently, the agencies have halted implementation of the Navigable Waters Protection Rule ("NWPR") nationwide and are interpreting "waters of the United States" consistent with the pre-2015 regulatory text until further notice.

On November 18, 2021, the EPA and USACE announced the ruling to revise the definition of "waters of the United States.", and will now implement the pre-2015 definition of "waters of the United States," updated to reflect consideration of Supreme Court decisions. This familiar approach would support a stable implementation of "waters of the United States" while the EPA and USACE continue to consult with states, tribes, local governments, and a broad array of stakeholders in both the current implementation and future regulatory actions.

The agencies are interpreting "waters of the United States" consistent with the pre-2015 regulatory regime until further update.

40 CFR 230.3(s)

- *All waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide*

- *All interstate waters including interstate wetlands;*

- *All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate or foreign commerce including any such waters: a) Which are or could be used by interstate or foreign travelers for recreational or other purposes; b) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or which are used or could be used for industrial purposes by industries in interstate commerce*

- *All impoundments of waters otherwise defined as waters of the United States under this definition*

- *Tributaries of waters identified above*

- *The territorial sea*

- *Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (s)(1) through (6) of this section; waste treatment systems, including treatment ponds or lagoons designed to meet the requirements of CWA (other than cooling ponds as defined in 40 CFR 423.11(m) which also meet the criteria of this definition) are not waters of the United States*

Wetlands and other waters that do not meet the definition of waters of the U.S. are not covered by the CWA; however, they are regulated by the State of California though the Porter-Cologne Water Quality Control Act (Porter-Cologne) and SWRCB Resolution No. 2019-0015 for California (see **Section 3.2**).

3.2 State

Porter-Cologne Water Quality Control Act. The Porter-Cologne Water Quality Control Act (Porter-Cologne) defines "water quality objectives" as the allowable "*limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisances within a specific area*." Thus, water quality objectives are intended to protect the public health and welfare, and to maintain or enhance water quality in relation to the existing and/or potential beneficial uses of the water. Water quality objectives apply to both waters of the U.S. and waters of the State. In the State of California, the Porter-Cologne Water Quality Control Act is administered in concurrence with the § 401 CWA Water Quality Certification. As with § 401 CWA, the Colorado River Basin RWQCB will provide review and water quality certification for Porter-Cologne.

State Water Resources Control Board Resolution No. 2019-0015. The California Code of Regulations, title 23, Section 3831(w) states that "[a]ll waters of the United States are also 'waters of the state.'" This regulation has remained in effect despite Supreme Court decisions such as *Rapanos* and *SWANCC*, which added limitations to what could be considered a water of the U.S. Because the interpretation of waters of the U.S. in place at the time § 3831(w) was adopted was broader than any post-*Rapanos* or post-*SWANCC* regulatory definitions that incorporated more limitations into the scope of federal jurisdiction, it is consistent with the Water Boards' intent to include both historic and current definitions of waters of the United States into the SWRCBs wetland jurisdictional framework.

As set forth in Resolution No. 2009-0026, although the state of California has historically relied primarily on requirements in the Clean Water Act to protect wetlands, U.S. Supreme Court rulings reducing the jurisdiction of the Clean Water Act over wetland areas by limiting the definition of "waters of the United States" necessitated the use of California's independent authorities under the Porter-Cologne Act to protect these vital resources.

The inclusion of both current and historic definitions of "waters of the U.S." ensures some regulatory stability in an area that has otherwise been in flux. The status of a water of the U. S. may only be used to establish that a wetland or water qualifies as a water of the State; it cannot be used to exclude a wetland or water from qualifying as a water of the State. In other words, wetlands that are categorically excluded from qualifying as a water of the U.S. may nevertheless qualify as waters of the State under another jurisdictional category. Examples of waters of the State include (but are not limited to: ephemeral streams, streams, rivers, lakes, wetlands, mudflats, vernal pools, and other aquatic sites and isolated wetlands.

On April 2, 2019, the SWRCB adopted **Resolution No. 2019-0015**, *Amendment to the Water Quality Control Plan for Ocean Waters of California and the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California to Establish a State Wetland Definition and Procedures for Discharges of Discharges of Dredged or Fill Material to Waters of the State* (Procedures). for inclusion in the forthcoming Water Quality Control Plan for Inland Surface Waters and Enclosed Bays and Estuaries and Ocean Waters of California. As they apply to this project, the Procedures provide the SWRCB and its nine RWQCBs to approve a project only if the applicant has demonstrated the following:

- A sequence of actions has been taken to first avoid, then to minimize, and lastly, compensate for adverse impacts that cannot be practicably avoided or minimized to waters of the state;

- The potential impacts will not contribute to a net loss of the overall abundance, diversity, and condition of aquatic resources in a watershed (or multiple watersheds when compensatory mitigation is permitted in another watershed);

- The discharge of dredged or fill material will not violate water quality standards and will be consistent with all applicable water quality control plans and policies for water quality control; and

- The discharge of dredged or fill material will not cause or contribute to significant degradation of the waters of the state.

The SWRCB and the RWQCBs have the authority to regulate the discharge of dredged or fill material under § 401 CWA and Porter-Cologne. When a discharge is proposed to waters outside of federal jurisdiction, the SWRCB and the RWQCBs regulate the discharge under Porter-Cologne through the issuance of Waste Discharge Requirements (WDRs). CWA § 401 Water Quality Certifications, WDRs, and waivers of WDRs are referred to as orders or permits.

The Colorado River Basin RWQCB (Region 7) will provide review and certification/permitting for this project.

Basin Plans. The SWRCB requires its nine RWQCBs to develop water quality control plans (Basin Plans) designed to preserve and enhance water quality and protect the beneficial uses of all Regional waters. Specifically, Basin Plans designate beneficial uses for surface waters and groundwater, set narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the State antidegradation policy, and describe implementation programs to protect all waters in the Regions. In addition, Basin Plans incorporate by reference all applicable State and Regional Board plans and policies, and other pertinent water quality policies and regulations. This project is under the jurisdiction of the Colorado River Basin RWQCB.

Construction Stormwater Program. The SWRCB implements water quality regulations under the federal CWA and California Porter-Cologne Water Quality Control Act and require compliance with the National Pollutant Discharge Elimination System (NPDES) for discharges of stormwater runoff associated with a construction activity.

Dischargers whose projects disturb one acre or more of soil are required to obtain coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (Construction General Permit, 2009-009-DWQ, as amended). Construction Activity subject to this permit includes clearing, grading, and disturbances to the ground such as stockpiling or excavation, but does not include regular maintenance activities performed to restore the original line, grade, or capacity of the facility.

The Construction General Permit requires the development and implementation of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP should contain a site map(s) which shows the construction site perimeter, existing and proposed buildings, lots, roadways, stormwater collection and discharge points, general topography both before and after construction, and drainage patterns.

The SWRCB will provide Construction General Permit review and permitting for this project.

Lake or Streambed Alteration Agreement. Sections 1600-1616 FGC of the FGC protect the natural flow and the bed, channel, and bank of any river, stream, or lake designated by the CDFW which is at

any time an existing fish or wildlife resource, or a waterbody from which these resources derive benefit. General project plans must be submitted to CDWF in sufficient detail to indicate the nature of the project proposed for construction, if the project would:

- Divert, obstruct, or change a streambed;
- Use material from the streambeds;
- Result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a stream.

The Inland Deserts Region (Region 6) of the CDFW serves Riverside County and will provide LSA Notification Review and Agreement services for this project.

4.0 METHODOLOGY

Prior to conducting the onsite field investigation, a review of readily available data relevant to the project was performed and the results were compiled from federal, state, and regional agency websites, databases, and management plans; aerial imagery, USGS topographic maps, National Wetland Inventory (NWI) maps, data from the U.S. Environmental Protection Agency's Watershed Assessment, Tracking, & Environmental Results System (WATERS), and Natural Resources Conservation Service (NRCS) soil surveys to determine areas of potential USACE, RWQCB, and CDFW jurisdiction, e.g. the location of any potential waters of the U.S. and State, including wetlands. UltraSystems biologist Matthew Sutton then conducted a reconnaissance-level field survey of the biological resources potentially associated with the project site and within a zone 500 feet out from the project site; these define the BSA (**Appendix A**, Figure 3, *Project Boundary and Biological Study Area [BSA]*). The BSA includes all areas that could potentially be directly, indirectly, or cumulatively impacted by the project.

Areas of potential jurisdiction to the USACE were evaluated and delineated in accordance with the methodology set forth in the USACE 1987 *Wetland Delineation Manual* (*Manual*; Environmental Laboratory, 1987), The *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (*Arid West Supplement*; 2008; Wakely et al., 2008), *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual* (Lichvar and McColley, 2008), and *the Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (*OHWM Supplement*; 2010; Curtis and Lichvar, 2010). Only those potentially jurisdictional features in and along the bed and banks near the project impact area and within a 500-foot buffer that comprised the Biological Study Area (BSA) were investigated and delineated.

On March 5, 2022 UltraSystems biologist Matthew Sutton conducted a survey of potentially jurisdictional features within the project site and continued their survey 500 feet upstream and downstream of the project footprint. Wetlands and other waters of the U.S. and State that are located outside of this segment of the BSA and not within known or anticipated areas of project-related ground disturbance will not be affected by the project and were therefore, not delineated. Results of the delineation surveys are provided in **Section 6.0**.

On March 5 through 6 and May 26 through 27, 2022, Mr. Sutton conducted a jurisdictional delineation survey within the project area and BSA. Representative photographs of the project site taken during the field surveys can be found in **Appendix C**, *Site Photographs*.

Mr. Sutton also used field guides, topographic maps, and aerial maps (scale is one inch = approximately 100 feet) during the field survey to assist in identifying and characterizing physical features. In addition, Mr. Sutton used a Global Positioning System (GPS) unit and other GIS and survey-related techniques, hardware and software to collect data and populate any attributes required by the relevant agencies. Digital color photographs were taken during the field survey to record existing site conditions.

The project site was surveyed to determine the presence and extent of waters and wetlands subject to jurisdiction of the United States Army Corps of Engineers (USACE), Regional Water Quality Control Board (RWQCB), and/or CDFW within the BSA; however, these agencies make the final determination of jurisdiction in accordance with their regulatory authority. Mr. Sutton also noted the surrounding environment, topography, land uses, substrates, and vegetation within and adjacent to each drainage. At each potential jurisdictional area, Mr. Sutton searched for the presence of wetland

hydrology, hydric soils, hydrophytic vegetation, signs of an OHWM, the presence of a well-defined bed and bank, and evidence of recent water flow and areas of scour. All drainages identified in the BSA were examined for connectivity, or lack of connectivity, to larger drainages. Vegetation along the drainages was also identified and any potential indicators of wetland conditions were recorded on data sheets and in field notes. Each potential jurisdictional area was assigned a name/number for identification.

The drainage boundaries and jurisdictional areas were delineated using a hand-held GPS unit and/or marked on aerial maps to map the observed OHWM (federal) and bank with associated riparian vegetation (state) on each side of the drainages. Widths were estimated when access was not possible. Width measurements were collected where the channel or associated vegetation width appeared to change. Following the field mapping, UltraSystems GIS staff digitized the jurisdictional boundaries into an ArcGIS file. GIS lengths, widths, acreages, and boundaries for each agency's jurisdiction were then calculated.

5.0 DATA REVIEW RESULTS

5.1 Climate and Hydrological Data

Desert Hot Springs has a hot-arid climate with very little precipitation during the summer months. Most precipitation falls between November and March. Arid climates tend to support sparse, scrubby vegetation. The closest historical climate data station to the project site is US COOP Station 046635 in the City of Palm Springs, California. and it is located approximately 7 miles south of the project site. Based on the monthly climate summary data from the Palm Springs US COOP station, the region near the project site generally receives 5.49 inches of rain per year. Snowfall is 0 inches. The July average maximum temperature is 108.2 degrees Fahrenheit (°F) and the January low is 42.3 degrees Fahrenheit (°F) (WRCC, 2022)[see **Appendix D**, *Climate Data*].
Monthly temperature and precipitation averages and extremes recorded at this station 2006 to 2022 are presented in **Table 5.1-1** (WRCC, 2022).

Table 5.1-1
TEMPERATURE AND PRECIPITATION STATISTICS FOR PALM SPRINGS STATION 046635 (1927-2005)

Calendar Month	Monthly Averages			
	Temperature (°F)			Precipitation (inches)
	Max	Min	Mean	Mean
January	69.9	42.3	56.1	1.14
February	73.7	45.6	59.6	1.02
March	79.3	48.8	64.05	0.59
April	86.7	54.1	70.4	0.17
May	94.5	60.4	77.5	0.05
June	103.0	67.0	85.0	0.06
July	108.2	75.2	91.7	0.20
August	106.8	74.3	90.6	0.30
September	101.7	68.1	84.9	0.34
October	91.4	59.4	75.4	0.26
November	78.7	49.2	64.0	0.47
December	69.8	42.3	56,0	0.93
Annual	**88.6**	**57.2**	**72.9**	**5.53**

5.2 Soils

Based on the USDA NRCS Web Soil Survey for Riverside County, Coachella Valley Area, California (Soil Survey Staff 2022), the BSA contains two soil map units (shown in **Appendix A**, Figure 7: *USDA Soils*, and described in **Appendix E**, *Soils Report*), which are presented in **Table 5.2-1**, *Soils Mapped Within the BSA*. Both mapped soil units are listed on the State Soil Data Access Hydric Soils List (USDA-NRCS 2022a).

Table 5.2-1
SUMMARY OF SOIL MAPPING UNITS

Name	Symbol	Ecological Site	Hydric Status	Acreage in BSA
Myoma fine sand, 0 to 5 percent slopes	MaB	Lacustrine Basin and Large River Floodplain	Hydric	101.2
Myoma fine sand 5 to 15 percent slopes	MaD	Lacustrine Basin and Large River Floodplain	Hydric	16.3
			Total	**117.5**

5.3 National Wetland Inventory

The U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) has mapped freshwater ponds within the golf club property located east of the project site and at some residential developed areas located southwest of the intersection of Dillon Road and Mountain View Road. These freshwater ponds are artificial water features located approximately 0.6 mile east and northeast of the project site. In addition, there is an NWI-mapped riverine area located approximately 0.25 mile east from the project site. This Riverine area does not occur within the BSA (see **Appendix A**, Figure 8: *National Wetlands Inventory*).

Neither freshwater ponds, riverine, nor other wetlands were mapped within the BSA or the project site.

Multiple *Riverine* areas have been mapped in the project vicinity by the NWI. The NWI has not mapped any of the jurisdictional features that were surveyed.

The NWI describes these areas as Riverine wetland (R4SBA). The Riverine System and individual attributes (i.e., 4, S, B, and A) are described in **Table 5.3-1.**

Table 5.3-1
NWI ATTRIBUTES OF R4SBA WETLANDS

Classification	Code	Description
System **Riverine**	**R**	All wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts of 0.5 ppt or greater. A channel is an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water.
Subsystem **Intermittent**	**4**	Includes channels that contain flowing water only part of the year. When the water is not flowing, it may remain in isolated pools or surface water may be absent.
Class **Streambed**	**SB**	Includes all wetlands contained within the Intermittent Subsystem of the Riverine System and all channels of the Estuarine System or of the

		Tidal Subsystem of the Riverine System that are completely dewatered at low tide.
Water Regime **Temporary Flooded**	**A**	Surface water is present for brief periods (from a few days to a few weeks) during the growing season, but the water table usually lies well below the ground surface for the most of the season.

5.4 Land Use

The project is located in the Sonoran Basin and Range Major Land Resource Area (MRLA) Region 40 of the Western Range and Irrigated Region (USDA NRCS, 2022b). MRLAs are geographically associated land resource units delineated by the Natural Resources Conservation Service and are the basic units for delineating statewide patterns of soils, climate, water resources, and land use by analyzing elevations, topography, and rainfall data (effective amount, timing, kind, and distribution).

Most of Region 40 is open desert. The majority of this MLRA is used for rangeland. Less than 10 percent of this MLRA is developed. Agricultural lands are concentrated along three major rivers, Colorado, Santa Cruz, and Gila, and represent less than 10 percent of this MLRA. Major concerns within this MLRA regarding croplands is insufficient water due to inefficient irrigation. Other factors affecting agriculture include degradation of water quality in the croplands due to excessive salts in surface water and ground water, air pollutants, soil erosion due to wind and water erosion caused by irrigation practices. The dominant factor affecting rangeland practices is reduced livestock production due to inadequate water and forage.

The project site is bounded by open space to north, west and south and by Palm Drive to the east. There is a golf club located east of the project site on the eastern side of Palm Drive.

5.5 Local Hydrology

The project site is located on an alluvial fan within the Morongo Wash hydrologic unit (HU; HU Code 181002010404) which drains approximately 34.9 miles. The Morongo Wash HU is contained within the larger Whitewater River hydrologic unit (HU; HU Code 18100201), which drains approximately 1,645 square miles.

Surface waters in the project area flow south and through the project vicinity (see **Appendix A**; Figure 9, *Surface Waters and Watersheds*) to the Coachella Valley Stormwater Channel. The surface waters continue to flow southeast to the Salton Sea, which is a terminal lake with no outlet to the ocean. Water entering the Salton Sea can only depart through evaporation.

A groundwater monitoring well (CASGEM Well ID: 50683) located along Little Morongo Road, approximately 0.47 mile north of 20th Avenue ,which recorded a groundwater depth of 220.9 feet below ground surface on June 20, 2022 (CASGEM 2022).

.

6.0 FIELD INVESTIGATION RESULTS

The field investigation resulted in the delineation of ten water features within the project site; five ephemeral drainages, a desert riparian wash and three swales associated with these ephemeral drainages, and an isolated desert playa. (see **Appendix A**, Figure 10, *Jurisdictional Waters*). Refer to **Appendix F**, *Field Data Sheets*, for field observations of each jurisdictional feature.

The combined potential impacts of waters under the jurisdictions of the RWQCB and CDFW resulting from construction of the project are summarized in **Table 6.0-1**. The extent of the aforementioned jurisdictional waters within the project site are shown in **Appendix A**, Figure 10, *Jurisdictional Waters*.

Table 6.0-1
TOTAL ACREAGE OF POTENTIAL IMPACTS TO JURISDICTIONAL WATERS

Agency Jurisdiction	Total in Project Area	Total Permanent Impact Acreage	Total Temporary Impact Acreage	Total Impact Acreage
Waters of the State (RWQCB/CDFW - Drainage)	0.49	0.49	0	**0.49**
Waters of the State (RWQCB – Swale)	0.25	0.25	0	**0.25**
Waters of the State (RWQCB/CDFW – Playa)	0.19	0.19	0	**0.19**
Waters of the State (RWQCB/CDFW – Desert Riparian)	1.00	1.00	0	**1.00**
Total Waters of the State (RWQCB)	1.93	1.93	0	1.93
Total Waters of the State (CDFW)	1.68	1.68	0	1.68

The jurisdictional areas include the following ephemeral drainages and associated swales.

6.1 Vegetation

The dominant vegetation type throughout the project site is creosote bush – white bursage scrub (*Larrea tridentata – Ambrosia Dumosa* shrubland alliance), based on *A Manual of California Vegetation, Second Edition* (Sawyer et al., 2009). The dominant species within this plant community are two desert shrub species: creosote bush (*Larrea tridentata*) and white bursage (*Ambrosia dumosa*). Several annual forbs and grasses such as Sahara mustard (*Brassica tournefortii*), Fremont pincushion (*Chaenactis fremontii*), desert dandelion (*Malacothrix glabrata*), and old han schismus (*Schismus barbatus*) occur in the intercanopy of the sparsely distributed shrubs and at low cover within the onsite drainages, swales, and playa during the wet season (Baldwin et al., 2012).

Vegetation within the various jurisdictional features includes species typical of creosote bush – white bursage scrub; however, the density of shrubs is much lower in ephemeral drainages and depressions such as swales and the playa observed onsite. The fourwing saltbush scrub (*Atriplex canescens* shrubland alliance; Sawyer et al., 2009) vegetation alliance occurs in a desert riparian wash; this alliance has a species assemblage that is more mesophytic than the other vegetated areas onsite. This desert riparian wash is described in more detail in **Section 6.2**. Refer to **Appendix G,** *Plant and Wildlife Species Recorded During the Field Surveys* for a list of plant and wildlife species observed.

6.2 Ephemeral Drainages and Associated Jurisdictional Features OnSite

The following ten jurisdictional areas were identified on the project site: five drainages, three swales, a desert riparian wash, and a playa. **Table 6.2-1** summarizes the attributes of each of the ten jurisdictional areas; attributes include characteristics such as width, linear feet, acreage, and other identifying characteristics of each of these jurisdictional areas. Each jurisdictional area is described below in this section. The OHWM and the top of the bank delineations were determined to be equivalent throughout the extent of all five onsite drainages. The main indicators used to delineate the OHWM was a change in vegetation from annual plants to shrubs, a change in vegetation density from less than 1 percent to higher cover, a distinct break in the bank's slope, and soil color. Potential permanent and temporary impacts to waters of the State (RWQCB and CDFW) are provided in **Table 6.0-1.**

6.2.1 Ephemeral Drainage D1 and Associated Jurisdictional Areas

Ephemeral Drainage D1 **(D1)** meets the definition of a water of the State as set forth in §§1602 – 1616 FGC, and the Procedures**.**

Drainage D1 receives its waters primarily from the project site's eastern boundary, approximately 550 feet north of the southern boundary, where stormwater overflows the roadway berm of Palm Drive (see **Appendix A**, Figure 10, *Jurisdictional Waters*). In the upstream portion of D1, water flows southward for approximately 200 feet before dispersing into a discontinuous channel that flows southwesterly for approximately 250 feet until reaching the northern base of a partially stabilized dune, which is located in the southwest corner of the project site. The drainage then flows around the base of the dune, first westerly, then southerly, until it reaches the southern border of the project site (see **Appendix A**, Figure 10, *Land Cover Types* for the location of the dune). At this southern junction, the channel flow abruptly turns westward and continues along the southern border for approximately 400 feet until it intersects with drainage D5, which flows eastward, in the opposite direction of D1's flow. At this point of intersection, both channels combine and the waters then flow southward onto the south-adjacent property. The combined flow of these connected drainages is considered part of D1, the larger of the two intersecting drainages.

The characteristics of D1 are summarized in **Table 6.2-1**. The dimensions of D1 are approximately 1166 linear feet, an average width of ten feet, and an area of 0.28 acre. Drainage D1 is an ephemeral drainage that is a water of the State potentially under the jurisdiction of CDFW and RWQCB.

The following three jurisdictional areas are associated with D1 and are detailed below: a desert riparian wash and two swales, Swale D1S2 and Swale D1S3. All three of these features meet the definition of a waters of the State as set forth in §§1602 – 1616 FGC and the Procedures.

Desert Riparian Wash. There is a desert riparian wash area associated with D1 that occurs in the southeastern segment of the project area. The plant community in this wash area was identified as fourwing saltbush scrub, a plant community described in *A Manual of California Vegetation, second edition* (Sawyer et al., 2009). The fourwing saltbush scrub was keyed to a more specific classification level of *Atriplex canescens* Desert Wash Association (Evens et al., 2020), based on the species composition. This plant community is considered desert riparian because it contains higher cover of mesophytic vegetation, such as fourwing saltbush (*Atriplex canescens*) and cheesebush (*Ambrosia salsola*), than in the surrounding upland areas of the project site. The Desert Wetlands Communities and Species Monitoring Protocols, which was developed to assist reserve managers in protecting wetland habitats within the MSHCP plan area, lists desert saltbush scrub as a wetland (i.e., riparian)

plant community (U.C. Riverside CCB, 2012). Desert saltbush scrub is a plant community based on the Holland (1986) classification system, whose vegetation is most similar to the fourwing saltbush scrub plant community described in Sawyer et al. (2009). The occurrence of the *Atriplex canescens*. Desert Wash Association (i.e., desert saltbush scrub) on the project site meets the identifying features of the wetland type of this habitat in that the water table appears to be high in this wash area based on the wet soils that were observed during the surveys.

Table 6.2-1
SUMMARY OF ATTRIBUTES OF ONSITE JURISDICTIONAL FEATURES

Water Feature Type/Name (Identification Code)	Coordinates		Average Width (Feet)	Linear Feet	Acreage within Project Site	Riparian Drip Line (Feet)	Dominant Vegetation	Potential Jurisdictional Authority
	Latitude	Longitude						
Waters of the State / Ephemeral Drainage (D1)	33.911132	-116.502832	10	1166	0.28	n/a	Sahara mustard, Fremont pincushion, desert dandelion	CDFW/ RWQCB
Waters of the State / Ephemeral Drainage (D2)	33.910599	-116.503271	5	62	0.01	n/a	Sahara mustard	CDFW/ RWQCB
Waters of the State / Ephemeral Drainage (D3)	33.910602	-116.503795	7	110	0.03	n/a	Fremont pincushion, desert dandelion	CDFW/ RWQCB
Waters of the State / Ephemeral Drainage (D4)	33.910880	-116.504932	7	222	0.04	n/a	Fremont pincushion, desert dandelion	CDFW/ RWQCB
Waters of the State / Ephemeral Drainage (D5)	33.910544	-116.505091	10	457	0.14	n/a	Sahara mustard, Fremont pincushion, desert dandelion	CDFW/ RWQCB
Waters of the State / Desert Riparian Wash	33.911394	-116.502119	150	465	1.00	1420	cheesebrush, fourwing saltbush, Sahara mustard, creosote bush	CDFW/ RWQCB
Waters of the State / Swale (D1S2)	33.910985	-116.503536	12	226	0.10	n/a	Sahara mustard, Fremont pincushion, desert dandelion	RWQCB
Waters of the State / Swale (D1S3)	33.910599	-116.502685	40	87	0.12	n/a	creosote bush, white bursage, fourwing saltbush	RWQCB
Waters of the State / Swale (D4S1)	33.911040	-116.505143	28	53	0.03	n/a	Sahara mustard, Fremont pincushion, desert dandelion	RWQCB
Waters of the State / Playa	33.914028	-116.502917	30	179	0.19	n/a	creosote bush, white bursage, fourwing saltbush	CDFW/ RWQCB

Desert riparian wash area occurs at the headwaters of D1 where stormwater runoff from Palm Drive overflows the roadway berm (see **Appendix A**, Figure 10, *Jurisdictional Waters*). This area is located on the north side of the stabilized desert dune. This area consists of a network of micro-channels that flow in a southerly to southwesterly direction until they meet the base of the stabilized desert dune. At this point the waters combine into a main channel, D1, and bend around the dune. The dominant plant species of this swale are fourwing saltbush, Sahara mustard, and creosote bush. This desert riparian habitat meets the definition of a water of the State as set forth in §§1602 – 1616 FGC and the Procedures, and will also be under the jurisdiction of CDFW and the RWQCB.

The characteristics of the desert riparian wash are summarized in **Table 6.2-1**. The riparian dripline around the perimeter of the wash is 1,420 feet. The dimensions of the wash are approximately 465 linear feet, an average width of 150 feet, and an area of 1.00 acre. The desert riparian wash is a riparian feature that is a water of the State potentially under the jurisdiction of CDFW and RWQCB.

This washout area was determined to be a desert riparian wash based on the following:

- First, there is evidence of large pulses of water entering into this wash during storm events. Several sections of the roadway berm have washed out during storm events and a mix of asphalt, rocks and gravel from the roadway margin and berm have been deposited within the wash along the various drainages that formed in these washout areas.

- Second, there is enough water entering into and spreading throughout the wash area to form a defined bed, bank and channel near the southeastern part of the wash, where the wash abuts the base of the stabilized dune and the waters channelize into a singular drainage.

- Third, there was also evidence of moist soils throughout the wash area during the May 2021 surveys, well after the rainy season, indicating that waters inundate this wash area and lead to higher soil moisture levels than in the upland areas of the project site.

- Fourth, there are indicators of repeated inundation and water flow events seen on historic aerial imagery (2006, 2009, 2011, 2013, 2014, 2016, 2017, 2018, 2019, and 2021; Google Earth, 2022).

Another major indication that the plant community in this wash area is a desert riparian plant community is the species assemblage that occurs here. The composition of species in this wash area is distinct from the creosote bush – white bursage scrub community that covers the other vegetated areas of the project site. The plant community in this wash is consistent with the fourwing saltbush scrub. In fact, the species assemblage within the wash can be further categorized to an association level, *Atriplex Canescens* Desert Wash Association (CDFW 2022; Sawyer et al., 2009); the attributes of which are described in reports associated with vegetation surveys conducted in the Lake Mead National Recreation Area (Evens et al., 2014; Evens et al., 2020).

Although the dominant species in fourwing saltbush scrub are not hydrophytic, there were some species observed that occur in USACE's *National Wetland Plant List* (NWPL). The four co-dominant species within the wash are fourwing saltbush, cheesebrush, creosote brush and Sahara mustard. Other native shrubs that occur at low frequency in this wash are bladderpod (*Peritoma arborea*), desert broom (*Baccharis sarothroides*), and white bursage. Native forbs that occur in the wash include California croton (*Croton californicus*), jimsonweed (*Datura wrightii*), Jerusalem thorn (*Parkinsonia aculeata*), desert tobacco (*Nicotiana obtusifolia*), and western ragweed (*Ambrosia psilostachya*). Other non-native forbs and grasses observed in the wash include London rocket (*Sysimbrium irio*),

pigweed (*Amaranthus* sp.), red brome (*Bromus rubens*), and old han schismus. The following plant species had hydrophytic indicators based on USACE's NWPL (USACE, 2020): Jerusalem thorn (FAC[1]), desert broom (FACU[2]), desert tobacco (FACU), and western ragweed (FACU).

Swale D1S2. Swale D1S2 (D1S2) is a low-lying area where stormwater overflow from Drainage D1 collects and briefly pools; soils remain saturated long after rain events. Swale D1S2 is formed when waters flowing through the initial part of D1, which flows through the desert riparian wash, channelize and abruptly turn from an easterly flow to a southerly flow (see **Appendix A**, Figure 10, *Jurisdictional Waters*). Waters overflow the western bank where the channel makes the bend and settle in the low-lying D1S2 area. Sheetflow from the stabilized desert dune located immediately east of the swale appears to also contribute to the formation of D1S2. There are mud cracks in approximately 50 percent of the surface soils of D1S2, indicating that water pools in these areas. Shrub density is also much lower than surrounding upland areas, also indicating pooling water where soil moisture remains too high for a sustained period for xerophytic shrubs to establish.

The characteristics of D1S2 are summarized in **Table 6.2-1**. The dimensions of D1S2 are approximately 226 linear feet, an average width of 12 feet, and an area of 0.10 acre. Swale D1S2 is an ephemeral swale that is a water of the State potentially under the jurisdiction of RWQCB per the Procedures.

Swale D1S3. Swale D1S3 (D1S3) occurs at the southern boundary of the project site where D1 turns sharply from a southerly flow to an easterly flow and proceeds along the southern boundary in an east to west direction. This swale is formed by a combination of two sources of water flow. One fluvial contributor is water that overflows the banks of D1 as it bends sharply from a north to south alignment to an east to west alignment at the southern boundary. Another fluvial contributor to D1S3 is stormwater runoff that flows down the southern slopes of the partially stabilized dune that is immediately north of the swale and settles in the flat low-lying area that comprises D1S3. Similar to the inundation signs evident at D1S2, mud cracks were observed across approximately 40 percent of the surfaces and shrub density was much lower in the bottom areas where water pools.

The characteristics of D1S3 are summarized in **Table 6.2-1**. The dimensions of D1S3 are approximately 87 linear feet, an average width of 40 feet, and an area of 0.12 acre. Swale D1S3 is an ephemeral swale that is a water of the State as defined by the Procedures, and potentially under the jurisdiction of the RWQCB.

6.2.2 Ephemeral Drainage D2

Ephemeral Drainage D2 (D2) meets the definition of a water of the State as set forth in §§1602 – 1616 FGC and the Procedures.

Drainage D2 is a tributary that extends approximately 62 feet upstream before eventually dissipating into surrounding areas with a relatively flat grade and with no definable drainage features. There is deposition of coarse sand in the low flow channel bottom, particularly in the 26 foot section of the downstream portion. The upstream portion is supplied by sheetflow.

[1] Facultative
[2] Facultative Upland

The characteristics of D2 are summarized in **Table 6.2-1**. The dimensions of D2 are approximately 62 linear feet, an average width of five feet, and an area of 0.01 acre. Drainage D2 is an ephemeral drainage that is a water of the State potentially under the jurisdiction of CDFW and the RWQCB.

6.2.3 Ephemeral Drainage D3

Ephemeral Drainage D3 (D3) meets the definition of a water of the State as set forth in §§1602 – 1616 FGC and the Procedures.

D3 is a channel that flows north to south and discharges into the larger D1 at the southern property boundary. The OHWM was determined at the top of the bank at a point in which the bank was visible. Points at which the bank was not identifiable, the point at which vegetation density increases and a break in the bank slope were used as indicators of the OHWM. The active floodplain was determined to be the areas between where creosote shrubs occur on both sides of the drainage. The topography of the floodplain gently slopes in the direction of the channel. The low terrace lies at a slightly higher elevation than the active floodplain. The low-flow channel is identifiable by the deposition of granules and the presence of incised banks toward the terminus of this drainage's downstream reach. (see **Appendix A**, Figure 10, *Jurisdictional Areas*).

The characteristics of D3 are summarized in **Table 6.2-1**. The dimensions of D3 are approximately 110 linear feet, an average width of seven feet, and an area of 0.03 acre. Drainage D3 is an ephemeral drainage that is a water of the State potentially under the jurisdiction of CDFW and RWQCB.

6.2.4 Ephemeral Drainage D4 and Associated Jurisdictional Area

Ephemeral Drainage D4 **(D4)** meets the definition of a water of the State as set forth in §§1602 – 1616 FGC and the Procedures.

Drainage D4 has a north-to-south orientation and discharges into D5, which flows along the southern property boundary in an easterly direction, opposite of D1's flow path (see **Appendix A**, Figure 10, *Jurisdictional Waters*). The banks contain relatively dense herbaceous vegetation. There are areas in the channel bottom that support ponded water, forming mud-cracked surfaces in several areas.

The characteristics of D4 are summarized in **Table 6.2-1**. The dimensions of D4 are approximately 222 linear feet, an average width of seven feet, and an area of 0.04 acre. Drainage D4 is an ephemeral drainage that is a water of the State potentially under the jurisdiction of CDFW and RWQCB.

Swale D4S1. Low-lying areas west of the upstream extent of D4 constitute Swale D4S1 (D4S1). Water ponds in D4S1 as evidenced by cracked mud on the soil surface, the persistence of saturated soils for an extended period after rain events, and low density of shrubs. . The swale appears to receive water through sheetflow and/or other indistinct drainages from surrounding areas. Waters from D4S1 discharge into D4 when it is filled during large rain events.

The characteristics of D4S1 are summarized in **Table 6.2-1**. The dimensions of D4S1 are approximately 53 linear feet, an average width of 28 feet, and an area of 0.03 acre. Swale D4S1 is an ephemeral swale that is a water of the State as defined in the Procedures and potentially under the jurisdiction of RWQCB.

6.2.5 Ephemeral Drainage D5

Ephemeral Drainage D5 (D5) meets the definition of a water of the State as set forth in §§1602 – 1616 FGC and the Procedures.

Drainage D5 is a channel located at the southern edge of the project site, approximately 50 feet east of the southwestern corner (see **Appendix A**, Figure 10, *Jurisdictional Waters*). This ephemeral drainage begins at the nexus of some dirt roads located at the southwest corner of the project site. There are no banks at the beginning of the channel, and banks develop between 200 and 500 feet east of the beginning of the channel.

The base substrate present in the low-flow channel is fine sand, with the top quarter-inch containing coarse granules. Sections of the channel for which there was no definable bank were mapped based on surface relief and soil color in addition to changes in vegetative cover. Soil color was used as an indicator of the active floodplain because there was a rain event that occurred during the week preceding the jurisdictional delineation survey, therefore many areas exhibited water flow and ponding.

The active floodplain is within the channel banks. There is very limited evidence that the water level in the channel exceeds the banks, however there are sections of the channel that do not exhibit definable banks In these areas, the floodplain widens in northern and southern directions. At these points, soil color was used as the main indicator of the floodplain limits. There was no clear evidence of low terrace above the banks of this channel.

The characteristics of D5 are summarized in **Table 6.2-1**. The dimensions of D5 are approximately 457 linear feet, an average width of ten feet, and an area of 0.14 acre. Drainage D5 is an ephemeral drainage that is a waters of the State potentially under the jurisdiction of CDFW and RWQCB.

6.3 Desert Playa

The onsite desert playa meets the definition of a water of the State as set forth in §§1602 – 1616 FGC and the Procedures, and will also be under the jurisdiction of the RWQCB. Playas are flat, lower regions of an arid basin that periodically floods and accumulates sands (Neal, 1975), and in which evaporite accumulations or lacustrine activity is evident (Neal and Motts, 1967; Shaw and Thomas, 1989). Hard playas are differentiated from soft playas in that they do not recharge via capillary action of groundwater discharge; groundwater deeper than 15 feet does not recharge soil surfaces (Lichvar et al., 2006). Hard playas fill as a result of precipitation and stormwater flow (Lichvar et al., 2006). Hard playas are characterized by dry, compact, and smooth surfaces. Surface relief is limited to surface crusts, mud cracks, or polygons. Hard playas often appear to have a shiny sheen or glaze on the surfaces. Hydric soil field indicator lists such as the USACE's *Corps of Engineers Wetland Delineation Manual* (1987 Manual) are not useful in identifying the occurrence of soils in playas because these soils typically lack the field indicators referenced in these guides (Environmental Laboratory, 1987).

The onsite desert playa is a large, low-lying area located in the northeast quadrant of the project site (see **Appendix A**, Figure 10, *Jurisdictional Waters*). This area sits in a mild depression that is approximately three feet lower than the surrounding upland areas. Sheetflow from the surrounding areas, which are at a slightly higher elevation, travels from the higher ground to eventually settle into this playa. There are no clearly-defined channels that discharge into the playa. The playa's soils are characterized by fine sands with cracked mud surfaces in areas of higher moisture, likely in the

lowest areas of the basin. The onsite playa is considered a hard playa because groundwater is deeper than 50 feet and thus groundwater discharge via capillary action is not possible (see **Appendix H**, *Percolation Testing*).

Similar to the characteristics of the onsite swales, there is evidence of persistent saturated soils in the playa surfaces for extended periods after rain events. Most of the shrub vegetation within the playa is creosote bush, which is raised on hummocks of sand, which range from one to three feet above the playa bottom. There are also areas of sparsely distributed white bursage in the drier areas of the playa. There is very low shrub cover throughout the playa bottom. The playa bottom is sparsely vegetated with forbs and grasses which form a thatch during the dry season.

The characteristics of the onsite desert playa are summarized in **Table 6.2-1**. The dimensions of the playa are approximately 179 linear feet, an average width of 30 feet, and an area of 0.19 acre. The onsite playa is an ephemeral playa that is a non-wetland water of the State potentially under the jurisdiction of RWQCB. The playa functions as an ephemeral pond with lacustrine characteristics. Because CDFW regulates lakes and streambeds it may also take jurisdiction of the playa.

6.4 Observed Jurisdictional Status

Using the results of the field investigation described in **Sections 6.1, 6.2** and **6.3** of this document, the preliminary determination was made that the ephemeral drainages and their associated swales and desert riparian wash, and the onsite playa are waters of the State. The drainages and their associated swales and desert riparian wash, and the onsite playa are jurisdictional to the Colorado River Basin RWQCB under the Procedures. The waters on the project site and in the BSA are considered isolated ephemeral drainages because they do not connect with other waters that eventually discharge into either the Salton Sea or the Pacific Ocean. Based on the field investigation, the onsite drainages and other jurisdictional features do not appear to connect to a network of drainages that discharges into the Salton Sea or the Pacific Ocean. In fact, all of the water seems to discharge to the property located south of the project site, and dissipate via evaporation and/or percolation. A major factor preventing waters from continuing southward past the south-adjacent property is that there are large dunes located south of this property that appear to inhibit any additional southward movement of water that enters this property. Therefore, the drainages, and their associated desert riparian wash and swales, and the isolated playa are considered to be waters of the State, and not waters of the U.S.

The ephemeral drainages, the desert riparian wash, and the onsite playa on the project site were determined to be waters of the State under the jurisdiction of the RWQCB and CDFW in that

1. Pursuant to SWRCB Resolution No. 2019-0015 (Procedures), all waters in the State of California are waters of the State; and

2. Five ephemeral drainages, within the limits of the BSA, meet the definition of a watercourse as "a body of water that flows perennially or episodically and that is defined by the area in which water currently flows, or has flowed, over a given course during the historic hydrologic course regime, and where the width of its course can reasonably be identified by physical or biological indicators" as provided by Brady and Vyverberg (2013).

3. The desert riparian wash within the project site contains a network of small channels and its substrates support vegetation that is associated with periods of elevated soil moisture. Due

to these characteristics of an ephemeral stream this wash meets the definition of waters of the State.

4. The onsite desert playa within the project site meets the definition of a lake in that there is evidence of surface soil cracks indicating the occurrence of a waterbody with lacustrine characteristics. Although the playa appears to be an isolated, ephemeral pond, it still meet's the SWRB's definition of waters of the State, which is based on both historic and current definitions of waters of the United States.

The swales on the project site were determined to be waters of the State under the jurisdiction of the RWQCB

1. Pursuant to SWRCB Resolution No. 2019-0015, all waters in the State of California are waters of the State; and

2. The three swales, within the limits of the BSA, both receive waters from and contribute waters to their associated drainages. Therefore, they meet the definition of a watercourse as "a body of water that flows perennially or episodically and that is defined by the area in which water currently flows, or has flowed, over a given course during the historic hydrologic course regime, and where the width of its course can reasonably be identified by physical or biological indicators" as provided by Brady and Vyverberg (2013).

Project-related impacts are anticipated to occur to these waters of the State, and are discussed further in **Section 7.0**.

Final jurisdictional status will be provided by the RWQCB and CDFW. **Appendix A** Figure 10, *Jurisdictional Waters* depicts the jurisdictional boundaries of the waters of the State that were delineated within the affected portion of the BSA.

Photographs of the project area are located in **Appendix C** *Site Photographs* For supporting documentation pertaining to the observed jurisdictional status, please refer to **Appendix F** *Field Data Sheets.*

7.0 POTENTIAL IMPACTS OF THE PROJECT

Project-related permanent impacts resulting from the excavation and/filling of waters of the State are detailed in **Section 6.0**, *Field Investigation Results*. This section discusses potential effects or impacts, if any, to water quality, water quantity, and aquatic/riparian habitats (environmental resources) that could result from project development. Environmental resources may be either directly or indirectly impacted by a project (defined by California Environmental Quality Act [CEQA] Guidelines § 15358). Direct and indirect impacts may be either permanent or temporary in nature. These impact categories are defined below.

- **Permanent impacts**: All impacts that result in the long-term or irreversible removal of environmental resources are considered permanent. Examples include constructing a building or permanent road on an area containing jurisdictional areas.

- **Temporary impacts**: Any impacts considered to have reversible effects on environmental resources can be viewed as temporary. Examples include short-term increased vehicle traffic and the generation of fugitive dust during construction; or removing vegetation and either allowing the natural vegetation to recolonize or actively revegetating the impact area.

7.1 Permanent Impacts

To meet the project's purpose and need, and after incorporating avoidance and minimization measures, project implementation will result in unavoidable impacts to environmental resources. Refer to **Appendix A**, Figure 10, *Jurisdictional Waters,* which depicts the location and area of impacts to waters and riparian habitats. Refer also to **Table 6.0-1**, *Total Acreage of Potential Impacts to Jurisdictional Waters,* which presents the approximate total acreages of aquatic/riparian habitat that will be directly impacted by project activities. Calculations were based on the currently proposed development design in conjunction with the jurisdictional delineation map created using GPS data from the field surveys. The ground-disturbing activities such as excavation and grading would entail the removal of all of the onsite drainages and other jurisdictional features.

Onsite drainages and other jurisdictional areas would be directly impacted by development of the project; however, waters that flow onto the project site would not be impacted. There are two main areas where offsite sources of stormwater discharge onto the project site: stormwater flowing south along the western roadway margin of Palm Drive discharges onto the project site at several points approximately 500 feet north of the southeastern project boundary, then flows onsite via the desert riparian wash and Drainage D1. A nexus of dirt roads near the southwestern corner of the project site discharges stormwater onto the project site via Drainage D5.

Development of the project would not have direct permanent impacts to these sources of offsite stormwater flow. The Preliminary Drainage Study for this project (see **Appendix I**, *Drainage Study*) indicates that the project proponent is developing upstream stormwater mitigation measures that would greatly reduce the storm flows coming from the north and west. According to this report, a stormwater channel is proposed along the north and west property lines to divert any offsite stormwater entering the site. Installation of these stormwater channels would reduce the impacts to offsite waters that discharge on the project site.

Waters generated onsite or waters generated upstream of the site that pass through the project site via one of the existing ephemeral drainages and then subsequently discharge offsite would be

impacted by development of the project. In particular, Drainage D1 collects waters generated offsite and carries them through the southern portion of the project site and then continues south of the project site. Development of the project would potentially lead to a lower volume of water discharging into the portion of D1 that continues south of the project site.

According to the Preliminary Drainage Study (see Appendix I, Drainage Study), all stormwater generated onsite would be collected onsite in one of five proposed infiltration basins and then discharged via a maintained storm channel. Thus, upon development of the project, a much reduced flow of water would enter into the stretch of D1 that continues southward from the project site. The reduction of water flow into this southward stretch of D1 would likely lead to the reduction of water flowing into the south-adjacent property. This reduced water flow may have an adverse impact on vegetation communities that occur on the south-adjacent property.

Currently, there are Date palm – California fan palm groves that occur south and southeast of where the defined bed and bank of D1 terminate, approximately 300 feet south of the project site (see **Appendix A**, Figure 11, *Land Cover Types*). These stands of palm trees provide nesting habitat for special status bird species and may be adversely affected by a reduced flow of water from D1.

The Date palm – California fan palm groves appear to be monotypic stands of California fan palm. California fan palm is rated as FAC species on USACE's National Wetland Plant List (USACE, 2020a). A FAC rating indicates that the species can be a facultative wetland species and be an indicator of wetland conditions when there is also hydrology and soils indicators of hydric conditions. Thus, these groves may be riparian habitat. Therefore, a reduction in the flow volume through D1 could adversely impact riparian (i.e., wetland) habitat. The Date palm – California fan palm groves have the same characteristics of Desert fan palm oasis woodland, which is a covered natural community under the MSHCP. Development of the project would potentially have permanent impacts to riparian habitat protected by both CDFW and the MSHCP.

As mentioned above, all waters generated onsite during and after construction would be collected onsite in infiltration basins and discharged into a maintained storm channel (see **Appendix I**, Drainage Study). The final design of the project will mitigate all offsite flows from stormwater runoff generated onsite. There are no anticipated negative upstream impacts as a result of development of the project. By contrast, development of the project would cut off some of the source flow of waters flowing to the south-adjacent property and this decrease in water flow may adversely impact vegetation communities such as Date palm – California fan palm groves that occur on the south-adjacent property.

Section 8.0 describes the necessary federal and state biological permits and/or approvals that will be required for project approval.

7.2 Temporary Impacts

All project impacts to waters of the State are anticipated to be permanent and no temporary impacts to jurisdictional waters (including wetlands) are anticipated as a result of this project.

8.0 POTENTIAL FEDERAL, STATE, AND LOCAL BIOLOGICAL PERMITS AND APPROVALS

Each project must comply with federal, state, and local environmental laws and regulations. Any project that proposes to fill or otherwise physically alter creeks, wetlands, or other waters requires a number of federal, state and, in some cases, local permits before it can proceed. Both permanent and temporary impacts will require permits. Permanent impacts are anticipated to the following waters of the State that were identified on the project site: five ephemeral drainages, three associated swales, an associated desert riparian wash, and an isolated playa. Upon consultation with RWQCB and CDFW and prior to project implementation and impacts (permanent or temporary) to jurisdictional waters, the project proponent would likely need to obtain the following federal and/or state biological permits and/or approvals:

- Waste Discharge Requirements permit (WDR) from the RWQCB.
- Lake or Streambed Alteration Agreement with CDFW.

9.0 LITERATURE CITED AND REFERENCES

Baldwin, B. G., D. H. Goldman, D. J. Keil, R. Patterson, T. J. Rosatti, and D. H. Wilken, editors. 2012. *The Jepson Manual: Vascular Plants of California,* second edition. University California Press, Berkeley.

Brady and Vyverberg, 2013. MESA: Mapping Episodic Stream Activity. MESA Protocol – Draft Final V5: July 3, 2013. Retrieved from https://www.energy.ca.gov/publications/2014/methods-describe-and-delineate-episodic-stream-processes-arid-landscapes. Last accessed on October 26, 2022.

CASGEM (California Statewide Groundwater Elevation Monitoring (CASGEM) Online System). 2022. Details for CASGEM Well #50683. Available at https://water.ca.gov/programs/groundwater-management/groundwater-elevation-monitoring--casgem. Accessed on November 1, 2022.

CDFW (California Department of Fish and Game). 2022. California Natural Community List. July 5, 2022. Retrieved from https://wildlife.ca.gov/Data/VegCAMP/Natural-Communities. Last accessed on July 12, 2022.

Curtis, K.E. and R.W. Lichvar. 2010. Updated Datasheet for the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States. Wetland Regulatory Assistance Program. Cold Regions Research and Engineering Laboratory. U.S. Army Engineer Research and Development Center, Hanover, New Hampshire.

Environmental Laboratory. 1987. *Corps of Engineers wetlands delineation manual*. Technical Report Y-87-1. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station. Retrieved from: http://el.erdc.usace.army.mil/wetlands/pdfs/wlman87.pdf

Evens, J. M., K. Sikes, D. Hastings, and J. S. Ratchford. 2014. Vegetation alliance descriptions for Lake Mead National Recreation Area, Death Valley National Park, and Mojave National Preserve (revised 2020). Unpublished report submitted to USDI National Park Service, Mojave Desert Network Inventory and Monitoring Program California Native Plant Society. Available at https://www.nps.gov/im/vmi-lake.htm. Accessed on September 26, 2022.

Evens, J. M., K. Sikes, J. Ratchford, and D. Stout. 2020. Field Key to the Vegetation Alliances of Lake Mead National Recreation Area, Death Valley National Park, Mojave National Preserve, and Castle Mountains National Monument. California Native Plant Society Unpublished Report, submitted to USDI, National Park Service, Mojave Desert Network Inventory and Monitoring Program. Sacramento, CA. Available at https://www.nps.gov/im/vmi-lake.htm. Accessed on September 26, 2022.

Google Earth. 2022. Version 7.3.3.7699. Desert Hot Springs, Riverside County, California. 33°54'39.55" 116°30'16.61". Eye altitude 3,300 feet. Imagery date August 5, 2021. Accessed on March 19, 2022.

Holland, R.F. 1986. Preliminary Descriptions of the Terrestrial Natural Communities of California. State of California, The Resources Agency, Nongame Heritage Program, California Department of Fish & Game, Sacramento, Calif. 156 pp.

Lichvar, R., W. Brostoff, and S. Sprecher. 2006. *Surficial Features Associated with Ponded Water on Playas of the Arid Southwestern United States: Indicators for Delineating RegulatedAreas Under the Clean Water Act* In Wetlands: The Society of Wetland Scientists. Vol. 26, No. 2, June 2006, pp. 385-399.

Lichvar, R. W and S. M. McColley. 2008. A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States: A Delineation Manual. Cold Regions Research and Engineering Laboratory. U.S. Army Engineer Research and Development Center, Hanover, New Hampshire.

Neal, J. T. 1975. Playas and Dried Lakes. Dowden, Hutchinson & Ross, Inc., Stroudsberg, PA, USA.

Neal, J. T. and W. S. Motts. 1967. Recent geomorphic changes in playas of the western United States. Journal of Geology 75:511–525.

Sawyer, J.O., T. Keeler-Wolf, J.M. Evens. 2009. *A Manual of California Vegetation, Second Edition*. California Native Plant Society Press. Sacramento, CA.

Shaw, P. A. and D. S. G. Thomas. 1989. Playas, pans and salt lakes. p. 184–208. In D. S. G. Thomas (ed.) Arid Zone Geomorphology. Belhaven Press, London, UK.

Soil Survey Staff. 2022. Web Soil Survey: Custom Soil Resource Report for Coachella Valley Area, Riverside County, California Available at https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm. Accessed on April 16, 2012.

U.C. Riverside CCB (University of California Center for Conservation Biology). 2012. Coachella Valley Multiple Species Habitat Conservation & Natural Community Conservation Plan: Desert Wetlands Communities and Species Monitoring Protocols. Prepared by U.C. Riverside CCB for the Coachella Valley Conservation Commission. Accessed at https://cvmshcp.org/bwg-materials/. Accessed on: October 19, 2022.

USACE (United States Army Corp of Engineers). 2020. National Wetland Plant List, version 3.4. Retrieved from: http://wetland-plants.usace.army.mil/.

USDA NRCS (United States Department of Agriculture, Natural Resources Soil Conservation Service). 2022a. Soil Data Access (SDA) California State Hydric Soils List. Available at: https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcseprd1389479.html Accessed on March 17, 2022.

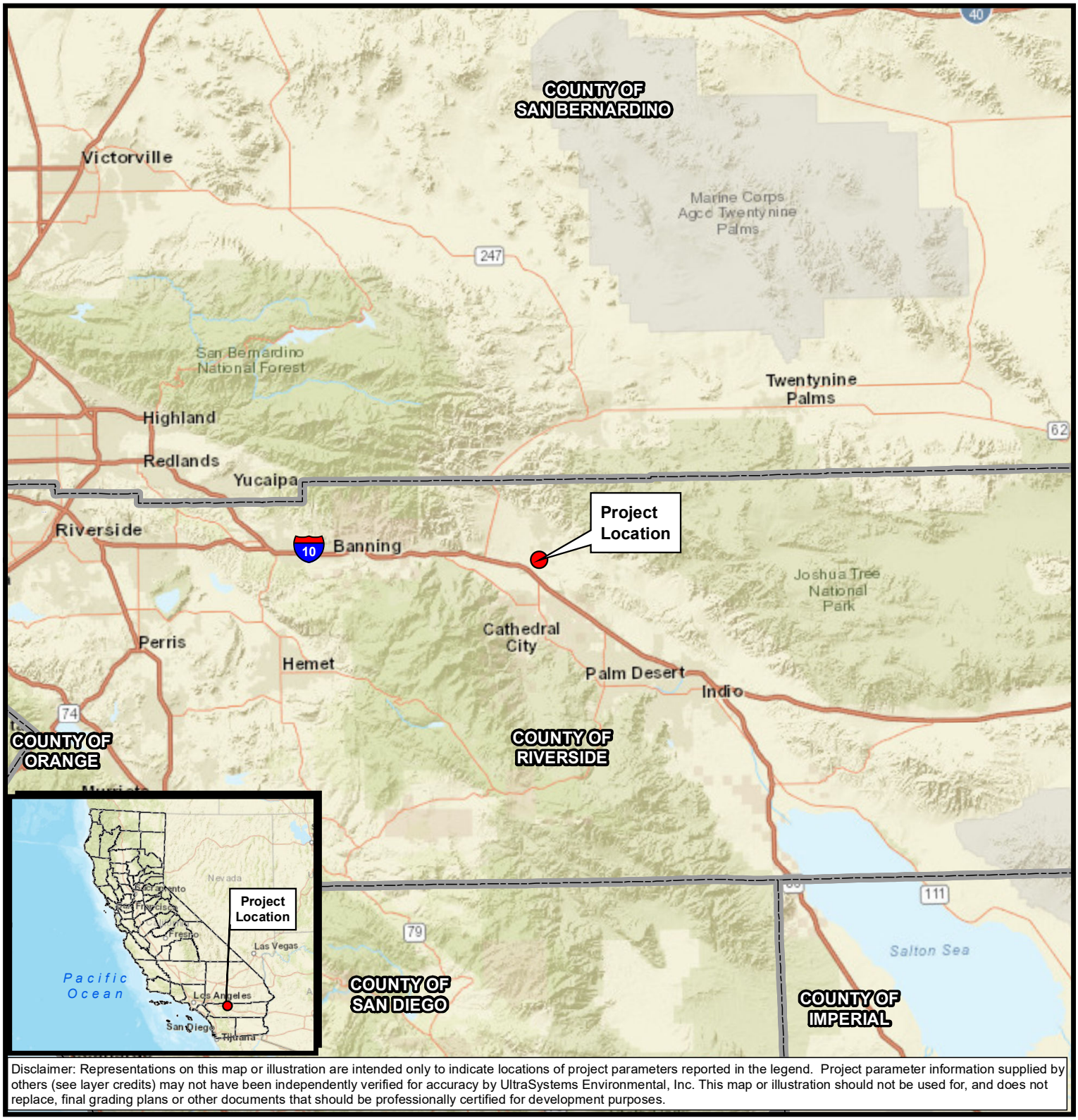
USDA NRCS (United States Department of Agriculture, Natural Resources Soil Conservation Service). 2022b. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin.) U.S. Department of Agriculture, Agriculture Handbook 296.

Wakely, J.S., R.W. Lichvar, and C.V. Noble (eds). 2008. *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0).* ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center.

WRCC (Western Regional Climate Center). 2022. Monthly Climate Summaries for Palm Springs Station 046635 for the Period of Record 1906 – 2016. Available at https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca6635. Accessed on April 25, 2022.

APPENDIX A

Figures



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\7129_Greenday_2_0_Regional_Location_2022_01_10.mxd

January 10, 2022

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community; California Department of Forestry and Fire Protection, 2009; UltraSystems Environmental, Inc., 2021

Scale: 1:887,040

N

0 7 14 Miles

0 7 14 Kilometers

Legend

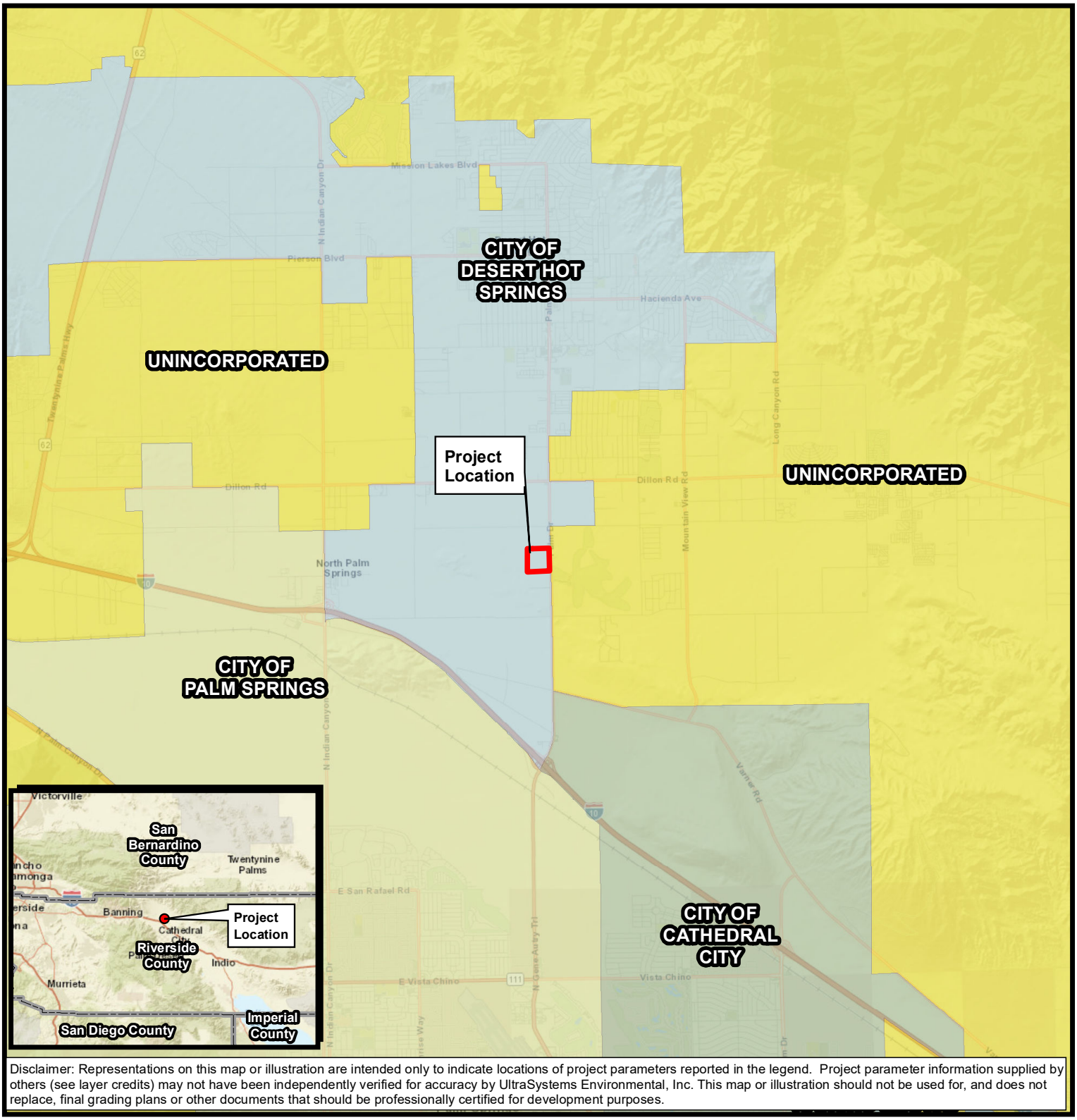
Project Location

County Boundary

Green Day Village Project

Regional Overview
Figure 1

UltraSystems
environmental • management • planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\7129_Greenday_3_0_Project_Vicinity_2022_02_01.mxd

February 01, 2022

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community; SCAG, 2020; UltraSystems Environmental, Inc., 2022

Scale: 1:95,040

N

Legend

Project Boundary

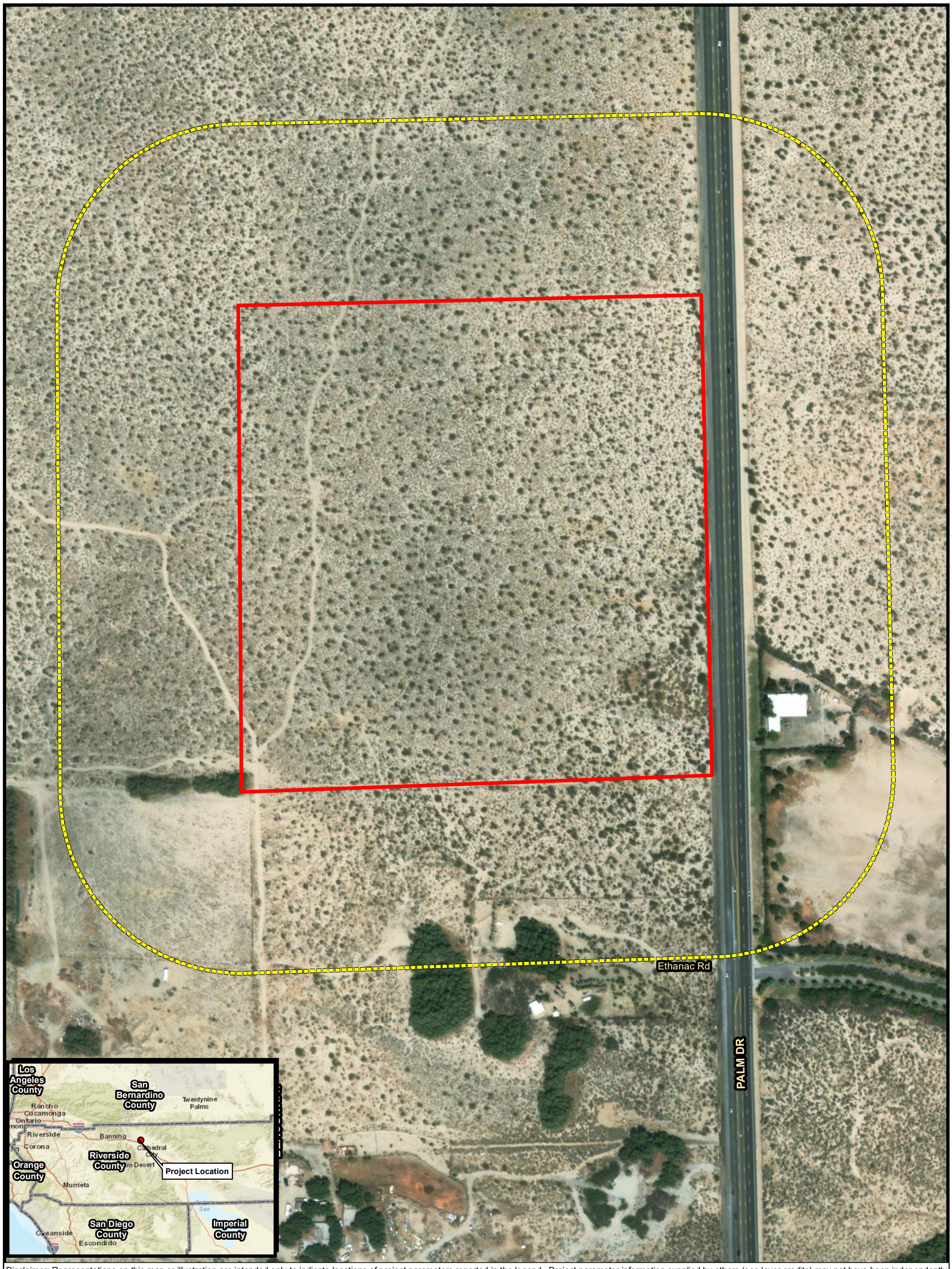
Green Day Village Project

Project Vicinity
Figure 2

0 0.75 1.5 Miles

0 0.8 1.6 Kilometers

UltraSystems
environmental • management • planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\BIO\7129_Greenday_4_4_Project_Location_BSA_11x17_2022_02_10.mxd

January 10, 2022

Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community; County of Riverside, 2020; UltraSystems Environmental, Inc., 2022

Scale: 1:3,000
1 inch = 250 feet
1 cm = 30 meters

N

0 125 250 Feet

0 30 60 Meters

Legend

Project Boundary

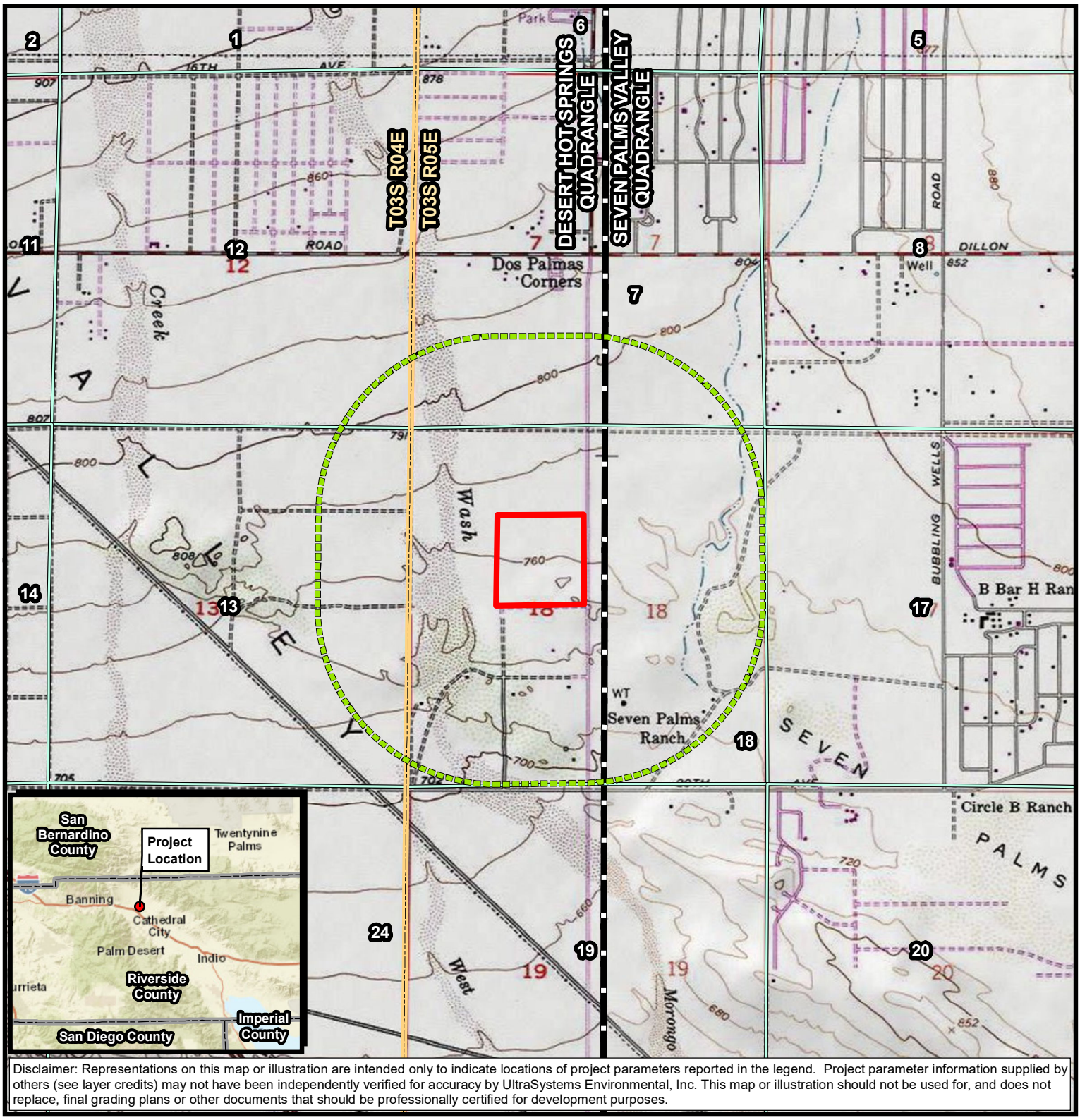
500ft Biological Study Area (BSA)

Green Day Village Project

Project Boundary and Biological Study Area (BSA)

Figure 3

UltraSystems
environmental • management • planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\7129_Greenday_4_5_Cul_Topo_2021_12_09.mxd

December 09, 2021

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Copyright:© 2013 National Geographic Society, i-cubed; Cal-Atlas, 2015; California Department of Conservation, 2019; UltraSystems Environmental, Inc., 2021

Scale: 1:24,000

N

0 1,000 2,000 Feet

0 250 500 Meters

Legend

- Project Boundary
- Half-Mile Radius
- Quadrangle Boundary
- Township Boundary
- Section Boundary

Green Day Village Project

Topographic Map
USGS Quadrangle: Desert Hot Springs
Township: 3S Range: 5E
Section: 18
Figure 4

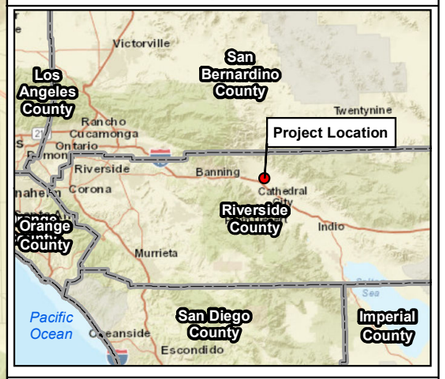
UltraSystems
environmental • management • planning

Green Day Village Project

Legend

- Project Boundary
- Bureau of Land Management (BLM)
- National Park Service (NPS)
- US Forest Service (USFS)
- Bureau of Indian Affairs (BIA)
- State Land
- Local Land
- CDFW Owned and Operated Lands
- Habitat Conservation Plan (HCP)/Natural Community Conservation Plan (NCCP)

Key Map



0 0.625 1.25 Miles

0 0.5 1 Kilometers

N

Scale: 1:79,200

Management Plan and Land Designation Areas

Figure 5

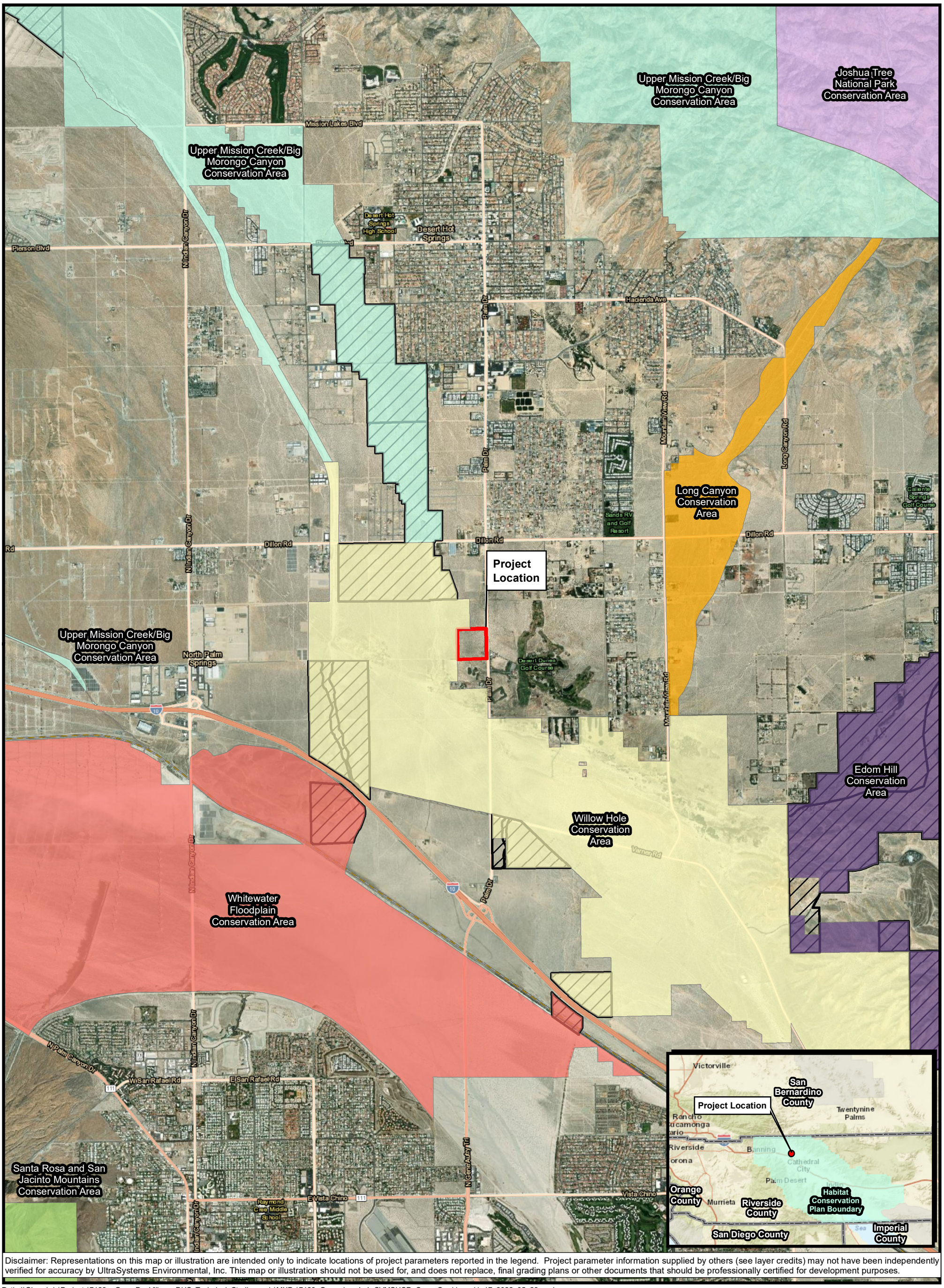
UltraSystems
environmental • management • planning

Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\Gissvr\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\7129_Greenday_4_4_Management_Plans_11x17_2022_02_07.mxd

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community; BLM, 2019; CDFW, 2013, 2018; UltraSystems Environmental, Inc., 2022

February 08, 2022



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\Gissvr\gis\Projects\7129a_GreenDayVillage_DHS_Technical_Studies_only\MXDs\7129_Greenday_4_4_CVMSHCP_Cons_Corridors_11x17_2022_05_23.mxd

May 23, 2022

Sources: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; CDFG, 2008; CVCC 2022; UltraSystems Environmental, Inc., 2022

Scale: 1:48,000
1 inch = 4,000 Feet
1 cm = 480 Meters

0 2,000 4,000 Feet

0 700 1,400 Meters

N

Legend

- Project Boundary
- Biological Corridors and Linkages

Conservation Area

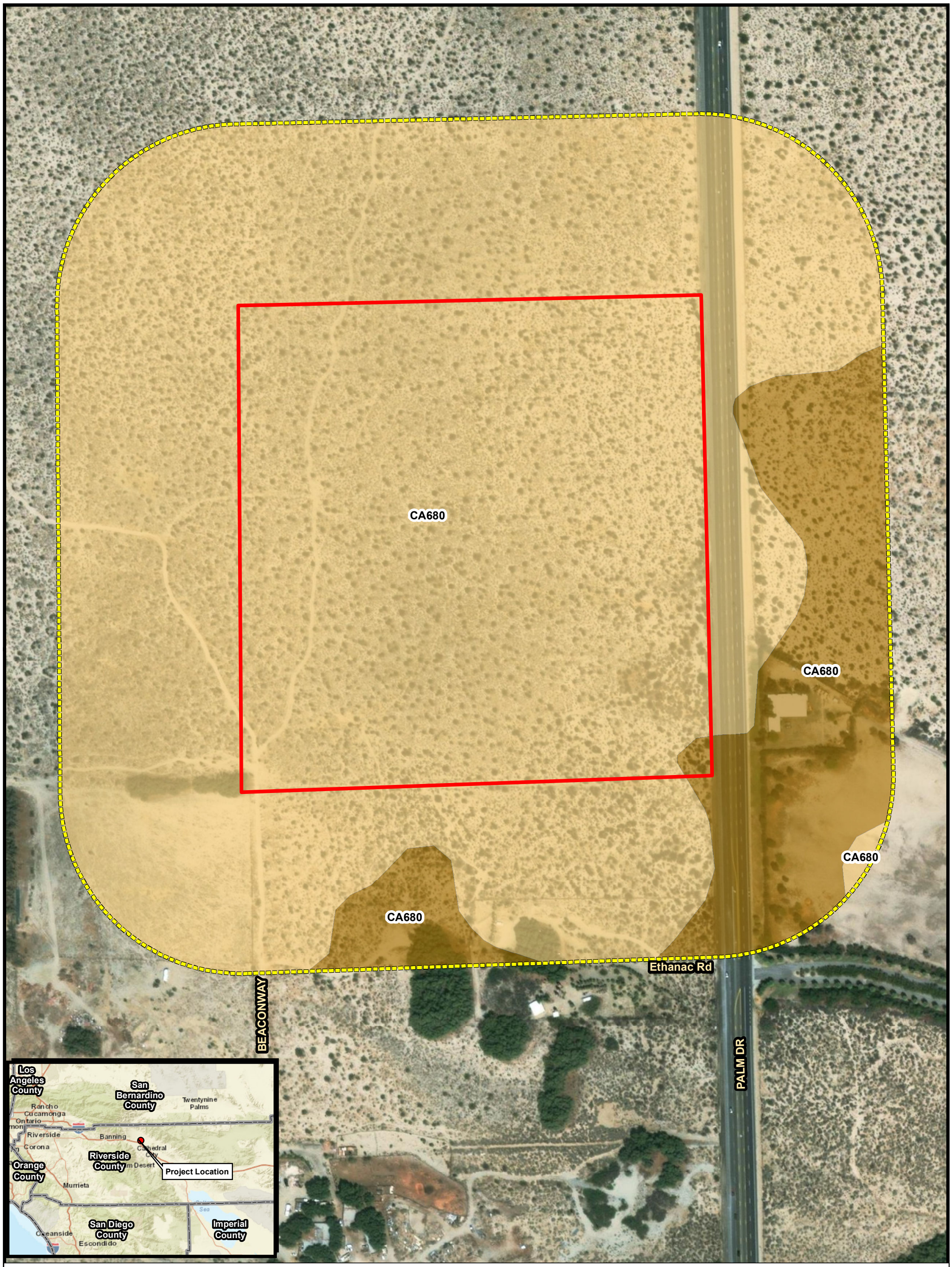
- Edom Hill Conservation
- Joshua Tree National Park Conservation Area
- Long Canyon Conservation
- Santa Rosa and San Jacinto Mountains Conservation Area
- Upper Mission Creek/Big Morongo Canyon Conservation Area
- Whitewater Floodplain Conservation Area
- Willow Hole Conservation

Green Day Village Project

CVMSHCP Conservation Areas and Corridors and Linkages

Figure 6

UltraSystems
environmental • management • planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\BIO\7129_Greenday_4_4_Soil_11x17_2022_01_25.mxd

February 01, 2022

Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community; USDA 2021; UltraSystems Environmental, Inc., 2022

Scale: 1:3,000
1 inch = 250 feet
1 cm = 30 meters

0 125 250 Feet

0 30 60 Meters

N

Legend

Project Boundary

500ft Biological Study Area (BSA)

USDA Map Unit

MaB-Myoma fine sand, 0 to 5 percent slopes

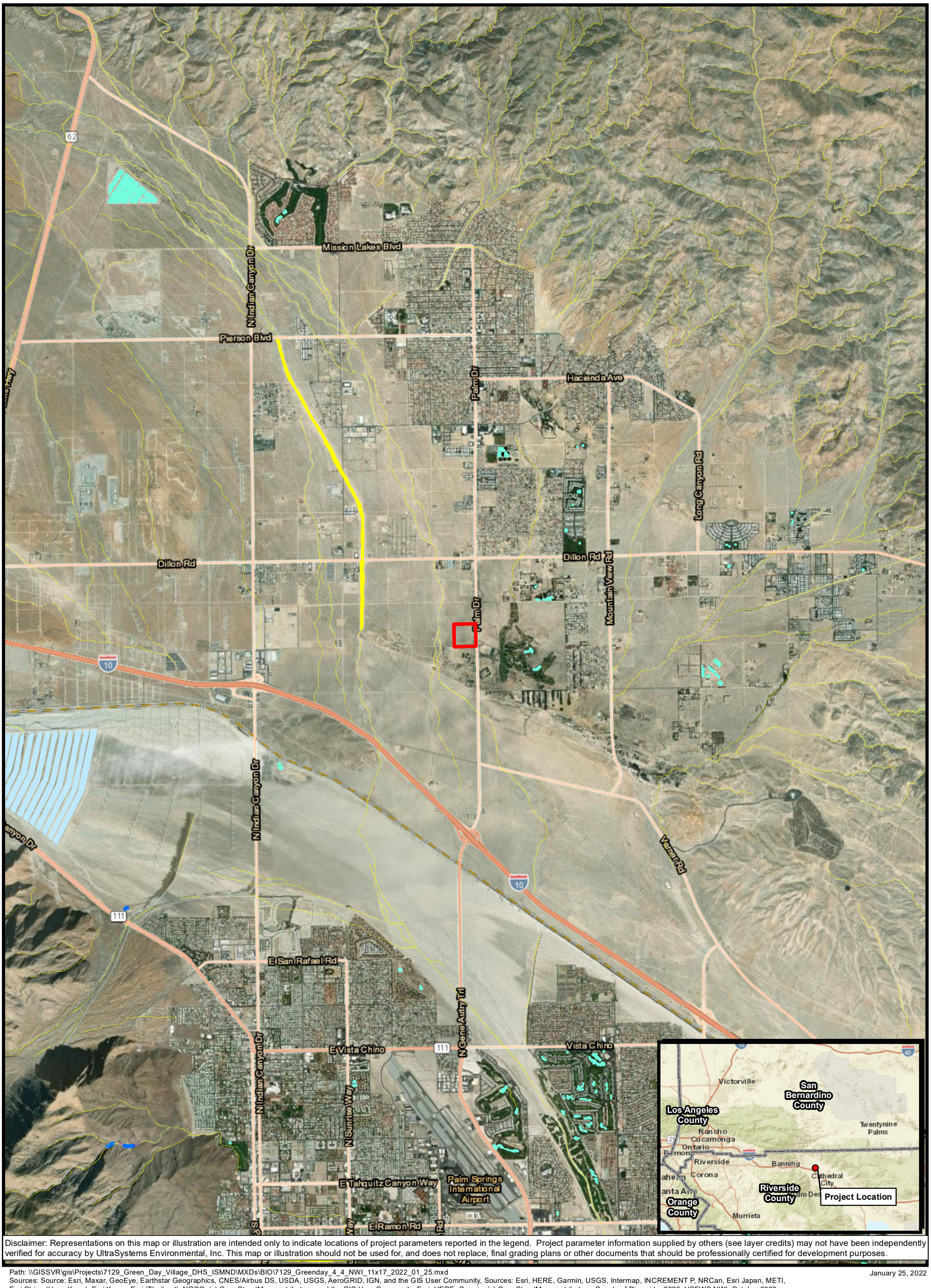
MaD-Myoma fine sand, 5 to 15 percent slopes

Green Day Village Project

USDA Soils

Figure 7

UltraSystems
environmental•management•planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\GISSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\BIO\7129_Greenday_4_4_NWI_11x17_2022_01_25.mxd

January 25, 2022

Sources: Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community, Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors; County of Riverside, 2020; USFWS NWI, October 2020; UltraSystems Environmental, Inc., 2022

Scale: 1:63,360
1 inch = 1 Miles
1 cm = 0.63 Kilometers

N

0 0.5 1 Miles

0 0.7 1.4 Kilometers

Legend

- Project Boundary

USFWS NWI Wetland Type

- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Riverine

Green Day Village Project

USFWS National Wetlands Inventory (NWI)

Figure 8

UltraSystems
environmental•management•planning



Green Day Village Project

Legend

- Project Boundary
- USGS Stream

HUC12, Name

- 181002010303, Mission Creek
- 181002010404, Morongo Wash
- USGS Waterbody

Key Map



0 300 600 Feet

0 140 Meters

N

Scale: 1:7,200

USGS Surface Waters and Watersheds

Figure 9

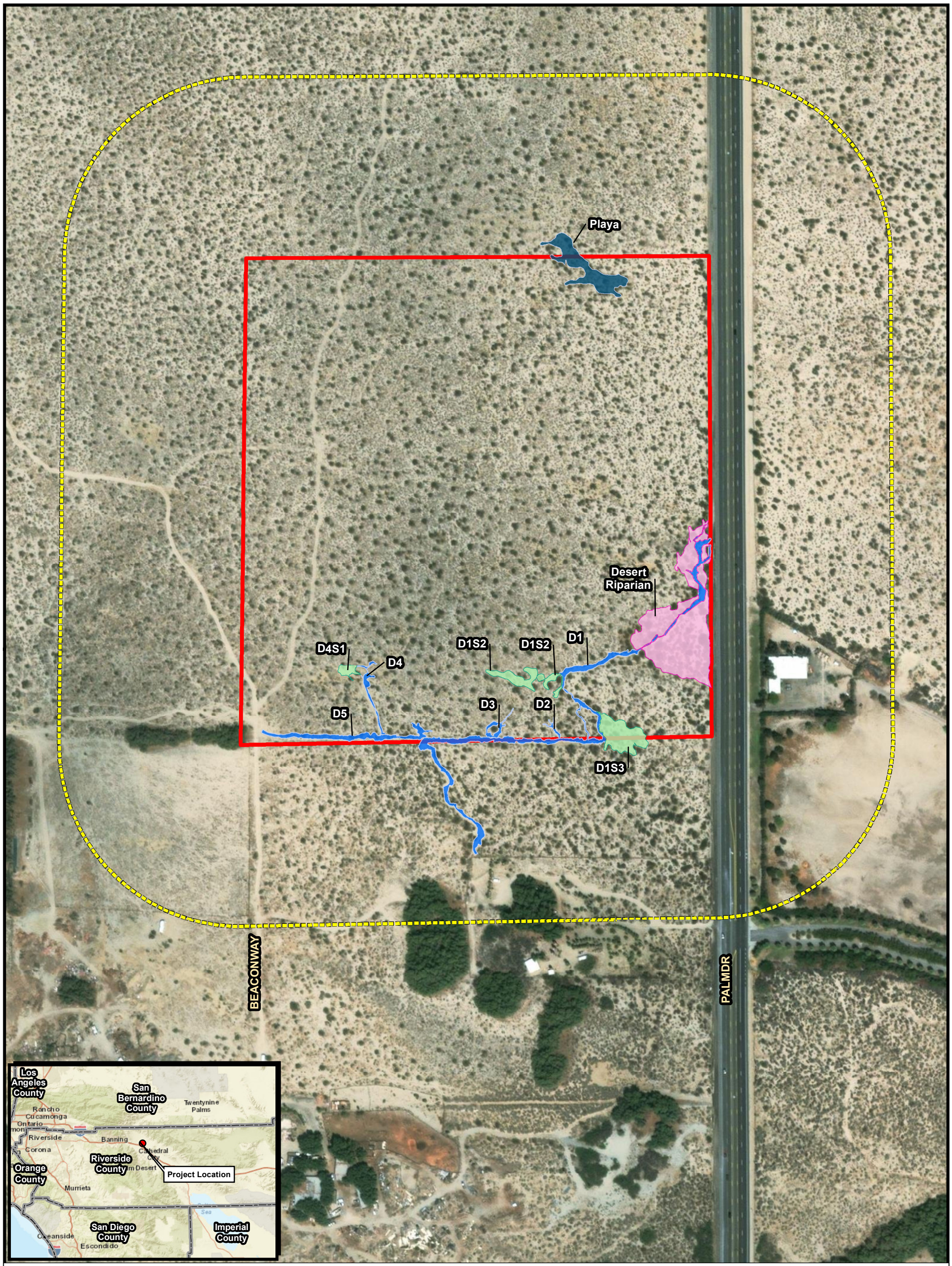
UltraSystems
environmental • management • planning

Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\gissvr\GIS\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\7129_Greenday_4_10_Surface_Waters_11x17_2022_10_19.mxd

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; USGS, 2022; UltraSystems Environmental, Inc., 2022

October 19, 2022



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\gissvr\GIS\Projects\7129a_GreenDayVillage_DHS_Technical_Studies_only\MXDs\7129a_Greenday_JD_2022_10_12.mxd

October 12, 2022

Sources: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; County of Riverside, 2020; UltraSystems Environmental, Inc., 2022

Scale: 1:3,000
1 inch = 250 feet
1 cm = 30 meters

N

0 125 250 Feet

0 30 60 Meters

Legend

- Project Boundary
- 500ft Biological Study Area (BSA)

Jurisdictional Waters

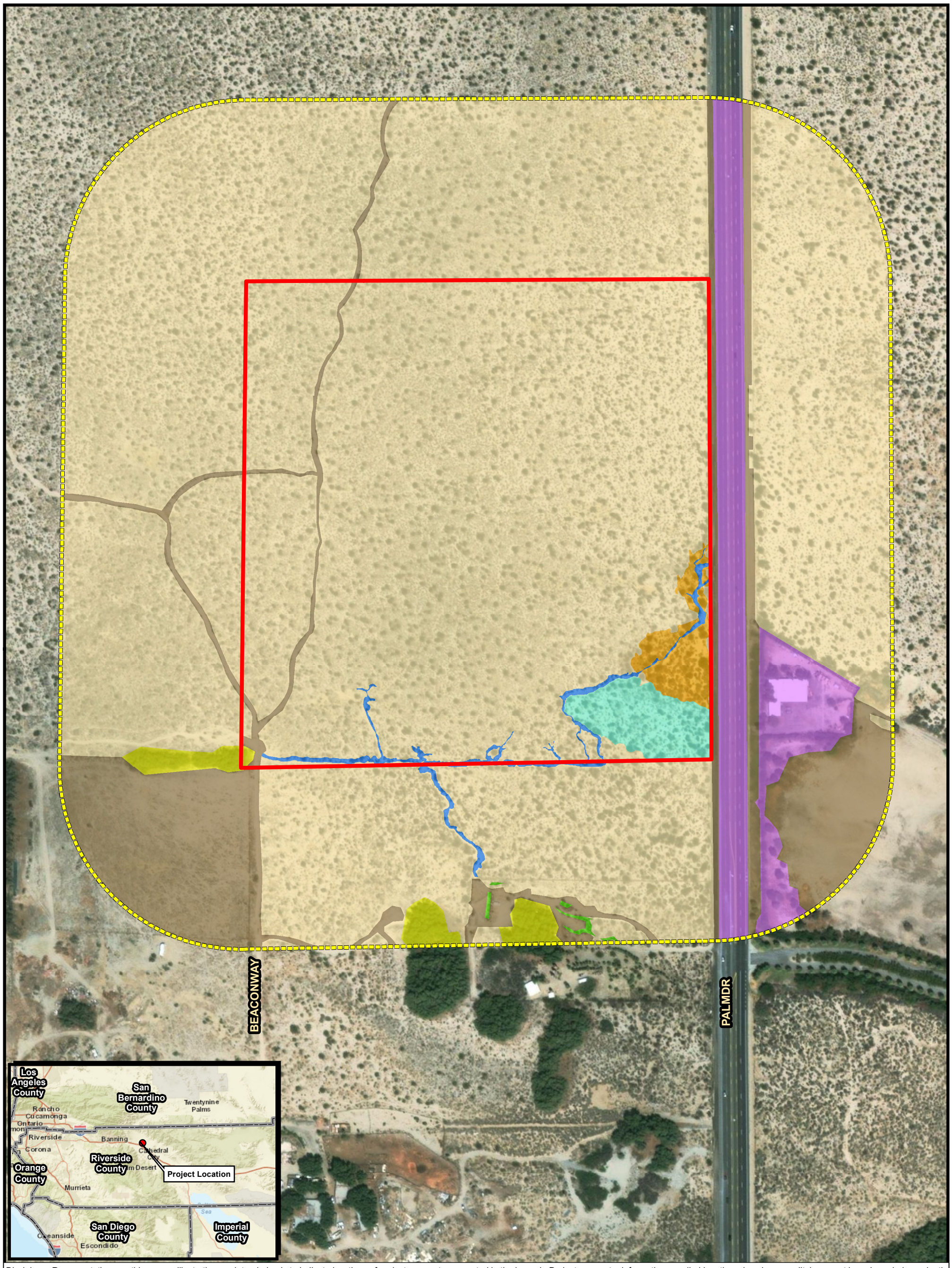
- Waters of the State (CDFW/RWQCB, Desert Riparian)
- Waters of the State (CDFW/RWQCB, Drainage)
- Waters of the State (CDFW/RWQCB, Playa)
- Waters of the State (RWQCB, Swale)

Green Day Village Project

Jurisdictional Waters

Figure 10

UltraSystems
environmental • management • planning



Disclaimer: Representations on this map or illustration are intended only to indicate locations of project parameters reported in the legend. Project parameter information supplied by others (see layer credits) may not have been independently verified for accuracy by UltraSystems Environmental, Inc. This map or illustration should not be used for, and does not replace, final grading plans or other documents that should be professionally certified for development purposes.

Path: \\gissvr\GIS\Projects\7129a_GreenDayVillage_DHS_Technical_Studies_only\MXDs\7129a_Greenday_Land_Cover_2022_10_07.mxd

October 07, 2022

Sources: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; County of Riverside, 2020; UltraSystems Environmental, Inc., 2022

Scale: 1:3,000
1 inch = 250 feet
1 cm = 30 meters

N

0 125 250 Feet

0 30 60 Meters

Legend

- Project Boundary
- 500ft Biological Study Area (BSA)

Land Cover Types

- Creosote bush – white bursage scrub
- Fourwing saltbush scrub
- Date palm - California fan palm groves
- Disturbed
- Developed/Ornamental
- Stabilized desert dunes
- Tamarisk thickets
- Unconsolidated streambed

Green Day Village Project

Land Cover
Figure 11

UltraSystems
environmental • management • planning

APPENDIX B

Project Drawings



SUMMARY

SITE AREA TOTAL 1,642,186 S.F. OR 37.29 ACRES

TENTATIVE TRACT

PARCEL #1 – COMMERCIAL	62,882 S.F.
PARCEL #2 – COMMERCIAL	167,494 S.F.
PARCEL #3 – COMMERCIAL	157,029 S.F.
PARCEL #4 – RESIDENTIAL	46,654 S.F.
PARCEL #5 – RESIDENTIAL	1,082,263 S.F.

COMMERCIAL

BLDG. 1 – FAST FOOD W/DRIVE-THRU & OUTDOOR SEATING	4,608
BLDG. 2 – RETAIL CONVENIENCE STORE	1,024
BLDG. 3 – RETAIL STORE	20,000
BLDG. 4 – RESTAURANTS	6,144
BLDG. 5 – RETAIL	3,749
BLDG. 6 – RETAIL	2,592
BLDG. 7 – RETAIL	1,920
BLDG. 8 – RETAIL	15,360
BLDG. 9 – MEDICAL OFFICE 2-STORY (10,927 FOOTPRINT)	21,854
BLDG. 10 – RECYCLING CENTER	240
BLDG. 11 – RECYCLING CENTER	480
COMMERCIAL TOTAL SF	77,971

TYPICAL RESIDENTIAL BUILDING (92 BUILDINGS)

UNIT 1 – ADU/STUDIO		208
UNIT 2 – TWO STORY (2 BDR.)		
LOWER LEVEL	388	
EXT. COVERED AREA	123	
UPPER LEVEL	375	
		886
UNIT 3 – TWO STORY (1 BDR.)		
LOWER LEVEL	378	
UPPER LEVEL	252.5	
		630.5
UNIT 4 – 1 BDR.		389
UNIT 5 – TWO STORY (1 BDR.)		
LOWER LEVEL	376	
UPPER LEVEL	252.5	
		628.5
UNIT 6 – TWO STORY (2 BDR.)		
LOWER LEVEL	373	
UPPER LEVEL	389	
		762
LOWER LEVEL TOTAL		2,235
UPPER LEVEL TOTAL		1,269
BUILDING TOTAL		3,504

RESIDENTIAL UNITS

UNIT 1 – ADU'S	92
UNIT 2 – 2-STORY 2-BDR.	92
UNIT 3 – 2-STORY 1-BDR.	92
UNIT 4 – 1-BDR.	92
UNIT 5 – 2-STORY 1-BDR.	92
UNIT 6 – 2-STORY 2-BDR.	92
APT. – 1-BDR. LOFT	60
TOTAL	612

RESIDENTIAL

PHASE A	
BLDGS. A1–A23	80,592
BLDG. AA – POOL HOUSE	1,200
PHASE B	
BLDGS. B1–B23	80,592
BLDG. BA – POOL HOUSE	1,200
PHASE C	
BLDG. C1–C10	35,040
BLDG. CA – BARN	384
BLDG. VILLAGE SERV. BLDG.	1,920
PHASE D	
BLDGS. D1–D14	49,056
BLDG. DA – POOL HOUSE	1,200
BLDG. DB – BARN	384
PHASE E	
BLDGS. E1–E14	49,056
BLDG. EA – POOL HOUSE	1,200
PHASE F	
BLDGS. F1–F8	28,032
BLDG. FA – POOL HOUSE	1,200
OTHERS	
FARM EQUIPMENT	1,620
COMMUNITY CENTER – 2-STORY	8,886
1-BDR LOFT APARTMENTS – 2-STORY+BASEMENT (16,425 FOOTPRINT)	32,850
VEGETABLE STANDS TOTAL OF 4 (72 EACH)	288

PARKING

	REQ. RATIO	REQ. STALLS	PROVIDED
PARCEL #1			
BLDG. 1 (INCLUDES OUTDOOR SEATING)	1/100 + 6 STACK FOR WINDOW	58	61
PARCEL #2			
BLDG. 2	1/250	5	
BLDG. 3	1/250	80	
BLDG. 4	1/75	82	
BLDG. 5	1/250	15	
BLDG. 6	1/250	11	
BLDG. 11	1/300 + 1/10,000 GROSS YARD AREA	3	
	PARCEL #2 SUB-TOTAL	196	199
PARCEL #3			
BLDG. 7	1/250	8	
BLDG. 8	1/250	62	
BLDG. 9	10 FOR FIRST 2,000 + 1/175 OVER 2,000	124	
BLDG. 10	1/300 + 1/10,000 GROSS YARD AREA	2	
	PARCEL #3 SUB-TOTAL	196	218
PARCEL #4			
APARTMENTS	1.5 COVERED +	90	
	1 UNCOVERED GUEST FOR EVERY 5 UNITS	18	
	PARCEL #4 SUB-TOTAL	108	64 (26+38 BSMT.)
R.O.W.			12
PARCEL #5			
PHASE A			115
PHASE B			115
PHASE C (VILLAGE SERV. BLDG.)			7
PHASE C			50
PHASE D			70
PHASE E			75
PHASE F			40
	TOTAL		1,026

LEGEND

- PROPERTY LINE
- NEW PROPERTY LINE
- FH FIRE HYDRANT
- FENCE
- PERIMETER WALL
- SOLAR PANEL CANOPIES @ RESIDENTIAL PARKING BAYS
- TYPICAL TRASH ENCLOSURE @ RESIDENTIAL AREAS
- TE TRASH ENCLOSURE @ COMMERCIAL AREAS

0' 60' 120' 180'

SCALE: 1" = 60'

SRK STEWART ROMBERGER KITE SRK ARCHITECTS INC.

2254 South Figueroa Street

Los Angeles, CA. 90007

Tel. (213) 747-1199

www.srkarchitectsinc.com

DEVELOPER:

LA WORLD CONSTRUCTION

2029 Century Park East #400
Century City, CA. 90067

CONSULTANT:

GREEN DAY VILLAGE
Desert Hot Springs, CA

NOT FOR CONSTRUCTION

DRAWINGS ISSUED

DELTA	DESCRIPTION	DATE
-	ENTITLEMENT SUBMITTAL	6/30/22

LICENSED ARCHITECT BRIAN A. KITE C-11258 DATE 08/31/23 STATE OF CALIFORNIA

Scale: 1" = 60'-0"
Checked by: RH, BK
Drawn by: RH, HC
Project #: 22002.01

6/22/2022

Drawing Title & Number:

PROPOSED SITE PLAN

A-1.1

© 2022 Ownership and use of documents: All drawings, specifications and copies thereof furnished by Stewart, Romberger & Kite are and shall remain its property. They are to be used in respect to this project and are not to be used on any other project. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the project is not to be construed as publication in derogation of Stewart, Romberger and Associates' common law copyright or other reserved rights.

© SRK Architects Inc. 2022 – 36"x24" Sheet

S:\+SRK ARCHITECTS INC+\+PROJECTS\PROJECTS\22002 - Green Day Village - Desert Hot Springs\00 PRE-DESIGN\A-ARCHITECTURAL\CAD\SP01-02X-SITE_A-1.1.dwg Jun 22, 2022 - 4:15pm

N89°41'59"E

1226.13'

1308.45'

APN: 657-280-003

FF=66.70
4,608 S.F.
1,152 S.F.
,024 S.F.
15,360 S.F.
6,144 S.F.
2,944 S.F.
2,592 S.F.
1,920 S.F.
15,360 S.F.
10,927 S.F.

CART
CART
CART
C
T
LOADING
LOADING

Drive
Palm

1322.08'

N00°25'03"E

N89°40'04"W

1243.72'

N00°20'56"W

N

0 20' 40' 80'
SCALE: 1"=40'



Photo 1: South-by-southwest-facing view of Ephemeral Drainage D1 where it initially enters eastern boundary of project site at washout of berm along Palm Drive's western roadway margin. 5/27/2022



Photo 2:.Northwest-facing view of Ephemeral Drainage D1 (upstream), located approximately 100 feet north of southern boundary of project site. 3/6/2022



Photo 3: North-facing view of Desert Riparian Wash area in southeastern segment of the project site. 3/5/2022



Photo 4: Northwest-facing view of Swale D1S2. 5/27/2022



Photo 5: Northeast-facing view of section of Swale D1S3. Photo taken from D1 at southern boundary of project site. Stabilized desert dune is the upland area behind D1S3. 3/6/2022



Photo 6:.Southwest-facing view of Swale D1S3, located at the southeastern segment of the project site. 5/26/2022



Photo 7: Southeast-facing view of Ephemeral Drainage D2 (downstream), which occurs along the southern project boundary where D2 discharges into D1. 3/6/2022

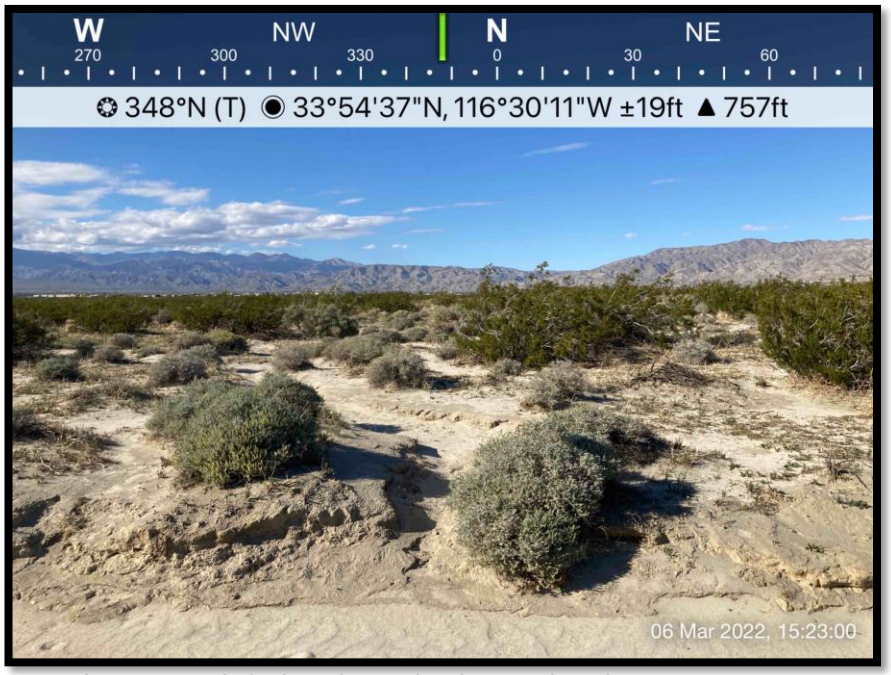


Photo 8: North-facing photo of Ephemeral Drainage D2 (upstream), which occurs along the southern project boundary where D2 discharges into D1. 3/6/2022



Photo 9: North-facing view of Ephemeral Drainage D3 (upstream). Photo taken from D1 at southern project boundary. 3/6/2022



Photo 10:.Southwest facing view of Ephemeral Drainage D3 (downstream), where it discharges into D1 at southern boundary of project site. 3/6/2022



Photo 11: Northwest-facing photo of Ephemeral Drainage D4 (upstream). 5/26/2022



Photo 12: South-facing view of Ephemeral Drainage D4 (downstream), near where it discharges into D1 at the southern boundary of the project site. 5/26/2022



Photo 13: Southeast-facing view of Swale D4S1. 5/26/2022



Photo 14:.Southwest facing view of the Playa, located at the northeastern segment of the project site near the northern boundary. Creosote bushes on raised hummocks. 5/27/2022



Photo 15: Surface soil cracks at lowest-lying area of the playa, located at the northeastern segment of the project site. 5/27/2022



Photo 16: South-by-southeast-facing view of California palm (*Washingtonia filifera*) stand that occurs where Ephemeral D1 dissipates into sheetflow, approximately 300 feet south of project site. 5/26/2022

APPENDIX D

Climate Data

PALM SPRINGS, CALIFORNIA (046635)

Period of Record Monthly Climate Summary

Period of Record : 03/01/1906 to 06/10/2016

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Average Max. Temperature (F)	69.6	73.7	79.3	86.7	94.5	103.0	108.2	106.8	101.7	91.4	78.7	69.8	88.6
Average Min. Temperature (F)	42.3	45.6	48.8	54.1	60.4	67.0	75.2	74.3	68.1	59.4	49.2	42.3	57.2
Average Total Precipitation (in.)	1.13	1.00	0.58	0.18	0.05	0.05	0.20	0.27	0.29	0.29	0.42	1.01	5.49
Average Total SnowFall (in.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Average Snow Depth (in.)	0	0	0	0	0	0	0	0	0	0	0	0	0

Percent of possible observations for period of record.
Max. Temp.: 97% Min. Temp.: 96.4% Precipitation: 98% Snowfall: 98.1% Snow Depth: 98.1%
Check Station Metadata or Metadata graphics for more detail about data completeness.

Western Regional Climate Center, wrcc@dri.edu

Monthly Report

California Irrigation Management Information System (CIMIS)

Rendered in ENGLISH Units.

June 2006 - May 2022

Printed on Thursday, June 23, 2022

Indio 2 - Imperial/Coachella Valley - Station 200

Month Year	Total ETo (in)	Total Precip (in)	Avg Sol Rad (Ly/day)	Avg Vap Pres (mBars)	Avg Max Air Temp (°F)	Avg Min Air Temp (°F)	Avg Air Temp (°F)	Avg Max Rel Hum (%)	Avg Min Rel Hum (%)	Avg Rel Hum (%)	Avg Dew Point (°F)	Avg Wind Speed (mph)	Avg Soil Temp (°F)
Jun 2006	9.80 K	0.00 L	634 L	11.0 L	104.1 L	68.8 L	89.4 L	53 L	11 L	23 L	46.4 L	6.7 L	79.1 L
Jul 2006	9.73 K	0.00 L	590 L	17.0 L	108.5 L	74.1 L	95.9 L	52 L	19 L	30 L	58.1 L	6.2 L	86.3 L
Aug 2006	9.04 K	0.00	606	13.8 K	105.2	66.8 L	90.0 K	56 K	14 K	29 K	52.2 K	5.5	82.6
Sep 2006	7.33	0.00	501	12.0	99.3	58.4 L	83.4 K	73 K	15 K	30	47.4	5.0 K	79.0
Oct 2006	4.87 K	0.00	397	12.0	86.9 K	56.0 L	70.8 K	82 K	23 K	48	47.8	5.3 K	70.8
Nov 2006	3.58	0.00	313	8.4	81.0 K	49.6 K	64.5	81	19	40	39.2	4.0	63.5
Dec 2006	2.60 K	0.00 L	267 L	5.8 L	70.9 L	37.6 L	53.2 L	84 L	19 L	42 L	30.0 L	3.6 L	53.5 L
Tots/Avgs	46.95	0.0	473	11.4	93.7	58.8	78.2	69	17	35	45.9	5.2	73.5

Indio 2 - Imperial/Coachella Valley - Station 200

Month Year	Total ETo (in)	Total Precip (in)	Avg Sol Rad (Ly/day)	Avg Vap Pres (mBars)	Avg Max Air Temp (°F)	Avg Min Air Temp (°F)	Avg Air Temp (°F)	Avg Max Rel Hum (%)	Avg Min Rel Hum (%)	Avg Rel Hum (%)	Avg Dew Point (°F)	Avg Wind Speed (mph)	Avg Soil Temp (°F)
Jan 2007	2.93 K	0.00 L	275 L	4.9 L	66.5 L	35.6 L	50.6 L	78 L	19 L	39 L	24.6 L	4.4 L	49.3 L

APPENDIX E

Soils Report

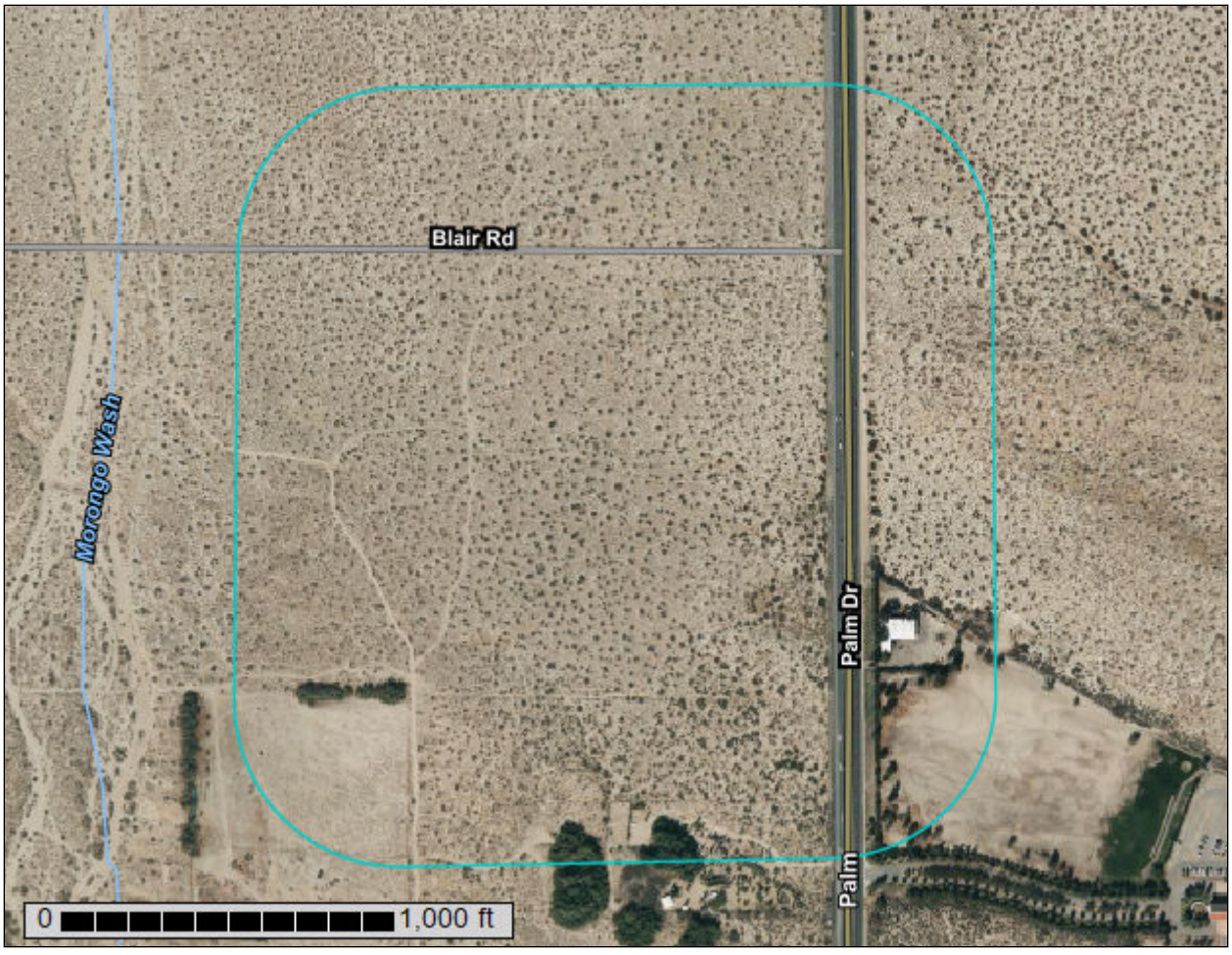
United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Riverside County, Coachella Valley Area, California



February 23, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map (Biological Study Area).....9
Legend.....10
Map Unit Legend (Biological Study Area).....12
Map Unit Descriptions (Biological Study Area).....12
Riverside County, Coachella Valley Area, California.....14
MaB—Myoma fine sand, 0 to 5 percent slopes.....14
MaD—Myoma fine sand, 5 to 15 percent slopes.....15
Soil Information for All Uses.....17
Suitabilities and Limitations for Use.....17
Wildlife Management.....17
Desert Tortoise (CA).....17
Soil Properties and Qualities.....24
Soil Chemical Properties.....24
pH (1 to 1 Water).....24
Ecological Sites.....31
All Ecological Sites — 31
Map—Dominant Ecological Site.....32
Legend—Dominant Ecological Site.....33
Table—Ecological Sites by Map Unit Component.....35
References.....36
Glossary.....38

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

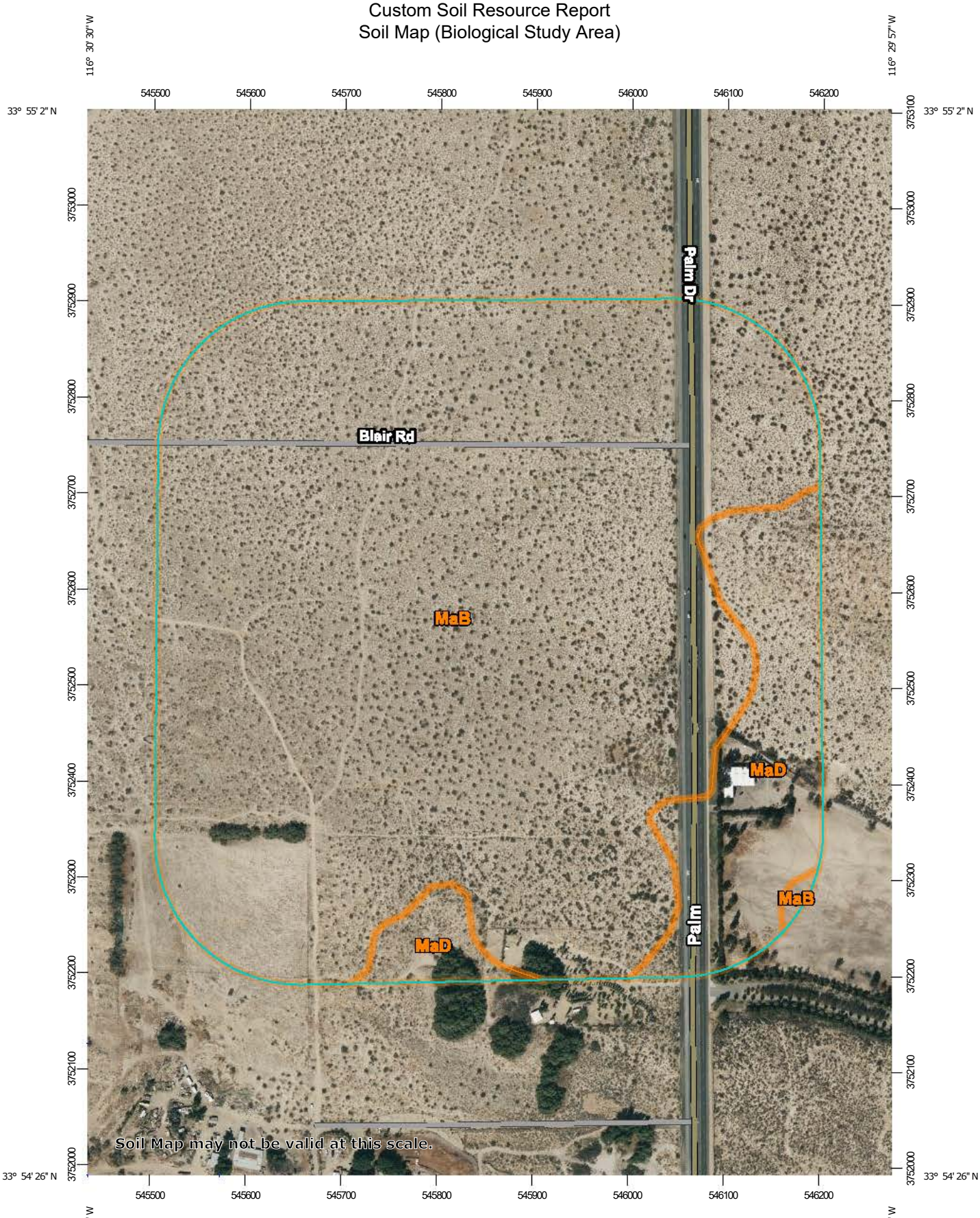
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.



Map Scale: 1:5,420 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 13, Sep 15, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 3, 2021—May 27, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend (Biological Study Area)

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MaB	Myoma fine sand, 0 to 5 percent slopes	101.2	86.2%
MaD	Myoma fine sand, 5 to 15 percent slopes	16.3	13.8%
Totals for Area of Interest		**117.5**	**100.0%**

Map Unit Descriptions (Biological Study Area)

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The

delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Riverside County, Coachella Valley Area, California

MaB—Myoma fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hkw3
Elevation: -200 to 1,800 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 to 75 degrees F
Frost-free period: 270 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Myoma and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myoma

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind blown sandy alluvium

Typical profile

H1 - 0 to 18 inches: fine sand
H2 - 18 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R031XY007CA - Lacustrine Basin and Large RIver Floodplain
Hydric soil rating: No

Minor Components

Coachella

Percent of map unit: 4 percent

Hydric soil rating: No

Carsitas

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed, noncalcareous soils

Percent of map unit: 4 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Channels
Hydric soil rating: Yes

MaD—Myoma fine sand, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: hkw4
Elevation: -200 to 1,800 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 to 75 degrees F
Frost-free period: 270 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Myoma and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myoma

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind blown sandy alluvium

Typical profile

H1 - 0 to 18 inches: fine sand
H2 - 18 to 60 inches: sand

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R031XY007CA - Lacustrine Basin and Large RIver Floodplain
Hydric soil rating: No

Minor Components

Coachella

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed, calcareous soils

Percent of map unit: 5 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Channels
Hydric soil rating: Yes

Carsitas

Percent of map unit: 2 percent
Hydric soil rating: No

Soil Information for All Uses

Suitabilities and Limitations for Use

The Suitabilities and Limitations for Use section includes various soil interpretations displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each interpretation.

Wildlife Management

Wildlife Management interpretations are tools for evaluating the suitability of the soil for various components of wildlife habitat, and as habitat of different types or species of wildlife. Example interpretations include crawfish aquaculture, burrowing animals and reptiles, grasses and legumes for food and cover, and freshwater wetland plants.

Desert Tortoise (CA)

This interpretation gives information about the soils as potential habitat for the desert tortoise. It is intended to be used only in those soil survey areas that have the potential for desert tortoise habitat. The soils are rated according to their suitability for burrowing by desert tortoises. Burrows are considered a necessary part of the habitat.

This interpretation is intended to provide guidelines in the identification and selection of sites that have the best potential for preserving, maintaining, or increasing local populations of the desert tortoise. It is of a general nature. It is designed to be used in the planning process to identify areas of concern prior to the application of conservation practices. Based upon the wildlife objectives, these areas can be avoided or practices can be adjusted to minimize damage to the burrow habitat. The guide does not take into account climate or soil temperature, which may influence the presence or distribution patterns of a wildlife species. The presence or absence of a species is determined at the local level.

The interpretation provides suitability ratings and identifies the dominant soil characteristics that influence the suitability of a site for burrowing by desert

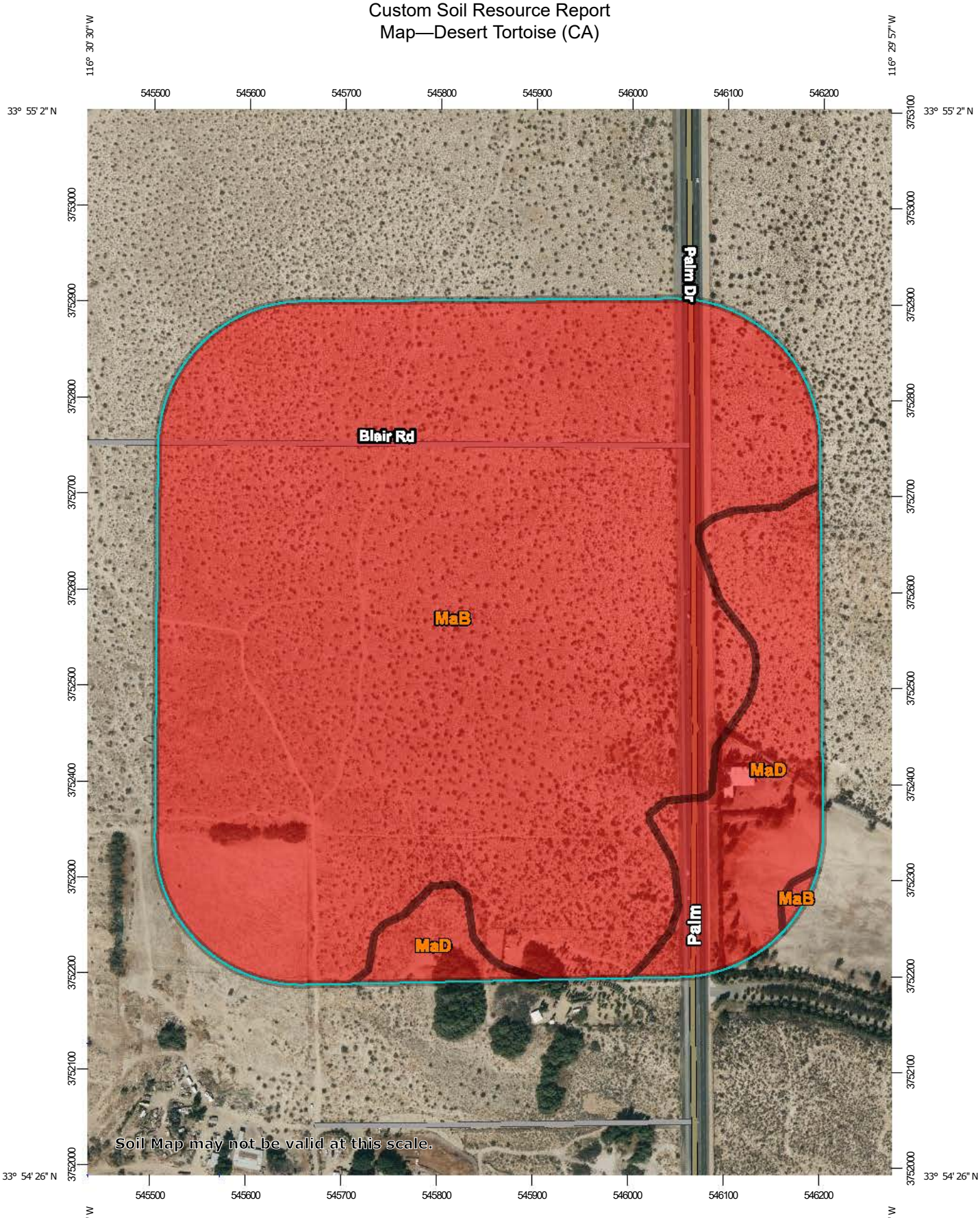
tortoises. This information allows the user to plan and develop alternatives in site selection by identifying the site that best meets the wildlife habitat requirements.

Soils that are rated "well suited" have no restrictions and are favorable for burrowing by desert tortoises. Colonization and population densities may be above average if other habitat factors are not limiting. A rating of "suited" indicates that the soil is suitable for burrowing by desert tortoises and that some restrictive features may limit the use of the habitat. Colonization and population densities may be average if the other habitat requirements are met. A rating of "poorly suited" indicates that the soil characteristics may limit establishment, maintenance, or use of the soil by burrowing species. Colonization and population densities may be restricted by the limiting factors even though all the other species habitat requirements are met.

The final identification and selection of a site for burrowing by desert tortoises are determined by the limitations of the soils that influence excavation, maintenance, and preservation of the burrows. This interpretation identifies the soil-related restricting features that have the most significant effects on the habitat.

The components listed for each map unit in the accompanying Summary by Map Unit table in Web Soil Survey or the Aggregation Report in Soil Data Viewer are determined by the aggregation method chosen. An aggregated rating class is shown for each map unit. The components listed for each map unit are only those that have the same rating class as the one shown for the map unit. The percent composition of each component in a particular map unit is given to help the user better understand the extent to which the rating applies to the map unit.

Other components with different ratings may occur in each map unit. The ratings for all components, regardless the aggregated rating of the map unit, can be viewed by generating the equivalent report from the Soil Reports tab in Web Soil Survey. Onsite investigation may be needed to validate these interpretations and to confirm the identity of the soil on a given site.



Map Scale: 1:5,420 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- Poorly suited
- Suited
- Well suited
- Not rated or not available

Soil Rating Lines
- Poorly suited
- Suited
- Well suited
- Not rated or not available

Soil Rating Points
- Poorly suited
- Suited
- Well suited
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 13, Sep 15, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 3, 2021—May 27, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND	MAP INFORMATION
	imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Tables—Desert Tortoise (CA)

Map unit symbol	Map unit name	Rating	Component name (percent)	Rating reasons (numeric values)	Acres in AOI	Percent of AOI
MaB	Myoma fine sand, 0 to 5 percent slopes	Poorly suited	Myoma (85%)	Sands in 0 to 30-inches depth (1.00)	101.2	86.2%
MaD	Myoma fine sand, 5 to 15 percent slopes	Poorly suited	Myoma (85%)	Sands in 0 to 30-inches depth (1.00)	16.3	13.8%
Totals for Area of Interest					**117.5**	**100.0%**

Rating	Acres in AOI	Percent of AOI
Poorly suited	117.5	100.0%
Totals for Area of Interest	**117.5**	**100.0%**

Rating Options—Desert Tortoise (CA)

Aggregation Method: Dominant Condition

Aggregation is the process by which a set of component attribute values is reduced to a single value that represents the map unit as a whole.

A map unit is typically composed of one or more "components". A component is either some type of soil or some nonsoil entity, e.g., rock outcrop. For the attribute being aggregated, the first step of the aggregation process is to derive one attribute value for each of a map unit's components. From this set of component attributes, the next step of the aggregation process derives a single value that represents the map unit as a whole. Once a single value for each map unit is derived, a thematic map for soil map units can be rendered. Aggregation must be done because, on any soil map, map units are delineated but components are not.

For each of a map unit's components, a corresponding percent composition is recorded. A percent composition of 60 indicates that the corresponding component typically makes up approximately 60% of the map unit. Percent composition is a critical factor in some, but not all, aggregation methods.

The aggregation method "Dominant Condition" first groups like attribute values for the components in a map unit. For each group, percent composition is set to the sum of the percent composition of all components participating in that group. These groups now represent "conditions" rather than components. The attribute value associated with the group with the highest cumulative percent composition is returned. If more than one group shares the highest cumulative percent composition, the corresponding "tie-break" rule determines which value should be returned. The "tie-break" rule indicates whether the lower or higher group value should be returned in the case of a percent composition tie. The result returned by this aggregation method represents the dominant condition throughout the map unit only when no tie has occurred.

Component Percent Cutoff: None Specified

Components whose percent composition is below the cutoff value will not be considered. If no cutoff value is specified, all components in the database will be considered. The data for some contrasting soils of minor extent may not be in the database, and therefore are not considered.

Tie-break Rule: Higher

The tie-break rule indicates which value should be selected from a set of multiple candidate values, or which value should be selected in the event of a percent composition tie.

Soil Properties and Qualities

The Soil Properties and Qualities section includes various soil properties and qualities displayed as thematic maps with a summary table for the soil map units in the selected area of interest. A single value or rating for each map unit is generated by aggregating the interpretive ratings of individual map unit components. This aggregation process is defined for each property or quality.

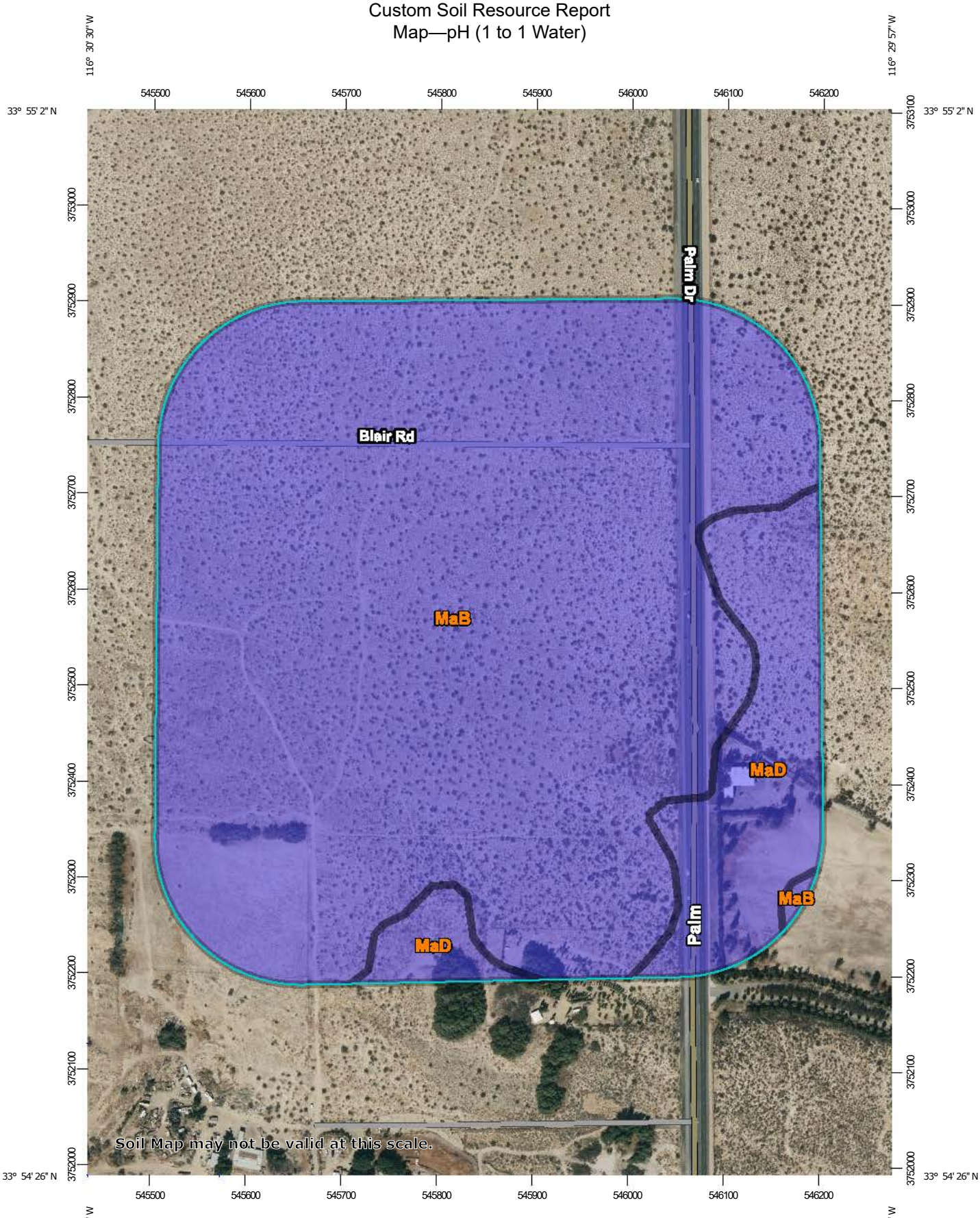
Soil Chemical Properties

Soil Chemical Properties are measured or inferred from direct observations in the field or laboratory. Examples of soil chemical properties include pH, cation exchange capacity, calcium carbonate, gypsum, and electrical conductivity.

pH (1 to 1 Water)

Soil reaction is a measure of acidity or alkalinity. It is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion. In general, soils that are either highly alkaline or highly acid are likely to be very corrosive to steel. The most common soil laboratory measurement of pH is the 1:1 water method. A crushed soil sample is mixed with an equal amount of water, and a measurement is made of the suspension.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.



Map Scale: 1:5,420 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 250 500 1000 1500

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

APPENDIX F

Field Data Sheets

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: 7129a Greenday
Project Number: 7129a
Stream: W1
Investigator(s): Matthew Sutton

Date: 3/5/2022 **Time:** 1:25 pm
Town: Desert Hot Springs **State:** CA
Photo begin file#: 5039 **Photo end file#:** 5098

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details: southern edge of the project site approx. 500' from SW corner and about 2' east of centerline of W1

Projection: WGS 1984 **Datum:** WGS

Coordinates: 33°59'37.912"N 116°30'18.912"W

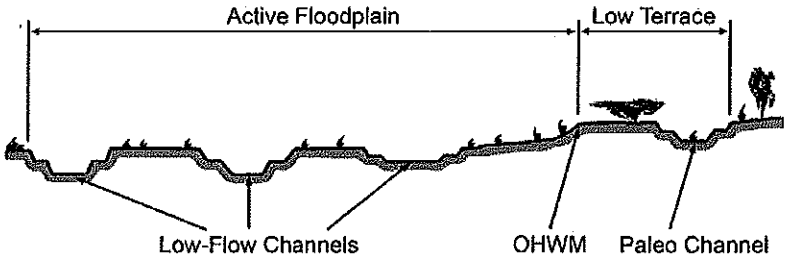
Potential anthropogenic influences on the channel system: People from nearby areas and their dogs could walk in channel. Some litter present within banks. Dirt roads west of the channel may contribute water flow and sediment.

Brief site description: The channel begins at the nexus of dirt roads at the southwest corner of the project site. There are no banks at the beginning of the channel and banks develop between 200 and 500 feet east of beginning. Then, banks dissipate to unidentifiable with signs of ponding (water/mud cracks) for the next 200 feet until another tributary discharges into channel.

Checklist of resources (if available):

- [X] Aerial photography
  Dates:
- [X] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [X] Global positioning system (GPS)
- [ ] Other studies
- [ ] Stream gage data
  Gage number:
  Period of record:
- [ ] History of recent effective discharges
- [ ] Results of flood frequency analysis
- [ ] Most recent shift-adjusted rating
- [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [X] GPS
   - [ ] Digitized on computer
   - [ ] Other:

Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
2.56	64	Cobble	Gravel
0.157	4	Pebble	
0.079	2.00	Granule	
0.039	1.00	Very coarse sand	
0.020	0.50	Coarse sand	
1/2 0.0098	0.25	Medium sand	Sand
1/4 0.005	0.125	Fine sand	
1/8 0.0025	0.0625	Very fine sand	
1/16 0.0012	0.031	Coarse silt	
1/32 0.00061	0.0156	Medium silt	Silt
1/64 0.00031	0.0078	Fine silt	
1/128 0.00015	0.0039	Very fine silt	
		Clay	Mud



Project ID: 7129a **Cross section ID:** W1-X **Date:** 3/8/2022 **Time:** 1:40 pm

Cross section drawing: (see below) sections of the channel for which there was no definable bank were mapped based on surface relief and soil color and change in vegetative cover. Soil color was used as an indicator of active floodplain because there was a rain event in the previous week and areas with water flow and ponding remain moist in many areas.

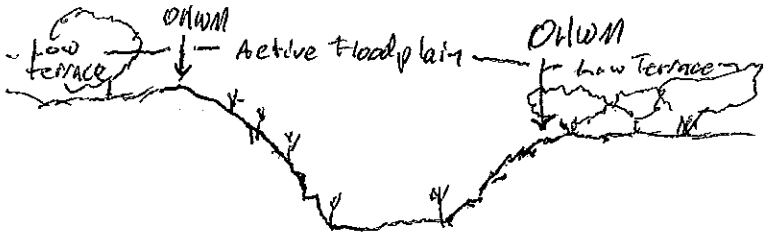
OHWM

GPS point: 33°54'37.912"N 916°30'18.912W

Indicators:

- ☐ Change in average sediment texture
- ☒ Change in vegetation species
- ☒ Change in vegetation cover
- ☒ Break in bank slope
- ☒ Other: soil color
- ☐ Other: _____

Comments:



Floodplain unit:

☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: 33°54'37.912"N 916°30'18.912"W

AF1X = Chaenactis Fremontii
AF2 = Malacothrix glabrata
AG1 = Schismus barbatus

Characteristics of the floodplain unit:

Average sediment texture: very coarse sand

Total veg cover: 31 % Tree: 0 % Shrub: 1 % Herb: 24 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☒ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☒ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☒ Surface relief
- ☒ Other: soil color
- ☒ Other: vegetation density
- ☐ Other: _____

Comments: Very limited evidence that water level in channel exceeds banks. However, there are sections of the channel without definable banks. In these areas, the floodplain widens out both to the north and south. At these points soil color was used as the main indicator for the limits of the floodplain. The dominant herb in the channel bottom is Brassica tournefortii. There is also Erodium cicutarium, AF1, Larrea tridentata, Ambrosia dumosa, and AF2, and AG1 Ambrosia salsola

The active floodplain is within channel banks. Represented by bare ground/rock points at cut bank and where _____ and occasional shrub cover forb cover

Project ID: 7129a **Cross section ID:** W1-X **Date:** 3/5/2022 **Time:** 1:40 pm

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: ~~Same as~~ 33° 54.63'141N 116° 30.27393W

Characteristics of the floodplain unit:
Average sediment texture: → Top 1/4": granule Base substrate: fine sand
Total veg cover: 1 % Tree: 0 % Shrub: 1< % Herb: 1 %
Community successional stage:
- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:
- ☒ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☒ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☒ Surface relief
- ☒ Other: paucity of vegetation
- ☒ Other: denser toward lower elevations OHWM
- ☐ Other: _____

Comments: Characterized by U-shaped channel - Channel bottom consists of coarser sand in upper layer and compacted finer sands and silts and clays at base. At beginning of channel where road intersects the SW corner of property channel has low gradient with lack of cut banks after channel intersects with W6 and it progresses eastward energy of water flow increases and banks get cut. OHWM is considered at top of banks or below where vegetation density increases.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: same as active floodplain

Characteristics of the floodplain unit:
Average sediment texture: _____
Total veg cover: _____ % Tree: _____ % Shrub: _____ % Herb: _____ %
Community successional stage:
- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:
- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☐ Surface relief
- ☐ Other: _____
- ☐ Other: _____
- ☐ Other: _____

Comments: No clear evidence of low terrace above banks of channel.

BIOLOGICAL FIELD SURVEY FORM

Job # 5929 Project Name AKM San Timoteo Storm Drain

Date 5/18/16 Surveyor(s) MT & HP

LOCATION DESCRIPTION

Site Address:	Adriano	City, State:	Moreno Valley, CA
Landowner or Manager		County:	Riverside

Start (time)	1:15 pm
Temp (°F)	102
Cloud Cover (%)	0
Precipitation	0
Wind (mph)	2-3

End (time)	7:46pm
Temp (°F)	97
Cloud Cover (%)	0
Precipitation	0
Wind (mph)	3-5

EXISTING SITE USES AND CHARACTERISTICS

Current Land Use(s): Developed (Roads, Houses) & Ag Fields

Surrounding Land Use(s): Residential, Ruderal, Ag. Fields

Visible Disturbances: -

Threats: -

Non-native species: Russian thistle, puncture vine, schismus barbatus

Comments: Some of the Ag Fields have been recently tilled.

Habitat Descriptions / Notes: -trimble w/ no # keeps freezing.

-Add how wide it is for center line -We focused on JD & Burrow Survey today.

-change so the offset direction is not required.

-Add CDFW - significant nexus to data dictionary

-ground squirrel burrows are present in the north side of the BSA

Burrow Survey

Start.
- 99°F
- 3-5 mph
- 0% cloud cover
- 5:20 pm

end
- 97°F
- 3-5
- 0%
- 7:46

Areas in the south of the BSA have been recently tilled so some of these areas were not surveyed.

UltraSystems
environmental management planning

16431 Scientific Way
Irvine, CA 92618
Phone: 949-788-4900 • Fax: 949-788-4901
www.ultrasystems.com

SPECIES OBSERVATIONS

PLANT SPECIES PRESENT

specify plant layer as herb (H), shrub (S) or tree (T)

Species	Layer
Hordeum	
Russian thistle	
Schismus barbatus	
Clarkia pul	
Ambrosia	
Puncture Vine	
Wake Purslane	
Helianthus annuus	
Encelia farinosa	
Cherry (Photo S23)	
W. Sycamore	
Elm	
Salix exigua	
Bulrush	
Mexe sprangletop	
Black mallow	
Thurschfeldia incana	
Dove weed	
Avena fatua	
Sandmat	
Brass Buttons	

Drain near corner of Larrac & Kalmia

WILDLIFE SPECIES PRESENT

specify observation type as aural (A), sign (S), or visual (V)

Species	Observation
CATO	
HOSP	
WRCT / CACT look up regions	
Grand Squirrels	
ANHU	

BIOLOGICAL FIELD SURVEY FORM

Job # 5929 Project Name AKM San Timoteo Storm Drain

Date 8/22/16 Surveyor(s) MT & HR

LOCATION DESCRIPTION

Site Address:	San Timoteo	City, State:	Moreno Valley
Landowner or Manager		County:	Riverside

Start (time)	9:00am
Temp (°F)	77
Cloud Cover (%)	0
Precipitation	0
Wind (mph)	0-1

End (time)	1:00 pm
Temp (°F)	90
Cloud Cover (%)	0
Precipitation	0
Wind (mph)	0-1

EXISTING SITE USES AND CHARACTERISTICS

Current Land Use(s): —

Surrounding Land Use(s): —

Visible Disturbances: —

Threats: —

Non-native species: —

Comments: Met with Engineers Quang Nguyen (City of Moreno Valley) & Morgan King (AKM Engineers)

Habitat Descriptions / Notes:

- Started JD at 28155 Locust Ave.
- Review hydrology study for Kalmia av & Carrie Ln
- Two catch basins on low point on Carrie
- Ask Damian - or tree of life how much water is required for riparian areas on Kalmia av & Carrie Ln.
- Discussed ponding on Cottonwood trees on Carrie Ln & Kalmia
- If you can determine the ponding of frequency of the flow
- Culvert on Pettit (south end) is regularly maintained. Engineer suggested 22 ft. from concrete pipe to avoid riparian trees. 4 ft high impact.

—

South of Pettit st: Streambed is 6ft but will need 8' for proper slope of 2-1

UltraSystems
environmental management planning

16431 Scientific Way
Irvine, CA 92618
Phone: 949-788-4900 • Fax: 949-788-4901
www.ultrasystems.com

SPECIES OBSERVATIONS

PLANT SPECIES PRESENT

specify plant layer as herb (H), shrub (S) or tree (T)

Species	Layer
Schinus molle (Pepper tree)	
Eucalyptus sp.	
Ornamental Fruits	
Hairy Crabgrass (Digitaria sanguinalis)	
Olive tree (Olea europaea)	
Pine Tree Orange tree (Citrus sinensis)	
49 Queen Palm (Syagrus romanzoffiana	
3 needle Pine 11" long	
Cypress tree	

WILDLIFE SPECIES PRESENT

specify observation type as aural (A), sign (S), or visual (V)

Species	Observation
CATS	✓

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: 7129a Greenday
Project Number: 7129a
Stream: W2
Investigator(s): Matthew Sutton

Date: 3/6/2022 **Time:** 8:55am
Town: Desert Hot Springs **State:** CA
Photo begin file#: 5111 **Photo end file#:** 5138

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: In SE quadrant approximately 100 feet north of southern boundary.

Projection: WGS 1984 **Datum:**
Coordinates: 33°54'38.811"N 116°30'10.785"W

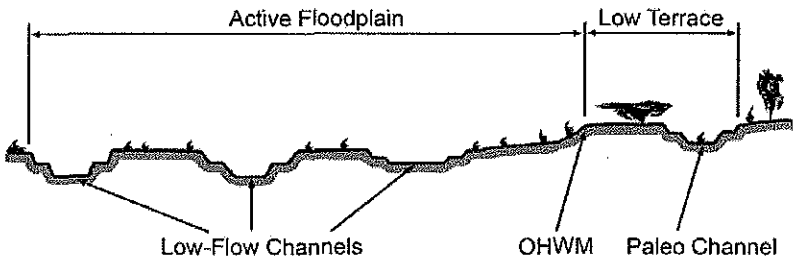
Potential anthropogenic influences on the channel system: Some erosion of banks may occur from occasional foot, bike or domestic dog traffic. Very limited human activity.

Brief site description: Site is located approximately 550 feet down stream of its point of origin at the eastern edge of the property. Channel bottom consists of lightly rippled sands. Banks have low slope (approximately 6 to 15 degrees) and consist of compressed and hardened layers of silt and sand (i.e., flaser bedding). There is some incision in flaser bedding indicating higher energy flows. Deposition of fine sands and silt above bank on west bank

Checklist of resources (if available):

- ☒ Aerial photography
  - Dates:
- ☒ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☒ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  - Gage number:
  - Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

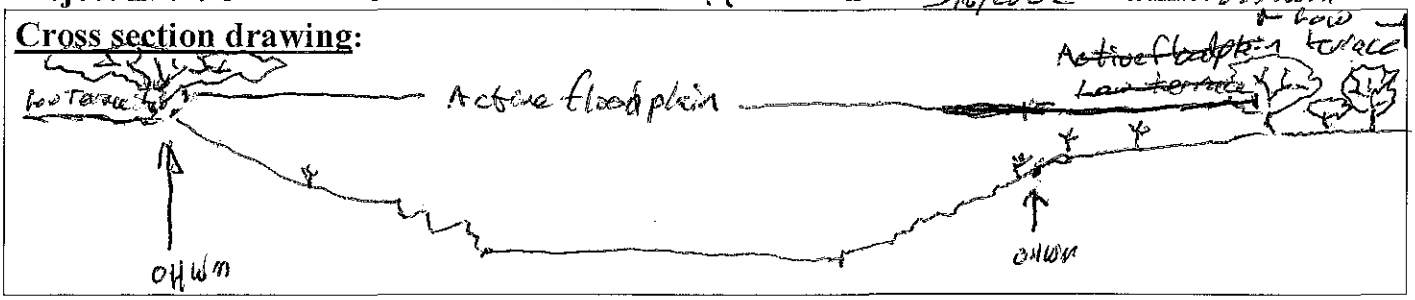


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☒ GPS
   - ☐ Digitized on computer
   - ☐ Other:

Project ID: 712a **Cross section ID:** W2-X **Date:** 3/6/2022 **Time:** 8:55am

Cross section drawing:



OHWM

GPS point: 33°54'38.738" N 116°30'10.839"

Indicators:

- [x] Change in average sediment texture
- [ ] Change in vegetation species
- [ ] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

Comments: OHWM indistinct at areas where bank slope is gradual and ~~low terrace~~ and the slope angle does not change significantly at point of intersection with low terrace. In these areas, OHWM determined mainly by change in sediment texture from coarse to fine.

Floodplain unit:

- [ ] Low-Flow Channel
- [x] Active Floodplain
- [ ] Low Terrace

GPS point: ~~33°54'38.738" N 116°30'10.839"~~ 33°54'38.630 N 116°30'10.936"W

Characteristics of the floodplain unit:

Average sediment texture: very course sand

Total veg cover: ~~2~~ 35 % Tree: 0 % Shrub: ~~5~~ 30 % Herb: ~~15~~ 5 %

Community successional stage:

- [ ] ~~NA~~
- [x] Early (herbaceous & seedlings)
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [x] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [x] Surface relief
- [x] Other: change in vegetative cover
- [ ] Other: _____
- [ ] Other: _____

Comments: ~~Both~~ one side of active floodplain and OHWM ~~are marked~~ occur at the top of the bank as primary flow occurs within the banks. There is a network of small channels that occur in the ~~low terrace~~ active floodplain, which may have resulted from ~~an unusually~~ higher energy flow events in which water exceed the bank on that side (west side) The dominant vegetation is Ambrosia dumosa with approximately 25% cover. There is also 5% cover of Larrea tridentata. The scattered herbaceous cover consists of Brassica tournefortii, AF1, and AF2 Ambrosia salsola also occurs.

AF1 = Chaenactis fremontii; AF2 = Malacothrix glabrata

Project ID: 7129a **Cross section ID:** WZ-X **Date:** 3/6/2022 **Time:** 8:55am

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: 33°54'38.811"N 116°30'10.785"W

Characteristics of the floodplain unit:

Average sediment texture: very coarse sand

Total veg cover: 1 % Tree: ____ % Shrub: ____ % Herb: 1 %

Community successional stage:

- ☐ NA
- ☑ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☒ Ripples
- ☐ Drift and/or debris
- ☒ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☒ Surface relief
- ☒ Other: flaser bedding
- ☐ Other: ____
- ☐ Other: ____

Comments:

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: 33°54'38.521"N 116°30'11.056W

Characteristics of the floodplain unit:

Average sediment texture: medium sand

Total veg cover: 50 % Tree: 0 % Shrub: 25 % Herb: 25 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☒ Soil development
- ☐ Surface relief
- ☒ Other: vegetation density change
- ☒ Other: vegetation species dominance
- ☐ Other: ____

Comments: Topography is relatively homogeneous and flat. There are rises in substrate (crests) at base of shrubs. The dominant shrub is Larrea tridenta with approximately 20% cover. The sub-dominant shrub is Ambrosia dumosa with 5% cover. There is approximately 25% cover of herbaceous species, ~~dominate~~ the dominant species is Brassica tournefortii, and there is lower cover of AF1 and AF2. Ambrosia salsola also occurs.

AF1 = Chaenactis fremontii, AF2 = Malacothrix glabrata

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Greenday
Project Number: 7129a
Stream: W3
Investigator(s): Matthew Sutter

Date: 3/6/2022 **Time:** 2:00 p.m.
Town: Desert Hot Springs **State:** CA
Photo begin file#: 5141 **Photo end file#:** 5178

Y ☑ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☑ Is the site significantly disturbed?

Location Details: Location is 102 feet west of where W2 discharges into channel on southern boundary.

Projection: WGS 84 **Datum:**
Coordinates: 33°54'38.057N 116°30'11.700"W

Potential anthropogenic influences on the channel system:
Observed bike and walking trail approximately 50 feet from upstream start of this tributary. This activity could erode the banks of this stream - ~~The banks of the down~~

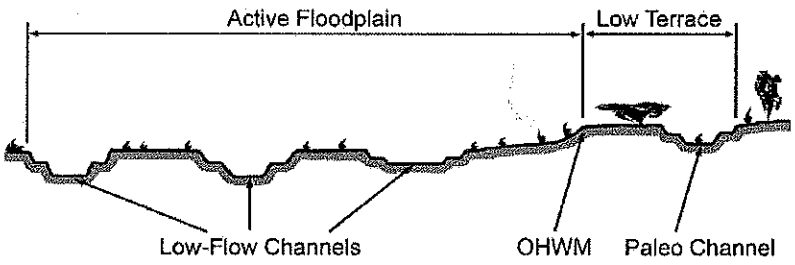
Brief site description: This tributary extends about 75 feet upstream before dissipating into a sheet flow dynamic with no definable features. There is deposition of sand in the low-flow channel bottom, particularly in the 26-foot section of the downstream portion of the stream. The upstream portion of the stream is supplied by sheet flow. The downstream banks are composed of consolidated sedimentary materials.

Checklist of resources (if available):

- ☑ Aerial photography
  Dates:
- ☐ Topographic maps
- ☐ Geologic maps
- ☐ Vegetation maps
- ☑ Soils maps
- ☐ Rainfall/precipitation maps
- ☐ Existing delineation(s) for site
- ☑ Global positioning system (GPS)
- ☐ Other studies

- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

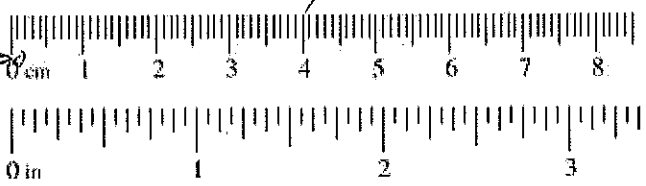
1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☑ GPS
   - ☐ Other:

W2 Data 5-27-2022 M. Sutton

Channel W2a (measured 5/27/2022) consist of a swale formed ~~by~~ at 2 points where W2 overflows banks when its path turns from east-west alignment to north-south alignment as it bends around large aeolian dune in SE section of project site. Part of the swale/channel that is formed is obscured by a bike/pedestrian path that transects project site from Palm Drive to dirt road on western side of site. This path is on northern side of dune. This swale does not have many definable banks except where approximately 20 feet from W2. Otherwise, characterized by moist soil with some mud cracks. Another source of this swale is sheetflow from slightly higher northern topography with some game trails.

Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	Gravel
2.56	64	Cobble	Gravel
0.157	4	Pebble	Gravel
0.079	2.00	Granule	Gravel
0.039	1.00	Very coarse sand	Sand
0.020	0.50	Coarse sand	Sand
1/2 0.0098	0.25	Medium sand	Sand
1/4 0.005	0.125	Fine sand	Sand
1/8 0.0025	0.0625	Very fine sand	Sand
1/16 0.0012	0.031	Coarse silt	Silt
1/32 0.00061	0.0156	Medium silt	Silt
1/64 0.00031	0.0078	Fine silt	Silt
1/128 0.00015	0.0039	Very fine silt	Silt
		Clay	Mud



Channel W2b is the swale that is generated by several factors. It occurs at the southern extent of W2 where W2 intersects with W5. At this intersection W2, which is in a N-S alignment at this juncture then bends 90 degrees to the west which is the beginning of W5. In the last 50 feet of W2's extent there is overflow of its banks. The largest area of overflow occurs east of its eastern bank. This swale ~~that~~ that is formed has a radius of approximately 50 feet. Another major contributor to the swale is sheetflow from the aeolian dune that is immediately north of the swale.

W2 Data 5.27.2022 M Sutton Matth Sutton

Swale W2c occurs at the northern extent of channel W2. This swale is generated by sheetflow that travels from north (higher elevation) to south (lower elevation) along Palm Drive and discharges onto the property at several points ~~at~~ between approximately 500 and 600 feet north of the southeastern boundary.

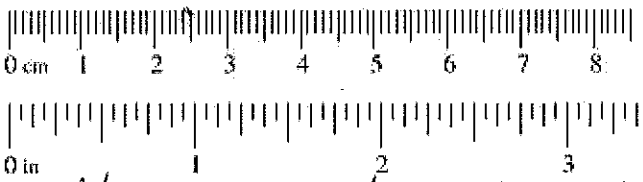
Plant species in W2c

Larrea tridentata
Ambrosia dunosa
Ambrosia salsola
Brassica tournefortii
Peritoma arborea
Croton californicus
Atriplex canescens
Datura wrightii
Bromus rubens
Schismus barbata
Parkinsonia aculeata

Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
2.56	64	Cobble	Gravel
0.157	4	Pebble	
0.079	2.00	Granule	
0.039	1.00	Very coarse sand	
0.020	0.50	Coarse sand	
1/2 0.0098	0.25	Medium sand	Sand
1/4 0.005	0.125	Fine sand	
1/8 0.0025	0.0625	Very fine sand	
1/16 0.0012	0.031	Coarse silt	
1/32 0.00081	0.0156	Medium silt	Silt
1/64 0.00031	0.0078	Fine silt	
1/128 0.00015	0.0039	Very fine silt	
		Clay	Mud

The dominant species in the ~~was~~ swale are Ambrosia salsola, Atriplex canescens, Brassica tournefortii, and Larrea tridentata.



The water enters the project site at points where the berm constructed of a compacted mix of asphalt, rock, and soil is washed out. The berm is on the western edge of Palm Drive's right-of-way at the edge of the roadway margin, and borders the eastern border of the project site. Water that enters the property at these several washout points forms a discontinuous channel consisting of several small channels that fan out into a swale for approximately 250 feet ~~north~~ south from the northernmost washout point to where a single channel with a well defined bed and bank forms. This initial point of the defined channel is approximately 50 feet west of the eastern boundary. The channel continues around a large aeolian dune located in the SE section of the property. The channel proceeds in an easterly direction around the dune until a point 400 feet west of the eastern boundary; it then proceeds in a SE direction until it discharges into at W-E channel.

Project ID: T129a **Cross section ID:** W3·Y **Date:** 3-6-2022 **Time:** 2:00pm

Cross section drawing:



OHWM

GPS point: 33°54'38.086"N 116°30'11.696"W

Indicators:

- [x] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

Comments: Where the banks are incised, the OHWM occurs at the top of bank. In the upstream areas, OHWM is determined by the line where shrubs and denser concentrations of herbaceous species occur as well as surface relief, and change in sediment texture.

Floodplain unit:

- [ ] Low-Flow Channel
- [x] Active Floodplain
- [ ] Low Terrace

GPS point: 33.54'38.186' 116°30'11.379"

Characteristics of the floodplain unit:

Average sediment texture: Coarse sand

Total veg cover: 25 % Tree: 0 % Shrub: 20 % Herb: 10 %

Community successional stage:

- [ ] NA
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Early (herbaceous & seedlings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [x] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [x] Soil development
- [x] Surface relief
- [x] Other: change in vegetation species
- [x] Other: change in vegetation density
- [ ] Other: _____

Comments: Vegetation density is higher in active floodplain than in low-flow channel or at OHWM. Ambrosia dumosa is the dominant shrub with approximately 20% cover. Brassica tournefortii is the dominant forb and AF1 and AF2 also occur.

AF1 = Chaenactis fremontii, AF2 = Malacothrix glabrata

Project ID: T129a **Cross section ID:** W3-X **Date:** 3/6/2012 **Time:** 2:00pm

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: recorded on GPS unit

Characteristics of the floodplain unit:

Average sediment texture: medium sand

Total veg cover: 30 % Tree: ____ % Shrub: 20 % Herb: 10 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☒ Soil development
- ☒ Surface relief
- ☐ Other: ____
- ☐ Other: ____
- ☐ Other: ____

Comments: The low terrace is at a higher elevation than OHWM and active floodplain. It is dominated with shrub species such that Larrea tridentata and Ambrosia dumosa are co-dominant. There is a denser cover of herbaceous species than in the active floodplain.

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: 33°54'38.057"N 116°30'11.700"W

Characteristics of the floodplain unit:

Average sediment texture: coarse sand

Total veg cover: 30 % Tree: ____ % Shrub: 20 % Herb: 10 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☒ Presence of bed and bank
- ☒ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: ____
- ☐ Other: ____
- ☐ Other: ____

Comments: Low-flow channel indicated by deposition of coarse sand, particularly in its downstream reaches. In addition, the downstream section is characterized by a definable bed and bank and there are knick points on the banks where impacted with higher energy water flow.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: 7129a Greenday
Project Number: 7129a
Stream: W4a - W4b
Investigator(s): matthew Sutton

Date: 3/6/2022 **Time:** 4:45 pm
Town: Desert Hot Spri **State:** CA
Photo begin file# 5179 **Photo end file#:** 5220

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details: The channel is about 300 feet west of channel W2 and discharges into stream at southern boundary.

Projection: WGS 84 **Datum:**
Coordinates: 33°54'38.060" 116°30'13.650"

Potential anthropogenic influences on the channel system: There seems to be an infrequently used bike path at the upstream terminus of the channel. Some erosion and additional water flow may enter channel as a result of altered hydrology of bike path.

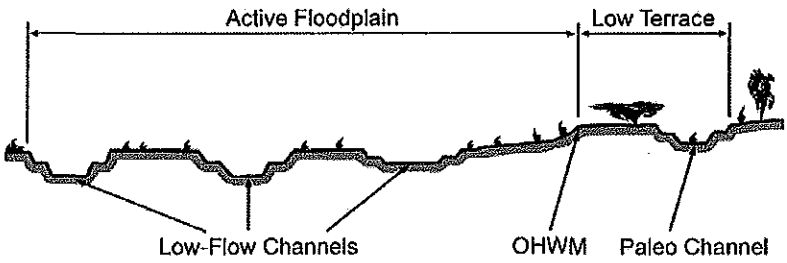
Brief site description: The channel is situated roughly on a north-south axis and discharges to the larger channel that runs along the southern boundary. During the downstream reach of the channel the banks alternate from being incised to having no incisions with a low slope.

Checklist of resources (if available):

- [X] Aerial photography
  Dates:
- [X] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [ ] Existing delineation(s) for site
- [X] Global positioning system (GPS)
- [ ] Other studies
- [ ] Stream gage data
  Gage number:
  Period of record:
- [ ] History of recent effective discharges
- [ ] Results of flood frequency analysis
- [ ] Most recent shift-adjusted rating
- [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

There is a connected channel directly east of W4a named W4b. Both channels are supplied by surface runoff of areas to the north and from foot trail that is W-E and approx 60 feet north of above channel discharges into W5. Channel W4b mapped on 5.27.2022

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [X] GPS
   - [ ] Digitized on computer
   - [ ] Other:

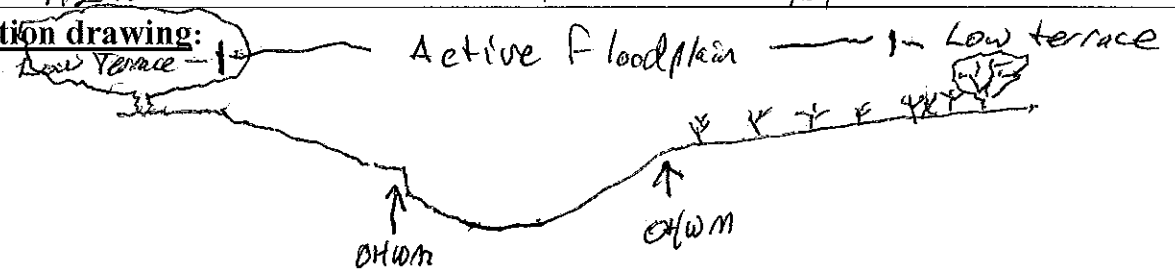
Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
2.56	64	Cobble	Gravel
0.157	4	Pebble	
0.079	2.00	Granule	
0.039	1.00	Very coarse sand	
0.020	0.50	Coarse sand	
1/2 0.0098	0.25	Medium sand	Sand
1/4 0.005	0.125	Fine sand	
1/8 0.0025	0.0625	Very fine sand	
1/16 0.0012	0.031	Coarse silt	
1/32 0.00081	0.0156	Medium silt	Silt
1/64 0.00031	0.0078	Fine silt	
1/128 0.00015	0.0039	Very fine silt	
		Clay	Mud



Project ID: 7129a **Cross section ID:** W4-X **Date:** 3/6/2022 **Time:** 4:45 pm

Cross section drawing:



OHWM

GPS point: 33°54'38.035N 116°30'13.582"

Indicators:

- [x] Change in average sediment texture
- [x] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [x] Other: Top of bank
- [ ] Other: _____

Comments: The ordinary high water mark was determined at top of bank where bank was visible. Where no identifiable bank then beginning of vegetation density and break in bank slope were used as indicators of OHWM. Note, this channel and an adjacent channel share the same OHWM near the point of discharge of each channel.

Floodplain unit:

- [ ] Low-Flow Channel
- [x] Active Floodplain
- [ ] Low Terrace

GPS point: 33°54'38.010N 116°30'13.518"

Characteristics of the floodplain unit:

Average sediment texture: granule

Total veg cover: 25 % Tree: 0 % Shrub: 5 % Herb: 20 %

Community successional stage:

- [ ] NA
- [x] Mid (herbaceous, shrubs, saplings)
- [ ] Early (herbaceous & seedlings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [ ] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [ ] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [x] Surface relief
- [x] Other: change in vegetation density
- [ ] Other: _____
- [ ] Other: _____

Comments: The active floodplain was determined to be above the top of bank. The topography of the floodplain is gently sloping (< 2°) towards the channel. The dominant vegetation is herbaceous. There is approximately 20% herbaceous cover with AF1, and AF2 as co-dominant. Brassica tournefortii, Ambrosia dumosa, Ambrosia salsola and Larrea tridentata also occur at lower cover.

AF1 = Chaenactis fremontii; AF2 = Malacothrix glabrata

Project ID: 7129a **Cross section ID:** W4-A **Date:** 3/6/2022 **Time:** 4:45pm

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: 33°54' 37.995 N 116°30' 13.495"

Characteristics of the floodplain unit:

Average sediment texture: Coarse sand

Total veg cover: 70 % Tree: ____ % Shrub: 20 % Herb: 50 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☒ Soil development
- ☐ Surface relief
- ☒ Other: vegetation density
- ☐ Other: ____
- ☐ Other: ____

Comments: The low terrace occurs at slightly higher topography than active floodplain. It is characterized by higher vegetative density. The dominant species are AF1 and AF2. In the shrub layer, Larrea tridentata and Ambrosia dumosa also occurs co-dominants. Brassica tournefortii also occurs

Floodplain unit: ☒ Low-Flow Channel ☐ Active Floodplain ☐ Low Terrace

GPS point: 33°54' 38.060" N 116°30' 13.650"

Characteristics of the floodplain unit:

Average sediment texture: Granule

Total veg cover: 10 % Tree: 0 % Shrub: 0 % Herb: 10 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☒ Drift and/or debris
- ☒ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☐ Other: ____
- ☐ Other: ____
- ☐ Other: ____

Comments: The low-flow channel is identifiable by deposition of granules in surface bottom coupled with defineable incised banks towards the terminus of its downstream reach. There is some drift along the banks. Three herbaceous species, AF1, AF2 and Brassica tournefortii co-occur.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Green Day Village JD Survey **Date:** 5·26·2022 **Time:** 10:37 am
Project Number: 7129a **Town:** Desert Hot Springs **State:** CA
Stream: W5 **Photo begin file#:** **Photo end file#:**
Investigator(s): M. Sutton, Amir Ayati

Y [X] / N [ ] Do normal circumstances exist on the site?

Y [ ] / N [X] Is the site significantly disturbed?

Location Details: Channel thut is in east to west orientation on southern boundary

Projection: WGS84 **Datum:**
Coordinates:

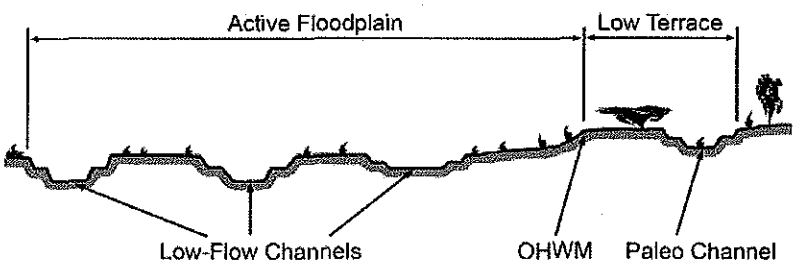
Potential anthropogenic influences on the channel system: Evidence of pedestrian traffic. May also be bicycle use on in channel.

Brief site description: Channel traverses east to west along southern boundary of project site. Sandy bottom of low flow channel. Slopes consist of cut banks with finer bedding, sloped sandy banks with 30° slopes, and shrub vegetation at top of bank. This channel continues until a point approx. 800 feet from western boundary, at which point it meets channel carrying water in a west to east direction. At the point of intersect both channels combine and water flows in a southerly direction towards the property to the south. This south-bearing channel discharges its water within the property to the south where there is little concentration of tamarisk and date palms. The water does not continue moving south because there are slopes rising from 10 to 20 feet in elevation south of the property to the south and north of 20th Street.

Checklist of resources (if available):

- [X] Aerial photography
  - Dates:
- [X] Topographic maps
- [ ] Geologic maps
- [ ] Vegetation maps
- [X] Soils maps
- [ ] Rainfall/precipitation maps
- [X] Existing delineation(s) for site
- [X] Global positioning system (GPS)
- [ ] Other studies
- [ ] Stream gage data
  - Gage number:
  - Period of record:
- [ ] History of recent effective discharges
- [ ] Results of flood frequency analysis
- [ ] Most recent shift-adjusted rating
- [ ] Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units

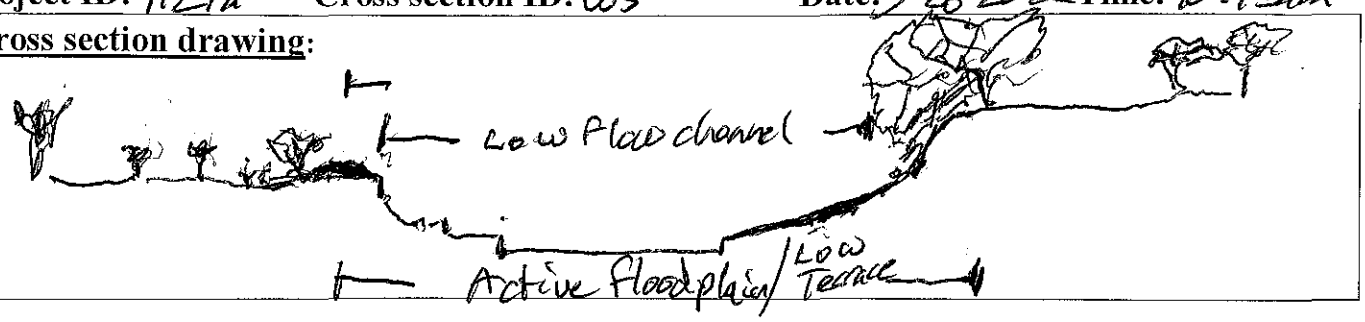


Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - [ ] Mapping on aerial photograph
   - [X] GPS
   - [ ] Digitized on computer
   - [ ] Other:

Project ID: 7129a **Cross section ID:** W5 **Date:** 5/26/2022 **Time:** 10:45am

Cross section drawing:



OHWM

GPS point: ~~33° 54.630~~ 33° 54.63285N 116° 30.21120W

Indicators:

- [ ] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [x] Other: Knick point
- [ ] Other: DOT

Comments: Indicated by top of cut bank, accumulated organic debris, change in slope.

Floodplain unit:

[x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: ~~33° 54.630S N 116° 30.21041 W~~ 33° 54.63075N 116° 30.21041 W

Characteristics of the floodplain unit: - depth of coarser sand varies from 1/4" to 2"

Average sediment texture: granule

Total veg cover: ~~01~~ % Tree: 0 % Shrub: 0 % Herb: 1 %

Community successional stage:

- [x] NA
- [ ] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

AF1 = Chaenactis fremontii; AF2 = Malacothrix glabrata

Indicators:

- [ ] Mudcracks
- [x] Ripples
- [x] Drift and/or debris
- [x] Presence of bed and bank
- [x] Benches
- [ ] Soil development
- [x] Surface relief
- [x] Other: flaser banks
- [x] Other: sediment texture
- [ ] Other:

Comments: Channel bottom is characterized by a relatively deep layer of coarse sands. several tributaries feed into this channel, increasing the energy of water flow with each addition. The channel is defined by well defined banks with knick points and distinct surface relief at OHWM. some benching on banks. The bottom is largely unvegetated with rare occurrence of shrub, and occassional forbs. The are low forbs that occur on banks. Forb species that occur include AF1 and AF2 of Psorothamnus emoryi.

Two individuals near top of bank on northern bank, just approx 50 feet east of intersection with W-4. Some individuals of Krameria bicolor in the channel bottom.

Project ID: 7/29a **Cross section ID:** WS **Date:** 5-26-2022 **Time:** 10:45am

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: 33° 54.63298N 116° 30.21050W

Characteristics of the floodplain unit:
Average sediment texture: very fine sand
Total veg cover: 10 % Tree: 0 % Shrub: 9 % Herb: 1 %
Community successional stage:
☐ NA ☐ Mid (herbaceous, shrubs, saplings)
☐ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

Indicators:
☐ Mudcracks ☒ Soil development
☐ Ripples ☒ Surface relief
☒ Drift and/or debris ☐ Other: _____
☐ Presence of bed and bank ☐ Other: _____
☐ Benches ☐ Other: _____

Comments: Shrubs present in active floodplain. The rest of the active floodplain is contained within the channel's banks, before topping of banks occurs on the southern banks of the channel. There is a large swale on the eastern extent of this channel that seems to be caused by a combination of bank overflow from channel W2 when it discharges into WS, this intersection is characterized by water flow turning ~90 degrees from W-S to E-W movement orientation. The other contributory source to large swale directly NE of this turn is the larger aeolian dune ~approx. 200 feet NE of this intersection

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: 33° 54.63298N 116° 30.21050W

Characteristics of the floodplain unit:
Average sediment texture: very fine sand
Total veg cover: 10 % Tree: 0 % Shrub: 9 % Herb: 1 %
Community successional stage:
☐ NA ☐ Mid (herbaceous, shrubs, saplings)
☒ Early (herbaceous & seedlings) ☐ Late (herbaceous, shrubs, mature trees)

The active floodplain is sparsely vegetated. Dominant shrub is Ambrosia dumosa with occurrences of Ambrosia salsola and AF1, AF2, and Salvia mustard.

Indicators:
☐ Mudcracks ☒ Soil development
☐ Ripples ☒ Surface relief
☒ Drift and/or debris ☐ Other: _____
☐ Presence of bed and bank ☐ Other: _____
☐ Benches ☐ Other: _____

Comments: Same as active floodplain. Shrub species are dominant at this layer. Dominant shrub is creosote. Sub-dominant shrubs are Ambrosia salsola and A. dumosa. There are several individuals of Krameria bicolor on the eastern extent of channel near intersection with W2. Forb species consist of AF1, AF2, Salvia mustard and AG1 = Schismus barbatus.

Arid West Ephemeral and Intermittent Streams OHWM Datasheet

Project: Green Day Village
Project Number: 11292
Stream: W6
Investigator(s): M. Sutton A. Ayati

Date: 5-26-2022 **Time:** 12:00 pm
Town: Desert Hot Springs **State:** CA
Photo begin file#: Amir **Photo end file#:** Amir

Y ☒ / N ☐ Do normal circumstances exist on the site?

Y ☐ / N ☒ Is the site significantly disturbed?

Location Details: N-S oriented low flow channel that discharges into south channel, see from SW boundary

Projection: WGS 84 **Datum:**
Coordinates:

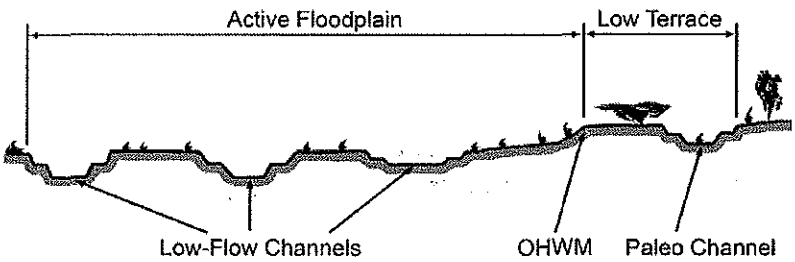
Potential anthropogenic influences on the channel system: Pedestrian and bike traffic, low.

Brief site description: Low gradient, low energy channel with some coarse sands deposited over very fine compacted sediment. Banks consist of dense herbaceous vegetation. This tributary extends approx. 150 feet before dissipating into smaller, less definable tributaries and a general sheetflow system of water flow. At the upstream extent there are several areas where water ponds, leaving mud-cracked bottom areas. One source of these ponds is sheet flow from the SW corner of project site.

Checklist of resources (if available):

- ☒ Aerial photography
  Dates:
- ☒ Topographic maps
- ☐ Geologic maps
- ☒ Vegetation maps
- ☒ Soils maps
- ☐ Rainfall/precipitation maps
- ☒ Existing delineation(s) for site
- ☐ Global positioning system (GPS)
- ☐ Other studies
- ☐ Stream gage data
  Gage number:
  Period of record:
- ☐ History of recent effective discharges
- ☐ Results of flood frequency analysis
- ☐ Most recent shift-adjusted rating
- ☐ Gage heights for 2-, 5-, 10-, and 25-year events and the most recent event exceeding a 5-year event

Hydrogeomorphic Floodplain Units



Procedure for identifying and characterizing the floodplain units to assist in identifying the OHWM:

1. Walk the channel and floodplain within the study area to get an impression of the geomorphology and vegetation present at the site.
2. Select a representative cross section across the channel. Draw the cross section and label the floodplain units.
3. Determine a point on the cross section that is characteristic of one of the hydrogeomorphic floodplain units.
   a) Record the floodplain unit and GPS position.
   b) Describe the sediment texture (using the Wentworth class size) and the vegetation characteristics of the floodplain unit.
   c) Identify any indicators present at the location.
4. Repeat for other points in different hydrogeomorphic floodplain units across the cross section.
5. Identify the OHWM and record the indicators. Record the OHWM position via:
   - ☐ Mapping on aerial photograph
   - ☐ Digitized on computer
   - ☒ GPS
   - ☐ Other:

~~5-26~~ 5-27-2022 W6a Swale

* There are areas where water settles into a group of interconnected swales at the upstream extent of W6. This appears to be a low-lying area that receives water input from water moving via sheetflow and/or via indistinct drainages and/or game paths from the surrounding areas that are at a slightly higher elevation. Several of the low lying areas consist of cracked sediments; these swales have very low vegetative cover. The dominant shrubs surrounding the swales are Larrea tridentata and Ambrosia dumosa.

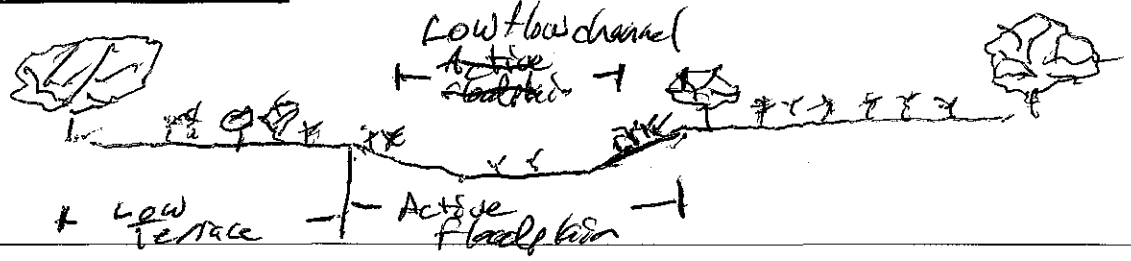
Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	
		Cobble	Gravel
2.56	64	Pebble	
0.157	4	Granule	
0.079	2.00	Very coarse sand	
0.039	1.00	Coarse sand	
0.020	0.50	Medium sand	Sand
1/2 0.0098	0.25	Fine sand	
1/4 0.005	0.125	Very fine sand	
1/8 0.0025	0.0625	Coarse silt	
1/16 0.0012	0.031	Medium silt	
1/32 0.00061	0.0156	Fine silt	Silt
1/64 0.00031	0.0078	Very fine silt	
1/128 0.00015	0.0039	Clay	Mud



Project ID: 7129a **Cross section ID:** W6 **Date** 5.26.2022 **Time:** 12:20pm

Cross section drawing:



OHWM

GPS point: 33° 54.64703N 116° 30.29449W

Indicators:

- [x] Change in average sediment texture
- [ ] Change in vegetation species
- [x] Change in vegetation cover
- [x] Break in bank slope
- [ ] Other: _____
- [ ] Other: _____

Comments: ~~OHWM~~ OHWM characterized by being between top of bank and where herbaceous vegetation is less dense and slope is at a lower gradient.

Floodplain unit: [x] Low-Flow Channel [ ] Active Floodplain [ ] Low Terrace

GPS point: 33° 54.64762N 116° 30.29345W

Characteristics of the floodplain unit:

Average sediment texture: granule

Total veg cover: 1 % Tree: 0 % Shrub: 0 % Herb: 1 %

Community successional stage:

- [ ] NA
- [x] Early (herbaceous & seedlings)
- [ ] Mid (herbaceous, shrubs, saplings)
- [ ] Late (herbaceous, shrubs, mature trees)

Indicators:

- [x] Mudcracks
- [ ] Ripples
- [ ] Drift and/or debris
- [x] Presence of bed and bank
- [ ] Benches
- [ ] Soil development
- [ ] Surface relief
- [x] Other: coarse sand density
- [x] Other: sparse vegetation/herbaceous
- [ ] Other: _____

Comments: Low flow channel has a higher density of coarse sands and very sparse vegetation. The sediment of channel bottom is compacted fines topped by coarser sands

Project ID: 1129a **Cross section ID:** W6 **Date:** 5-26-2022 **Time:** 12:00 pm

Floodplain unit: ☐ Low-Flow Channel ☒ Active Floodplain ☐ Low Terrace

GPS point: 33° 54.64628 N 116° 30.29492 W

Characteristics of the floodplain unit:

Average sediment texture: very coarse sand

Total veg cover: 20 % Tree: 0 % Shrub: 0 % Herb: 20 %

Community successional stage:

- ☐ NA
- ☒ Early (herbaceous & seedlings)
- ☐ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☒ Other: denser herbaceous vegetation
- ☐ Other: _____
- ☐ Other: _____

Comments: Consists of area between the top of bank and the area on bank where vegetation density and density of coarse sand decreases. This area covered by annual forbs.

Floodplain unit: ☐ Low-Flow Channel ☐ Active Floodplain ☒ Low Terrace

GPS point: 33° 54.64647 N 116° 30.29841 W

Characteristics of the floodplain unit:

Average sediment texture: fine sand

Total veg cover: 15 % Tree: 0 % Shrub: 5 % Herb: 10 %

Community successional stage:

- ☐ NA
- ☐ Early (herbaceous & seedlings)
- ☒ Mid (herbaceous, shrubs, saplings)
- ☐ Late (herbaceous, shrubs, mature trees)

Indicators:

- ☐ Mudcracks
- ☐ Ripples
- ☐ Drift and/or debris
- ☐ Presence of bed and bank
- ☐ Benches
- ☐ Soil development
- ☒ Surface relief
- ☒ Other: occurrence of small shrubs
- ☒ Other: change in vegetation
- ☐ Other: _____

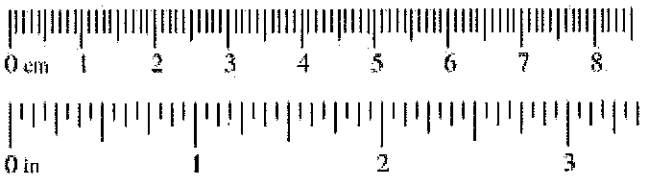
Comments: Consists of area between top of bank and occurrence of creosote shrub. Shrub species dominated by Ambrosia salsola in final 50 feet of stream course and by A. dumosa in the upstream section. Several annual forb species make up the forb layer.

North Swale 5-27-2022 Matthew Sutton

There is a large low-lying area in the northeast quadrant of the project site that functions as a swale. Sheetflow from the surrounding areas, which are at a slightly higher elevation, moves

Wentworth Size Classes

Inches (in)	Millimeters (mm)	Wentworth size class	
10.08	256	Boulder	Gravel
2.56	64	Cobble	
0.157	4	Pebble	
0.079	2.00	Granule	
0.039	1.00	Very coarse sand	Sand
0.020	0.50	Coarse sand	
1/2 0.0098	0.25	Medium sand	
1/4 0.005	0.125	Fine sand	
1/8 0.0025	0.0625	Very fine sand	
1/16 0.0012	0.031	Coarse silt	Silt
1/32 0.00061	0.0156	Medium silt	
1/64 0.00031	0.0078	Fine silt	
1/128 0.00015	0.0039	Very fine silt	
		Clay	Mud



from the higher ground and settles in this swale. There are no clearly defined channels that discharge into the swale. The swale is characterized by fine sands with cracked surfaces in the wetter areas. There are some areas where there is an approximately 3 foot rise between the swale and surrounding areas. There is a large cluster of Larrea tridentata in the middle of the swale. The density of shrub cover, primarily Larrea tridentata, is relatively low compared to surrounding areas. Forb cover is approximately 20%. Ambrosia dumosa occurs sporadically. The swale extends from 200 feet west of the eastern boundary to 500 feet and from 50 to 100 feet south of the northern boundary.

APPENDIX G

PLANT AND WILDLIFE SPECIES RECORDED DURING THE FIELD SURVEYS

Table 1 contains the list of vascular plant taxa recorded during the biological field surveys conducted within the BSA. Plant nomenclature and taxonomic order is based on *The Jepson Manual: Vascular Plants of California, s*econd Edition (Baldwin et al., 2012) and/or the Calflora website (Calflora, 2022).

Table 1
Plant Species Observed during the Field Surveys

Scientific Name	Common Name
Amaranthaceae	**Amaranth Family**
Amaranthus sp. *	pigweed
Aricaceae	**Palm Family**
Washingtonia filifera	California fan palm
Asteraceae	**Sunflower Family**
Ambrosia dumosa	white-bursage
Ambrosia psilostachya	western ragweed
Ambrosia salsola	cheesebrush
Baccharis sarothroides	broom baccharis
Chaenactis fremontii	Fremont pincushion
Geraea canescens	hairy desert sunflower
Malacothrix glabrata	desert dandelion
Rafinesquia neomexicana	desert chicory
Stephanomeria sp.	wirelettuce
Brassicaceae	**Mustard Family**
*Sisymbrium irio**	London rocket
*Brassica tournefortii**	Sahara mustard
Cactaceae	**Cactus Family**
Cylindropuntia echinocarpa	silver cholla
Chenopodiaceae	**Goosefoot Family**
Atriplex canescens	fourwing saltbush
Cleomaceae	**Cleome Family**
Peritoma arborea	bladderpod
Euphorbiaceae	**Spurge Family**
Euphorbia albomarginata	rattlesnake sandmat
Croton californicus	desert croton

Scientific Name	Common Name
Fabaceae	**Legume Family**
Psorothamnus emoryi	Emory's indigo bush
*Parkinsonia aculeata**	Jerusalem thorn
Geraniaceae	**Geranium Family**
*Erodium cicutarium**	redstem filaree
Krameriaceae	**Rhattany Family**
Krameria bicolor	white rhatany
Loasaceae	**Loasaceae Family**
Petalonyx thurberi ssp. *thurberi*	Thurber's sandpaper plant
Nyctaginaceae	**Four o'clock Family**
Abronia villosa	hairy sand verbena
Onagraceae	**Evening Primrose Family**
Camissoniopsis pallida	pale yellow sun cup
Chylismia claviformis	brown-eyed primrose
Poaceae	**Grasses Family**
*Hordeum murinum**	wall barley
*Schismus barbatus**	old han schismus
*Bromus rubens**	red brome
Solanaceae	**Nightshade Family**
Nicotiana obtusifolia	desert tobacco
Datura wrightii	jimsonweed
Tamaricaceae	**Tamarisk Family**
*Tamarix ramosissima**	salt cedar
Zygophyllaceae	**Zygophyllaceae Family**
Larrea tridentata	creosote bush
*Non-native species	

Table 2 contains the list of wildlife species observed and/or detected during the biological field surveys. Wildlife nomenclature and taxonomic order is based on the following treatments according to class of species:

- **Birds.** *Check-list of North American Birds. S*eventh Edition and Supplements (Chesser et al., 2022)
- **Mammals**. *Complete List of Amphibian, Reptile, Bird and Mammal Species in California* (CDFW, 2016).

Table 2
Wildlife Species Observed/Detected during the Field Surveys

Scientific Name	Common Name
Accipitridae	
Buteo jamaicensis	red-tailed hawk
Ardeidae	
Ardea alba	great egret
Cathartidae	
Cathartes aura	turkey vulture
Columbidae	
*Columba livia**	rock pigeon
Corvidae	
Corvus corax	common raven
Falconidae	
Falco columbarius	merlin
Falco sparverius	American kestrel
Fringillidae	
Haemorhous mexicanus	house finch
Hirundinidae	
Stelgidopteryx serripennis	northern rough-winged swallow

Scientific Name	Common Name
Hirundo rustica	barn swallow
Parulidae	
Setophaga coronata	yellow-rumped warbler
Passerellidae	
Zonotrichia leucophrys	white-crowned sparrow
Canidae	
*Canis latrans**	coyote
Heteromyidae	
Chaetodipus penicillatus	desert pocket mouse
Leporidae	
Lepus californicus	black-tailed jackrabbit
Sylvilagus audubonii	desert cottontail
Sciuridae	
Ammospermophilus leucurus	white-tailed antelope squirrel
Otospermophilus beecheyi	California ground squirrel
Hesperiidae	
Erynnis funeralis	funereal duskywing
Pieridae	
Pieris rapae	cabbage white
Nymphalidae	
Vanessa cardui	painted lady
*Non-native species	

APPENDIX G3

PERCOLATION TESTING REPORT

Sladden Engineering

45090 Golf Center Parkway, Suite F, Indio, CA. 92201 (760) 863-0713 Fax (760) 863-0847
6782 Stanton Avenue, Suite C, Buena Park, CA. 90621 (714) 523-0952 Fax (714) 523-1369
450 Egan Avenue, Beaumont, CA. 92223 (951) 845-7743 Fax (951) 845-8863
www.sladdenengineering.com

June 29, 2022

Project No. 544-21557
22-06-375

LA World Construction
2029 Century Park East, Suite 400
Century City, California 90067

Project: Proposed Green Day Village
APN 657-280-003
Palm Drive
Desert Hot Springs, California

Subject: Percolation/Infiltration Testing for On-Site Storm Water Management

In accordance with your request, we have performed percolation testing on the subject site to evaluate the infiltration potential of the near surface soil to assist in storm water management system design. It is our understanding that on-site storm water retention including infiltration is planned for the proposed mixed-use development.

Percolation testing was performed on June 15, 2022 within two (2) shallow test holes excavated on the site. Testing was performed at depths of approximately 5 and 10 feet below existing grade. The approximate locations of the test holes are presented on the attached Percolation Test Location Plan (Figure 3). Testing was performed by placing water within the test bores and recording the drop in the water surface with time. Testing was performed in general accordance with the *United States Bureau of Reclamation (BOR) Procedure 7300-89 (1999)*. Test results are summarized in the following table.

PERCOLATION TEST RESULTS

Test No.	Depth (Ft)	Percolation Rate (in/hr)	Infiltration Rate (in/hr)
P-1	10.00	120	20
P-2	5.00	120	20

The percolation rates determined represent the ultimate field rates that do not include a safety factor. The corresponding infiltration rates were calculated using the Porchet Method. An appropriate safety factor should be incorporated into design. The favorable infiltration rates are considered representative of the sandy soil throughout the site..

Groundwater was not encountered to the maximum explored depth of approximately 51.5 feet bgs during our geotechnical investigation. Based upon our field investigation it is our opinion that groundwater should not be factor in stormwater retention/infiltration system design.

If you have any questions regarding this memo, please contact the undersigned.

Respectfully submitted,
SLADDEN ENGINEERING

Matthew J. Cohrt
Principal Geologist

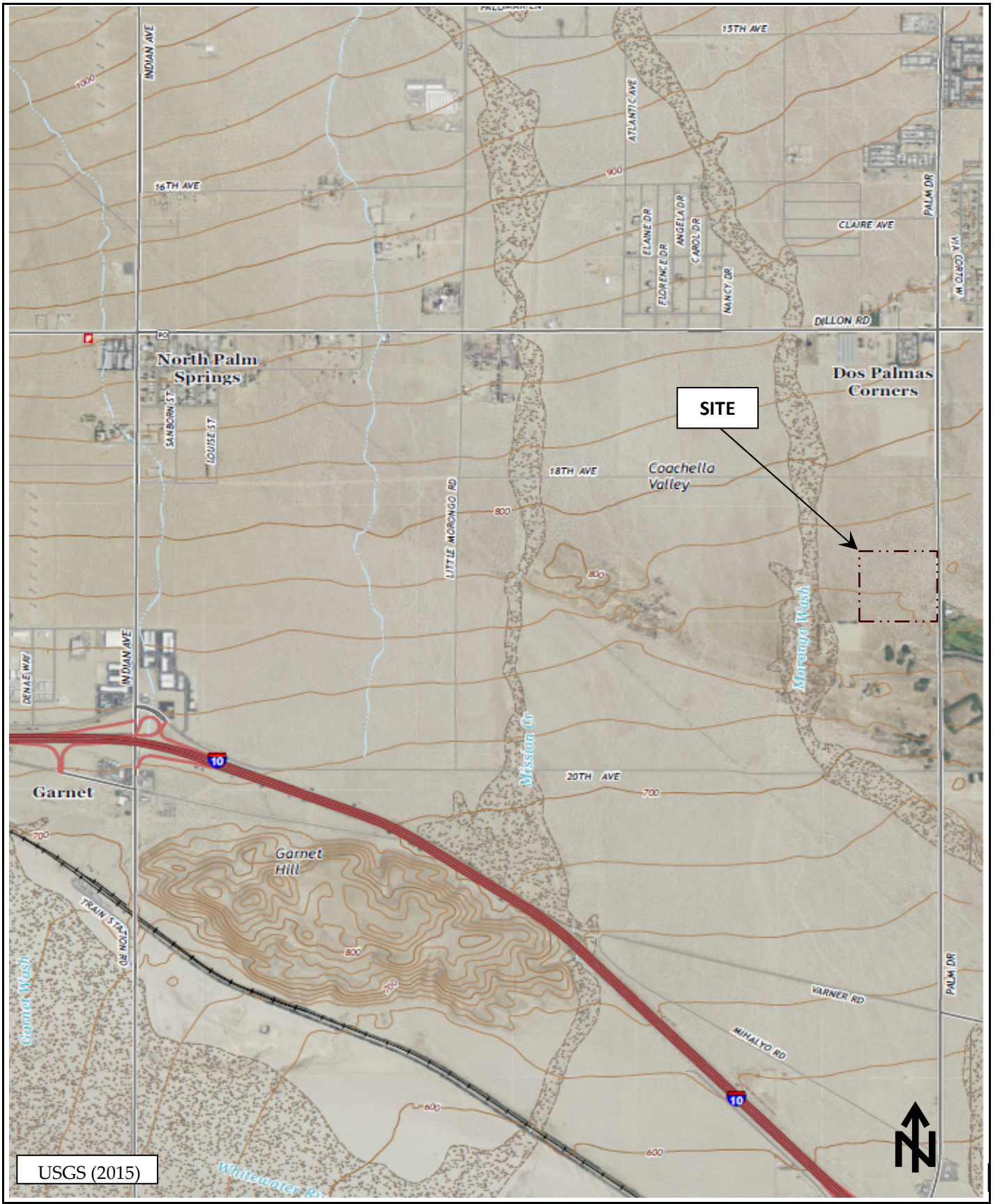
CERTIFIED ENGINEERING GEOLOGIST
MATTHEW J. COHRT
2634
STATE OF CALIFORNIA

Brett L. Anderson
Principal Engineer

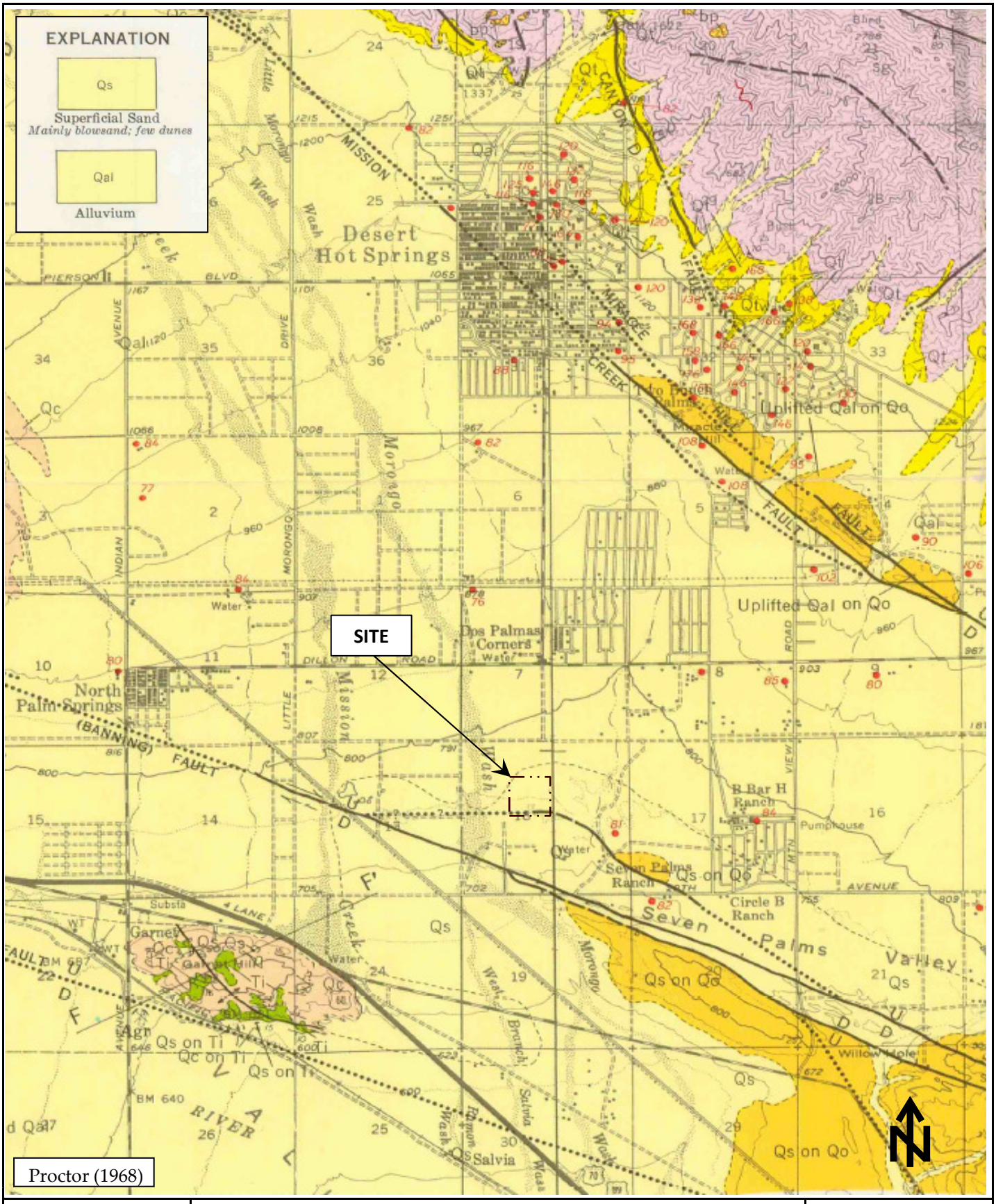
REGISTERED PROFESSIONAL ENGINEER
BRETT L. ANDERSON
No. C45389
CIVIL ENGINEERING
STATE OF CALIFORNIA

Copies: 4/Addressee

SITE LOCATION MAP
REGIONAL GEOLOGIC MAP
PERCOLATION TEST LOCATION PLAN



Sladden Engineering	SITE LOCATION MAP	FIGURE 1
	Project Number: 544-21557	
	Report Number: 22-06-375	
	Date: June 29, 2022	



Sladden Engineering	REGIONAL GEOLOGIC MAP	FIGURE 2
	Project Number: 544-21557	
	Report Number: 22-06-375	
	Date: June 29, 2022	



LEGEND

P-2 Percolation Test Location

Sladden Engineering	PERCOLATION TEST LOCATION PLAN	**FIGURE** 3
	Project Number: 544-21557	
	Report Number: 22-06-375	
	Date: June 29, 2022	

BORELOGS

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	5/17/2022
Elevation:	750 FT. MSL	Boring No:	BH6/P-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		
							4		
	3 3 5						6		Silty Sand to Sand (SM/SW); light yellowish brown, dry, fine- to coarse-grained
							8		
	8 14 18						10		
							12		
							14		Terminated at ~11.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED GREEN DAY VILLAGE
PALM DRIVE, DESERT HOT SPRINGS; APN 657-280-003

Project No:	544-21557	Page	1
Report No:	22-06-375		

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	5/17/2022
Elevation:	750 FT. MSL	Boring No:	P-2

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand to Sand (SM/SW); light yellowish brown, dry, fine- to coarse-grained
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED GREEN DAY VILLAGE
PALM DRIVE, DESERT HOT SPRINGS; APN 657-280-003

Project No:	544-21557	Page	2
Report No:	22-06-375		

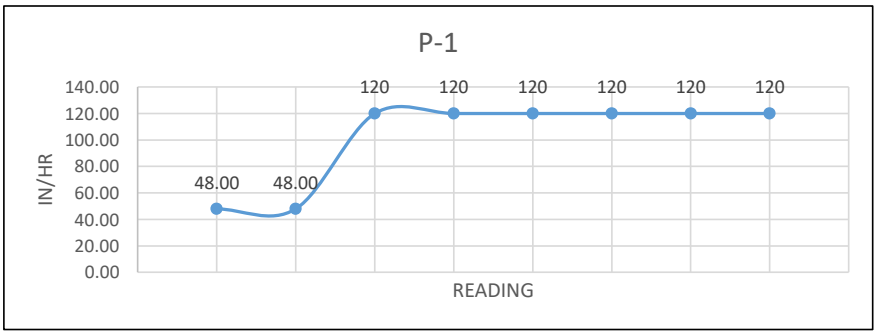
RIVERSIDE COUNTY STORMWATER TESTING DATA SHEETS

STORMWATER PERCOLATION SHEET (LESS THAN 10 FT)

Project:	APN 657-280-003	Depth (ft):	10.00
Job No. :	544-21557	USCS Soil Class:	SM
Date:	6/15/2022	Sandy Soil:	R.F.
Test Hole #:	P-1	Tested By:	R.F.

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
A	25.00	10.00	20	0	20	48.00
B	25.00	10.00	20	0	20	48.00

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
1	10.00	10.00	20	0	20	120
2	10.00	10.00	20	0	20	120
3	10.00	10.00	20	0	20	120
4	10.00	10.00	20	0	20	120
5	10.00	10.00	20	0	20	120
6	10.00	10.00	20	0	20	120



PERCOLATION RATE CONVERSION (PORCHET METHOD)

$$I_{t=} \quad \frac{\Delta H\ 60\ R}{\Delta t(r+2H_{avg})}$$

Δt =	10.00
D_f =	120.00
r =	4.00
D_0 =	100
D_t =	120.00
H_0 =	20
H_f =	0
ΔH =	20.00
H_{avg} =	10.00

Δt (minutes)
D_f (Final Depth to water)
r (hole radius in inches)
D_0 (Initial Depth to water)
D_t (Total Depth of test hole)
H_0 (initial height of water at selected time interval)

$$H_0 = D_t - D_0$$

H_f (final height of water at the selected time interval)

$$H_f = D_t - D_f$$

ΔH (change in head over the time interval)

$$\Delta H = H_0 - H_f$$

H_{avg} (average head height over the time interval)

$$H_{avg} = (H_0 + H_f)/2$$

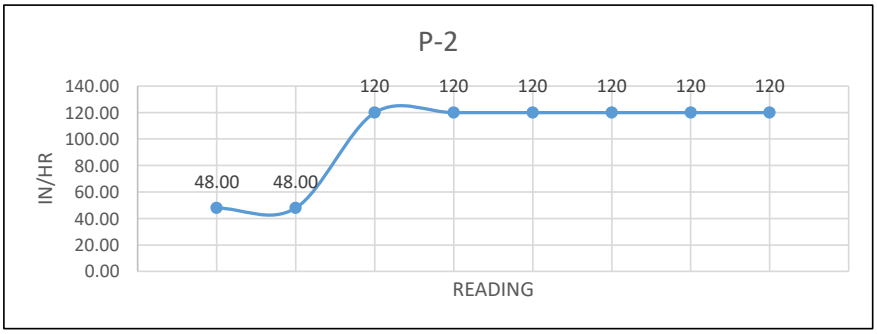
Field Rate:	120 in/hr
Infiltration Rate:	20.00 in/hr

STORMWATER PERCOLATION SHEET (LESS THAN 10 FT)

Project:	APN 657-280-003	Depth (ft):	5.00
Job No. :	544-21557	USCS Soil Class:	SM
Date:	6/15/2022	Sandy Soil:	R.F.
Test Hole #:	P-2	Tested By:	R.F.

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
A	25.00	5.00	20	0	20	48.00
B	25.00	5.00	20	0	20	48.00

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
1	10.00	5.00	20	0	20	120
2	10.00	5.00	20	0	20	120
3	10.00	5.00	20	0	20	120
4	10.00	5.00	20	0	20	120
5	10.00	5.00	20	0	20	120
6	10.00	5.00	20	0	20	120



PERCOLATION RATE CONVERSION (PORCHET METHOD)

$$I_{t=} \quad \frac{\Delta H\ 60\ R}{\Delta t(r+2H_{avg})}$$

Δt =	10.00
D_f =	60.00
r =	4.00
D_0 =	40
D_t =	60.00
H_0 =	20
H_f =	0
ΔH =	20.00
H_{avg} =	10.00

Δt (minutes)
D_f (Final Depth to water)
r (hole radius in inches)
D_0 (Initial Depth to water)
D_t (Total Depth of test hole)
H_0 (initial height of water at selected time interval)

$$H_0 = D_t - D_0$$

H_f (final height of water at the selected time interval)

$$H_f = D_t - D_f$$

ΔH (change in head over the time interval)

$$\Delta H = H_0 - H_f$$

H_{avg} (average head height over the time interval)

$$H_{avg} = (H_0 + H_f)/2$$

Field Rate:	120 in/hr
Infiltration Rate:	20.00 in/hr

APPENDIX G2

DRAINAGE STUDY

PRELIMINARY DRAINAGE STUDY FOR TENTATIVE PARCEL MAP NO. TBD GREEN DAY VILLAGE PROJECT CITY OF DESERT HOT SPRINGS

Date: July 8, 2022

Prepared for:
LA World Construction
2029 Century Park East #400
Century City CA 90067

Revision History	
Date	Comment

Prepared by:
ASAP Consulting
6533 Cattleman Drive
Eastvale CA 92880

Engineer of Work/ Contact Person:
Prasad Kasturi, P.E.
Phone: 951-234-3435

SECTION 1 – INTRODUCTION

1.1 BACKGROUND

ASAP Consulting has been retained by LA World Construction to prepare Entitlement engineering for a new Residential/Commercial development known as Green Day Village, Tentative Parcel Map No. XXXXX with parking lot improvements and proposed private streets which requires a drainage report to show how storm water runoff from the 100 year storm shall be handled on-site for proper storm water handling and safety to the general public.

The project site is located in the City of Desert Hot Springs, California along Palm Drive across the Desert Dunes Golf Course with APN 657-280-003 and approximately 38.34 acres. Figure 1 shows the general vicinity of the project location.

The site is vacant and undeveloped and currently lies within a FEMA mapped flood plain Zone AO, Depth 3 foot. Existing land cover consists mostly of desert shrubbery and blow sand. There are no existing utilities on-site but will be designed and connected to the proposed wet utilities proposed in Palm Drive along the project frontage and storm water infrastructure onsite will discharge to onsite storm water basins for infiltration.

1.2 OBJECTIVE

1.) The objective of this drainage study is to determine the 100-year onsite discharges in accordance with the criteria and procedures described in the Riverside County Flood Control & Water Conservation District (RCFCD&WCD) Hydrology Manual. The included calculations have been prepared so as to show the required storage volume for on-site retention.

2.) As of June 15, 2009, developers must comply with the Colorado River Basin Regional Water Quality Control Board (CRBRWCB) requiring the preparation, approval, and implementation of a project-specific WQMP for discretionary New Developments and Redevelopment projects that fall into four (4) of the eight (8) Priority Development Project categories. This project falls into Category 3; “Commercial or Industrial ≥ 100,000 sq. ft., Category 6; “Restaurant disturbing > 5,000 sq. ft., Category 7; “Home subdivision ≥ 10 housing units, and Category 8; “Parking lots of 5,000 square feet or more of impervious surface exposed to storm water”. A separate submittal will be made for the Final project-specific WQMP.

SECTION 2 – HYDROLOGY

2.1 APPROACH AND METHODOLOGY

The hydrologic analysis described in this report was performed in accordance with the criteria and procedures outlined in the Riverside County Flood Control and Water Conservation District Hydrology Manual dated April 1978, referred to hereafter as “Hydrology Manual”.

The websoil survey (NRCS) Soil Map, shows the site lies entirely within hydrologic soil type “A”. A copy of the report is included in the appendix.

Precipitation data used in this study was taken from NOAA atlas 14 precipitation data at the site locations and a copy of that is included in the appendix as well.

The developed site will consist lot of impervious area and were analyzed with appropriate runoff coefficients for the residential and commercial land uses of the project. See RCFC&WCD hydrology manual E Plates included in Appendix A.

The design of the retention basins and other facilities as required in this drainage study shall be designed and installed per City of Desert Hot Springs and Riverside County Hydrology Manual requirements.

2.2 RATIONAL METHOD HYDROLOGY RESULTS

The peak 100-year discharges will be calculated using the rational method, as prescribed by the RCFC&WCD Hydrology Manual. Detailed calculations will be provided in the next submittal. For entitlements, unit hydrograph calculations are provided to make sure the storm water basins are sized adequately to store the 100-year storm runoff.

2.3 STORAGE VOLUMES

The project is required to retain 100% of the Q100 storm event onsite. A spreadsheet based on the Shortcut Method Synthetic Unit Hydrograph approach as prescribed by the RCFC&WCD Hydrology Manual has been utilized to perform the calculations. Basin storage capacity is modeled based on manual integration of the basin area at 1 foot contour intervals. Rainfall input data for the 100 year, 3, 6, and 24 hour storms is input per said Hydrology Manual. Basin Inflow is modeled in 5 minute intervals for the 3 and 6 hour storms, and 15 minute intervals for the 24 hour storm, based on the design storm unit hydrographs presented in the manual.

The full calculations can be found in the Synthetic Unit Hydrograph Calculations Section of this Report. A brief summary is provided below:

Basin Name: Basin “A”
Top (WSE): 347.27
Depth: 4 Feet
Area @ top: 46,870 sq ft
Available Volume: 153,579 Cu Ft
Required Flood Volume: 117,655 Cu Ft
100 Year Water Surface: 3 Hour: 346.88 6 Hour: 347.27 24 Hour: 346.57

Basin Name: Basin “B”
Top (WSE): 349.99
Depth: 4 feet
Area @ top: 2,200 sq ft
Available Volume: 7,038 Cu Ft
Required Flood Volume: 5,979 Cu Ft
100 Year Water Surface: 3 Hour: 349.99 6 Hour: 349.82 24 Hour: 349.74

Basin Name: Basin “C”
Top (WSE): 362.74
Depth: 4 foot
Area @ top: 2,200 sq ft
Available Volume: 15,446 Cu Ft
Required Flood Volume: 8,559 Cu Ft
100 Year Water Surface: 3 Hour: 362.56 6 Hour: 362.69 24 Hour: 362.74

Basin Name: Basin “D”
Top (WSE): 356.57
Depth: 5 feet
Area @ top: 6,000 sq ft
Available Volume: 43,956 Cu Ft
Required Flood Volume: 28,240 Cu Ft
100 Year Water Surface: 3 Hour: 356.12 6 Hour: 356.34 24 Hour: 356.57

Basin Name: Basin “E”
Top (WSE): 349.13
Depth: 5 feet
Area @ top: 6,000 sq ft
Available Volume: 44,842 Cu Ft
Required Flood Volume: 25,623 Cu Ft
100 Year Water Surface: 3 Hour: 248.82 6 Hour: 348.99 24 Hour: 349.13

2.4 DEVELOPMENT TYPE

The proposed development is based upon residential and commercial land use.

2.5 DRAINAGE AREA AND FLOW PATTERNS

The proposed development provides for 5 different retention locations on the site. Therefore, the proposed site grading contains a series of high points and low point collection locations carefully planned to proportionately collect and convey runoff to different portions of the site. Please see the Exhibit “A” (Hydrology map) for the Synthetic Unit Hydrograph Calculations as they clearly detail the various subareas and collection systems to be employed.

2.6 MANNING’S EQUATION “N” VALUES

Manning’s “N” values for asphalt with a smooth texture are typically taken as 0.015. N values for troweled finished Concrete Gutter are typically taken as 0.013. It was considered appropriate to utilize a manning’s value of 0.013 for all curb/gutter/pavement cross sections.

SECTION 3 – CONCLUSION

Methodology used in this study is in compliance with the Riverside County Flood Control and Water Conservation District criteria.

The Hydrology report contained herein does not account for any off-site runoff entering and being stored on-site. At the date of the preparation of this Preliminary Hydrology Report, upstream storm water mitigation measures are being prepared to drastically reduce the storm flows coming from the north which, may have an impact on the project site. As part of the upstream measures, a storm water channel is proposed along the north and west property lines to divert any offsite storm water impacting the site.

The pad and finish floor elevations that are shown on the Preliminary Grading plans which is also part of this report may need to be raised or lowered once the upstream mitigations have been conditionally approved and off-site storm water runoff flows can be modeled so that the final design will mitigate the off-site flows.

There are no anticipated negative downstream or upstream impacts.

SECTION 4 – REFERENCES

1. Riverside County Flood Control and Water Conservation District Hydrology Manual, 1978.
2. City of Desert Hot Springs Standard Details and Specifications
3. Civil Design – Rational Method calculation software
4. Hydraflow Express Extension for Civil 3D, Hydraulic sizing/calculation program

VICINITY MAP



VICINITY MAP

SYNTHETIC UNIT HYDROGRAPH CALCULATIONS

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN A		
10	AREA DESIGNATION	SUBAREAS A		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE	24.88		
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN	1.46		
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	52%		
27				
28	LENGTH OF WATERCOURSE (L)	1926		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	1400		
30				
31	ELEVATION OF HEADWATER	363.44		
32	ELEVATION OF CONCENTRATION POINT	345		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		344	28168	
45		345	32805	
46		346	37469	
47		347	42157	
48		348	46870	
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN A
[2] AREA DESIGNATION	SUBAREAS A
[3] AREA - ACRES	26.340
[4] L-FEET	1926
[5] L-MILES	0.365
[6] La-FEET	1400
[7] La-MILES	0.265
[8] ELEVATION OF HEADWATER	363.44
[9] ELEVATION OF CONCENTRATION POINT	345
[10] H-FEET	18.44
[11] S-FEET/MILE	50.6
[12] S^0.5	7.11
[13] L*LCA/S^0.5	0.01360
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.070
[16] LAG TIME-MINUTES	4.22
[17] 25% OF LAG-MINUTES	1.05
[18] 40% OF LAG-MINUTES	1.69
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	1.63

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	26.340	1.00	2.42	3.13	26.340	1.00	3.13	5.06	26.340	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	26.34	SUM [7]	2.42	SUM [9]	26.34	SUM [11]	3.13	SUM [13]	26.34	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.25	1.61	2.06
FLOOD VOLUME	(cu-ft)	119,267	153,579	196,746
	(acre-ft)	2.74	3.53	4.52
REQUIRED STORAGE	(cu-ft)	102,270	117,655	89,748
	(acre-ft)	2.35	2.70	2.06
PEAK FLOW	(cfs)	51.68	44.36	8.62
MAXIMUM WSEL	(ft)	346.88	347.27	346.57

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN A
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
	COMMERCIAL			90%	0.00	0.00	0.000	0.0000
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
A	SF - 1/4 ACRE	32	0.74	50%	0.41	24.88	0.945	0.3844
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
	MF - APARTMENTS			80%	0.00	0.00	0.000	0.0000
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
A	RETENTION BASINS	44	0.63	0%	0.63	1.46	0.055	0.0349
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	26.34	SUM	0.4194

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.209680334

C= 0.00388

Ft=C(24-(T/60))^1.55 = 0.00388 (24-(T/60))^1.55 + 0.21 in/hr

LOW LOSS RATE (80-90 PERCENT) = 52%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN A

BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	26.34
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	4.22
UNIT TIME-PERCENT OF LAG	118.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.42
CONSTANT LOSS RATE-in/hr	0.42
LOW LOSS RATE - PERCENT	52%

TOTAL PERCOLATION RATE (cfs) 1.63 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.42	0.20	0.180	4.75	937.07
2	10	0.17	1.3	0.378	0.42	0.20	0.180	4.75	937.07
3	15	0.25	1.1	0.319	0.42	0.17	0.153	4.02	717.77
4	20	0.33	1.5	0.436	0.42	0.23	0.016	0.43	0.00
5	25	0.42	1.5	0.436	0.42	0.23	0.016	0.43	0.00
6	30	0.50	1.8	0.523	0.42	0.27	0.103	2.72	328.38
7	35	0.58	1.5	0.436	0.42	0.23	0.016	0.43	0.00
8	40	0.67	1.8	0.523	0.42	0.27	0.103	2.72	328.38
9	45	0.75	1.8	0.523	0.42	0.27	0.103	2.72	328.38
10	50	0.83	1.5	0.436	0.42	0.23	0.016	0.43	0.00
11	55	0.92	1.6	0.465	0.42	0.24	0.045	1.19	0.00
12	60	1.00	1.8	0.523	0.42	0.27	0.103	2.72	328.38
13	65	1.08	2.2	0.639	0.42	0.33	0.220	5.78	1246.27
14	70	1.17	2.2	0.639	0.42	0.33	0.220	5.78	1246.27
15	75	1.25	2.2	0.639	0.42	0.33	0.220	5.78	1246.27
16	80	1.33	2.0	0.581	0.42	0.30	0.161	4.25	787.33
17	85	1.42	2.6	0.755	0.42	0.39	0.336	8.84	2164.17
18	90	1.50	2.7	0.784	0.42	0.41	0.365	9.61	2393.64
19	95	1.58	2.4	0.697	0.42	0.36	0.278	7.31	1705.22
20	100	1.67	2.7	0.784	0.42	0.41	0.365	9.61	2393.64
21	105	1.75	3.3	0.958	0.42	0.50	0.539	14.20	3770.49
22	110	1.83	3.1	0.900	0.42	0.47	0.481	12.67	3311.54
23	115	1.92	2.9	0.842	0.42	0.44	0.423	11.14	2852.59
24	120	2.00	3.0	0.871	0.42	0.45	0.452	11.90	3082.07
25	125	2.08	3.1	0.900	0.42	0.47	0.481	12.67	3311.54
26	130	2.17	4.2	1.220	0.42	0.64	0.800	21.08	5835.76
27	135	2.25	5.0	1.452	0.42	0.76	1.033	27.20	7671.55
28	140	2.33	3.5	1.016	0.42	0.53	0.597	15.73	4229.44
29	145	2.42	6.8	1.975	0.42	1.03	1.555	40.97	11802.08
30	150	2.50	7.3	2.120	0.42	1.11	1.701	44.79	12949.45
31	155	2.58	8.2	2.381	0.42	1.24	1.962	51.68	15014.72
32	160	2.67	5.9	1.713	0.42	0.89	1.294	34.08	9736.81
33	165	2.75	2.0	0.581	0.42	0.30	0.161	4.25	787.33
34	170	2.83	1.8	0.523	0.42	0.27	0.103	2.72	328.38
35	175	2.92	1.8	0.523	0.42	0.27	0.103	2.72	328.38
36	180	3.00	0.6	0.174	0.42	0.09	0.083	2.19	169.53
							14.968		102269.90

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.25
FLOOD VOLUME (acft)	2.74
FLOOD VOLUME (cuft)	119266.53
REQUIRED STORAGE (acft)	2.35
REQUIRED STORAGE (cuft)	102269.90
PEAK FLOW RATE (cfs)	51.68

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN A BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	26.34		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	4.22		
UNIT TIME-PERCENT OF LAG	118.5		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.419		
LOW LOSS RATE - PERCENT	52%	TOTAL PERCOLATION RATE (cfs)	1.63 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.188	0.42	0.10	0.09	2.36	220.73
2	10	0.17	0.6	0.225	0.42	0.12	0.11	2.84	362.55
3	15	0.25	0.6	0.225	0.42	0.12	0.11	2.84	362.55
4	20	0.33	0.6	0.225	0.42	0.12	0.11	2.84	362.55
5	25	0.42	0.6	0.225	0.42	0.12	0.11	2.84	362.55
6	30	0.50	0.7	0.263	0.42	0.14	0.13	3.31	504.37
7	35	0.58	0.7	0.263	0.42	0.14	0.13	3.31	504.37
8	40	0.67	0.7	0.263	0.42	0.14	0.13	3.31	504.37
9	45	0.75	0.7	0.263	0.42	0.14	0.13	3.31	504.37
10	50	0.83	0.7	0.263	0.42	0.14	0.13	3.31	504.37
11	55	0.92	0.7	0.263	0.42	0.14	0.13	3.31	504.37
12	60	1.00	0.8	0.300	0.42	0.16	0.14	3.78	646.18
13	65	1.08	0.8	0.300	0.42	0.16	0.14	3.78	646.18
14	70	1.17	0.8	0.300	0.42	0.16	0.14	3.78	646.18
15	75	1.25	0.8	0.300	0.42	0.16	0.14	3.78	646.18
16	80	1.33	0.8	0.300	0.42	0.16	0.14	3.78	646.18
17	85	1.42	0.8	0.300	0.42	0.16	0.14	3.78	646.18
18	90	1.50	0.8	0.300	0.42	0.16	0.14	3.78	646.18
19	95	1.58	0.8	0.300	0.42	0.16	0.14	3.78	646.18
20	100	1.67	0.8	0.300	0.42	0.16	0.14	3.78	646.18
21	105	1.75	0.8	0.300	0.42	0.16	0.14	3.78	646.18
22	110	1.83	0.8	0.300	0.42	0.16	0.14	3.78	646.18
23	115	1.92	0.8	0.300	0.42	0.16	0.14	3.78	646.18
24	120	2.00	0.9	0.338	0.42	0.18	0.16	4.25	788.00
25	125	2.08	0.8	0.300	0.42	0.16	0.14	3.78	646.18
26	130	2.17	0.9	0.338	0.42	0.18	0.16	4.25	788.00
27	135	2.25	0.9	0.338	0.42	0.18	0.16	4.25	788.00
28	140	2.33	0.9	0.338	0.42	0.18	0.16	4.25	788.00
29	145	2.42	0.9	0.338	0.42	0.18	0.16	4.25	788.00
30	150	2.50	0.9	0.338	0.42	0.18	0.16	4.25	788.00
31	155	2.58	0.9	0.338	0.42	0.18	0.16	4.25	788.00
32	160	2.67	0.9	0.338	0.42	0.18	0.16	4.25	788.00
33	165	2.75	1.0	0.376	0.42	0.20	0.18	4.73	929.82
34	170	2.83	1.0	0.376	0.42	0.20	0.18	4.73	929.82
35	175	2.92	1.0	0.376	0.42	0.20	0.18	4.73	929.82
36	180	3.00	1.0	0.376	0.42	0.20	0.18	4.73	929.82
37	185	3.08	1.0	0.376	0.42	0.20	0.18	4.73	929.82
38	190	3.17	1.1	0.413	0.42	0.22	0.20	5.20	1071.64
39	195	3.25	1.1	0.413	0.42	0.22	0.20	5.20	1071.64
40	200	3.33	1.1	0.413	0.42	0.22	0.20	5.20	1071.64
41	205	3.42	1.2	0.451	0.42	0.24	0.03	0.83	0.00
42	210	3.50	1.3	0.488	0.42	0.25	0.07	1.82	56.23
43	215	3.58	1.4	0.526	0.42	0.27	0.11	2.80	353.03
44	220	3.67	1.4	0.526	0.42	0.27	0.11	2.80	353.03
45	225	3.75	1.5	0.563	0.42	0.29	0.14	3.79	649.83
46	230	3.83	1.5	0.563	0.42	0.29	0.14	3.79	649.83
47	235	3.92	1.6	0.601	0.42	0.31	0.18	4.78	946.63
48	240	4.00	1.6	0.601	0.42	0.31	0.18	4.78	946.63
49	245	4.08	1.7	0.639	0.42	0.33	0.22	5.77	1243.43
50	250	4.17	1.8	0.676	0.42	0.35	0.26	6.76	1540.23
51	255	4.25	1.9	0.714	0.42	0.37	0.29	7.75	1837.03
52	260	4.33	2.0	0.751	0.42	0.39	0.33	8.74	2133.83
53	265	4.42	2.1	0.789	0.42	0.41	0.37	9.73	2430.63
54	270	4.50	2.1	0.789	0.42	0.41	0.37	9.73	2430.63
55	275	4.58	2.2	0.826	0.42	0.43	0.41	10.72	2727.42
56	280	4.67	2.3	0.864	0.42	0.45	0.44	11.71	3024.22

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN A BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	26.34		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	4.22		
UNIT TIME-PERCENT OF LAG	118.5		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.419		
LOW LOSS RATE - PERCENT	52%	TOTAL PERCOLATION RATE (cfs)	1.63 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.901	0.42	0.47	0.48	12.70	3321.02
58	290	4.83	2.4	0.901	0.42	0.47	0.48	12.70	3321.02
59	295	4.92	2.5	0.939	0.42	0.49	0.52	13.69	3617.82
60	300	5.00	2.6	0.977	0.42	0.51	0.56	14.68	3914.62
61	305	5.08	3.1	1.164	0.42	0.61	0.74	19.62	5398.62
62	310	5.17	3.6	1.352	0.42	0.71	0.93	24.57	6882.61
63	315	5.25	3.9	1.465	0.42	0.76	1.05	27.54	7773.01
64	320	5.33	4.2	1.578	0.42	0.82	1.16	30.51	8663.41
65	325	5.42	4.7	1.765	0.42	0.92	1.35	35.45	10147.40
66	330	5.50	5.6	2.103	0.42	1.10	1.68	44.36	12818.59
67	335	5.58	1.9	0.714	0.42	0.37	0.29	7.75	1837.03
68	340	5.67	0.9	0.338	0.42	0.18	0.16	4.25	788.00
69	345	5.75	0.6	0.225	0.42	0.12	0.11	2.84	362.55
70	350	5.83	0.5	0.188	0.42	0.10	0.09	2.36	220.73
71	355	5.92	0.3	0.113	0.42	0.06	0.05	1.42	0.00
72	360	6.00	0.2	0.075	0.42	0.04	0.04	0.95	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.61
FLOOD VOLUME (acft)	3.53
FLOOD VOLUME (cuft)	153578.76
REQUIRED STORAGE (acft)	2.70
REQUIRED STORAGE (cuft)	117654.63
PEAK FLOW RATE (cfs)	44.36

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN A
BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	26.340	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.4194
LAG TIME - MINUTES	4.22	MINIMUM LOSS RATE (for var. loss) - in/hr	0.210
UNIT TIME-PERCENT OF LAG	355.5	LOW LOSS RATE - DECIMAL	0.52
TOTAL ADJUSTED STORM RAIN-INCHES	5.06	C	0.00388
		PERCOLATION RATE (cfs)	1.63

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.040	0.741	0.021	0.019	0.51	0.00
2	30	0.50	0.3	0.061	0.732	0.032	0.029	0.76	0.00
3	45	0.75	0.3	0.061	0.723	0.032	0.029	0.76	0.00
4	60	1.00	0.4	0.081	0.715	0.042	0.039	1.02	0.00
5	75	1.25	0.3	0.061	0.706	0.032	0.029	0.76	0.00
6	90	1.50	0.3	0.061	0.698	0.032	0.029	0.76	0.00
7	105	1.75	0.3	0.061	0.690	0.032	0.029	0.76	0.00
8	120	2.00	0.4	0.081	0.681	0.042	0.039	1.02	0.00
9	135	2.25	0.4	0.081	0.673	0.042	0.039	1.02	0.00
10	150	2.50	0.4	0.081	0.665	0.042	0.039	1.02	0.00
11	165	2.75	0.5	0.101	0.657	0.053	0.048	1.27	0.00
12	180	3.00	0.5	0.101	0.649	0.053	0.048	1.27	0.00
13	195	3.25	0.5	0.101	0.641	0.053	0.048	1.27	0.00
14	210	3.50	0.5	0.101	0.633	0.053	0.048	1.27	0.00
15	225	3.75	0.5	0.101	0.625	0.053	0.048	1.27	0.00
16	240	4.00	0.6	0.121	0.617	0.063	0.058	1.53	0.00
17	255	4.25	0.6	0.121	0.609	0.063	0.058	1.53	0.00
18	270	4.50	0.7	0.142	0.601	0.074	0.068	1.78	139.76
19	285	4.75	0.7	0.142	0.594	0.074	0.068	1.78	139.76
20	300	5.00	0.8	0.162	0.586	0.085	0.077	2.04	369.03
21	315	5.25	0.6	0.121	0.578	0.063	0.058	1.53	0.00
22	330	5.50	0.7	0.142	0.571	0.074	0.068	1.78	139.76
23	345	5.75	0.8	0.162	0.563	0.085	0.077	2.04	369.03
24	360	6.00	0.8	0.162	0.556	0.085	0.077	2.04	369.03
25	375	6.25	0.9	0.182	0.549	0.095	0.087	2.29	598.30
26	390	6.50	0.9	0.182	0.541	0.095	0.087	2.29	598.30
27	405	6.75	1.0	0.202	0.534	0.106	0.097	2.55	827.56
28	420	7.00	1.0	0.202	0.527	0.106	0.097	2.55	827.56
29	435	7.25	1.0	0.202	0.520	0.106	0.097	2.55	827.56
30	450	7.50	1.1	0.223	0.513	0.116	0.106	2.80	1056.83
31	465	7.75	1.2	0.243	0.506	0.127	0.116	3.06	1286.09
32	480	8.00	1.3	0.263	0.499	0.137	0.126	3.31	1515.36
33	495	8.25	1.5	0.304	0.492	0.159	0.145	3.82	1973.89
34	510	8.50	1.5	0.304	0.485	0.159	0.145	3.82	1973.89
35	525	8.75	1.6	0.324	0.478	0.169	0.155	4.08	2203.16
36	540	9.00	1.7	0.344	0.471	0.180	0.164	4.33	2432.43
37	555	9.25	1.9	0.385	0.465	0.201	0.184	4.84	2890.96
38	570	9.50	2.0	0.405	0.458	0.211	0.193	5.09	3120.23
39	585	9.75	2.1	0.425	0.451	0.222	0.203	5.35	3349.49
40	600	10.00	2.2	0.445	0.445	0.233	0.000	0.01	0.00
41	615	10.25	1.5	0.304	0.439	0.159	0.145	3.82	1973.89
42	630	10.50	1.5	0.304	0.432	0.159	0.145	3.82	1973.89
43	645	10.75	2.0	0.405	0.426	0.211	0.193	5.09	3120.23
44	660	11.00	2.0	0.405	0.420	0.211	0.193	5.09	3120.23
45	675	11.25	1.9	0.385	0.414	0.201	0.184	4.84	2890.96
46	690	11.50	1.9	0.385	0.407	0.201	0.184	4.84	2890.96
47	705	11.75	1.7	0.344	0.401	0.180	0.164	4.33	2432.43
48	720	12.00	1.8	0.364	0.395	0.190	0.174	4.59	2661.69
49	735	12.25	2.5	0.506	0.390	0.264	0.116	3.07	1296.56
50	750	12.50	2.6	0.526	0.384	0.275	0.143	3.76	1914.66
51	765	12.75	2.8	0.567	0.378	0.296	0.189	4.97	3010.95
52	780	13.00	2.9	0.587	0.372	0.306	0.215	5.66	3625.79
53	795	13.25	3.4	0.688	0.367	0.359	0.322	8.47	6158.21
54	810	13.50	3.4	0.688	0.361	0.359	0.327	8.62	6289.90
55	825	13.75	2.3	0.466	0.356	0.243	0.110	2.90	1142.00
56	840	14.00	2.3	0.466	0.350	0.243	0.115	3.04	1270.29
57	855	14.25	2.7	0.546	0.345	0.285	0.202	5.31	3316.08
58	870	14.50	2.6	0.526	0.340	0.275	0.187	4.92	2961.08
59	885	14.75	2.6	0.526	0.334	0.275	0.192	5.05	3084.12
60	900	15.00	2.5	0.506	0.329	0.264	0.177	4.66	2725.56

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN A BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			26.340	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.4194		
LAG TIME - MINUTES			4.22	MINIMUM LOSS RATE (for var. loss) - in/hr			0.210		
UNIT TIME-PERCENT OF LAG			355.5	LOW LOSS RATE - DECIMAL			0.52		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00388		
				PERCOLATION RATE (cfs)			1.63		
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
61	915	15.25	2.4	0.486	0.324	0.254	0.162	4.26	2365.18
62	930	15.50	2.3	0.466	0.319	0.243	0.146	3.85	2002.97
63	945	15.75	1.9	0.385	0.314	0.201	0.070	1.85	199.47
64	960	16.00	1.9	0.385	0.310	0.201	0.075	1.98	313.32
65	975	16.25	0.4	0.081	0.305	0.042	0.039	1.02	0.00
66	990	16.50	0.4	0.081	0.300	0.042	0.039	1.02	0.00
67	1005	16.75	0.3	0.061	0.296	0.032	0.029	0.76	0.00
68	1020	17.00	0.3	0.061	0.291	0.032	0.029	0.76	0.00
69	1035	17.25	0.5	0.101	0.287	0.053	0.048	1.27	0.00
70	1050	17.50	0.5	0.101	0.282	0.053	0.048	1.27	0.00
71	1065	17.75	0.5	0.101	0.278	0.053	0.048	1.27	0.00
72	1080	18.00	0.4	0.081	0.274	0.042	0.039	1.02	0.00
73	1095	18.25	0.4	0.081	0.270	0.042	0.039	1.02	0.00
74	1110	18.50	0.4	0.081	0.266	0.042	0.039	1.02	0.00
75	1125	18.75	0.3	0.061	0.262	0.032	0.029	0.76	0.00
76	1140	19.00	0.2	0.040	0.259	0.021	0.019	0.51	0.00
77	1155	19.25	0.3	0.061	0.255	0.032	0.029	0.76	0.00
78	1170	19.50	0.4	0.081	0.251	0.042	0.039	1.02	0.00
79	1185	19.75	0.3	0.061	0.248	0.032	0.029	0.76	0.00
80	1200	20.00	0.2	0.040	0.245	0.021	0.019	0.51	0.00
81	1215	20.25	0.3	0.061	0.241	0.032	0.029	0.76	0.00
82	1230	20.50	0.3	0.061	0.238	0.032	0.029	0.76	0.00
83	1245	20.75	0.3	0.061	0.235	0.032	0.029	0.76	0.00
84	1260	21.00	0.2	0.040	0.232	0.021	0.019	0.51	0.00
85	1275	21.25	0.3	0.061	0.230	0.032	0.029	0.76	0.00
86	1290	21.50	0.2	0.040	0.227	0.021	0.019	0.51	0.00
87	1305	21.75	0.3	0.061	0.225	0.032	0.029	0.76	0.00
88	1320	22.00	0.2	0.040	0.222	0.021	0.019	0.51	0.00
89	1335	22.25	0.3	0.061	0.220	0.032	0.029	0.76	0.00
90	1350	22.50	0.2	0.040	0.218	0.021	0.019	0.51	0.00
91	1365	22.75	0.2	0.040	0.216	0.021	0.019	0.51	0.00
92	1380	23.00	0.2	0.040	0.214	0.021	0.019	0.51	0.00
93	1395	23.25	0.2	0.040	0.213	0.021	0.019	0.51	0.00
94	1410	23.50	0.2	0.040	0.212	0.021	0.019	0.51	0.00
95	1425	23.75	0.2	0.040	0.211	0.021	0.019	0.51	0.00
96	1440	24.00	0.2	0.040	0.210	0.021	0.019	0.51	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	2.06
FLOOD VOLUME (acft)	4.52
FLOOD VOLUME (cuft)	196745.52
REQUIRED STORAGE (acft)	2.06
REQUIRED STORAGE (cuft)	89748.43
PEAK FLOW (cfs)	8.62

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN A

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
344	0	0		28168	0	0	0.00
345	1	1	4637	32805	30487	30487	0.70
346	1	2	4664	37469	35137	65624	1.51
347	1	3	4688	42157	39813	105437	2.42
348	1	4	4713	46870	44514	149950	3.44

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	1.62789	cfs

MAXWELL IV DRYWELLS

NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		1.62789	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	110301	cu ft (100-yr 6-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	1.62789	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**19**	hrs < 36 hrs

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	4.75	1,425	1,425	488	937	344.03	937	0.02
2	10	4.75	1,425	2,363	488	1,874	344.06	1,874	0.04
3	15	4.02	1,206	3,080	488	2,592	344.09	2,592	0.06
4	20	0.43	128	2,720	488	2,232	344.07	2,232	0.05
5	25	0.43	128	2,360	488	1,872	344.06	1,872	0.04
6	30	2.72	817	2,689	488	2,200	344.07	2,200	0.05
7	35	0.43	128	2,329	488	1,840	344.06	1,840	0.04
8	40	2.72	817	2,657	488	2,169	344.07	2,169	0.05
9	45	2.72	817	2,985	488	2,497	344.08	2,497	0.06
10	50	0.43	128	2,625	488	2,137	344.07	2,137	0.05
11	55	1.19	358	2,495	488	2,006	344.07	2,006	0.05
12	60	2.72	817	2,823	488	2,335	344.08	2,335	0.05
13	65	5.78	1,735	4,069	488	3,581	344.12	3,581	0.08
14	70	5.78	1,735	5,316	488	4,827	344.16	4,827	0.11
15	75	5.78	1,735	6,562	488	6,073	344.20	6,073	0.14
16	80	4.25	1,276	7,349	488	6,861	344.23	6,861	0.16
17	85	8.84	2,653	9,513	488	9,025	344.30	9,025	0.21
18	90	9.61	2,882	11,907	488	11,419	344.37	11,419	0.26
19	95	7.31	2,194	13,612	488	13,124	344.43	13,124	0.30
20	100	9.61	2,882	16,006	488	15,518	344.51	15,518	0.36
21	105	14.20	4,259	19,776	488	19,288	344.63	19,288	0.44
22	110	12.67	3,800	23,088	488	22,600	344.74	22,600	0.52
23	115	11.14	3,341	25,940	488	25,452	344.83	25,452	0.58
24	120	11.90	3,570	29,023	488	28,534	344.94	28,534	0.66
25	125	12.67	3,800	32,334	488	31,846	345.04	31,846	0.73
26	130	21.08	6,324	38,170	488	37,681	345.20	37,681	0.87
27	135	27.20	8,160	45,841	488	45,353	345.42	45,353	1.04
28	140	15.73	4,718	50,071	488	49,582	345.54	49,582	1.14
29	145	40.97	12,290	61,873	488	61,385	345.88	61,385	1.41
30	150	44.79	13,438	74,822	488	74,334	346.22	74,334	1.71
31	155	51.68	15,503	89,837	488	89,349	346.60	89,349	2.05
32	160	34.08	10,225	99,574	488	99,086	346.84	99,086	2.27
33	165	4.25	1,276	100,361	488	99,873	346.86	99,873	2.29
34	170	2.72	817	100,690	488	100,201	346.87	100,201	2.30
35	175	2.72	817	101,018	488	100,530	346.88	100,530	2.31
36	180	2.19	658	101,188	488	100,699	346.88	100,699	2.31

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	2.36	709	709	488	221	344.01	221	0.01
2	10	2.84	851	1,072	488	583	344.02	583	0.01
3	15	2.84	851	1,434	488	946	344.03	946	0.02
4	20	2.84	851	1,797	488	1,308	344.04	1,308	0.03
5	25	2.84	851	2,159	488	1,671	344.05	1,671	0.04
6	30	3.31	993	2,664	488	2,175	344.07	2,175	0.05
7	35	3.31	993	3,168	488	2,680	344.09	2,680	0.06
8	40	3.31	993	3,672	488	3,184	344.10	3,184	0.07
9	45	3.31	993	4,177	488	3,688	344.12	3,688	0.08
10	50	3.31	993	4,681	488	4,193	344.14	4,193	0.10
11	55	3.31	993	5,185	488	4,697	344.15	4,697	0.11
12	60	3.78	1,135	5,832	488	5,343	344.18	5,343	0.12
13	65	3.78	1,135	6,478	488	5,989	344.20	5,989	0.14
14	70	3.78	1,135	7,124	488	6,636	344.22	6,636	0.15
15	75	3.78	1,135	7,770	488	7,282	344.24	7,282	0.17
16	80	3.78	1,135	8,416	488	7,928	344.26	7,928	0.18
17	85	3.78	1,135	9,063	488	8,574	344.28	8,574	0.20
18	90	3.78	1,135	9,709	488	9,220	344.30	9,220	0.21
19	95	3.78	1,135	10,355	488	9,867	344.32	9,867	0.23
20	100	3.78	1,135	11,001	488	10,513	344.34	10,513	0.24
21	105	3.78	1,135	11,647	488	11,159	344.37	11,159	0.26
22	110	3.78	1,135	12,293	488	11,805	344.39	11,805	0.27
23	115	3.78	1,135	12,940	488	12,451	344.41	12,451	0.29
24	120	4.25	1,276	13,728	488	13,239	344.43	13,239	0.30
25	125	3.78	1,135	14,374	488	13,886	344.46	13,886	0.32
26	130	4.25	1,276	15,162	488	14,674	344.48	14,674	0.34
27	135	4.25	1,276	15,950	488	15,462	344.51	15,462	0.35
28	140	4.25	1,276	16,738	488	16,250	344.53	16,250	0.37
29	145	4.25	1,276	17,526	488	17,038	344.56	17,038	0.39
30	150	4.25	1,276	18,314	488	17,826	344.58	17,826	0.41
31	155	4.25	1,276	19,102	488	18,614	344.61	18,614	0.43
32	160	4.25	1,276	19,890	488	19,402	344.64	19,402	0.45
33	165	4.73	1,418	20,820	488	20,331	344.67	20,331	0.47
34	170	4.73	1,418	21,750	488	21,261	344.70	21,261	0.49
35	175	4.73	1,418	22,679	488	22,191	344.73	22,191	0.51
36	180	4.73	1,418	23,609	488	23,121	344.76	23,121	0.53
37	185	4.73	1,418	24,539	488	24,051	344.79	24,051	0.55
38	190	5.20	1,560	25,611	488	25,122	344.82	25,122	0.58
39	195	5.20	1,560	26,682	488	26,194	344.86	26,194	0.60
40	200	5.20	1,560	27,754	488	27,266	344.89	27,266	0.63
41	205	0.83	248	27,513	488	27,025	344.89	27,025	0.62
42	210	1.82	545	27,570	488	27,081	344.89	27,081	0.62
43	215	2.80	841	27,923	488	27,434	344.90	27,434	0.63
44	220	2.80	841	28,276	488	27,787	344.91	27,787	0.64
45	225	3.79	1,138	28,925	488	28,437	344.93	28,437	0.65
46	230	3.79	1,138	29,575	488	29,087	344.95	29,087	0.67
47	235	4.78	1,435	30,522	488	30,034	344.99	30,034	0.69
48	240	4.78	1,435	31,469	488	30,980	345.01	30,980	0.71
49	245	5.77	1,732	32,712	488	32,224	345.05	32,224	0.74
50	250	6.76	2,029	34,252	488	33,764	345.09	33,764	0.78
51	255	7.75	2,325	36,089	488	35,601	345.15	35,601	0.82
52	260	8.74	2,622	38,223	488	37,735	345.21	37,735	0.87
53	265	9.73	2,919	40,654	488	40,165	345.28	40,165	0.92
54	270	9.73	2,919	43,084	488	42,596	345.34	42,596	0.98
55	275	10.72	3,216	45,812	488	45,323	345.42	45,323	1.04

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	11.71	3,513	48,836	488	48,348	345.51	48,348	1.11
57	285	12.70	3,809	52,157	488	51,669	345.60	51,669	1.19
58	290	12.70	3,809	55,478	488	54,990	345.70	54,990	1.26
59	295	13.69	4,106	59,096	488	58,607	345.80	58,607	1.35
60	300	14.68	4,403	63,010	488	62,522	345.91	62,522	1.44
61	305	19.62	5,887	68,409	488	67,921	346.06	67,921	1.56
62	310	24.57	7,371	75,292	488	74,803	346.23	74,803	1.72
63	315	27.54	8,261	83,065	488	82,576	346.43	82,576	1.90
64	320	30.51	9,152	91,728	488	91,240	346.64	91,240	2.09
65	325	35.45	10,636	101,876	488	101,387	346.90	101,387	2.33
66	330	44.36	13,307	114,694	488	114,206	347.20	114,206	2.62
67	335	7.75	2,325	116,531	488	116,043	347.24	116,043	2.66
68	340	4.25	1,276	117,319	488	116,831	347.26	116,831	2.68
69	345	2.84	851	117,682	488	117,193	347.26	117,193	2.69
70	350	2.36	709	117,902	488	117,414	347.27	117,414	2.70
71	355	1.42	425	117,840	488	117,351	347.27	117,351	2.69
72	360	0.95	284	117,635	488	117,146	347.26	117,146	2.69

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.51	459	459	1465	-	344.00	-	0.00
2	30	0.76	688	688	1465	-	344.00	-	0.00
3	45	0.76	688	688	1465	-	344.00	-	0.00
4	60	1.02	917	917	1465	-	344.00	-	0.00
5	75	0.76	688	688	1465	-	344.00	-	0.00
6	90	0.76	688	688	1465	-	344.00	-	0.00
7	105	0.76	688	688	1465	-	344.00	-	0.00
8	120	1.02	917	917	1465	-	344.00	-	0.00
9	135	1.02	917	917	1465	-	344.00	-	0.00
10	150	1.02	917	917	1465	-	344.00	-	0.00
11	165	1.27	1,146	1,146	1465	-	344.00	-	0.00
12	180	1.27	1,146	1,146	1465	-	344.00	-	0.00
13	195	1.27	1,146	1,146	1465	-	344.00	-	0.00
14	210	1.27	1,146	1,146	1465	-	344.00	-	0.00
15	225	1.27	1,146	1,146	1465	-	344.00	-	0.00
16	240	1.53	1,376	1,376	1465	-	344.00	-	0.00
17	255	1.53	1,376	1,376	1465	-	344.00	-	0.00
18	270	1.78	1,605	1,605	1465	140	344.00	140	0.00
19	285	1.78	1,605	1,745	1465	280	344.01	280	0.01
20	300	2.04	1,834	2,114	1465	649	344.02	649	0.01
21	315	1.53	1,376	2,024	1465	559	344.02	559	0.01
22	330	1.78	1,605	2,164	1465	699	344.02	699	0.02
23	345	2.04	1,834	2,533	1465	1,068	344.04	1,068	0.02
24	360	2.04	1,834	2,902	1465	1,437	344.05	1,437	0.03
25	375	2.29	2,063	3,500	1465	2,035	344.07	2,035	0.05
26	390	2.29	2,063	4,099	1465	2,633	344.09	2,633	0.06
27	405	2.55	2,293	4,926	1465	3,461	344.11	3,461	0.08
28	420	2.55	2,293	5,754	1465	4,289	344.14	4,289	0.10
29	435	2.55	2,293	6,581	1465	5,116	344.17	5,116	0.12
30	450	2.80	2,522	7,638	1465	6,173	344.20	6,173	0.14
31	465	3.06	2,751	8,924	1465	7,459	344.24	7,459	0.17
32	480	3.31	2,980	10,440	1465	8,974	344.29	8,974	0.21
33	495	3.82	3,439	12,413	1465	10,948	344.36	10,948	0.25
34	510	3.82	3,439	14,387	1465	12,922	344.42	12,922	0.30
35	525	4.08	3,668	16,590	1465	15,125	344.50	15,125	0.35
36	540	4.33	3,898	19,023	1465	17,558	344.58	17,558	0.40
37	555	4.84	4,356	21,914	1465	20,449	344.67	20,449	0.47
38	570	5.09	4,585	25,034	1465	23,569	344.77	23,569	0.54
39	585	5.35	4,815	28,384	1465	26,918	344.88	26,918	0.62
40	600	0.01	7	26,925	1465	25,460	344.84	25,460	0.58
41	615	3.82	3,439	28,899	1465	27,434	344.90	27,434	0.63
42	630	3.82	3,439	30,873	1465	29,408	344.96	29,408	0.68
43	645	5.09	4,585	33,993	1465	32,528	345.06	32,528	0.75
44	660	5.09	4,585	37,114	1465	35,648	345.15	35,648	0.82
45	675	4.84	4,356	40,004	1465	38,539	345.23	38,539	0.88
46	690	4.84	4,356	42,895	1465	41,430	345.31	41,430	0.95
47	705	4.33	3,898	45,328	1465	43,863	345.38	43,863	1.01
48	720	4.59	4,127	47,990	1465	46,524	345.46	46,524	1.07
49	735	3.07	2,762	49,286	1465	47,821	345.49	47,821	1.10
50	750	3.76	3,380	51,201	1465	49,736	345.55	49,736	1.14
51	765	4.97	4,476	54,212	1465	52,747	345.63	52,747	1.21
52	780	5.66	5,091	57,838	1465	56,372	345.74	56,372	1.29
53	795	8.47	7,623	63,996	1465	62,531	345.91	62,531	1.44
54	810	8.62	7,755	70,286	1465	68,821	346.08	68,821	1.58
55	825	2.90	2,607	71,428	1465	69,963	346.11	69,963	1.61
56	840	3.04	2,735	72,698	1465	71,233	346.14	71,233	1.64
57	855	5.31	4,781	76,014	1465	74,549	346.22	74,549	1.71
58	870	4.92	4,426	78,975	1465	77,510	346.30	77,510	1.78

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	5.05	4,549	82,059	1465	80,594	346.38	80,594	1.85
60	900	4.66	4,191	84,785	1465	83,320	346.44	83,320	1.91
61	915	4.26	3,830	87,150	1465	85,685	346.50	85,685	1.97
62	930	3.85	3,468	89,153	1465	87,688	346.55	87,688	2.01
63	945	1.85	1,665	89,352	1465	87,887	346.56	87,887	2.02
64	960	1.98	1,778	89,666	1465	88,201	346.57	88,201	2.02
65	975	1.02	917	89,118	1465	87,653	346.55	87,653	2.01
66	990	1.02	917	88,570	1465	87,105	346.54	87,105	2.00
67	1005	0.76	688	87,792	1465	86,327	346.52	86,327	1.98
68	1020	0.76	688	87,015	1465	85,550	346.50	85,550	1.96
69	1035	1.27	1,146	86,696	1465	85,231	346.49	85,231	1.96
70	1050	1.27	1,146	86,377	1465	84,912	346.48	84,912	1.95
71	1065	1.27	1,146	86,059	1465	84,594	346.48	84,594	1.94
72	1080	1.02	917	85,511	1465	84,046	346.46	84,046	1.93
73	1095	1.02	917	84,963	1465	83,498	346.45	83,498	1.92
74	1110	1.02	917	84,415	1465	82,950	346.44	82,950	1.90
75	1125	0.76	688	83,637	1465	82,172	346.42	82,172	1.89
76	1140	0.51	459	82,631	1465	81,166	346.39	81,166	1.86
77	1155	0.76	688	81,853	1465	80,388	346.37	80,388	1.85
78	1170	1.02	917	81,305	1465	79,840	346.36	79,840	1.83
79	1185	0.76	688	80,528	1465	79,063	346.34	79,063	1.82
80	1200	0.51	459	79,522	1465	78,056	346.31	78,056	1.79
81	1215	0.76	688	78,744	1465	77,279	346.29	77,279	1.77
82	1230	0.76	688	77,967	1465	76,502	346.27	76,502	1.76
83	1245	0.76	688	77,190	1465	75,724	346.25	75,724	1.74
84	1260	0.51	459	76,183	1465	74,718	346.23	74,718	1.72
85	1275	0.76	688	75,406	1465	73,941	346.21	73,941	1.70
86	1290	0.51	459	74,399	1465	72,934	346.18	72,934	1.67
87	1305	0.76	688	73,622	1465	72,157	346.16	72,157	1.66
88	1320	0.51	459	72,615	1465	71,150	346.14	71,150	1.63
89	1335	0.76	688	71,838	1465	70,373	346.12	70,373	1.62
90	1350	0.51	459	70,831	1465	69,366	346.09	69,366	1.59
91	1365	0.51	459	69,825	1465	68,360	346.07	68,360	1.57
92	1380	0.51	459	68,818	1465	67,353	346.04	67,353	1.55
93	1395	0.51	459	67,812	1465	66,347	346.02	66,347	1.52
94	1410	0.51	459	66,805	1465	65,340	345.99	65,340	1.50
95	1425	0.51	459	65,799	1465	64,333	345.96	64,333	1.48
96	1440	0.51	459	64,792	1465	63,327	345.93	63,327	1.45

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN B		
10	AREA DESIGNATION	SUBAREA B (APARTMENTS)		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS	1.07		
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	26%		
27				
28	LENGTH OF WATERCOURSE (L)	410		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	200		
30				
31	ELEVATION OF HEADWATER	355.67		
32	ELEVATION OF CONCENTRATION POINT	352.68		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		347	2000	
45		348	2000	
46		349	2000	
47		350	2000	
48		351	2000	
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN B
[2] AREA DESIGNATION	SUBAREA B (APARTMENTS)
[3] AREA - ACRES	1.070
[4] L-FEET	410
[5] L-MILES	0.078
[6] La-FEET	200
[7] La-MILES	0.038
[8] ELEVATION OF HEADWATER	355.67
[9] ELEVATION OF CONCENTRATION POINT	352.68
[10] H-FEET	2.99
[11] S-FEET/MILE	38.5
[12] S^0.5	6.21
[13] L*LCA/S^0.5	0.00047
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.020
[16] LAG TIME-MINUTES	1.18
[17] 25% OF LAG-MINUTES	0.29
[18] 40% OF LAG-MINUTES	0.47
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.09

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	1.070	1.00	2.42	3.13	1.070	1.00	3.13	5.06	1.070	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	1.07	SUM [7]	2.42	SUM [9]	1.07	SUM [11]	3.13	SUM [13]	1.07	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.81	1.94	3.06
FLOOD VOLUME	(cu-ft)	7,038	7,549	11,873
	(acre-ft)	0.16	0.17	0.27
REQUIRED STORAGE	(cu-ft)	5,979	5,667	5,584
	(acre-ft)	0.14	0.13	0.13
PEAK FLOW	(cfs)	2.33	2.03	0.55
MAXIMUM WSEL	(ft)	349.99	349.82	349.74

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN B
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
	COMMERCIAL			90%	0.00	0.00	0.000	0.0000
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
	SF - 1/4 ACRE			50%	0.00	0.00	0.000	0.0000
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
A	MF - APARTMENTS	32	0.74	80%	0.21	1.07	1.000	0.2072
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
	RETENTION BASINS			0%	0.00	0.00	0.000	0.0000
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	1.07	SUM	0.2072

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.1036
C= 0.00192

Ft=C(24-(T/60))^1.55 = 0.00192 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 26%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 3 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.07		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.18		
UNIT TIME-PERCENT OF LAG	424.3		
TOTAL ADJUSTED STORM RAIN-INCHES	2.42		
CONSTANT LOSS RATE-in/hr	0.21		
LOW LOSS RATE - PERCENT	26%	TOTAL PERCOLATION RATE (cfs)	0.09 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.21	0.10	0.170	0.18	26.89
2	10	0.17	1.3	0.378	0.21	0.10	0.170	0.18	26.89
3	15	0.25	1.1	0.319	0.21	0.08	0.112	0.12	8.25
4	20	0.33	1.5	0.436	0.21	0.11	0.228	0.24	45.54
5	25	0.42	1.5	0.436	0.21	0.11	0.228	0.24	45.54
6	30	0.50	1.8	0.523	0.21	0.14	0.316	0.34	73.50
7	35	0.58	1.5	0.436	0.21	0.11	0.228	0.24	45.54
8	40	0.67	1.8	0.523	0.21	0.14	0.316	0.34	73.50
9	45	0.75	1.8	0.523	0.21	0.14	0.316	0.34	73.50
10	50	0.83	1.5	0.436	0.21	0.11	0.228	0.24	45.54
11	55	0.92	1.6	0.465	0.21	0.12	0.257	0.28	54.86
12	60	1.00	1.8	0.523	0.21	0.14	0.316	0.34	73.50
13	65	1.08	2.2	0.639	0.21	0.17	0.432	0.46	110.79
14	70	1.17	2.2	0.639	0.21	0.17	0.432	0.46	110.79
15	75	1.25	2.2	0.639	0.21	0.17	0.432	0.46	110.79
16	80	1.33	2.0	0.581	0.21	0.15	0.374	0.40	92.15
17	85	1.42	2.6	0.755	0.21	0.20	0.548	0.59	148.08
18	90	1.50	2.7	0.784	0.21	0.20	0.577	0.62	157.40
19	95	1.58	2.4	0.697	0.21	0.18	0.490	0.52	129.44
20	100	1.67	2.7	0.784	0.21	0.20	0.577	0.62	157.40
21	105	1.75	3.3	0.958	0.21	0.25	0.751	0.80	213.33
22	110	1.83	3.1	0.900	0.21	0.23	0.693	0.74	194.69
23	115	1.92	2.9	0.842	0.21	0.22	0.635	0.68	176.04
24	120	2.00	3.0	0.871	0.21	0.23	0.664	0.71	185.37
25	125	2.08	3.1	0.900	0.21	0.23	0.693	0.74	194.69
26	130	2.17	4.2	1.220	0.21	0.32	1.012	1.08	297.23
27	135	2.25	5.0	1.452	0.21	0.38	1.245	1.33	371.80
28	140	2.33	3.5	1.016	0.21	0.26	0.809	0.87	231.98
29	145	2.42	6.8	1.975	0.21	0.51	1.768	1.89	539.60
30	150	2.50	7.3	2.120	0.21	0.55	1.913	2.05	586.21
31	155	2.58	8.2	2.381	0.21	0.62	2.174	2.33	670.10
32	160	2.67	5.9	1.713	0.21	0.45	1.506	1.61	455.70
33	165	2.75	2.0	0.581	0.21	0.15	0.374	0.40	92.15
34	170	2.83	1.8	0.523	0.21	0.14	0.316	0.34	73.50
35	175	2.92	1.8	0.523	0.21	0.14	0.316	0.34	73.50
36	180	3.00	0.6	0.174	0.21	0.05	0.129	0.14	13.61
							21.743		5979.41

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.81
FLOOD VOLUME (acft)	0.16
FLOOD VOLUME (cuft)	7037.60
REQUIRED STORAGE (acft)	0.14
REQUIRED STORAGE (cuft)	5979.41
PEAK FLOW RATE (cfs)	2.33

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.07		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.18		
UNIT TIME-PERCENT OF LAG	424.3		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.207		
LOW LOSS RATE - PERCENT	26%	TOTAL PERCOLATION RATE (cfs)	0.09 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.188	0.21	0.05	0.14	0.15	16.83
2	10	0.17	0.6	0.225	0.21	0.06	0.02	0.02	0.00
3	15	0.25	0.6	0.225	0.21	0.06	0.02	0.02	0.00
4	20	0.33	0.6	0.225	0.21	0.06	0.02	0.02	0.00
5	25	0.42	0.6	0.225	0.21	0.06	0.02	0.02	0.00
6	30	0.50	0.7	0.263	0.21	0.07	0.06	0.06	0.00
7	35	0.58	0.7	0.263	0.21	0.07	0.06	0.06	0.00
8	40	0.67	0.7	0.263	0.21	0.07	0.06	0.06	0.00
9	45	0.75	0.7	0.263	0.21	0.07	0.06	0.06	0.00
10	50	0.83	0.7	0.263	0.21	0.07	0.06	0.06	0.00
11	55	0.92	0.7	0.263	0.21	0.07	0.06	0.06	0.00
12	60	1.00	0.8	0.300	0.21	0.08	0.09	0.10	2.17
13	65	1.08	0.8	0.300	0.21	0.08	0.09	0.10	2.17
14	70	1.17	0.8	0.300	0.21	0.08	0.09	0.10	2.17
15	75	1.25	0.8	0.300	0.21	0.08	0.09	0.10	2.17
16	80	1.33	0.8	0.300	0.21	0.08	0.09	0.10	2.17
17	85	1.42	0.8	0.300	0.21	0.08	0.09	0.10	2.17
18	90	1.50	0.8	0.300	0.21	0.08	0.09	0.10	2.17
19	95	1.58	0.8	0.300	0.21	0.08	0.09	0.10	2.17
20	100	1.67	0.8	0.300	0.21	0.08	0.09	0.10	2.17
21	105	1.75	0.8	0.300	0.21	0.08	0.09	0.10	2.17
22	110	1.83	0.8	0.300	0.21	0.08	0.09	0.10	2.17
23	115	1.92	0.8	0.300	0.21	0.08	0.09	0.10	2.17
24	120	2.00	0.9	0.338	0.21	0.09	0.13	0.14	14.22
25	125	2.08	0.8	0.300	0.21	0.08	0.09	0.10	2.17
26	130	2.17	0.9	0.338	0.21	0.09	0.13	0.14	14.22
27	135	2.25	0.9	0.338	0.21	0.09	0.13	0.14	14.22
28	140	2.33	0.9	0.338	0.21	0.09	0.13	0.14	14.22
29	145	2.42	0.9	0.338	0.21	0.09	0.13	0.14	14.22
30	150	2.50	0.9	0.338	0.21	0.09	0.13	0.14	14.22
31	155	2.58	0.9	0.338	0.21	0.09	0.13	0.14	14.22
32	160	2.67	0.9	0.338	0.21	0.09	0.13	0.14	14.22
33	165	2.75	1.0	0.376	0.21	0.10	0.17	0.18	26.28
34	170	2.83	1.0	0.376	0.21	0.10	0.17	0.18	26.28
35	175	2.92	1.0	0.376	0.21	0.10	0.17	0.18	26.28
36	180	3.00	1.0	0.376	0.21	0.10	0.17	0.18	26.28
37	185	3.08	1.0	0.376	0.21	0.10	0.17	0.18	26.28
38	190	3.17	1.1	0.413	0.21	0.11	0.21	0.22	38.34
39	195	3.25	1.1	0.413	0.21	0.11	0.21	0.22	38.34
40	200	3.33	1.1	0.413	0.21	0.11	0.21	0.22	38.34
41	205	3.42	1.2	0.451	0.21	0.12	0.24	0.26	50.39
42	210	3.50	1.3	0.488	0.21	0.13	0.28	0.30	62.45
43	215	3.58	1.4	0.526	0.21	0.14	0.32	0.34	74.51
44	220	3.67	1.4	0.526	0.21	0.14	0.32	0.34	74.51
45	225	3.75	1.5	0.563	0.21	0.15	0.36	0.38	86.56
46	230	3.83	1.5	0.563	0.21	0.15	0.36	0.38	86.56
47	235	3.92	1.6	0.601	0.21	0.16	0.39	0.42	98.62
48	240	4.00	1.6	0.601	0.21	0.16	0.39	0.42	98.62
49	245	4.08	1.7	0.639	0.21	0.17	0.43	0.46	110.68
50	250	4.17	1.8	0.676	0.21	0.18	0.47	0.50	122.73
51	255	4.25	1.9	0.714	0.21	0.19	0.51	0.54	134.79
52	260	4.33	2.0	0.751	0.21	0.20	0.54	0.58	146.85
53	265	4.42	2.1	0.789	0.21	0.21	0.58	0.62	158.90
54	270	4.50	2.1	0.789	0.21	0.21	0.58	0.62	158.90
55	275	4.58	2.2	0.826	0.21	0.21	0.62	0.66	170.96
56	280	4.67	2.3	0.864	0.21	0.22	0.66	0.70	183.02

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.07
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.18
UNIT TIME-PERCENT OF LAG	424.3
TOTAL ADJUSTED STORM RAIN-INCHES	3.13
CONSTANT LOSS RATE-in/hr	0.207
LOW LOSS RATE - PERCENT	26%

TOTAL PERCOLATION RATE (cfs) 0.09 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.901	0.21	0.23	0.69	0.74	195.07
58	290	4.83	2.4	0.901	0.21	0.23	0.69	0.74	195.07
59	295	4.92	2.5	0.939	0.21	0.24	0.73	0.78	207.13
60	300	5.00	2.6	0.977	0.21	0.25	0.77	0.82	219.19
61	305	5.08	3.1	1.164	0.21	0.30	0.96	1.02	279.47
62	310	5.17	3.6	1.352	0.21	0.35	1.14	1.23	339.75
63	315	5.25	3.9	1.465	0.21	0.38	1.26	1.35	375.92
64	320	5.33	4.2	1.578	0.21	0.41	1.37	1.47	412.09
65	325	5.42	4.7	1.765	0.21	0.46	1.56	1.67	472.38
66	330	5.50	5.6	2.103	0.21	0.55	1.90	2.03	580.89
67	335	5.58	1.9	0.714	0.21	0.19	0.51	0.54	134.79
68	340	5.67	0.9	0.338	0.21	0.09	0.13	0.14	14.22
69	345	5.75	0.6	0.225	0.21	0.06	0.02	0.02	0.00
70	350	5.83	0.5	0.188	0.21	0.05	0.14	0.15	16.83
71	355	5.92	0.3	0.113	0.21	0.03	0.08	0.09	0.00
72	360	6.00	0.2	0.075	0.21	0.02	0.06	0.06	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.94
FLOOD VOLUME (acft)	0.17
FLOOD VOLUME (cuft)	7549.40
REQUIRED STORAGE (acft)	0.13
REQUIRED STORAGE (cuft)	5667.01
PEAK FLOW RATE (cfs)	2.03

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES 1.070 UNIT TIME-MINUTES 15 LAG TIME - MINUTES 1.18 UNIT TIME-PERCENT OF LAG 1273.0 TOTAL ADJUSTED STORM RAIN-INCHES 5.06					CONSTANT LOSS RATE-in/hr n/a VARIABLE LOSS RATE (AVG) in/hr 0.2072 MINIMUM LOSS RATE (for var. loss) - in/hr 0.104 LOW LOSS RATE - DECIMAL 0.26 C 0.00192 PERCOLATION RATE (cfs) 0.09				
Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.040	0.366	0.011	0.030	0.03	0.00
2	30	0.50	0.3	0.061	0.362	0.016	0.045	0.05	0.00
3	45	0.75	0.3	0.061	0.357	0.016	0.045	0.05	0.00
4	60	1.00	0.4	0.081	0.353	0.021	0.060	0.06	0.00
5	75	1.25	0.3	0.061	0.349	0.016	0.045	0.05	0.00
6	90	1.50	0.3	0.061	0.345	0.016	0.045	0.05	0.00
7	105	1.75	0.3	0.061	0.341	0.016	0.045	0.05	0.00
8	120	2.00	0.4	0.081	0.337	0.021	0.060	0.06	0.00
9	135	2.25	0.4	0.081	0.333	0.021	0.060	0.06	0.00
10	150	2.50	0.4	0.081	0.329	0.021	0.060	0.06	0.00
11	165	2.75	0.5	0.101	0.325	0.026	0.075	0.08	0.00
12	180	3.00	0.5	0.101	0.321	0.026	0.075	0.08	0.00
13	195	3.25	0.5	0.101	0.317	0.026	0.075	0.08	0.00
14	210	3.50	0.5	0.101	0.313	0.026	0.075	0.08	0.00
15	225	3.75	0.5	0.101	0.309	0.026	0.075	0.08	0.00
16	240	4.00	0.6	0.121	0.305	0.032	0.090	0.10	3.21
17	255	4.25	0.6	0.121	0.301	0.032	0.090	0.10	3.21
18	270	4.50	0.7	0.142	0.297	0.037	0.105	0.11	17.63
19	285	4.75	0.7	0.142	0.293	0.037	0.105	0.11	17.63
20	300	5.00	0.8	0.162	0.290	0.042	0.120	0.13	32.05
21	315	5.25	0.6	0.121	0.286	0.032	0.090	0.10	3.21
22	330	5.50	0.7	0.142	0.282	0.037	0.105	0.11	17.63
23	345	5.75	0.8	0.162	0.278	0.042	0.120	0.13	32.05
24	360	6.00	0.8	0.162	0.275	0.042	0.120	0.13	32.05
25	375	6.25	0.9	0.182	0.271	0.047	0.135	0.14	46.48
26	390	6.50	0.9	0.182	0.267	0.047	0.135	0.14	46.48
27	405	6.75	1.0	0.202	0.264	0.053	0.150	0.16	60.90
28	420	7.00	1.0	0.202	0.260	0.053	0.150	0.16	60.90
29	435	7.25	1.0	0.202	0.257	0.053	0.150	0.16	60.90
30	450	7.50	1.1	0.223	0.253	0.058	0.165	0.18	75.32
31	465	7.75	1.2	0.243	0.250	0.063	0.180	0.19	89.75
32	480	8.00	1.3	0.263	0.246	0.068	0.017	0.02	0.00
33	495	8.25	1.5	0.304	0.243	0.079	0.061	0.06	0.00
34	510	8.50	1.5	0.304	0.240	0.079	0.064	0.07	0.00
35	525	8.75	1.6	0.324	0.236	0.084	0.088	0.09	1.07
36	540	9.00	1.7	0.344	0.233	0.089	0.111	0.12	23.76
37	555	9.25	1.9	0.385	0.230	0.100	0.155	0.17	65.92
38	570	9.50	2.0	0.405	0.226	0.105	0.178	0.19	88.56
39	585	9.75	2.1	0.425	0.223	0.111	0.202	0.22	111.16
40	600	10.00	2.2	0.445	0.220	0.116	0.225	0.24	133.74
41	615	10.25	1.5	0.304	0.217	0.079	0.087	0.09	0.36
42	630	10.50	1.5	0.304	0.214	0.079	0.090	0.10	3.39
43	645	10.75	2.0	0.405	0.210	0.105	0.194	0.21	103.84
44	660	11.00	2.0	0.405	0.207	0.105	0.197	0.21	106.80
45	675	11.25	1.9	0.385	0.204	0.100	0.180	0.19	90.25
46	690	11.50	1.9	0.385	0.201	0.100	0.183	0.20	93.15
47	705	11.75	1.7	0.344	0.198	0.089	0.146	0.16	57.04
48	720	12.00	1.8	0.364	0.195	0.095	0.169	0.18	79.37
49	735	12.25	2.5	0.506	0.192	0.132	0.314	0.34	218.62
50	750	12.50	2.6	0.526	0.190	0.137	0.337	0.36	240.88
51	765	12.75	2.8	0.567	0.187	0.147	0.380	0.41	282.61
52	780	13.00	2.9	0.587	0.184	0.153	0.403	0.43	304.81
53	795	13.25	3.4	0.688	0.181	0.179	0.507	0.54	404.94
54	810	13.50	3.4	0.688	0.178	0.179	0.510	0.55	407.59
55	825	13.75	2.3	0.466	0.176	0.121	0.290	0.31	195.79
56	840	14.00	2.3	0.466	0.173	0.121	0.293	0.31	198.37
57	855	14.25	2.7	0.546	0.170	0.142	0.376	0.40	278.87
58	870	14.50	2.6	0.526	0.168	0.137	0.358	0.38	261.89
59	885	14.75	2.6	0.526	0.165	0.137	0.361	0.39	264.36
60	900	15.00	2.5	0.506	0.163	0.132	0.343	0.37	247.30

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.070	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2072
LAG TIME - MINUTES	1.18	MINIMUM LOSS RATE (for var. loss) - in/hr	0.104
UNIT TIME-PERCENT OF LAG	1273.0	LOW LOSS RATE - DECIMAL	0.26
TOTAL ADJUSTED STORM RAIN-INCHES	5.06	C	0.00192
		PERCOLATION RATE (cfs)	0.09

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
61	915	15.25	2.4	0.486	0.160	0.126	0.326	0.35	230.20
62	930	15.50	2.3	0.466	0.158	0.121	0.308	0.33	213.07
63	945	15.75	1.9	0.385	0.155	0.100	0.229	0.25	137.43
64	960	16.00	1.9	0.385	0.153	0.100	0.232	0.25	139.72
65	975	16.25	0.4	0.081	0.151	0.021	0.060	0.06	0.00
66	990	16.50	0.4	0.081	0.148	0.021	0.060	0.06	0.00
67	1005	16.75	0.3	0.061	0.146	0.016	0.045	0.05	0.00
68	1020	17.00	0.3	0.061	0.144	0.016	0.045	0.05	0.00
69	1035	17.25	0.5	0.101	0.142	0.026	0.075	0.08	0.00
70	1050	17.50	0.5	0.101	0.140	0.026	0.075	0.08	0.00
71	1065	17.75	0.5	0.101	0.137	0.026	0.075	0.08	0.00
72	1080	18.00	0.4	0.081	0.135	0.021	0.060	0.06	0.00
73	1095	18.25	0.4	0.081	0.133	0.021	0.060	0.06	0.00
74	1110	18.50	0.4	0.081	0.132	0.021	0.060	0.06	0.00
75	1125	18.75	0.3	0.061	0.130	0.016	0.045	0.05	0.00
76	1140	19.00	0.2	0.040	0.128	0.011	0.030	0.03	0.00
77	1155	19.25	0.3	0.061	0.126	0.016	0.045	0.05	0.00
78	1170	19.50	0.4	0.081	0.124	0.021	0.060	0.06	0.00
79	1185	19.75	0.3	0.061	0.123	0.016	0.045	0.05	0.00
80	1200	20.00	0.2	0.040	0.121	0.011	0.030	0.03	0.00
81	1215	20.25	0.3	0.061	0.119	0.016	0.045	0.05	0.00
82	1230	20.50	0.3	0.061	0.118	0.016	0.045	0.05	0.00
83	1245	20.75	0.3	0.061	0.116	0.016	0.045	0.05	0.00
84	1260	21.00	0.2	0.040	0.115	0.011	0.030	0.03	0.00
85	1275	21.25	0.3	0.061	0.113	0.016	0.045	0.05	0.00
86	1290	21.50	0.2	0.040	0.112	0.011	0.030	0.03	0.00
87	1305	21.75	0.3	0.061	0.111	0.016	0.045	0.05	0.00
88	1320	22.00	0.2	0.040	0.110	0.011	0.030	0.03	0.00
89	1335	22.25	0.3	0.061	0.109	0.016	0.045	0.05	0.00
90	1350	22.50	0.2	0.040	0.108	0.011	0.030	0.03	0.00
91	1365	22.75	0.2	0.040	0.107	0.011	0.030	0.03	0.00
92	1380	23.00	0.2	0.040	0.106	0.011	0.030	0.03	0.00
93	1395	23.25	0.2	0.040	0.105	0.011	0.030	0.03	0.00
94	1410	23.50	0.2	0.040	0.105	0.011	0.030	0.03	0.00
95	1425	23.75	0.2	0.040	0.104	0.011	0.030	0.03	0.00
96	1440	24.00	0.2	0.040	0.104	0.011	0.030	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	3.06
FLOOD VOLUME (acft)	0.27
FLOOD VOLUME (cuft)	11873.23
REQUIRED STORAGE (acft)	0.13
REQUIRED STORAGE (cuft)	5584.27
PEAK FLOW (cfs)	0.55

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN B

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
347	0	0		2000	0	0	0.00
348	1	1	0	2000	2000	2000	0.05
349	1	2	0	2000	2000	4000	0.09
350	1	3	0	2000	2000	6000	0.14
351	1	4	0	2000	2000	8000	0.18

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	0.09259	cfs
MAXWELL IV DRYWELLS			
NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		0.09259	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	5979	cu ft (100-yr 3-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	0.09259	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**18**	hrs < 36 hrs

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.18	55	55	28	27	347.01	27	0.00
2	10	0.18	55	82	28	54	347.03	54	0.00
3	15	0.12	36	90	28	62	347.03	62	0.00
4	20	0.24	73	135	28	108	347.05	108	0.00
5	25	0.24	73	181	28	153	347.08	153	0.00
6	30	0.34	101	254	28	227	347.11	227	0.01
7	35	0.24	73	300	28	272	347.14	272	0.01
8	40	0.34	101	373	28	346	347.17	346	0.01
9	45	0.34	101	447	28	419	347.21	419	0.01
10	50	0.24	73	492	28	465	347.23	465	0.01
11	55	0.28	83	547	28	520	347.26	520	0.01
12	60	0.34	101	621	28	593	347.30	593	0.01
13	65	0.46	139	732	28	704	347.35	704	0.02
14	70	0.46	139	842	28	815	347.41	815	0.02
15	75	0.46	139	953	28	925	347.46	925	0.02
16	80	0.40	120	1,045	28	1,018	347.51	1,018	0.02
17	85	0.59	176	1,193	28	1,166	347.58	1,166	0.03
18	90	0.62	185	1,351	28	1,323	347.66	1,323	0.03
19	95	0.52	157	1,480	28	1,453	347.73	1,453	0.03
20	100	0.62	185	1,638	28	1,610	347.80	1,610	0.04
21	105	0.80	241	1,851	28	1,823	347.91	1,823	0.04
22	110	0.74	222	2,046	28	2,018	348.01	2,018	0.05
23	115	0.68	204	2,222	28	2,194	348.10	2,194	0.05
24	120	0.71	213	2,407	28	2,379	348.19	2,379	0.05
25	125	0.74	222	2,602	28	2,574	348.29	2,574	0.06
26	130	1.08	325	2,899	28	2,871	348.44	2,871	0.07
27	135	1.33	400	3,271	28	3,243	348.62	3,243	0.07
28	140	0.87	260	3,503	28	3,475	348.74	3,475	0.08
29	145	1.89	567	4,042	28	4,015	349.01	4,015	0.09
30	150	2.05	614	4,629	28	4,601	349.30	4,601	0.11
31	155	2.33	698	5,299	28	5,271	349.64	5,271	0.12
32	160	1.61	483	5,754	28	5,727	349.86	5,727	0.13
33	165	0.40	120	5,847	28	5,819	349.91	5,819	0.13
34	170	0.34	101	5,920	28	5,892	349.95	5,892	0.14
35	175	0.34	101	5,994	28	5,966	349.98	5,966	0.14
36	180	0.14	41	6,007	28	5,979	349.99	5,979	0.14

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.15	45	45	28	17	347.01	17	0.00
2	10	0.02	6	23	28	-	347.00	-	0.00
3	15	0.02	6	6	28	-	347.00	-	0.00
4	20	0.02	6	6	28	-	347.00	-	0.00
5	25	0.02	6	6	28	-	347.00	-	0.00
6	30	0.06	18	18	28	-	347.00	-	0.00
7	35	0.06	18	18	28	-	347.00	-	0.00
8	40	0.06	18	18	28	-	347.00	-	0.00
9	45	0.06	18	18	28	-	347.00	-	0.00
10	50	0.06	18	18	28	-	347.00	-	0.00
11	55	0.06	18	18	28	-	347.00	-	0.00
12	60	0.10	30	30	28	2	347.00	2	0.00
13	65	0.10	30	32	28	4	347.00	4	0.00
14	70	0.10	30	34	28	6	347.00	6	0.00
15	75	0.10	30	36	28	9	347.00	9	0.00
16	80	0.10	30	39	28	11	347.01	11	0.00
17	85	0.10	30	41	28	13	347.01	13	0.00
18	90	0.10	30	43	28	15	347.01	15	0.00
19	95	0.10	30	45	28	17	347.01	17	0.00
20	100	0.10	30	47	28	19	347.01	19	0.00
21	105	0.10	30	49	28	22	347.01	22	0.00
22	110	0.10	30	52	28	24	347.01	24	0.00
23	115	0.10	30	54	28	26	347.01	26	0.00
24	120	0.14	42	68	28	40	347.02	40	0.00
25	125	0.10	30	70	28	42	347.02	42	0.00
26	130	0.14	42	84	28	57	347.03	57	0.00
27	135	0.14	42	99	28	71	347.04	71	0.00
28	140	0.14	42	113	28	85	347.04	85	0.00
29	145	0.14	42	127	28	99	347.05	99	0.00
30	150	0.14	42	141	28	113	347.06	113	0.00
31	155	0.14	42	155	28	128	347.06	128	0.00
32	160	0.14	42	170	28	142	347.07	142	0.00
33	165	0.18	54	196	28	168	347.08	168	0.00
34	170	0.18	54	222	28	194	347.10	194	0.00
35	175	0.18	54	249	28	221	347.11	221	0.01
36	180	0.18	54	275	28	247	347.12	247	0.01
37	185	0.18	54	301	28	273	347.14	273	0.01
38	190	0.22	66	339	28	312	347.16	312	0.01
39	195	0.22	66	378	28	350	347.17	350	0.01
40	200	0.22	66	416	28	388	347.19	388	0.01
41	205	0.26	78	466	28	439	347.22	439	0.01
42	210	0.30	90	529	28	501	347.25	501	0.01
43	215	0.34	102	603	28	576	347.29	576	0.01
44	220	0.34	102	678	28	650	347.33	650	0.01
45	225	0.38	114	765	28	737	347.37	737	0.02
46	230	0.38	114	851	28	823	347.41	823	0.02
47	235	0.42	126	950	28	922	347.46	922	0.02
48	240	0.42	126	1,048	28	1,021	347.51	1,021	0.02
49	245	0.46	138	1,159	28	1,131	347.57	1,131	0.03
50	250	0.50	151	1,282	28	1,254	347.63	1,254	0.03
51	255	0.54	163	1,417	28	1,389	347.69	1,389	0.03
52	260	0.58	175	1,563	28	1,536	347.77	1,536	0.04
53	265	0.62	187	1,722	28	1,694	347.85	1,694	0.04
54	270	0.62	187	1,881	28	1,853	347.93	1,853	0.04
55	275	0.66	199	2,052	28	2,024	348.01	2,024	0.05

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	0.70	211	2,235	28	2,207	348.10	2,207	0.05
57	285	0.74	223	2,430	28	2,402	348.20	2,402	0.06
58	290	0.74	223	2,625	28	2,598	348.30	2,598	0.06
59	295	0.78	235	2,832	28	2,805	348.40	2,805	0.06
60	300	0.82	247	3,052	28	3,024	348.51	3,024	0.07
61	305	1.02	307	3,331	28	3,303	348.65	3,303	0.08
62	310	1.23	368	3,671	28	3,643	348.82	3,643	0.08
63	315	1.35	404	4,047	28	4,019	349.01	4,019	0.09
64	320	1.47	440	4,459	28	4,431	349.22	4,431	0.10
65	325	1.67	500	4,931	28	4,903	349.45	4,903	0.11
66	330	2.03	609	5,512	28	5,484	349.74	5,484	0.13
67	335	0.54	163	5,647	28	5,619	349.81	5,619	0.13
68	340	0.14	42	5,661	28	5,633	349.82	5,633	0.13
69	345	0.02	6	5,639	28	5,611	349.81	5,611	0.13
70	350	0.15	45	5,656	28	5,628	349.81	5,628	0.13
71	355	0.09	27	5,655	28	5,627	349.81	5,627	0.13
72	360	0.06	18	5,645	28	5,617	349.81	5,617	0.13

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.03	29	29	83	-	347.00	-	0.00
2	30	0.05	43	43	83	-	347.00	-	0.00
3	45	0.05	43	43	83	-	347.00	-	0.00
4	60	0.06	58	58	83	-	347.00	-	0.00
5	75	0.05	43	43	83	-	347.00	-	0.00
6	90	0.05	43	43	83	-	347.00	-	0.00
7	105	0.05	43	43	83	-	347.00	-	0.00
8	120	0.06	58	58	83	-	347.00	-	0.00
9	135	0.06	58	58	83	-	347.00	-	0.00
10	150	0.06	58	58	83	-	347.00	-	0.00
11	165	0.08	72	72	83	-	347.00	-	0.00
12	180	0.08	72	72	83	-	347.00	-	0.00
13	195	0.08	72	72	83	-	347.00	-	0.00
14	210	0.08	72	72	83	-	347.00	-	0.00
15	225	0.08	72	72	83	-	347.00	-	0.00
16	240	0.10	87	87	83	3	347.00	3	0.00
17	255	0.10	87	90	83	6	347.00	6	0.00
18	270	0.11	101	107	83	24	347.01	24	0.00
19	285	0.11	101	125	83	42	347.02	42	0.00
20	300	0.13	115	157	83	74	347.04	74	0.00
21	315	0.10	87	160	83	77	347.04	77	0.00
22	330	0.11	101	178	83	95	347.05	95	0.00
23	345	0.13	115	210	83	127	347.06	127	0.00
24	360	0.13	115	242	83	159	347.08	159	0.00
25	375	0.14	130	288	83	205	347.10	205	0.00
26	390	0.14	130	335	83	252	347.13	252	0.01
27	405	0.16	144	396	83	313	347.16	313	0.01
28	420	0.16	144	457	83	373	347.19	373	0.01
29	435	0.16	144	518	83	434	347.22	434	0.01
30	450	0.18	159	593	83	510	347.25	510	0.01
31	465	0.19	173	683	83	599	347.30	599	0.01
32	480	0.02	16	616	83	532	347.27	532	0.01
33	495	0.06	58	591	83	507	347.25	507	0.01
34	510	0.07	62	569	83	486	347.24	486	0.01
35	525	0.09	84	570	83	487	347.24	487	0.01
36	540	0.12	107	594	83	510	347.26	510	0.01
37	555	0.17	149	660	83	576	347.29	576	0.01
38	570	0.19	172	748	83	665	347.33	665	0.02
39	585	0.22	194	859	83	776	347.39	776	0.02
40	600	0.24	217	993	83	910	347.45	910	0.02
41	615	0.09	84	994	83	910	347.46	910	0.02
42	630	0.10	87	997	83	914	347.46	914	0.02
43	645	0.21	187	1,101	83	1,017	347.51	1,017	0.02
44	660	0.21	190	1,208	83	1,124	347.56	1,124	0.03
45	675	0.19	174	1,298	83	1,214	347.61	1,214	0.03
46	690	0.20	176	1,391	83	1,308	347.65	1,308	0.03
47	705	0.16	140	1,448	83	1,365	347.68	1,365	0.03
48	720	0.18	163	1,527	83	1,444	347.72	1,444	0.03
49	735	0.34	302	1,746	83	1,663	347.83	1,663	0.04
50	750	0.36	324	1,987	83	1,904	347.95	1,904	0.04
51	765	0.41	366	2,270	83	2,186	348.09	2,186	0.05
52	780	0.43	388	2,574	83	2,491	348.25	2,491	0.06
53	795	0.54	488	2,979	83	2,896	348.45	2,896	0.07
54	810	0.55	491	3,387	83	3,304	348.65	3,304	0.08
55	825	0.31	279	3,583	83	3,499	348.75	3,499	0.08
56	840	0.31	282	3,781	83	3,698	348.85	3,698	0.08
57	855	0.40	362	4,060	83	3,977	348.99	3,977	0.09
58	870	0.38	345	4,322	83	4,238	349.12	4,238	0.10

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.39	348	4,586	83	4,503	349.25	4,503	0.10
60	900	0.37	331	4,833	83	4,750	349.38	4,750	0.11
61	915	0.35	314	5,064	83	4,980	349.49	4,980	0.11
62	930	0.33	296	5,277	83	5,193	349.60	5,193	0.12
63	945	0.25	221	5,414	83	5,331	349.67	5,331	0.12
64	960	0.25	223	5,554	83	5,471	349.74	5,471	0.13
65	975	0.06	58	5,528	83	5,445	349.72	5,445	0.12
66	990	0.06	58	5,503	83	5,419	349.71	5,419	0.12
67	1005	0.05	43	5,463	83	5,379	349.69	5,379	0.12
68	1020	0.05	43	5,422	83	5,339	349.67	5,339	0.12
69	1035	0.08	72	5,411	83	5,328	349.66	5,328	0.12
70	1050	0.08	72	5,400	83	5,317	349.66	5,317	0.12
71	1065	0.08	72	5,389	83	5,305	349.65	5,305	0.12
72	1080	0.06	58	5,363	83	5,280	349.64	5,280	0.12
73	1095	0.06	58	5,338	83	5,254	349.63	5,254	0.12
74	1110	0.06	58	5,312	83	5,229	349.61	5,229	0.12
75	1125	0.05	43	5,272	83	5,188	349.59	5,188	0.12
76	1140	0.03	29	5,217	83	5,134	349.57	5,134	0.12
77	1155	0.05	43	5,177	83	5,094	349.55	5,094	0.12
78	1170	0.06	58	5,152	83	5,068	349.53	5,068	0.12
79	1185	0.05	43	5,112	83	5,028	349.51	5,028	0.12
80	1200	0.03	29	5,057	83	4,974	349.49	4,974	0.11
81	1215	0.05	43	5,017	83	4,934	349.47	4,934	0.11
82	1230	0.05	43	4,977	83	4,894	349.45	4,894	0.11
83	1245	0.05	43	4,937	83	4,854	349.43	4,854	0.11
84	1260	0.03	29	4,882	83	4,799	349.40	4,799	0.11
85	1275	0.05	43	4,842	83	4,759	349.38	4,759	0.11
86	1290	0.03	29	4,788	83	4,705	349.35	4,705	0.11
87	1305	0.05	43	4,748	83	4,664	349.33	4,664	0.11
88	1320	0.03	29	4,693	83	4,610	349.30	4,610	0.11
89	1335	0.05	43	4,653	83	4,570	349.28	4,570	0.10
90	1350	0.03	29	4,599	83	4,515	349.26	4,515	0.10
91	1365	0.03	29	4,544	83	4,461	349.23	4,461	0.10
92	1380	0.03	29	4,490	83	4,406	349.20	4,406	0.10
93	1395	0.03	29	4,435	83	4,352	349.18	4,352	0.10
94	1410	0.03	29	4,381	83	4,297	349.15	4,297	0.10
95	1425	0.03	29	4,326	83	4,243	349.12	4,243	0.10
96	1440	0.03	29	4,272	83	4,188	349.09	4,188	0.10

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN C		
10	AREA DESIGNATION	SUBAREA C (DRIVE-THRU)		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL	1.24		
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	18%		
27				
28	LENGTH OF WATERCOURSE (L)	334		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	160		
30				
31	ELEVATION OF HEADWATER	366		
32	ELEVATION OF CONCENTRATION POINT	364.58		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		359	2200	
45		360	2200	
46		361	2200	
47		362	2200	
48		363	2200	
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN C
[2] AREA DESIGNATION	SUBAREA C (DRIVE-THRU)
[3] AREA - ACRES	1.240
[4] L-FEET	334
[5] L-MILES	0.063
[6] La-FEET	160
[7] La-MILES	0.030
[8] ELEVATION OF HEADWATER	366
[9] ELEVATION OF CONCENTRATION POINT	364.58
[10] H-FEET	1.42
[11] S-FEET/MILE	22.4
[12] S^0.5	4.74
[13] L*LCA/S^0.5	0.00040
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.018
[16] LAG TIME-MINUTES	1.11
[17] 25% OF LAG-MINUTES	0.28
[18] 40% OF LAG-MINUTES	0.44
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.10

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	1.240	1.00	2.42	3.13	1.240	1.00	3.13	5.06	1.240	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	1.24	SUM [7]	2.42	SUM [9]	1.24	SUM [11]	3.13	SUM [13]	1.24	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	2.00	2.31	3.43
FLOOD VOLUME	(cu-ft)	8,994	10,384	15,446
	(acre-ft)	0.21	0.24	0.35
REQUIRED STORAGE	(cu-ft)	7,838	8,132	8,559
	(acre-ft)	0.18	0.19	0.20
PEAK FLOW	(cfs)	2.78	2.43	0.70
MAXIMUM WSEL	(ft)	362.56	362.69	362.74

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN C
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
A	COMMERCIAL	32	0.74	90%	0.14	1.24	1.000	0.1406
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
	SF - 1/4 ACRE			50%	0.00	0.00	0.000	0.0000
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
	MF - APARTMENTS			80%	0.00	0.00	0.000	0.0000
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
	RETENTION BASINS			0%	0.00	0.00	0.000	0.0000
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	1.24	SUM	0.1406

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.0703
C= 0.00130

Ft=C(24-(T/60))^1.55 = 0.00130 (24-(T/60))^1.55 + 0.07 in/hr

LOW LOSS RATE (80-90 PERCENT) = 18%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN C
BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.24
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.11
UNIT TIME-PERCENT OF LAG	450.7
TOTAL ADJUSTED STORM RAIN-INCHES	2.42
CONSTANT LOSS RATE-in/hr	0.14
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.10 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.14	0.07	0.237	0.29	57.58
2	10	0.17	1.3	0.378	0.14	0.07	0.237	0.29	57.58
3	15	0.25	1.1	0.319	0.14	0.06	0.179	0.22	35.97
4	20	0.33	1.5	0.436	0.14	0.08	0.295	0.37	79.18
5	25	0.42	1.5	0.436	0.14	0.08	0.295	0.37	79.18
6	30	0.50	1.8	0.523	0.14	0.09	0.382	0.47	111.59
7	35	0.58	1.5	0.436	0.14	0.08	0.295	0.37	79.18
8	40	0.67	1.8	0.523	0.14	0.09	0.382	0.47	111.59
9	45	0.75	1.8	0.523	0.14	0.09	0.382	0.47	111.59
10	50	0.83	1.5	0.436	0.14	0.08	0.295	0.37	79.18
11	55	0.92	1.6	0.465	0.14	0.08	0.324	0.40	89.99
12	60	1.00	1.8	0.523	0.14	0.09	0.382	0.47	111.59
13	65	1.08	2.2	0.639	0.14	0.11	0.498	0.62	154.80
14	70	1.17	2.2	0.639	0.14	0.11	0.498	0.62	154.80
15	75	1.25	2.2	0.639	0.14	0.11	0.498	0.62	154.80
16	80	1.33	2.0	0.581	0.14	0.10	0.440	0.55	133.20
17	85	1.42	2.6	0.755	0.14	0.14	0.614	0.76	198.02
18	90	1.50	2.7	0.784	0.14	0.14	0.643	0.80	208.82
19	95	1.58	2.4	0.697	0.14	0.13	0.556	0.69	176.41
20	100	1.67	2.7	0.784	0.14	0.14	0.643	0.80	208.82
21	105	1.75	3.3	0.958	0.14	0.17	0.818	1.01	273.64
22	110	1.83	3.1	0.900	0.14	0.16	0.760	0.94	252.03
23	115	1.92	2.9	0.842	0.14	0.15	0.702	0.87	230.42
24	120	2.00	3.0	0.871	0.14	0.16	0.731	0.91	241.23
25	125	2.08	3.1	0.900	0.14	0.16	0.760	0.94	252.03
26	130	2.17	4.2	1.220	0.14	0.22	1.079	1.34	370.86
27	135	2.25	5.0	1.452	0.14	0.26	1.311	1.63	457.29
28	140	2.33	3.5	1.016	0.14	0.18	0.876	1.09	295.24
29	145	2.42	6.8	1.975	0.14	0.36	1.834	2.27	651.74
30	150	2.50	7.3	2.120	0.14	0.38	1.979	2.45	705.75
31	155	2.58	8.2	2.381	0.14	0.43	2.241	2.78	802.98
32	160	2.67	5.9	1.713	0.14	0.31	1.573	1.95	554.51
33	165	2.75	2.0	0.581	0.14	0.10	0.440	0.55	133.20
34	170	2.83	1.8	0.523	0.14	0.09	0.382	0.47	111.59
35	175	2.92	1.8	0.523	0.14	0.09	0.382	0.47	111.59
36	180	3.00	0.6	0.174	0.14	0.03	0.034	0.04	0.00
							23.978		7838.01

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.00
FLOOD VOLUME (acft)	0.21
FLOOD VOLUME (cuft)	8994.33
REQUIRED STORAGE (acft)	0.18
REQUIRED STORAGE (cuft)	7838.01
PEAK FLOW RATE (cfs)	2.78

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN C

BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.24
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.11
UNIT TIME-PERCENT OF LAG	450.7
TOTAL ADJUSTED STORM RAIN-INCHES	3.13
CONSTANT LOSS RATE-in/hr	0.141
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.10 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.188	0.14	0.03	0.05	0.06	0.00
2	10	0.17	0.6	0.225	0.14	0.04	0.08	0.11	0.98
3	15	0.25	0.6	0.225	0.14	0.04	0.08	0.11	0.98
4	20	0.33	0.6	0.225	0.14	0.04	0.08	0.11	0.98
5	25	0.42	0.6	0.225	0.14	0.04	0.08	0.11	0.98
6	30	0.50	0.7	0.263	0.14	0.05	0.12	0.15	14.95
7	35	0.58	0.7	0.263	0.14	0.05	0.12	0.15	14.95
8	40	0.67	0.7	0.263	0.14	0.05	0.12	0.15	14.95
9	45	0.75	0.7	0.263	0.14	0.05	0.12	0.15	14.95
10	50	0.83	0.7	0.263	0.14	0.05	0.12	0.15	14.95
11	55	0.92	0.7	0.263	0.14	0.05	0.12	0.15	14.95
12	60	1.00	0.8	0.300	0.14	0.05	0.16	0.20	28.92
13	65	1.08	0.8	0.300	0.14	0.05	0.16	0.20	28.92
14	70	1.17	0.8	0.300	0.14	0.05	0.16	0.20	28.92
15	75	1.25	0.8	0.300	0.14	0.05	0.16	0.20	28.92
16	80	1.33	0.8	0.300	0.14	0.05	0.16	0.20	28.92
17	85	1.42	0.8	0.300	0.14	0.05	0.16	0.20	28.92
18	90	1.50	0.8	0.300	0.14	0.05	0.16	0.20	28.92
19	95	1.58	0.8	0.300	0.14	0.05	0.16	0.20	28.92
20	100	1.67	0.8	0.300	0.14	0.05	0.16	0.20	28.92
21	105	1.75	0.8	0.300	0.14	0.05	0.16	0.20	28.92
22	110	1.83	0.8	0.300	0.14	0.05	0.16	0.20	28.92
23	115	1.92	0.8	0.300	0.14	0.05	0.16	0.20	28.92
24	120	2.00	0.9	0.338	0.14	0.06	0.20	0.24	42.89
25	125	2.08	0.8	0.300	0.14	0.05	0.16	0.20	28.92
26	130	2.17	0.9	0.338	0.14	0.06	0.20	0.24	42.89
27	135	2.25	0.9	0.338	0.14	0.06	0.20	0.24	42.89
28	140	2.33	0.9	0.338	0.14	0.06	0.20	0.24	42.89
29	145	2.42	0.9	0.338	0.14	0.06	0.20	0.24	42.89
30	150	2.50	0.9	0.338	0.14	0.06	0.20	0.24	42.89
31	155	2.58	0.9	0.338	0.14	0.06	0.20	0.24	42.89
32	160	2.67	0.9	0.338	0.14	0.06	0.20	0.24	42.89
33	165	2.75	1.0	0.376	0.14	0.07	0.24	0.29	56.86
34	170	2.83	1.0	0.376	0.14	0.07	0.24	0.29	56.86
35	175	2.92	1.0	0.376	0.14	0.07	0.24	0.29	56.86
36	180	3.00	1.0	0.376	0.14	0.07	0.24	0.29	56.86
37	185	3.08	1.0	0.376	0.14	0.07	0.24	0.29	56.86
38	190	3.17	1.1	0.413	0.14	0.07	0.27	0.34	70.84
39	195	3.25	1.1	0.413	0.14	0.07	0.27	0.34	70.84
40	200	3.33	1.1	0.413	0.14	0.07	0.27	0.34	70.84
41	205	3.42	1.2	0.451	0.14	0.08	0.31	0.38	84.81
42	210	3.50	1.3	0.488	0.14	0.09	0.35	0.43	98.78
43	215	3.58	1.4	0.526	0.14	0.09	0.39	0.48	112.75
44	220	3.67	1.4	0.526	0.14	0.09	0.39	0.48	112.75
45	225	3.75	1.5	0.563	0.14	0.10	0.42	0.52	126.73
46	230	3.83	1.5	0.563	0.14	0.10	0.42	0.52	126.73
47	235	3.92	1.6	0.601	0.14	0.11	0.46	0.57	140.70
48	240	4.00	1.6	0.601	0.14	0.11	0.46	0.57	140.70
49	245	4.08	1.7	0.639	0.14	0.11	0.50	0.62	154.67
50	250	4.17	1.8	0.676	0.14	0.12	0.54	0.66	168.64
51	255	4.25	1.9	0.714	0.14	0.13	0.57	0.71	182.62
52	260	4.33	2.0	0.751	0.14	0.14	0.61	0.76	196.59
53	265	4.42	2.1	0.789	0.14	0.14	0.65	0.80	210.56
54	270	4.50	2.1	0.789	0.14	0.14	0.65	0.80	210.56
55	275	4.58	2.2	0.826	0.14	0.15	0.69	0.85	224.53
56	280	4.67	2.3	0.864	0.14	0.16	0.72	0.90	238.50

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN C BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.24		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.11		
UNIT TIME-PERCENT OF LAG	450.7		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.141		
LOW LOSS RATE - PERCENT	18%	TOTAL PERCOLATION RATE (cfs)	0.10 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.901	0.14	0.16	0.76	0.94	252.48
58	290	4.83	2.4	0.901	0.14	0.16	0.76	0.94	252.48
59	295	4.92	2.5	0.939	0.14	0.17	0.80	0.99	266.45
60	300	5.00	2.6	0.977	0.14	0.18	0.84	1.04	280.42
61	305	5.08	3.1	1.164	0.14	0.21	1.02	1.27	350.28
62	310	5.17	3.6	1.352	0.14	0.24	1.21	1.50	420.14
63	315	5.25	3.9	1.465	0.14	0.26	1.32	1.64	462.06
64	320	5.33	4.2	1.578	0.14	0.28	1.44	1.78	503.98
65	325	5.42	4.7	1.765	0.14	0.32	1.62	2.01	573.84
66	330	5.50	5.6	2.103	0.14	0.38	1.96	2.43	699.59
67	335	5.58	1.9	0.714	0.14	0.13	0.57	0.71	182.62
68	340	5.67	0.9	0.338	0.14	0.06	0.20	0.24	42.89
69	345	5.75	0.6	0.225	0.14	0.04	0.08	0.11	0.98
70	350	5.83	0.5	0.188	0.14	0.03	0.05	0.06	0.00
71	355	5.92	0.3	0.113	0.14	0.02	0.09	0.11	3.82
72	360	6.00	0.2	0.075	0.14	0.01	0.06	0.08	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.31
FLOOD VOLUME (acft)	0.24
FLOOD VOLUME (cuft)	10384.38
REQUIRED STORAGE (acft)	0.19
REQUIRED STORAGE (cuft)	8132.16
PEAK FLOW RATE (cfs)	2.43

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN C BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			1.240	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.1406		
LAG TIME - MINUTES			1.11	MINIMUM LOSS RATE (for var. loss) - in/hr			0.070		
UNIT TIME-PERCENT OF LAG			1352.0	LOW LOSS RATE - DECIMAL			0.18		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00130		
				PERCOLATION RATE (cfs)			0.10		
Unit Time Period	Time		Pattern	Storm	Loss Rate		Effective	Flood	Required
	Minutes	Hours	Percent	Rain in/hr	in/hr		Rain	Hydrograph Flow	Storage
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.040	0.248	0.007	0.033	0.04	0.00
2	30	0.50	0.3	0.061	0.245	0.011	0.050	0.06	0.00
3	45	0.75	0.3	0.061	0.243	0.011	0.050	0.06	0.00
4	60	1.00	0.4	0.081	0.240	0.015	0.066	0.08	0.00
5	75	1.25	0.3	0.061	0.237	0.011	0.050	0.06	0.00
6	90	1.50	0.3	0.061	0.234	0.011	0.050	0.06	0.00
7	105	1.75	0.3	0.061	0.231	0.011	0.050	0.06	0.00
8	120	2.00	0.4	0.081	0.228	0.015	0.066	0.08	0.00
9	135	2.25	0.4	0.081	0.226	0.015	0.066	0.08	0.00
10	150	2.50	0.4	0.081	0.223	0.015	0.066	0.08	0.00
11	165	2.75	0.5	0.101	0.220	0.018	0.083	0.10	0.94
12	180	3.00	0.5	0.101	0.218	0.018	0.083	0.10	0.94
13	195	3.25	0.5	0.101	0.215	0.018	0.083	0.10	0.94
14	210	3.50	0.5	0.101	0.212	0.018	0.083	0.10	0.94
15	225	3.75	0.5	0.101	0.210	0.018	0.083	0.10	0.94
16	240	4.00	0.6	0.121	0.207	0.022	0.100	0.12	19.47
17	255	4.25	0.6	0.121	0.204	0.022	0.100	0.12	19.47
18	270	4.50	0.7	0.142	0.202	0.026	0.116	0.14	37.99
19	285	4.75	0.7	0.142	0.199	0.026	0.116	0.14	37.99
20	300	5.00	0.8	0.162	0.196	0.029	0.133	0.16	56.51
21	315	5.25	0.6	0.121	0.194	0.022	0.100	0.12	19.47
22	330	5.50	0.7	0.142	0.191	0.026	0.116	0.14	37.99
23	345	5.75	0.8	0.162	0.189	0.029	0.133	0.16	56.51
24	360	6.00	0.8	0.162	0.186	0.029	0.133	0.16	56.51
25	375	6.25	0.9	0.182	0.184	0.033	0.149	0.19	75.03
26	390	6.50	0.9	0.182	0.181	0.033	0.001	0.00	0.00
27	405	6.75	1.0	0.202	0.179	0.036	0.023	0.03	0.00
28	420	7.00	1.0	0.202	0.177	0.036	0.026	0.03	0.00
29	435	7.25	1.0	0.202	0.174	0.036	0.028	0.03	0.00
30	450	7.50	1.1	0.223	0.172	0.040	0.051	0.06	0.00
31	465	7.75	1.2	0.243	0.170	0.044	0.073	0.09	0.00
32	480	8.00	1.3	0.263	0.167	0.047	0.096	0.12	15.41
33	495	8.25	1.5	0.304	0.165	0.055	0.139	0.17	63.18
34	510	8.50	1.5	0.304	0.163	0.055	0.141	0.17	65.74
35	525	8.75	1.6	0.324	0.160	0.058	0.164	0.20	90.87
36	540	9.00	1.7	0.344	0.158	0.062	0.186	0.23	115.98
37	555	9.25	1.9	0.385	0.156	0.069	0.229	0.28	163.65
38	570	9.50	2.0	0.405	0.154	0.073	0.251	0.31	188.71
39	585	9.75	2.1	0.425	0.151	0.077	0.274	0.34	213.75
40	600	10.00	2.2	0.445	0.149	0.080	0.296	0.37	238.77
41	615	10.25	1.5	0.304	0.147	0.055	0.157	0.19	83.05
42	630	10.50	1.5	0.304	0.145	0.055	0.159	0.20	85.43
43	645	10.75	2.0	0.405	0.143	0.073	0.262	0.32	200.73
44	660	11.00	2.0	0.405	0.141	0.073	0.264	0.33	203.06
45	675	11.25	1.9	0.385	0.139	0.069	0.246	0.30	182.78
46	690	11.50	1.9	0.385	0.137	0.069	0.248	0.31	185.06
47	705	11.75	1.7	0.344	0.135	0.062	0.210	0.26	142.15
48	720	12.00	1.8	0.364	0.133	0.066	0.232	0.29	166.97
49	735	12.25	2.5	0.506	0.131	0.091	0.375	0.47	327.29
50	750	12.50	2.6	0.526	0.129	0.095	0.398	0.49	352.06
51	765	12.75	2.8	0.567	0.127	0.102	0.440	0.55	399.39
52	780	13.00	2.9	0.587	0.125	0.106	0.462	0.57	424.11
53	795	13.25	3.4	0.688	0.123	0.124	0.565	0.70	539.16
54	810	13.50	3.4	0.688	0.121	0.124	0.567	0.70	541.24
55	825	13.75	2.3	0.466	0.119	0.084	0.346	0.43	294.82
56	840	14.00	2.3	0.466	0.117	0.084	0.348	0.43	296.85
57	855	14.25	2.7	0.546	0.116	0.098	0.431	0.53	389.20
58	870	14.50	2.6	0.526	0.114	0.095	0.412	0.51	368.58
59	885	14.75	2.6	0.526	0.112	0.095	0.414	0.51	370.52
60	900	15.00	2.5	0.506	0.110	0.091	0.396	0.49	349.85

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN C BY: PK DATE: 7/4/2022				

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.240	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1406
LAG TIME - MINUTES	1.11	MINIMUM LOSS RATE (for var. loss) - in/hr	0.070
UNIT TIME-PERCENT OF LAG	1352.0	LOW LOSS RATE - DECIMAL	0.18
TOTAL ADJUSTED STORM RAIN-INCHES	5.06	C	0.00130
		PERCOLATION RATE (cfs)	0.10

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
61	915	15.25	2.4	0.486	0.109	0.087	0.377	0.47	329.14
62	930	15.50	2.3	0.466	0.107	0.084	0.358	0.44	308.41
63	945	15.75	1.9	0.385	0.105	0.069	0.279	0.35	219.89
64	960	16.00	1.9	0.385	0.104	0.069	0.281	0.35	221.68
65	975	16.25	0.4	0.081	0.102	0.015	0.066	0.08	0.00
66	990	16.50	0.4	0.081	0.101	0.015	0.066	0.08	0.00
67	1005	16.75	0.3	0.061	0.099	0.011	0.050	0.06	0.00
68	1020	17.00	0.3	0.061	0.098	0.011	0.050	0.06	0.00
69	1035	17.25	0.5	0.101	0.096	0.018	0.005	0.01	0.00
70	1050	17.50	0.5	0.101	0.095	0.018	0.006	0.01	0.00
71	1065	17.75	0.5	0.101	0.093	0.018	0.008	0.01	0.00
72	1080	18.00	0.4	0.081	0.092	0.015	0.066	0.08	0.00
73	1095	18.25	0.4	0.081	0.091	0.015	0.066	0.08	0.00
74	1110	18.50	0.4	0.081	0.089	0.015	0.066	0.08	0.00
75	1125	18.75	0.3	0.061	0.088	0.011	0.050	0.06	0.00
76	1140	19.00	0.2	0.040	0.087	0.007	0.033	0.04	0.00
77	1155	19.25	0.3	0.061	0.085	0.011	0.050	0.06	0.00
78	1170	19.50	0.4	0.081	0.084	0.015	0.066	0.08	0.00
79	1185	19.75	0.3	0.061	0.083	0.011	0.050	0.06	0.00
80	1200	20.00	0.2	0.040	0.082	0.007	0.033	0.04	0.00
81	1215	20.25	0.3	0.061	0.081	0.011	0.050	0.06	0.00
82	1230	20.50	0.3	0.061	0.080	0.011	0.050	0.06	0.00
83	1245	20.75	0.3	0.061	0.079	0.011	0.050	0.06	0.00
84	1260	21.00	0.2	0.040	0.078	0.007	0.033	0.04	0.00
85	1275	21.25	0.3	0.061	0.077	0.011	0.050	0.06	0.00
86	1290	21.50	0.2	0.040	0.076	0.007	0.033	0.04	0.00
87	1305	21.75	0.3	0.061	0.075	0.011	0.050	0.06	0.00
88	1320	22.00	0.2	0.040	0.074	0.007	0.033	0.04	0.00
89	1335	22.25	0.3	0.061	0.074	0.011	0.050	0.06	0.00
90	1350	22.50	0.2	0.040	0.073	0.007	0.033	0.04	0.00
91	1365	22.75	0.2	0.040	0.072	0.007	0.033	0.04	0.00
92	1380	23.00	0.2	0.040	0.072	0.007	0.033	0.04	0.00
93	1395	23.25	0.2	0.040	0.071	0.007	0.033	0.04	0.00
94	1410	23.50	0.2	0.040	0.071	0.007	0.033	0.04	0.00
95	1425	23.75	0.2	0.040	0.071	0.007	0.033	0.04	0.00
96	1440	24.00	0.2	0.040	0.070	0.007	0.033	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	3.43
FLOOD VOLUME (acft)	0.35
FLOOD VOLUME (cuft)	15445.60
REQUIRED STORAGE (acft)	0.20
REQUIRED STORAGE (cuft)	8559.12
PEAK FLOW (cfs)	0.70

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN C

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
359	0	0		2200	0	0	0.00
360	1	1	0	2200	2200	2200	0.05
361	1	2	0	2200	2200	4400	0.10
362	1	3	0	2200	2200	6600	0.15
363	1	4	0	2200	2200	8800	0.20

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	0.10185	cfs
MAXWELL IV DRYWELLS			
NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		0.10185	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	8559	cu ft (100-yr 24-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	0.10185	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**23**	hrs < 36 hrs

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.29	88	88	31	58	359.03	58	0.00
2	10	0.29	88	146	31	115	359.05	115	0.00
3	15	0.22	67	182	31	151	359.07	151	0.00
4	20	0.37	110	261	31	230	359.10	230	0.01
5	25	0.37	110	340	31	309	359.14	309	0.01
6	30	0.47	142	452	31	421	359.19	421	0.01
7	35	0.37	110	531	31	500	359.23	500	0.01
8	40	0.47	142	642	31	612	359.28	612	0.01
9	45	0.47	142	754	31	723	359.33	723	0.02
10	50	0.37	110	833	31	803	359.36	803	0.02
11	55	0.40	121	923	31	893	359.41	893	0.02
12	60	0.47	142	1,035	31	1,004	359.46	1,004	0.02
13	65	0.62	185	1,190	31	1,159	359.53	1,159	0.03
14	70	0.62	185	1,344	31	1,314	359.60	1,314	0.03
15	75	0.62	185	1,499	31	1,469	359.67	1,469	0.03
16	80	0.55	164	1,632	31	1,602	359.73	1,602	0.04
17	85	0.76	229	1,830	31	1,800	359.82	1,800	0.04
18	90	0.80	239	2,039	31	2,009	359.91	2,009	0.05
19	95	0.69	207	2,216	31	2,185	359.99	2,185	0.05
20	100	0.80	239	2,424	31	2,394	360.09	2,394	0.05
21	105	1.01	304	2,698	31	2,668	360.21	2,668	0.06
22	110	0.94	283	2,950	31	2,920	360.33	2,920	0.07
23	115	0.87	261	3,181	31	3,150	360.43	3,150	0.07
24	120	0.91	272	3,422	31	3,391	360.54	3,391	0.08
25	125	0.94	283	3,674	31	3,643	360.66	3,643	0.08
26	130	1.34	401	4,045	31	4,014	360.82	4,014	0.09
27	135	1.63	488	4,502	31	4,471	361.03	4,471	0.10
28	140	1.09	326	4,797	31	4,767	361.17	4,767	0.11
29	145	2.27	682	5,449	31	5,418	361.46	5,418	0.12
30	150	2.45	736	6,155	31	6,124	361.78	6,124	0.14
31	155	2.78	834	6,958	31	6,927	362.15	6,927	0.16
32	160	1.95	585	7,512	31	7,482	362.40	7,482	0.17
33	165	0.55	164	7,645	31	7,615	362.46	7,615	0.17
34	170	0.47	142	7,757	31	7,726	362.51	7,726	0.18
35	175	0.47	142	7,869	31	7,838	362.56	7,838	0.18
36	180	0.04	13	7,851	31	7,820	362.55	7,820	0.18

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.06	18	18	31	-	359.00	-	0.00
2	10	0.11	32	32	31	1	359.00	1	0.00
3	15	0.11	32	33	31	2	359.00	2	0.00
4	20	0.11	32	33	31	3	359.00	3	0.00
5	25	0.11	32	34	31	4	359.00	4	0.00
6	30	0.15	46	49	31	19	359.01	19	0.00
7	35	0.15	46	64	31	34	359.02	34	0.00
8	40	0.15	46	79	31	49	359.02	49	0.00
9	45	0.15	46	94	31	64	359.03	64	0.00
10	50	0.15	46	109	31	79	359.04	79	0.00
11	55	0.15	46	124	31	94	359.04	94	0.00
12	60	0.20	59	153	31	123	359.06	123	0.00
13	65	0.20	59	182	31	151	359.07	151	0.00
14	70	0.20	59	211	31	180	359.08	180	0.00
15	75	0.20	59	240	31	209	359.10	209	0.00
16	80	0.20	59	269	31	238	359.11	238	0.01
17	85	0.20	59	298	31	267	359.12	267	0.01
18	90	0.20	59	327	31	296	359.13	296	0.01
19	95	0.20	59	355	31	325	359.15	325	0.01
20	100	0.20	59	384	31	354	359.16	354	0.01
21	105	0.20	59	413	31	383	359.17	383	0.01
22	110	0.20	59	442	31	412	359.19	412	0.01
23	115	0.20	59	471	31	441	359.20	441	0.01
24	120	0.24	73	514	31	484	359.22	484	0.01
25	125	0.20	59	543	31	512	359.23	512	0.01
26	130	0.24	73	586	31	555	359.25	555	0.01
27	135	0.24	73	629	31	598	359.27	598	0.01
28	140	0.24	73	672	31	641	359.29	641	0.01
29	145	0.24	73	715	31	684	359.31	684	0.02
30	150	0.24	73	757	31	727	359.33	727	0.02
31	155	0.24	73	800	31	770	359.35	770	0.02
32	160	0.24	73	843	31	813	359.37	813	0.02
33	165	0.29	87	900	31	870	359.40	870	0.02
34	170	0.29	87	957	31	926	359.42	926	0.02
35	175	0.29	87	1,014	31	983	359.45	983	0.02
36	180	0.29	87	1,071	31	1,040	359.47	1,040	0.02
37	185	0.29	87	1,128	31	1,097	359.50	1,097	0.03
38	190	0.34	101	1,198	31	1,168	359.53	1,168	0.03
39	195	0.34	101	1,269	31	1,239	359.56	1,239	0.03
40	200	0.34	101	1,340	31	1,310	359.60	1,310	0.03
41	205	0.38	115	1,425	31	1,394	359.63	1,394	0.03
42	210	0.43	129	1,524	31	1,493	359.68	1,493	0.03
43	215	0.48	143	1,636	31	1,606	359.73	1,606	0.04
44	220	0.48	143	1,749	31	1,719	359.78	1,719	0.04
45	225	0.52	157	1,876	31	1,845	359.84	1,845	0.04
46	230	0.52	157	2,003	31	1,972	359.90	1,972	0.05
47	235	0.57	171	2,143	31	2,113	359.96	2,113	0.05
48	240	0.57	171	2,284	31	2,253	360.02	2,253	0.05
49	245	0.62	185	2,439	31	2,408	360.09	2,408	0.06
50	250	0.66	199	2,607	31	2,577	360.17	2,577	0.06
51	255	0.71	213	2,790	31	2,759	360.25	2,759	0.06
52	260	0.76	227	2,987	31	2,956	360.34	2,956	0.07
53	265	0.80	241	3,197	31	3,167	360.44	3,167	0.07
54	270	0.80	241	3,408	31	3,377	360.54	3,377	0.08
55	275	0.85	255	3,632	31	3,602	360.64	3,602	0.08

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	0.90	269	3,871	31	3,840	360.75	3,840	0.09
57	285	0.94	283	4,123	31	4,093	360.86	4,093	0.09
58	290	0.94	283	4,376	31	4,345	360.98	4,345	0.10
59	295	0.99	297	4,642	31	4,612	361.10	4,612	0.11
60	300	1.04	311	4,923	31	4,892	361.22	4,892	0.11
61	305	1.27	381	5,273	31	5,242	361.38	5,242	0.12
62	310	1.50	451	5,693	31	5,662	361.57	5,662	0.13
63	315	1.64	493	6,155	31	6,124	361.78	6,124	0.14
64	320	1.78	535	6,659	31	6,628	362.01	6,628	0.15
65	325	2.01	604	7,233	31	7,202	362.27	7,202	0.17
66	330	2.43	730	7,932	31	7,902	362.59	7,902	0.18
67	335	0.71	213	8,115	31	8,084	362.67	8,084	0.19
68	340	0.24	73	8,158	31	8,127	362.69	8,127	0.19
69	345	0.11	32	8,159	31	8,128	362.69	8,128	0.19
70	350	0.06	18	8,146	31	8,115	362.69	8,115	0.19
71	355	0.11	34	8,150	31	8,119	362.69	8,119	0.19
72	360	0.08	23	8,142	31	8,112	362.69	8,112	0.19

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	37	37	92	-	359.00	-	0.00
2	30	0.06	56	56	92	-	359.00	-	0.00
3	45	0.06	56	56	92	-	359.00	-	0.00
4	60	0.08	74	74	92	-	359.00	-	0.00
5	75	0.06	56	56	92	-	359.00	-	0.00
6	90	0.06	56	56	92	-	359.00	-	0.00
7	105	0.06	56	56	92	-	359.00	-	0.00
8	120	0.08	74	74	92	-	359.00	-	0.00
9	135	0.08	74	74	92	-	359.00	-	0.00
10	150	0.08	74	74	92	-	359.00	-	0.00
11	165	0.10	93	93	92	1	359.00	1	0.00
12	180	0.10	93	94	92	2	359.00	2	0.00
13	195	0.10	93	94	92	3	359.00	3	0.00
14	210	0.10	93	95	92	4	359.00	4	0.00
15	225	0.10	93	96	92	5	359.00	5	0.00
16	240	0.12	111	116	92	24	359.01	24	0.00
17	255	0.12	111	135	92	44	359.02	44	0.00
18	270	0.14	130	173	92	82	359.04	82	0.00
19	285	0.14	130	211	92	120	359.05	120	0.00
20	300	0.16	148	268	92	176	359.08	176	0.00
21	315	0.12	111	287	92	196	359.09	196	0.00
22	330	0.14	130	325	92	234	359.11	234	0.01
23	345	0.16	148	382	92	290	359.13	290	0.01
24	360	0.16	148	438	92	347	359.16	347	0.01
25	375	0.19	167	513	92	422	359.19	422	0.01
26	390	0.00	1	422	92	331	359.15	331	0.01
27	405	0.03	26	357	92	265	359.12	265	0.01
28	420	0.03	29	294	92	202	359.09	202	0.00
29	435	0.03	31	234	92	142	359.06	142	0.00
30	450	0.06	57	199	92	107	359.05	107	0.00
31	465	0.09	82	189	92	97	359.04	97	0.00
32	480	0.12	107	204	92	113	359.05	113	0.00
33	495	0.17	155	267	92	176	359.08	176	0.00
34	510	0.17	157	333	92	241	359.11	241	0.01
35	525	0.20	183	424	92	332	359.15	332	0.01
36	540	0.23	208	540	92	448	359.20	448	0.01
37	555	0.28	255	704	92	612	359.28	612	0.01
38	570	0.31	280	892	92	801	359.36	801	0.02
39	585	0.34	305	1,106	92	1,014	359.46	1,014	0.02
40	600	0.37	330	1,345	92	1,253	359.57	1,253	0.03
41	615	0.19	175	1,428	92	1,336	359.61	1,336	0.03
42	630	0.20	177	1,513	92	1,422	359.65	1,422	0.03
43	645	0.32	292	1,714	92	1,622	359.74	1,622	0.04
44	660	0.33	295	1,917	92	1,826	359.83	1,826	0.04
45	675	0.30	274	2,100	92	2,008	359.91	2,008	0.05
46	690	0.31	277	2,285	92	2,193	360.00	2,193	0.05
47	705	0.26	234	2,427	92	2,335	360.06	2,335	0.05
48	720	0.29	259	2,594	92	2,502	360.14	2,502	0.06
49	735	0.47	419	2,921	92	2,830	360.29	2,830	0.06
50	750	0.49	444	3,273	92	3,182	360.45	3,182	0.07
51	765	0.55	491	3,673	92	3,581	360.63	3,581	0.08
52	780	0.57	516	4,097	92	4,005	360.82	4,005	0.09
53	795	0.70	631	4,636	92	4,544	361.07	4,544	0.10
54	810	0.70	633	5,177	92	5,086	361.31	5,086	0.12
55	825	0.43	386	5,472	92	5,381	361.45	5,381	0.12
56	840	0.43	389	5,769	92	5,677	361.58	5,677	0.13
57	855	0.53	481	6,158	92	6,067	361.76	6,067	0.14
58	870	0.51	460	6,527	92	6,435	361.93	6,435	0.15

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.51	462	6,897	92	6,806	362.09	6,806	0.16
60	900	0.49	442	7,247	92	7,156	362.25	7,156	0.16
61	915	0.47	421	7,576	92	7,485	362.40	7,485	0.17
62	930	0.44	400	7,885	92	7,793	362.54	7,793	0.18
63	945	0.35	312	8,105	92	8,013	362.64	8,013	0.18
64	960	0.35	313	8,326	92	8,235	362.74	8,235	0.19
65	975	0.08	74	8,309	92	8,217	362.74	8,217	0.19
66	990	0.08	74	8,291	92	8,199	362.73	8,199	0.19
67	1005	0.06	56	8,255	92	8,163	362.71	8,163	0.19
68	1020	0.06	56	8,219	92	8,127	362.69	8,127	0.19
69	1035	0.01	6	8,133	92	8,041	362.66	8,041	0.18
70	1050	0.01	7	8,049	92	7,957	362.62	7,957	0.18
71	1065	0.01	9	7,966	92	7,874	362.58	7,874	0.18
72	1080	0.08	74	7,948	92	7,856	362.57	7,856	0.18
73	1095	0.08	74	7,931	92	7,839	362.56	7,839	0.18
74	1110	0.08	74	7,913	92	7,821	362.56	7,821	0.18
75	1125	0.06	56	7,877	92	7,785	362.54	7,785	0.18
76	1140	0.04	37	7,822	92	7,731	362.51	7,731	0.18
77	1155	0.06	56	7,786	92	7,694	362.50	7,694	0.18
78	1170	0.08	74	7,769	92	7,677	362.49	7,677	0.18
79	1185	0.06	56	7,732	92	7,641	362.47	7,641	0.18
80	1200	0.04	37	7,678	92	7,586	362.45	7,586	0.17
81	1215	0.06	56	7,642	92	7,550	362.43	7,550	0.17
82	1230	0.06	56	7,606	92	7,514	362.42	7,514	0.17
83	1245	0.06	56	7,570	92	7,478	362.40	7,478	0.17
84	1260	0.04	37	7,515	92	7,423	362.37	7,423	0.17
85	1275	0.06	56	7,479	92	7,387	362.36	7,387	0.17
86	1290	0.04	37	7,424	92	7,333	362.33	7,333	0.17
87	1305	0.06	56	7,388	92	7,296	362.32	7,296	0.17
88	1320	0.04	37	7,333	92	7,242	362.29	7,242	0.17
89	1335	0.06	56	7,297	92	7,206	362.28	7,206	0.17
90	1350	0.04	37	7,243	92	7,151	362.25	7,151	0.16
91	1365	0.04	37	7,188	92	7,096	362.23	7,096	0.16
92	1380	0.04	37	7,133	92	7,042	362.20	7,042	0.16
93	1395	0.04	37	7,079	92	6,987	362.18	6,987	0.16
94	1410	0.04	37	7,024	92	6,933	362.15	6,933	0.16
95	1425	0.04	37	6,970	92	6,878	362.13	6,878	0.16
96	1440	0.04	37	6,915	92	6,823	362.10	6,823	0.16

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN D		
10	AREA DESIGNATION	SUBAREA D (ANCHOR STORE)		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL	3.85		
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	18%		
27				
28	LENGTH OF WATERCOURSE (L)	610		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	420		
30				
31	ELEVATION OF HEADWATER	361.67		
32	ELEVATION OF CONCENTRATION POINT	358.66		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		352	6000	
45		353	6000	
46		354	6000	
47		355	6000	
48		356	6000	
49		357	6000	
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN D
[2] AREA DESIGNATION	SUBAREA D (ANCHOR STORE)
[3] AREA - ACRES	3.850
[4] L-FEET	610
[5] L-MILES	0.116
[6] La-FEET	420
[7] La-MILES	0.080
[8] ELEVATION OF HEADWATER	361.67
[9] ELEVATION OF CONCENTRATION POINT	358.66
[10] H-FEET	3.01
[11] S-FEET/MILE	26.1
[12] S^0.5	5.10
[13] L*LCA/S^0.5	0.00180
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.033
[16] LAG TIME-MINUTES	1.96
[17] 25% OF LAG-MINUTES	0.49
[18] 40% OF LAG-MINUTES	0.78
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.28

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	3.850	1.00	2.42	3.13	3.850	1.00	3.13	5.06	3.850	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	3.85	SUM [7]	2.42	SUM [9]	3.85	SUM [11]	3.13	SUM [13]	3.85	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	2.00	2.31	3.43
FLOOD VOLUME	(cu-ft)	27,926	32,242	47,956
	(acre-ft)	0.64	0.74	1.10
REQUIRED STORAGE	(cu-ft)	24,740	26,045	28,240
	(acre-ft)	0.57	0.60	0.65
PEAK FLOW	(cfs)	8.63	7.56	2.18
MAXIMUM WSEL	(ft)	356.12	356.34	356.57

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN D
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
A	COMMERCIAL	32	0.74	90%	0.14	3.85	1.000	0.1406
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
	SF - 1/4 ACRE			50%	0.00	0.00	0.000	0.0000
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
	MF - APARTMENTS			80%	0.00	0.00	0.000	0.0000
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
	RETENTION BASINS			0%	0.00	0.00	0.000	0.0000
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	3.85	SUM	0.1406

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.0703

C= 0.00130

Ft=C(24-(T/60))^1.55 = 0.00130 (24-(T/60))^1.55 + 0.07 in/hr

LOW LOSS RATE (80-90 PERCENT) = 18%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN D
BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.85
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.96
UNIT TIME-PERCENT OF LAG	255.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.42
CONSTANT LOSS RATE-in/hr	0.14
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.14	0.07	0.237	0.91	190.31
2	10	0.17	1.3	0.378	0.14	0.07	0.237	0.91	190.31
3	15	0.25	1.1	0.319	0.14	0.06	0.179	0.69	123.23
4	20	0.33	1.5	0.436	0.14	0.08	0.295	1.14	257.39
5	25	0.42	1.5	0.436	0.14	0.08	0.295	1.14	257.39
6	30	0.50	1.8	0.523	0.14	0.09	0.382	1.47	358.02
7	35	0.58	1.5	0.436	0.14	0.08	0.295	1.14	257.39
8	40	0.67	1.8	0.523	0.14	0.09	0.382	1.47	358.02
9	45	0.75	1.8	0.523	0.14	0.09	0.382	1.47	358.02
10	50	0.83	1.5	0.436	0.14	0.08	0.295	1.14	257.39
11	55	0.92	1.6	0.465	0.14	0.08	0.324	1.25	290.93
12	60	1.00	1.8	0.523	0.14	0.09	0.382	1.47	358.02
13	65	1.08	2.2	0.639	0.14	0.11	0.498	1.92	492.18
14	70	1.17	2.2	0.639	0.14	0.11	0.498	1.92	492.18
15	75	1.25	2.2	0.639	0.14	0.11	0.498	1.92	492.18
16	80	1.33	2.0	0.581	0.14	0.10	0.440	1.69	425.10
17	85	1.42	2.6	0.755	0.14	0.14	0.614	2.37	626.34
18	90	1.50	2.7	0.784	0.14	0.14	0.643	2.48	659.89
19	95	1.58	2.4	0.697	0.14	0.13	0.556	2.14	559.26
20	100	1.67	2.7	0.784	0.14	0.14	0.643	2.48	659.89
21	105	1.75	3.3	0.958	0.14	0.17	0.818	3.15	861.13
22	110	1.83	3.1	0.900	0.14	0.16	0.760	2.92	794.05
23	115	1.92	2.9	0.842	0.14	0.15	0.702	2.70	726.97
24	120	2.00	3.0	0.871	0.14	0.16	0.731	2.81	760.51
25	125	2.08	3.1	0.900	0.14	0.16	0.760	2.92	794.05
26	130	2.17	4.2	1.220	0.14	0.22	1.079	4.15	1163.00
27	135	2.25	5.0	1.452	0.14	0.26	1.311	5.05	1431.33
28	140	2.33	3.5	1.016	0.14	0.18	0.876	3.37	928.22
29	145	2.42	6.8	1.975	0.14	0.36	1.834	7.06	2035.08
30	150	2.50	7.3	2.120	0.14	0.38	1.979	7.62	2202.78
31	155	2.58	8.2	2.381	0.14	0.43	2.241	8.63	2504.65
32	160	2.67	5.9	1.713	0.14	0.31	1.573	6.06	1733.20
33	165	2.75	2.0	0.581	0.14	0.10	0.440	1.69	425.10
34	170	2.83	1.8	0.523	0.14	0.09	0.382	1.47	358.02
35	175	2.92	1.8	0.523	0.14	0.09	0.382	1.47	358.02
36	180	3.00	0.6	0.174	0.14	0.03	0.034	0.13	0.00
							23.978		24739.53

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.00
FLOOD VOLUME (acft)	0.64
FLOOD VOLUME (cuft)	27925.95
REQUIRED STORAGE (acft)	0.57
REQUIRED STORAGE (cuft)	24739.53
PEAK FLOW RATE (cfs)	8.63

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN D

BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.85
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.96
UNIT TIME-PERCENT OF LAG	255.5
TOTAL ADJUSTED STORM RAIN-INCHES	3.13
CONSTANT LOSS RATE-in/hr	0.141
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.188	0.14	0.03	0.05	0.18	0.00
2	10	0.17	0.6	0.225	0.14	0.04	0.08	0.33	14.56
3	15	0.25	0.6	0.225	0.14	0.04	0.08	0.33	14.56
4	20	0.33	0.6	0.225	0.14	0.04	0.08	0.33	14.56
5	25	0.42	0.6	0.225	0.14	0.04	0.08	0.33	14.56
6	30	0.50	0.7	0.263	0.14	0.05	0.12	0.47	57.95
7	35	0.58	0.7	0.263	0.14	0.05	0.12	0.47	57.95
8	40	0.67	0.7	0.263	0.14	0.05	0.12	0.47	57.95
9	45	0.75	0.7	0.263	0.14	0.05	0.12	0.47	57.95
10	50	0.83	0.7	0.263	0.14	0.05	0.12	0.47	57.95
11	55	0.92	0.7	0.263	0.14	0.05	0.12	0.47	57.95
12	60	1.00	0.8	0.300	0.14	0.05	0.16	0.62	101.33
13	65	1.08	0.8	0.300	0.14	0.05	0.16	0.62	101.33
14	70	1.17	0.8	0.300	0.14	0.05	0.16	0.62	101.33
15	75	1.25	0.8	0.300	0.14	0.05	0.16	0.62	101.33
16	80	1.33	0.8	0.300	0.14	0.05	0.16	0.62	101.33
17	85	1.42	0.8	0.300	0.14	0.05	0.16	0.62	101.33
18	90	1.50	0.8	0.300	0.14	0.05	0.16	0.62	101.33
19	95	1.58	0.8	0.300	0.14	0.05	0.16	0.62	101.33
20	100	1.67	0.8	0.300	0.14	0.05	0.16	0.62	101.33
21	105	1.75	0.8	0.300	0.14	0.05	0.16	0.62	101.33
22	110	1.83	0.8	0.300	0.14	0.05	0.16	0.62	101.33
23	115	1.92	0.8	0.300	0.14	0.05	0.16	0.62	101.33
24	120	2.00	0.9	0.338	0.14	0.06	0.20	0.76	144.71
25	125	2.08	0.8	0.300	0.14	0.05	0.16	0.62	101.33
26	130	2.17	0.9	0.338	0.14	0.06	0.20	0.76	144.71
27	135	2.25	0.9	0.338	0.14	0.06	0.20	0.76	144.71
28	140	2.33	0.9	0.338	0.14	0.06	0.20	0.76	144.71
29	145	2.42	0.9	0.338	0.14	0.06	0.20	0.76	144.71
30	150	2.50	0.9	0.338	0.14	0.06	0.20	0.76	144.71
31	155	2.58	0.9	0.338	0.14	0.06	0.20	0.76	144.71
32	160	2.67	0.9	0.338	0.14	0.06	0.20	0.76	144.71
33	165	2.75	1.0	0.376	0.14	0.07	0.24	0.90	188.09
34	170	2.83	1.0	0.376	0.14	0.07	0.24	0.90	188.09
35	175	2.92	1.0	0.376	0.14	0.07	0.24	0.90	188.09
36	180	3.00	1.0	0.376	0.14	0.07	0.24	0.90	188.09
37	185	3.08	1.0	0.376	0.14	0.07	0.24	0.90	188.09
38	190	3.17	1.1	0.413	0.14	0.07	0.27	1.05	231.47
39	195	3.25	1.1	0.413	0.14	0.07	0.27	1.05	231.47
40	200	3.33	1.1	0.413	0.14	0.07	0.27	1.05	231.47
41	205	3.42	1.2	0.451	0.14	0.08	0.31	1.19	274.86
42	210	3.50	1.3	0.488	0.14	0.09	0.35	1.34	318.24
43	215	3.58	1.4	0.526	0.14	0.09	0.39	1.48	361.62
44	220	3.67	1.4	0.526	0.14	0.09	0.39	1.48	361.62
45	225	3.75	1.5	0.563	0.14	0.10	0.42	1.63	405.00
46	230	3.83	1.5	0.563	0.14	0.10	0.42	1.63	405.00
47	235	3.92	1.6	0.601	0.14	0.11	0.46	1.77	448.38
48	240	4.00	1.6	0.601	0.14	0.11	0.46	1.77	448.38
49	245	4.08	1.7	0.639	0.14	0.11	0.50	1.92	491.76
50	250	4.17	1.8	0.676	0.14	0.12	0.54	2.06	535.15
51	255	4.25	1.9	0.714	0.14	0.13	0.57	2.21	578.53
52	260	4.33	2.0	0.751	0.14	0.14	0.61	2.35	621.91
53	265	4.42	2.1	0.789	0.14	0.14	0.65	2.50	665.29
54	270	4.50	2.1	0.789	0.14	0.14	0.65	2.50	665.29
55	275	4.58	2.2	0.826	0.14	0.15	0.69	2.64	708.67
56	280	4.67	2.3	0.864	0.14	0.16	0.72	2.78	752.06

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN D BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.85		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.96		
UNIT TIME-PERCENT OF LAG	255.5		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.141		
LOW LOSS RATE - PERCENT	18%	TOTAL PERCOLATION RATE (cfs)	0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.901	0.14	0.16	0.76	2.93	795.44
58	290	4.83	2.4	0.901	0.14	0.16	0.76	2.93	795.44
59	295	4.92	2.5	0.939	0.14	0.17	0.80	3.07	838.82
60	300	5.00	2.6	0.977	0.14	0.18	0.84	3.22	882.20
61	305	5.08	3.1	1.164	0.14	0.21	1.02	3.94	1099.11
62	310	5.17	3.6	1.352	0.14	0.24	1.21	4.66	1316.02
63	315	5.25	3.9	1.465	0.14	0.26	1.32	5.10	1446.16
64	320	5.33	4.2	1.578	0.14	0.28	1.44	5.53	1576.31
65	325	5.42	4.7	1.765	0.14	0.32	1.62	6.26	1793.22
66	330	5.50	5.6	2.103	0.14	0.38	1.96	7.56	2183.65
67	335	5.58	1.9	0.714	0.14	0.13	0.57	2.21	578.53
68	340	5.67	0.9	0.338	0.14	0.06	0.20	0.76	144.71
69	345	5.75	0.6	0.225	0.14	0.04	0.08	0.33	14.56
70	350	5.83	0.5	0.188	0.14	0.03	0.05	0.18	0.00
71	355	5.92	0.3	0.113	0.14	0.02	0.09	0.36	23.39
72	360	6.00	0.2	0.075	0.14	0.01	0.06	0.24	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.31
FLOOD VOLUME (acft)	0.74
FLOOD VOLUME (cuft)	32241.83
REQUIRED STORAGE (acft)	0.60
REQUIRED STORAGE (cuft)	26045.07
PEAK FLOW RATE (cfs)	7.56

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN D BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES 3.850 UNIT TIME-MINUTES 15 LAG TIME - MINUTES 1.96 UNIT TIME-PERCENT OF LAG 766.6 TOTAL ADJUSTED STORM RAIN-INCHES 5.06					CONSTANT LOSS RATE-in/hr n/a VARIABLE LOSS RATE (AVG) in/hr 0.1406 MINIMUM LOSS RATE (for var. loss) - in/hr 0.070 LOW LOSS RATE - DECIMAL 0.18 C 0.00130 PERCOLATION RATE (cfs) 0.28				
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.040	0.248	0.007	0.033	0.13	0.00
2	30	0.50	0.3	0.061	0.245	0.011	0.050	0.19	0.00
3	45	0.75	0.3	0.061	0.243	0.011	0.050	0.19	0.00
4	60	1.00	0.4	0.081	0.240	0.015	0.066	0.26	0.00
5	75	1.25	0.3	0.061	0.237	0.011	0.050	0.19	0.00
6	90	1.50	0.3	0.061	0.234	0.011	0.050	0.19	0.00
7	105	1.75	0.3	0.061	0.231	0.011	0.050	0.19	0.00
8	120	2.00	0.4	0.081	0.228	0.015	0.066	0.26	0.00
9	135	2.25	0.4	0.081	0.226	0.015	0.066	0.26	0.00
10	150	2.50	0.4	0.081	0.223	0.015	0.066	0.26	0.00
11	165	2.75	0.5	0.101	0.220	0.018	0.083	0.32	37.54
12	180	3.00	0.5	0.101	0.218	0.018	0.083	0.32	37.54
13	195	3.25	0.5	0.101	0.215	0.018	0.083	0.32	37.54
14	210	3.50	0.5	0.101	0.212	0.018	0.083	0.32	37.54
15	225	3.75	0.5	0.101	0.210	0.018	0.083	0.32	37.54
16	240	4.00	0.6	0.121	0.207	0.022	0.100	0.38	95.05
17	255	4.25	0.6	0.121	0.204	0.022	0.100	0.38	95.05
18	270	4.50	0.7	0.142	0.202	0.026	0.116	0.45	152.56
19	285	4.75	0.7	0.142	0.199	0.026	0.116	0.45	152.56
20	300	5.00	0.8	0.162	0.196	0.029	0.133	0.51	210.06
21	315	5.25	0.6	0.121	0.194	0.022	0.100	0.38	95.05
22	330	5.50	0.7	0.142	0.191	0.026	0.116	0.45	152.56
23	345	5.75	0.8	0.162	0.189	0.029	0.133	0.51	210.06
24	360	6.00	0.8	0.162	0.186	0.029	0.133	0.51	210.06
25	375	6.25	0.9	0.182	0.184	0.033	0.149	0.58	267.57
26	390	6.50	0.9	0.182	0.181	0.033	0.001	0.00	0.00
27	405	6.75	1.0	0.202	0.179	0.036	0.023	0.09	0.00
28	420	7.00	1.0	0.202	0.177	0.036	0.026	0.10	0.00
29	435	7.25	1.0	0.202	0.174	0.036	0.028	0.11	0.00
30	450	7.50	1.1	0.223	0.172	0.040	0.051	0.20	0.00
31	465	7.75	1.2	0.243	0.170	0.044	0.073	0.28	4.24
32	480	8.00	1.3	0.263	0.167	0.047	0.096	0.37	82.47
33	495	8.25	1.5	0.304	0.165	0.055	0.139	0.53	230.76
34	510	8.50	1.5	0.304	0.163	0.055	0.141	0.54	238.73
35	525	8.75	1.6	0.324	0.160	0.058	0.164	0.63	316.75
36	540	9.00	1.7	0.344	0.158	0.062	0.186	0.72	394.70
37	555	9.25	1.9	0.385	0.156	0.069	0.229	0.88	542.72
38	570	9.50	2.0	0.405	0.154	0.073	0.251	0.97	620.53
39	585	9.75	2.1	0.425	0.151	0.077	0.274	1.05	698.27
40	600	10.00	2.2	0.445	0.149	0.080	0.296	1.14	775.94
41	615	10.25	1.5	0.304	0.147	0.055	0.157	0.60	292.48
42	630	10.50	1.5	0.304	0.145	0.055	0.159	0.61	299.87
43	645	10.75	2.0	0.405	0.143	0.073	0.262	1.01	657.84
44	660	11.00	2.0	0.405	0.141	0.073	0.264	1.02	665.08
45	675	11.25	1.9	0.385	0.139	0.069	0.246	0.95	602.12
46	690	11.50	1.9	0.385	0.137	0.069	0.248	0.95	609.20
47	705	11.75	1.7	0.344	0.135	0.062	0.210	0.81	475.95
48	720	12.00	1.8	0.364	0.133	0.066	0.232	0.89	553.02
49	735	12.25	2.5	0.506	0.131	0.091	0.375	1.45	1050.80
50	750	12.50	2.6	0.526	0.129	0.095	0.398	1.53	1127.71
51	765	12.75	2.8	0.567	0.127	0.102	0.440	1.69	1274.67
52	780	13.00	2.9	0.587	0.125	0.106	0.462	1.78	1351.41
53	795	13.25	3.4	0.688	0.123	0.124	0.565	2.18	1708.61
54	810	13.50	3.4	0.688	0.121	0.124	0.567	2.18	1715.06
55	825	13.75	2.3	0.466	0.119	0.084	0.346	1.33	949.99
56	840	14.00	2.3	0.466	0.117	0.084	0.348	1.34	956.27
57	855	14.25	2.7	0.546	0.116	0.098	0.431	1.66	1243.00
58	870	14.50	2.6	0.526	0.114	0.095	0.412	1.59	1178.99
59	885	14.75	2.6	0.526	0.112	0.095	0.414	1.59	1185.01
60	900	15.00	2.5	0.506	0.110	0.091	0.396	1.52	1120.82

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT				PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN D BY: PK DATE: 7/4/2022					
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			3.850	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.1406		
LAG TIME - MINUTES			1.96	MINIMUM LOSS RATE (for var. loss) - in/hr			0.070		
UNIT TIME-PERCENT OF LAG			766.6	LOW LOSS RATE - DECIMAL			0.18		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00130		
				PERCOLATION RATE (cfs)			0.28		
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
61	915	15.25	2.4	0.486	0.109	0.087	0.377	1.45	1056.55
62	930	15.50	2.3	0.466	0.107	0.084	0.358	1.38	992.18
63	945	15.75	1.9	0.385	0.105	0.069	0.279	1.07	717.32
64	960	16.00	1.9	0.385	0.104	0.069	0.281	1.08	722.90
65	975	16.25	0.4	0.081	0.102	0.015	0.066	0.26	0.00
66	990	16.50	0.4	0.081	0.101	0.015	0.066	0.26	0.00
67	1005	16.75	0.3	0.061	0.099	0.011	0.050	0.19	0.00
68	1020	17.00	0.3	0.061	0.098	0.011	0.050	0.19	0.00
69	1035	17.25	0.5	0.101	0.096	0.018	0.005	0.02	0.00
70	1050	17.50	0.5	0.101	0.095	0.018	0.006	0.03	0.00
71	1065	17.75	0.5	0.101	0.093	0.018	0.008	0.03	0.00
72	1080	18.00	0.4	0.081	0.092	0.015	0.066	0.26	0.00
73	1095	18.25	0.4	0.081	0.091	0.015	0.066	0.26	0.00
74	1110	18.50	0.4	0.081	0.089	0.015	0.066	0.26	0.00
75	1125	18.75	0.3	0.061	0.088	0.011	0.050	0.19	0.00
76	1140	19.00	0.2	0.040	0.087	0.007	0.033	0.13	0.00
77	1155	19.25	0.3	0.061	0.085	0.011	0.050	0.19	0.00
78	1170	19.50	0.4	0.081	0.084	0.015	0.066	0.26	0.00
79	1185	19.75	0.3	0.061	0.083	0.011	0.050	0.19	0.00
80	1200	20.00	0.2	0.040	0.082	0.007	0.033	0.13	0.00
81	1215	20.25	0.3	0.061	0.081	0.011	0.050	0.19	0.00
82	1230	20.50	0.3	0.061	0.080	0.011	0.050	0.19	0.00
83	1245	20.75	0.3	0.061	0.079	0.011	0.050	0.19	0.00
84	1260	21.00	0.2	0.040	0.078	0.007	0.033	0.13	0.00
85	1275	21.25	0.3	0.061	0.077	0.011	0.050	0.19	0.00
86	1290	21.50	0.2	0.040	0.076	0.007	0.033	0.13	0.00
87	1305	21.75	0.3	0.061	0.075	0.011	0.050	0.19	0.00
88	1320	22.00	0.2	0.040	0.074	0.007	0.033	0.13	0.00
89	1335	22.25	0.3	0.061	0.074	0.011	0.050	0.19	0.00
90	1350	22.50	0.2	0.040	0.073	0.007	0.033	0.13	0.00
91	1365	22.75	0.2	0.040	0.072	0.007	0.033	0.13	0.00
92	1380	23.00	0.2	0.040	0.072	0.007	0.033	0.13	0.00
93	1395	23.25	0.2	0.040	0.071	0.007	0.033	0.13	0.00
94	1410	23.50	0.2	0.040	0.071	0.007	0.033	0.13	0.00
95	1425	23.75	0.2	0.040	0.071	0.007	0.033	0.13	0.00
96	1440	24.00	0.2	0.040	0.070	0.007	0.033	0.13	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	3.43
FLOOD VOLUME (acft)	1.10
FLOOD VOLUME (cuft)	47956.10
REQUIRED STORAGE (acft)	0.65
REQUIRED STORAGE (cuft)	28240.23
PEAK FLOW (cfs)	2.18

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN D

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
352	0	0		6000	0	0	0.00
353	1	1	0	6000	6000	6000	0.14
354	1	2	0	6000	6000	12000	0.28
355	1	3	0	6000	6000	18000	0.41
356	1	4	0	6000	6000	24000	0.55
357	1	5	0	6000	6000	30000	0.69

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	0.27778	cfs
MAXWELL IV DRYWELLS			
NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		0.27778	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	28240	cu ft (100-yr 3-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	0.27778	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**28**	hrs < 26 hrs

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.91	274	274	83	190	352.03	190	0.00
2	10	0.91	274	464	83	381	352.06	381	0.01
3	15	0.69	207	587	83	504	352.08	504	0.01
4	20	1.14	341	845	83	761	352.13	761	0.02
5	25	1.14	341	1,102	83	1,019	352.17	1,019	0.02
6	30	1.47	441	1,460	83	1,377	352.23	1,377	0.03
7	35	1.14	341	1,717	83	1,634	352.27	1,634	0.04
8	40	1.47	441	2,075	83	1,992	352.33	1,992	0.05
9	45	1.47	441	2,433	83	2,350	352.39	2,350	0.05
10	50	1.14	341	2,691	83	2,607	352.43	2,607	0.06
11	55	1.25	374	2,982	83	2,898	352.48	2,898	0.07
12	60	1.47	441	3,340	83	3,256	352.54	3,256	0.07
13	65	1.92	576	3,832	83	3,749	352.62	3,749	0.09
14	70	1.92	576	4,324	83	4,241	352.71	4,241	0.10
15	75	1.92	576	4,816	83	4,733	352.79	4,733	0.11
16	80	1.69	508	5,241	83	5,158	352.86	5,158	0.12
17	85	2.37	710	5,868	83	5,784	352.96	5,784	0.13
18	90	2.48	743	6,528	83	6,444	353.07	6,444	0.15
19	95	2.14	643	7,087	83	7,004	353.17	7,004	0.16
20	100	2.48	743	7,747	83	7,663	353.28	7,663	0.18
21	105	3.15	944	8,608	83	8,525	353.42	8,525	0.20
22	110	2.92	877	9,402	83	9,319	353.55	9,319	0.21
23	115	2.70	810	10,129	83	10,046	353.67	10,046	0.23
24	120	2.81	844	10,889	83	10,806	353.80	10,806	0.25
25	125	2.92	877	11,683	83	11,600	353.93	11,600	0.27
26	130	4.15	1,246	12,846	83	12,763	354.13	12,763	0.29
27	135	5.05	1,515	14,278	83	14,194	354.37	14,194	0.33
28	140	3.37	1,012	15,206	83	15,123	354.52	15,123	0.35
29	145	7.06	2,118	17,241	83	17,158	354.86	17,158	0.39
30	150	7.62	2,286	19,444	83	19,361	355.23	19,361	0.44
31	155	8.63	2,588	21,949	83	21,865	355.64	21,865	0.50
32	160	6.06	1,817	23,682	83	23,598	355.93	23,598	0.54
33	165	1.69	508	24,107	83	24,024	356.00	24,024	0.55
34	170	1.47	441	24,465	83	24,382	356.06	24,382	0.56
35	175	1.47	441	24,823	83	24,740	356.12	24,740	0.57
36	180	0.13	39	24,778	83	24,695	356.12	24,695	0.57

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.18	55	55	83	-	352.00	-	0.00
2	10	0.33	98	98	83	15	352.00	15	0.00
3	15	0.33	98	112	83	29	352.00	29	0.00
4	20	0.33	98	127	83	44	352.01	44	0.00
5	25	0.33	98	142	83	58	352.01	58	0.00
6	30	0.47	141	200	83	116	352.02	116	0.00
7	35	0.47	141	257	83	174	352.03	174	0.00
8	40	0.47	141	315	83	232	352.04	232	0.01
9	45	0.47	141	373	83	290	352.05	290	0.01
10	50	0.47	141	431	83	348	352.06	348	0.01
11	55	0.47	141	489	83	406	352.07	406	0.01
12	60	0.62	185	591	83	507	352.08	507	0.01
13	65	0.62	185	692	83	609	352.10	609	0.01
14	70	0.62	185	793	83	710	352.12	710	0.02
15	75	0.62	185	895	83	811	352.14	811	0.02
16	80	0.62	185	996	83	913	352.15	913	0.02
17	85	0.62	185	1,097	83	1,014	352.17	1,014	0.02
18	90	0.62	185	1,199	83	1,115	352.19	1,115	0.03
19	95	0.62	185	1,300	83	1,217	352.20	1,217	0.03
20	100	0.62	185	1,401	83	1,318	352.22	1,318	0.03
21	105	0.62	185	1,503	83	1,419	352.24	1,419	0.03
22	110	0.62	185	1,604	83	1,521	352.25	1,521	0.03
23	115	0.62	185	1,705	83	1,622	352.27	1,622	0.04
24	120	0.76	228	1,850	83	1,767	352.29	1,767	0.04
25	125	0.62	185	1,951	83	1,868	352.31	1,868	0.04
26	130	0.76	228	2,096	83	2,013	352.34	2,013	0.05
27	135	0.76	228	2,241	83	2,157	352.36	2,157	0.05
28	140	0.76	228	2,385	83	2,302	352.38	2,302	0.05
29	145	0.76	228	2,530	83	2,447	352.41	2,447	0.06
30	150	0.76	228	2,675	83	2,591	352.43	2,591	0.06
31	155	0.76	228	2,820	83	2,736	352.46	2,736	0.06
32	160	0.76	228	2,964	83	2,881	352.48	2,881	0.07
33	165	0.90	271	3,152	83	3,069	352.51	3,069	0.07
34	170	0.90	271	3,340	83	3,257	352.54	3,257	0.07
35	175	0.90	271	3,528	83	3,445	352.57	3,445	0.08
36	180	0.90	271	3,717	83	3,633	352.61	3,633	0.08
37	185	0.90	271	3,905	83	3,821	352.64	3,821	0.09
38	190	1.05	315	4,136	83	4,053	352.68	4,053	0.09
39	195	1.05	315	4,368	83	4,284	352.71	4,284	0.10
40	200	1.05	315	4,599	83	4,516	352.75	4,516	0.10
41	205	1.19	358	4,874	83	4,791	352.80	4,791	0.11
42	210	1.34	402	5,192	83	5,109	352.85	5,109	0.12
43	215	1.48	445	5,554	83	5,470	352.91	5,470	0.13
44	220	1.48	445	5,915	83	5,832	352.97	5,832	0.13
45	225	1.63	488	6,320	83	6,237	353.04	6,237	0.14
46	230	1.63	488	6,725	83	6,642	353.11	6,642	0.15
47	235	1.77	532	7,174	83	7,090	353.18	7,090	0.16
48	240	1.77	532	7,622	83	7,539	353.26	7,539	0.17
49	245	1.92	575	8,114	83	8,031	353.34	8,031	0.18
50	250	2.06	618	8,649	83	8,566	353.43	8,566	0.20
51	255	2.21	662	9,228	83	9,144	353.52	9,144	0.21
52	260	2.35	705	9,850	83	9,766	353.63	9,766	0.22
53	265	2.50	749	10,515	83	10,431	353.74	10,431	0.24
54	270	2.50	749	11,180	83	11,097	353.85	11,097	0.25
55	275	2.64	792	11,889	83	11,805	353.97	11,805	0.27

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	2.78	835	12,641	83	12,558	354.09	12,558	0.29
57	285	2.93	879	13,436	83	13,353	354.23	13,353	0.31
58	290	2.93	879	14,232	83	14,148	354.36	14,148	0.32
59	295	3.07	922	15,071	83	14,987	354.50	14,987	0.34
60	300	3.22	966	15,953	83	15,869	354.64	15,869	0.36
61	305	3.94	1,182	17,052	83	16,969	354.83	16,969	0.39
62	310	4.66	1,399	18,368	83	18,285	355.05	18,285	0.42
63	315	5.10	1,529	19,814	83	19,731	355.29	19,731	0.45
64	320	5.53	1,660	21,390	83	21,307	355.55	21,307	0.49
65	325	6.26	1,877	23,184	83	23,100	355.85	23,100	0.53
66	330	7.56	2,267	25,367	83	25,284	356.21	25,284	0.58
67	335	2.21	662	25,946	83	25,862	356.31	25,862	0.59
68	340	0.76	228	26,090	83	26,007	356.33	26,007	0.60
69	345	0.33	98	26,105	83	26,022	356.34	26,022	0.60
70	350	0.18	55	26,076	83	25,993	356.33	25,993	0.60
71	355	0.36	107	26,100	83	26,016	356.34	26,016	0.60
72	360	0.24	71	26,087	83	26,004	356.33	26,004	0.60

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.13	115	115	250	-	352.00	-	0.00
2	30	0.19	173	173	250	-	352.00	-	0.00
3	45	0.19	173	173	250	-	352.00	-	0.00
4	60	0.26	230	230	250	-	352.00	-	0.00
5	75	0.19	173	173	250	-	352.00	-	0.00
6	90	0.19	173	173	250	-	352.00	-	0.00
7	105	0.19	173	173	250	-	352.00	-	0.00
8	120	0.26	230	230	250	-	352.00	-	0.00
9	135	0.26	230	230	250	-	352.00	-	0.00
10	150	0.26	230	230	250	-	352.00	-	0.00
11	165	0.32	288	288	250	38	352.01	38	0.00
12	180	0.32	288	325	250	75	352.01	75	0.00
13	195	0.32	288	363	250	113	352.02	113	0.00
14	210	0.32	288	400	250	150	352.03	150	0.00
15	225	0.32	288	438	250	188	352.03	188	0.00
16	240	0.38	345	533	250	283	352.05	283	0.01
17	255	0.38	345	628	250	378	352.06	378	0.01
18	270	0.45	403	780	250	530	352.09	530	0.01
19	285	0.45	403	933	250	683	352.11	683	0.02
20	300	0.51	460	1,143	250	893	352.15	893	0.02
21	315	0.38	345	1,238	250	988	352.16	988	0.02
22	330	0.45	403	1,391	250	1,141	352.19	1,141	0.03
23	345	0.51	460	1,601	250	1,351	352.23	1,351	0.03
24	360	0.51	460	1,811	250	1,561	352.26	1,561	0.04
25	375	0.58	518	2,078	250	1,828	352.30	1,828	0.04
26	390	0.00	2	1,831	250	1,581	352.26	1,581	0.04
27	405	0.09	81	1,661	250	1,411	352.24	1,411	0.03
28	420	0.10	89	1,501	250	1,251	352.21	1,251	0.03
29	435	0.11	98	1,348	250	1,098	352.18	1,098	0.03
30	450	0.20	176	1,274	250	1,024	352.17	1,024	0.02
31	465	0.28	254	1,278	250	1,028	352.17	1,028	0.02
32	480	0.37	332	1,361	250	1,111	352.19	1,111	0.03
33	495	0.53	481	1,592	250	1,342	352.22	1,342	0.03
34	510	0.54	489	1,830	250	1,580	352.26	1,580	0.04
35	525	0.63	567	2,147	250	1,897	352.32	1,897	0.04
36	540	0.72	645	2,542	250	2,292	352.38	2,292	0.05
37	555	0.88	793	3,085	250	2,835	352.47	2,835	0.07
38	570	0.97	871	3,705	250	3,455	352.58	3,455	0.08
39	585	1.05	948	4,403	250	4,153	352.69	4,153	0.10
40	600	1.14	1,026	5,179	250	4,929	352.82	4,929	0.11
41	615	0.60	542	5,472	250	5,222	352.87	5,222	0.12
42	630	0.61	550	5,772	250	5,522	352.92	5,522	0.13
43	645	1.01	908	6,430	250	6,180	353.03	6,180	0.14
44	660	1.02	915	7,095	250	6,845	353.14	6,845	0.16
45	675	0.95	852	7,697	250	7,447	353.24	7,447	0.17
46	690	0.95	859	8,306	250	8,056	353.34	8,056	0.18
47	705	0.81	726	8,782	250	8,532	353.42	8,532	0.20
48	720	0.89	803	9,335	250	9,085	353.51	9,085	0.21
49	735	1.45	1,301	10,386	250	10,136	353.69	10,136	0.23
50	750	1.53	1,378	11,513	250	11,263	353.88	11,263	0.26
51	765	1.69	1,525	12,788	250	12,538	354.09	12,538	0.29
52	780	1.78	1,601	14,140	250	13,890	354.31	13,890	0.32
53	795	2.18	1,959	15,848	250	15,598	354.60	15,598	0.36
54	810	2.18	1,965	17,563	250	17,313	354.89	17,313	0.40
55	825	1.33	1,200	18,513	250	18,263	355.04	18,263	0.42
56	840	1.34	1,206	19,469	250	19,219	355.20	19,219	0.44
57	855	1.66	1,493	20,712	250	20,462	355.41	20,462	0.47
58	870	1.59	1,429	21,891	250	21,641	355.61	21,641	0.50

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	1.59	1,435	23,076	250	22,826	355.80	22,826	0.52
60	900	1.52	1,371	24,197	250	23,947	355.99	23,947	0.55
61	915	1.45	1,307	25,254	250	25,004	356.17	25,004	0.57
62	930	1.38	1,242	26,246	250	25,996	356.33	25,996	0.60
63	945	1.07	967	26,963	250	26,713	356.45	26,713	0.61
64	960	1.08	973	27,686	250	27,436	356.57	27,436	0.63
65	975	0.26	230	27,666	250	27,416	356.57	27,416	0.63
66	990	0.26	230	27,646	250	27,396	356.57	27,396	0.63
67	1005	0.19	173	27,569	250	27,319	356.55	27,319	0.63
68	1020	0.19	173	27,491	250	27,241	356.54	27,241	0.63
69	1035	0.02	18	27,259	250	27,009	356.50	27,009	0.62
70	1050	0.03	23	27,031	250	26,781	356.46	26,781	0.61
71	1065	0.03	27	26,809	250	26,559	356.43	26,559	0.61
72	1080	0.26	230	26,789	250	26,539	356.42	26,539	0.61
73	1095	0.26	230	26,769	250	26,519	356.42	26,519	0.61
74	1110	0.26	230	26,749	250	26,499	356.42	26,499	0.61
75	1125	0.19	173	26,671	250	26,421	356.40	26,421	0.61
76	1140	0.13	115	26,536	250	26,286	356.38	26,286	0.60
77	1155	0.19	173	26,459	250	26,209	356.37	26,209	0.60
78	1170	0.26	230	26,439	250	26,189	356.36	26,189	0.60
79	1185	0.19	173	26,362	250	26,112	356.35	26,112	0.60
80	1200	0.13	115	26,227	250	25,977	356.33	25,977	0.60
81	1215	0.19	173	26,149	250	25,899	356.32	25,899	0.59
82	1230	0.19	173	26,072	250	25,822	356.30	25,822	0.59
83	1245	0.19	173	25,994	250	25,744	356.29	25,744	0.59
84	1260	0.13	115	25,859	250	25,609	356.27	25,609	0.59
85	1275	0.19	173	25,782	250	25,532	356.26	25,532	0.59
86	1290	0.13	115	25,647	250	25,397	356.23	25,397	0.58
87	1305	0.19	173	25,569	250	25,319	356.22	25,319	0.58
88	1320	0.13	115	25,434	250	25,184	356.20	25,184	0.58
89	1335	0.19	173	25,357	250	25,107	356.18	25,107	0.58
90	1350	0.13	115	25,222	250	24,972	356.16	24,972	0.57
91	1365	0.13	115	25,087	250	24,837	356.14	24,837	0.57
92	1380	0.13	115	24,952	250	24,702	356.12	24,702	0.57
93	1395	0.13	115	24,817	250	24,567	356.09	24,567	0.56
94	1410	0.13	115	24,682	250	24,432	356.07	24,432	0.56
95	1425	0.13	115	24,547	250	24,297	356.05	24,297	0.56
96	1440	0.13	115	24,412	250	24,162	356.03	24,162	0.55

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN E		
10	AREA DESIGNATION	SUBAREA E (OFFICE BLDG)		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL	3.6		
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	18%		
27				
28	LENGTH OF WATERCOURSE (L)	598		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	410		
30				
31	ELEVATION OF HEADWATER	357.1		
32	ELEVATION OF CONCENTRATION POINT	352.2		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		345	6000	
45		346	6000	
46		347	6000	
47		348	6000	
48		349	6000	
49		350	6000	
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN E
[2] AREA DESIGNATION	SUBAREA E (OFFICE BLDG)
[3] AREA - ACRES	3.600
[4] L-FEET	598
[5] L-MILES	0.113
[6] La-FEET	410
[7] La-MILES	0.078
[8] ELEVATION OF HEADWATER	357.1
[9] ELEVATION OF CONCENTRATION POINT	352.2
[10] H-FEET	4.9
[11] S-FEET/MILE	43.3
[12] S^0.5	6.58
[13] L*LCA/S^0.5	0.00134
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.029
[16] LAG TIME-MINUTES	1.75
[17] 25% OF LAG-MINUTES	0.44
[18] 40% OF LAG-MINUTES	0.70
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.28

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	3.600	1.00	2.42	3.13	3.600	1.00	3.13	5.06	3.600	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	3.6	SUM [7]	2.42	SUM [9]	3.60	SUM [11]	3.13	SUM [13]	3.60	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	2.00	2.31	3.43
FLOOD VOLUME	(cu-ft)	26,113	30,148	44,842
	(acre-ft)	0.60	0.69	1.03
REQUIRED STORAGE	(cu-ft)	22,944	23,980	25,623
	(acre-ft)	0.53	0.55	0.59
PEAK FLOW	(cfs)	8.07	7.07	2.04
MAXIMUM WSEL	(ft)	348.82	348.99	349.13

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN E
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
A	COMMERCIAL	32	0.74	90%	0.14	3.60	1.000	0.1406
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
	SF - 1/4 ACRE			50%	0.00	0.00	0.000	0.0000
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
	MF - APARTMENTS			80%	0.00	0.00	0.000	0.0000
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
	RETENTION BASINS			0%	0.00	0.00	0.000	0.0000
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	3.6	SUM	0.1406

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.0703
C= 0.00130

Ft=C(24-(T/60))^1.55 = 0.00130 (24-(T/60))^1.55 + 0.07 in/hr

LOW LOSS RATE (80-90 PERCENT) = 18%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period, T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 3 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN E BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.75
UNIT TIME-PERCENT OF LAG	286.1
TOTAL ADJUSTED STORM RAIN-INCHES	2.42
CONSTANT LOSS RATE-in/hr	0.14
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.14	0.07	0.237	0.85	172.54
2	10	0.17	1.3	0.378	0.14	0.07	0.237	0.85	172.54
3	15	0.25	1.1	0.319	0.14	0.06	0.179	0.64	109.81
4	20	0.33	1.5	0.436	0.14	0.08	0.295	1.06	235.27
5	25	0.42	1.5	0.436	0.14	0.08	0.295	1.06	235.27
6	30	0.50	1.8	0.523	0.14	0.09	0.382	1.38	329.36
7	35	0.58	1.5	0.436	0.14	0.08	0.295	1.06	235.27
8	40	0.67	1.8	0.523	0.14	0.09	0.382	1.38	329.36
9	45	0.75	1.8	0.523	0.14	0.09	0.382	1.38	329.36
10	50	0.83	1.5	0.436	0.14	0.08	0.295	1.06	235.27
11	55	0.92	1.6	0.465	0.14	0.08	0.324	1.17	266.63
12	60	1.00	1.8	0.523	0.14	0.09	0.382	1.38	329.36
13	65	1.08	2.2	0.639	0.14	0.11	0.498	1.79	454.81
14	70	1.17	2.2	0.639	0.14	0.11	0.498	1.79	454.81
15	75	1.25	2.2	0.639	0.14	0.11	0.498	1.79	454.81
16	80	1.33	2.0	0.581	0.14	0.10	0.440	1.58	392.08
17	85	1.42	2.6	0.755	0.14	0.14	0.614	2.21	580.26
18	90	1.50	2.7	0.784	0.14	0.14	0.643	2.32	611.63
19	95	1.58	2.4	0.697	0.14	0.13	0.556	2.00	517.54
20	100	1.67	2.7	0.784	0.14	0.14	0.643	2.32	611.63
21	105	1.75	3.3	0.958	0.14	0.17	0.818	2.94	799.80
22	110	1.83	3.1	0.900	0.14	0.16	0.760	2.73	737.08
23	115	1.92	2.9	0.842	0.14	0.15	0.702	2.53	674.35
24	120	2.00	3.0	0.871	0.14	0.16	0.731	2.63	705.71
25	125	2.08	3.1	0.900	0.14	0.16	0.760	2.73	737.08
26	130	2.17	4.2	1.220	0.14	0.22	1.079	3.88	1082.07
27	135	2.25	5.0	1.452	0.14	0.26	1.311	4.72	1332.98
28	140	2.33	3.5	1.016	0.14	0.18	0.876	3.15	862.53
29	145	2.42	6.8	1.975	0.14	0.36	1.834	6.60	1897.52
30	150	2.50	7.3	2.120	0.14	0.38	1.979	7.13	2054.33
31	155	2.58	8.2	2.381	0.14	0.43	2.241	8.07	2336.60
32	160	2.67	5.9	1.713	0.14	0.31	1.573	5.66	1615.25
33	165	2.75	2.0	0.581	0.14	0.10	0.440	1.58	392.08
34	170	2.83	1.8	0.523	0.14	0.09	0.382	1.38	329.36
35	175	2.92	1.8	0.523	0.14	0.09	0.382	1.38	329.36
36	180	3.00	0.6	0.174	0.14	0.03	0.034	0.12	0.00
							23.978		22943.67

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.00
FLOOD VOLUME (acft)	0.60
FLOOD VOLUME (cuft)	26112.58
REQUIRED STORAGE (acft)	0.53
REQUIRED STORAGE (cuft)	22943.67
PEAK FLOW RATE (cfs)	8.07

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN E

BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.75
UNIT TIME-PERCENT OF LAG	286.1
TOTAL ADJUSTED STORM RAIN-INCHES	3.13
CONSTANT LOSS RATE-in/hr	0.141
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.188	0.14	0.03	0.05	0.17	0.00
2	10	0.17	0.6	0.225	0.14	0.04	0.08	0.31	8.21
3	15	0.25	0.6	0.225	0.14	0.04	0.08	0.31	8.21
4	20	0.33	0.6	0.225	0.14	0.04	0.08	0.31	8.21
5	25	0.42	0.6	0.225	0.14	0.04	0.08	0.31	8.21
6	30	0.50	0.7	0.263	0.14	0.05	0.12	0.44	48.77
7	35	0.58	0.7	0.263	0.14	0.05	0.12	0.44	48.77
8	40	0.67	0.7	0.263	0.14	0.05	0.12	0.44	48.77
9	45	0.75	0.7	0.263	0.14	0.05	0.12	0.44	48.77
10	50	0.83	0.7	0.263	0.14	0.05	0.12	0.44	48.77
11	55	0.92	0.7	0.263	0.14	0.05	0.12	0.44	48.77
12	60	1.00	0.8	0.300	0.14	0.05	0.16	0.58	89.34
13	65	1.08	0.8	0.300	0.14	0.05	0.16	0.58	89.34
14	70	1.17	0.8	0.300	0.14	0.05	0.16	0.58	89.34
15	75	1.25	0.8	0.300	0.14	0.05	0.16	0.58	89.34
16	80	1.33	0.8	0.300	0.14	0.05	0.16	0.58	89.34
17	85	1.42	0.8	0.300	0.14	0.05	0.16	0.58	89.34
18	90	1.50	0.8	0.300	0.14	0.05	0.16	0.58	89.34
19	95	1.58	0.8	0.300	0.14	0.05	0.16	0.58	89.34
20	100	1.67	0.8	0.300	0.14	0.05	0.16	0.58	89.34
21	105	1.75	0.8	0.300	0.14	0.05	0.16	0.58	89.34
22	110	1.83	0.8	0.300	0.14	0.05	0.16	0.58	89.34
23	115	1.92	0.8	0.300	0.14	0.05	0.16	0.58	89.34
24	120	2.00	0.9	0.338	0.14	0.06	0.20	0.71	129.90
25	125	2.08	0.8	0.300	0.14	0.05	0.16	0.58	89.34
26	130	2.17	0.9	0.338	0.14	0.06	0.20	0.71	129.90
27	135	2.25	0.9	0.338	0.14	0.06	0.20	0.71	129.90
28	140	2.33	0.9	0.338	0.14	0.06	0.20	0.71	129.90
29	145	2.42	0.9	0.338	0.14	0.06	0.20	0.71	129.90
30	150	2.50	0.9	0.338	0.14	0.06	0.20	0.71	129.90
31	155	2.58	0.9	0.338	0.14	0.06	0.20	0.71	129.90
32	160	2.67	0.9	0.338	0.14	0.06	0.20	0.71	129.90
33	165	2.75	1.0	0.376	0.14	0.07	0.24	0.85	170.47
34	170	2.83	1.0	0.376	0.14	0.07	0.24	0.85	170.47
35	175	2.92	1.0	0.376	0.14	0.07	0.24	0.85	170.47
36	180	3.00	1.0	0.376	0.14	0.07	0.24	0.85	170.47
37	185	3.08	1.0	0.376	0.14	0.07	0.24	0.85	170.47
38	190	3.17	1.1	0.413	0.14	0.07	0.27	0.98	211.03
39	195	3.25	1.1	0.413	0.14	0.07	0.27	0.98	211.03
40	200	3.33	1.1	0.413	0.14	0.07	0.27	0.98	211.03
41	205	3.42	1.2	0.451	0.14	0.08	0.31	1.12	251.60
42	210	3.50	1.3	0.488	0.14	0.09	0.35	1.25	292.16
43	215	3.58	1.4	0.526	0.14	0.09	0.39	1.39	332.73
44	220	3.67	1.4	0.526	0.14	0.09	0.39	1.39	332.73
45	225	3.75	1.5	0.563	0.14	0.10	0.42	1.52	373.29
46	230	3.83	1.5	0.563	0.14	0.10	0.42	1.52	373.29
47	235	3.92	1.6	0.601	0.14	0.11	0.46	1.66	413.86
48	240	4.00	1.6	0.601	0.14	0.11	0.46	1.66	413.86
49	245	4.08	1.7	0.639	0.14	0.11	0.50	1.79	454.42
50	250	4.17	1.8	0.676	0.14	0.12	0.54	1.93	494.99
51	255	4.25	1.9	0.714	0.14	0.13	0.57	2.06	535.55
52	260	4.33	2.0	0.751	0.14	0.14	0.61	2.20	576.11
53	265	4.42	2.1	0.789	0.14	0.14	0.65	2.33	616.68
54	270	4.50	2.1	0.789	0.14	0.14	0.65	2.33	616.68
55	275	4.58	2.2	0.826	0.14	0.15	0.69	2.47	657.24
56	280	4.67	2.3	0.864	0.14	0.16	0.72	2.60	697.81

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN E BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.75		
UNIT TIME-PERCENT OF LAG	286.1		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.141		
LOW LOSS RATE - PERCENT	18%	TOTAL PERCOLATION RATE (cfs)	0.28 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.901	0.14	0.16	0.76	2.74	738.37
58	290	4.83	2.4	0.901	0.14	0.16	0.76	2.74	738.37
59	295	4.92	2.5	0.939	0.14	0.17	0.80	2.87	778.94
60	300	5.00	2.6	0.977	0.14	0.18	0.84	3.01	819.50
61	305	5.08	3.1	1.164	0.14	0.21	1.02	3.69	1022.33
62	310	5.17	3.6	1.352	0.14	0.24	1.21	4.36	1225.15
63	315	5.25	3.9	1.465	0.14	0.26	1.32	4.77	1346.85
64	320	5.33	4.2	1.578	0.14	0.28	1.44	5.17	1468.54
65	325	5.42	4.7	1.765	0.14	0.32	1.62	5.85	1671.36
66	330	5.50	5.6	2.103	0.14	0.38	1.96	7.07	2036.45
67	335	5.58	1.9	0.714	0.14	0.13	0.57	2.06	535.55
68	340	5.67	0.9	0.338	0.14	0.06	0.20	0.71	129.90
69	345	5.75	0.6	0.225	0.14	0.04	0.08	0.31	8.21
70	350	5.83	0.5	0.188	0.14	0.03	0.05	0.17	0.00
71	355	5.92	0.3	0.113	0.14	0.02	0.09	0.33	16.46
72	360	6.00	0.2	0.075	0.14	0.01	0.06	0.22	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.31
FLOOD VOLUME (acft)	0.69
FLOOD VOLUME (cuft)	30148.21
REQUIRED STORAGE (acft)	0.55
REQUIRED STORAGE (cuft)	23980.45
PEAK FLOW RATE (cfs)	7.07

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN E BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			3.600	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.1406		
LAG TIME - MINUTES			1.75	MINIMUM LOSS RATE (for var. loss) - in/hr			0.070		
UNIT TIME-PERCENT OF LAG			858.4	LOW LOSS RATE - DECIMAL			0.18		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00130		
				PERCOLATION RATE (cfs)			0.28		
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.040	0.248	0.007	0.033	0.12	0.00
2	30	0.50	0.3	0.061	0.245	0.011	0.050	0.18	0.00
3	45	0.75	0.3	0.061	0.243	0.011	0.050	0.18	0.00
4	60	1.00	0.4	0.081	0.240	0.015	0.066	0.24	0.00
5	75	1.25	0.3	0.061	0.237	0.011	0.050	0.18	0.00
6	90	1.50	0.3	0.061	0.234	0.011	0.050	0.18	0.00
7	105	1.75	0.3	0.061	0.231	0.011	0.050	0.18	0.00
8	120	2.00	0.4	0.081	0.228	0.015	0.066	0.24	0.00
9	135	2.25	0.4	0.081	0.226	0.015	0.066	0.24	0.00
10	150	2.50	0.4	0.081	0.223	0.015	0.066	0.24	0.00
11	165	2.75	0.5	0.101	0.220	0.018	0.083	0.30	18.87
12	180	3.00	0.5	0.101	0.218	0.018	0.083	0.30	18.87
13	195	3.25	0.5	0.101	0.215	0.018	0.083	0.30	18.87
14	210	3.50	0.5	0.101	0.212	0.018	0.083	0.30	18.87
15	225	3.75	0.5	0.101	0.210	0.018	0.083	0.30	18.87
16	240	4.00	0.6	0.121	0.207	0.022	0.100	0.36	72.64
17	255	4.25	0.6	0.121	0.204	0.022	0.100	0.36	72.64
18	270	4.50	0.7	0.142	0.202	0.026	0.116	0.42	126.42
19	285	4.75	0.7	0.142	0.199	0.026	0.116	0.42	126.42
20	300	5.00	0.8	0.162	0.196	0.029	0.133	0.48	180.19
21	315	5.25	0.6	0.121	0.194	0.022	0.100	0.36	72.64
22	330	5.50	0.7	0.142	0.191	0.026	0.116	0.42	126.42
23	345	5.75	0.8	0.162	0.189	0.029	0.133	0.48	180.19
24	360	6.00	0.8	0.162	0.186	0.029	0.133	0.48	180.19
25	375	6.25	0.9	0.182	0.184	0.033	0.149	0.54	233.96
26	390	6.50	0.9	0.182	0.181	0.033	0.001	0.00	0.00
27	405	6.75	1.0	0.202	0.179	0.036	0.023	0.08	0.00
28	420	7.00	1.0	0.202	0.177	0.036	0.026	0.09	0.00
29	435	7.25	1.0	0.202	0.174	0.036	0.028	0.10	0.00
30	450	7.50	1.1	0.223	0.172	0.040	0.051	0.18	0.00
31	465	7.75	1.2	0.243	0.170	0.044	0.073	0.26	0.00
32	480	8.00	1.3	0.263	0.167	0.047	0.096	0.35	60.88
33	495	8.25	1.5	0.304	0.165	0.055	0.139	0.50	199.55
34	510	8.50	1.5	0.304	0.163	0.055	0.141	0.51	206.99
35	525	8.75	1.6	0.324	0.160	0.058	0.164	0.59	279.95
36	540	9.00	1.7	0.344	0.158	0.062	0.186	0.67	352.84
37	555	9.25	1.9	0.385	0.156	0.069	0.229	0.82	491.24
38	570	9.50	2.0	0.405	0.154	0.073	0.251	0.90	564.00
39	585	9.75	2.1	0.425	0.151	0.077	0.274	0.99	636.69
40	600	10.00	2.2	0.445	0.149	0.080	0.296	1.07	709.32
41	615	10.25	1.5	0.304	0.147	0.055	0.157	0.56	257.25
42	630	10.50	1.5	0.304	0.145	0.055	0.159	0.57	264.16
43	645	10.75	2.0	0.405	0.143	0.073	0.262	0.94	598.89
44	660	11.00	2.0	0.405	0.141	0.073	0.264	0.95	605.66
45	675	11.25	1.9	0.385	0.139	0.069	0.246	0.89	546.78
46	690	11.50	1.9	0.385	0.137	0.069	0.248	0.89	553.41
47	705	11.75	1.7	0.344	0.135	0.062	0.210	0.75	428.81
48	720	12.00	1.8	0.364	0.133	0.066	0.232	0.83	500.87
49	735	12.25	2.5	0.506	0.131	0.091	0.375	1.35	966.33
50	750	12.50	2.6	0.526	0.129	0.095	0.398	1.43	1038.24
51	765	12.75	2.8	0.567	0.127	0.102	0.440	1.58	1175.66
52	780	13.00	2.9	0.587	0.125	0.106	0.462	1.66	1247.43
53	795	13.25	3.4	0.688	0.123	0.124	0.565	2.03	1581.43
54	810	13.50	3.4	0.688	0.121	0.124	0.567	2.04	1587.46
55	825	13.75	2.3	0.466	0.119	0.084	0.346	1.25	872.06
56	840	14.00	2.3	0.466	0.117	0.084	0.348	1.25	877.94
57	855	14.25	2.7	0.546	0.116	0.098	0.431	1.55	1146.05
58	870	14.50	2.6	0.526	0.114	0.095	0.412	1.48	1086.19
59	885	14.75	2.6	0.526	0.112	0.095	0.414	1.49	1091.83
60	900	15.00	2.5	0.506	0.110	0.091	0.396	1.42	1031.81

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN E BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			3.600	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.1406		
LAG TIME - MINUTES			1.75	MINIMUM LOSS RATE (for var. loss) - in/hr			0.070		
UNIT TIME-PERCENT OF LAG			858.4	LOW LOSS RATE - DECIMAL			0.18		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00130		
				PERCOLATION RATE (cfs)			0.28		
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
61	915	15.25	2.4	0.486	0.109	0.087	0.377	1.36	971.71
62	930	15.50	2.3	0.466	0.107	0.084	0.358	1.29	911.52
63	945	15.75	1.9	0.385	0.105	0.069	0.279	1.01	654.51
64	960	16.00	1.9	0.385	0.104	0.069	0.281	1.01	659.73
65	975	16.25	0.4	0.081	0.102	0.015	0.066	0.24	0.00
66	990	16.50	0.4	0.081	0.101	0.015	0.066	0.24	0.00
67	1005	16.75	0.3	0.061	0.099	0.011	0.050	0.18	0.00
68	1020	17.00	0.3	0.061	0.098	0.011	0.050	0.18	0.00
69	1035	17.25	0.5	0.101	0.096	0.018	0.005	0.02	0.00
70	1050	17.50	0.5	0.101	0.095	0.018	0.006	0.02	0.00
71	1065	17.75	0.5	0.101	0.093	0.018	0.008	0.03	0.00
72	1080	18.00	0.4	0.081	0.092	0.015	0.066	0.24	0.00
73	1095	18.25	0.4	0.081	0.091	0.015	0.066	0.24	0.00
74	1110	18.50	0.4	0.081	0.089	0.015	0.066	0.24	0.00
75	1125	18.75	0.3	0.061	0.088	0.011	0.050	0.18	0.00
76	1140	19.00	0.2	0.040	0.087	0.007	0.033	0.12	0.00
77	1155	19.25	0.3	0.061	0.085	0.011	0.050	0.18	0.00
78	1170	19.50	0.4	0.081	0.084	0.015	0.066	0.24	0.00
79	1185	19.75	0.3	0.061	0.083	0.011	0.050	0.18	0.00
80	1200	20.00	0.2	0.040	0.082	0.007	0.033	0.12	0.00
81	1215	20.25	0.3	0.061	0.081	0.011	0.050	0.18	0.00
82	1230	20.50	0.3	0.061	0.080	0.011	0.050	0.18	0.00
83	1245	20.75	0.3	0.061	0.079	0.011	0.050	0.18	0.00
84	1260	21.00	0.2	0.040	0.078	0.007	0.033	0.12	0.00
85	1275	21.25	0.3	0.061	0.077	0.011	0.050	0.18	0.00
86	1290	21.50	0.2	0.040	0.076	0.007	0.033	0.12	0.00
87	1305	21.75	0.3	0.061	0.075	0.011	0.050	0.18	0.00
88	1320	22.00	0.2	0.040	0.074	0.007	0.033	0.12	0.00
89	1335	22.25	0.3	0.061	0.074	0.011	0.050	0.18	0.00
90	1350	22.50	0.2	0.040	0.073	0.007	0.033	0.12	0.00
91	1365	22.75	0.2	0.040	0.072	0.007	0.033	0.12	0.00
92	1380	23.00	0.2	0.040	0.072	0.007	0.033	0.12	0.00
93	1395	23.25	0.2	0.040	0.071	0.007	0.033	0.12	0.00
94	1410	23.50	0.2	0.040	0.071	0.007	0.033	0.12	0.00
95	1425	23.75	0.2	0.040	0.071	0.007	0.033	0.12	0.00
96	1440	24.00	0.2	0.040	0.070	0.007	0.033	0.12	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	3.43
FLOOD VOLUME (acft)	1.03
FLOOD VOLUME (cuft)	44842.06
REQUIRED STORAGE (acft)	0.59
REQUIRED STORAGE (cuft)	25623.26
PEAK FLOW (cfs)	2.04

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN E

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
345	0	0		6000	0	0	0.00
346	1	1	0	6000	6000	6000	0.14
347	1	2	0	6000	6000	12000	0.28
348	1	3	0	6000	6000	18000	0.41
349	1	4	0	6000	6000	24000	0.55
350	1	5	0	6000	6000	30000	0.69

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	0.27778	cfs
MAXWELL IV DRYWELLS			
NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		0.27778	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	25623	cu ft (100-yr 24-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	0.27778	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**26**	hrs < 36 hrs

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.85	256	256	83	173	345.03	173	0.00
2	10	0.85	256	428	83	345	345.06	345	0.01
3	15	0.64	193	538	83	455	345.08	455	0.01
4	20	1.06	319	773	83	690	345.12	690	0.02
5	25	1.06	319	1,009	83	925	345.15	925	0.02
6	30	1.38	413	1,338	83	1,255	345.21	1,255	0.03
7	35	1.06	319	1,573	83	1,490	345.25	1,490	0.03
8	40	1.38	413	1,903	83	1,819	345.30	1,819	0.04
9	45	1.38	413	2,232	83	2,149	345.36	2,149	0.05
10	50	1.06	319	2,467	83	2,384	345.40	2,384	0.05
11	55	1.17	350	2,734	83	2,651	345.44	2,651	0.06
12	60	1.38	413	3,063	83	2,980	345.50	2,980	0.07
13	65	1.79	538	3,518	83	3,435	345.57	3,435	0.08
14	70	1.79	538	3,973	83	3,890	345.65	3,890	0.09
15	75	1.79	538	4,428	83	4,344	345.72	4,344	0.10
16	80	1.58	475	4,820	83	4,737	345.79	4,737	0.11
17	85	2.21	664	5,400	83	5,317	345.89	5,317	0.12
18	90	2.32	695	6,012	83	5,928	345.99	5,928	0.14
19	95	2.00	601	6,529	83	6,446	346.07	6,446	0.15
20	100	2.32	695	7,141	83	7,058	346.18	7,058	0.16
21	105	2.94	883	7,941	83	7,857	346.31	7,857	0.18
22	110	2.73	820	8,678	83	8,594	346.43	8,594	0.20
23	115	2.53	758	9,352	83	9,269	346.54	9,269	0.21
24	120	2.63	789	10,058	83	9,975	346.66	9,975	0.23
25	125	2.73	820	10,795	83	10,712	346.79	10,712	0.25
26	130	3.88	1,165	11,877	83	11,794	346.97	11,794	0.27
27	135	4.72	1,416	13,210	83	13,127	347.19	13,127	0.30
28	140	3.15	946	14,073	83	13,989	347.33	13,989	0.32
29	145	6.60	1,981	15,970	83	15,887	347.65	15,887	0.36
30	150	7.13	2,138	18,024	83	17,941	347.99	17,941	0.41
31	155	8.07	2,420	20,361	83	20,278	348.38	20,278	0.47
32	160	5.66	1,699	21,976	83	21,893	348.65	21,893	0.50
33	165	1.58	475	22,368	83	22,285	348.71	22,285	0.51
34	170	1.38	413	22,698	83	22,614	348.77	22,614	0.52
35	175	1.38	413	23,027	83	22,944	348.82	22,944	0.53
36	180	0.12	36	22,980	83	22,897	348.82	22,897	0.53

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	51	51	83	-	345.00	-	0.00
2	10	0.31	92	92	83	8	345.00	8	0.00
3	15	0.31	92	100	83	16	345.00	16	0.00
4	20	0.31	92	108	83	25	345.00	25	0.00
5	25	0.31	92	116	83	33	345.01	33	0.00
6	30	0.44	132	165	83	82	345.01	82	0.00
7	35	0.44	132	214	83	130	345.02	130	0.00
8	40	0.44	132	262	83	179	345.03	179	0.00
9	45	0.44	132	311	83	228	345.04	228	0.01
10	50	0.44	132	360	83	277	345.05	277	0.01
11	55	0.44	132	409	83	325	345.05	325	0.01
12	60	0.58	173	498	83	415	345.07	415	0.01
13	65	0.58	173	587	83	504	345.08	504	0.01
14	70	0.58	173	677	83	593	345.10	593	0.01
15	75	0.58	173	766	83	683	345.11	683	0.02
16	80	0.58	173	855	83	772	345.13	772	0.02
17	85	0.58	173	945	83	861	345.14	861	0.02
18	90	0.58	173	1,034	83	951	345.16	951	0.02
19	95	0.58	173	1,123	83	1,040	345.17	1,040	0.02
20	100	0.58	173	1,213	83	1,129	345.19	1,129	0.03
21	105	0.58	173	1,302	83	1,219	345.20	1,219	0.03
22	110	0.58	173	1,392	83	1,308	345.22	1,308	0.03
23	115	0.58	173	1,481	83	1,398	345.23	1,398	0.03
24	120	0.71	213	1,611	83	1,527	345.25	1,527	0.04
25	125	0.58	173	1,700	83	1,617	345.27	1,617	0.04
26	130	0.71	213	1,830	83	1,747	345.29	1,747	0.04
27	135	0.71	213	1,960	83	1,877	345.31	1,877	0.04
28	140	0.71	213	2,090	83	2,006	345.33	2,006	0.05
29	145	0.71	213	2,220	83	2,136	345.36	2,136	0.05
30	150	0.71	213	2,350	83	2,266	345.38	2,266	0.05
31	155	0.71	213	2,479	83	2,396	345.40	2,396	0.06
32	160	0.71	213	2,609	83	2,526	345.42	2,526	0.06
33	165	0.85	254	2,780	83	2,697	345.45	2,697	0.06
34	170	0.85	254	2,950	83	2,867	345.48	2,867	0.07
35	175	0.85	254	3,121	83	3,037	345.51	3,037	0.07
36	180	0.85	254	3,291	83	3,208	345.53	3,208	0.07
37	185	0.85	254	3,462	83	3,378	345.56	3,378	0.08
38	190	0.98	294	3,673	83	3,589	345.60	3,589	0.08
39	195	0.98	294	3,884	83	3,800	345.63	3,800	0.09
40	200	0.98	294	4,095	83	4,011	345.67	4,011	0.09
41	205	1.12	335	4,346	83	4,263	345.71	4,263	0.10
42	210	1.25	375	4,639	83	4,555	345.76	4,555	0.10
43	215	1.39	416	4,971	83	4,888	345.81	4,888	0.11
44	220	1.39	416	5,304	83	5,221	345.87	5,221	0.12
45	225	1.52	457	5,677	83	5,594	345.93	5,594	0.13
46	230	1.52	457	6,051	83	5,967	345.99	5,967	0.14
47	235	1.66	497	6,464	83	6,381	346.06	6,381	0.15
48	240	1.66	497	6,878	83	6,795	346.13	6,795	0.16
49	245	1.79	538	7,333	83	7,249	346.21	7,249	0.17
50	250	1.93	578	7,828	83	7,744	346.29	7,744	0.18
51	255	2.06	619	8,363	83	8,280	346.38	8,280	0.19
52	260	2.20	659	8,939	83	8,856	346.48	8,856	0.20
53	265	2.33	700	9,556	83	9,473	346.58	9,473	0.22
54	270	2.33	700	10,173	83	10,089	346.68	10,089	0.23
55	275	2.47	741	10,830	83	10,747	346.79	10,747	0.25

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	2.60	781	11,528	83	11,444	346.91	11,444	0.26
57	285	2.74	822	12,266	83	12,183	347.03	12,183	0.28
58	290	2.74	822	13,005	83	12,921	347.15	12,921	0.30
59	295	2.87	862	13,783	83	13,700	347.28	13,700	0.31
60	300	3.01	903	14,603	83	14,520	347.42	14,520	0.33
61	305	3.69	1,106	15,625	83	15,542	347.59	15,542	0.36
62	310	4.36	1,308	16,850	83	16,767	347.79	16,767	0.38
63	315	4.77	1,430	18,197	83	18,114	348.02	18,114	0.42
64	320	5.17	1,552	19,666	83	19,583	348.26	19,583	0.45
65	325	5.85	1,755	21,337	83	21,254	348.54	21,254	0.49
66	330	7.07	2,120	23,374	83	23,290	348.88	23,290	0.53
67	335	2.06	619	23,909	83	23,826	348.97	23,826	0.55
68	340	0.71	213	24,039	83	23,956	348.99	23,956	0.55
69	345	0.31	92	24,047	83	23,964	348.99	23,964	0.55
70	350	0.17	51	24,015	83	23,932	348.99	23,932	0.55
71	355	0.33	100	24,031	83	23,948	348.99	23,948	0.55
72	360	0.22	67	24,015	83	23,931	348.99	23,931	0.55

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.12	108	108	250	-	345.00	-	0.00
2	30	0.18	161	161	250	-	345.00	-	0.00
3	45	0.18	161	161	250	-	345.00	-	0.00
4	60	0.24	215	215	250	-	345.00	-	0.00
5	75	0.18	161	161	250	-	345.00	-	0.00
6	90	0.18	161	161	250	-	345.00	-	0.00
7	105	0.18	161	161	250	-	345.00	-	0.00
8	120	0.24	215	215	250	-	345.00	-	0.00
9	135	0.24	215	215	250	-	345.00	-	0.00
10	150	0.24	215	215	250	-	345.00	-	0.00
11	165	0.30	269	269	250	19	345.00	19	0.00
12	180	0.30	269	288	250	38	345.01	38	0.00
13	195	0.30	269	307	250	57	345.01	57	0.00
14	210	0.30	269	325	250	75	345.01	75	0.00
15	225	0.30	269	344	250	94	345.02	94	0.00
16	240	0.36	323	417	250	167	345.03	167	0.00
17	255	0.36	323	490	250	240	345.04	240	0.01
18	270	0.42	376	616	250	366	345.06	366	0.01
19	285	0.42	376	742	250	492	345.08	492	0.01
20	300	0.48	430	923	250	673	345.11	673	0.02
21	315	0.36	323	995	250	745	345.12	745	0.02
22	330	0.42	376	1,122	250	872	345.15	872	0.02
23	345	0.48	430	1,302	250	1,052	345.18	1,052	0.02
24	360	0.48	430	1,482	250	1,232	345.21	1,232	0.03
25	375	0.54	484	1,716	250	1,466	345.24	1,466	0.03
26	390	0.00	2	1,468	250	1,218	345.20	1,218	0.03
27	405	0.08	76	1,294	250	1,044	345.17	1,044	0.02
28	420	0.09	83	1,127	250	877	345.15	877	0.02
29	435	0.10	91	969	250	719	345.12	719	0.02
30	450	0.18	165	883	250	633	345.11	633	0.01
31	465	0.26	238	871	250	621	345.10	621	0.01
32	480	0.35	311	932	250	682	345.11	682	0.02
33	495	0.50	450	1,131	250	881	345.15	881	0.02
34	510	0.51	457	1,338	250	1,088	345.18	1,088	0.02
35	525	0.59	530	1,618	250	1,368	345.23	1,368	0.03
36	540	0.67	603	1,971	250	1,721	345.29	1,721	0.04
37	555	0.82	741	2,462	250	2,212	345.37	2,212	0.05
38	570	0.90	814	3,026	250	2,776	345.46	2,776	0.06
39	585	0.99	887	3,663	250	3,413	345.57	3,413	0.08
40	600	1.07	959	4,372	250	4,122	345.69	4,122	0.09
41	615	0.56	507	4,630	250	4,380	345.73	4,380	0.10
42	630	0.57	514	4,894	250	4,644	345.77	4,644	0.11
43	645	0.94	849	5,493	250	5,243	345.87	5,243	0.12
44	660	0.95	856	6,098	250	5,848	345.97	5,848	0.13
45	675	0.89	797	6,645	250	6,395	346.07	6,395	0.15
46	690	0.89	803	7,198	250	6,948	346.16	6,948	0.16
47	705	0.75	679	7,627	250	7,377	346.23	7,377	0.17
48	720	0.83	751	8,128	250	7,878	346.31	7,878	0.18
49	735	1.35	1,216	9,094	250	8,844	346.47	8,844	0.20
50	750	1.43	1,288	10,133	250	9,883	346.65	9,883	0.23
51	765	1.58	1,426	11,308	250	11,058	346.84	11,058	0.25
52	780	1.66	1,497	12,556	250	12,306	347.05	12,306	0.28
53	795	2.03	1,831	14,137	250	13,887	347.31	13,887	0.32
54	810	2.04	1,837	15,725	250	15,475	347.58	15,475	0.36
55	825	1.25	1,122	16,597	250	16,347	347.72	16,347	0.38
56	840	1.25	1,128	17,475	250	17,225	347.87	17,225	0.40
57	855	1.55	1,396	18,621	250	18,371	348.06	18,371	0.42
58	870	1.48	1,336	19,707	250	19,457	348.24	19,457	0.45

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	1.49	1,342	20,799	250	20,549	348.42	20,549	0.47
60	900	1.42	1,282	21,831	250	21,581	348.60	21,581	0.50
61	915	1.36	1,222	22,802	250	22,552	348.76	22,552	0.52
62	930	1.29	1,162	23,714	250	23,464	348.91	23,464	0.54
63	945	1.01	905	24,368	250	24,118	349.02	24,118	0.55
64	960	1.01	910	25,028	250	24,778	349.13	24,778	0.57
65	975	0.24	215	24,993	250	24,743	349.12	24,743	0.57
66	990	0.24	215	24,958	250	24,708	349.12	24,708	0.57
67	1005	0.18	161	24,870	250	24,620	349.10	24,620	0.57
68	1020	0.18	161	24,781	250	24,531	349.09	24,531	0.56
69	1035	0.02	16	24,547	250	24,297	349.05	24,297	0.56
70	1050	0.02	21	24,318	250	24,068	349.01	24,068	0.55
71	1065	0.03	26	24,094	250	23,844	348.97	23,844	0.55
72	1080	0.24	215	24,059	250	23,809	348.97	23,809	0.55
73	1095	0.24	215	24,024	250	23,774	348.96	23,774	0.55
74	1110	0.24	215	23,989	250	23,739	348.96	23,739	0.54
75	1125	0.18	161	23,901	250	23,651	348.94	23,651	0.54
76	1140	0.12	108	23,758	250	23,508	348.92	23,508	0.54
77	1155	0.18	161	23,669	250	23,419	348.90	23,419	0.54
78	1170	0.24	215	23,634	250	23,384	348.90	23,384	0.54
79	1185	0.18	161	23,546	250	23,296	348.88	23,296	0.53
80	1200	0.12	108	23,403	250	23,153	348.86	23,153	0.53
81	1215	0.18	161	23,315	250	23,065	348.84	23,065	0.53
82	1230	0.18	161	23,226	250	22,976	348.83	22,976	0.53
83	1245	0.18	161	23,137	250	22,887	348.81	22,887	0.53
84	1260	0.12	108	22,995	250	22,745	348.79	22,745	0.52
85	1275	0.18	161	22,906	250	22,656	348.78	22,656	0.52
86	1290	0.12	108	22,764	250	22,514	348.75	22,514	0.52
87	1305	0.18	161	22,675	250	22,425	348.74	22,425	0.51
88	1320	0.12	108	22,533	250	22,283	348.71	22,283	0.51
89	1335	0.18	161	22,444	250	22,194	348.70	22,194	0.51
90	1350	0.12	108	22,301	250	22,051	348.68	22,051	0.51
91	1365	0.12	108	22,159	250	21,909	348.65	21,909	0.50
92	1380	0.12	108	22,017	250	21,767	348.63	21,767	0.50
93	1395	0.12	108	21,874	250	21,624	348.60	21,624	0.50
94	1410	0.12	108	21,732	250	21,482	348.58	21,482	0.49
95	1425	0.12	108	21,589	250	21,339	348.56	21,339	0.49
96	1440	0.12	108	21,447	250	21,197	348.53	21,197	0.49

EXHIBIT “A”

PROPOSED CONDITION HYDROLOGY MAP

DRAINAGE BOUNDARY

X
3.85

DRNG AREA ID

AREA IN ACRES

CATCH BASIN

SD

STORM DRAIN

A
26.34

B
1.07

C
1.24

D
3.85

E
3.60

STORAGE CHAMBER

BASIN "A"
BOTTOM=57.5
(AREA=3051.34 SF.)

BASIN "B"
BOTTOM=44.0
(AREA=28167.66 SF.)

TRACT BOUNDARY

1' TO 3' MAX. RETAINING WALL

4' RETAINING WALL

HEADWALL OUTLET STRUCTURE

2:1 SLOPE

SWIMMING POOL

Drive

Palm

N

0 20' 40' 80'
SCALE: 1"=40'

UNIT HYDROGRAPH
HYDROLOGY EXHIBIT
GREEN DAY VILLAGE, DHS CA

APPENDIX A
Rainfall and Soil Data and E Plates

NOAA Atlas 14, Volume 6, Version 2
Location name: Desert Hot Springs, California, USA*
Latitude: 33.9134°, Longitude: -116.5046°
Elevation: 767.88 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.079 (0.066-0.096)	0.115 (0.095-0.139)	0.168 (0.139-0.204)	0.215 (0.177-0.265)	0.288 (0.229-0.367)	0.351 (0.273-0.457)	0.422 (0.320-0.563)	0.503 (0.371-0.690)	0.627 (0.444-0.896)	0.737 (0.503-1.09)
10-min	0.113 (0.094-0.137)	0.164 (0.137-0.200)	0.240 (0.199-0.293)	0.309 (0.253-0.379)	0.413 (0.328-0.526)	0.504 (0.392-0.654)	0.606 (0.459-0.806)	0.722 (0.532-0.988)	0.899 (0.636-1.29)	1.06 (0.722-1.56)
15-min	0.137 (0.114-0.166)	0.199 (0.165-0.242)	0.290 (0.241-0.354)	0.373 (0.307-0.459)	0.500 (0.397-0.636)	0.609 (0.474-0.791)	0.732 (0.556-0.975)	0.873 (0.643-1.20)	1.09 (0.769-1.55)	1.28 (0.873-1.89)
30-min	0.212 (0.177-0.258)	0.309 (0.257-0.376)	0.451 (0.374-0.550)	0.580 (0.476-0.713)	0.777 (0.617-0.988)	0.947 (0.736-1.23)	1.14 (0.863-1.52)	1.36 (1.00-1.86)	1.69 (1.20-2.42)	1.99 (1.36-2.94)
60-min	0.308 (0.256-0.374)	0.448 (0.372-0.544)	0.654 (0.542-0.797)	0.840 (0.690-1.03)	1.13 (0.894-1.43)	1.37 (1.07-1.78)	1.65 (1.25-2.20)	1.97 (1.45-2.69)	2.45 (1.73-3.50)	2.88 (1.97-4.26)
2-hr	0.423 (0.352-0.513)	0.597 (0.496-0.726)	0.852 (0.706-1.04)	1.08 (0.889-1.33)	1.43 (1.14-1.82)	1.73 (1.34-2.25)	2.06 (1.56-2.74)	2.44 (1.80-3.34)	3.00 (2.12-4.29)	3.49 (2.38-5.16)
3-hr	0.512 (0.426-0.622)	0.718 (0.596-0.873)	1.02 (0.843-1.24)	1.29 (1.06-1.58)	1.69 (1.34-2.15)	2.04 (1.59-2.65)	2.42 (1.84-3.23)	2.86 (2.11-3.91)	3.51 (2.48-5.01)	4.06 (2.78-6.01)
6-hr	0.670 (0.558-0.814)	0.939 (0.780-1.14)	1.33 (1.10-1.62)	1.68 (1.38-2.06)	2.20 (1.75-2.79)	2.64 (2.05-3.43)	3.13 (2.37-4.17)	3.68 (2.71-5.04)	4.50 (3.18-6.43)	5.20 (3.55-7.70)
12-hr	0.817 (0.680-0.992)	1.17 (0.973-1.42)	1.68 (1.39-2.05)	2.13 (1.75-2.62)	2.81 (2.23-3.57)	3.38 (2.63-4.39)	4.01 (3.04-5.34)	4.71 (3.48-6.46)	5.77 (4.08-8.24)	6.67 (4.55-9.86)
24-hr	0.963 (0.853-1.11)	1.42 (1.26-1.64)	2.08 (1.84-2.41)	2.66 (2.33-3.11)	3.53 (2.99-4.25)	4.25 (3.53-5.23)	5.06 (4.10-6.36)	5.95 (4.70-7.70)	7.29 (5.53-9.82)	8.44 (6.19-11.8)
2-day	1.06 (0.935-1.22)	1.59 (1.41-1.84)	2.37 (2.09-2.74)	3.05 (2.66-3.55)	4.05 (3.43-4.88)	4.90 (4.07-6.02)	5.83 (4.73-7.34)	6.87 (5.42-8.89)	8.42 (6.38-11.3)	9.74 (7.14-13.6)
3-day	1.10 (0.972-1.26)	1.67 (1.48-1.93)	2.51 (2.21-2.90)	3.24 (2.83-3.78)	4.32 (3.66-5.20)	5.23 (4.34-6.43)	6.23 (5.05-7.84)	7.35 (5.80-9.50)	9.01 (6.83-12.1)	10.4 (7.64-14.5)
4-day	1.13 (1.00-1.31)	1.74 (1.54-2.01)	2.62 (2.31-3.04)	3.40 (2.97-3.96)	4.54 (3.85-5.47)	5.51 (4.57-6.77)	6.56 (5.32-8.26)	7.74 (6.11-10.0)	9.49 (7.19-12.8)	11.0 (8.04-15.3)
7-day	1.24 (1.10-1.43)	1.94 (1.72-2.24)	2.95 (2.60-3.41)	3.84 (3.36-4.48)	5.16 (4.37-6.21)	6.26 (5.19-7.69)	7.46 (6.05-9.38)	8.79 (6.93-11.4)	10.7 (8.15-14.5)	12.4 (9.09-17.3)
10-day	1.31 (1.16-1.50)	2.06 (1.82-2.37)	3.14 (2.77-3.64)	4.10 (3.59-4.79)	5.53 (4.68-6.66)	6.72 (5.58-8.25)	8.01 (6.49-10.1)	9.44 (7.45-12.2)	11.5 (8.75-15.5)	13.3 (9.75-18.5)
20-day	1.43 (1.27-1.65)	2.28 (2.02-2.63)	3.53 (3.11-4.08)	4.63 (4.05-5.40)	6.28 (5.32-7.56)	7.65 (6.35-9.40)	9.15 (7.42-11.5)	10.8 (8.52-14.0)	13.2 (10.00-17.8)	15.2 (11.1-21.2)
30-day	1.61 (1.42-1.85)	2.56 (2.27-2.96)	3.98 (3.51-4.60)	5.23 (4.58-6.10)	7.11 (6.03-8.57)	8.69 (7.21-10.7)	10.4 (8.43-13.1)	12.3 (9.68-15.9)	15.0 (11.4-20.2)	17.3 (12.7-24.0)
45-day	1.77 (1.57-2.04)	2.83 (2.50-3.26)	4.39 (3.88-5.08)	5.80 (5.07-6.76)	7.92 (6.71-9.53)	9.70 (8.05-11.9)	11.6 (9.43-14.6)	13.7 (10.8-17.8)	16.8 (12.7-22.6)	19.3 (14.2-26.9)
60-day	1.94 (1.72-2.24)	3.09 (2.73-3.56)	4.80 (4.23-5.55)	6.34 (5.55-7.39)	8.66 (7.34-10.4)	10.6 (8.82-13.1)	12.8 (10.4-16.1)	15.1 (11.9-19.5)	18.5 (14.0-24.9)	21.2 (15.6-29.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

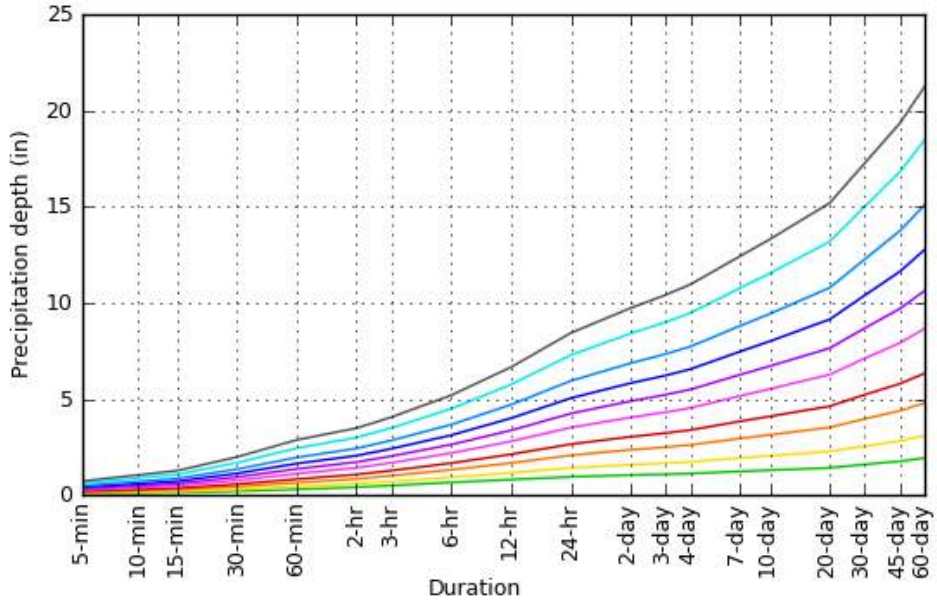
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

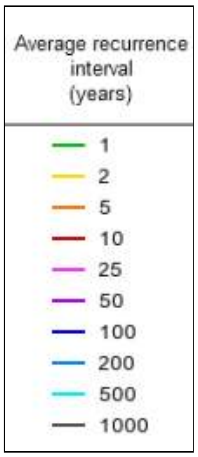
Please refer to NOAA Atlas 14 document for more information.

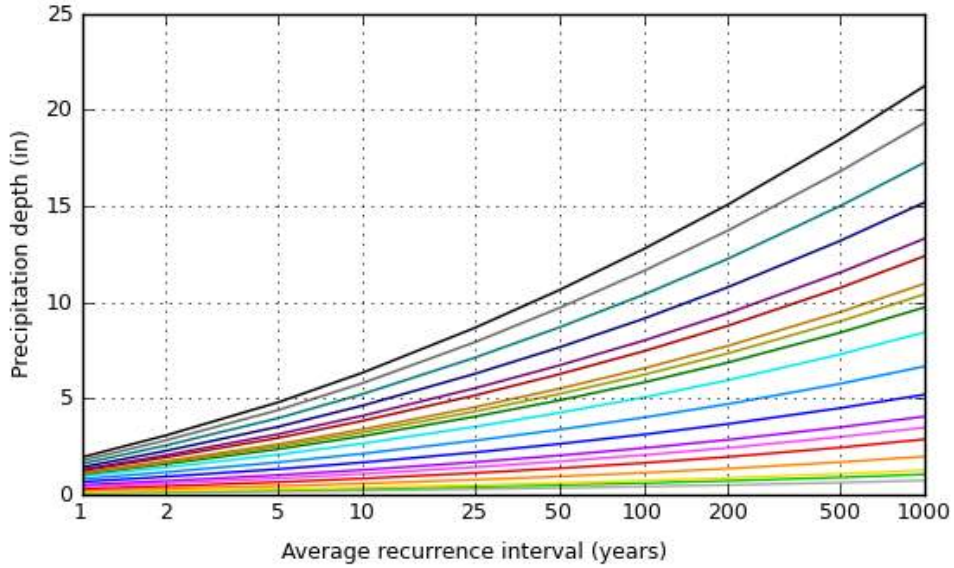
Back to Top

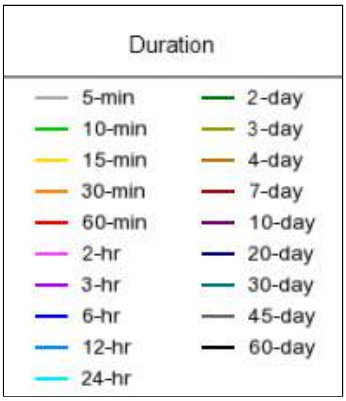
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.9134°, Longitude: -116.5046°









NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Mon Jun 13 02:24:57 2022

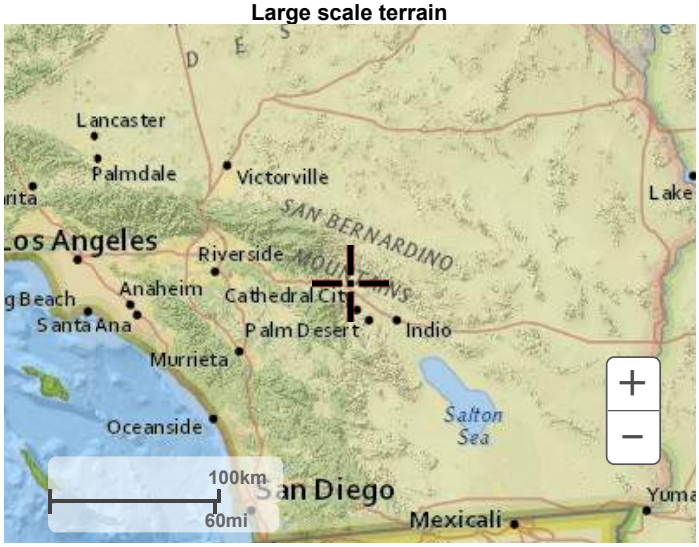
Back to Top

Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

United States Department of Agriculture

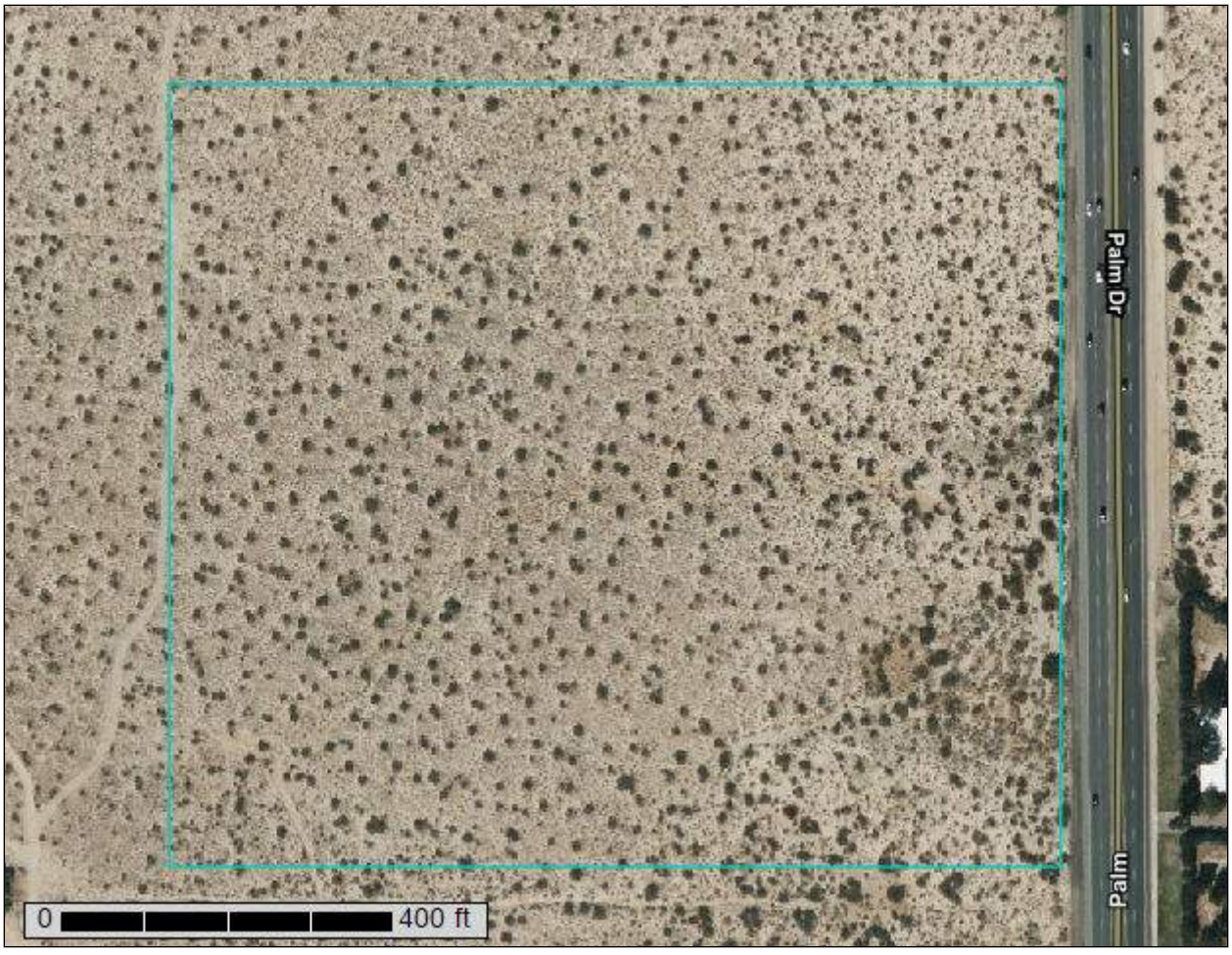
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Riverside County, Coachella Valley Area, California

Green day Village



June 12, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....12
Map Unit Descriptions.....12
Riverside County, Coachella Valley Area, California.....14
MaB—Myoma fine sand, 0 to 5 percent slopes.....14
MaD—Myoma fine sand, 5 to 15 percent slopes.....15
References.....17

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:2,430 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 13, Sep 15, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 3, 2021—May 27, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MaB	Myoma fine sand, 0 to 5 percent slopes	23.2	99.5%
MaD	Myoma fine sand, 5 to 15 percent slopes	0.1	0.5%
Totals for Area of Interest		**23.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Riverside County, Coachella Valley Area, California

MaB—Myoma fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hkw3
Elevation: -200 to 1,800 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 to 75 degrees F
Frost-free period: 270 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Myoma and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myoma

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind blown sandy alluvium

Typical profile

H1 - 0 to 18 inches: fine sand
H2 - 18 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R031XY007CA - Lacustrine Basin and Large RIver Floodplain
Hydric soil rating: No

Minor Components

Coachella

Percent of map unit: 4 percent

Hydric soil rating: No

Carsitas

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed, noncalcareous soils

Percent of map unit: 4 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Channels
Hydric soil rating: Yes

MaD—Myoma fine sand, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: hkw4
Elevation: -200 to 1,800 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 to 75 degrees F
Frost-free period: 270 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Myoma and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myoma

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind blown sandy alluvium

Typical profile

H1 - 0 to 18 inches: fine sand
H2 - 18 to 60 inches: sand

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R031XY007CA - Lacustrine Basin and Large RIver Floodplain
Hydric soil rating: No

Minor Components

Coachella

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed, calcareous soils

Percent of map unit: 5 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Channels
Hydric soil rating: Yes

Carsitas

Percent of map unit: 2 percent
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

RCFC & WCD
HYDROLOGY MANUAL

RUNOFF INDEX NUMBERS FOR PERVIOUS AREAS

PLATE E-6.1 (1 of 2)

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

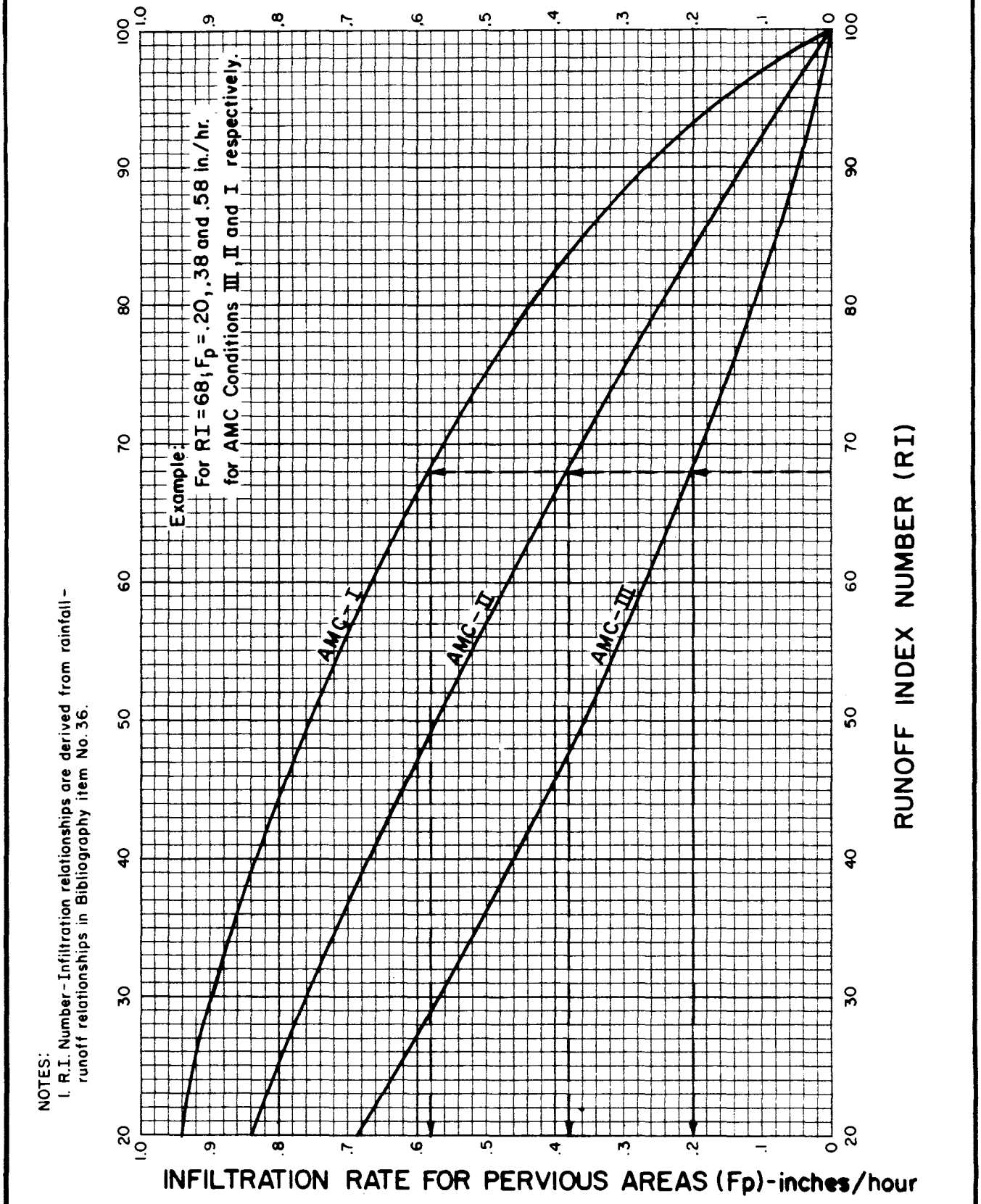
1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.

2. Quality of cover definitions:
   Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.

3. See Plate C-2 for a detailed description of cover types.

4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.

5. Reference Bibliography item 17.



NOTES:
1. R.I. Number-Infiltration relationships are derived from rainfall-runoff relationships in Bibliography item No. 36.

RCFC & WCD

HYDROLOGY MANUAL

INFILTRATION RATE FOR PERVIOUS AREAS VERSUS RUNOFF INDEX NUMBERS

PLATE E-6.2

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent(2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. (½ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.

3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

RCFC & WCD
HYDROLOGY MANUAL

IMPERVIOUS COVER FOR DEVELOPED AREAS

PLATE E-6.3

APPENDIX D1

CULTURAL RESOURCES SURVEY

PHASE I
CULTURAL RESOURCES SURVEY

GREEN DAY VILLAGE PROJECT
City of Desert Hot Springs, Riverside County, California

Prepared for:

Avraham Farzan, CEO
LA World Construction
2029 Century Park East, Suite 400
Century City, CA 90067

Prepared by:

UltraSystems Environmental Inc.
16431 Scientific Way
Irvine, CA 92618
(949) 788-4900

July 2022

Key Words: City of Desert Hot Springs; Riverside County; Desert Hot Springs, *Calif.* USGS Quadrangle; Pass Cahuilla; Negative Findings

PHASE I
CULTURAL RESOURCES SURVEY

FOR THE

GREEN DAY VILLAGE PROJECT
City of Desert Hot Springs, Riverside County, California

Avraham Farzan, CEO
LA World Construction
2029 Century Park East, Suite 400,
Century City, CA 90067

Prepared by:

Stephen O'Neil, M.A., RPA
Megan B. Doukakis, M.A.

July 2022

Prepared by: _____ Date: July 12, 2022
Stephen O'Neil, M.A., RPA
UltraSystems Environmental Inc.

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1
1.1 Overview 1-1

2.0 SETTINGS 2-1
2.1 Natural Setting 2-1
2.2 Cultural Setting 2-2
2.2.1 Prehistoric Context 2-2
2.2.2 Paleoindian Period (10,000-6000 B.C.) 2-2
2.2.3 Early Archaic or Pinto Period (6000-2000 B.C.) 2-2
2.2.4 Late Archaic or Gypsum Period (2000 B.C.-A.D. 500) 2-3
2.2.5 Late Prehistoric or Patayan Period (A.D. 500-Historic Contact) 2-3
2.2.6 Ethnohistoric Context 2-4
2.2.7 Local Settlement 2-7
2.2.8 Historic Context 2-7

3.0 RESEARCH METHODS 3-1
3.1 Records Search 3-1
3.2 Field Survey 3-1
3.3 Native American Outreach 3-1

4.0 FINDINGS 4-1
4.1 Records Search 4-1
4.1.1 Recorded Archaeological Sites 4-1
4.1.2 Previous Archaeological Investigations 4-3
4.2 Native American Outreach 4-5
4.3 Pedestrian Survey Results 4-7

5.0 MANAGEMENT CONSIDERATIONS 5-1
5.1 Site Evaluation Criteria 5-1
5.2 Potential Effects 5-1

6.0 CONCLUSIONS AND RECOMMENDATIONS 6-1

7.0 REFERENCES 7-1

TABLES

Table 4.1-1 - Known Cultural Resources Within a 0.5-Mile Radius of the APE 4-1
Table 4.1-2 - Known Cultural Resource Studies Within a 0.5-Mile Radius of the APE 4-4

FIGURES

Figure 4.1-1 - View from Northwest Corner; View to South 4-8
Figure 4.1-2 – Ground Surface in the Northeast Quarter; View to the South 4-9
Figure 4.1-3 – Vegetation with Creosote and Grass; View to the Southeast 4-10
Figure 4.1-4 – Wash Bed in Southeast Quarter; View to the North 4-11
Figure 5 - Project Regional Location Map ..... Attachment A - 2

Figure 6 - Project Study Area.....Attachment A - 3
Figure 7 - Project Study Topographic Map.....Attachment A - 4

ATTACHMENTS

Attachment A Project Maps
Attachment B Personnel Background
Attachment C Native American Heritage Commission Records Search and Native American Contacts
Attachment D CHRIS Records Search

1.0 INTRODUCTION

1.1 Overview

UltraSystems Environmental, Inc. (UltraSystems) conducted a Phase I cultural resources survey on behalf of LA World Construction in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue (**Attachment A**, **Figure 5** and **Figure 6**). This may be seen on the *Desert Hot Springs, Calif*., USGS topographical quadrangle, Range 05 East, Township 03 South, in the SE ¼ of the NW ¼ of Section 18 (**Attachment A**, **Figure 7**). The subject property is bordered on the north and west with open land. To the east of the project area is bordered by Palm Drive, beyond which is open land and the Desert Dunes Golf Club. To the south are scattered residential properties in otherwise open land (**Attachment A**, **Figure 6**).

A cultural resources record search, Native American consultations, and an intensive pedestrian cultural resources survey were undertaken by Stephen O'Neil, M.A., RPA, who qualifies as a Principal Prehistoric Archaeologist and Historic Archaeologist per United States Secretary of the Interior Standards (see **Attachment B**). The purpose of the records search was to identify previously-recorded cultural resources (prehistoric and historic archaeological sites, historic buildings, structures, objects, or districts) within the project area and a half-mile radius. The records search included a review of previously-recorded prehistoric and historic archaeological sites within the proposed project area and a 0.5-mile buffer, and a review of listed cultural resource surveys and/or excavation reports within that same geographical area. The research was conducted at the Eastern Information Center (EIC) at the University of California at Riverside, which is the local California Historic Resources Information System (CHRIS) Information Center. In addition, outreach to the Native American Heritage Commission and local Native American tribes was conducted.

Ms. Megan B. Doukakis, M.A., contacted the Native American Heritage Commission (NAHC) requesting a Sacred Lands File (SLF) search. The cultural resources record search was requested from the EIC by Ms. Doukakis. An intensive pedestrian cultural resources survey was conducted by Mr. O'Neil. (See **Attachment B**).

Disposition of Data

This report will be filed with the EIC, University of California, Riverside; LA World Construction; the City of Desert Hot Springs Planning Department; and UltraSystems Environmental, Inc., Irvine, California. All field notes and other documentation related to the study will remain on file at the Irvine office of UltraSystems

2.0 SETTINGS

2.1 Natural Setting

The project site is located in the City of Desert Hot Springs, which is shown on the *Desert Hot Springs, Calif*., USGS quadrangle map. Desert Hot Springs is bordered by the cities of Palm Springs to the southwest and Cathedral City to the southeast, and Riverside County jurisdiction lands to the west, north and east, all within in Riverside County. The project site is at an elevation ranging from approximately 740 to 770 feet, sloping to the south, with a knoll at the parcel's south-east edge. The city is served by Interstate 10.

The study area is located on the alluvial plain of Desert Hot Springs, south of the downtown area. The parcel is dry vacant desert land with a scattering of small rocks on a sandy floor, and desert shrub plant communities. In a larger context, the parcel is located in the upper Coachella Valley, northeast of the upper Salton Trough and near the base of the Little San Bernardino Mountains. The Coachella Valley is regarded as the northwest end of the Colorado Desert. The Salton Trough ranges in elevation from about 273 feet below mean sea level to 2,580 feet above mean sea level at the San Gorgonio Pass. To the southeast of the project site is the open Coachella Valley floor.

The Salton Trough is part of the Gulf of California rift and is surrounded by mountains uplifted during the Miocene and Pliocene (Dibblee 1954, Hamilton 1961). Approximately 4.4 million years ago, the Gulf extended up to the base of Mount San Jacinto to about as far north as the San Gorgonio Pass, likely placing the Desert Hot Springs area within the gulf waters (Quinn 2006). Fossil-bearing strata such as those containing sea turtle and whale remains testify to the presence of the gulf in the project area. In more recent geologic time, the Colorado River during heavy flooding events periodically broke through a barrier of sand and debris the river had formed that cut off this "bay" of the gulf, filling much of the basin with fresh water lakes. During wet climatic cycles, even without inflow from the Colorado River, the basin filled with shallow ephemeral lakes.

Over the millennia, many different lakes filled this basin. Over 500 years ago, the Salton Trough was covered in a great lake now referred to as Lake Cahuilla that extended from northern Indio to below the United States international border near Mexicali. The high watermark of this most recent aspect of the ancient lake (42 feet above mean sea level) can be seen along the northeastern shoreline, where mountain foothills are coated with mineral deposits (primarily tufa). This last great prehistoric lake had been relatively stable for about 500 years (AD 900-1500). It is thought that this last great lake evaporated, probably due to a change in course of the Colorado River, in less than one generation (60-80 years).

The project supports a Creosote Brush Scrub plant community (Munz and Keck 1973). See the Biological Resources Evaluation for the proposed project (UltraSystems, 2022) for further information the flora of the project site. Floral and faunal resources flourished in the dunes and thickets, providing important resources for prehistoric and Contact Period peoples (Bean and Saubel 1978).

Common native animals that are adapted to living in the Desert Hot Springs area include coyotes (*Canis latrans*), foxes (kit fox [*Vulpes macrotis*] and grey fox [*Urocyon cinereoargenteus]*), desert cottontail (*Sylvilagus audubonii*), black-tailed hare (*Lepus californicus*), various rats (i.e., kangaroo rats of three species and wood rats), several mice genera, and a host of birds, reptiles, and

amphibians. Prehistoric hunters would often bag small game animals and larger ones, including deer and bighorn sheep.

2.2 Cultural Setting

2.2.1 Prehistoric Context

The foothills of the Little San Bernardino Mountains and the desert floor of the Coachella Valley, the setting of Desert Hot Springs, are a part of the Cahuilla tribe's traditional lands. This region was occupied by the Pass Cahuilla, whose territory extended eastward through San Gorgonio Pass and the Coachella Valley as far as Indio (Bean et al. 1991). Therefore, the prehistory of that desert region is described here in the Prehistoric Background section. While there would have been influences from the southern California coastal region, early habitation of the surrounding Little San Bernardino and San Jacinto Mountains and Coachella Valley was predominantly desert oriented.

California's southern desert region has a long history of human occupation, with dates at the start of the early Holocene stretching back to circa 10,000 years Before Present (YBP) (Moratto 1984:96-97; Schaefer 1994:62). This now arid region includes the Colorado and Mojave Deserts, located east of the Sierra Nevada, Peninsular, and Transverse ranges. Prehistoric material in this region has been categorized according to periods or patterns that define technological, economic, social and ideological elements. Within these periods, archaeologists have defined patterns or complexes specific to prehistory within the desert region, including the current project area.

A cultural sequence for the Colorado Desert has been summarized by Schaefer (1994) under three major periods: Paleoindians, Archaic, and Late Prehistoric. These periods date between ca. 10,000-6000 B.C., 6000 B.C.-A.D. 500, and A.D. 500-Historic Contact, respectively. The introduction of pottery in this area separates the Archaic from the Late Prehistoric Period. The Archaic Period is divided here into Early and Late, dating between ca. 6000-2000 B.C. and 2000 B.C.-A.D. 500, respectively. In the Great Basin, the Archaic is also referred to as the Desert Culture (Jennings 1964; Warren 1967; Moratto 1984). Following numerous elements of earlier syntheses for California's desert region (e.g., Rogers 1929, 1939, 1966; Warren 1980, 1984), the cultural patterns within these broad periods are defined in this area as the San Dieguito Complex, Pinto Period, Gypsum Period, and Patayan Period. The Patayan Period is further subdivided into three periods, *Patayan I-III* (Rogers 1945; Waters 1982).

2.2.2 Paleoindian Period (10,000-6000 B.C.)

During the Paleoindian Period, in contrast to the dry climate of today, California's desert regions during the late Pleistocene and the early Holocene contained a series of large, pluvial lakes. Archaeological evidence suggests that early Holocene hunter-gathers of the desert region were well adapted to the wetland environments supported by the lakes. Sites were typically located on or near the shores of former pluvial lakes and marshes, and have artifact assemblages marked by their diversity of flaked-stone artifacts. Such sites, however, have not been documented for the Colorado Desert region, including the nearly 10,000-year-old pluvial shoreline of Lake LeConte (now referred to as Lake Cahuilla) (Moratto 1984:96).

2.2.3 Early Archaic or Pinto Period (6000-2000 B.C.)

As the environment transitioned from the pluvial conditions of the Pleistocene to the more arid Holocene climate, many of the lakes and wetlands present during the Paleoindian Period began to

dry up. By the Early Archaic or Pinto Period, many of these wetlands had disappeared. Desert populations appear to have adapted to these more arid conditions by withdrawing to the margins of the desert or concentrating around the few oases still present within it (Warren 1984:413-414). A brief period of moister conditions may have led to a temporary reoccupation of the desert region between 4500 and 3500 B.C. However, evidence from Mojave Desert and western Great Basin sites suggests that most Pinto Period sites were temporary, seasonal camps of small, highly mobile groups. Slab metates and manos (a milling stone set used to process hard seeds), shaped scrapers, and the Pinto projectile point characterize the artifact assemblages of the Pinto Basin Complex.

2.2.4 Late Archaic or Gypsum Period (2000 B.C.-A.D. 500)

The beginning of the Late Archaic or Gypsum Period coincides with the beginning of the Little Pluvial, a brief period of moister climatic conditions. By the second half of the Gypsum Period, arid conditions returned. Desert peoples appear to have been well adapted to the conditions by this time, however, and there was no notable drop in population. Gypsum Period sites are characterized by a wider range of diagnostic projectile points, such as Gypsum and Elko types, as well as split-twig figurines, the latter commonly preserved in caves (Warren 1984:416-417). While manos and metates continued to be employed, a new milling stone technology tool set, mortars and pestles, was introduced during this period. Warren (1984:419) suggests that mortars and pestles were used to process mesquite pods. Near the end of this period, the bow and arrow appear to have been introduced.

In the Coachella Valley, recent excavations at a dozen Late Archaic Period sites indicate occupation on the shores of Holocene Lake Cahuilla was restricted to specialized temporary camps, used for fishing, trapping, and gathering resources (Love and Dahdul 2002:81). In contrast, the range of types and density of artifacts at site CA-RIV-2936 suggest to Love and Dahdul a permanent or semi-permanent occupation occurred in an area that was not dependent on lacustrine resources. stopped

2.2.5 Late Prehistoric or Patayan Period (A.D. 500-Historic Contact)

The period from the end of the Archaic Period to European contact was a time of complex and ongoing change in material culture, burial practices, and subsistence focus. These changes most likely reflect both *in situ* cultural adaptations in response to shifts in environmental conditions, as well as influences from outside the area. The Late Prehistoric is identified with the introduction of pottery, and is marked by stronger regional differentiation. While the artifact assemblages are generally similar to those of the Gypsum Period, there are some notable differences. In addition to ceramics, the period is distinguished by the introduction of cremation in the archaeological record. In general, projectile points are smaller, and triangular in shape. Regional differentiation in the distribution of projectile point and pottery types was due, in part, to trade and influences of neighboring cultures in the Lower Colorado River and Great Basin. Such influence includes the major migration into southern California of Takic-speaking people (Uto-Aztecan language group) from the southwestern Great Basin region (Nevada, and eastern California) (Warren 1968).

Within the Colorado Desert region, the local Patayan cultural pattern is divided into three periods with different pottery types and regional site distributions, developmental phases that characterize cultural changes. Unfortunately, the dearth of independent dates and stratified sties, as well as confusion concerning the definition of ceramic types has limited the development of a reliable Patayan chronology.

The Patayan I Phase (1,075 to 950 years BP) is characterized by a heavy influence of western Arizona Patayan on Colorado Desert populations (Waters 1982). The inception of this period has been dated

by the association of intrusive Hohokam potsherds in two stratified Patayan sites in Arizona and five radiocarbon dates ranging from 1,125 (± 80) years BP to 900 (± 65) years BP (Cordell 1997). Cottonwood Triangular and Desert Side-Notched projectile points, the change from extended inhumations to cremations, the introduction of pottery, the presence of networks of trail systems (with pot-drops and trailside shrines), and the late introduction of small-scale agriculture characterize the Patayan Period in general. Diverse pottery types are increasingly common throughout the period. Five ceramic wares have been distinguished for this phase: Colorado Red, Black Mesa Buff, Black Mesa Red-on-buff, Colorado Beige, and Colorado Red-on-beige (Cordell 1997). Material culture also included clay figurines and pipes, bedrock grinding slicks and mortars, worked bone tools, and rock art. As discussed further below, the cyclical filling and desiccation of Lake Cahuilla dictated the settlement patterns in the Salton Trough and Coachella Valley during this period.

During the Patayan II Phase, use of pottery by groups occupying the Salton Trough rapidly increased. This increase may partially be the result of populations adjusting their subsistence and settlement patterns to adapt to environmental changes that occurred as a result of intermittent filling and drying of the Salton Basin (Stone 1991).

In the Salton Trough, the Patayan III Phase (450 years BP to contact) is characterized by large population shifts triggered by the final evaporation of Ancient Lake Cahuilla (Rogers 1945; Wilke 1978; Waters 1982). Although a gradual process, the lake's desiccation represented a massive and fundamental degradation of the subsistence productivity of the region. Patayan groups, already mobile and dispersed, may have moved to areas where resources were more readily available, or where social or kinship ties facilitated integration into other existing groups. Groups on the western side of the drying lake may have moved to the foothills and mountains of western California, such as the San Jacinto and San Bernardino Ranges along the boundaries of the project area (Waters 1982). Other groups may have moved to the Colorado River Valley and expanded down into the river delta (Rogers 1945). It has also been suggested that population increases due to migration to the Colorado River may have contributed to the high frequency of inter-group conflict documented by early Spanish explorers of the region (Forbes 1965).

Final desiccation of Lake Cahuilla certainly had an impact on a population dependent on the lake. However, since these mobile groups were already highly adapted to a diversity of resource strategies, including desert, mountain, lake, and marsh habitats, they would simply have shifted their subsistence emphasis. For example, an increased exploitation of agaves is evidenced at this time (Shackley 1984). This shift in resource procurement during Patayan III likely did not result in major population movements for populations utilizing an existing, flexible, hunter-gatherer settlement and subsistence

2.2.6 Ethnohistoric Context

The project area lies within the ethnographic boundaries of the Cahuilla tribe (Kroeber 1925). The name "Cahuilla" is possibly derived from a native word meaning a "master, boss" (Bean 1978:575). *'Ivi'lyu'atam* is the traditional term for the linguistically and culturally defined Cahuilla cultural nationality, and "refers to persons speaking the Cahuilla language and recognizing a commonly shared cultural heritage" (Bean 1972:85). It is thought that the Cahuilla ancestral group migrated to Southern California about 2,000 to 3,000 years ago, most likely from southern Sierra Nevada ranges of east-central California, with other related Takic-speaking socio-linguistic groups (Moratto 1984:559). The Cahuilla settled in a territory that extended west to east from the present-day city of Riverside to the central portion of the Salton Sea in the Colorado Desert, and south to north from the

San Jacinto Valley to the San Bernardino Mountains. While 60 percent of Cahuilla territory was located in the Lower Sonoran Desert environment, 75 percent of their diet from plant resources was acquired in the Upper Sonoran and Transition environmental zones (Bean 1978:576). The project area is within the northern portion of Cahuilla territory, among the Pass (or Western) Cahuilla group of the tribe.

The Cahuilla language and its dialects are a branch of the Takic family of the Uto-Aztecan linguistic stock (Mithun 1999). It is very closely related to the Cupeño language, whose speakers are on their southern border. The Takic branch also includes the Juaneño/Luiseño (or *Payomkawichum*) tribal group to the west in today's Orange and San Diego counties, the Gabrielino (or *Tongva*) in Los Angeles County to the northwest, and the Serrano to the north.

The Cahuilla had three primary levels of socio-political organization (Bean 1978:580). The highest level was the cultural nationality, encompassing everyone speaking a common language. Next were the two patrimonies of the Wildcats (*tuktum*) and the Coyotes (*'istam*). Every clan of the Cahuilla fell into one or the other of these moieties. The third basic level consisted of the numerous political-ritual-corporate units called sibs, or a patrilineal clan (Bean 1978:580). While anthropologists have designated groups of Cahuilla clans by their geographical location into Pass, Desert, and Mountain, suggesting dialect and ceremonial differences between these groups (Strong 1929), these social and linguistic areas were more a result of proximity than actual social connections. In reality, there was a continuum of minor differences from one clan to the next. Lineages within a clan cooperated in defense, in community subsistence activities, and in religious ceremonies. While most lineages owned their own village site and particular resource area, much of the territory was open to all Cahuilla people.

Each lineage within a sib had a defined territory that, among the Cahuilla of the Coachella Valley desert, was formed around springs in mountain canyons and the alluvial fans that spread from these canyons out into the desert floor. Villages in these canyons were occupied year-round. They were situated to take maximum advantage of natural resources such as climate, water, food, and materials. Individuals or groups would periodically leave the village for gathering, hunting, visiting, or trading activities. The sibs and lineages would maintain formal associations among themselves for protection, for religious ceremonies, and help with large projects. The relationship between these groups was maintained through intermarriage and ceremonial reciprocity (Bean 1972).

The founding lineage of a sib often possessed the position of ceremonial leader, and maintained both the ceremonial house and the clan ceremonial bundle that the leader used. The lineages had their own leaders (*nét*) who, like the clan leader, inherited their positions usually father to son. The *nét* was responsible for the upkeep of community religious rituals and ritual objects. He was an "economic executive" for his people, directing the timing and location for the gathering of foods and hunting of game, their storage for future use, and ultimate disposition.

Villages were usually located in canyons or on alluvial fans near a source of accessible water such as springs or where large wells could be dug. Each family and lineage had their houses (*kish*) and granaries for the storage of food, and ramadas for work and cooking. There would often be sweat houses and song houses (for non-religious music). Each community also had a separate house for the lineage or clan leader. There was a ceremonial house, or *kís'áámnawet*, associated with the clan leader. Most major religious ceremonies of the clan were held there. Houses and ancillary structures were often spaced apart, and a "village" could spread out over a mile or more. In addition to the residences, each lineage had ownership rights to various resource collecting locations, "including food collecting, hunting, and other areas. Individuals also owned specific areas or resources, e.g.,

plant foods, hunting areas, mineral collecting places, or sacred spots used only by shamans, healers and the like" (Bean 1990:2).

While the Cahuilla utilized over 200 plants (Bean and Saubel 1972), the most important species representing food resources in these deserts and mountains included: two mesquite species, the screwbean and honey (*Prosodies pubescens* and *P. glandulosa*); six species of acorn-bearing oaks, including coast live oak (*Quercus agrifolia*), scrub oak (*Q. berberifolia*), and Engelmann oak (*Q. engelmanii*); pine trees with pinon nuts (*Pinus quadrofolia* and other *Pinus* spp.); prickly-pear cacti with fruit and fleshy leaves (*Opuntia littoralis* and *O. basilaris*); and yucca with blossoms and flower stalks (*Yucca whipple* and *Y. schidigerai*). To a lesser degree, several hard seed plants, such as manzanita (*Archtostaphylos glauca* and *A. Pringlei*), sunflowers (*Helianthus annuus*), chia and other sages (*Salvia columbariae* and *Salvia* spp.), lemonade berry (*Rhus trilobata*), wild rose (*Rosa californica*), and buckwheat (*Eriogonum fasciculatum*), coyote gourd (*Curcurbita feotidissima*), along with fruits, berries, tubers and greens, were also gathered (O'Neil 2001). Among the most important tubers was amole (*Chlorogalum pomeridianum*) for tools and soap, while common greens included several *Chenopodium* spp., clovers (*Trifolium* spp.), miner's lettuce (*Claytonia perfoliata*) and white sage (*Salvia apian*), all to be found in the immediate region (Dale 1985). There are several native California berry-producing plants in this region, such as toyon (*Heteromelies arbutifolia*), grape (*Vitis girdiana*), blackberry (*Rubus ursinus*), and elderberry (*Sambucus mexicanus*). The elderberry was also gathered for medicine and tool manufacture. Numerous additional plants were used for medicines, twine, basketry, ornamentation, tools, and ceremonial regalia (O'Neil 2001).

This region was a highly productive environment, well suited to a sophisticated hunting and gathering economy. Recent studies (cf. Bean and Lawton 1993; Lightfoot and Parrish 2009), have documented that aboriginal people in southern California managed the structure and productivity of this environment through a combination of controlled burning, selective harvesting and pruning, and occasional replanting, seed broadcast, and possibly limited irrigation.

Segments of the Cahuilla had also adapted limited agricultural practices by the time Euro-Americans traveled into their territory. Bean (1978:578) has suggested that their "proto-agricultural techniques and a marginal agriculture" consisting of beans, squash and corn may have been adopted from the Colorado River groups to the east. Certainly, by the time of the first Romero Expedition in 1823-24, the Pass and Desert Cahuilla were observed growing corn, pumpkins, and beans in small gardens localized around springs in the Thermal area of the Coachella Valley (Bean and Mason 1962:104). Despite the increasing use and diversity of crops, there is no evidence that this small-scale agriculture was anything more than a supplement to Cahuilla subsistence, and it apparently did not alter social organization.

A wide variety of tools and implements were employed by the Cahuilla to gather and collect food resources. For the hunt, these included the bow and arrow, traps, nets, sling and blinds for hunting land mammals and birds, and nets for fish in Lake Cahuilla. Rabbits and hares were commonly brought down by the throwing stick, as well as communal hunts for these animals that utilized clubs and tremendous nets. The ground meal and unprocessed hard seeds were stored in large finely woven baskets, and the unprocessed mesquite beans were stored in large granaries woven of willow branches and raised off the ground on platforms to keep them from vermin.

Pottery was introduced to the Cahuilla via trade from the Colorado River region during the Late Prehistoric period. The art of constructing pottery was later adopted by the Cahuilla, using the paddle and anvil technique.

The Cahuilla worldview derives from principles set forth in the tribe's origin myths. The creator gods were two brothers, *Mukat* and *Tamayowut*, *Mukat* being the elder. As they brought the earth, plants, minerals, people, and ritual objects into being, contests of will and power were played out between the two. *Mukat*, as the elder, was wiser and more patient in his rendering of things, and his vision of the world-to-be is that manifested in the world the Cahuilla live in today. Values of old age, patience, "correct action" in the sense of performing activities properly and deliberately, and reciprocity were taught to each generation through the oral narrative accounts of mythic stories. These virtues helped to maintain a balance with nature and within the community.

2.2.7 Local Settlement

The nearest Cahuilla village to the project site would have been the Late Prehistoric and historic settlement at Palm Springs, located approximately 5.5 miles to the south across the valley floor (Bean 1978:576, Figure 1). This village was inhabited by the *kauisiktum* clan associated with the Pass Cahuilla (Strong 1929:91).

2.2.8 Historic Context

Spanish / Mexican Era

Spanish and Mexican explorers traveled through the vicinity of the project area during the late 18th to early 19th centuries, although they did not settle in the area. The first known Europeans to cross the Coachella Valley were those moving goods from Mexico north to the newly established Mission San Gabriel and Tucson, Arizona. Cattle, horses, supplies, and people were transported between these two regions. Between 1823 and 1825, the Lt. Jose Romero expedition crossed the Coachella Valley in search of a good route to Yuma. The expedition is chronicled as having observed and camped by springs and wells within the Valley which though mostly situated on the southern side below the San Jacinto and Santa Rosa mountains, may also have included the Seven Palms oasis east of the project area.

Because the Coachella Valley was regarded as having a "marginal environment" that was generally inhospitable, it was thought unsuitable for large-scale ranching or farming. The distance between the coastal missions and the Mexican ranchos was thought too great for desired travel by the Spanish and Mexicans. Due to this thinking, the Cahuilla remained relatively isolated from early Euro-American expansionism, allowing their traditional customs and practices to remain intact longer than in those areas closer to Spanish influences.

American Era

In the 1850s the federal government became interested in the Colorado Desert, and especially the Coachella Valley, for establishing potential regional routes and general westward expansion. In 1853 geologist William Blake, under contract with the U.S. Army, conducted a general exploratory survey of the Colorado Desert and noted the shoreline features associated with the former Lake Cahuilla. Blake's was the first written record suggesting the existence of the ancient lake.

It was not until the construction of the Southern Pacific Railroad in the 1870s that the Cahuilla experienced a significant intrusion by Hispanics and Euro-Americans. Many Cahuilla were hired to help construct the railroad. The railroad opened up the desert area and stimulated a desire by Euro-Americans to claim what were traditional Cahuilla lands for settlement, agriculture and grazing. This invasion resulted in devastating impacts on the Cahuilla. Measles and smallpox epidemics of 1825,

followed by those in the mid-1860s significantly reduced the population size, especially the numbers of children. Old village sites were abandoned and traditional lands were rapidly lost to outsiders. Traditional Cahuilla lifeways fell into crisis.

Indian reservations were established in the region to provide protected homelands for the Cahuilla and Serrano. The Morongo Reservation and other small reservations were eventually set aside by President Grant in 1868, although they had no official status for many years. In 1877 the Mission Indian Agency was finally created for southern California. The closest Indian reservations to the project site are the Torres-Martinez Reservation, located south of Indio; Cabazon, north of Indio; and Augustin, near Coachella.

The modern Cahuilla are affiliated with one or more of the Indian reservations in the Coachella Valley, including Cabazon, Torres-Martinez, Agua Caliente, and Augustine. Individuals with Pass and Desert Cahuilla affiliations are also found at the Santa Rosa, Cahuilla, Ramona, Los Coyotes, and Soboba reservations located outside of the Coachella Valley. Many Cahuilla are very aware of their historic past and maintain cultural identity and sensitivity about their heritage and the archaeological resources and sacred places in the area.

In the 1800s, arid and semi-arid areas like present day Desert Hot Springs saw little activity because of their distance from the coast and the missions, and also because of the somewhat unsuitable conditions for large populations due to the low water supply and poor soil conditions. 1849 Dr. 0. M. Wozencraft first presented the idea that the Colorado Desert could become a major agricultural area if dependable water supplies became available. In an effort to populate and develop these public lands of the Western United States, the United States Congress passed the Desert Land Act on March 3, 1877. A maximum of 640 acres at $1.25 an acre was promised to those who would irrigate and develop the land within three years (Desert Hot Springs Historical Society 2008).

Anglo settlement began in the Coachella Valley in the 1880s, after the public land was opened for claims under the Homestead Act and other federal land programs. Agriculture pioneering began about this time as the fertility of the eastern valley soils and the availability of artesian water were enthusiastically promoted to encourage settlement. The construction of the railroad through the valley enabled farmers to transport their products to larger markets and for passengers to more easily travel to and through the desert region. Three years after the railroad was completed, unused lands were sold at $1.25 per acre for settlement and preemption (Robinson 1948:151).

It was not until 1901, with the backing of irrigation expert George Chaffey, that the first canal was completed to bring water to the Imperial Valley. In 1905 the Colorado River again flowed into the Salton Basin literally invading the valley through an intake gate constructed below the border the previous year due to a water shortage. February of 1907 saw completion of a dike by Southern Pacific railroad crews to stop this flow. Although the railroad had to construct new lines because the original ones were now located at the bottom of the newly formed Salton Sea, the effects of this flood were even more disastrous for the California Development Company. They were bankrupt; ownership of the canals and irrigation system was turned over to the Southern Pacific Railroad. Since then, the Imperial Valley agricultural area has rebuilt and expanded to its present proportion. (Lantis et al. 1963:60- 61; Steere 1952:10-36; Weide and Barker et al. n.d.:27).

City of Desert Hot Springs

In 1858, the first surveyors demarcated a water seep in the Desert Hot Springs area and described it near "Two Bunches of Palms" in an otherwise treeless desert terrain. The watering hole known as

Two Bunch Palms became the first geographical reference for the area. In 1908, Jack Riley came to this location in search of land to claim under the Desert Land Act. While he is credited as being the first Anglo to step foot in the Desert Hot Springs area, it is unclear if Mr. Riley took up residence in the area. Under the original Homestead Act of 1862 settlers could obtain 160 acres of land from the federal government if they lived on the land and cultivated for five years. In 1912, the Homestead Act was modified to allow acquisition of 320 acres of land and the residence requirement was reduced to three years (Robinson 1948). This made homesteading on marginal desert land more attractive. Hilda M. Gray is credited as the first homesteader in the Desert Hot Springs area. Ms. Gray established her home just south of Two Bunch Palms in 1909. She lived here for four years before moving to Arcadia to resume her career as a legal secretary (Desert Hot Springs Historical Society 2008; Gray 2016).

A few others tried their luck at homesteading in Desert Hot Springs, including Cabot Yerxa, who was born on June 11, 1883 in Hamilton, North Dakota, and came to Southern California in 1913. Local legend has it that he heard about the mud hole at Two Bunch Palms and undertook the journey to find the water site, wandering for two weeks into the desert with only a small amount of food and a quart of water. After two weeks he found the mud hole at Two Bunch Palms and claimed homestead of 160 acres adjacent to the area (Brown 2011; Desert Hot Springs Historical Society 2008). He built a small cabin named Eagles Nest and lived with his burro, Merry Christmas. He dug a well which he named Miracle Hill at the spot of the mud hole. He named it Miracle due to the fact that it had cold water on one side of the hill and hot water on the other (Brown 2011).

In hopes of developing Miracle Hill into commercial property, Yerxa set out to improve his homestead, making the necessary adjustments so that he could obtain a title to the land and develop it himself (Brown 2011; Desert Hot Springs Historical Society 2008). Before he could obtain title, he left to fight in WWI. When he returned in 1941, he found the land had been claimed in 1933 by LW Coffee who had learned of the location from Yerxa. He had built a Desert Hot Springs Resort without Yerxa's involvement. This became the basis for the development of the town of Desert Hot Springs, founded July 12, 1941 but not yet incorporated (Brown 2011; Desert Hot Springs Historical Society 2008).

Starting in the 1920s, a new industry featuring equestrian camps, resorts, hotels, and eventually country clubs began to spread from Desert Hot Springs in the north throughout the Coachella Valley, transforming it into Southern California's premier winter retreat. Desert Hot Springs became a tourist destination in the 1950s thanks to its small hotel spas. Many city dwellers came to the desert on the weekends looking to escape the busy urban lifestyle and to experience the so-called "healing powers" of the waters of Desert Hot Springs. A few years before the city's incorporation in 1963, the town of Desert Hot Springs was hailed in a health brochure as one of the greatest health centers of all time. Realtors and development companies came in droves to scope out the potential value of the area and the town expanded to include an area of more than six square miles (City of Desert Hot Springs 2008).

Desert Hot Springs experienced tremendous growth in the 1980s and 1990s when housing and apartment developments filled up many of the vacant lots. According to the U.S. census, the city's population doubled in the 1980s and increased by 5,000 in the year 2000. The World Population Review (2022) showed that the City had a population of 27,172 in 2020; this has risen to an estmat5ed 32,716 in 2021 according to the United States Census Bureau (2022); the City of Desert Hot Springs has an area of approximately 33.6 square miles (87 square kilometers). Today, much of Desert Hot Springs' economy relies on its water. Tourists come from all over the world to experience

the "healing powers" of the heated mineral water and many claim to have been cured of their ailments. The groundwater of Desert Hot Springs is also ranked among the nation's best and has won multiple awards in recent years in the International Water Tasting Competition at Berkeley Springs, West Virginia, including the 1999 and 2004 Gold Medals for the "Best Tasting Municipal Drinking Water" (City of Desert Hot Springs 2008).

Project Site Land Use History

Use of the project site during the mid-20th century to present was determined using historic aerial photos and USGS topographic maps (NETROnline, 2022).

Historic aerial photos are available for Desert Hot Springs from 1972 -2018, as well as 1952 seen in All Phase Environmental's Phase I Environmental Assessment (2011:9). These maps support the USGS maps' evidence of no agricultural use of this area from the first aerial in 1972, as well as no structures. The corner of Palm Ave and Dillion Road to the north of the site boundary has one building on it, the primary building of what will become Las Palmas Corner (NETROnline :1972). The first major change to the area shows in 1995 aerials as the building of the Desert Dunes Golf Club on the adjacent lot to the east which opened in 1989 (NETROnline: 1984-1995). Additional buildings are added to Las Palmas Corner (NETROnline: 1995-1996). By 2014, the project site itself continues to be completely open desert lands (NETROnline: 2012-2014).

United State Geological Survey (USGS) topographic maps prepared from 1944 through 2018 show no use or improvements within the project boundary over the years. The available topographic maps for the project area start in 1944 which show two small structures immediately south of the project boundary below the southeast corner along what is now 20th Street (USGS, 1944). 1960 sees the emergence of a small agricultural field in the project area immediately to the south near the southeastern portion of the site, the absence of the northern-most of the nearby two buildings, as well as inclusion of the Murango Wash which runs along the western side of the property (USGS:1959-1960). The USGS map from 1973 shows the elimination of the agricultural patch to the south by this time and no evidence of any structures on site (USGS: 1972-1973). The 2012 topo contains Beacon Way off 20th Avenue to the south paved, as well as Blair Rd connecting Palm Ave and 18th Avenue to the northeast (USGS: 1987-2012), both surrounding but beyond the parcel boundary. The most recent USGS topo available, dating 2018, has Blair Road extending toward the western edge of the site and an unnamed dirt road following the Murango Wash to the south halfway across the site (USGS: 2015-2018).

3.0 RESEARCH METHODS

This cultural resources inventory and related archival research included a background archaeological records check (archival research) at the EIC, University of California at Riverside, a Sacred Lands File search request to the NAHC, and the list of local Native American entities to contact from the NAHC. A pedestrian cultural resource survey of the entire project area was conducted. This report presents the results of all of these cultural resource tasks including cultural resource management recommendations.

3.1 Records Search

A cultural resource records search by EIC staff was requested December 9, 2021, the local CHRIS facility for Riverside County. Due to restrictive access protocols resulting from the COVID-19 pandemic there have been delays in the records search process. (Communication from Eulices Lopez, Administrative / Coordinator Assistant of the EIC on April 2, 2021.) The records search was completed March 16, 2022. That research was conducted to identify cultural resources on or near the project site. The EIC material was reviewed to identify resources that have been previously evaluated for historic significance and to identify any previous completed cultural resources survey reports.

The California State Historic Resources Inventory for Riverside County was reviewed to identify local cultural resources that have been previously evaluated for historic significance, as well as survey reports. The following were also searched and reviewed: the official records and maps for archaeological sites and surveys in National Register of Historic Places; Listed Properties and Determined Eligible Properties (2012), California Register of Historical Resources (2012), California Points of Historical Interest (2012), California Inventory of Historic Resources (1976), California Historical Landmarks (2012), Handbook of North American Indians, Vol. 8, California (1978), and Historic Spots in California (2002). The scope of the records search included a 0.5-mile radius buffer zone of the project's APE (see **Attachment A, Figure 3**) to assess the sensitivity of the project site for subsurface archaeological resources and to assist in determining the potential to encounter such resources, especially prehistoric—i.e., Native American—cultural remains, during earth-moving activities associated with the undertaking.

3.2 Field Survey

On April 5, 2022, Archaeologist Stephen O'Neil, M.A., RPA, visited the project area to conduct a pedestrian survey. During the survey, the project site was carefully inspected for any indication of human activities dating to the prehistoric or historic periods (i.e., 50 years or older). The project site is an undeveloped open desert land. Therefore, there were no restrictions to observation of the surface aside from native flora.

3.3 Native American Outreach

On December 9, 2021, Mr. O'Neil sent a request to the Native American Heritage Commission (NAHC) via email notifying them of the proposed project activities and describing its location. The NAHC was requested to conduct a search of its Sacred Lands File (SLF) (**Attachment C**), as well as to make recommendations as to the local Native American tribes and organizations that should be contacted regarding knowledge they may have on local traditional cultural properties and possible concerns they may have about potential impacts to cultural resources resulting from implementation of the proposed project. The Commission's SLF results were received by email on February 7, 2022. The 21 tribes and Native American individuals recommended by the NAHC were contacted by mail and email on February 9, 2022.

4.0 FINDINGS

4.1 Records Search

4.1.1 Recorded Archaeological Sites

Based on the EIC cultural resources records search, it was determined that there are no prehistoric or historic cultural resource previously recorded within the project site boundary. Within the half-mile buffer zone, there have been 24 recorded prehistoric (18) and historic-era (six) resources. **Table 4.1-1** summarizes these resources.

The six historic-era resources break down to one residence or work station circa 1940s (CA-RIV-4109H), a well pump and associated historic trash deposits (CA-RIV-8784), a late historic slab foundation with associated trash deposit (CA-RIV-8783) and three road segments (18th Avenue [P-33-08414], paved 20th Avenue [P-33-08403], and a dirt segment of 20th Avenue [P-33-028053]). (See **Table 4.1-1.**)

A prehistoric site and a site-complex (CA-RIV-154 and CA-RIV-8783 respectively) along with numerous prehistoric isolates are located to the south, southwest, east and northeast of the project boundary. The large habitation and burial site CA-RIV-154 (also known as Seven Palms Village II) is located 300 meters to the south of the project's southern boundary (Eberhardt 1952; Wilson 2007). A large complex of sites is situated immediately east of the project, across Palm Drive in the Seven Palms Ranch (now the Desert Dunes Golf Club); this consists of CA-RIV-1825, -1827, -2642, -2643, -2644, -2646, -2647, and -8766; the site is also identified as Seven Palms Site #1 and #2, and as Seven Palms 1 – 6 (see **Table 4.1-1**). This site complex is centered approximately 550 meters to the southeast of the project boundary. All of these prehistoric sites, plus several historic sites, are also grouped together as CA-RIV-8783 that includes these prehistoric and historic sites in addition to nearby isolate artifacts found along Palm Drive Avenue, that were identified on the original Seven Palms Ranch property (**Table 4.1-1**).

In addition to the Seven Palms Village site and associated smaller prehistoric sites and isolates, surveys along Palm Drive and 18th Avenue recorded several prehistoric isolates consisting of ceramics and ground stone (33-012629, -013679, -016743, -016744, -016745, -016747, -016748, and -016749). These are located to the southeast, north and northeast of the project boundary and are also grouped together within RIV-8783 (**Table 4.1-1**).

Table 4.1-1
KNOWN CULTURAL RESOURCES WITHIN A 0.5-MILE RADIUS OF THE APE

Site Number	Author(s)	Date	Description
P-33-000154; CA-RIV-154	Eberhart, William Britt W. Wilson	1952 2007	This prehistoric site is known as the Seven Palms Village II which contains lithic scatters, ceramic scatters, burials and cremations, and numerous associated smaller sites and isolates. Associated with the Seven Palms oasis.
P-33-001825 CA-RIV-1825	Breece	1980	This is a prehistoric site consisting of Tizon Brownware body sherds, located at the Seven Palms Ranch.

Site Number	Author(s)	Date	Description
P-33-001827; CA-RIV-1827	Breece	1980	This is a prehistoric site consisti9ng of a Tizon brownware sherd and chert projectile points, pottery sherds, debitage and a broken chert knife in the past; located on the Seven Palms Ranch.
P-33-002642; CA-RIV-2642	C.E. Drover M. Dahdul	1982 2010	This is a prehistoric site containing Lower Colorado buff ware ceramics, burnt bone, debitage and fired daub; located on the Seven Palms Ranch.
P-33-002643; CA-RIV-2643	C.E. Drover	1982	This is a prehistoric site consists of Lower Colorado buff ware sherds and fire effected rock; located on the Seven Palms Ranch.
P-33-002644; CA-RIV-2644	C.E. Drover	1982	This is a prehistoric site consists of Lower Colorado Buff Ware sherds, fire effected rock, and debitage; located on the Seven Palms Ranch.
P-33-002645; CA-RIV-2645	C.E. Drover	1982	This is a prehistoric site consists of Lower Colorado Buff Ware sherds, fire effected rock, debitage, hammerstone and ground stone; located on the Seven Palms Ranch.
P-33-002547; CA-RIV-2647	C.E. Drover	1982	This is a prehistoric site consists of human remains possibly from a cremation, Lower Colorado Buff Ware sherds, fire effected rock, burnt bone, debitage, and metate fragments; located on the Seven Palms Ranch.
P-33-004109; CA-RIV-4109	Dicken Eversion M. Hogan	1990 1992	This historic site consists of a concrete foundation with associated trash scatter, a well and remaining fences. It is located on the Seven Palms Ranch.
P-33-008403	J. Brock A. Fogla and D. Mengers	1998 2016	This historic property consists of a paved portion of 20th Avenue intersecting Palm Drive between Interstate 10 and Two Bunch Palms Drive in Desert Hot Springs and Riverside County jurisdiction lands.
P-33-008414	J. Brock	1998	This historic property consists of a dirt portion of 18th Avenue intersecting Palm Drive between Interstate10 and Two Bunch Palms Drive in Desert Hot Springs and Riverside County jurisdiction lands.
P-33-012629	M. Hogan and S. Moffitt	1992	This prehistoric isolate consists of a single ceramic sherd.
P-33-013678	Breece	1980	This prehistoric isolate consists of a single Tizon Brownware sherd. located on the Seven Palms Ranch.
P-33-013679	Breece	1980	This prehistoric isolate consists of a single Tizon Brownware sherd located on the Seven Palms Ranch.
P-33-016742; CA-RIV-8766	Ballester, Daniel	2007	This is a prehistoric archaeological site contains a scatter of lithic flakes, two mano fragments, faunal remains, four ceramic sherds and two fragments of fire effected rock; located on the Seven Palms Ranch.

Site Number	Author(s)	Date	Description
P-33-016743	Ballester, Daniel	2007	This is a prehistoric isolate consisting of a metate fragment located 20 feet south of 18th Avenue.
P-33-016744	Ballester, Daniel	2007	This is a prehistoric isolate consist of a possible buffware ceramic shard located on the Seven Palms Ranch.
P-33-016745	Ballester, Daniel	2007	This isa prehistoric isolate consisting of a mano fragments located about five feet south of 18th Avenue.
P-33-016747	Ballester, Daniel	2007	This is a prehistoric isolate consisting of a biface mano fragment in sand dunes located on the Seven Palms Ranch.
P-33-016748	Ballester, Daniel	2007	This is a prehistoric isolate consisting of a metate fragment located on the Seven Palms Ranch.
P-33-016749	Ballester, Daniel	2007	This is a prehistoric isolate consisting of a mano fragment located on the Seven Palms Ranch.
P-33-016775; CA-RIV-8783	Smallwood, Josh	2007	This is an historic archaeological site consisting of a later historic period concrete slab foundation and associated modern refuse. It is located on the Seven Palms Ranch.
P-33-016776; CA-RIV-8784	Smallwood, Josh	2007	This is an historic archaeological site consisting of a well pump and associated equipment, as well as unrelated refuse.
P-33-028053	Molask, Ken	2017	This is an historic archaeological site consisting of a dirt portion of 20th Avenue between Little Morongo Road on the west and Palm Drive on the east.

4.1.2 Previous Archaeological Investigations

According to the records at the EIC, there have been 16 previous cultural resource studies within the one-half-mile buffer of the project (**Table 4.1-2**) (see **Attachment D**). Four of these surveys intersect the current project boundary and two of these surveys are along the northern and eastern edge of the current project site.

A survey reported on by CRM Tech (2008; RI-08104) consisted of an Archaeological Testing and Evaluation program for the archaeological sites CA-RIV-2642, CA-RIV-2643, and a portion of CA-RIV-2646 for the Desert Dunes Golf Course Project. A subsequent Data Recovery program was prepared by CRM Tech (2010; RI-08686) for CA-RIV-2642. The area immediately southeast of the current project was included in the prior project (CRM TECH 2010). An archaeological survey for the Seven Palms Ranch that included the eastern edge of the project area was conducted by Westec Services, Inc. (1980; RI-00952). An Archaeological Assessment was prepared by Drover (1989; RI-00954) for the Desert Dunes Resort (Seven Palms Ranch). This assessment included the entirety of our project area.

James Brock (1998; RI-04086) prepared an Historic Property Survey Report for the Widening of Palm Drive directly to the east of the project area. To the northern boundary of the current project area is the cultural resources assessment conducted by Everson and Love (1991; RI-03164) for the Tentative Parcel 26565.

Five of these surveys identified prehistoric or historic resources adjacent to the current project area (RI-00952, RI-00954, RI-03164, RI-04086, and RI-08104.).

Table 4.1-2
KNOWN CULTURAL RESOURCE STUDIES WITHIN A 0.5-MILE RADIUS OF THE APE

Report Number	Author(s)	Date	Title	Resources
RI-00284	Weaver, Richard A.	1977	Cultural Resource Identification-Sundesert Nuclear Project	NA-
RI-00951	Drover, Christopher E.	1982	An Environmental Impact Evaluation: The Archaeological Test Phase of RIV-1825 and 1827, Seven Palms Ranch, Desert Hot Springs, California	33-001825, 33-001827, 33-002642, 33-002643, 33-002644, 33-002645, 33-002646, 33-002647, 33-002648
RI-00952	Weaver, Richard	1980	Archaeological Survey of the Seven Palms Ranch, North Palm Springs, California	33-001825, 33-001827, 33-013678, 33-013679, 33-013680
RI-00953	Drover, Christopher E.	1988	An Environmental Impact Evaluation Mitigation By Data Collection: Riv-1825; 1827; 2645 and 2648 Seven Palms Ranch, Desert Hot Springs, California	33-001825, 33-001827, 33-002645, 33-002648
RI-00954	Drover, Christopher E.	1989	Environmental Impact Evaluation: An Archaeological Assessment of Desert Dunes Resort (Seven Palms Ranch) Desert Hot Springs, Riverside County, California	33-002642, 33-002643, 33-002644, 33-002646, 33-002647
RI-03164	Everson, Dicken, and Kevin Hallaran	1991	CULTURAL RESOURCES ASSESSMENT: TENTATIVE PARCEL 26565, DESERT HOT SPRINGS, RIVERSIDE COUNTY	33-004109
RI-03165	Everson, Dicken, and Kevin Hallaran	1991	CULTURAL RESOURCES ASSESSMENT: TENTATIVE PARCEL 26564, DESERT HOT SPRINGS, RIVERSIDE COUNTY	33-004109
RI-03636	Hogan, Michael	1992	CULTURAL RESOURCES ASSESSMENT, 26+ MILE SEGMENT OF THE AT&T FIBEROPTICS LINE REPLACEMENT PROJECT, WHITEWATER TO COACHELLA, RIVERSIDE COUNTY, CALIFORNIA	33-004109
RI-04086	BROCK, JAMES	1998	HISTORIC PROPERTY SURVEY REPORT FOR THE WIDENING OF PALM DRIVE BETWEEN INTERSTATE 10 AND TWO BUNCH PALMS DRIVE, DESERT HOT SPRINGS, CALIFORNIA.	33-008108, 33-008403, 33-008409, 33-008412, 33-008413, 33-008414
RI-06297	Hogan, Michael, Bai "Tom" Tang, Matthew Wetherbee, Casey Tibbet and Daniel Ballester	2004	HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT, ASSESSOR'S PARCEL NUMBERS 657-230-009, -010, -017, -020, AND -022, NEAR THE CITY OF DESERT HOT SPIRNGS, RIVERSIDE COUNTY, CALIFORNIA	33-008410, 33-008414

Report Number	Author(s)	Date	Title	Resources
RI-08104	Mariam Dahdul, Harry Quinn, and Zachary Hruby	2008	Final Report Archaeological Testing and Evaluation Program at Sites CA-RIV-2642, - 2643, and a portion of -2646 Near the city of Desert Hot Springs Riverside, County, California	33-002642, 33-002643, 33-002646
RI-08686	Michael Hogan and Bai "Tom" Tang	2010	Archaeological Investigations on a Portion of Locus 1, Site CA-RIV-5642	NA
RI-10299	Bai "Tom" Tang, Michael Hogan, Ben Kerridge, Daniel Ballester, and Nina Gallardo	2015	IDENTIFICATION AND EVALUATION OF HISTORIC PROPERTIES CHROMIUM-6 WATER TREATMENT FACILITIES PROJECT, COACHELLA VALLEY, RIVERSIDE COUNTY, CALIFORNIA	NA
RI-10451	Mirro, Michael	2010	Cultural Resources Records Search for Shot Points Located on Private Land for the U.S. Geological Survey (USGS) Salton Seismic Imaging Project (SSIP)	33-000056, 33-001117, 33-011637
RI-10461	William T. Eckhardt, Matthew M. DeCarlo, Doug Mengers, Sherri Andrews, Don Laylander, and Tony Quach	2015	Archaeological Investigations and Monitoring for the Construction of the Devers-Palo Verde No. 2 Transmission Line Project, Riverside County, California	33-018128, 33-020289, 33-020290, 33-020294, 33-020317, 33-020318, 33-020319, 33-020320, 33-020321, 33-020322, 33-020323, 33-020324, 33-020325, 33-020336, 33-020409, 33-020410, 33-020975, 33-020976, 33-020977, 33-020978, 33-020979, 33-021001, 33-021014, 33-022103, 33-022105, 33-023799
RI-10500	Robert Cunningham, Wendy Blumel	2017	Cultural Resources Investigation 105-Acre Parcel in the City of Desert Hot Springs	NA

4.2 Native American Outreach

On December 9, 2021, Mr. O'Neil submitted a request to the NAHC via email for a Sacred Lands File (SLF) search within the 0.5-mile project buffer. The results of the search request were received February 7, 2022 at the office of UltraSystems from Mr. Andrew Green, Cultural Resources Analyst. The NAHC letter stated that "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above

referenced project. The results were positive. Please contact the Agua Caliente Band of Cahuilla Indians on the attached list for more information" [emphasis in the original]. (See **Attachment C**.)

UltraSystems prepared letters to each of the 21 tribal contacts representing 14 tribes and bands named by the NAHC (**Attachment C)**. On February 9, 2022, Ms. Doukakis mailed letters with accompanying maps to all 21 tribal contacts, and emailed the letters and maps to each of the 19 tribal contacts for which email addresses were known, with the contact letter and map describing the project and showing the project's location, requesting a reply if they have knowledge of cultural resources in the area that they wished to share, and asking if they had any questions or concerns regarding the project. An email was also sent to the Director of the Agua Caliente Band of Cahuilla Indians Cultural Resources Department who, was also included on the Commission's contact list, had been "cc'd" by Mr. Green in his response to Mr. O'Neil.

Jill McCormick, Historic Preservation Officer for the Quechan Tribe of the Fort Yuma Reservation replied by email on March 1, 2022 indicating that the tribe has no comments on this project and will defer to the more local Tribes and support their decisions on the project. Ryan Nordness, Cultural Resource Analyst and Bonnie Bryant, Cultural Resources Technician with the San Manuel Band of Mission Indians both responded by email on March 1 and March 3, 2022 indicating that the project area is outside of their ancestral territory and would not like to consult on the project. Copies of these replies are located in **Attachment C**.

Following up on the initial letter and email contacts, telephone calls were conducted by Archaeological Technician Megan B. Doukakis on June 27 and 28, 2022 to those tribes who had not previously replied by email or letter and had provided telephone numbers. These calls were to the 18 tribal contacts who had not already responded to UEI mailing and email. Eight of the telephone calls were placed with no answer and so messages were left describing the project and requesting a response. These were to Wayne Walker, Co-Chairperson of the Serrano Nation of Mission Indians; Joseph Hamilton, Chairperson and John Gomez, Environmental Coordinator of the Ramon Band of Cahuilla; Anne Brierty, THPO and Robert Martin, Chairperson of the Morongo Band of Mission Indians; Doug Welmas, Chairperson of the Cabazon Band of Mission Indians; Patricia Garcia-Plotkin, Director and Jeff Grubbe, Chairperson of the Agua Caliente Band of Cahuilla Indians. In a call to Mark Cochrane, Co-Chairperson of the Serrano Nation of Mission Indians, the phone line was disconnected so no message was able to be left. In a call to Michael Mirelez, Cultural Resource Coordinator of the Torres-Martinez Desert Cahuilla Indians there was no answer and the answering machine was full so no message could be left. Calls to Amanda Vance, Chairperson of the Augustine Band of Cahuilla Mission Indians, Daniel Salgado, Chairperson of the Cahuilla Band of Indians, and Ray Chapparosa, Chairperson of the Los Coyote Band of Cahuilla and Cupeno Indians resulted with messages being left for them with the tribal receptionists. In a call to Lovina Redner, Tribal Chair of the Santa Rosa Band of Cahuilla Indians, the tribal receptionist indicated that the Chair was not in the office and that email is the best way to reach her. No message was left.

In a call to Joseph Ontiveros, Cultural Resource Department of the Soboba Band of Luiseño Indians on June 27, 2022, Mr. Ontiveros indicated that the project area is sensitive and near a Traditional Cultural Place (TCP) for the tribe. Mr. Ontiveros indicated that the tribe can provide information about that TCP during consultation with the lead agency. Mr. Ontiveros also requested Native American monitoring during ground disturbance.

In a call to Anthony Madrigal, Tribal Historic Preservation Officer of the Twenty-Nine Palms Band of Mission Indians on June 28, 2022, Mr. Madrigal asked that UltraSystems contact Sarah Bliss, Director of Tribal Programs. Ms. Bliss was called the same day and she asked that we forward her the letter

that we sent to Mr. Madrigal and she will provide a response. This email was sent the same day. No response has been received to date.

There have been no further responses to date (see contact record table in **Attachment C**).

4.3 Pedestrian Survey Results

On March 5, 2022, Mr. O'Neil, with Miguel Anguiano, B.A., Field Technician, conducted a Phase I pedestrian cultural resources survey of the project parcel using standard archaeological procedures and techniques that meet the Secretary of Interior's standards and guidelines for cultural resources inventory.

Systematic transects of the parcel were conducted. Because of the open nature of the project site with no roads or demarcated project boundaries of the parcel available, boundary marker stakes were placed in the four corners prior to the start of the survey. The transects were started in the northwest corner, where photos were in three directions – to the east, southeast across the parcel, and then to the south, were taken to record the surface conditions (**Figure 4.3-1**). From that point the archaeologist proceeded to walk the transects in ten meter transects (with O'Neil and Anguiano separated by ten meters, making each transect 20 meters wide) south to north and back again. Photographs were taken periodically to document the soil type, ground cover and vegetation. The survey was finished at the southeast corner along Palm Drive.

The surface consisted of sandy soil with occasional small rocks (**Figure 4.3-2**). The surface was generally exposed with only minor amounts of grass and herbaceous plants remaining from the winter rains two months prior. Creosote bushes dominated the landscape but were spread apart sufficiently to allow approximately 75 percent ground visibility (**Figure 4.3-3**); sage, Jimsonweed, sand verbena and *Atriplex* species are also present. There is a small knoll in the southeast quarter of the site which could be walked over. There is a winding waterway also in the southeast quarter of the project site, approximately three feet deep (**Figure 4.3-4**), which was walked as the terrain permitted.

The only signs of animals observed during the survey were of rabbit or jackrabbits as well as of owls in the form of pellets. Numerous burrow tunnels were observed, possibly of rabbit or coyote dens. The carcass of a juvenile big horn sheep was observed immediately outside of the southwest corner of the project boundary (it is supposed that the young bighorn sheep had traveled onto the desert floor from the nearby Little San Bernardino Mountains and reached a location too far to return before becoming dehydrated).

The result of the pedestrian survey was negative for both prehistoric and historic sites, features and isolates.

Figure 4.1-1
VIEW FROM NORTHWEST CORNER; VIEW TO SOUTH



Figure 4.1-2
GROUND SURFACE IN THE NORTHEAST QUARTER; VIEW TO THE SOUTH



Figure 4.1-3
VEGETATION WITH CREASOTE AND GRASS; VIEW TO THE SOUTHEAST



Figure 4.1-4
WASH BED IN SOUTHEAST QUARTER; VIEW TO THE NORTH

UltraSystems Environmental Inc.

2014 Biological Assessment Report for the Quail Ridge Residential Development Project, Riverside County, California. Prepared for: Quail Ridge Partners, LLC. UltraSystems Environmental Inc., Irvine, California.



5.0 MANAGEMENT CONSIDERATIONS

5.1 Site Evaluation Criteria

Evaluation of significance under the California Environmental Quality Act (CEQA) uses criteria found in eligibility statements for the California Register of Historical Resources (CRHR). Generally, a resource is to be considered historically significant if it meets the criteria for listing in the California Register of Historical Resources in the state historic preservation law [Public Resources Code § 5024.1; California Code of Regulations § 15064.5(a)(3)]. These criteria provide that a resource may be listed as a potentially significant historical resource if it:

- Is associated with the events that have made a significant contribution to the broad patterns of California history and cultural heritage.
- Is associated with the lives of person important in our past.
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic value.
- Has yielded, or may be likely to yield, information important in prehistory or history.

No NRHP or CRHR prehistoric or historic cultural resources were identified during this investigation. Therefore, an evaluation of significance under CEQA was not required for this study.

5.2 Potential Effects

No known listed, potentially significant cultural resources will be adversely impacted by the proposed project. There is the potential for prehistoric resources sites in the immediate area of the project site and within the project boundary, given the presence of habitation and burial village sites CA-RIV-154 approximately 300 meters to the south of the current project boundary, CA-RIV-8783 approximately 550 meters to the southeast, and isolate prehistoric artifacts previously discovered along adjacent road surveys to the east and north (see **Section 4.1.1** above).

6.0 CONCLUSIONS AND RECOMMENDATIONS

Past experience in the Coachella Valley region leads one to expect the strong likelihood of prehistoric sites in the immediate area of the project site, and the result of the Eastern Information Center's record search results bears this out. Research into local Native American history indicates that the Coachella Valley region was heavily occupied in the past with villages and an abundance of supporting camps. The results of the CHRIS record search within the project site's half-mile buffer zone indicates there is the potential for prehistoric properties that may have ancillary deposits in the project area.

During the call to Joseph Ontiveros, Cultural Resource Department of the Soboba Band of Luiseño Indians on June 27, 2022, Mr. Ontiveros indicated that the project area is sensitive and near a Traditional Cultural Place (TCP) for the tribe. Mr. Ontiveros indicated that the tribe can provide information about that TCP during consultation with the lead agency. Mr. Ontiveros also requested Native American monitoring during ground disturbance. The eight Cahuilla tribal organizations in

the project region have not responded to the outreach letters, emails and telephone calls to date with descriptions of known traditional cultural resources in the project area or statements of specific concerns. The results of the NAHC's SLF records search did indicate the presence of a traditional cultural resource within the project area boundary; however, none of the tribal contact provided further information on this traditional resource.

The cultural resource study findings suggest that there is a moderate potential for finding subsurface prehistoric cultural resources. The presence of prehistoric habitation and burial sites, CA-RIV-154 and CA-RIV-8783 300 meters to the south and 550 meters to the southeast of the project boundary and numerous surrounding finds of isolate artifacts to the north, east and south indicates the presence of Native American material throughout the immediate area. It is recommended that there be archaeological monitors and tribal monitors present during any ground-disturbing construction work. Also, there are no known historic cultural resources within the project boundary or immediately adjacent based on findings of the CHRIS records search, research conducted on the property's history and the pedestrian survey; therefore, it is determined there is a low potential for the presence of historic resources. If prehistoric and/or historic items are observed during subsurface activities, work should be stopped in that area and a qualified archaeologist should be called to assess the findings and retrieve the material.

If human remains are encountered during excavations associated with this project, work will halt and the Riverside County Coroner will be notified (§ 5097.98 of the Public Resources Code). The Coroner will determine whether the remains are recent human origin or older Native American ancestry. If the coroner, with the aid of the supervising archaeologist, determines that the remains are prehistoric, they will contact the NAHC. The NAHC will be responsible for designating the most likely descendant (MLD), who will be responsible for the ultimate disposition of the remains, as required by § 7050.5 of the California Health and Safety Code. The MLD will make recommendations within 24 hours of his or her notification by the NAHC. These recommendations may include scientific removal and nondestructive analysis of human remains and items associated with Native American burials (§ 7050.5 of the Health and Safety Code).

7.0 REFERENCES

All Phase Environmental

2021 Phase I Environmental Sites Assessment: Green Day Village, West of Palm Drive and 1,320 feet south of 18th Avenue, Desert Hot Springs, California, 92240. Prepared for: LA World Construction, Century City, California. Prepared by: All Phase Environmental, Inc., Huntington Beach, California.

Bean, Lowell J.

1972 *Mukat's People: The Cahuilla Indians of Southern California*. University of California Press, Los Angeles.

1978 Cahuilla. In *California*, edited by Robert F. Heizer, pp. 575-587. Handbook of North American Indians, Vol. 8, William G. Sturtevant, general editor. Smithsonian Institution, Washington, D.C.

1990 *Ethnography of the Toro Canyon Cahuilla*. Prepared for George Berkey & Associates, Inc. Cultural Systems Research, Inc., Menlo Park, California.

Bean, Lowell J., and Harry W, Lawton

1993 Some Explanations for the Rise of Cultural Complexity in Native California with Comments on Proto-Agriculture. In *Before the Wilderness: Environmental Management by Native Californians*, edited by Thomas C. Blackburn and Kat Anderson, pp. 27-54. Ballena Press, Menlo Park, California.

Bean, Lowell J., and William B. Mason

1962 *The Romero Expeditions, 1823-1826*. Palm Springs Desert Museum, Palm Springs, California.

Bean, Lowell J., and Katherine Siva Saubel

1972 *Temalpakhe: Cahuilla Indian Knowledge and Usage of Plants*. Malki Museum Press, Morongo Indian Reservation, California.

Bean, Lowell J., Sylvia B. Vane, and Jackson Young

1991 The Cahuilla Landscape: The Santa Rosa and San Jacinto Mountains. *Ballena Press Anthropological Papers* No. 37. Ballena Press, Menlo Park, California.

Brock, James

1998 Historic Property Survey Report For The Widening Of Palm Drive Between Interstate 10 And Two Bunch Palms Drive, Desert Hot Springs, California. RI-04086. Prepared for Pulte Homes/Del Webb. On file at the Eastern Information Center, Anthropology Department; University of California, Riverside.

Brown, Richard E., editor

2011 *Cabot Abram Yerxa: on the Desert Since 1913*. Cabot's Museum Foundation, Desert Hot Springs, California.

Dahdul, Mariam, Harry Quinn, and Zachary Hruby

2008 Final Report Archaeological Testing and Evaluation Program at Sites CA-RIV-2642, - 2643, and a portion of -2646 Near the city of Desert Hot Springs Riverside, County, California. RI-08104. Prepared for Riverside County Planning Department. On file at the Eastern Information Center, Anthropology Department; University of California, Riverside.

Dale, Nancy

1985 *Flowering Plants: The Santa Monica Mountains, Coastal and Chaparral Regions of Southern California*. Capra Press, Santa Barbara, California.

Desert Hot Springs Historical Society

2008 In the Beginning. Desert Hot Springs Historical Society Website. http://www.dhshistoricalsociety.com/desert_hot_springs_history.htm. Accessed May 24, 2022.

Dibblee, L.

1954 Geology of the Imperial Valley Region, California. In *Geology of Southern California*, R. A. Jahns, ed., pp. 21-28. *California Division of Mines and Geology Bulletin* 170. Sacramento.

Drover, Christopher E.

1989 Environmental Impact Evaluation: An Archaeological Assessment of Desert Dunes Resort (Seven Palms Ranch) Desert Hot Springs, Riverside County, California. RI-00954. Prepared for Terra Nova Planning and Research. On file at the Eastern Information Center, Anthropology Department; University of California, Riverside.

Eberhart

1952 Archaeological Site Survey Record, RIV-154. On file at the Eastern Information Center. Anthropology Department; University of California, Riverside.

Forbes, Jack D.

1965 *Warriors of the Colorado*. University of Oklahoma Press: Norman, Oklahoma.

Gray, Dean M.

2016 Hilda M. Gray, Desert Hot Springs Homestead Pioneer, http://www.hildamgray.org. Accessed May 24, 2022.

Hamilton, W.

1961 Origin of the Gulf of California. *Geological Society of America Bulletin* 72:1307-1318.

Jennings, Jesse D.

1964 The Desert West. In *Prehistoric Man in the New World*, J.D. Jennings and E. Norbeck, editors, pp. 149-174. University of Chicago Press, Chicago.

Kroeber, Alfred L.

1925 Handbook of the Indians of California. *Bureau of American Ethnology Bulletin No. 78*, U.S. Government Printing Office, Washington, D.C.

Lantis, David W., Rodney Steiner and Arthur E. Karinen

1963 *California: Land of Contrast*. Wadsworth Publishing Company, Belmont, California.

Lightfoot, Kent G., and Otis Parrish

2009 California Indians and Their Environment: An Introduction. *California Natural History Guides*, 96. University of California Press, Berkeley.

Love, Bruce, and Mariam Dahdul

2002 Desert Chronologies and the Archaic Period in the Coachella Valley. *Pacific Coast Archaeological Society Quarterly* 38(2):65-86.

Mithun, Marianne

1999 *The Language of Native North America*. Cambridge University Press, Cambridge, United Kingdom.

Moratto, Michael J.

1984 *California Archaeology*. Academic Press, New York.

Munz, P. and D. Keck

1973 *A California Flora with Supplemental* by Philip A. Munz. University of California Press, Berkeley.

NETROnline

2022 Historic Aerials by NETROnline. http://www.historicaerials.com/aerials. Accessed May 24, 2022.

O'Neil, Stephen

2001 *Ethnobotanical Research in the Bolsa Chica Region*. Prepared for Dr. Nancy Whitney-Desautels, Scientific Research Systems, Inc., Temecula, California.

Quinn, H. M.

2013 Personal Communication.

Robinson, W. W.

1948 *Land in California*. University of California Press, Berkeley.

Rogers, Malcolm J.

1929 Report on an Archaeological Reconnaissance in the Mojave Sink Region. *San Diego Museum of Man Papers No. 1*. San Diego, California.

1945 An Outline of Yuman Prehistory. *Southwestern Journal of Anthropology* 1(2):167-198.

Schaefer, Jerry

1994 The Challenge of Archaeological Research in the Colorado Desert: Recent Approaches and Discoveries. *Journal of California and Great Basin Anthropology* 16(1):60-80.

Schroth, Adella

1999 *Site Record for CA-RIV-10811*. Record form prepared by Pete McHenry, LSA Associates. February 23, 1999. On file at the Eastern Information Center, Anthropology Department; University of California, Riverside.

Shackley, M. Steven

1984 *Archaeological Investigations in the Western Colorado Desert: A Socio-ecological Approach*. Report on file at the Southeast Information Center, Imperial College Desert Museum, Ocotillo, California.

Steere, Cullis Huntington

1952 *Imperial and Coachella Valleys*. Stanford University Press, Stanford, California.

Stone, Connie L.

1991 The Linear Oasis: Managing Cultural Resources Along the Lower Colorado River. *Monograph* No. 6. Bureau of Land Management, Phoenix, Arizona.

Strong, W. Duncan

1929 Aboriginal Society in Southern California. *University of California Publications in American Archaeology and Ethnology 26*. (Reprinted 1972. *Classics in California Anthropology*, 2. Malki Museum Press, Banning, California.)

UltraSystems Environmental Inc.

2014 Biological Assessment Report for the Quail Ridge Residential Development Project, Riverside County, California. Prepared for: Quail Ridge Partners, LLC. UltraSystems Environmental Inc., Irvine, California.

US Census

2022 Quick Facts: Desert Hot Springs city, California. https://www.census.gov/quickfacts/fact/table/deserthotspringscitycalifornia/PST045221. Accessed July 12, 2022.

USGS (United States Geological Survey, U.S. Department of the Interior)

1943 *Desert Hot Springs, Calif.* 7.5', USGS Quadrangle map.

1955 *Desert Hot Springs, Calif.* 7.5', USGS Quadrangle map.

1962 *Desert Hot Springs, Calif.* 7.5', USGS Quadrangle map.

1971 *Desert Hot Springs, Calif.* 7.5', USGS Quadrangle map.

1975 *Desert Hot Springs, Calif.* 7.5', USGS Quadrangle map.

1986 *Desert Hot Springs, Calif.* 7.5', USGS Quadrangle map.

2015 *Desert Hot Springs, Calif.* 7.5', USGS Quadrangle map.

2018 *Desert Hot Springs, Calif.* 7.5', USGS Quadrangle map.

Wilson, Britt W.

2007 Primary Record, 33-00154 (Seven Palms Village II). Update. On file at the Eastern Information Center. Anthropology Department; University of California, Riverside.

World Population Review

2022 Desert Hot Springs, California Population. https://worldpopulationreview.com/us-cities/desert-hot-springs-ca-population. Accessed July 12, 2022.

Warren, Claude N.

1967 The San Dieguito Complex: A Review and Hypothesis. *American Antiquity* 32(2):168-185.

1968 Cultural tradition and ecological adaptation to the southern California coast. In C. Irwin-William, editor, Archaic prehistory in the Western United States. *Eastern New Mexico Contribution in Anthropology* 1(3):1-14.

1980 Pinto points and Problems in Mojave Desert Archaeology. In L.B. Harten, C.N. Warren, and D.R. Tuohy editors, *Anthropological Papers in Memory of Earl H. Swanson, Jr*., pp. 67-76. Special Publication of the Idaho State Museum of Natural History, Pocatello.

1984 The Desert Region. In *California Archaeology*, Michael J. Moratto (author), pp. 339-430. New York: Academic Press.

Waters, Michael R.

1982 The Lowland Patayan Ceramic Technology. In *Hohokam and Patayan*, R.H.

Weaver, Richard

1980 Archaeological Survey of the Seven Palms Ranch, North Palm Springs, California, RI-00952. Prepared for L. D. King. On file at the Eastern Information Center. Anthropology Department; University of California, Riverside.

Wilke, Philip J.

1978 Late Prehistoric Human Ecology at Lake Cahuilla, Coachella Valley, California. *University of California Archaeological Research Facility Contributions No. 38*. University of California, Berkeley.

APPENDICES

ATTACHMENT A

PROJECT MAPS

Figure 5
PROJECT REGIONAL LOCATION MAP

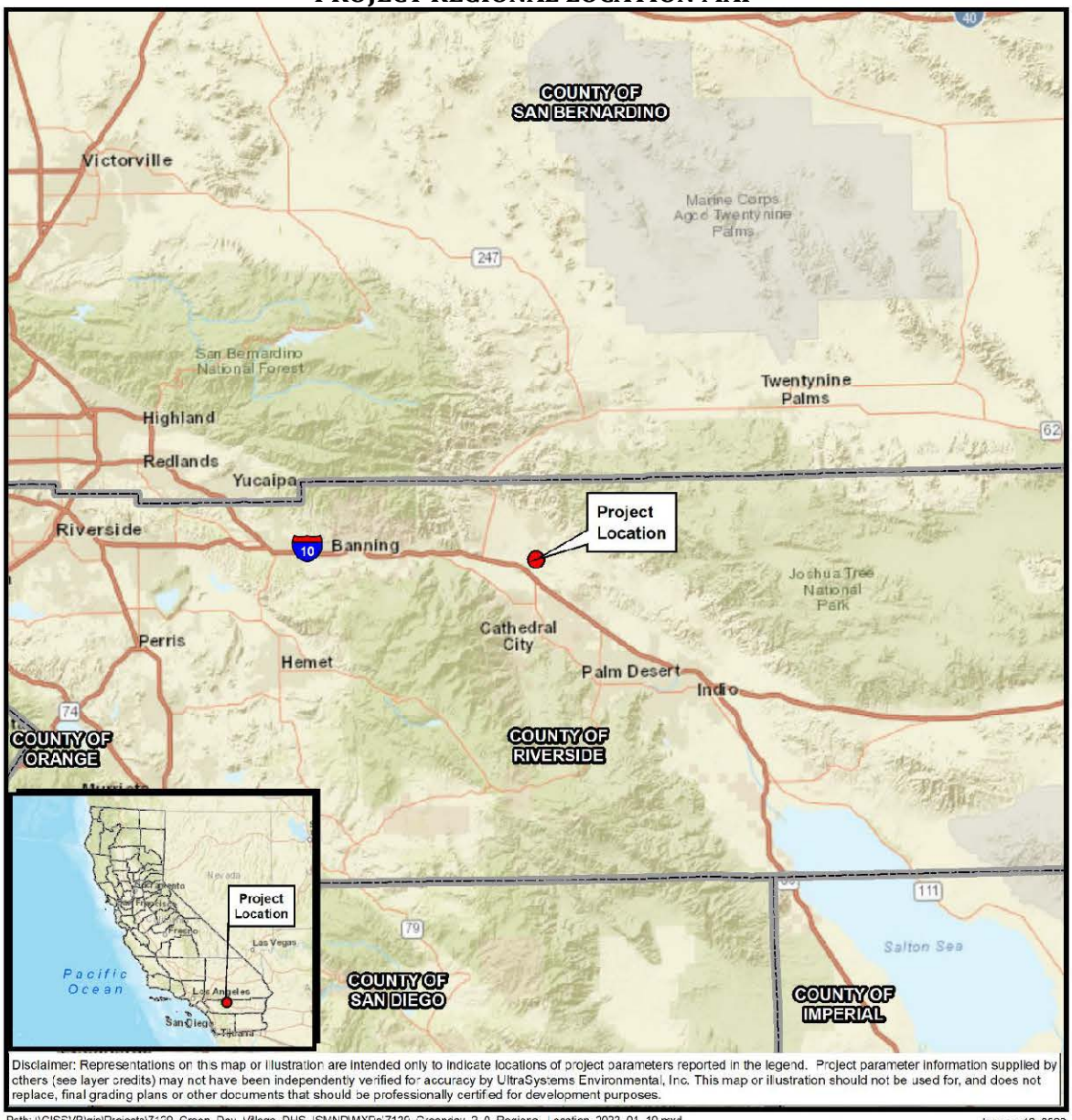


Figure 6
PROJECT STUDY AREA

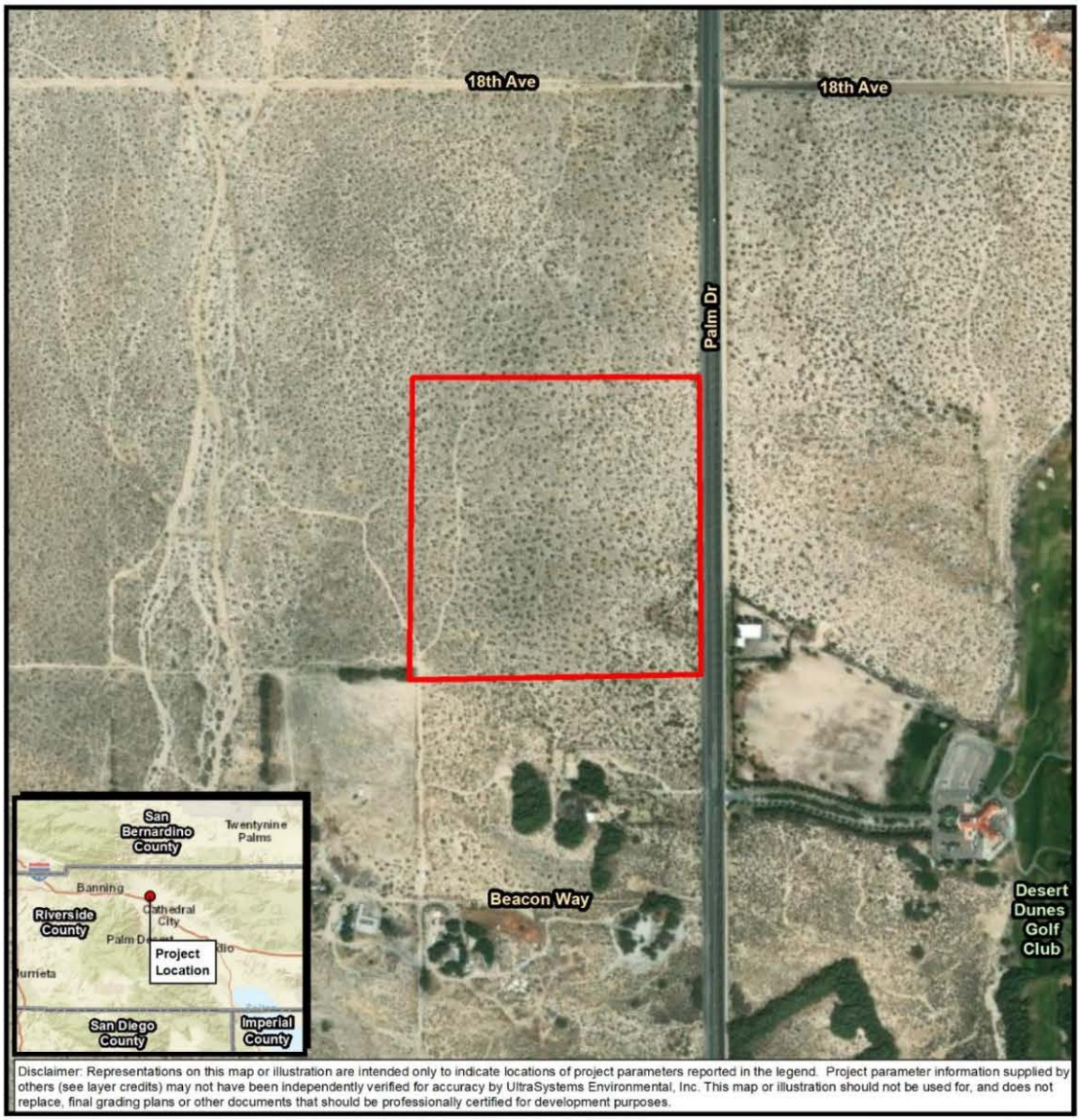
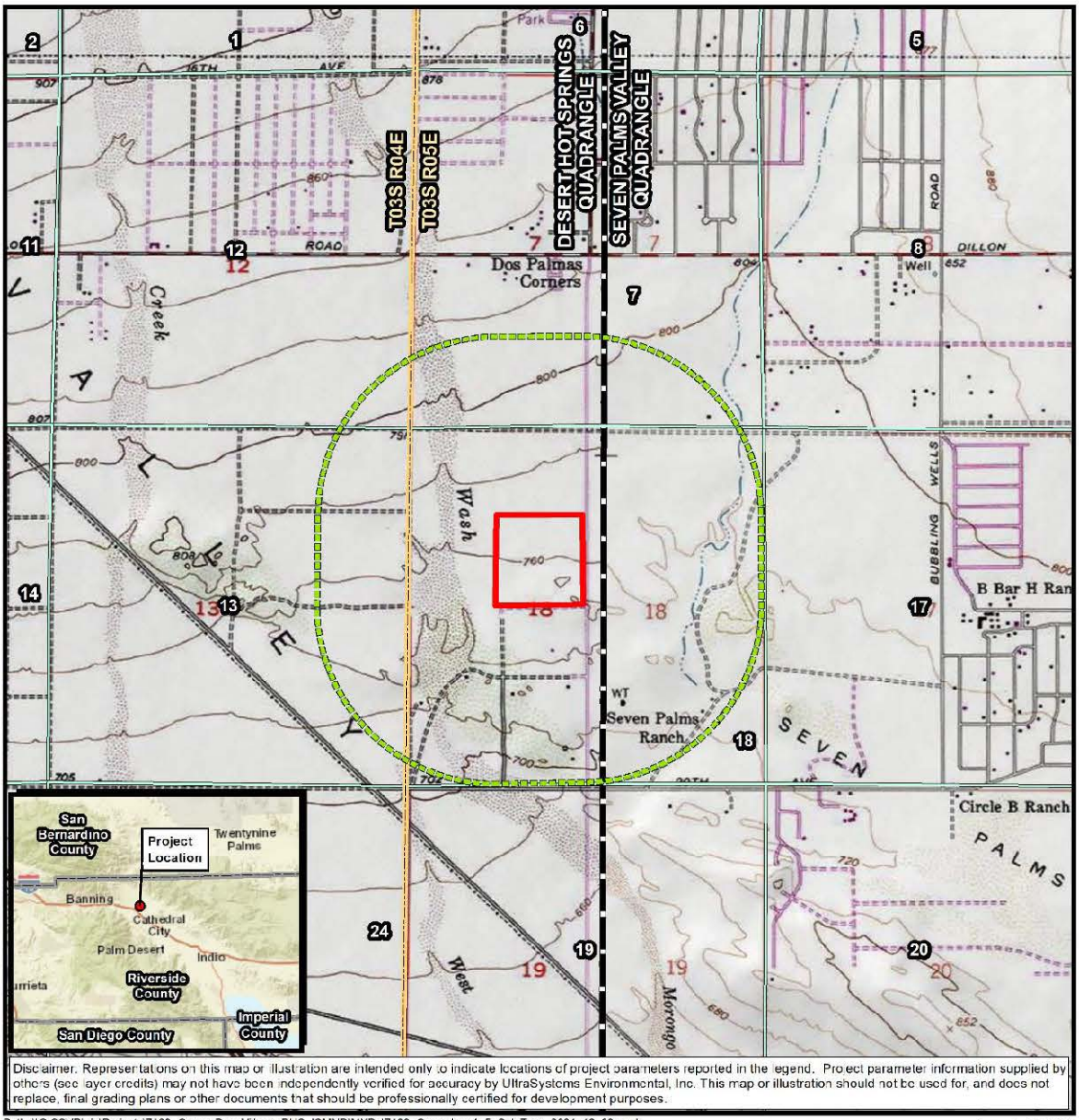


Figure 7
PROJECT STUDY TOPOGRAPHIC MAP



ATTACHMENT B

PERSONNEL BACKGROUND

Stephen O'Neil, M.A., RPA

Cultural Resources Manager, Cultural Anthropology/Archaeology

Education

- M.A., Anthropology (Ethnography emphasis), California State University, Fullerton, CA, 2002
- B.A., Anthropology, California State University, Long Beach, CA, 1979

Professional and Institutional Affiliations

- California Mission Studies Association
- City of Laguna Beach Environmental Sustainability Committee, appointed 2012
- Orange County Natural History Museum; Board Member
- Pacific Coast Archaeological Society; Board Member and Past President
- Society of California Archaeology

Professional Registrations and Licenses

- Register of Professional Archaeologists (No. 16104) (current)
- Riverside County, CA, Cultural Resource Consultant (No. 259) (current)
- Cultural Resource Field Director, BLM Permit (CA-13-19) – California, 2013
- NEPA and CEQ Consultation for Environmental Professionals; course by the National Association of Environmental Professionals, 2013

Professional Experience

Mr. O'Neil has 30 years of experience as a cultural anthropologist in California. He has researched and written on archaeology, ethnography, and history. Mr. O'Neil has archaeological experience in excavation, survey, monitoring, and lab work. Most of this has been on Native American prehistoric sites, but also includes Spanish, Mexican, and American period adobe sites. His supervisory experience includes excavation and survey crew chief and project director of an adobe house excavation. He has a wide range of expertise in Phase I & II Environmental Site Assessments, archaeological resource assessment surveys, salvage operations, and cultural background studies for various EIR projects. Mr. O'Neil has worked for cultural resource management firms as well as government agencies and Native American entities. He has prepared technical reports as well as published journal articles.

Select project experience

Inglewood Avenue Corridor Widening Project, City of Lawndale, Los Angeles County, CA: 2013-2014

Mr. O'Neil directed and conducted archaeological field survey, cultural resource records search, Native American contacts and report writing for this project. The City of Lawndale is widening Inglewood Avenue from Marine Avenue north. The project uses Caltrans funds and the cultural resources report was prepared in Caltrans format. A separate historic properties report was prepared as well. Prepared for Huitt-Zollars Engineering.

Via Ballena Storm Drain Relocation, City of San Clemente, Orange County, CA: 2013

Mr. O'Neil directed and conducted archaeological field survey, cultural resource records search, Native American contacts and report writing for this project. This residential area has a damaged storm drain under Via Ballena that was causing earth movement and erosion. The meet requirements for state funding, and cultural resources inventory report was required. Prepared for the City of San Clemente

Pine Canyon Road – Three Points Road to Lake Hughes Road, Los Angeles County, CA: 2013
Mr. O'Neil directed and conducted archaeological field survey, cultural resource records search, Native American contacts and report writing for this project. This nine-mile portion of Pine Canyon Road lies partially within the Angeles National Forest. A series of widening and culvert repairs is planned by the Los Angeles County Department of Public Works (LACDPW). An assessment was made of possible cultural resources, historic and prehistoric that may be affected by the construction, and four historic sites were recorded. Prepared for LACDPW.

Alton Parkway Extension Project, Cities of Irvine and Lake Forest, Orange County, CA: 2012
Mr. O'Neil directed and conducted archaeological and paleontological monitoring, archaeological excavation, cultural resource records search, Native American contacts and report writing for this project. Alton Parkway was extended 2.1 miles between the cities of Irvine and Lake Forest. For the portion within the City of Irvine, UltraSystems conducted monitoring and excavation services. One prehistoric site was excavated and reported on; a series of living features were discovered and also reported. The final monitoring report described the paleontological and archaeological findings. A separate technical report on the archaeological excavations was also prepared. Mr. O'Neil directed research into historic and prehistoric background, and prepared the final assessment of potential impacts. Prepared for the Orange County Department of Public Works.

NEPA and CEQA Documentation, Los Angeles Regional Interoperable Communications System (LA-RICS), Los Angeles County, CA: 2011-2014
Mr. O'Neil is part of UltraSystems team currently preparing technical studies and NEPA and CEQA documentation toward the construction of LA-RICS, an $800-million emergency communications system due to be operational in 2016. LA-RICS will provide a highly coordinated emergency communications system to all first-responders to natural and man-made disasters throughout Los Angeles County. Mr. O'Neil is the cultural and historical resources studies team leader, directing five researchers. These studies include coordination of field visits to all 260-plus locations for an archaeologist and/or an architectural historian with agency escorts to observe and record any on-site prehistoric and historic features, performing records and literature searches at archaeology information centers and local archives, contacting local agencies for historically listed structures and districts, coordinate public notices of the project throughout Los Angeles County, consultation with the Native American Heritage Commission and all local tribal organizations, and direct consultation with the California State Historic Preservation Officer (SHPO). This information was compiled by Mr. O'Neil and is used to prepare FCC historical resource forms which were submitted to the SHPO for review.

Megan B. Doukakis

Archaeological Technician

Education

- M.A. Public Archaeology, California State University, Northridge, 2019
- B.A., Anthropology, California State University, Long Beach, 2011
- University of California, Los Angeles- Pimu Catalina Archaeological Field School, 2010
- International Scholar Laureate Program: Delegation on Anthropology and Archaeology in China, 2009
- Earthwatch Institute, "Unearthing Mallorca's Past" archaeological excavation, Mallorca, Spain, 2005

Professional and Institutional Affiliations

- Phi Kappa Phi National Honor Society, 2011
- Sigma Alpha Lambda, National Leadership and Honor Organization, 2010
- Society for California Archaeology Membership 2012-2015

Professional Experience

Ms. Black has worked in the field of cultural resource management for five years at environmental firms. Before this Ms. Black had participated in multiple field schools in Southern California and abroad. She has experience in survey, excavation, laboratory work, and information searches. Ms. Black holds the title of Archaeological Technician at UltraSystems Environmental. Prior to this, she completed a CRM internship at UltraSystems. These positions have provided her with the opportunity to contribute to proposals, final reports, project scheduling, archaeological record searches and paleontological, archaeological and Native American monitor organizing for projects.

Select project experience

Results of the Condition Assessment, Site Monitoring, and Effects Treatment Plan (CASMET) Marine Corps Base Camp Pendleton, San Diego County, CA

Client: Marine Corps Base Camp Pendleton, Duration: 5/11 to 9/11

Ms. Black conducted survey and excavation for the USMC Base Camp Pendleton condition assessment project. Areas were tested around Camp Pendleton for the presence and condition of cultural material previously recorded. She also conducted laboratory work and curation for the material collected within excavations. Ms. Black contributed to the final report with background records searches and prehistoric and historic background writing for the report.

Archaeological Excavation Results Report for the Alton Parkway Extension Project, Orange County, CA

Client: Orange County Department of Public Works; Contract: $357,170, 10/10 to 6/12

Ms. Black participated in the Alton Parkway project, City of Irvine, Orange County, CA. She was responsible for cleaning and cataloging the artifacts recovered from the excavation and surface collections. She also contributed to the final report by compiling the historical background information.

Identification and Evaluation of Historic Properties ADA Wheelchair Access Ramp Improvement Project, City of Lake Forest, Orange County, CA

Client: City of Lake Forest/Penco, Contract: $2,981.62, Duration: 6/12 to 7/12

Ms. Black contributed to the cultural resource records search, field survey, Native American contacts and report writing for this project. This residential area required wheelchair access ramps on every

corner in this neighborhood. An assessment of the possible cultural resources that may be affected with this construction was made for the City of Lake Forest. Ms. Black contributed the historic and prehistoric background, and the assessment of the possible resources in the area.

Tenaska Solar Projects Imperial Solar Energy Center–South; Imperial Solar Energy Center–West; and Wistaria Ranch, Imperial County, CA

Client: Tenaska/CSOLAR Development, Contract: $3,441,809, 10/13 to 8/15.

Ms. Black conducted Native American contacts for field monitoring, coordinated with subcontractors to initiate cultural and paleontological field surveys, for the several solar energy projects being handled by UltraSystems Environmental in the El Centro area, Imperial County, CA. She contributed different parts of the survey report and monitoring program documents, including historic and prehistoric background, editorial review. At ISEC- West, Ms. Black was responsible for contacting and organizing Tribal monitors for this project. She contacted tribal organizations and inquired about their interest in providing tribal monitors for this project. Ms. Black directly organized with Native American groups to sign agreements, and fill out tax paperwork. She was also responsible for organizing and keeping track of and gathering field log from monitors from six tribal groups. She also recovered previously recorded artifacts in the field before the start of the project.

NEPA and CEQA Documentation, Los Angeles Regional Interoperable Communications System - Long Term Evolution, Los Angeles County, CA

Client: LARICS Joint Powers Authority, Contract: $3,051,312, 1/12 to 1/15.

UltraSystems' team prepared technical studies and NEPA and CEQA documentation toward the construction of LA-RICS-LTE, an $800-million emergency communications system that will provide a highly coordinated emergency communications system to all first-responders to natural and man-made disasters throughout Los Angeles County. For this project Ms. Black conducted record searches at the South Central Coastal Information Center for the Department of Commerce on over 300 project sites throughout the County of Los Angeles. She helped prepare letters to the NAHC and tribal organizations associated with the project area. Ms. Black contributed to contacting, organizing, and scheduling architectural historians to conduct historical research around the project areas. Letters were written for contact to local agencies and cities. A public notice was constructed and published in three local newspapers. Ms. Black also constructed hundreds of Federal Communications Commission 620 and 621 forms for submission to California State Historic Preservation Office.

Newton Canyon Monitoring Project, CA

Client: County of Los Angeles Department of Public Works, Contract: $2,930.00, Duration: 7/13 to 12/13

Ms. Black was an archaeological monitor for this project. She monitored all ground disturbing activities as well as lightly surveying the area for cultural material. Ms. Black also conducted the records center research at the South Central Coastal Information Center at CSUF. Through email, letter, and telephone correspondence, Ms. Black contacted the NAHC and associated tribal groups.

ATTACHMENT C

Native American Heritage Commission Records Search and Native American Contacts

UltraSystems
environmental•management•planning

December 9, 2021

Government Program Analyst
Native American Heritage Commission
1550 Harbor Blvd., Suite 100
West Sacramento, California 95691

Subject: Cultural Resources Inventory- Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear NAHC Staff,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems will conduct a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary. I am requesting a Native American Contact List of interested tribes, organizations and individuals in the general Project area, and a search of the Sacred Lands File for potential traditional cultural sites.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the Desert Dunes Golf Club and to the south are residential properties.

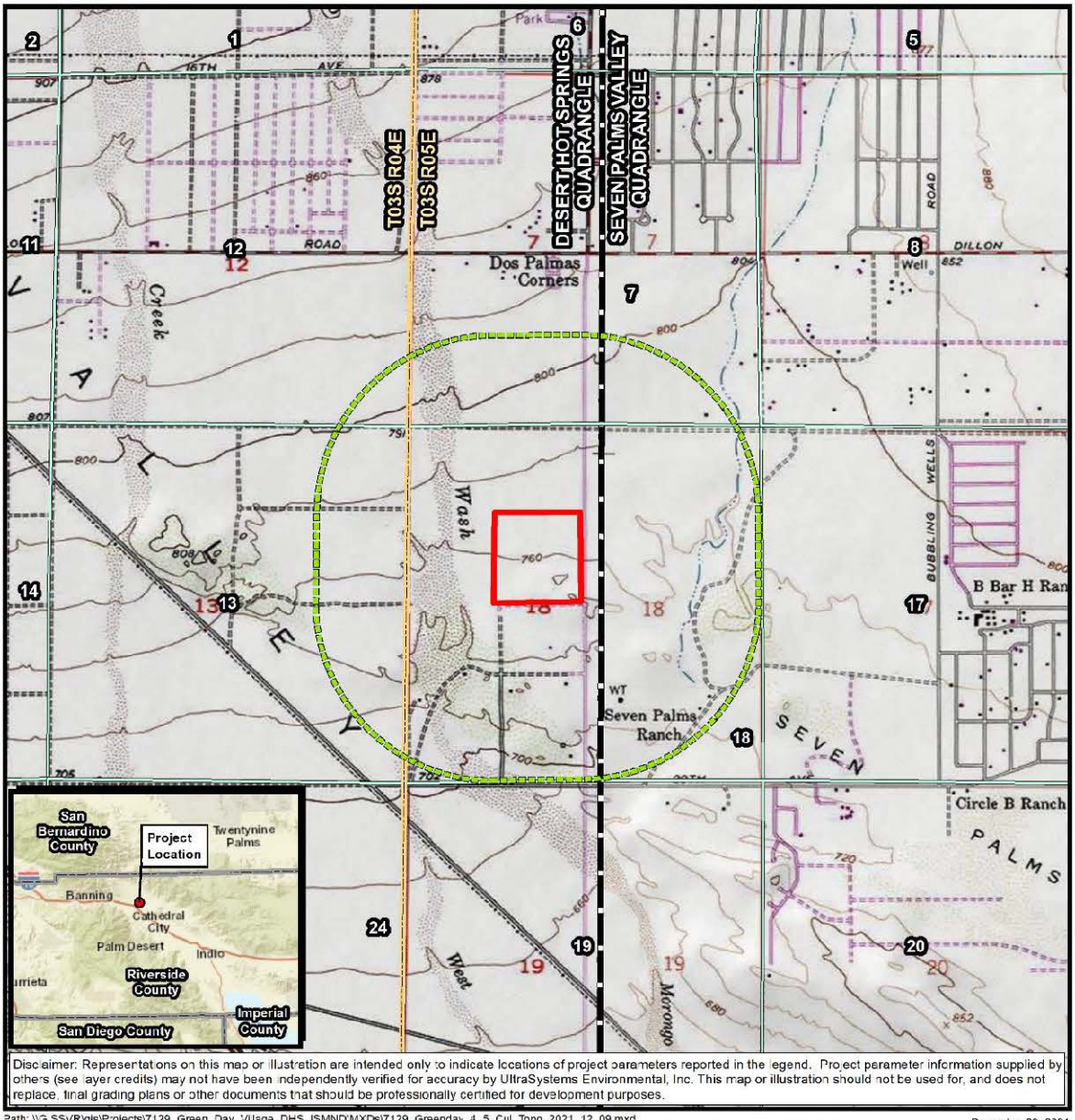
If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com



Path: \\G SSVR\gis\Projects\7129_Green_Day_Village_DHS_ISMND\MXDs\7129_Greenday_4_5_Cul_Topo_2021_12_09.mxd December 09, 2021
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Copyright © 2013 National Geographic Society, i-cubed, Cal-Atlas, 2015, California Department of Conservation, 2019; UltraSystems Environmental, Inc., 2021

Scale: 1:24,000

N

0 1,000 2,000 Feet

0 250 500 Meters

Legend

- Project Boundary
- Half-Mile Radius
- Quadrangle Boundary
- Township Boundary
- Section Boundary

Green Day Village Project

Topographic Map
USGS Quadrangle: Desert Hot Springs
Township: 3S Range: 5E
Section: 18

UltraSystems

STATE OF CALIFORNIA — Gavin Newsom, *Governor*

NATIVE AMERICAN HERITAGE COMMISSION

CHAIRPERSON
Laura Miranda
Luiseño

VICE CHAIRPERSON
Reginald Pagaling
Chumash

PARLIAMENTARIAN
Russell Attebery
Karuk

SECRETARY
Sara Dutschke
Miwok

COMMISSIONER
William Mungary
Paiute/White Mountain Apache

COMMISSIONER
Isaac Bojorquez
Ohlone-Costanoan

COMMISSIONER
Buffy McQuillen
Yokayo Pomo, Yuki, Nomlaki

COMMISSIONER
Wayne Nelson
Luiseño

COMMISSIONER
Stanley Rodriguez
Kumeyaay

EXECUTIVE SECRETARY
Christina Snider
Pomo

NAHC HEADQUARTERS
1550 Harbor Boulevard
Suite 100
West Sacramento,
California 95691
(916) 373-3710
nahc@nahc.ca.gov
NAHC.ca.gov

February 7, 2022

Stephen O'Neil
UltraSystems Environmental

Via Email to: soneil@ultrasystems.com

Re: Green Day Village Project, Riverside County

Dear Mr. O'Neil:

A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information submitted for the above referenced project. The results were positive. Please contact the Agua Caliente Band of Cahuilla Indians on the attached list for information. Please note that tribes do not always record their sacred sites in the SLF, nor are they required to do so. A SLF search is not a substitute for consultation with tribes that are traditionally and culturally affiliated with a project's geographic area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites, such as the appropriate regional California Historical Research Information System (CHRIS) archaeological Information Center for the presence of recorded archaeological sites.

Attached is a list of Native American tribes who may also have knowledge of cultural resources in the project area. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. Please contact all of those listed; if they cannot supply information, they may recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call or email to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from tribes, please notify the NAHC. With your assistance, we can assure that our lists contain current information.

If you have any questions or need additional information, please contact me at my email address: Andrew.Green@nahc.ca.gov.

Sincerely,

Andrew Green

Andrew Green
Cultural Resources Analyst

Attachment

Page 1 of 1

Native American Heritage Commission
Native American Contact List
Riverside County
2/7/2022

Agua Caliente Band of Cahuilla Indians
Patricia Garcia-Plotkin, Director
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264
Phone: (760) 699 - 6907
Fax: (760) 699-6924
ACBCI-THPO@aguacaliente.net

Agua Caliente Band of Cahuilla Indians
Jeff Grubbe, Chairperson
5401 Dinah Shore Drive — Cahuilla
Palm Springs, CA, 92264
Phone: (760) 699 - 6800
Fax: (760) 699-6919

Augustine Band of Cahuilla Mission Indians
Amanda Vance, Chairperson
P.O. Box 846 — Cahuilla
Coachella, CA, 92236
Phone: (760) 398 - 4722
Fax: (760) 369-7161
hhaines@augustinetribe.com

Cabazon Band of Mission Indians
Doug Welmas, Chairperson
84-245 Indio Springs Parkway — Cahuilla
Indio, CA, 92203
Phone: (760) 342 - 2593
Fax: (760) 347-7880
jstapp@cabazonindians-nsn.gov

Cahuilla Band of Indians
Daniel Salgado, Chairperson
52701 U.S. Highway 371 — Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 5549
Fax: (951) 763-2808
Chairman@cahuilla.net

Los Coyotes Band of Cahuilla and Cupeño Indians
Ray Chapparosa, Chairperson
P.O. Box 189 — Cahuilla
Warner Springs, CA, 92086-0189
Phone: (760) 782 - 0711
Fax: (760) 782-0712

Morongo Band of Mission Indians
Ann Brierty, THPO
12700 Pumarra Road — Cahuilla
Banning, CA, 92220 — Serrano
Phone: (951) 755 - 5259
Fax: (951) 572-6004
abrierty@morongo-nsn.gov

Morongo Band of Mission Indians
Robert Martin, Chairperson
12700 Pumarra Road — Cahuilla
Banning, CA, 92220 — Serrano
Phone: (951) 755 - 5110
Fax: (951) 755-5177
abrierty@morongo-nsn.gov

Quechan Tribe of the Fort Yuma Reservation
Manfred Scott, Acting Chairman
Kw'ts'an Cultural Committee
P.O. Box 1899 — Quechan
Yuma, AZ, 85366
Phone: (928) 750 - 2516
scottmanfred@yahoo.com

Quechan Tribe of the Fort Yuma Reservation
Jill McCormick, Historic Preservation Officer
P.O. Box 1899 — Quechan
Yuma, AZ, 85366
Phone: (760) 572 - 2423
historicpreservation@quechantribe.com

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Green Day Village Project, Riverside County.

PROJ-2022-000435 — 02/07/2022 03:38 PM — 1 of 2

Native American Heritage Commission
Native American Contact List
Riverside County
2/7/2022

Ramona Band of Cahuilla
Joseph Hamilton, Chairperson
P.O. Box 391670 — Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 4105
Fax: (951) 763-4325
admin@ramona-nsn.gov

Ramona Band of Cahuilla
John Gomez, Environmental Coordinator
P. O. Box 391670 — Cahuilla
Anza, CA, 92539
Phone: (951) 763 - 4105
Fax: (951) 763-4325
jgomez@ramona-nsn.gov

San Manuel Band of Mission Indians
Jessica Mauck, Director of Cultural Resources
26569 Community Center Drive — Serrano
Highland, CA, 92346
Phone: (909) 864 - 8933
Jessica.Mauck@sanmanuel-nsn.gov

Santa Rosa Band of Cahuilla Indians
Lovina Redner, Tribal Chair
P.O. Box 391820 — Cahuilla
Anza, CA, 92539
Phone: (951) 659 - 2700
Fax: (951) 659-2228
lsaul@santarosa-nsn.gov

Serrano Nation of Mission Indians
Wayne Walker, Co-Chairperson
P. O. Box 343 — Serrano
Patton, CA, 92369
Phone: (253) 370 - 0167
serranonation1@gmail.com

Serrano Nation of Mission Indians
Mark Cochrane, Co-Chairperson
P. O. Box 343 — Serrano
Patton, CA, 92369
Phone: (909) 528 - 9032
serranonation1@gmail.com

Soboba Band of Luiseno Indians
Isaiah Vivanco, Chairperson
P. O. Box 487 — Cahuilla
San Jacinto, CA, 92581 — Luiseno
Phone: (951) 654 - 5544
Fax: (951) 654-4198
ivivanco@soboba-nsn.gov

Soboba Band of Luiseno Indians
Joseph Ontiveros, Cultural Resource Department
P.O. BOX 487 — Cahuilla
San Jacinto, CA, 92581 — Luiseno
Phone: (951) 663 - 5279
Fax: (951) 654-4198
jontiveros@soboba-nsn.gov

Torres-Martinez Desert Cahuilla Indians
Michael Mirelez, Cultural Resource Coordinator
P.O. Box 1160 — Cahuilla
Thermal, CA, 92274
Phone: (760) 399 - 0022
Fax: (760) 397-8146
mmirelez@tmdci.org

Twenty-Nine Palms Band of Mission Indians
Anthony Madrigal, Tribal Historic Preservation Officer
46-200 Harrison Place — Chemehuevi
Coachella, CA, 92236
Phone: (760) 775 - 3259
amadrigal@29palmsbomi-nsn.gov

Twenty-Nine Palms Band of Mission Indians
Darrell Mike, Chairperson
46-200 Harrison Place — Chemehuevi
Coachella, CA, 92236
Phone: (760) 863 - 2444
Fax: (760) 863-2449
29chairman@29palmsbomi-nsn.gov

This list is current only as of the date of this document. Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources assessment for the proposed Green Day Village Project, Riverside County.

PROJ-2022-000435 — 02/07/2022 03:38 PM — 2 of 2

UltraSystems
environmental•management•planning

February 9, 2022

Ann Brierty, THPO
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA, 92220

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear THPO Brierty,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Morongo Band of Mission Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Ray Chapparosa, Chairperson
Los Coyotes Band of Cahuilla and Cupeño Indians
P.O. Box 189
Warner Springs, CA, 92086-0189

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Chairperson Chapparosa,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Los Coyotes Band of Cahuilla and Cupeño Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Mark Cochrane, Co-Chairperson
Serrano Nation of Mission Indians
P. O. Box 343
Patton, CA, 92369

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Co-Chairperson Cochrane,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Serrano Nation of Mission Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Patricia Garcia-Plotkin, Director
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA, 92264

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Director Garcia-Plotkin,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]. Please contact the Agua Caliente Band of Cahuilla Indians on the attached list for information." Information on the SLF traditional site, and any other cultural resources in the project study area that the tribe is willing to share with us for the study would be appreciated.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

John Gomez, Environmental Coordinator
Ramona Band of Cahuilla
P. O. Box 391670
Anza, CA, 92539

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Coordinator Gomez,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Ramona Band of Cahuilla.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Jeff Grubbe, Chairperson
Agua Caliente Band of Cahuilla Indians
5401 Dinah Shore Drive
Palm Springs, CA, 92264

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Chairperson Grubbe,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]. Please contact the Agua Caliente Band of Cahuilla Indians on the attached list for information." Information on the SLF traditional site, and any other cultural resources in the project study area that the tribe is willing to share with us for the study would be appreciated.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Joseph Hamilton, Chairperson
Ramona Band of Cahuilla
P.O. Box 391670
Anza, CA, 92539

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Chairperson Hamilton,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Ramona Band of Cahuilla.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Anthony Madrigal, Tribal Historic Preservation Officer
Twenty-Nine Palms Band of Mission Indians
46-200 Harrison Place
Coachella, CA, 92236

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Officer Madrigal,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Twenty-Nine Palms Band of Mission Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Robert Martin, Chairperson
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA, 92220

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Chairperson Martin,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Morongo Band of Mission Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Jessica Mauck, Director of Cultural Resources
San Manuel Band of Mission Indians
26569 Community Center Drive
Highland, CA, 92346

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Director Mauck,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the San Manuel Band of Mission Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental • management • planning

February 9, 2022

Jill McCormick, Historic Preservation Officer
Quechan Tribe of the Fort Yuma Reservation
P.O. Box 1899
Yuma, AZ, 85366

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Officer McCormick,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Quechan Tribe of the Fort Yuma Reservation.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Darrell Mike, Chairperson
Twenty-Nine Palms Band of Mission Indians
46-200 Harrison Place
Coachella, CA, 92236

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Chairperson Mike,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Twenty-Nine Palms Band of Mission Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Michael Mirelez, Cultural Resource Coordinator
Torres-Martinez Desert Cahuilla Indians
P.O. Box 1160
Thermal, CA, 92274

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Coordinator Mirelez,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Torres-Martinez Desert Cahuilla Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Joseph Ontiveros, Cultural Resource Department
Soboba Band of Luiseno Indians
P.O. BOX 487
San Jacinto, CA, 92581

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Mr. Ontiveros,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Soboba Band of Luiseno Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Lovina Redner, Tribal Chair
Santa Rosa Band of Cahuilla Indians
P.O. Box 391820
Anza, CA, 92539

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Chair Redner,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Santa Rosa Band of Cahuilla Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Daniel Salgado, Chairperson
Cahuilla Band of Indians
52701 U.S. Highway 371
Anza, CA, 92539

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Chairperson Salgado,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Cahuilla Band of Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Manfred Scott, Acting Chairman Kw'ts'an Cultural Committee
Quechan Tribe of the Fort Yuma Reservation
P.O. Box 1899
Yuma, AZ, 85366

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Chairperson Scott,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Quechan Tribe of the Fort Yuma Reservation.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Amanda Vance, Chairperson
Augustine Band of Cahuilla Mission Indians
P.O. Box 846
Coachella, CA, 92236

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Chairperson Vance,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Augustine Band of Cahuilla Mission Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Isaiah Vivanco, Chairperson
Soboba Band of Luiseno Indians
P. O. Box 487
San Jacinto, CA, 92581

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Chairperson Vivanco,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Soboba Band of Luiseno Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Wayne Walker, Co-Chairperson
Serrano Nation of Mission Indians
P. O. Box 343
Patton, CA, 92369

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Co-Chairperson Walker,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Serrano Nation of Mission Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

February 9, 2022

Doug Welmas, Chairperson
Cabazon Band of Mission Indians
84-245 Indio Springs Parkway
Indio, CA, 92203

Subject: Cultural Resources Inventory - Green Day Village Project, Desert Hot Springs, Riverside County, California. UltraSystems Environmental Project No. 7129.

Dear Chairperson Welmas,

UltraSystems Environmental, Inc. (UEI) has been contracted by LA World Construction to conduct a Cultural Resources Inventory in support of the Green Day Village Project. The Project consists of the development of a tiny home community in the city of Desert Hot Springs, Riverside County, California. UltraSystems is conducting a cultural resources study to evaluate the potential presence of prehistoric and historic resources within the project boundary.

The proposed project would include the development of a community of tiny homes on a 38.34 acre parcel. They would be constructing 665 dwellings totaling 159,200 sq. ft., with 86,420 sq. ft. of landscaping area. Currently, the project area is undeveloped open land.

As part of the cultural resources study for the Project, I am writing to request your input on potential Native American resources in or near the Area of Potential Effect (APE). In a letter dated February 7, 2021, the Native American Heritage Commission stated: "A record search of the Native American Heritage Commission (NAHC) Sacred Lands File (SLF) was completed for the information you have submitted for the above referenced project. The results were positive [emphasis in the original]." The Commission recommended that local Native American individuals and organizations be contacted for further information, including the Cabazon Band of Mission Indians.

The Project is located in the southeast portion of the City of Desert Hot Springs, and is specifically located along Palm Drive, midblock between 18th Avenue and 20th Avenue. This may be seen on the *Desert Hot Springs, Calif.*, USGS topographical quadrangle, R 05 E, T 03 S, in the SE ¼ of the NW ¼ of Section 18. The subject property is bordered on the north and west with open land. To the east of the project area is the open land and the Desert Dunes Golf Club and to the south are scattered residential properties in otherwise open land. This is shown on the enclosed map and the Project area is depicted with a half-mile buffer zone.

If you require additional information or have any questions, please contact me.

Thank you for your help.

Sincerely,

Stephen O'Neil, M.A., RPA
Cultural Resources Manager
soneil@ultrasystems.com

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-7443
Telephone: 949.788.4900, ext. 276
Facsimile: 949.788.4901
Website: www.ultrasystems.com

From: Steve Oneil
To: Ryan Nordness
Cc: Megan Black
Subject: RE: Information request for Green Day Village Project, Desert Hot Springs, Riverside County, CA
Date: Wednesday, March 2, 2022 11:22:44 AM
Attachments: image001.jpg

Good morning Ryan,

Thank you for your reply regarding the Green Day Village Project in Desert Hot Springs representing the San Manuel Band. Your reply will be placed in the project's cultural resources inventory report.

Best regards,

Steve

Stephen O'Neil | Cultural Resources Manager | M.A./RPA

UltraSystems Environmental | WBE/DBE/SBE/WOSB
16431 Scientific Way
Irvine, CA 92618
Office **949.788.4900 ext. 276**
Fax 949.788.4901
Cell 949.677.2391



Please consider the environment before printing this e-mail. Thank you.
E-Mail Confidentiality Notice: The information contained in this e-mail message is intended only for the personal and confidential use of the recipient(s) named above. This message may be an attorney-client communication and/or work product and as such is privileged and confidential. If the reader of this message is not the intended recipient, you are hereby notified that you have received this document in error and that any review, dissemination, distribution, or copying of this message is strictly prohibited. If you have received this communication in error, please notify us immediately by e-mail, and delete the original message.

From: Ryan Nordness <Ryan.Nordness@sanmanuel-nsn.gov>
Sent: Tuesday, March 1, 2022 2:33 PM
To: Steve Oneil <soneil@ultrasystems.com>
Subject: RE: Information request for Green Day Village Project, Desert Hot Springs, Riverside County, CA

Hello Stephen,
Thank you for contacting the San Manuel Band of Mission Indians (SMBMI) regarding the above-referenced project. SMBMI appreciates the opportunity to review the project documentation, which was received by the Cultural Resources Management Department on February 24th. The proposed project is located outside of Serrano ancestral territory and, as such, SMBMI will not be requesting to receive consulting party status with the lead agency or to participate in the scoping, development, or review of documents created pursuant to legal and regulatory mandates.

Kind regards,
Ryan Nordness
Cultural Resource Analyst
San Manuel Band of Mission Indians

From: Steve Oneil
To: Bonnie Bryant
Cc: Ryan Nordness; Megan Black
Subject: RE:7129 Green Day Village - Section 106 tribal consultation
Date: Thursday, March 3, 2022 10:14:29 AM
Attachments: ~WRD0000.jpg
image001.jpg

Mr. Bryant,

Thank you for responding on behalf of the San Manuel Band regarding the Green Day Village project in Desert Hot Springs. Your information and email will be included in our cultural resources inventory report.

Yours,

Steve O'Neil

Stephen O'Neil | Cultural Resources Manager | M.A./RPA
UltraSystems Environmental | WBE/DBE/SBE/WOSB
16431 Scientific Way
Irvine, CA 92618
Office **949.788.4900 ext. 276**
Fax 949.788.4901
Cell 949.677.2391

Please consider the environment before printing this e-mail. Thank you.
E-Mail Confidentiality Notice: The information contained in this e-mail message is intended only for the personal and confidential use of the recipient(s) named above. This message may be an attorney-client communication and/or work product and as such is privileged and confidential. If the reader of this message is not the intended recipient, you are hereby notified that you have received this document in error and that any review, dissemination, distribution, or copying of this message is strictly prohibited. If you have received this communication in error, please notify us immediately by e-mail, and delete the original message.

From: Bonnie Bryant <Bonnie.Bryant@sanmanuel-nsn.gov>
Sent: Thursday, March 3, 2022 8:39 AM
To: Soneil@ultrasystems.com
Cc: Ryan Nordness <Ryan.Nordness@sanmanuel-nsn.gov>
Subject: Section 106 tribal consultation

Hello, Mr. O'Neil

Project: Green Village #7129
Thank you for contacting the San Manuel Band of Mission Indians regarding the proposed project. This project is located outside of Serrano ancestral territory, and, as a result, SMBMI will not be requesting consultation under 106 for this undertaking.

Respectfully,
Mr. Bonnie Bryant
Cultural Resources Technician
Bonnie.Bryant@sanmanuel-nsn.gov

Bonnie Bryant
Cultural Resources Tech
Bonnie.Bryant@sanmanuel-nsn.gov
O:(909) 864-8933 x 50-2033
M:(909) 633-6615
26569 Community Center Dr Highland, California 92346

From: mblack@ultrasystems.com
To: "Quechan Historic Preservation Officer"
Subject: RE: 7129- Green Day Village Project, Riverside County
Date: Wednesday, February 16, 2022 10:24:33 AM
Attachments: image001.jpg

Thank you for your response.

Best regards,

Megan Black Doukakis | Archaeological Technician | M.A.

UltraSystems Environmental | WBE/DBE/SBE/WOSB
16431 Scientific Way Irvine, CA 92618
Office **949.788.4900 Ext. 228** Fax 949.788.4901
Cell 310.850.8127

Please note that I am working remotely. I can best be reached via email or cell.

Description: Ultrasystems logo2.tif

please consider the environment before printing this e-mail. Thank you.

E-Mail Confidentiality Notice: The information contained in this e-mail message is intended only for the personal and confidential use of the recipient(s) named above. This message may be an attorney-client communication and/or work product and as such is privileged and confidential. If the reader of this message is not the intended recipient, you are hereby notified that you have received this document in error and that any review, dissemination, distribution, or copying of this message is strictly prohibited. If you have received this communication in error, please notify us immediately by e-mail, and delete the original message.

1994 – 2019 | Celebrating 25 Years in Business!

From: Quechan Historic Preservation Officer <historicpreservation@quechantribe.com>
Sent: Tuesday, February 15, 2022 11:28 AM
To: mblack@ultrasystems.com
Subject: RE: 7129- Green Day Village Project, Riverside County

This email is to inform you that we have no comments on this project. We defer to the more local Tribes and support their decisions on the projects.

Native American Contact Log

Name	Tribe/Affiliation	Letter and Fax Contacts	E-mail Contacts	Telephone Contacts	Comments
Andrew Green, Asst. Government Program Analyst	Native American Heritage Commission	N/A	Dec. 9, 2021	N/A	Request for Sacred Lands File search and local Native American representatives contact information. Reply received February 7, 2022 from Andrew Green.
Patricia Garcia-Plotkin, Director	Agua Caliente Band of Cahuilla Indians	February 9, 2022 (Letter)	February 9, 2022	June 27, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022. A phone call was made June 27, 2022. There was no answer; a message was left. No response to date.
Jeff Grubbe, Chairperson	Agua Caliente Band of Cahuilla Indians	February 9, 2022 (Letter)	No email address available	June 27, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022. A phone call was made June 27, 2022. There was no answer; a message was left on the administrative assistants answering machine. No response to date.
Amanda Vance, Chairperson	Augustine Band of Cahuilla Mission Indians	February 9, 2022 (Letter)	February 9, 2022	June 28, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022. A phone call was made June 28, 2022. The tribal receptionist indicated that the Chairperson was not int. She took a message and indicated that she would pass our message along to their operations team and they will get back to us. No response to date.
Doug Welmas, Chairperson	Cabazon Band of Mission Indians	February 9, 2022 (Letter)	February 9, 2022	June 28, 2022	Letter and email describing project and requesting input on concerns was sent

Name	Tribe/Affiliation	Letter and Fax Contacts	E-mail Contacts	Telephone Contacts	Comments
					February 9, 2022. A phone call was made June 28, 2022. There was no answer; a message was left. No response to date.
Daniel Salgado, Chairperson	Cahuilla Band of Indians	February 9, 2022 (Letter)	No email address available	June 28, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022. A phone call was made June 28, 2022. The tribal receptionist indicated that the Chairperson was not available and transferred me to his receptionist's voicemail. A message was left. No response to date.
Ray Chapparosa, Chairperson	Los Coyote Band of Cahuilla and Cupeno Indians	February 9, 2022 (Letter)	February 9, 2022	June 28, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022. A phone call was made June 28, 2021. The tribal receptionist indicated that he was not in the office and took a message. No response to date.
Anne Brierty, THPO	Morongo Band of Mission Indians	February 9, 2022 (Letter)	February 9, 2022	June 28, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022. A phone call was made June 28, 2022. There was no answer; a message was left. No response to date.
Robert Martin, Chairperson	Morongo Band of Mission Indians	February 9, 2022 (Letter)	February 9, 2022	June 28, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022. A phone call was made June 28, 2022. There was no answer; a message was left. No response to date.

Name	Tribe/Affiliation	Letter and Fax Contacts	E-mail Contacts	Telephone Contacts	Comments
Lovina Redner, Tribal Chair	Santa Rosa Band of Cahuilla Indians	February 9, 2022 (Letter)	February 9, 2022	June 27, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022. A phone call was made June 27, 2022. The tribal receptionist indicated that the Chair was not in the office and that we email is the best way to reach her. No response to date
Manfred Scott, Acting Chairman	Quechan Tribe of the Fort Yuma Reservation	February 9, 2022 (Letter)	February 9, 2022	N/A	Letter and email describing project and requesting input on concerns was sent February 9, 2022. Email response was received on February 15, 2022 from Ms. McCormick indicating that they have no comments on this project defer to the more local Tribes and support their decisions on the project.
Jill McCormick, Historic Preservation Officer	Quechan Tribe of the Fort Yuma Reservation	February 9, 2022 (Letter)	February 9, 2022	N/A	Letter and email describing project and requesting input on concerns was sent February 9, 2022. Email response was received on February 15, 2022 from Ms. McCormick indicating that they have no comments on this project defer to the more local Tribes and support their decisions on the project.
Joseph Hamilton, Chairperson	Ramon Band of Cahuilla	February 9, 2022 (Letter)	February 9, 2022	June 28, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022. A phone call was made June 28, 2022. There was no answer; a message was left. No response to date.
John Gomez, Environmental Coordinator	Ramon Band of Cahuilla Indians	February 9, 2022 (Letter)	February 9, 2022	June 28, 2022	Letter and email describing project and requesting input on

Name	Tribe/Affiliation	Letter and Fax Contacts	E-mail Contacts	Telephone Contacts	Comments
					concerns was sent February 9, 2022. A phone call was made June 28, 2022. There was no answer; a message was left. No response to date.
Jessica Mauck, Director of Cultural Resources	San Manuel Band of Mission Indians	February 9, 2022 (Letter)	February 9, 2022	N/A	Letter and email describing project and requesting input on concerns was sent February 9, 2022. An email response was received on March 1, 2022 from Ryan Nordness, Cultural Resource Analyst indicating that the project area is outside of their ancestral territory and would not like to consult. A second response was received on March 3 from Mr. Bonnie Bryant, Cultural Resources Technician indicating that the project area is outside of their ancestral territory and would not like to consult.
Wayne Walker, Co-Chairperson	Serrano Nation of Mission Indians	February 9, 2022 (Letter)	February 9, 2022	June 28, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022 A phone call was made June 28, 2022. There was no answer; a message was left. No response to date.
Mark Cochrane, Co-Chairperson	Serrano Nation of Mission Indians	February 9, 2022 (Letter)	February 9, 2022	June 28, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022. A phone call was made June 28, 2022. The Phone line was disconnected. No message was left. No response to date.
Michael Mirelez, Cultural	Torres-Martinez Desert Cahuilla Indians	February 9, 2022 (Letter)	February 9, 2022	June 28, 2022	Letter and email describing project and requesting input on

Name	Tribe/Affiliation	Letter and Fax Contacts	E-mail Contacts	Telephone Contacts	Comments
Resource Coordinator					concerns was sent February 9, 2022. A phone call was made June 28, 2022. There was no answer; The answering machine was full so no message was left. No response to date.
Isaiah Vivanco, Chairperson	Soboba Band of Luiseño Indians	February 9, 2022 (Letter)	February 9, 2022	June 27, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022. A phone call was made June 27, 2022 to Mr. Ontiveros – see below.
Joseph Ontiveros, Cultural Resource Department	Soboba Band of Luiseño Indians	February 9, 2022 (Letter)	February 9, 2022	June 27, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022. A phone call was made June 27, 2022 to Mr. Ontiveros and he indicated that the project area is sensitive and near a TCP for the tribe. He indicated that the tribe can provide information about that TCP during consultation with the lead agency. Mr. Ontiveros also requested Native American monitoring during ground disturbance.
Anthony Madrigal, Tribal Historic Preservation Officer	Twenty-Nine Palms Band of Mission Indians	February 9, 2022 (Letter)	February 9, 2022	June 28, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022. A phone call was made June 28, 2022. Mr. Madrigal asked that I contact Sarah Bliss, Director of Tribal Programs. She was called the same day and asked that I forward her the letter that we sent to Mr. Madrigal and she will

Name	Tribe/Affiliation	Letter and Fax Contacts	E-mail Contacts	Telephone Contacts	Comments
					provide a response. This email was sent the same day. No response to date.
Carrel Mike, Chairperson	Twenty-Nine Palms Band of Mission Indians	February 9, 2022 (Letter)	February 9, 2022	June 28, 2022	Letter and email describing project and requesting input on concerns was sent February 9, 2022. A phone call was made June 28, 2022. Mr. Madrigal asked that I contact Sarah Bliss, Director of Tribal Programs. She was called the same day and asked that I forward her the letter that we sent to Mr. Madrigal and she will provide a response. This email was sent the same day. No response to date.

ATTACHMENT D

CHRIS Records Search Bibliography

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
RI-00510	NADB-R - 1080549; Other - UCRARU #337; Voided - MF-0442	1978	Stan Wilmoth	Environmental Impact Evaluation: Archaeological Assessment of Tentative Parcel Map 12196, Murrieta Area of Riveside County, California	Archaeological Research Unit, U.C. Riverside	
RI-01854	NADB-R - 1082231; Voided - MF-2016	1984	SCIENTIFIC RESOURCE SURVEYS, INC.	ARCHAEOLOGICAL ASSESSMENT - CA. 80 ACRES NEAR MURRIETA	AUTHOR(S)	
RI-01990	NADB-R - 1082409; Submitter - 825; Voided - MF-2179	1985	MCCARTHY, DANIEL F.	AN ARCHAEOLOGICAL ASSESSMENT OF 0.93 ACRE OF LAND IN MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	ARCHAEOLOGICAL RESEARCH UNIT, U.C. RIVERSIDE	
RI-02120	NADB-R - 1082547; Submitter - UCRARU #894; Voided - MF-2308	1987	DE MUNCK, VICTOR C.	ARCHAEOLOGICAL ASSESSMENT OF 7.61 ACRES OF LAND LOCATED IN THE MURRIETA AREA OF RIVERSIDE COUNTY, CALIFORNIA	ARCHAEOLOGICAL RESEARCH UNIT, U.C. RIVERSIDE	
RI-02243	NADB-R - 1082676; Voided - MF-2434	1988	DROVER, C.E.	AN ARCHAEOLOGICAL ASSESSMENT OF TM CHANGE OF ZONE 5056, RIVERSIDE COUNTY, CALIFORNIA	AUTHOR(S)	
RI-02321	NADB-R - 1082778; Voided - MF-2522	1987	RHODES, KEITH D. and N.A. RHODES	AN ARCHAEOLOGICAL ASSESSMENT OF EL RANCHO MURRIETA THROUGHBRED RANCH, RIVERSIDE COUNTY, CALIFORNIA	MACKO ARCHAEOLOGICAL CONSULTING, Huntington Beach, CA	
RI-02389	NADB-R - 1082887; Voided - MF-2629	1988	KELLER, JEAN SALPAS	AN ARCHAEOLOGICAL ASSESSMENT OF COZ 5165 AND PLOT PLAN 10.517, RIVERSIDE COUNTY, CALIFORNIA	AUTHOR(S)	
RI-02502	NADB-R - 1084016; Submitter - R-1768A; Voided - MF-2729	1989	WADE, SUE A. and SUSAN M. HECTOR	AN ARCHIVAL AND LIMITED FIELD ARCHAEOLOGICAL SURVEY OF THE TEMESCAL WASH AND RICE CANYON PIPELINE ALTERNATIVES FOR THE REGIONAL WATER RECLAMATION FACILITY AT RANCHO CALIFORNIA	RECON	33-000050, 33-000116, 33-000270, 33-000365, 33-000523, 33-001003, 33-001004, 33-001071, 33-001086, 33-001382, 33-001384, 33-001727, 33-001860, 33-001861, 33-002134, 33-002765, 33-002798, 33-003330
RI-02799	NADB-R - 1083406; Voided - MF-3000	1990	KELLER, JEAN A.	AN ARCHAEOLOGICAL ASSESSMENT OF PLOT PLAN 11,816 RIVERSIDE COUNTY, CALIFORNIA	AUTHOR	
RI-02849	NADB-R - 1083452; Submitter - 1085; Voided - MF-3046	1990	SWOPE, KAREN K.	AN ARCHAEOLOGICAL ASSESSMENT OF CONDITIONAL USE PERMIT 3086, LOCATED IN THE MURRIETA AREA OF RIVERSIDE COUNTY, CALIFORNIA	ARCHAEOLOGICAL RESEARCH UNIT, U.C. RIVERSIDE	

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
RI-02993	NADB-R - 1083537; Submitter - UCRARU #1097; Voided - MF-3217	1990	LOVE, BRUCE	CULTURAL RESOURCES ASSESSMENT: CONDITIONAL USE PERMIT #2803 R #1 MURRIETA, RIVERSIDE COUNTY, CALIFORNIA.	Archaeological Research Unit, U.C. Riverside	
RI-02994	NADB-R - 1083538; Submitter - UCRARU #1097-2; Voided - MF-3218	1990	LOVE, BRUCE	CULTURAL RESOURCES ASSESSMENT: PLOT PLAN 12080, MURRIETA, RIVERSIDE COUNTY, CALIFORNIA.	ARCHAEOLOGICAL RESEARCH UNIT, U.C. RIVERSIDE	
RI-03189	NADB-R - 1083751; Other - 89-90; Voided - MF-3408	1990	PEAK AND ASSOCIATES and Brian F. Mooney Associates	CULTURAL RESOURCES ASSESSMENT OF AT&T'S PROPOSED SAN BERNARDINO TO SAN DIEGO FIBER OPTIC CABLE, SAN BERNARDINO, RIVERSIDE AND SAN DIEGO COUNTIES, CALIFORNIA	PEAK AND ASSOCIATES & BRIAN F. MOONEY ASSOCIATES	
RI-03376	NADB-R - 1084018; Submitter - R-1768A; Voided - MF-3617	1989	WADE, SUE A. and SUSAN M. HECTOR	A CULTURAL RESOURCE SURVEY OF THE PROPOSED RANCHO-TEMECULA EFFLUENT PIPELINE FROM TEMECULA TO WARM SPRINGS IN THE ELSINORE VALLEY WITH ADDITIONAL CONSIDERATION OF THE SURFACE WATER DISCHARGE INTO TEMESCAL WASH	RECON	33-000659, 33-001086, 33-002798, 33-006998, 33-007200
RI-03636	NADB-R - 1084376; Voided - MF-3925	1993	WHITE, ROBERT S.	AN ARCHAEOLOGICAL ASSESSMENT OF THE 2+ MILE MURRIETA LINES "F" & "F-1" FLOOD CONTROL CHANNEL IN MURRIETA, RIVERSIDE COUNTY.	ARCHAEOLOGICAL ASSOCIATES	
RI-03896	NADB-R - 1084803; Voided - MF-4253	1995	KELLER, JEAN A.	A PHASE I CULTURAL RESOURCES ASSESSMENT OF MURRIETA HOT SPRINGS ROAD - MADISON AVENUE CORRIDOR MASTER DEVELOPMENT PLAN, 268.0 ACRES OF LAND IN MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	AUTHOR	33-005785, 33-005786, 33-005787
RI-03911	Caltrans - E.A. 341300; NADB-R - 1084834; Voided - MF-4274	1993	STURM, BRADLEY L.	NEGATIVE ARCHAEOLOGICAL SURVEY REPORT: ROUTE I-215, POST MILE 10.6	LSA ASSOCIATES	
RI-04352	NADB-R - 1085650; Voided - MF-4648	1999	KELLER, JEAN A.	A PHASE I CULTURAL RESOURCES ASSESSMENT OF PLOT PLAN 99-027, +17.3 ACRES OF LAND IN THE CITY OF MURRIETA, RIVERSIDE COUNTY, CALIFORNIA.	AUTHOR	

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
RI-04643	NADB-R - 1086002	2001	KELLER, JEAN A.	A PHASE I CULTURAL RESOURCES ASSESSMENT OF VESTING TENTATIVE TRACT MAP 31324, 7.9 ACRES OF LAND IN THE CITY OF MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	Cultural Resources Consultant, Encinitas, CA	33-012524
RI-04644	NADB-R - 1086003	2003	KELLER, JEAN A.	A PHASE I CULTURAL RESOURCES ASSESSMENT OF VESTING TENTATIVE TRACT MAP 29820, 12.72 ACRES OF LAND IN THE CITY OF MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	Jean A. Keller, consultant	
RI-04645	NADB-R - 1086004	2003	KELLER, JEAN A.	A PHASE I CULTURAL RESOURCES ASSESSMENT OF VESTING TENTATIVE TRACT MAP 30315, 9.11 ACRES OF LAND IN THE CITY OF MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	Jean A. Keller, consultant	
RI-04852	NADB-R - 1086214	2005	WHITE, ROBERT S. and LAURA S. WHITE	A CULTURAL RESOURCES ASSESSMENT OF A 1.88-ACRE PARCEL LOCATED EAST OF THE INTERSECTION OF KALMIA STREET AND WASHINGTON AVENUE, CITY OF MURRIETA, RIVERSIDE COUNTY	ARCHAEOLOGICAL ASSOCIATES	
RI-04877	NADB-R - 1086239	2003	PEAK & ASSOCIATES, INC.	CULTURAL RESOURCES ASSESSMENT OF THE PROPOSED TEMECULA VALLEY REGIONAL WATER RECLAMATION FACILITY EFFLUENT PIPELINE, RIVERSIDE COUNTY, CALIFORNIA	PEAK & ASSOCIATES, INC.	33-010986
RI-05142	NADB-R - 1086505; Other - 33-98	1998	HARRIS, NINA and DENNIS R. GALLEGOS	CULTURAL RESOURCES SURVEY REPORT FOR MURRIETA LINES D AND D-1 RIVERSIDE COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT RIVESIDE COUNTY, CA	GALLEGOS & ASSOCIATES	
RI-05209	NADB-R - 1086572; Submitter - LSA CONTRACT NO. EDG230	2002	GOODWIN, RIORDAN and ROBERT REYNOLDS	CULTURAL AND PALEONTOLOGICAL RESOURCES ASSESSMENT: MURRIETA SENIOR CENTER, CITY OF MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	LSA ASSOCIATES	
RI-05211	NADB-R - 1086574	2000	WHITE, LAURIE	RECORDS SEARCH RESULTS FOR SPRINT PCS FACILITY RV54XC453A (BUTLER RANCH), CITY OF MURRIETA, RIVERSIDE COUNTY, CA	MICHAEL BRANDMAN ASSOCIATES	

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
RI-05675	NADB-R - 1087038	2003	SHEPARD, RICHARD S.	PHASE I CULTURAL RESOURCES ASSESSMENT: ASSESSOR PARCEL NO. 909-08-02, MURRIETA, RIVERSIDE COUNTY, CA	BONTERRA CONSULTING	33-001086, 33-012344, 33-012345
RI-05966	NADB-R - 1087329	2002	HOGAN, MICHAEL	CALTRANS NEGATIVE HISTORICAL PROPERTY SURVEY REPORT FOR I-15/CALIFORNIA OAKS ROAD DIAMOND INTERCHANGE PROJECT, IN THE CITY OF MURRIETA, RIVERSIDE COUNTY, CA	CRM TECH	
RI-05977	NADB-R - 1087340; Submitter - 1152	2003	HOGAN, MICHAEL, BAI TANG, and JOHN EDDY	ARCHAEOLOGICAL MONITORING REPORT, ASSESSOR'S PARCEL NUMBER 909-080-002, 42180 IVY STREET, CITY OF MURRIETA, RIVERSIDE COUNTY, CA	CRM TECH	33-028178
RI-06028	NADB-R - 1087391	2005	KELLER, JEAN A.	A PHASE II HISTORICAL RESOURCES INVESTIGATION OF CA-RIV-5519-H LOCATED WITHIN TENTATIVE PARCEL MAP 31078, +/- 9.55 ACRES OF LAND IN MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	JEAN A. KELLER	33-005787
RI-06406	NADB-R - 1087769; Submitter - CONTRACT #1290	2005	HOGAN, MICHAEL, BAI TANG, and JOSH SMALLWOOD	ARCHAEOLOGICAL MONITORING REPORT, TRACT NO. 30315, IN THE CITY OF MURRIETA, RIVERSIDE COUNTY, CA	CRM TECH	33-013977
RI-06446	NADB-R - 1087811; Submitter - CONTRACT #1614	2005	TANG, BAI, MICHAEL HOGAN, CASEY TIBBET, and JOSH SMALLWOOD	HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT: ASSESSOR'S PARCEL NUMBERS 906-080-003, AND -012 THROUGH -015, IN THE CITY OF MURRIETA, RIVERSIDE COUNTY, CA	CRM TECH	
RI-06457	NADB-R - 1087822; Submitter - CRM TECH CONTRACT #1244	2004	HOGAN, MICHAEL, BAI TANG, CASEY TIBBET, and DANIEL BALLESTER	HISTORICAL/ARCHAEOLOGICAL RESOURCES SURVEY REPORT, MURRIETA WASTEWATER PLANNING AND CONSTRUCTION PROJECT, IN THE CITY OF MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	CRM TECH	
RI-06658	NADB-R - 1088025; Submitter - CRM TECH Contract #1985	2006	B. Tom Tang	Photo Recordation of Historic Building, the Cora Stollar House, 42036 D Street, City of Murrieta, Riverside County, California	CRM TECH	
RI-06896	Submitter - Technical Series No. 125	2007	Alexandrowicz, John Stephen	An Historical Resources Identification Investigation For the Heritage Village Apartments Project, 24865 Jefferson Avenue, City of Murrieta, Riverside County, California	Archeological Consulting Services	

Report List

Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
RI-07023		2006	Keller, Jean A.	A Phase I Cultural Resources Assessment of Murrieta Commons, DP 004-51, +/- 12.22 Acres of Land in the City of Murrieta, Riverside County, California	Jean A. Keller	33-002362, 33-015312
RI-07050		2006	Strauss, Monica	Historic Property Survey Report. for the Ivy Street Bridge Project. City of Murrieta, County of Riverside, California.	EDAW, Inc., Los Angeles, CA	33-001085, 33-001086
RI-07602	Submitter - CRM TECH Contract No. 2195	2008	Josh Smallwood and Clarence Bodmer	PHOTO-RECORDATION OF HISTORIC BUILDINGS 24629 WASHINGTON AVENUE MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	CRM TECH	
RI-07678	Submitter - Contract No. 2201	2008	Smallwood, Josh and Terri Jacquemain	HISTORIC BUILDING EVALUATION 24570 WASHINGTON AVENUE CITY OF MURRIETA, RIVERSIDE COUNTY, CALIFORNIA	CRM Tech	33-017013
RI-07890	Submitter - Affinis Job No. 2151	2006	Robbins-Wade, Mary	Cultural Resources Inventory, 25071 Adams Avenue Murrieta, Riverside County, California VTM 33893	Affinis	33-007432
RI-08162		2002	Robert Reynolds	Letter Report: Results of the Cultural and Paleontological Resource Assessment for the New Clay Street Parcel (P.M. 30299), Murrieta, Riverside County, California	LSA Associates Inc, Riverside, California	
RI-08305	Submitter - No. 137	2009	John Alexandrowicz	An Historical Resources Identification for the Monte Vista II Apartments Project, NE Corner of the Jefferson Avenue and Jumiper Street, City of Murrieta, Riverside County, California	Archaeological Consulting Services	
RI-08389		2010	Rebecca McCorkle Apple, Christopher L. Shaver, and Monica Strauss	Archeaeological Survey Report for the Los Alamos / Interstate 15 Overcrossing, City of Murrieta, County of Riverside, California.	AECOM	
RI-09065		2012	Tracy A. Stropes and Brian F. Smith	PHASE I CULTURAL RESOURCES ASSESSMENT FOR THE WASHINGTON AVENUE PROJECT, CITY OF MURRIETA, APN 909-080-043	Brian F. Smith and Associates, Inc.	33-007471
RI-09089		2011	Jennifer M. and Sanka, M.A.	Monitoring Report Ivy Street Bridge Project City of Murrieta, Riverside County, California		33-001085, 33-001086, 33-019856
RI-09596		2016	Jeanette A. McKenna	An Updated Cultural Resources Investigation for the Mighty Development, Inc., Project Area, 11.35 Acres of Land in the City of Murrieta, Riverside County, California	McKenna et al.	

Report List

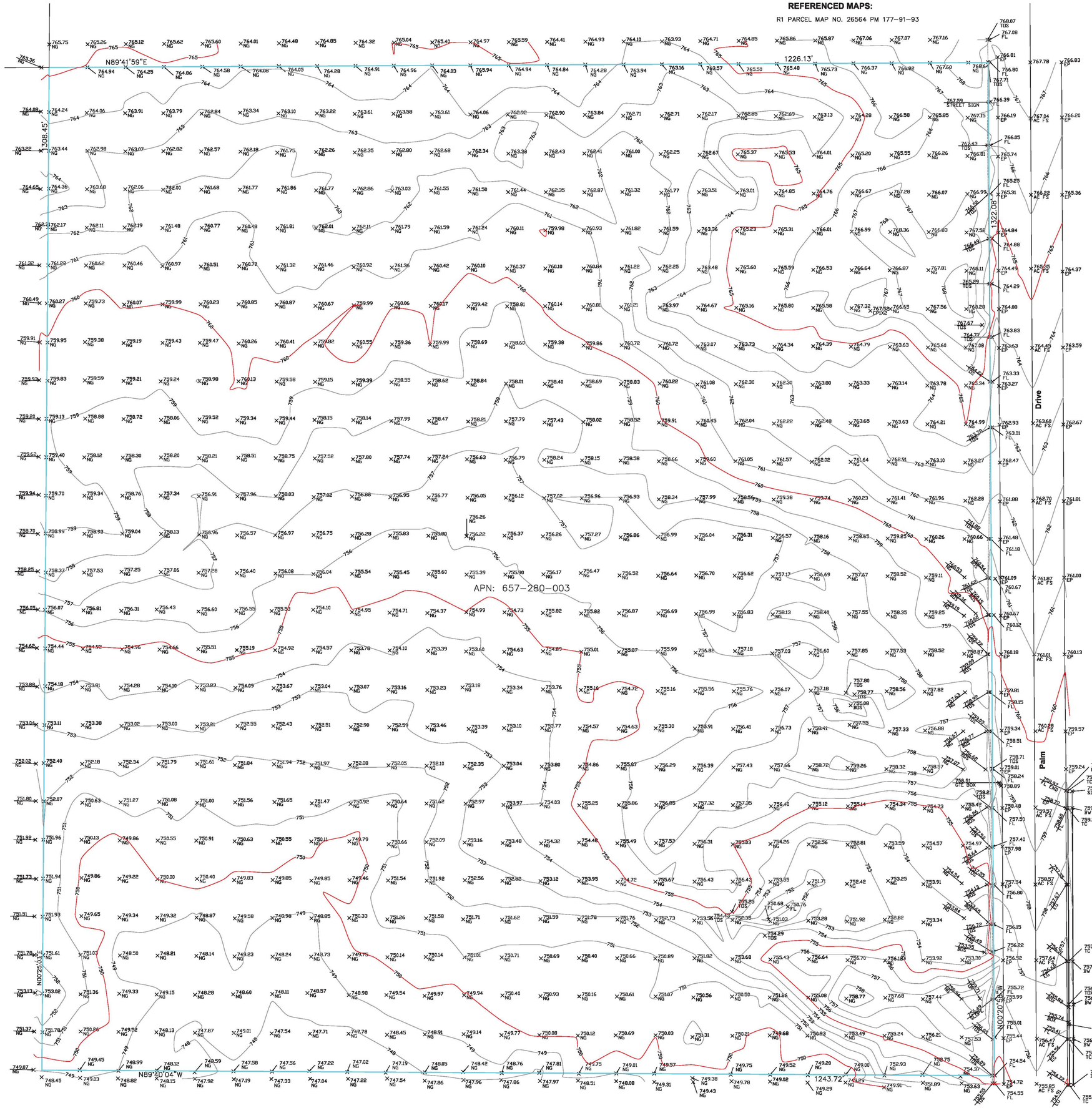
Report No.	Other IDs	Year	Author(s)	Title	Affiliation	Resources
RI-09949		2017	Brian F. Smith	A Phase 1 Cultural Resources Survey for the FMC Murrieta Project	Tectonics Design Group; Brian F Smith and Associates	
RI-10000		2017	brian f smith	A PHASE I CULTURAL RESOURCES SURVEY FOR THE JEFFERSON AND IVY PROJECT	BRIAN F SMITH AND ASSOCIATES	
RI-10082		2002	Heather Bell	NEPA Screening for Wireless Telecommunication Site - Los Alamos 24950 Madison Avenue, Murrieta, Riverside County, California	Clayton Group Services	
RI-10460		2018	Jannifer M. Sanka	Archaeological Monittoring Plan for the Jefferson and Ivy Ranch Apartment Homes Project 11.44 Acres in the City of Murrieta, Riverside County, California	L&L Enviromental, Inc	
RI-10612		2006	Monica Strauss, Christopher L. Shaver, Kurt Heidelberg, and David Bricker	Extended Phase I Archaeological Investigation Between CA-RIV-1085 and CA-RIV-1086 for the Ivy Street Bridge Project, City of Murrieta, County of Riverside, California. Ivy Street Bridge Project between New Clay Street and Hayes Avenue. Caltrans District 8	EDAW, Inc.	33-001085; 33-001086
RI-10613		2006	Monica Strauss, Kurt Heidelbert, and David Bricker	Archaeological Survey Report for the Ivy Street Bridge Project, City of Murrieta, County of Riverside, California. Ivy Street Bridge Project between New Clay Street and Hayes Avenue, Caltrans District 8	EDAW, Inc.	
RI-10688		2018	Courtney Montgomery	Phase I Archaeological Survey for Wilhelm-Sauls Investments, LLC Murrieta Properties	Soar Environmental Consulting	

APPENDIX E1

TOPO SURVEY

REFERENCED MAPS:

R1 PARCEL MAP NO. 26564 PM 177–91–93



SYMBOL LEGEND

- MAINTENANCE HOLE
- SEWER MAINTENANCE HOLE
- STORM DRAIN MAINTENANCE HOLE
- POWER MAINTENANCE HOLE
- TELEPHONE MAINTENANCE HOLE
- SEWER LAMP HOLE
- MAINTENANCE HOLE LARGE
- PULLBOX
- TRAFFIC SIGNAL PULLBOX
- STREET LIGHT PULLBOX
- ELECTRIC PULLBOX
- TELEVISION PULLBOX
- IRRIGATION CONTROL BOX
- WATER METER
- GAS VALVE
- WATER VALVE
- VALVE
- SPRINKLER
- GAS METER
- STAND PIPE
- BOREHOLE
- NEWS STAND
- MAIL BOX
- DRINKING FOUNTAIN
- PHONE
- LIGHT STANDARD
- TRAFFIC STANDARD
- LIGHT & TRAFFIC STANDARD
- PARKING METER
- VENT
- SIGN
- FIRE HYDRANT
- GUARD POST
- POWER POLE
- GUY WIRE
- CLEAN OUT
- CHAIN LINK FENCE
- WOOD FENCE
- MONITORING POINT
- MONITORING STATION
- MONITORING WELL
- OAK TREE
- TREE
- PALM TREE
- SHRUB
- BILLBOARD
- CONCRETE

Survey Abbreviations:

AC	Asphaltic Concrete
ASSMD	Assumed
BK	Book
BLDG	Building
BM	Benchmark
BOB	Basis of Bearings
BOS	Bottom of Slope
BRNG	Bearing
BT	Bottom of trench
BW	Back of Walk
CEFB	City Engineer Field Book
COEFB	County Engineer Field Book
CL	Centerline
CLF	Chain Link Fence
CMU	Concrete Masonry Unit
CONC	Concrete
COR	Corner
CS	Commercial Sign
DEG	Degrees
DIA	Diameter
DIST	Distance
DN	Down
DWY	Driveway
(E)	Existing
E'LY	Easterly
ELEV	Elevation
ENC	Encroachment
EP	Edge of Pavement
FG	Finish grade
FH	Fire Hydrant
FL	Flow line
FND	Found
FS	Finish surface
GP	Guard Post
GTE	General Telephone
H	Height
HND	Handhole
INT	Intersection
IP	Ion pile
L	Length
LA	Landscape Area
LP	Light pole
LS	Land Surveyor
L & T	Lead and Tag
MB	Map Book
MBX	Mail Box
MEA	Measured
MH	Manhole
MNMT	Monument
N'LY	Northerly
NL	Nail
OR	Official Records
O/H	Overhang
O/S	Offset
PA	Planter Area
PB	Pipe Bollard
PG	Page
PKWY	Parkway
PL	Property Line
PM	Punch Mark
PP	Power Pole
PROP	Property
PVMT	Pavement
R	Radius
RAD	Radial
RCE	Registered Civil Engineer
RET	Retaining
RS	Record of Survey
SFD	Single Family Dwelling
SSMH	Sanitary Sewer Manhole
S/WALK	Sidewalk
TC	Top of Curb
TCH	Top of Channel
TOS	Top of Slope
TSP	Traffic Signal Pole
TSV	Traffic Signal Vault
TT	Top of trench
TW	Top of Wall
TYP	Typical
WF	Wood Fence
WIF	Wrought Iron Fence
WKWY	Walkway
WM	Water Meter

Survey Notes:

1. All information shown on the drawings is given as the best present knowledge and performed within generally accepted engineering practice but without guarantee of accuracy per 2021 Professional Land Surveyors Act, Section 8770.6. The survey map as shown hereon represents existing line of sight and readily accessible, free of obstructions, such as thick foliage, poison oak / ivy, heavy brush and debris accumulation. The trees as shown hereon with the dripline diameter is approximate in size. Where actual conditions conflict with the drawings, they shall be reported to the engineer so that proper revisions may be made.
2. Establishment of contour: Contouring is the graphical representation of constant elevation lines that are interpolated or extrapolated between actual field measured elevations or map elevations and should not be interpreted as precise ground conditions, only an infinite number of field measurements would represent such precise conditions, which obviously are not possible. The number of such field measurements are therefore limited to the scope and intent of the resulting map.
3. The design of structural elements, i.e., retaining wall, soldier piles, friction piles and grade beams shall be field verified prior to adoption of final design
4. Boundary descriptions were obtained from PARCEL MAP NO. 26565, PMB 177-89-90 For establishment of boundary lines, refer to "Corner Record " map to be filed.
5. This survey map was prepared without the benefit of a Title Report and therefore, easements are not shown hereon.
6. Bench Mark: Elev = 250.607 FEET, BM # 603.60 NGS NAVD88, DESERT HOT SPRINGS QUAD (1978)
7. Legal Description:
   The South half of Government Lot 1 of the NW 1/4, Section 18, T 3 S, R 5 E, SBBM
   County of Riverside, State of California;
   Except East 55.00 feet as conveyed to the County of Riverside by Deed Recorded April 11, 1996, Instrument No. 37515 of Official Records of Riverside County, CA
8. Area of Lot: 1,642,186 sq.ft. or 37.29 acres

TOPOGRAPHIC SURVEY MAP

1" = 50'

NORTH

RB Engineers, Inc.
2139 Pinecrest Dr.
Altadena, CA 91001
Cell: 1-213-435-2521
E-mail: resur@rbengineersinc.com

REGISTERED PROFESSIONAL ENGINEER — RICHARD BOLOURCHI — No. 31123 — EXP. 06/30/23 — CIVIL — STATE OF CALIFORNIA

ATTENTION: If, the drawings are provided in an electronic format, the following shall apply: The electronic files are provided for the convenience of the addressee(s). The engineer shall not be liable for any damages that may result from the use of the electronic files by the addressee(s) or by any person or entity that receives the electronic files directly or indirectly from the addressee(s). Any use or reuse by the addressee(s) or by others who obtain the files directly or indirectly from the addressee(s) without the written consent of the engineer shall be unauthorized and unlawful. The addressee(s) shall indemnify and hold harmless the engineer from any and all claims, damages, losses, and expenses including attorney's fees arising out of or resulting therefrom. Any transfer of these electronic files to other parties shall include this entire statement. Any reuse of the electronic files for any purpose other than that originally intended by the engineer or on any project other than the project for which they were originally prepared by the engineer will be at the user's sole risk and without liability to the engineer. The user shall indemnify and hold harmless the engineer from all claims, damages, losses, and expenses including attorney's fees arising out of or resulting therefrom. Any such use or reuse will entitle the engineer to further compensation at rates to be agreed upon by user and engineer. However, signed and sealed hard copies of the drawings prepared by the engineer for this project are the property of the engineer. Reuse of these documents in any form by any entity other than these intended for this project, whether the project is completed or not, without the express written permission of the engineer shall be unlawful. The engineer shall be indemnified and held harmless from any reuse of the documents without specific written verification or adaptation by the engineer for the specific purpose intended and shall be compensated at rates to be agreed upon by the owner and the engineer. Submission or distribution of these documents to meet official regulatory requirements or for purposes in connection with the project is not to be construed as publication in derogation of the engineer's reserved rights. Unauthorized use of these documents shall void all representations or warranties by the engineer and shall void any and all liability by the engineer for any damages. By commencing any use of these documents, the user acknowledges that he has read this notice, that he understands it, and that he agrees to be bound by its terms and conditions. The user shall indemnify the engineer for any and all costs attributable to claims that arise as a result of the user's use of these documents. If the user does not agree to these terms and conditions, the user shall immediately return all documents to the engineer.

OWNER: MR. AVRAHAM FARZAN, LA WORLD CONSTRUCTION

PROJECT DESCRIPTION: GVD D H S Palm Drive

ISSUE / REVISION	DWG #
SUBMIT TO CLIENT 11-25-21	C-1

DATE: 11-25-2021

SCALE: 1" = 50'

JOB: RB 21.73

SITE ADDRESS:

VACANT LAND, PALM DRIVE
DESERT HOT SPRING, CA 92240
APN: 657-280-003

TITLE OF SHEET:

TOPOGRAPHIC SURVEY MAP

SHEET **C-1** OF SHEETS

APPENDIX E2

FAULT STUDY

Sladden Engineering

45090 Golf Center Parkway, Suite F, Indio, Ca 92201 (760) 863-0713 Fax (760) 863-0847
6782 Stanton Avenue, Suite C, Buena Park, CA 90621 (714) 523-0952 Fax (714) 523-1369
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

December 13, 2021

Project No. 544-21557
21-12-825

LA World Construction
2029 Century Park East, Suite 400
Century City, California 90067

Subject: Preliminary Fault Hazard Evaluation

Project: Proposed Green Day Village
APN 657-280-003
Palm Drive
Desert Hot Springs, California

Sladden Engineering is pleased to present the results of our Preliminary Fault Hazard Evaluation prepared for the proposed Green Day Village project site (APN 657-280-003) located on the west side of Palm Drive between 18th Avenue and Beacon Way in the City of Desert Hot Springs, California. Our services were performed in accordance with our proposal for geologic evaluation services dated November 23, 2021 and your authorization to proceed with the work.

The purpose of our evaluation was to address the possibility of active faulting potential at the site as defined by the State of California. Currently, the site is situated within a Riverside County designated fault zone for the Seven Palms Ranch Fault.

The opinions presented herein were based upon our review of applicable geologic literature, aerial photo analysis and interpretation, and geologic reconnaissance of the site and surrounding area. Based on our evaluation, it is our professional opinion that the risk associated with primary surface fault rupture impacting the new building areas to be considered low.

We appreciate the opportunity to provide service to you on this project. If you have any questions regarding this report, please contact the undersigned.

Respectfully submitted,
SLADDEN ENGINEERING

Matthew J. Cohrt
Principal Geologist

PROFESSIONAL GEOLOGIST
Matthew J. Cohrt
No. 2634
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

PROFESSIONAL GEOLOGIST
JAMES W. MINOR III
No. 9735
STATE OF CALIFORNIA

James W. Minor III
Project Geologist

REGISTERED PROFESSIONAL ENGINEER
BRETT L. ANDERSON
No. C45389
CIVIL ENGINEERING
STATE OF CALIFORNIA

Brett L. Anderson
Principal Engineer

Letter/mc
4/addressee

PROJECT DESCRIPTION

It is our understanding that a new mixed-use development is currently being considered for the subject property. The subject site is located on the west side of Palm Drive between 18 Avenue and Beacon Avenue in the City of Desert Hot Springs, California. The site is identified by the County of Riverside as APN 657-280-003 and consist of approximately 38.54 acres of undeveloped land. The site is located at approximately 33.9125 degrees north latitude and 116.5037 degrees west longitude. The approximate location of the site is indicated on the Site location Map and Fault Zone Map (Figure 1 and Figure 2, respectively).

Based on our review of geologic maps and literature for the site vicinity, Sladden has determined that the site is not situated within a State of California designated Earthquake Fault Zone (Figure 2) but is located within a Riverside County Fault Zone (Figure 3) In accordance with the Alquist-Priolo Act, structures intended for human occupancy are not allowed to be built across active fault traces. Evaluation of the associated potential ground surface rupture hazard is required by State and local governing agencies prior to development to demonstrate that no active faults underlie any proposed structure intended for habitable use.

PURPOSE AND SCOPE OF WORK

The purpose of Sladden's Literature Review and Photo-lineament Analysis was to evaluate mapped fault locations and to assess photo-lineaments on and adjacent to the subject site with respect to active faulting potential.

The scope of Sladden's Literature and Photo-lineament Analysis was based on our understanding of the client's needs and our experience with similar projects in the region. Following our cursory review of the project location and review of select geologic literature, we recommended that a phased investigation would be best suited to assess the presence of potential active faulting on the site. Specifically, Sladden's work consisted of the following tasks:

- A review of select published and unpublished geologic literature of the sites and site vicinity.

- The performance of aerial photographic lineament analyses to evaluate the location and extent of lineaments potentially indicative of active faulting on and immediately adjacent to the site.

SITE CONDITIONS

The subject parcel is located on the west side of Palm Drive between 18th Avenue and Beacon Way in the City of Desert Hot Springs, California. The site consists of approximately 38.34 acres of undeveloped land and is covered in scattered native vegetation. The site is bounded by Palm Drive to the east, undeveloped land to the north and east and sparsely developed land the immediate south.

The subject property is located on the eastern portion of the United States Geological Survey (USGS) Desert Hot Springs Quadrangle Map (USGS, 2015), at approximately 34.9125 degrees north latitude and 116.5037 degrees west longitude. Site elevations range from approximately 765 to 745 feet above mean sea level (MSL)with surface gradients descending to the south. Morongo Wash is located approximately 600 feet to the west of the site.

GEOLOGIC SETTING

The project site is located within the Colorado Desert Physiographic Province (also referred to as the Salton Trough) that is characterized as a northwest-southeast trending structural depression extending from the Gulf of California to the Banning Pass. The Salton Trough is dominated by several northwest trending faults, most notably the San Andreas Fault system. The Salton Trough is bounded by the Santa Rosa – San Jacinto Mountains on the southwest, the San Bernardino Mountains on the north, the Little San Bernardino - Chocolate – Orocopia Mountains on the east and extends through the Imperial Valley into the Gulf of California on the south.

A relatively thick sequence (20,000 feet) of sediment has been deposited in the Coachella Valley portion of the Salton Trough from Miocene to present times. These sediments are predominately terrestrial in nature with some lacustrian (lake) and minor marine deposits. The major contributor of these sediments has been the Colorado River. The mountains surrounding the Coachella Valley are composed primarily of Precambrian metamorphic and Mesozoic "granitic" rock.

The Salton Trough is an internally draining area with no readily available outlet to Gulf of California and with portions well below sea level (-253' msl). The region is intermittently blocked from the Gulf of California by the damming effects of the Colorado River delta (current elevation +30'msl). Between about 300AD and 1600 AD (to 1700) the Salton Trough has been inundated by the River's water, forming ancient Lake Cahuilla (max. elevation +58' msl). Since that time the floor of the Trough has been repeatedly flooded with other "fresh" water lakes (1849, 1861, and 1891), the most recent and historically long lived being the current Salton Sea (1905). The sole outlet for these waters is evaporation, leaving behind vast amounts of terrestrial sediment materials and evaporite minerals.

The site has been mapped by Rogers (1965), Proctor (1968) and Dibblee (2004) to be immediately underlain by Quaternary-age alluvium. The regional geologic setting for the site vicinity is presented on the attached Regional Geologic Maps (Figure 4 through Figure 6).

SEISMICITY AND FAULTING

The southwestern United States is a tectonically active and structurally complex region, dominated by northwest trending dextral faults. The faults of the region are often part of complex fault systems, composed of numerous subparallel faults that splay or step from main fault traces. Strong seismic shaking could be produced by any of these faults during the design life of any proposed development at the Site.

Sladden considers that the most significant geologic hazard at the site to be the potential for moderate to strong seismic shaking that is likely to occur during the design life of any proposed development at the site. The site is located in the highly seismic Southern California region within the influence of several fault systems that are considered to be active or potentially active. An active fault is defined by the State of California as a "sufficiently active and well defined fault" that has exhibited surface displacement within the Holocene epoch (about the last 11,000 years). A potentially active fault is defined by the State as a fault with a history of movement within Pleistocene time (between 11,000 and 1.6 million years ago).

Some of the more significant seismic events within recent times, near the subject site, include: M_W6.0 North Palm Springs (1986), M_W6.1 Joshua Tree (1992), M_W7.3 Landers (1992), M_W 6.2 Big Bear (1992) and M_W7.1 Hector Mine (1999).

Table 1 lists the closest known potentially active faults that was generated in part using the EQFAULT computer program (Blake, 2000), as modified using the fault parameters from The Revised 2002 California Probabilistic Seismic Hazard Maps (Cao et al, 2003) and the Fault and Fold Database of the United States (USGS, 2021a). This table does not identify the probability of reactivation or the on-site effects from earthquakes occurring on any faults in the region.

TABLE 1
CLOSEST KNOWN ACTIVE FAULTS

Fault Name	Distance (Km)	Maximum Event
Seven Palms Ranch Fault	*0.0	Unpublished
San Andreas – Southern	1.8	7.5
San Andreas – San Bernardino	1.8	7.5
San Andreas – Coachella	3.3	7.2
Burnt Mountain	12.3	6.5
Eureka Peak	16.7	6.4
Pinto Mountain	19.3	7.2
Landers	29.0	7.3
North Frontal Fault Zone (East)	32.1	6.7
San Jacinto – Anza	39.1	7.2

*Not Recognized by the State of California as an active fault

.

LITERATURE REVIEW AND PHOTO-LINEAMENT ANALYSIS

Literature Review

Sladden has conducted a review of available published and unpublished geologic literature applicable to the site and site vicinity. Locations of faults in the vicinity of the site were reviewed on the California Fault Map (Jennings, 1994), Southern California Earthquake Data Center (SCEDC, 2021), CDMG (1980) (Figure 2), RCCMC (2021) (Figure 3), Clark (1984) (Figure 7) and Hope (1969) (Figure 8). The EQFAULT (Blake, 2000) computer software program was utilized in order to generate and analyze the spatial distribution of known faults in the vicinity of the site. The regional geologic conditions for the site and surrounding area were reviewed on Rogers (1965) (Figure 4), Proctor (1968) (Figure 5) and Dibblee (2004) (Figure 6). Fault studies and fault evaluations specific to the project vicinity were reviewed within Hilltop (2004), Leighton and Associates, Inc. (2009) and CDMG (1979 & 1987), (Figure 9). A complete list of the geologic references reviewed for this report are presented under the references section.

Aerial Photographic Review

Sladden has performed a lineament analysis to identify possible unmapped faults and to evaluate topographic expressions of published and unpublished fault traces. Black and white stereo photo pairs of the site available from Riverside County Flood Control & Water Conservation District (RCFC) were utilized for our lineament analysis. In addition, a portion of the B4 Lidar Project imagery (Bevis and Hudnut, 2005) and USGS 3D Elevation Program (3DEP) imagery were reviewed (USGS, 2021).

Tonal, geomorphic, and vegetative lineaments were evaluated and classified as strong, moderate or weak in accordance with their strength of expression, length, continuity, persistence between photos and flights, orientation, and plausible origin. A strong lineament is a well-defined feature that can be continuously traced for several hundred feet to a few thousand feet. A moderate lineament is less well defined, somewhat discontinuous and can be traced for a few hundred feet. A weak lineament is discontinuous, poorly defined and can be traced only for a couple of hundred feet or less. Table 2 presents the stereo-photo pairs review for this evaluation.

TABLE 2
AERIAL PHOTOGRAPHS REVIEWED

Date	Photo Numbers	Scale	Source
5-24-74	267, 268	1″=2000′	RCFC
2-1-80	280, 281	1″=2000′	RCFC
2-7-841	1438, 1439	1″=1600′	RCFC
1-19-90	5-77, 5-78	1″=1600′	RCFC
1-28-95	5-87, 5-88	1″=1600′	RCFC
3-11-00	5-67, 5-68	1″=1600′	RCFC
4-18-05	5-66, 5-67	1″=1600′	RCFC
3-12-10	5-69, 5-70	1″=1600′	RCFC

Numerous photo-lineaments were observed in the area of the subject site on the aerial photographs reviewed for this investigation. Strong geomorphic/vegetation lineaments are visible to the south of the subject parcel and are coincident with the mapped trace of the San Andreas Fault (South Branch). The lineaments have a general orientation of 293 degrees and are consistently visible between the stereo photo pairs reviewed. Weakly developed topographic highs and lows are visible to the immediate east of Palm Avenue and are interpreted as a depositional features (eolian sand) and are not seismogenic in nature. Similarly, a subtle slope break is visible on the subject parcel that is also interpreted as a depositional feature.

Anastomosing, ephemeral, drainages (Morongo Wash) were identified to the west of the site. These lineaments are oriented in a north-south direction, are non-seismogenic and are clearly the result of regional drainage patterns.

CONCLUSIONS AND RECOMMENDATIONS

The subject parcel is not located in State of California designated faut zone (Figure 2). However, the subject parcel is currently located within a County of Riverside delineated faut zone for the Seven Palms Ranch fault. The Seven Palms Ranch fault is mapped in a roughly east-west orientation through the southern portion of the parcel and is generally mapped as a splay of the San Andreas Fault system (South Branch).

There is little agreement to the early mapping of the Seven Palms Ranch fault through the subject property. The fault appears to be initially mapped by Rogers (1965) on the Santa Ana Sheet and later mapped transecting the site by Proctor (1968). Clark (1984) and Hope (1969) do not recognize the fault as mapped transecting the subject parcel. The California Division of Mines and Geology (CDMG, 1979) concluded that there is no clear evidence of the Seven Palms Ranch fault.

Previous fault trench investigations of the property located to immediate east of Palm Drive were conducted by Hilltop (2004) and Leighton and Associates (2009). Those investigations were performed as part of the Desert Dunes Golf Course development. The investigations include aerial photo review and fault trenching of lineaments in the vicinity, inclusive of the mapped location of the Seven Palms Ranch fault. No evidence of the Seven Palms Ranch fault, as mapped by Proctor (1968) was observed during the investigations.

Based on our lineament evaluation of the site and our review of pertinent geologic information presented herein, it is our professional opinion that no surface manifestations indicative of active faulting exist within the subject parcel. Previous fault trench studies of the Seven Palms Ranch fault did not find evidence of active faulting to the immediate east of the subject parcel. Additionally, CDMG (1979) concluded that there is not sufficient evidence of the Seven Palms Ranch fault. Therefore, it is our opinion that subsurface fault trenching on the parcel is not warranted at this time.

LIMITATIONS

This report has been prepared for the exclusive use of LA World Construction, and the agents for specific application to the proposed development to be located on the west side of Palm Drive between 18th Avenue and Beacon Way in the City of Desert Hot Springs, California. The findings, conclusions and recommendations presented in this report were prepared in accordance with generally accepted geological practice at the time and location it was prepared. No other warranty, expressed or implied, is made. Grading or other development plans for the site were not available for our review at the time of our investigation and report preparation.

The scope of our geologic evaluation for active faulting did not include any other geotechnical investigative services nor any environmental site assessment for the presence or absence of hazardous/toxic materials in the soil, surface water, groundwater, atmosphere, or the presence of wetlands.

This report may be used only by the client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on-site and of-site) or other factors may change over time, and additional work may be required with the passage of time. Based on the intended use of this report and the nature of the new project, Sladden Engineering may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Sladden Engineering from any liability resulting from the use of this report by any unauthorized party.

REFERENCES

California Division of Mines and Geology (CDMG), 1979, Fault Evaluation Report FER-86.

California Division of Mines and Geology (CDMG), 1987, Fault Evaluation Report FER-185.

Bevis, M. and Hudnut, K. (2005): B4 Lidar Project: Airborne Laser Swath Mapping (ALSM) Survey of the San Andreas Fault (SAF) System of Central and Southern California, including the Banning segment of the SAF and the San Jacinto fault system. National Center for Airborne Laser Mapping (NCALM), U.S. Geological Survey, the Ohio State University, and the Southern California Integrated GPS Project. Distributed by OpenTopography. https://doi.org/10.5066/F7TQ5ZQ6 . Accessed: 2021-12-13

Blake, T., 2000, EQFAULT and EQSEARCH, Computer Programs for Deterministic and Probabilistic Prediction of Peak Horizontal Acceleration from Digitized California Faults.

California Division of Mines and Geology (CDMG), 1980, State of California, Special Studies Zones, Desert Hot Springs Quadrangle, scale 1:24,000.

California Geological Survey, (CGS), 2018, Earthquake Fault Zones, A Guide for Government Agencies, Property Owners / Developers, and Geoscience Practitioners for Assessing Fault Rupture Hazards in California; Special Publication 42.

Cao, T., Bryant, W.A., Rowshandel B., Branum D., Wills C.J., 2003, "The Revised 2002 California Probabilistic Seismic Hazard Maps".

Clark, M.M., Map Showing Recently Active Breaks Along the San Andreas Fault and Associated Fault Between Salton Sea and Whitewater River-Mission Creek, California. Scale 1:24,000.

Dibblee, T.W., 2004, Geologic Map of the Desert Hot Springs Quadrangle, Riverside County, California; scale 1:24,000

Hilltop Geotechnical, Inc. (Hilltop), 2004, Report of Supplemental Fault Investigation, Proposed Desert Dunes Development, Desert Haven Area, Riverside County, California; dated May 14, 2004.

Hope, R.A., Map Showing Recently Active Breaks Along the San Andreas and Related Faults Between Cajon Pass and Salton Sea, California; scale 1:24,000.

Jennings, Charles W. (Compiler), 1994, Fault Activity Map of California and Adjacent Areas, California Division of Mines and Geology, Geologic Data Map No. 6.

Leighton and Associates Inc, 2009, Review of the Banning, Seven Palms Ranch and Other Faults, Sun City Development, Northeastern Corner of Palm Drive and 20th Avenue, Desert Hot Springs Area of Unincorporated Riverside County, California (County Geologic Report No 2031).

Proctor, R.J., 1968, Geologic Map and Sections of the Desert Hot Springs Area, Riverside County, California; scale 1:62,500

Rogers T.H (compiler), Jenkins, O.P (edition), 1965, Geologic Map of California, Santa Ana Sheet, sixth printing 1992, California Division of Mines and Geology, 1: 250,000.

REFERENCES
(Continued)

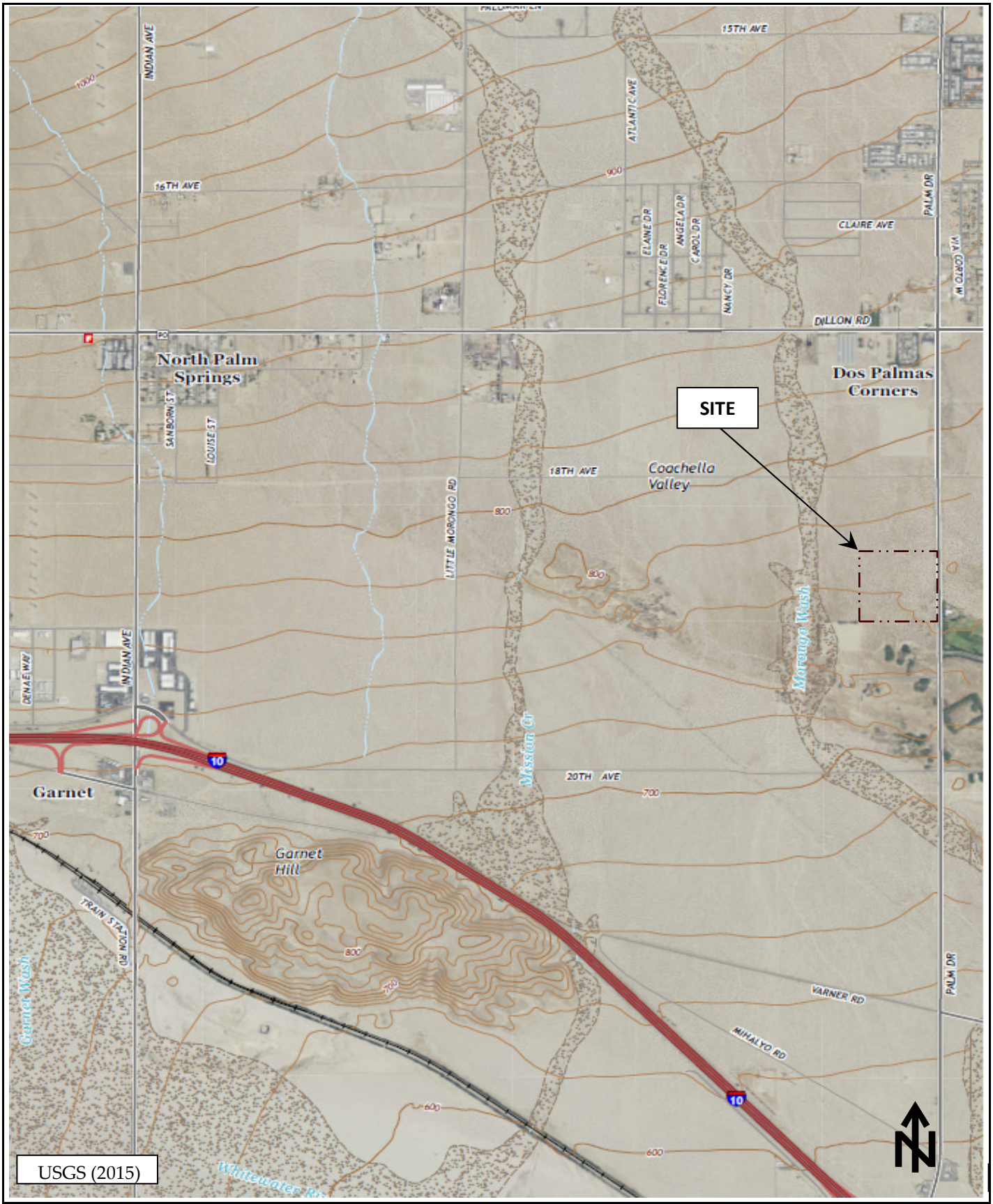
Southern California Earthquake Data Center, (SCEDC), 2021, available at: https://scedc.caltech.edu/index.html

United States Geological Survey (USGS), 2015, Topographic Map of the Desert Hot Springs Quadrangle, Scale 1:24000.

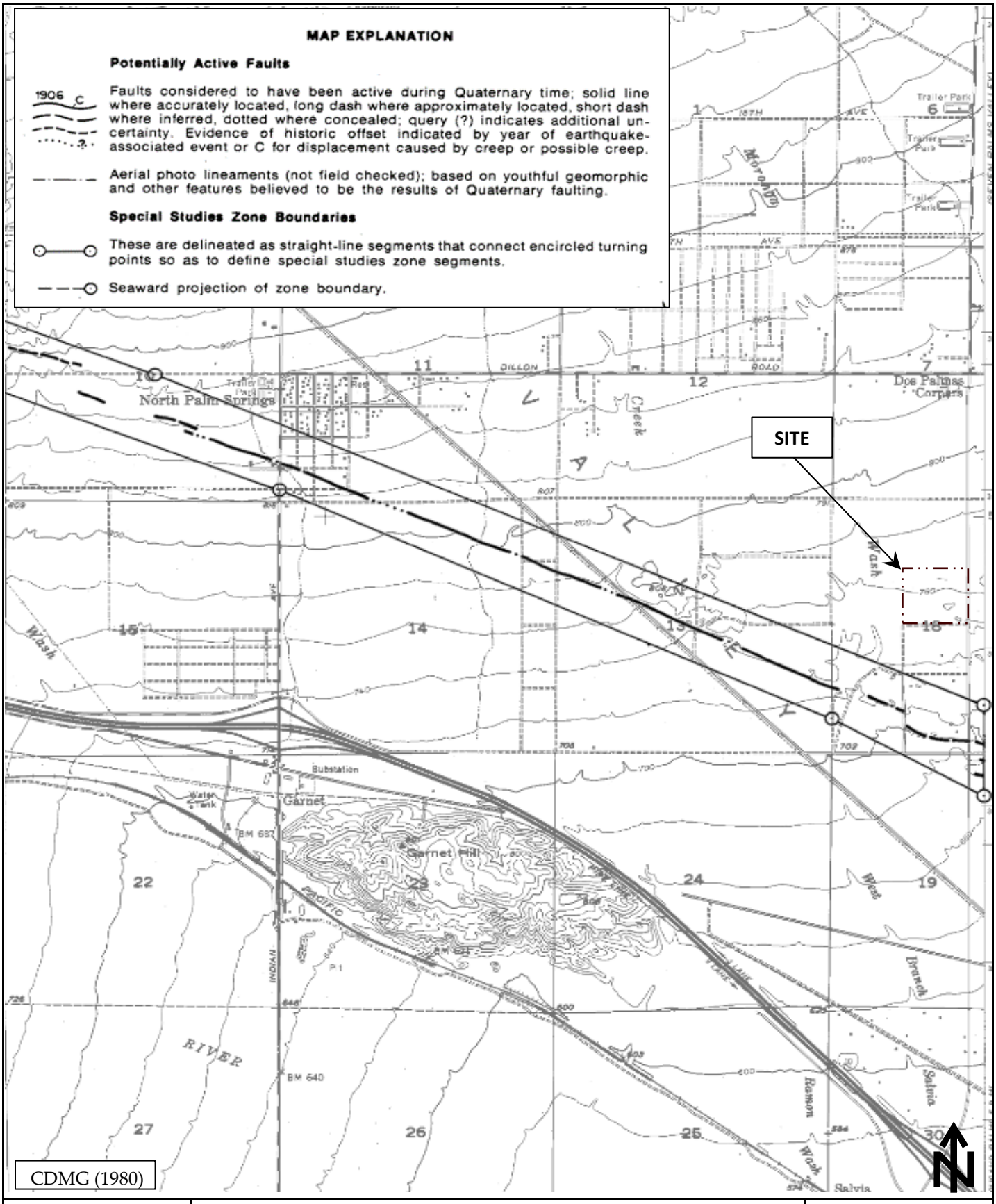
United States Geological Survey (USGS), 2021, 3DEP DEM viewer, available at: https://apps.nationalmap.gov/3depdem/

FIGURES

Site Location Map
Fault Zone Map
Riverside County Fault Map
Regional Geologic Map (Rogers, 1965)
Regional Geologic Map (Proctor, 1968)
Regional Geologic Map (Dibblee, 2004)
Fault Map (Clark, 1986)
Fault Map (Hope, 1969)
Figure 4A & 4B From FER-86



Sladden Engineering	SITE LOCATION MAP	FIGURE 1
	Project Number: 544-21557	
	Report Number: 21-12-825	
	Date: December 13, 2021	



Sladden Engineering	STATE DELINEATED FAULT ZONE MAP	FIGURE 2
	Project Number: 544-21557	
	Report Number: 21-12-825	
	Date: December 13, 2021	

Sladden Engineering

RIVERSIDE COUNTY FAULT MAP

Project Number:	544-21557
Report Number:	21-12-825
Date:	December 13, 2021

FIGURE 3

RCMMC (2021)

Map My County Map

Legend

- Parcels
- Faults
  - OTHER AUTHORITY
  - ALQUIST-PRIOLO
  - RIVERSIDE COUNTY
- Blueline Streams
- City Areas
- World Street Map

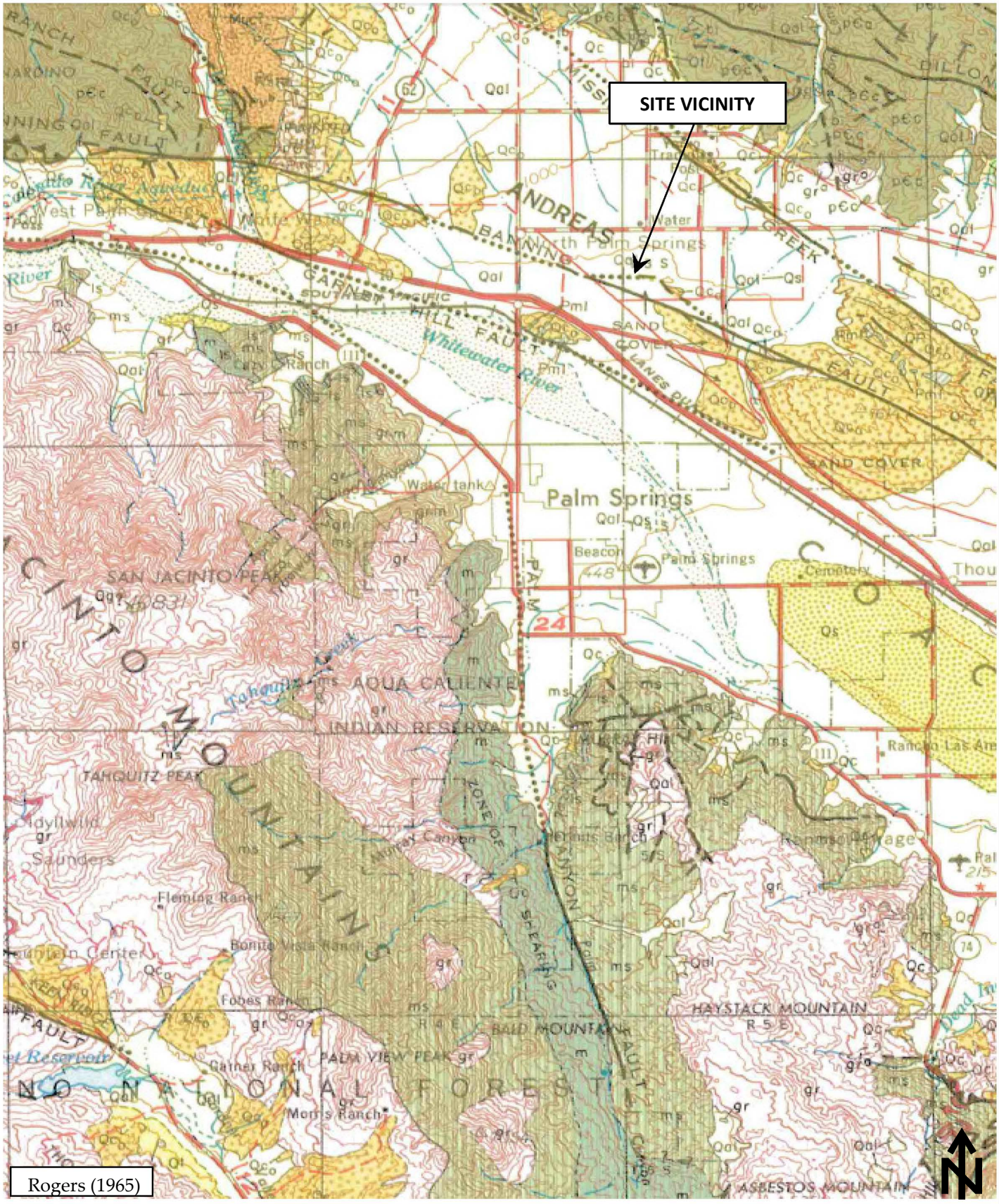
0 752 1,505 Feet

"IMPORTANT" Maps and data are to be used for reference purposes only. Map features are approximate, and are not necessarily accurate to surveying or engineering standards. The County of Riverside makes no warranty or guarantee as to the content (the source is often third party), accuracy, timeliness, or completeness of any of the data provided, and assumes no legal responsibility for the information contained on this map. Any use of this product with respect to accuracy and precision shall be the sole responsibility of the user.

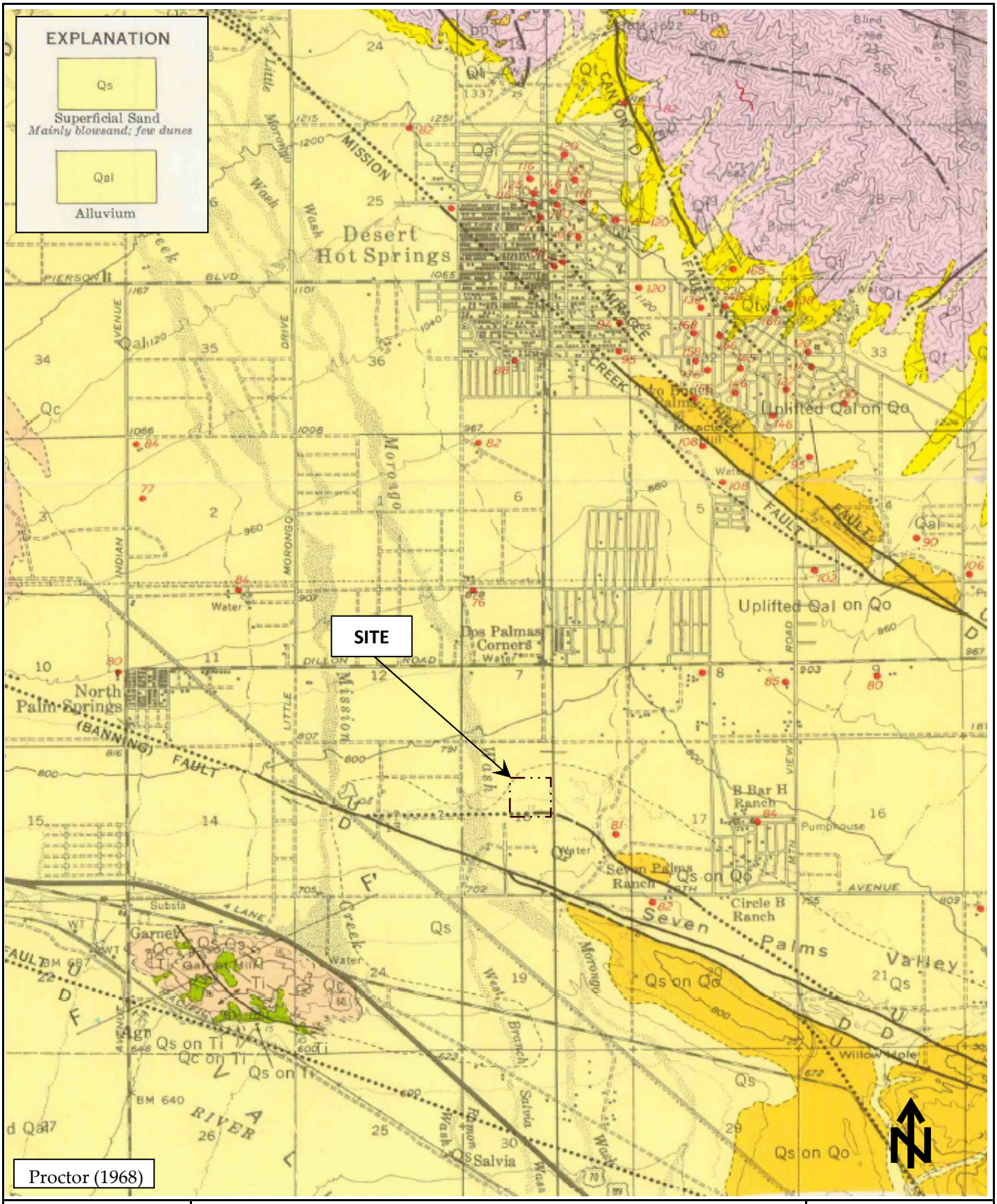
REPORT PRINTED ON... 12/6/2021 1:36:51 PM

© Riverside County GIS

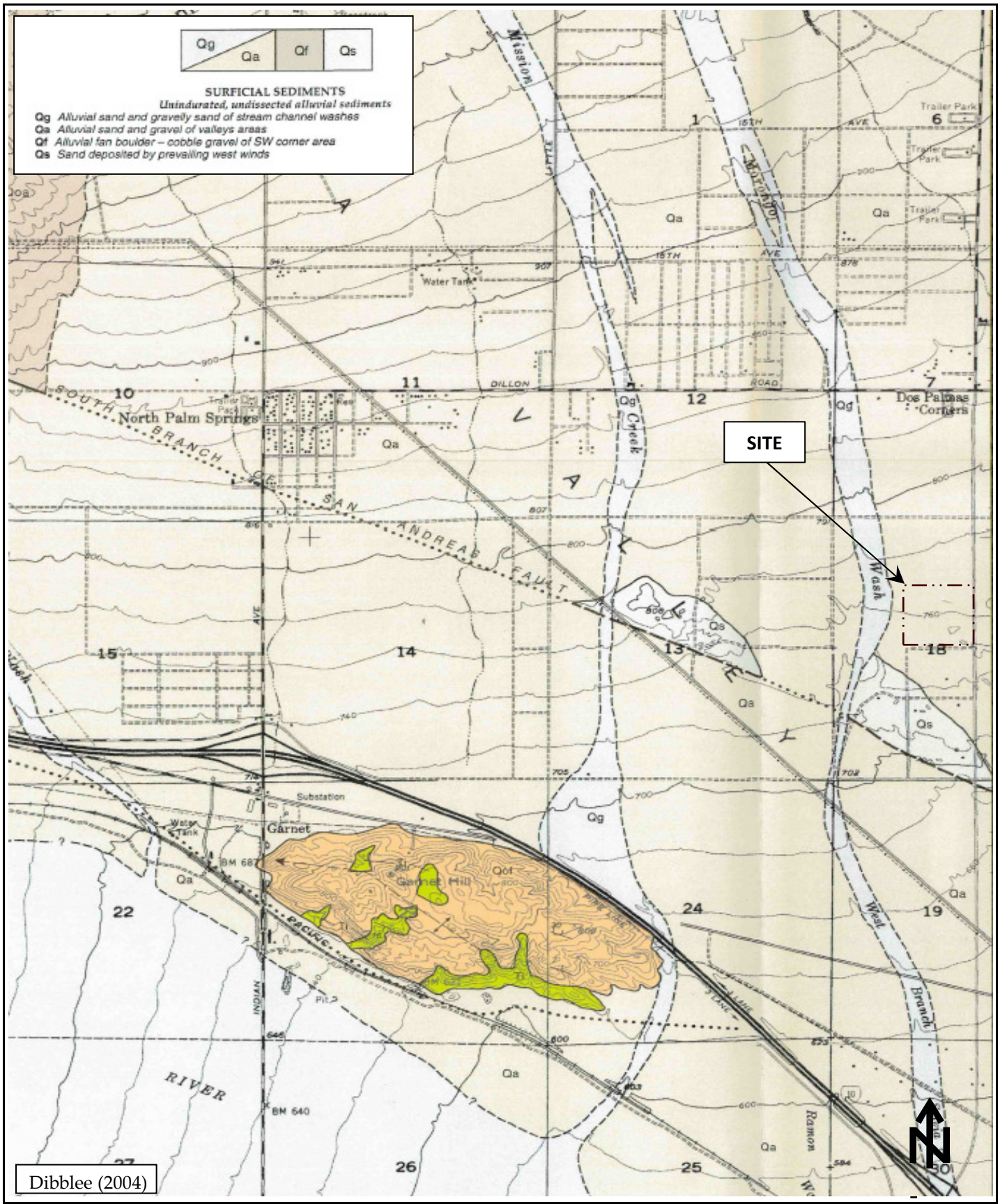
Notes



Sladden Engineering	REGIONAL GEOLOGIC MAP	FIGURE 4
	Project Number: 544-21557	
	Report Number: 21-12-825	
	Date: December 13, 2021	



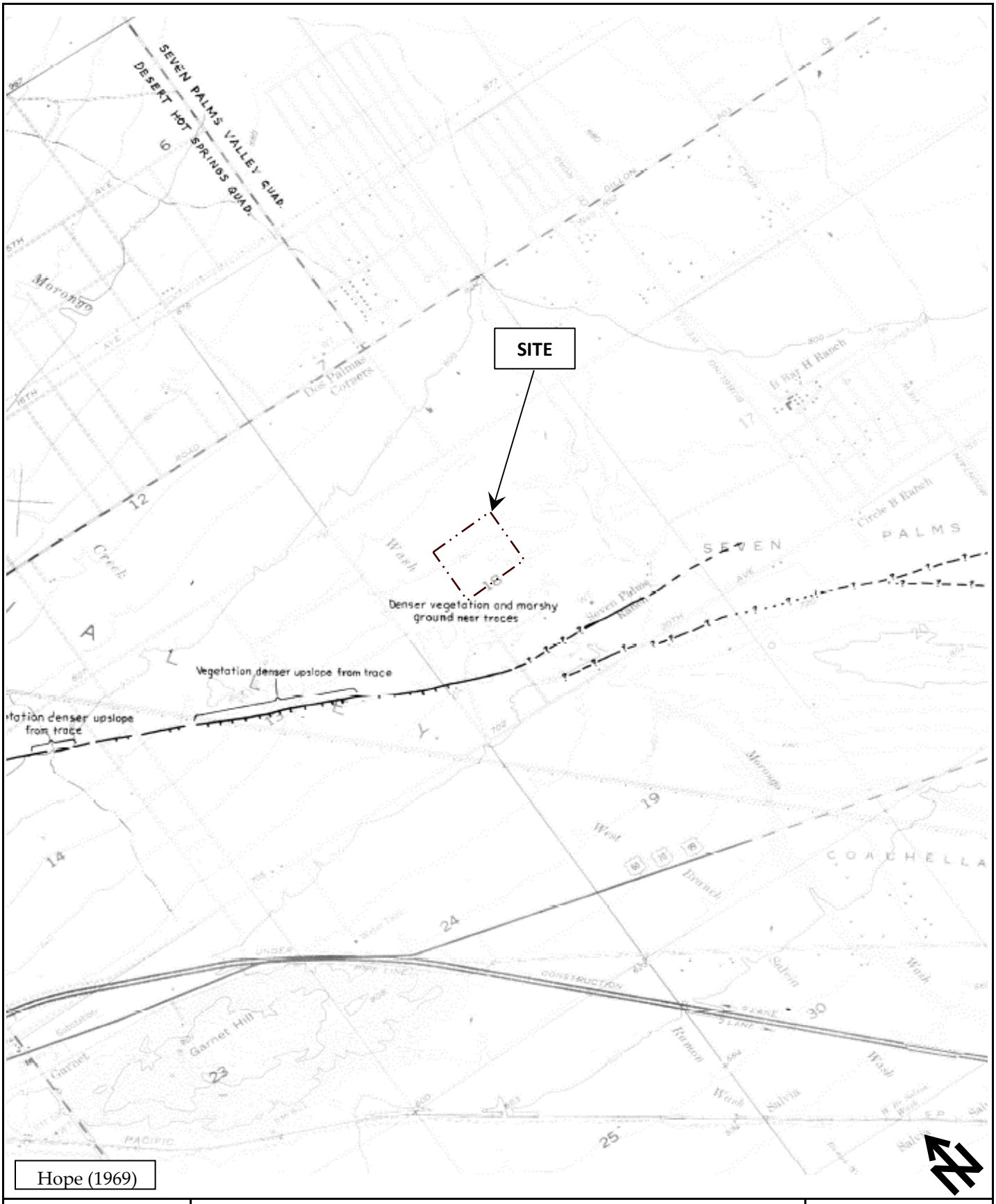
	REGIONAL GEOLOGIC MAP	FIGURE
Sladden Engineering	Project Number: 544-21557	5
	Report Number: 21-12-825	
	Date: December 13, 2021	



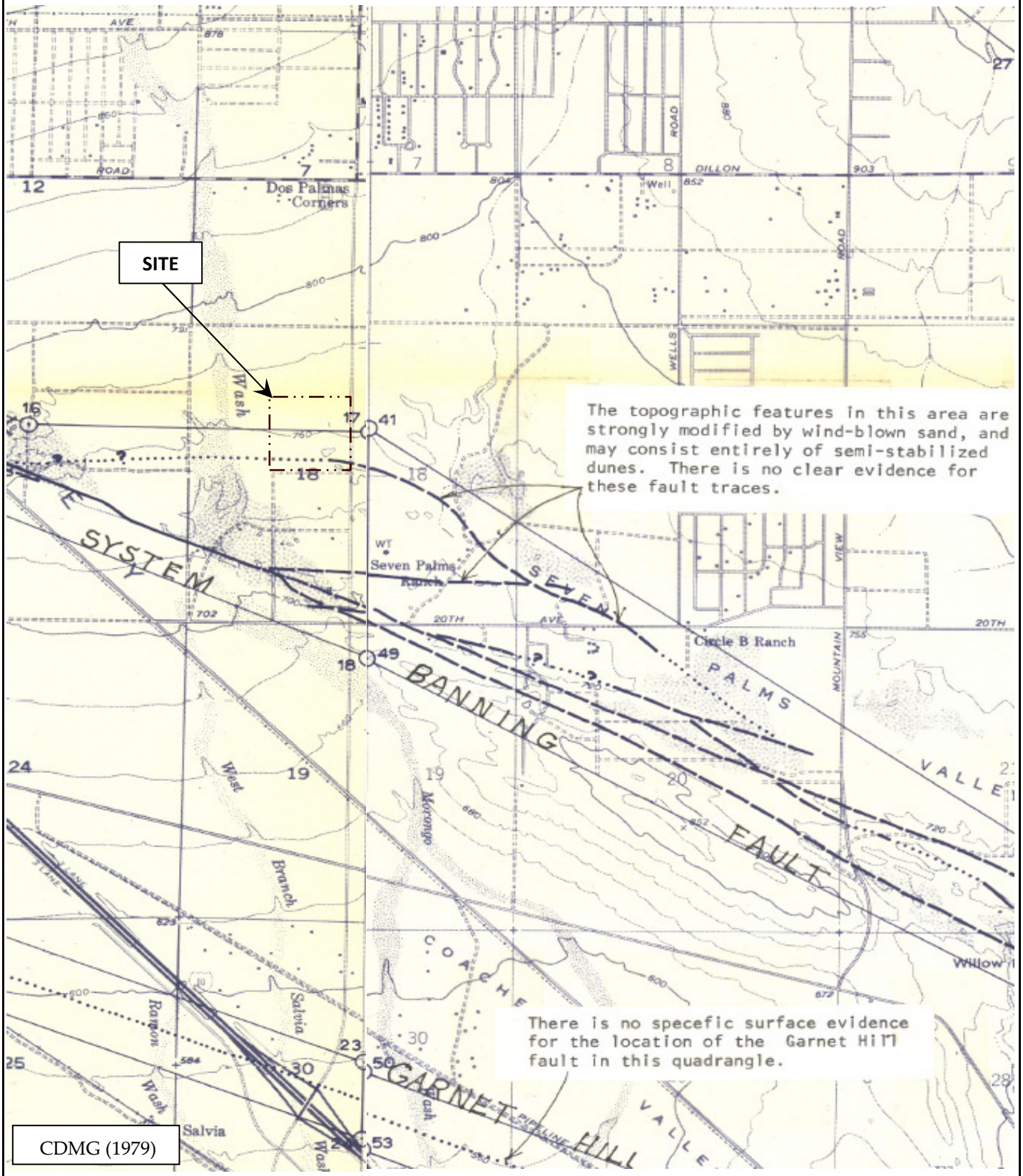
Sladden Engineering	REGIONAL GEOLOGIC MAP	FIGURE 6
	Project Number: 544-21557	
	Report Number: 21-12-825	
	Date: December 13, 2021	



Sladden Engineering	CLARK (1984) FAULT MAP	FIGURE 7
	Project Number: 544-21557	
	Report Number: 21-12-825	
	Date: December 13, 2021	



Sladden Engineering	HOPE (1969) FAULT MAP	FIGURE 8
	Project Number: 544-21557	
	Report Number: 21-12-825	
	Date: December 13, 2021	



Sladden Engineering	FIGURE 4A & 4B FROM FER-86		FIGURE 9
	Project Number:	544-21557	
	Report Number:	21-12-825	
	Date:	December 13, 2021	

APPENDIX E3

SEISMIC HAZARD ANALYSIS

Project: PROPOSED GREEN DAY VILLAGE; APN 657-280-003
Project Number: 544-21557
Client: LA WORLD CONSTRUCTION
Site Lat/Long: 33.9125/-116.5037
Controlling Seismic Source: SAF South Branch / SAF North Branch

REFERENCE	NOTATION	VALUE
Site Class	C, D, D default, or E	D measured
Site Class D - Table 11.4-1	F_a	1.0
Site Class D - 21.3(ii)	F_v	2.5
$0.2*(S_{D1}/S_{DS})$	T_0	0.134
S_{D1}/S_{DS}	T_S	0.670
Fundamental Period (12.8.2)	T	Period
Seismic Design Maps or Fig 22-14	T_L	8
Equation 11.4-4 - $2/3*S_{M1}$	S_{D1}	1.1163*
Equation 11.4-2 - F_V*S_1	S_{M1}	1.6745*

REFERENCE	NOTATION	VALUE
Fv (Table 11.4-2)[Used for General Spectrum]	F_v	1.7
Design Maps	S_s	2.499
Design Maps	S_1	0.985
Equation 11.4-1 - F_A*S_S	S_{MS}	2.499*
Equation 11.4-3 - $2/3*S_{MS}$	S_{DS}	1.666*
Design Maps	PGA	1.028
Table 11.8-1	F_{PGA}	1.1
Equation 11.8-1 - $F_{PGA}*PGA$	PGA_M	1.131*
Section 21.5.3	80% of PGA_M	0.905
Design Maps	C_{RS}	0.892
Design Maps	C_{R1}	0.877

RISK COEFFICIENT

Cr - At Perods <=0.2, Cr=C_{RS}	C_{RS}	0.892
Cr - At Periods >=1.0, Cr=C_{R1}	C_{R1}	0.877

Cr - At Periods between 0.2 and 1.0 use trendline formula to complete

Period	Cr
0.200	0.892
0.300	0.890
0.400	0.888
0.500	0.886
0.600	0.885
0.680	0.883
1.000	0.877

* **Code based design value**. See accompanying data for Site Specific Design values.

Mapped values from https://seismicmaps.org/

Sladden Engineering

PROBABILISTIC SPECTRA[1]
2% in 50 year Exceedence

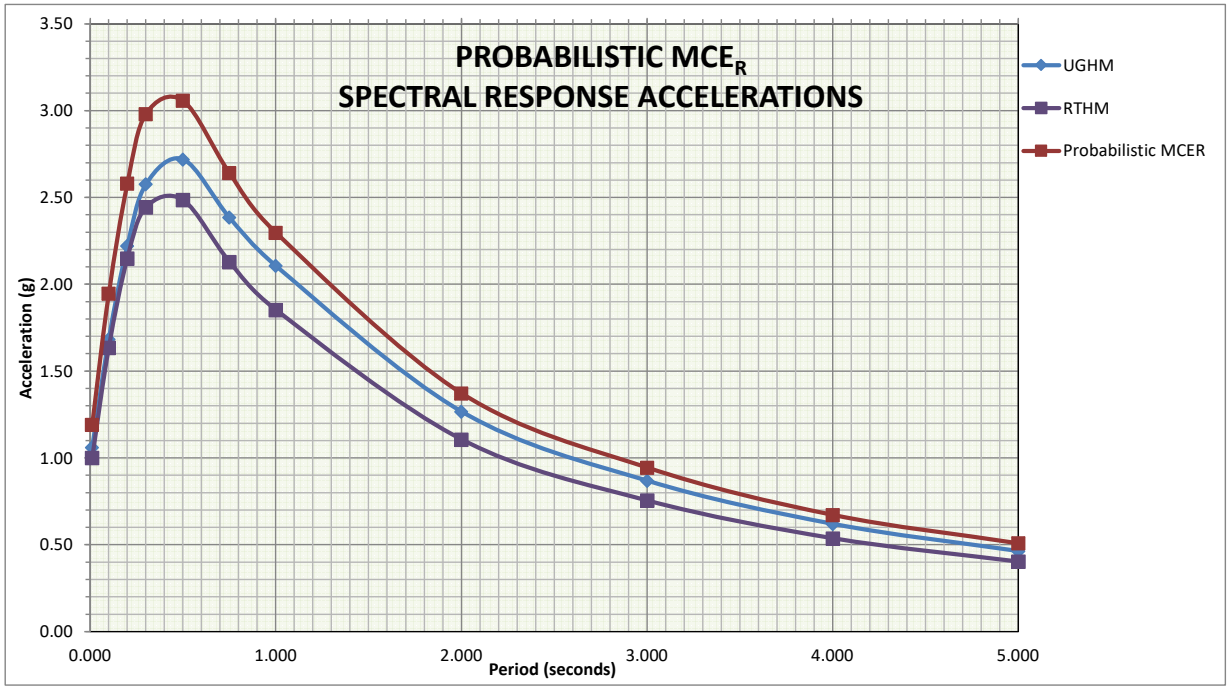
Project No: 544-21557

Period	UGHM	RTHM	Max Directional Scale Factor[2]	Probabilistic MCE
0.010	1.061	1.001	1.19	1.191
0.100	1.684	1.636	1.19	1.947
0.200	2.221	2.150	1.20	2.580
0.300	2.577	2.444	1.22	2.982
0.500	2.720	2.486	1.23	3.058
0.750	2.385	2.130	1.24	2.641
1.000	2.107	1.853	1.24	2.298
2.000	1.267	1.107	1.24	1.373
3.000	0.869	0.756	1.25	0.945
4.000	0.621	0.538	1.25	0.673
5.000	0.464	0.404	1.26	0.509

Probabilistic PGA: 1.061
Is Probabilistic $Sa_{(max)}$<$1.2F_a$? NO

[1] Data Sources:
https://earthquake.usgs.gov/hazards/interactive/
https://earthquake.usgs.gov/designmaps/rtgm/

[2] Shahi-Baker RotD100/RotD50 Factors (2014)



Sladden Engineering

DETERMINISTIC SPECTRUM

Largest Amplitudes of Ground Motions Considering All Sources Calculated using Weighted Mean of Attenuation Equations[1]

Controlling Source: SAF South Branch / SAF North Branch

Is Probabilistic $Sa_{(max)}$<1.2Fa? NO

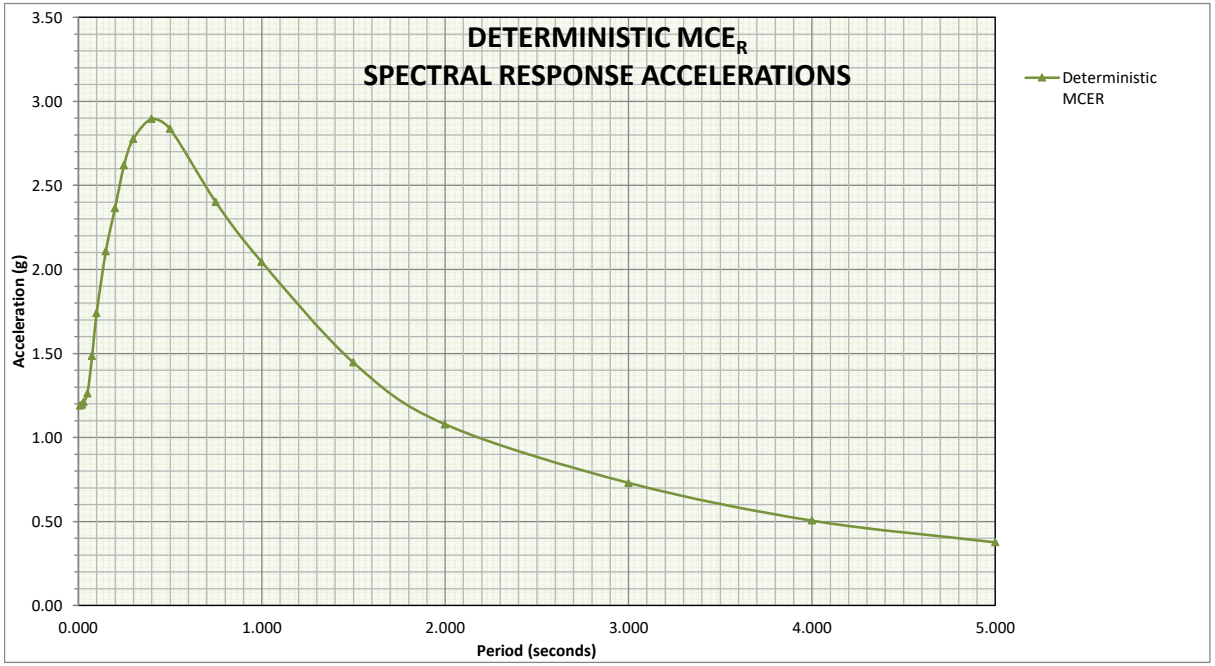
Period	Deterministic PSa Median + 1.σ for 5% Damping	Max Directional Scale Factor[2]	Deterministic MCE	Section 21.2.2 Scaling Factor Applied
0.010	1.000	1.19	1.190	1.190
0.020	1.005	1.19	1.196	1.196
0.030	1.017	1.19	1.210	1.210
0.050	1.061	1.19	1.263	1.263
0.075	1.247	1.19	1.484	1.484
0.100	1.462	1.19	1.740	1.740
0.150	1.757	1.20	2.108	2.108
0.200	1.970	1.20	2.364	2.364
0.250	2.165	1.21	2.620	2.620
0.300	2.276	1.22	2.777	2.777
0.400	2.354	1.23	2.895	2.895
0.500	2.306	1.23	2.837	2.837
0.750	1.936	1.24	2.401	2.401
1.000	1.649	1.24	2.045	2.045
1.500	1.166	1.24	1.446	1.446
2.000	0.869	1.24	1.077	1.077
3.000	0.584	1.25	0.730	0.730
4.000	0.405	1.25	0.506	0.506
5.000	0.299	1.26	0.376	0.376

Project No: 544-21557

Is Determinstic $Sa_{(max)}$<1.5*Fa?	NO
Section 21.2.2 Scaling Factor:	N/A
Deterministic PGA:	1.000
Is Deterministic PGA >=F_{PGA}*0.5?	YES

[1] NGAWest 2 GMPE worksheet and Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3) - Time Dependent Model

[2] Shahi-Baker RotD100/RotD50 Factors (2014)



Sladden Engineering

SITE SPECIFIC SPECTRA

Period	Probabilistic MCE	Deterministic MCE	Site-Specific MCE	Design Response Spectrum (Sa)
0.010	1.191	1.190	1.190	0.793
0.100	1.947	1.740	1.740	1.160
0.200	2.580	2.364	2.364	1.576
0.300	2.982	2.777	2.777	1.851
0.500	3.058	2.837	2.837	1.891
0.750	2.641	2.401	2.401	1.601
1.000	2.298	2.045	2.045	1.363
2.000	1.373	1.077	1.077	0.718
3.000	0.945	0.730	0.730	0.487
4.000	0.673	0.506	0.506	0.337
5.000	0.509	0.376	0.376	0.251

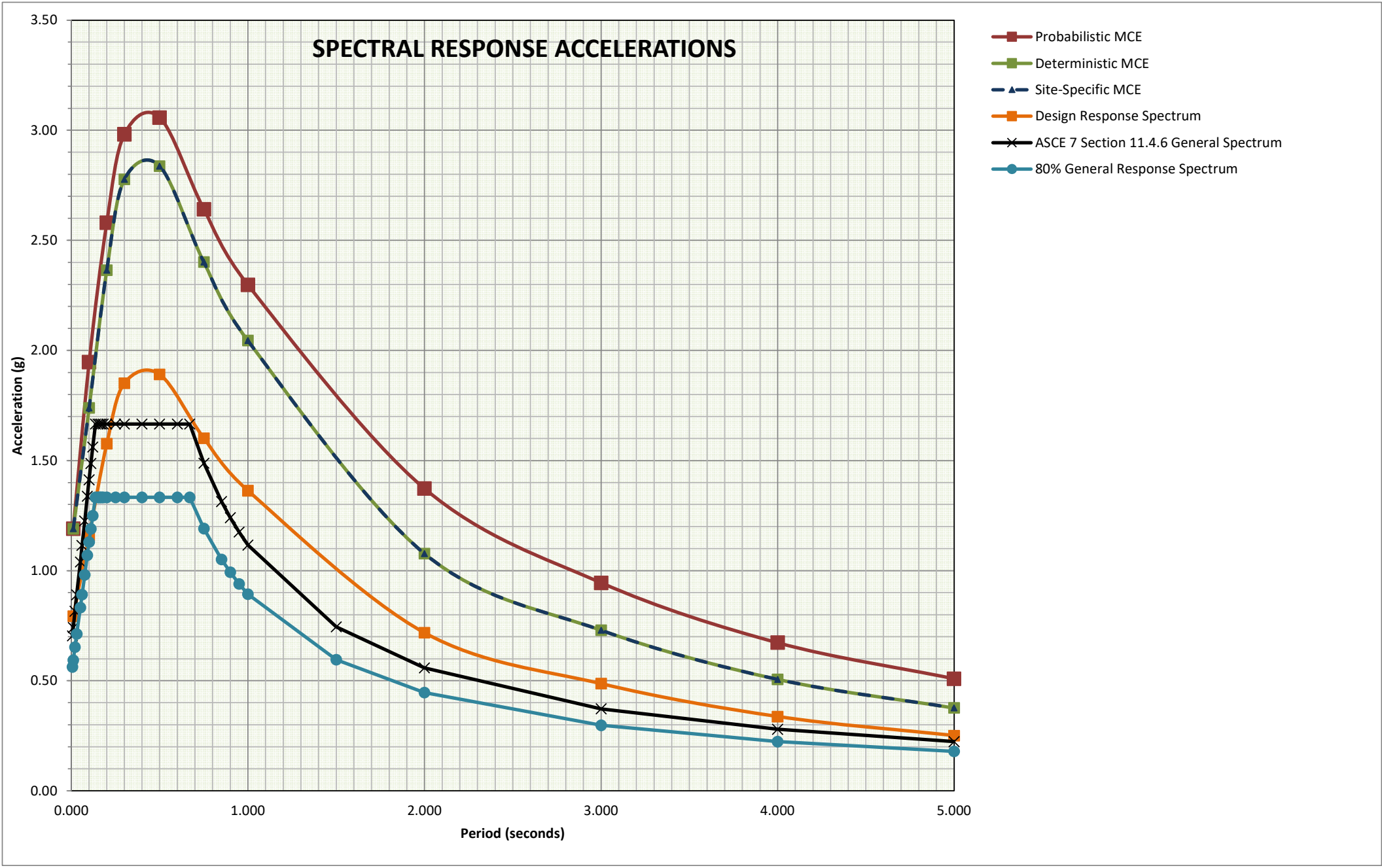
ASCE 7-16: Section 21.4
Site Specific

	Calculated Value	Design Value
SDS:	1.702	1.702
SD1:	1.460	1.460
SMS:	2.553	2.553
SM1:	2.189	2.189
Site Specific PGAm:	1.000	1.000
Site Class:	D measured	

Seismic Design Category - Short* E
Seismic Design Category - 1s* E
* Risk Categories I, II, or III

Period	ASCE 7 SECTION 11.4.6 General Spectrum	80% General Response Spectrum
0.005	0.704	0.563
0.010	0.741	0.593
0.020	0.816	0.652
0.030	0.890	0.712
0.050	1.039	0.831
0.060	1.114	0.891
0.075	1.226	0.981
0.090	1.338	1.070
0.100	1.412	1.130
0.110	1.487	1.190
0.120	1.561	1.249
0.136	1.666	1.333
0.150	1.666	1.333
0.160	1.666	1.333
0.170	1.666	1.333
0.180	1.666	1.333
0.200	1.666	1.333
0.250	1.666	1.333
0.300	1.666	1.333
0.400	1.666	1.333
0.500	1.666	1.333
0.600	1.666	1.333
0.670	1.666	1.333
0.750	1.488	1.191
0.850	1.313	1.051
0.900	1.240	0.992
0.950	1.175	0.940
1.000	1.116	0.893
1.500	0.744	0.595
2.000	0.558	0.447
3.000	0.372	0.298
4.000	0.279	0.223
5.000	0.223	0.179

Project No: 544-21557


SPECTRAL RESPONSE ACCELERATIONS
Acceleration (g)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.000
1.000
2.000
3.000
4.000
5.000
Period (seconds)
Probabilistic MCE
Deterministic MCE
Site-Specific MCE
Design Response Spectrum
ASCE 7 Section 11.4.6 General Spectrum
80% General Response Spectrum

APPENDIX E4

GEOTECHNICAL INVESTIGATION

GEOTECHNICAL INVESTIGATION
PROPOSED MIXED-USE DEVELOPMENT
GREEN DAY VILLAGE
APN 657-280-003
PALM DRIVE
DESERT HOT SPRINGS, CALIFORNIA

-Prepared By-

Sladden Engineering

45090 Golf Center Parkway, Suite F
Indio, California 92201
(760) 863-0713

Sladden Engineering

45090 Golf Center Parkway, Suite F, Indio, CA 92201 (760) 863-0713 Fax (760) 863-0847
6782 Stanton Avenue, Suite C, Buena Park, CA 90621 (714) 523-0952 Fax (714) 523-1369
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863
www.sladdenengineering.com

July 6, 2022

Project No. 544-21557
22-06-386

LA World Construction
2029 Century Park East, Suite 400
Century City, California 90067

Subject: Geotechnical Investigation

Project: Proposed Mixed-Use Development
Green Day Village
APN 657-280-003
Palm Drive
Desert Hot Springs, California

Sladden Engineering is pleased to present the results of our geotechnical investigation performed for the proposed Green Day Village mixed-use development to be constructed on the subject property (APN 657-280-003) located on the west side of Palm Drive between 18th Avenue and Beacon Way in the City of Desert Hot Springs, California. Our services were completed in accordance with our proposal for geotechnical engineering services dated March 23, 2022 and your authorization to proceed with the work. The purpose of our investigation was to explore the subsurface conditions at the site in order to provide recommendations for foundation design and site preparation. Evaluation of environmental issues and hazardous wastes was not included within the scope of services provided.

The opinions, recommendations and design criteria presented in this report are based on our field exploration program, laboratory testing and engineering analyses. Based on the results of our investigation, it is our professional opinion that the proposed project is feasible from a geotechnical perspective provided that the recommendations presented in this report are implemented into design and carried out through construction.

We appreciate the opportunity to provide service to you on this project. If you have any questions regarding this report, please contact the undersigned.

Respectfully submitted,
SLADDEN ENGINEERING

Matthew J. Cohrt
Principal Geologist

CERTIFIED ENGINEERING GEOLOGIST
MATTHEW J. COHRT
2634
STATE OF CALIFORNIA

Brett L. Anderson
Principal Engineer

REGISTERED PROFESSIONAL ENGINEER
BRETT L. ANDERSON
No. C45389
CIVIL ENGINEERING
STATE OF CALIFORNIA

SER/mc

Copies: 4/Addressee

GEOTECHNICAL INVESTIGATION
PROPOSED MIXED-USE DEVELOPMENT
GREEN DAY VILLAGE
APN 657-280-003
DESERT HOT SPRINGS, CALIFORNIA

TABLE OF CONTENTS

INTRODUCTION 1
PROJECT DESCRIPTION 1
SCOPE OF SERVICES 2
SITE CONDITIONS 2
GEOLOGIC SETTING 3
SUBSURFACE CONDITIONS 3
SEISMICITY AND FAULTING 4
- Literature Review 5
- Aerial Photographic Review 5

SITE SPECIFIC GROUND MOTION PARAMETERS 7
GEOLOGIC HAZARDS 7
CONCLUSIONS 9
EARTHWORK AND GRADING 9
- Site Clearing 9
- Preparation of Residential Building Areas 10
- Preparation of Commercial Building Areas 10
- Compaction 10
- Shrinkage and Subsidence 11

FOUNDATIONS: CONVENTIONAL SHALLOW SPREAD FOOTINGS 11
STRUCTURAL MAT-SLABS 12
POST-TENSIONED SLABS 12
SLABS-ON-GRADE 12
LATERAL PRESSURES 13
ON-SITE PAVEMENT DESIGN 13
CORROSION SERIES 14
UTILITY TRENCH BACKFILL 14
EXTERIOR CONCRETE FLATWORK 14
DRAINAGE 14
LIMITATIONS 15
ADDITIONAL SERVICES 15
REFERENCES 16
FIGURES - Site Location Map
Regional Geologic Map (Rogers (1965)
Regional Geologic Map (Proctor 1968)
Regional Geologic Map (Dibblee, 2004)
Exploration Location Plan
State Delineated Fault Zone Map
Riverside County Fault Map
Fault Map (Clark, 1984)
Fault Map (Hope, 1969)
Figure 4A & 4B From FER-86

GEOTECHNICAL INVESTIGATION
PROPOSED MIXED-USE DEVELOPMENT
GREEN DAY VILLAGE
APN 657-280-003
PALM DRIVE
DESERT HOT SPRINGS, CALIFORNIA

TABLE OF CONTENTS (Continued)

APPENDIX A - Field Exploration

APPENDIX B- Laboratory Testing

APPENDIX C- Seismic Design Map and Report
Seismic Hazard Analysis (SHA)

APPENDIX D- Dynamic Settlement Analysis

APPENDIX E- Site Plan

INTRODUCTION

This report presents the results of the geotechnical investigation performed for the proposed Green Day Village mixed-use development to be constructed on the property (APN 657-280-003) located on the west side of Palm Drive between 18th Avenue and Beacon Way in the City of Desert Hot Springs, California. The site consists of approximately 38.54 acres of undeveloped land with the central portion of the site located at approximately 33.9125 degrees North latitude and 116.5037 degrees West longitude. The approximate location of the site is indicated on the Site Location Map (Figure 1).

Our investigation was conducted in order to evaluate the engineering properties of the subsurface materials, to evaluate their *in-situ* characteristics, and to provide engineering recommendations and design criteria for site preparation, foundation design and the design of various site improvements. This study also includes a review of published and unpublished geotechnical and geological literature regarding seismicity at and near the subject site.

PROJECT DESCRIPTION

Based on the provided Site Plan (SRK, 2022), it is our understanding that the proposed project will consist of constructing a new mixed-use development on the currently undeveloped property. The residential portion of the project will consist of constructing 92 residential buildings each ranging from 208 ft² to 886 ft² of living space and constructing a 16,425 ft² (footprint) two-story apartment building with a subterranean level parking. New commercial structures will consist of a 4,608 ft² drive-thru restaurant (Building 1), a 1,024 ft² convenience store (Building 2), a 20,000 ft² retail store (Building 3), a 6,144 ft² restaurant building (Building 4), four retail buildings ranging from 1,920 ft² to 15,360 ft² (Buildings 5 through Building 8), a 10,927 ft² (footprint) two-story medial office building (Building 9), two recycle center buildings (Building 10 and 11), and a 8,886 ft² two-story community center building, The project will also include farm equipment buildings, swimming pools, solar canopies, concrete flatwork, paved parking areas, underground utilities, recharge basins, landscape areas and various other improvements. For our analyses we expect the new buildings will consist of relatively lightweight wood-frame, light-gauge steel-frame, reinforced masonry or reinforced concrete tilt-up structures supported on conventional shallow spread footings and concrete slabs-on-grade.

We anticipate that grading will be limited to minor cuts and fills to accomplish the desired pad elevations and provide adequate gradients for site drainage. This does not include the removal and re-compaction of the primary foundation bearing soil within the building areas. Upon completion of the precise grading plans, Sladden should be retained in order to verify that the recommendations presented within in this report are incorporated into the design of the proposed project.

Structural foundation loads were not available at the time of this report. Based on our experience with relatively lightweight wood-frame, steel-frame, reinforced masonry or reinforced concrete tilt-up structures, we expect that isolated column loads will be less than 20 kips and continuous wall loads will be less than 2.0 kips per linear foot for residential structures. For commercial structures we expect that isolated column loads will be less than 50 kips and continuous walls loads will be less than 5.0 kips per linear foot. If these assumed loads vary significantly from the actual loads, we should be consulted to verify the applicability of the recommendations provided.

SCOPE OF SERVICES

The purpose of our investigation was to determine specific engineering characteristics of the surface and near surface soil in order to develop foundation design criteria and recommendations for site preparation. Exploration of the site was achieved by drilling seven (7) exploratory boreholes/test holes to depths between approximately 5 and 51 feet below the existing ground surface (bgs). Specifically, our site characterization consisted of the following tasks:

- Site reconnaissance to assess the existing surface conditions on and adjacent to the site.
- The excavation of seven (7) exploratory boreholes/test holes to depths between approximately 5 and 51 feet bgs in order to characterize the subsurface soil conditions. Representative samples of the soil were classified in the field and retained for laboratory testing and engineering analyses.
- The performance of laboratory testing on selected samples to evaluate their engineering characteristics.
- The review of geologic literature and previous reports conducted for the project site with respect to potential geologic hazards.
- The performance of engineering analyses to develop recommendations for foundation design and site preparation.
- The preparation of this report summarizing our work at the site.

SITE CONDITIONS

The subject parcel is located on the west side of Palm Drive between 18th Avenue and Beacon Way in the City of Desert Hot Springs, California. The site consists of approximately 38.34 acres of undeveloped land and is covered in scattered native vegetation. The site is bounded by Palm Drive to the east, undeveloped land to the north and east and sparsely developed land the immediate south.

The subject property is located on the eastern portion of the United States Geological Survey (USGS) Desert Hot Springs Quadrangle Map (USGS, 2015), at approximately 34.9125 degrees north latitude and 116.5037 degrees west longitude. Site elevations range from approximately 765 to 745 feet above mean sea level (MSL) with surface gradients descending to the south. Morongo Wash is located approximately 600 feet to the west of the site.

No natural ponding of water or surface seeps were observed at or near the site during our investigation conducted on May 17, 2022. Site drainage appears to be controlled via sheet flow and surface infiltration.

GEOLOGIC SETTING

The project site is located within the Colorado Desert Physiographic Province (also referred to as the Salton Trough) that is characterized as a northwest-southeast trending structural depression extending from the Gulf of California to the Banning Pass. The Salton Trough is dominated by several northwest trending faults, most notably the San Andreas Fault system. The Salton Trough is bounded by the Santa Rosa – San Jacinto Mountains on the southwest, the San Bernardino Mountains on the north, the Little San Bernardino - Chocolate – Orocopia Mountains on the east and extends through the Imperial Valley into the Gulf of California on the south.

A relatively thick sequence (20,000 feet) of sediment has been deposited in the Coachella Valley portion of the Salton Trough from Miocene to present times. These sediments are predominately terrestrial in nature with some lacustrian (lake) and minor marine deposits. The major contributor of these sediments has been the Colorado River. The mountains surrounding the Coachella Valley are composed primarily of Precambrian metamorphic and Mesozoic "granitic" rock.

The Salton Trough is an internally draining area with no readily available outlet to Gulf of California and with portions well below sea level (-253' msl). The region is intermittently blocked from the Gulf of California by the damming effects of the Colorado River delta (current elevation +30'msl). Between about 300AD and 1600 AD (to 1700) the Salton Trough has been inundated by the River's water, forming ancient Lake Cahuilla (max. elevation +58' msl). Since that time the floor of the Trough has been repeatedly flooded with other "fresh" water lakes (1849, 1861, and 1891), the most recent and historically long lived being the current Salton Sea (1905). The sole outlet for these waters is evaporation, leaving behind vast amounts of terrestrial sediment materials and evaporite minerals.

The site has been mapped by Rogers (1965), Proctor (1968) and Dibblee (2004) to be immediately underlain by Quaternary-age alluvium. The regional geologic setting for the site vicinity is presented on the attached Regional Geologic Maps (Figure 2 through Figure 4).

SUBSURFACE CONDITIONS

The subsurface conditions at the site were investigated by drilling seven (7) exploratory boreholes/test holes to depths between approximately 5 and 51 feet bgs in order to evaluate the subsurface soil conditions. The approximate locations of the boreholes and test holes are illustrated on the Exploration Location Plan (Figure 5). The boreholes and test holes were advanced using a track-mounted CME-75 limited access drill-rig equipped with 8-inch outside diameter (O.D.) hollow stem augers. A representative of Sladden was on-site to log the materials encountered and retrieve samples for laboratory testing and engineering analysis.

During our field investigation, alluvial sediment was encountered throughout the depths explored. The native soil consists primarily of interbedded sand (SP/SW) and silty sand (SM) with minor proportions of sandy silt (ML) encountered. Generally, the granular soil appeared light yellowish brown to light grayish brown, dry to slightly moist and fine- to coarse-grained. Cohesive soil appeared yellowish brown to light yellowish brown, moist, stiff to very stiff and exhibited characteristics indicative of low plasticity soil.

The final logs represent our interpretation of the contents of the field logs, and the results of the laboratory observations and tests of the field samples. The final logs are included in Appendix A of this report. The stratification lines represent the approximate boundaries between soil types, although the transitions may be gradual and variable across the site.

Groundwater was not encountered within our exploratory boreholes conducted for this investigation. Information regarding the approximate depth to groundwater provided by the California Department of Water Resources (2022) online database indicates that the depth to groundwater is in excess of 80 feet below the existing ground surface in the vicinity of the site. The following table provides a summary of the highest groundwater depths recorded in the project vicinity.

TABLE 1
GROUNDWATER DEPTHS

STATE WELL	LAT/LONG	DISTANCE (KM)	DATE	DEPTH (FT)
03S04E14J001S	33.9102/-116.5284	2.30	12/02/2020	216.5
03S04E12B002S	33.932/-116.5141	2.35	02/21/2020	175.4
03S04E12C001S	33.9318/-116.5190	2.55	05/11/2015	175.4
03S05E17J001S	33.9101/-116.4758	2.60	02/20/2019	83.9
03S04E01J001S	33.9390/-116.5135	3.05	06/20/2017	216
03S05E30G001S	33.8833/-116.4996	3.25	02/02/1977	188.4
03S04E11L004S	33.9230/-116.5386	3.45	05/17/2017	151
03S04E22A001S	33.9021/-116.5473	4.20	06/04/2014	97.7

SEISMICITY AND FAULTING

The southwestern United States is a tectonically active and structurally complex region, dominated by northwest trending dextral faults. The faults of the region are often part of complex fault systems, composed of numerous subparallel faults which splay or step from main fault traces. Strong seismic shaking could be produced by any of these faults during the design life of the proposed project.

We consider the most significant geologic hazard to the project to be the potential for moderate to strong seismic shaking that is likely to occur during the design life of the project. The proposed project is located in the highly seismic Southern California region within the influence of several fault systems that are considered to be active or potentially active. An active fault is defined by the State of California as a "sufficiently active and well defined fault" that has exhibited surface displacement within the Holocene epoch (about the last 11,000 years). A potentially active fault is defined by the State as a fault with a history of movement within Pleistocene time (between 11,000 and 1.6 million years ago).

As previously stated, the site has been subjected to strong seismic shaking related to active faults that traverse through the region. Some of the more significant seismic events near the subject site within recent times include: M6.0 North Palm Springs (1986), M6.1 Joshua Tree (1992), M7.3 Landers (1992), M6.2 Big Bear (1992), M7.1 Hector Mine (1999), and M7.1 Ridgecrest (2019).

Table 2 lists the closest known potentially active faults that was generated in part using fault parameters from The Revised 2002 California Probabilistic Seismic Hazard Maps (Cao et al, 2003) and the Fault and Fold Database of the United States (USGS, 2022a). This table does not identify the probability of reactivation or the on-site effects from earthquakes occurring on any faults in the region.

TABLE 2
CLOSEST KNOWN ACTIVE FAULTS

Fault Name	Distance (Km)	Maximum Event
San Andreas – Southern	0.5	7.5
San Andreas – San Bernardino	1.8	7.5
San Andreas – Coachella	3.3	7.2
Burnt Mountain	12.3	6.5
Eureka Peak	16.7	6.4
Pinto Mountain	19.3	7.2
Landers	29.0	7.3
North Frontal Fault Zone (East)	32.1	6.7
San Jacinto – Anza	39.1	7.2

*Not Recognized by the State of California as an active fault

Literature Review

Sladden previously conducted a review of available published and unpublished geologic literature applicable to the site and site vicinity (Sladden, 2021). Locations of faults in the vicinity of the site were reviewed on the California Fault Map (Jennings, 1994), Southern California Earthquake Data Center (SCEDC, 2021), CDMG (1980) (Figure 6), RCCMC (2021) (Figure 7), Clark (1984) (Figure 8) and Hope (1969) (Figure 9). The EQFAULT (Blake, 2000) computer software program was utilized in order to generate and analyze the spatial distribution of known faults in the vicinity of the site. The regional geologic conditions for the site and surrounding area were reviewed on Rogers (1965) (Figure 2), Proctor (1968) (Figure 3) and Dibblee (2004) (Figure 4). Fault studies and fault evaluations specific to the project vicinity were reviewed within Hilltop (2004), Leighton and Associates, Inc. (2009) and CDMG (1979 & 1987), (Figure 10). A complete list of the geologic references reviewed for this report and Sladden (2021) are presented under the references section.

Aerial Photographic Review

As part of our previous work on the site (Sladden, 2021), a lineament analysis was conducted in order to identify possible unmapped faults and to evaluate topographic expressions of published and unpublished fault traces. Black and white stereo photo pairs of the site available from Riverside County Flood Control & Water Conservation District (RCFC) were utilized for our lineament analysis. In addition, a portion of the B4 Lidar Project imagery (Bevis and Hudnut, 2005) and USGS 3D Elevation Program (3DEP) imagery were reviewed (USGS, 2021).

Tonal, geomorphic, and vegetative lineaments were evaluated and classified as strong, moderate or weak in accordance with their strength of expression, length, continuity, persistence between photos and flights, orientation, and plausible origin. A strong lineament is a well-defined feature that can be continuously traced for several hundred feet to a few thousand feet. A moderate lineament is less well defined, somewhat discontinuous and can be traced for a few hundred feet. A weak lineament is discontinuous, poorly defined and can be traced only for a couple of hundred feet or less. Table 3 presents the stereo-photo pairs review for this evaluation.

TABLE 3
AERIAL PHOTOGRAPHS REVIEWED

Date	Photo Numbers	Scale	Source
5-24-74	267, 268	1″=2000′	RCFC
2-1-80	280, 281	1″=2000′	RCFC
2-7-841	1438, 1439	1″=1600′	RCFC
1-19-90	5-77, 5-78	1″=1600′	RCFC
1-28-95	5-87, 5-88	1″=1600′	RCFC
3-11-00	5-67, 5-68	1″=1600′	RCFC
4-18-05	5-66, 5-67	1″=1600′	RCFC
3-12-10	5-69, 5-70	1″=1600′	RCFC

Numerous photo-lineaments were observed in the area of the subject site on the aerial photographs reviewed. Strong geomorphic/vegetation lineaments are visible to the south of the subject parcel and are coincident with the mapped trace of the San Andreas Fault (South Branch). The lineaments have a general orientation of 293 degrees and are consistently visible between the stereo photo pairs reviewed. Weakly developed topographic highs and lows are visible to the immediate east of Palm Avenue and are interpreted as a depositional features (eolian sand) and are not seismogenic in nature. Similarly, a subtle slope break is visible on the subject parcel that is also interpreted as a depositional feature.

Anastomosing, ephemeral, drainages (Morongo Wash) were identified to the west of the site. These lineaments are oriented in a north-south direction, are non-seismogenic and are clearly the result of regional drainage patterns.

The subject parcel is not located in State of California designated faut zone (Figure 5). However, the subject parcel is currently located within a County of Riverside delineated faut zone for the Seven Palms Ranch fault. The Seven Palms Ranch fault is mapped in a roughly east-west orientation through the southern portion of the parcel and is generally mapped as a splay of the San Andreas Fault system (South Branch).

There is little agreement to the early mapping of the Seven Palms Ranch fault through the subject property. The fault appears to be initially mapped by Rogers (1965) on the Santa Ana Sheet and later mapped transecting the site by Proctor (1968). Clark (1984) and Hope (1969) do not recognize the fault as mapped transecting the subject parcel. The California Division of Mines and Geology (CDMG, 1979) concluded that there is no clear evidence of the Seven Palms Ranch fault (Figure 9).

Previous fault trench investigations of the property located to immediate east of Palm Drive were conducted by Hilltop (2004) and Leighton and Associates (2009). Those investigations were performed as part of the Desert Dunes Golf Course development. The investigations include aerial photo review and fault trenching of lineaments in the vicinity, inclusive of the mapped location of the Seven Palms Ranch fault. No evidence of the Seven Palms Ranch fault, as mapped by Proctor (1968) was observed during the investigations.

Based on our lineament evaluation of the site and our review of pertinent geologic information presented herein, it is our professional opinion that no surface manifestations indicative of active faulting exist within the subject parcel. Previous fault trench studies of the Seven Palms Ranch fault did not find evidence of active faulting to the immediate east of the subject parcel. Additionally, CDMG (1979) concluded that there is not sufficient evidence of the Seven Palms Ranch fault. Therefore, it is our opinion that subsurface fault trenching on the parcel is not warranted at this time.

SITE SPECIFIC GROUND MOTION PARAMETERS

Sladden has reviewed the 2019 California Building Code (CBC) and ASCE7-16 and developed site specific ground motion parameters for the subject site. The project Seismic Design Maps and site-specific ground motion parameters are summarized in the following table and included within Appendix C. The project Structural Engineer should verify that all design parameters provided are applicable for the subject project.

TABLE 4
GROUND MOTION PARAMETERS

Latitude / Longitude	33.9125/-116.5037		
Risk Category	II		
Site Class	D		
Code Reference Documents	ASCE 7-16; Chapter 11 & 21		
Description	**Type**	**Map Based**	**Site-Specific**
MCE_R Ground Motion (0.2 second period)	S_S	2.499	---
MCE_R Ground Motion (1.0 second period)	S_1	0.985	---
Site-Modified Spectral Acceleration Value	S_{MS}	2.499	**2.553**
Site-Modified Spectral Acceleration Value	S_{M1}	null	**2.189**
Numeric Seismic Design Value at 0.2 second SA	S_{DS}	1.666	**1.702**
Numeric Seismic Design Value at 1.0 second SA	S_{D1}	null	**1.460**
Site Amplification Factor at 0.2 second	F_a	1	**1.0**
Site Amplification Factor at 1.0 second	F_v	null	**2.5**
Site Peak Ground Acceleration	PGA_M	1.13	**1.00**

GEOLOGIC HAZARDS

The subject site is located in an active seismic zone and will likely experience strong seismic shaking during the design life of the proposed project. In general, the intensity of ground shaking will depend on several factors including the distance to the earthquake focus, the earthquake magnitude, the response characteristics of the underlying materials, and the quality and type of construction. Geologic hazards and their relationship to the site are discussed below.

I. Surface Rupture. Based on our previous work on the project site (Sladden, 2021), known active faults are not mapped on or projecting towards the site. Finally, no signs of active surface fault rupture or secondary seismic effects (lateral spreading, lurching etc.) were identified on-site during our field investigation. Therefore, it is our opinion that risks associated with primary surface ground rupture should be considered "low".

II. Ground Shaking. The site has been subjected to past ground shaking by faults that traverse through the region. Strong seismic shaking from nearby active faults is expected to produce strong seismic shaking during the design life of the proposed project. A site-specific approach determined the peak ground acceleration (PGAm) at the site to be 1.00g.

III. Liquefaction/Seismic Settlement. Liquefaction is the process in which loose, saturated granular soil loses strength as a result of cyclic loading. The strength loss is a result of a decrease in granular sand volume and a positive increase in pore pressures. Generally, liquefaction can occur if all of the following conditions apply; liquefaction-susceptible soil, groundwater within a depth of 50 feet or less, and strong seismic shaking.

According to the County of Riverside, the site is situated within a "Moderate" liquefaction potential zone (RCPR, 2022). Based on our experience in the project vicinity and the recorded depth to groundwater (>80 feet) (CDWR, 2022), risks associated with liquefaction and liquefaction related hazards should be considered "negligible".

We have performed dynamic settlement calculations (dry sand) utilizing a magnitude of 7.45 (USGS, 2022) and site-specific peak ground acceleration of 1.00g (PGAm). Historic high and anticipated high groundwater depths were determined to be approximately 80 feet bgs (State Well No. 03S05E17J001S). The seismic settlement calculations are included within Appendix D. Calculations indicate potential total seismic settlements of 3.4 inches. The potential seismically related differential settlements are expected to be less than approximately 2.0 inches. Based upon the general uniformity of the soil and groundwater conditions underlying the site, we expect the maximum differential settlement to occur over a horizontal distance of approximately 200 feet. Accordingly, risks associated with seismic settlement should be considered in the design of the new structures.

IV. Tsunamis and Seiches. Because the site is situated at an elevated inland location and is not immediately adjacent to any impounded bodies of water, risk associated with tsunamis and seiches is considered "negligible".

V. Slope Failure, Landslides, Rock Falls. The site is situated on relatively level ground and is not immediately adjacent to any slopes or hillsides that could be potentially susceptible to slope instability. No signs of slope instability in the form of landslides, rock falls, earthflows or slumps were observed at or near the subject site during our investigation. As such, risks associated with slope instability should be considered "negligible".

VI. Expansive Soil. Expansion Index testing of select samples was performed in order to evaluate the expansive potential of the materials underlying the site. Based the results of our laboratory testing (EI = 1), the materials underlying the site are considered "non-expansive".

VII. Flooding and Erosion. No signs of flooding or erosion were observed during our field investigation. However, risks associated with flooding and erosion should be evaluated and mitigated by the project design Civil Engineer.

CONCLUSIONS

Based on the results of our investigation, it is our professional opinion that the project should be feasible from a geotechnical perspective provided that the recommendations provided in this report are incorporated into design and carried out through construction. The main geotechnical concerns in the construction of the proposed project are the presence of loose and potentially compressible surface soil, the potential seismic settlements and the potential for strong ground motions.

Because of the loose and potentially compressible condition of some of the near surface soil, remedial grading including over-excavation and re-compaction is recommended for the proposed building and foundation areas. We recommend that remedial grading within the proposed building areas include over-excavation and re-compaction of the primary foundation bearing soil. Specific recommendations for site preparation are presented in the Earthwork and Grading section of this report.

Groundwater was not encountered within our bores and groundwater is expected to be in excess of 80 feet below the existing ground surface (CDWR, 2022) in the vicinity of the site. As such, specific liquefaction analyses were not performed. Based upon the depth to groundwater, the potential for liquefaction and the related surficial affects of liquefaction impacting the site are considered “negligible”.

Caving did occur to varying degrees within each of our exploratory bores and the surface soil may be susceptible to caving within deeper excavations. All excavations should be constructed in accordance with the normal CALOSHA excavation criteria. On the basis of our observations of the materials encountered, we anticipate that the subsoil will conform to that described by CALOSHA as Type B or C. Soil conditions should be verified in the field by a "Competent person" employed by the Contractor.

The following recommendations present more detailed design criteria that have been developed on the basis of our field and laboratory investigation.

EARTHWORK AND GRADING

All earthwork including excavation, backfill and preparation of the surface soil, should be performed in accordance with the geotechnical recommendations presented in this report and portions of the local regulatory requirements, as applicable. All earth work should be performed under the observation and testing of a qualified soil engineer. The following geotechnical engineering recommendations for the proposed project are based on observations from the field investigation program, laboratory testing and geotechnical engineering analyses.

a. Site Clearing: Areas to be graded should be cleared of vegetation and associated root systems and debris. All areas scheduled to receive fill should be cleared of old fills and any irreducible matter. The strippings should be removed off-site, or stockpiled for later use in landscape areas. Voids left by obstructions should be properly backfilled in accordance with the compaction recommendations of this report.

b. Preparation of Residential Building Areas. In order to provide firm and uniform foundation bearing conditions, we recommend over-excavation and re-compaction throughout the building areas. All artificial fill and native low density near surface soil should be removed to a depth of 4 feet below existing grade or to a minimum depth of 3 feet below the bottom of the footings, whichever is deeper. Remedial grading should extend laterally a minimum of 5 feet beyond the building foundations. The native soil exposed by over-excavation should be scarified, moisture conditioned to near optimum moisture content, and compacted to at least 90 percent relative compaction prior to fill placement.

c. Preparation of Commercial Building Areas: Commercial structures should be prepared in the same manner as for the residential structure areas except that removals should extend to a depth of at least 6 feet below existing grade or 5 feet below bottom of footings, whichever is deeper. The native soil exposed by overexcavation should then be scarified, moisture conditioned to near optimum moisture content and compacted to at least 90 percent relative compaction prior to fill placement.

d. Compaction. Soil to be used as engineered fill should be free of organic material, debris, and other deleterious substances, and should not contain irreducible matter greater than three inches in maximum dimension. All fill materials should be placed in thin lifts, not exceeding six inches in a loose condition at near optimum moisture content. If import fill is required, the material should be of a low to non-expansive nature and should meet the following criteria:

Plastic Index	Less than 12
Liquid Limit	Less than 35
Percent Soil Passing #200 Sieve	Between 15% and 35%
Maximum Aggregate Size	3 inches

The subgrade soil and all fill material should be compacted with acceptable compaction equipment to at least 90 percent relative compaction. The exposed subgrade should be observed by a representative of Sladden Engineering prior to fill placement. Compaction testing should be performed in order to verify proper compaction. Table 5 provides a summary of the excavation and compaction recommendations.

TABLE 5
SUMMARY OF RECOMMENDATIONS

*Remedial Grading	Residential Areas: Over-excavation and re-compaction within the building areas and extending laterally at least 5 feet beyond the building limits and to a depth of 4 feet below existing grade or to a minimum depth of 3 feet below the bottom of the footings, whichever is deeper. Commercial Areas: Over-excavation and re-compaction within the building areas and extending laterally at least 5 feet beyond the building limits and to a depth of 6 feet below existing grade or to a minimum depth of 5 feet below the bottom of the footings, whichever is deeper.
Native/Import Engineered Fill	Place in thin lifts not exceeding 6 inches in a loose condition at or near optimum moisture content and compact to a minimum of 90 percent relative compaction.
Asphalt Concrete Sections	Compact the top 12 inches to at least 95 percent compaction within 2 percent of optimum moisture content.

*Actual depth may vary and should be determined by a representative of Sladden Engineering in the field during construction.

e. Shrinkage and Subsidence**.** Volumetric shrinkage of the material that is excavated and replaced as controlled compacted fill should be anticipated. We estimate that this shrinkage could vary from 10 to 20 percent. Subsidence of the surfaces that are scarified and compacted should be between 1 and 3 tenths of a foot. This will vary depending upon the type of equipment used, the moisture content of the soil at the time of grading and the actual degree of compaction attained.

FOUNDATIONS: CONVENTIONAL SHALLOW SPREAD FOOTINGS

Conventional spread footings may be utilized for the various site structures provided that the estimated seismic related settlements of approximately 2.0 inches over a horizontal distance of approximately 200 feet is considered in design. Exterior footings should extend at least 18 inches beneath lowest adjacent grade and interior footings should extend at least 12 inches below slab subgrade. Isolated square or rectangular footings at least 2 feet square and continuous footings at least 12 inches wide may be designed using allowable bearing pressures of 2000 and 1800 pounds per square foot, respectively. The allowable bearing pressure may be increased by approximately 250 psf for each additional 1 foot of width and 250 psf for each additional 6 inches of depth, if desired. The maximum allowable bearing pressure should be limited to 3000 psf unless confirmed by Sladden Engineering subsequent to performing specific settlement calculations. The allowable bearing pressures are for dead and frequently applied live loads and may be increased by 1/3 to resist wind, seismic or other transient loading. All footings should be reinforced in accordance with the project structural engineer's recommendations.

Based on the allowable bearing pressures recommended above the total static settlement of conventional shallow spread footings is expected to be less than one inch, provided that foundation preparation conforms to the recommendations provided in this report. Differential static settlement is anticipated to be approximately one-half the total static settlement for similarly loaded footings spaced approximately 40 feet apart.

Resistance to lateral loads may be provided by a combination of friction acting at the base of the slabs or foundations and passive earth pressure along the sides of the foundations. A coefficient of friction of 0.45 between soil and concrete may be used for dead load forces only. A passive earth pressure of 275 pounds per square foot, per foot of depth, may be used for the sides of footings that are placed against properly compacted native soil. Passive earth pressure should be ignored within the upper 1 foot except where confined.

All footing excavations should be observed by a representative of the project geotechnical consultant to verify adequate embedment depths prior to placement of forms, steel reinforcement or concrete. The excavations should be trimmed neat, level and square. All loose, disturbed, sloughed or moisture-softened soils and/or any construction debris should be removed prior to concrete placement. Excavated soil generated from footing and/or utility trenches should not be stockpiled within the building envelope or in areas of exterior concrete flatwork.

STRUCTURAL MAT SLABS

The use of structural mat slabs may also be considered to accommodate potential differential seismic settlements. We recommend an allowable soil bearing pressure of 1,500 pounds per square foot (psf) be utilized for structural mat slab design. The allowable bearing pressure may be increased by one-third when considering transient live loads, including seismic and wind forces. Structural mat slabs should be designed to accommodate approximately 2.0 inches of differential settlement over a horizontal distance of 200 feet.

Lateral load resistance for the mat will be developed by passive soil pressure against the sides of the mat and by friction acting at the base of the concrete mat bearing on compacted fill. An allowable passive pressure of 250 psf per foot of depth may be used for design purposes. An allowable coefficient of friction 0.40 may be used for dead and sustained live loads to compute the frictional resistance of the mat placed directly on compacted fill. Under seismic and wind loading conditions, the passive pressure may be increased by one-third.

POST-TENSIONED SLABS

Post-tensioned slabs may also be considered for the proposed residential structures to mitigate potential seismic differential settlements. We have evaluated the on-site soil for construction of post-tensioned foundation systems in general accordance with design specifications of the Post Tensioning Institute. Post-tensioned slabs should be designed to be rigid and capable of spanning areas of non-uniform support and meet the following criteria:

1. Bearing Capacity = 1500 psf
2. Potential Differential Dynamic Settlement = 2.0 inches (over a horizontal distance of 200 feet)
3. Coefficient of Friction = 0.40

SLABS-ON-GRADE

In order to reduce the risk of heave, cracking and settlement, concrete slabs-on-grade must be placed on properly compacted engineered fill soil as outlined in the previous sections of this report. The slab subgrades should remain near optimum moisture content and should not be permitted to dry prior to concrete placement. All slab subgrades should be firm and unyielding. Disturbed soil should be removed and then replaced and compacted to a minimum of 90 percent relative compaction.

Slab thickness and reinforcement should be determined by the structural engineer. All slab reinforcement should be supported on concrete chairs to ensure that reinforcement is placed at slab mid-height. We recommend minimum slab thicknesses of 4.0 inches within residential buildings and 5.0 inches within commercial building areas. We recommend a minimum reinforcement of #3 bars at 18-inches on center in each direction for residential structures and #4 bars at 24 inches on center for commercial structures.

Slabs with moisture sensitive surfaces should be underlain with a moisture vapor barrier consisting of a polyvinyl chloride membrane such as 10-mil Visqueen. All laps within the membrane should be sealed and at least 2 inches of clean sand should be placed over the membrane to promote uniform curing of the concrete and to limit damage. To reduce the potential for punctures, the membrane should be placed on a pad surface that has been graded smooth without any sharp protrusions. If a smooth surface can not be achieved by grading, consideration should be given to placing a thin leveling course of sand across the pad surface prior to placement of the membrane.

LATERAL PRESSURES

Retaining walls will be required to accomplish the proposed subterranean level construction. Cantilever retaining walls may be designed using "active" pressures. Active pressures may be estimated using an equivalent fluid weight of 35 pcf for drained native soil with level backfill conditions. "At Rest" pressures should be utilized for restrained walls. At rest pressures may be estimated using an equivalent fluid weight of 55 pcf for drained native soil with level backfill conditions.

According to the 2019 CBC, seismic loads must be considered in the design of earth retaining structures in excess of six (6) feet in height. The "seismic" pressures may be estimated using a uniform pressure distributing equivalent to a factor of 15H for cantilever walls and 20H for restrained walls where H is the height of the wall in feet. The seismic pressures should be applied as a point load acting at a height of 0.6H (where H is the height of the wall).

ON-SITE PAVEMENT DESIGN

Asphalt concrete pavements should be designed in accordance with Topic 608 of the Caltrans Highway Design Manual based on R-Value and Traffic Index. An R-Value of 60 was assumed to develop the following preliminary pavement design sections. On-site and any imported soil should be tested for R-Value after grading. The R-Value of subgrade soil should be utilized in final pavement design. For Pavement design, a Traffic Index (TI) of 6.0 was used for the light duty pavements and Traffic Index of 7.5 was used for heavy duty pavement. We assumed Asphalt Concrete (AC) over Class II Aggregate Base (AB). The preliminary flexible pavement design is as follows:

TABLE 4
RECOMMENDED ASPHALT PAVEMENT SECTION LAYER THICKNESS

Pavement Material	Recommended Thickness	
	TI = 6.0	TI = 7.5
Asphalt Concrete Surface Course	3.0 inches	3.0 inches
Class II Aggregate Base Course	4.0 inches	6.0 inches
Compacted Subgrade Soil	12.0 inches	12.0 inches

Asphalt concrete and Class II aggregate base should conform to the latest edition of the Standard Specifications for Public Works Construction ("Greenbook") or CalTrans Standard Specifications. The aggregate base course should be compacted to at least 95 percent of the maximum dry density as determined by ASTM Method D 1557.

CORROSION SERIES

The soluble sulfate concentrations of the surface soil were determined to be 200 parts per million (ppm). The soil is considered to have a "negligible" corrosion potential with respect to concrete. The use of Type V cement and special sulfate resistant concrete mixes should not be required. The soluble sulfate content of the surface soil should be reevaluated after grading and appropriate concrete mix designs should be established based upon post-grading test results.

The pH level of the surface soil was 9.4. Based on soluble chloride concentration testing (330 ppm), the soil is considered to have a "moderate" corrosion potential with respect to normal grade steel. The minimum resistivity of the surface soil was found to be 1,200 ohm-cm, that suggests that the site soil is considered to have a "moderate" corrosion potential with respect to ferrous metal installations. A corrosion expert should be consulted regarding appropriate corrosion protection measures for corrosion sensitive installations.

UTILITY TRENCH BACKFILL

All utility trench backfill should be compacted to a minimum of 90 percent relative compaction. Trench backfill materials should be placed in lifts no greater than six inches in a loose condition, moisture conditioned (or air-dried) as necessary to achieve near optimum moisture content and then mechanically compacted in place to a minimum of 90 percent relative compaction. A representative of the project geotechnical consultant should test the backfill to verify adequate compaction.

EXTERIOR CONCRETE FLATWORK

To minimize cracking of concrete flatwork, the subgrade soil below concrete flatwork areas should first be compacted to a minimum of 90 percent relative compaction. A representative of the project geotechnical consultant should observe and verify the density and moisture content of the soil.

DRAINAGE

All final grades should be provided with positive gradients away from foundations to provide rapid removal of surface water runoff to an adequate discharge point. No water should be allowed to be pond on or immediately adjacent to foundation elements. In order to reduce water infiltration into the subgrade soil, surface water should be directed away from building foundations to an adequate discharge point. Subgrade drainage should be evaluated upon completion of the precise grading plans and in the field during grading.

LIMITATIONS

The findings and recommendations presented in this report are based upon an interpolation of the soil conditions between the exploratory boring locations and extrapolation of these conditions throughout the proposed building area. Should conditions encountered during grading appear different than those indicated in this report, this office should be notified.

The use of this report by other parties or for other projects is not authorized. The recommendations of this report are contingent upon monitoring of the grading operation by a representative of Sladden Engineering. All recommendations are considered to be tentative pending our review of the grading operation and additional testing, if indicated. If others are employed to perform any soil testing, this office should be notified prior to such testing in order to coordinate any required site visits by our representative and to assure indemnification of Sladden Engineering.

We recommend that a pre-job conference be held on the site prior to the initiation of site grading. The purpose of this meeting will be to assure a complete understanding of the recommendations presented in this report as they apply to the actual grading performed.

ADDITIONAL SERVICES

Once completed, final project plans and specifications should be reviewed by use prior to construction to confirm that the full intent of the recommendations presented herein have been applied to design and construction. Following review of plans and specifications, observation should be performed by the Soil Engineer during construction to document that foundation elements are founded on/or penetrate into the recommended soil, and that suitable backfill soil is placed upon competent materials and properly compacted at the recommended moisture content.

Tests and observations should be performed during grading by the Soil Engineer or his representative in order to verify that the grading is being performed in accordance with the project specifications. Field density testing shall be performed in accordance with acceptable ASTM test methods. The minimum acceptable degree of compaction should be 90 percent for subgrade soils and 95 percent for Class II aggregate base as obtained by the ASTM Test Method D1557. Where testing indicates insufficient density, additional compactive effort shall be applied until retesting indicates satisfactory compaction.

REFERENCES

ASCE7-16, 2016, Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

Blake, T., 2000, EQFAULT and EQSEARCH, Computer Programs for Deterministic and Probabilistic Prediction of Peak Horizontal Acceleration from Digitized California Faults.

California Building Code (CBC), 2019, California Building Standards Commission.

California Division of Mines and Geology (CDMG), 1979, Fault Evaluation Report FER-86.

California Division of Mines and Geology (CDMG), 1987, Fault Evaluation Report FER-185.

California Geological Survey, (CGS), 2018, Earthquake Fault Zones, A Guide for Government Agencies, Property Owners / Developers, and Geoscience Practitioners for Assessing Fault Rupture Hazards in California; Special Publication 42.

Cao, T., Bryant, W.A., Rowshandel B., Branum D., Wills C.J., 2003, "The Revised 2002 California Probabilistic Seismic Hazard Maps".

Clark, M.M., Map Showing Recently Active Breaks Along the San Andreas Fault and Associated Fault Between Salton Sea and Whitewater River-Mission Creek, California. Scale 1:24,000.

Bevis, M. and Hudnut, K. (2005): B4 Lidar Project: Airborne Laser Swath Mapping (ALSM) Survey of the San Andreas Fault (SAF) System of Central and Southern California, including the Banning segment of the SAF and the San Jacinto fault system. National Center for Airborne Laser Mapping (NCALM), U.S. Geological Survey, the Ohio State University, and the Southern California Integrated GPS Project. Distributed by Open Topography. https://doi.org/10.5066/F7TQ5ZQ6 .

California Department of Mines and Geology (CDMG), 1980, State of California Special Studies Zones, for the Desert Hot Springs Quadrangle.

California Department of Water Resources (CDWR), 2022, Water Data Library. Available at: https://wdl.water.ca.gov/waterdatalibrary/

Cao T., Bryant, W.A., Rowshandel B., Branum D., Wills C.J., 2003, "The Revised 2002 California Probabilistic Seismic Hazard Maps".

Dibblee, T.W., 2004, Geologic Map of the Desert Hot Springs Quadrangle, Riverside County, California; scale 1:24,000

GoogleEarth.com, 2022, Vertical Aerial Photograph for the Desert Hot Springs area, California, Undated, Variable Scale. Reviewed at googlearth.com

Hilltop Geotechnical, Inc. (Hilltop), 2004, Report of Supplemental Fault Investigation, Proposed Desert Dunes Development, Desert Haven Area, Riverside County, California; dated May 14, 2004.

Hope, R.A., Map Showing Recently Active Breaks Along the San Andreas and Related Faults Between Cajon Pass and Salton Sea, California; scale 1:24,000

REFERENCES
(Continued)

Jennings, Charles W. (Compiler), 1994, Fault Activity Map of California and Adjacent Areas, California Division of Mines and Geology, Geologic Data Map No. 6

Leighton and Associates Inc, 2009, Review of the Banning, Seven Palms Ranch and Other Faults, Sun City Development, Northeastern Corner of Palm Drive and 20th Avenue, Desert Hot Springs Area of Unincorporated Riverside County, California (County Geologic Report No 2031).

Proctor, R.J., 1968, Geologic Map and Sections of the Desert Hot Springs Area, Riverside County, California; Special Report 94, Plate 1.

Riverside County Parcel Report (RCPR), 2022, available at https://gis1.countyofriverside.us/Html5Viewer/index.html?viewer=MMC_Public

Rogers T.H (compiler), Jenkins, O.P (edition), 1965, Geologic Map of California, Santa Ana Sheet, sixth printing 1992, California Division of Mines and Geology, 1: 250,000.

Sladden Engineering (Sladden), 2021, Preliminary Fault Hazard Evaluation, Proposed Green Day Village, APN 657-280-003, Palm Drive, Desert Hot Springs, California; Project No. 544-21557, Report No. 21-12-825, dated December 13, 2021.

Southern California Earthquake Data Center, (SCEDC), 2021, available at: https://scedc.caltech.edu/index.html

SRK Architects, Inc., 2022, Proposed Site Plan, Green Day Village, Desert Hot Springs, California, Sheet A-1.1, dated 6/24/2022.

Structural Engineers Association California (SEAC), 2022, OSHPD Seismic Design Maps; available at: https://seismicmaps.org/

United States Geological Survey (USGS), 2015, Desert Hot Springs 7.5 Minute Quadrangle Map, 1:24000.

United States Geological Survey (USGS), 2021, 3DEP DEM viewer, available at: https://apps.nationalmap.gov/3depdem/

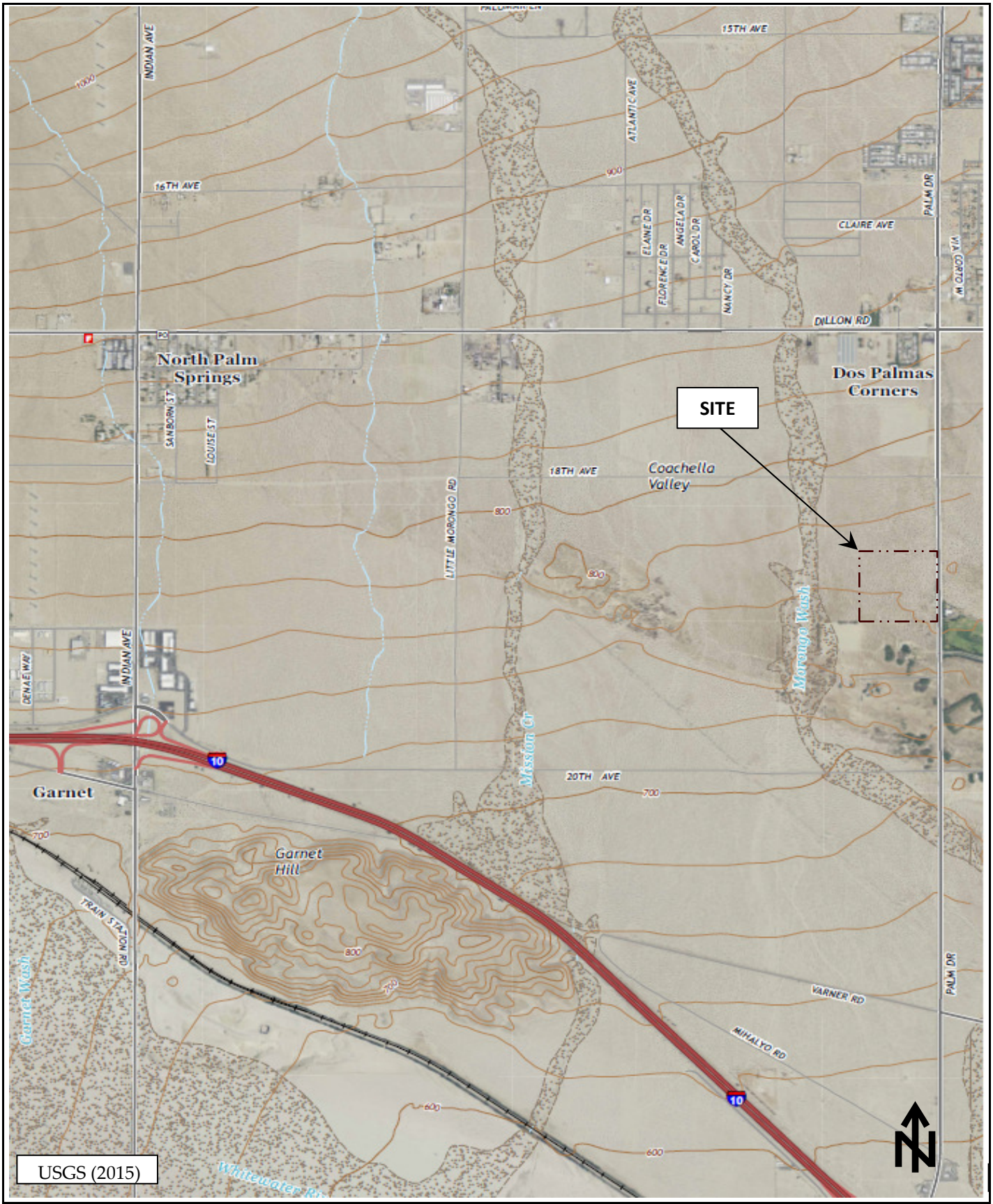
United States Geological Survey (USGS), 2022a, Quaternary Fault and Fold Database; available at: https://www.sciencebase.gov/catalog/item/589097b1e4b072a7ac0cae23

United States Geological Survey (USGS), 2022b, Risk-Targeted Ground Motion Calculator; available at: https://earthquake.usgs.gov/designmaps/rtgm/

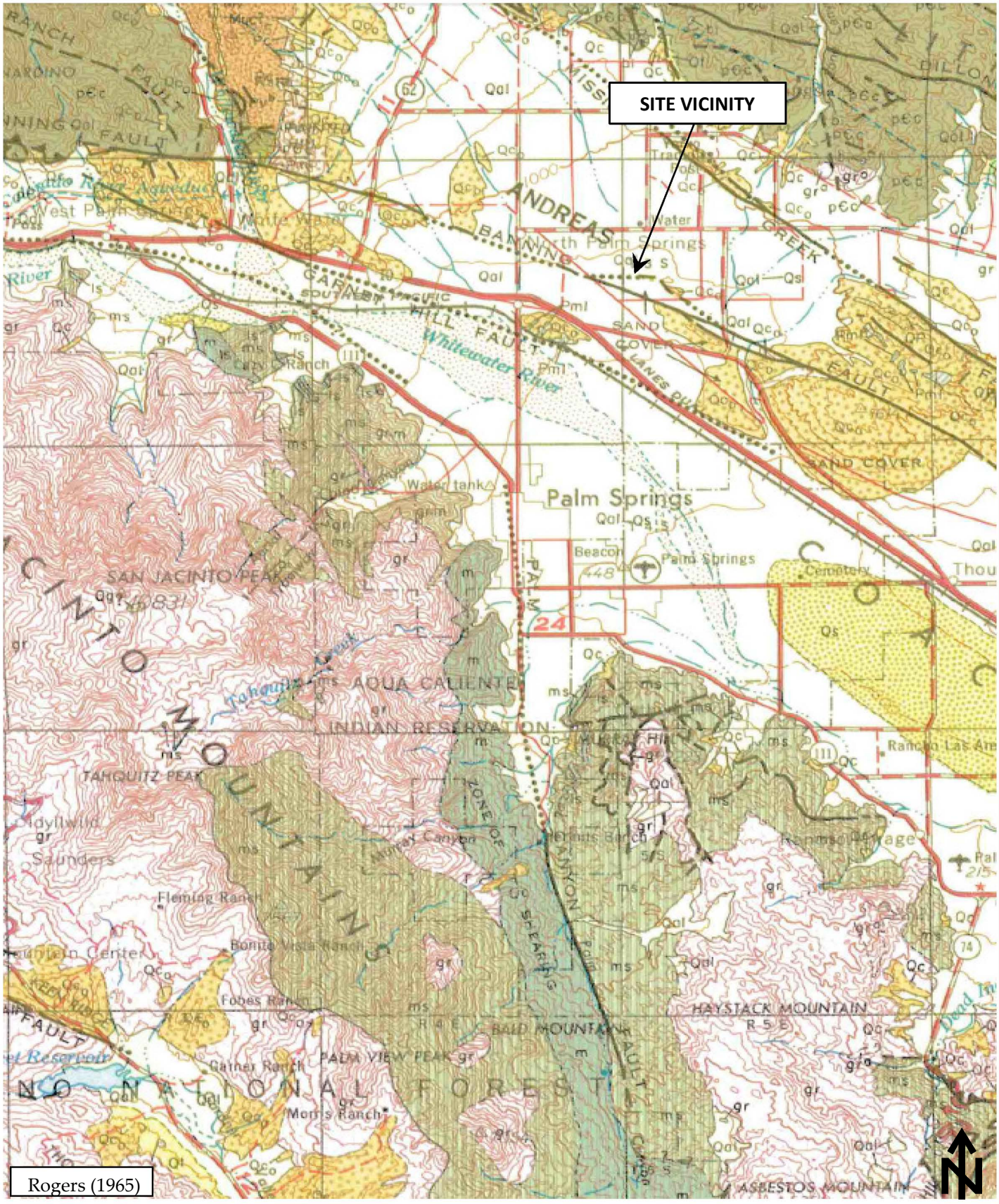
United States Geological Survey (USGS), 2022c, Unified Hazard Tool; available at: https://earthquake.usgs.gov/hazards/interactive/

FIGURES

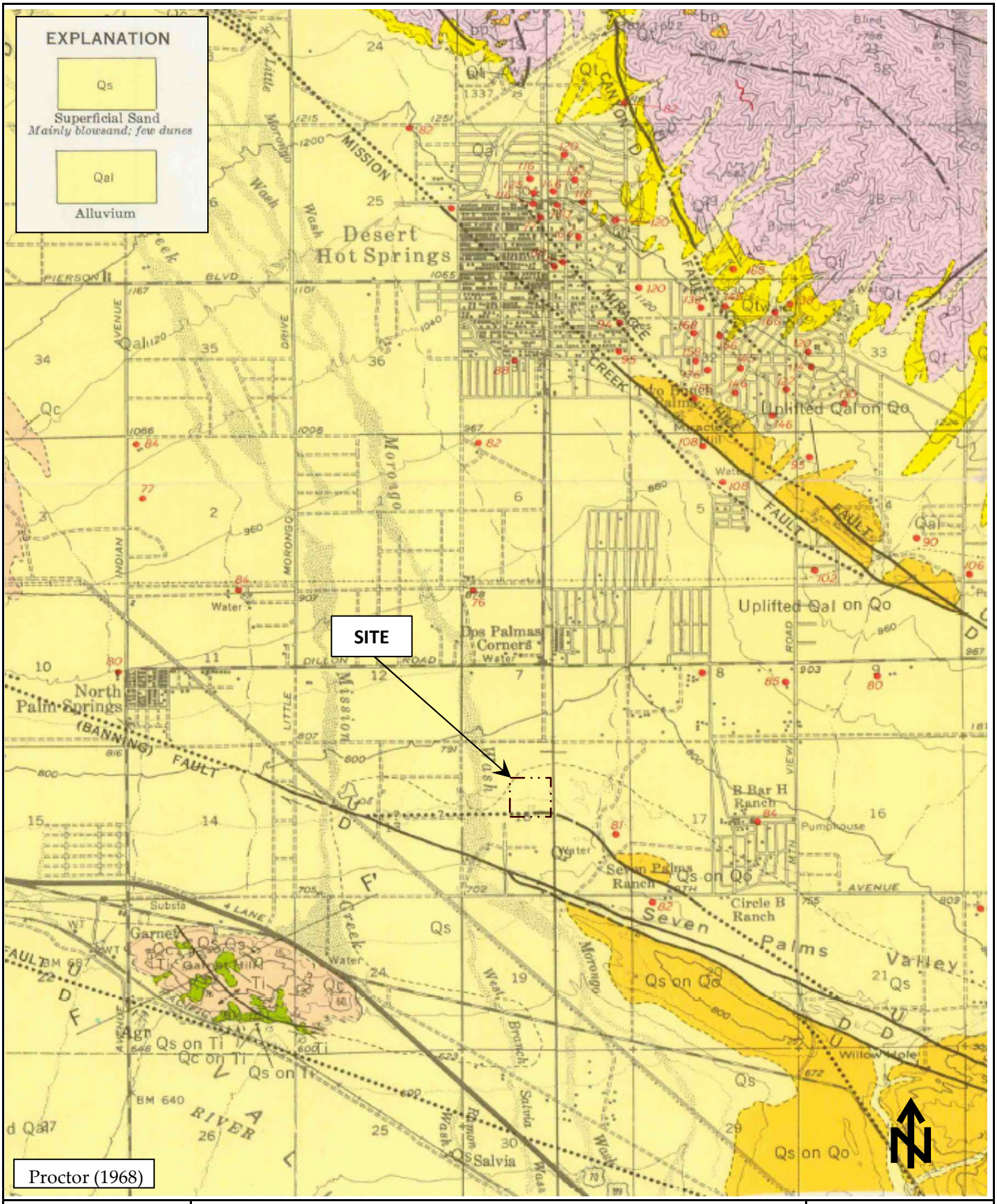
Site Location Map
Regional Geologic Map (Rogers, 1965)
Regional Geologic Map (Proctor, 1968)
Regional Geologic Map (Dibblee, 2004)
Exploration Location Plan
State Delineated Fault Zone Map
Riverside County Fault Map
Fault Map (Clark, 1984)
Fault Map (Hope, 1969)
Figure 4A & 4B From FER-86



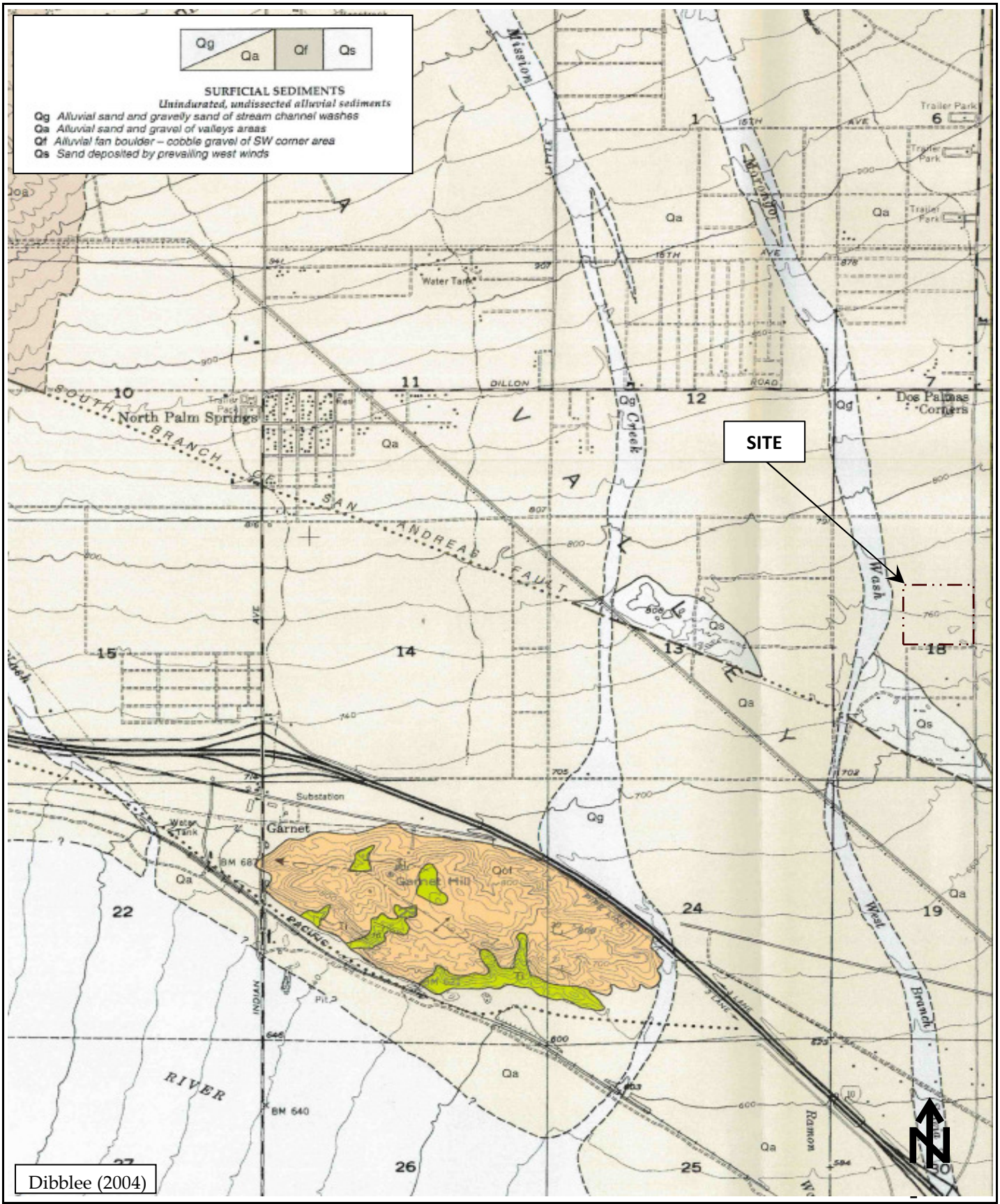
Sladden Engineering	SITE LOCATION MAP	FIGURE 1
	Project Number: 544-21557	
	Report Number: 22-06-386	
	Date: July 6, 2022	



Sladden Engineering	REGIONAL GEOLOGIC MAP	FIGURE 2
	Project Number: 544-21557	
	Report Number: 22-06-386	
	Date: July 6, 2022	



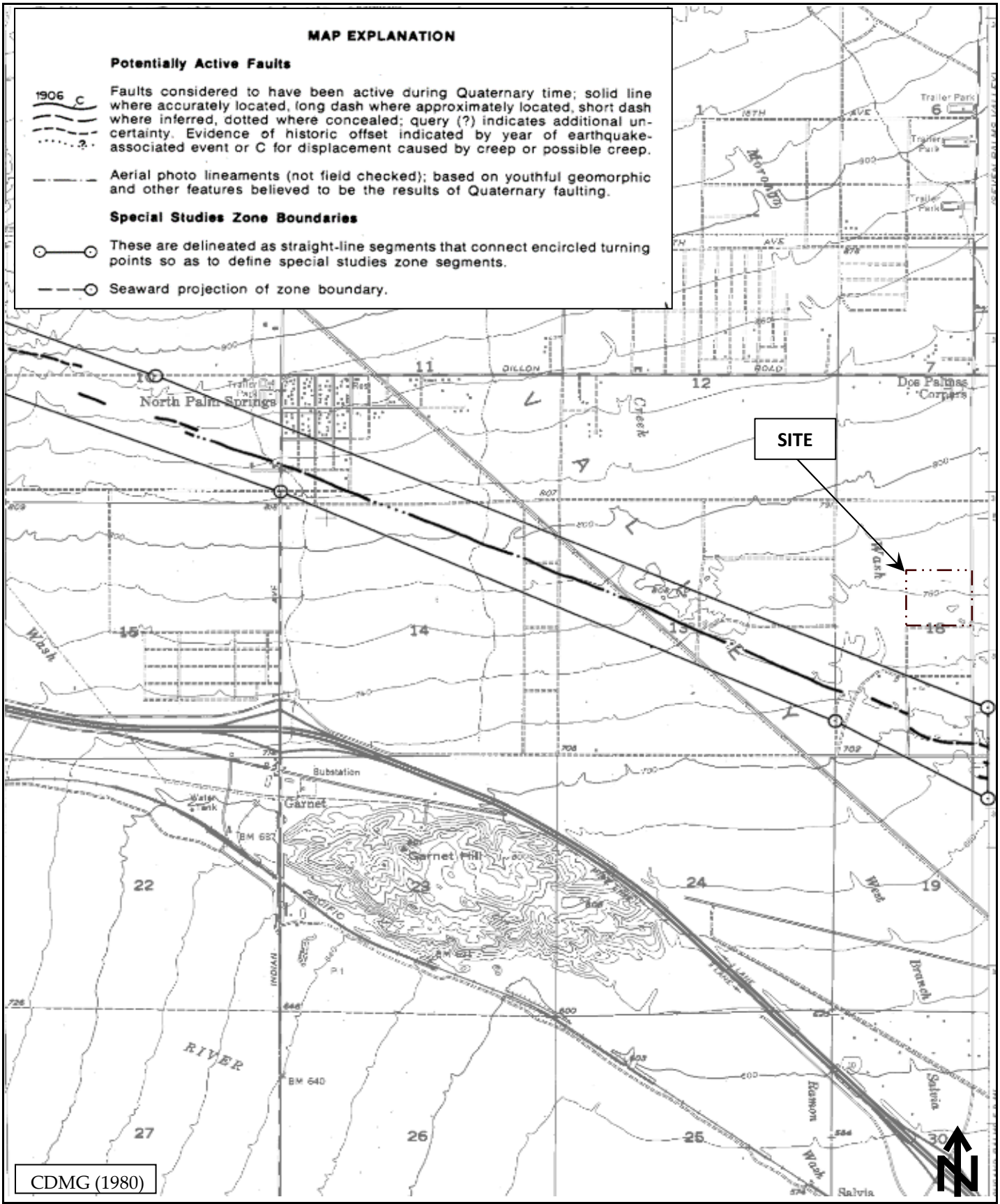
Sladden Engineering	REGIONAL GEOLOGIC MAP	FIGURE 3
	Project Number: 544-21557	
	Report Number: 22-06-386	
	Date: July 6, 2022	



Sladden Engineering	REGIONAL GEOLOGIC MAP	FIGURE 4
	Project Number: 544-21557	
	Report Number: 22-06-386	
	Date: July 6, 2022	



Sladden Engineering	EXPLORATION LOCATION PLAN	FIGURE 5
	Project Number: 544-21557	
	Report Number: 22-06-386	
	Date: July 6, 2022	



Sladden Engineering	STATE DELINEATED FAULT ZONE MAP	FIGURE 6
	Project Number: 544-21557	
	Report Number: 22-06-386	
	Date: July 6, 2022	

Sladden Engineering

RIVERSIDE COUNTY FAULT MAP

Project Number:	544-21557
Report Number:	22-06-386
Date:	July 6, 2022

FIGURE 7

RCMMC (2021)

Map My County Map

Legend

- Parcels
- Faults
  - OTHER AUTHORITY
  - ALQUIST-PRIOLO
  - RIVERSIDE COUNTY
- Blueline Streams
- City Areas
- World Street Map

0 752 1,505 Feet

"IMPORTANT" Maps and data are to be used for reference purposes only. Map features are approximate, and are not necessarily accurate to surveying or engineering standards. The County of Riverside makes no warranty or guarantee as to the content (the source is often third party), accuracy, timeliness, or completeness of any of the data provided, and assumes no legal responsibility for the information contained on this map. Any use of this product with respect to accuracy and precision shall be the sole responsibility of the user.

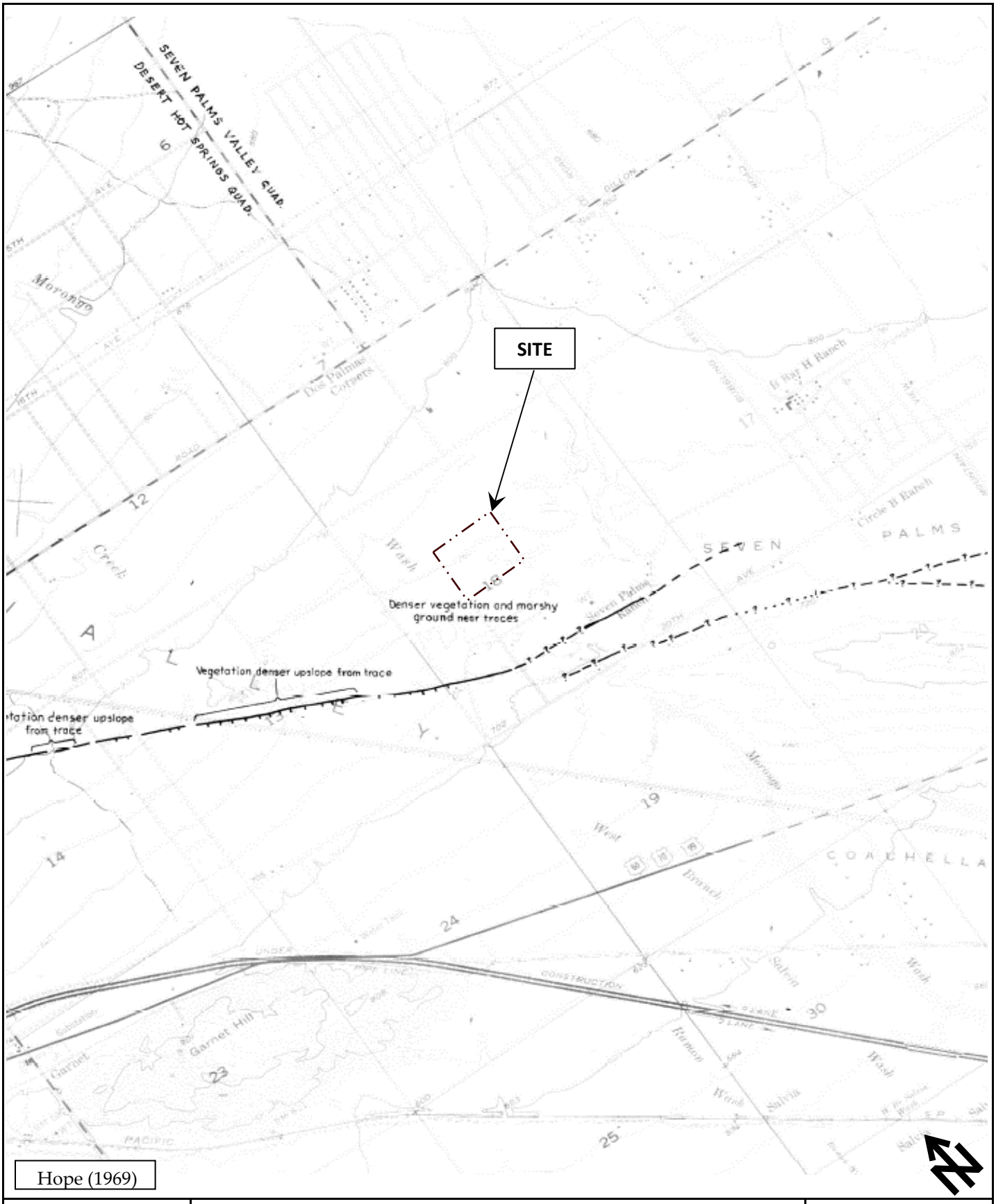
REPORT PRINTED ON... 12/6/2021 1:36:51 PM

© Riverside County GIS

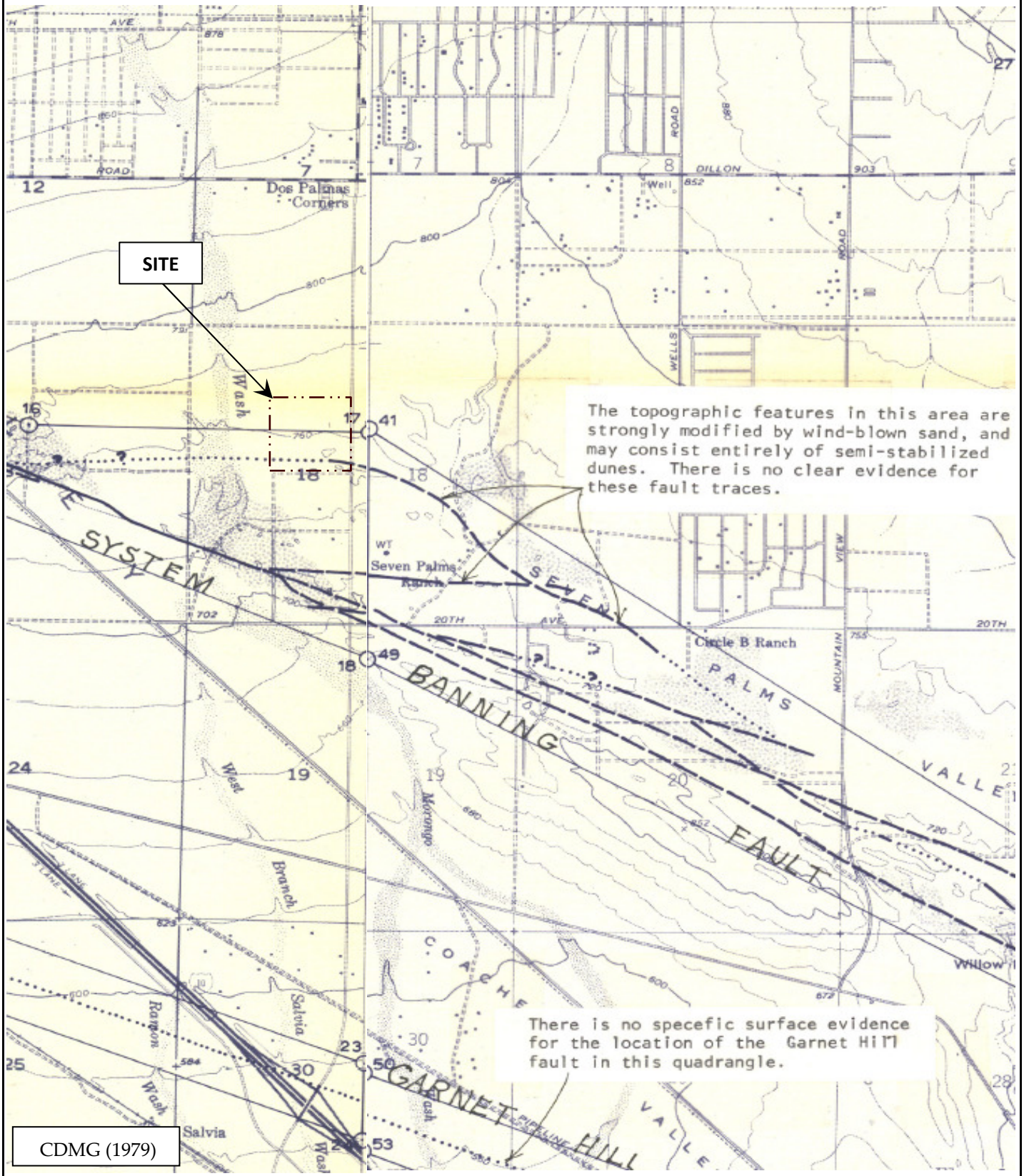
Notes



Sladden Engineering	CLARK (1984) FAULT MAP	FIGURE 8
	Project Number: 544-21557	
	Report Number: 22-06-386	
	Date: July 6, 2022	



Sladden Engineering	HOPE (1969) FAULT MAP	FIGURE 9
	Project Number: 544-21557	
	Report Number: 22-06-386	
	Date: July 6, 2022	



Sladden Engineering	FIGURE 4A & 4B FROM FER-86	FIGURE 10
	Project Number: 544-21557	
	Report Number: 22-06-386	
	Date: July 6, 2022	

APPENDIX A

FIELD EXPLORATION

APPENDIX A

FIELD EXPLORATION

For our field investigation seven (7) exploratory bores/test holes were excavated on May 17, 2022 utilizing a track mounted hollow stem limited access auger rig (CME-75). Continuous logs of the materials encountered were made by a representative of Sladden Engineering. Materials encountered in the boreholes were classified in accordance with the Unified Soil Classification System which is presented in this appendix.

Representative undisturbed samples were obtained within our bores by driving a thin-walled steel penetration sampler (California split spoon sampler) or a Standard Penetration Test (SPT) sampler with a 140 pound automatic-trip hammer dropping approximately 30 inches (ASTM D1586). The number of blows required to drive the samplers 18 inches was recorded in 6-inch increments and blowcounts are indicated on the boring logs.

The California samplers are 3.0 inches in diameter, carrying brass sample rings having inner diameters of 2.5 inches. The standard penetration samplers are 2.0 inches in diameter with an inner diameter of 1.5 inches. Undisturbed samples were removed from the sampler and placed in moisture sealed containers in order to preserve the natural soil moisture content. Bulk samples were obtained from the excavation spoils and samples were then transported to our laboratory for further observations and testing.

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			TYPICAL NAMES	
COARSE GRAINED SOILS: MORE THAN HALF IS LARGER THAN No.200 SIEVE	GRAVELS: MORE THAN HALF COARSE FRACTION IS LARGER THAN No.4 SIEVE SIZE	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVEL-SAND MIXTURES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, POORLY-GRADED GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS: MORE THAN HALF COARSE FRACTION IS SMALLER THAN No.4 SIEVE SIZE	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS: MORE THAN HALF IS SMALLER THAN No.200 SIEVE	SILTS AND CLAYS: LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS & VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, CLEAN CLAYS
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS: LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACIOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

EXPLANATION OF BORE LOG SYMBOLS


California Split-spoon Sample


Unrecovered Sample


Standard Penetration Test Sample


Groundwater depth

Note: The stratification lines on the borelogs represent the approximate boundaries between the soil types; the transitions may be gradual.

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	5/17/2022
Elevation:	750 Ft MSL	Boring No:	BH-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Sand (SW/SP); light yellowish brown, dry, fine- to coarse-grained with gravel (Qs-Qal).
■	10 14 16	1	1	22.7	1.5	105.7	4		Silty Sand (SM); light yellowish brown, dry, medium dense, fine- to coarse-grained, micaceous (Qs-Qal).
■	12 18 12			12.1	0.6	112.0	6		Silty Sand (SM); light yellowish brown, dry, medium dense, fine- to coarse-grained with gravel (Qs-Qal).
▣	3 6 5			43.9	3.8		10		Silty Sand (SM); light yellowish brown, dry, medium dense, fine- to coarse-granied (Qs-Qal).
■	8 16 25			4.2	0.3	105.2	16		Sand (SP); light grayish brown, dry, medium dense, fine-grained, micaceous, well-sorted (Qs-Qal).
⊠	5 11 15						20		No Recovery.
■	12 20 23			16.0	0.5	99.3	26		Silty Sand (SM); light grayish brow, dry, medium dense, fine- to coarse-grained, micaceous (Qs-Qal).
▣	6 10 15			8.3	0.9		30		Sand (SP); light grayish brown, dry, medium dense, fine-grained, micaceous, well-sorted (Qs-Qal).
■	26 50-6			6.0	0.5	108.9	36		Sand (SP); light grayish brown, dry, very dense, fine-grained, micaceous, well-sorted (Qs-Qal).
▣	2 6 7			52.6	21.0		40		Sandy Silt (ML); yellowish brown, moist, stiff, low plasticity (Qs-Qal).
■	10 24 30			24.4	11.2	110.3	46		Silty Sand (SM); yellowish brown, dry to slightly moist, dense, fine-grained (Qs-Qal).
▣	3 7 10			54.0	23.4		50		Sandy Silt (ML); yellowish brown, moist, very stiff, low plasticity (Qs-Qal).

Completion Notes:
Terminated at ~51.5 Feet bgs.
No Bedrock Encountered.
No Groundwater or Seepage Encountered.

PROPOSED GREEN DAY VILLAGE
PALM DRIVE, DESERT HOT SPRINGS; APN 657-280-003

Project No:	544-21557	Page	1
Report No:	22-06-386		

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	5/17/2022
Elevation:	750 Ft MSL	Boring No:	BH-2

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							0		Sand (SW/SP); light yellowish brown, dry, fine- to coarse-grained with gravel (Qs-Qal).
							2		
							4		
	5 6 5			52.2	5.2		6		Sandy Silt (ML); light yellowish brown, dry, stiff, low plasticity (Qs-Qal).
							8		
	8 19 17			6.1	0.4	107.2	10		Sand (SP); light yellowish brown, dry, medium dense, fine- to coarse-grained, well-sorted (Qs-Qal).
							12		
							14		
	3 3 5			15.4	1.5		16		Silty Sand (SM); yellowish brown, dry, loose, fine- to coarse-grained (Qs-Qal).
							18		
	9 12 20			16.5	0.7	114.8	20		Silty Sand (SM); yellowish brown, dry, medium dense, fine- to coarse-grained (Qs-Qal).
							22		
							24		Terminated at ~21.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED GREEN DAY VILLAGE
PALM DRIVE, DESERT HOT SPRINGS; APN 657-280-003

Project No:	544-21557	Page	2
Report No:	22-06-386		

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	5/17/2022
Elevation:	750 Ft MSL	Boring No:	BH-3

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							0		Sand (SW/SP); light yellowish brown, dry, fine- to coarse-grained with gravel (Qs-Qal).
							2		
							4		
■	5 7 9			5.1	0.4		6		Sand (SP/SW); yellowish brown, dry, loose, fine- to coarse-grained (Qs-Qal).
							8		
▪	3 5 5			6.8	0.8		10		Sand (SP); yellowish brown, dry, loose, fine-grained, well-sorted (Qs-Qal).
							12		
							14		
■	7 10 14			16.6	1.1	95.1	16		Silty Sand (SM); light grayish brown, dry, medium dense, fine- to coarse-grained, micaceous (Qs-Qal).
							18		
▪	6 9 10			3.4	0.7		20		Sand (SP); yellowish brown, dry, medium dense, fine-grained, well-sorted (Qs-Qal).
							22		
							24		Terminated at ~21.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED GREEN DAY VILLAGE
PALM DRIVE, DESERT HOT SPRINGS; APN 657-280-003

Project No:	544-21557	Page	3
Report No:	22-06-386		

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	5/17/2022
Elevation:	750 Ft MSL	Boring No:	BH-4

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							0		Sand (SW/SP); light yellowish brown, dry, fine- to coarse-grained with gravel (Qs-Qal).
							2		
							4		
▯	2 3 5			4.4	0.5		6		Sand (SP); light yellowish brown, dry, loose, fine-grained, well-sorted (Qs-Qal).
							8		
☒	10 17 23						10		No Recovery.
							12		
							14		
☒	6 10 14						16		No Recovery.
							18		
■	10 18 25			3.8	0.2		20		Sand (SP); light yellowish brown, dry, medium dense, fine-grained, well-sorted (Qs-Qal).
							22		
							24		Terminated at ~21.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED GREEN DAY VILLAGE
PALM DRIVE, DESERT HOT SPRINGS; APN 657-280-003

Project No:	544-21557	Page	4
Report No:	22-06-386		

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	5/17/2022
Elevation:	750 Ft MSL	Boring No:	BH-5

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Sand (SW/SP); light yellowish brown, dry, fine- to coarse-grained with gravel (Qs-Qal).
							4		
	4 6 10			25.3	0.6	94.8	6		Silty Sand (SM); light yellowish brown, dry, loose, fine- to coarse-grained (Qs-Qal).
							8		
	3 7 7			5.7	0.8		10		Sand (SP); light yellowish brown, dry, medium dense, fine- to coarse-grained, micaceous (Qs-Qal).
							12		
	12 22 30			4.1	0.2		14		Sand (SP); light yellowish brown, dry, dense, fine- to coarse-grained, micaceous (Qs-Qal).
							16		
							18		
	6 10 11			10.2	0.8		20		Sand (SP); light yellowish brown, dry, medium dense, fine- to coarse-grained, micaceous (Qs-Qal).
							22		
							24		Terminated at ~21.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered.
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED GREEN DAY VILLAGE
PALM DRIVE, DESERT HOT SPRINGS; APN 657-280-003

Project No:	544-21557	Page	5
Report No:	22-06-386		

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	5/17/2022
Elevation:	750 Ft MSL	Boring No:	BH-6/P-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand to Sand (SM/SW); light yellowish brown, dry, fine- to coarse-grained (Qs-Qal).
X	3 3 5						4 6 8		No Recovery.
■	8 14 18			18.9	0.5		10 12		Silty Sand (SM): light brownish gray, dry, medium dense, fine- to coarse-grained, micaceous, (Qs-Qal).
							14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50		Terminated at ~11.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.

Completion Notes:

PROPOSED GREEN DAY VILLAGE
PALM DRIVE, DESERT HOT SPRINGS; APN 657-280-003

Project No:	544-21557	Page	6
Report No:	22-06-386		

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	5/17/2022
Elevation:	750 Ft MSL	Boring No:	P-2

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand to Sand (SM/SW); light yellowish brown, dry, fine- to coarse-grained
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED GREEN DAY VILLAGE
PALM DRIVE, DESERT HOT SPRINGS; APN 657-280-003

Project No:	544-21557	Page	7
Report No:	22-06-386		

APPENDIX B

LABORATORY TESTING

APPENDIX B

LABORATORY TESTING

Representative bulk and relatively undisturbed soil samples were obtained in the field and returned to our laboratory for additional observations and testing. Laboratory testing was generally performed in two phases. The first phase consisted of testing in order to determine the compaction of the existing natural soil and the general engineering classifications of the soils underlying the site. This testing was performed in order to estimate the engineering characteristics of the soil and to serve as a basis for selecting samples for the second phase of testing. The second phase consisted of soil mechanics testing. This testing including consolidation, shear strength and expansion testing was performed in order to provide a means of developing specific design recommendations based on the mechanical properties of the soil.

CLASSIFICATION AND COMPACTION TESTING

Unit Weight and Moisture Content Determinations: Each undisturbed sample was weighed and measured in order to determine its unit weight. A small portion of each sample was then subjected to testing in order to determine its moisture content. This was used in order to determine the dry density of the soil in its natural condition. The results of this testing are shown on the Bore Logs.

Maximum Density-Optimum Moisture Determinations: Representative soil types were selected for maximum density determinations. This testing was performed in accordance with the ASTM Standard D1557, Test Method A. The results of testing are presented graphically in this appendix. The maximum densities are compared to the field densities of the soil in order to determine the existing relative compaction to the soil.

Classification Testing: Soil samples were selected for classification testing. This testing consists of mechanical grain size analyses. This provides information for developing classifications for the soil in accordance with the Unified Soil Classification System which is presented in the preceding appendix. This classification system categorizes the soil into groups having similar engineering characteristics. The results of this testing is very useful in detecting variations in the soils and in selecting samples for further testing.

SOIL MECHANIC'S TESTING

Expansion Testing: One (1) bulk sample was selected for Expansion testing. Expansion testing was performed in accordance with the UBC Standard 18-2. This testing consists of remolding 4-inch diameter by 1-inch thick test specimens to a moisture content and dry density corresponding to approximately 50 percent saturation. The samples are subjected to a surcharge of 144 pounds per square foot and allowed to reach equilibrium. At that point the specimens are inundated with distilled water. The linear expansion is then measured until complete.

Direct Shear Testing: One (1) sample was selected for Direct Shear testing. This test measures the shear strength of the soil under various normal pressures and is used to develop parameters for foundation design and lateral design. Tests were performed using a recompacted test specimen that was saturated prior to tests. Tests were performed using a strain controlled test apparatus with normal pressures ranging from 800 to 2300 pounds per square foot.

Consolidation Testing: One (1) relatively undisturbed sample was selected for consolidation testing. For this test, a one-inch thick test specimen was subjected to vertical loads varying from 575 psf to 11520 psf applied progressively. The consolidation at each load increment was recorded prior to placement of each subsequent load. The specimens were saturated at 575 psf or 720 psf load increment.

Corrosion Series Testing: The soluble sulfate concentrations of the surface soil were determined in accordance with California Test Method Number (CA) 417. The pH and Minimum Resistivity were determined in accordance with CA 643. The soluble chloride concentrations were determined in accordance with CA 422.

Sladden Engineering
450 Egan Avenue, Beaumont CA 92223 (951) 845-7743 Fax (951) 845-8863

Maximum Density/Optimum Moisture

ASTM D698/D1557

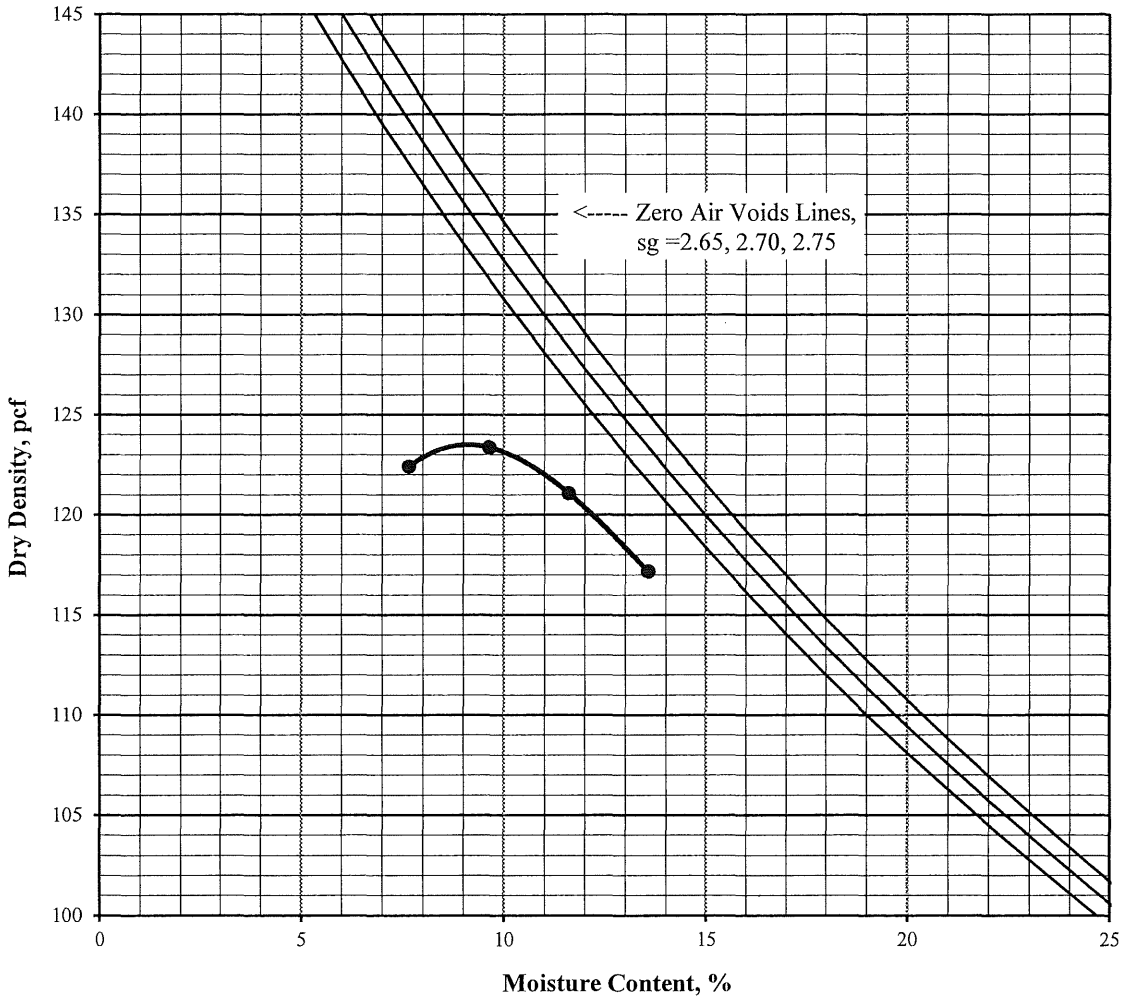
Project Number: 544-21557
Project Name: Palm Drive
Lab ID Number: LN6-22246
Sample Location: BH-1 Bulk 1 @ 0-5'
Description: Olive Brown Silty Sand (SM)

July 5, 2022

ASTM D-1557 A
Rammer Type: Machine

Maximum Density: 123.5 pcf
Optimum Moisture: 10%

Sieve Size	% Retained
3/4"	
3/8"	
#4	0.3



Sladden Engineering
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Expansion Index

ASTM D 4829

Job Number: 544-21557 July 5, 2022
Job Name: Palm Drive
Lab ID Number: LN6-22246
Sample ID: BH-1 Bulk 1 @ 0-5'
Soil Description: Olive Brown Silty Sand (SM)

Wt of Soil + Ring:	584.5
Weight of Ring:	188.6
Wt of Wet Soil:	395.9
Percent Moisture:	8.2%
Sample Height, in	0.95
Wet Density, pcf:	126.7
Dry Denstiy, pcf:	117.1

% Saturation:	50.4

Expansion **Rack # 2**

Date/Time	6/30/2022	3:30 PM
Initial Reading	0.0000	
Final Reading	0.0012	

Expansion Index **1**

(Final - Initial) x 1000

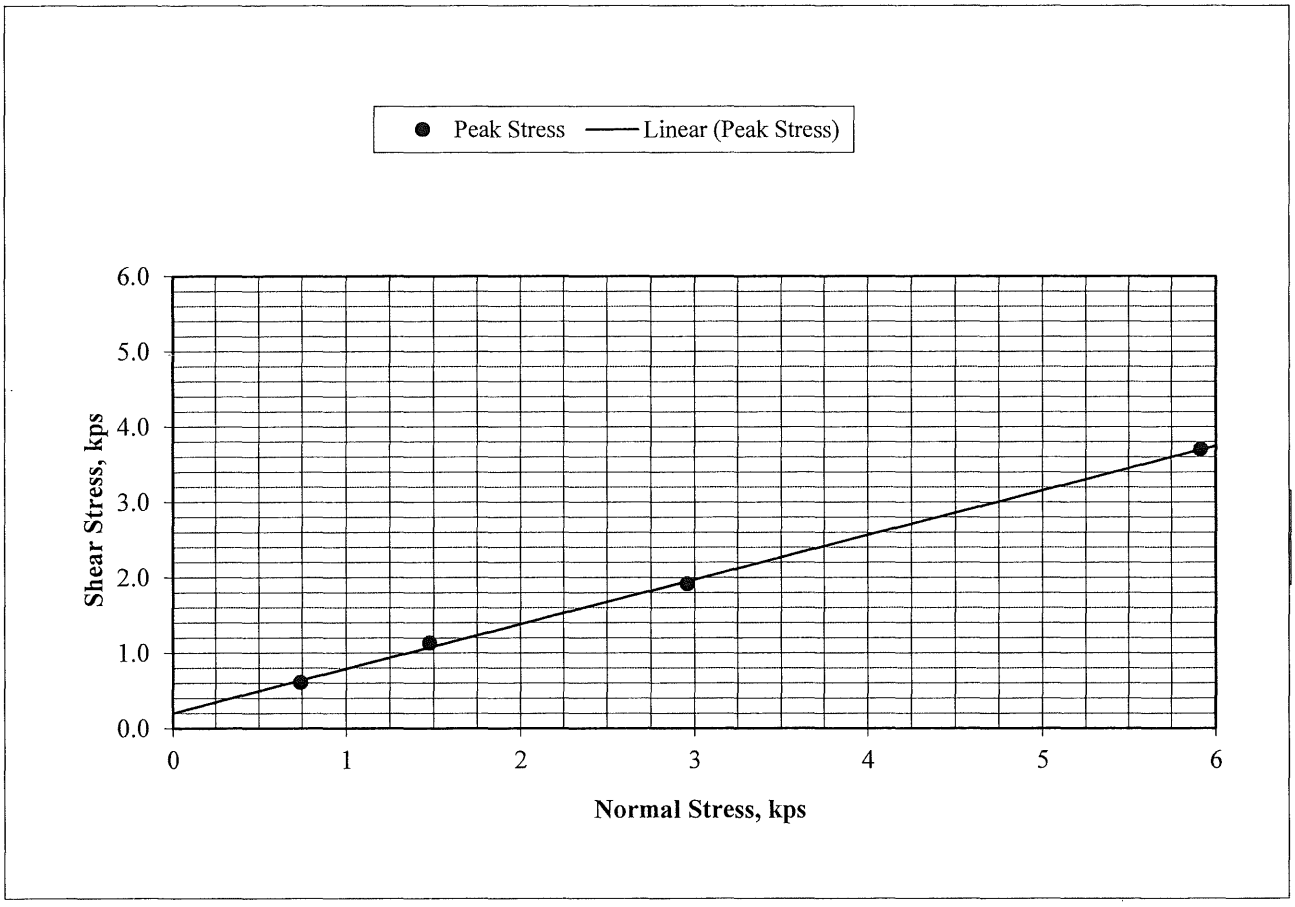
Sladden Engineering

450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Direct Shear ASTM D 3080-04
(modified for unconsolidated condition)

Job Number:	544-21557		July 5, 2022
Job Name	Palm Drive	Initial Dry Density:	111.0 pcf
Lab ID No.	LN6-22246	Initial Mosture Content:	10.1 %
Sample ID	BH-1 Bulk 1 @ 0-5'	Peak Friction Angle (Ø):	31°
Classification	Olive Brown Silty Sand (SM)	Cohesion (c):	200 psf
Sample Type	Remolded @ 90% of Maximum Density		

Test Results	1	2	3	4	Average
Moisture Content, %	16.6	16.6	16.6	16.6	16.6
Saturation, %	86.7	86.7	86.7	86.7	86.7
Normal Stress, kps	0.739	1.479	2.958	5.916	
Peak Stress, kps	0.610	1.134	1.918	3.706	



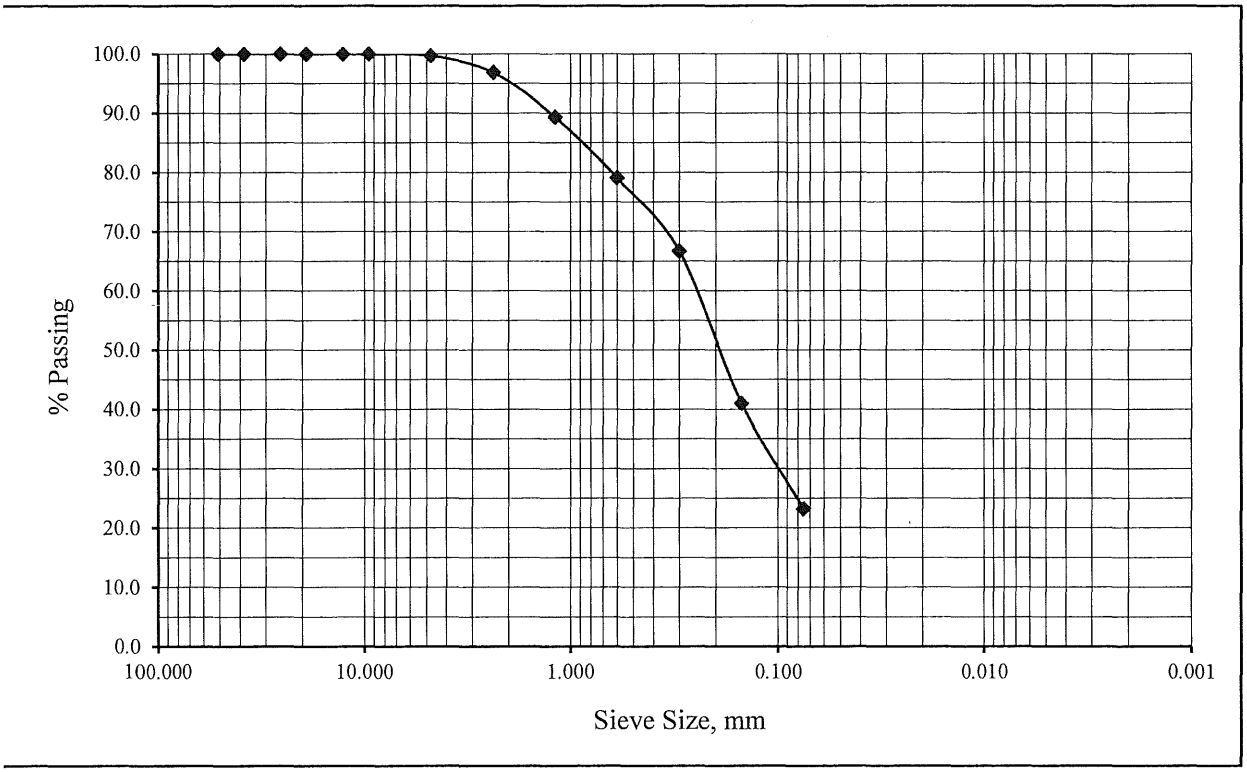
Sladden Engineering
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Gradation

ASTM C117 & C136

Project Number: 544-21557 July 5, 2022
Project Name: Palm Drive
Lab ID Number: LN6-22246
Sample ID: BH-1 Bulk 1 @ 0-5' Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
2"	50.8	100.0
1 1/2"	38.1	100.0
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	99.7
#8	2.36	96.9
#16	1.18	89.3
#30	0.60	79.1
#50	0.30	66.7
#100	0.15	41.0
#200	0.075	23.2



Sladden Engineering

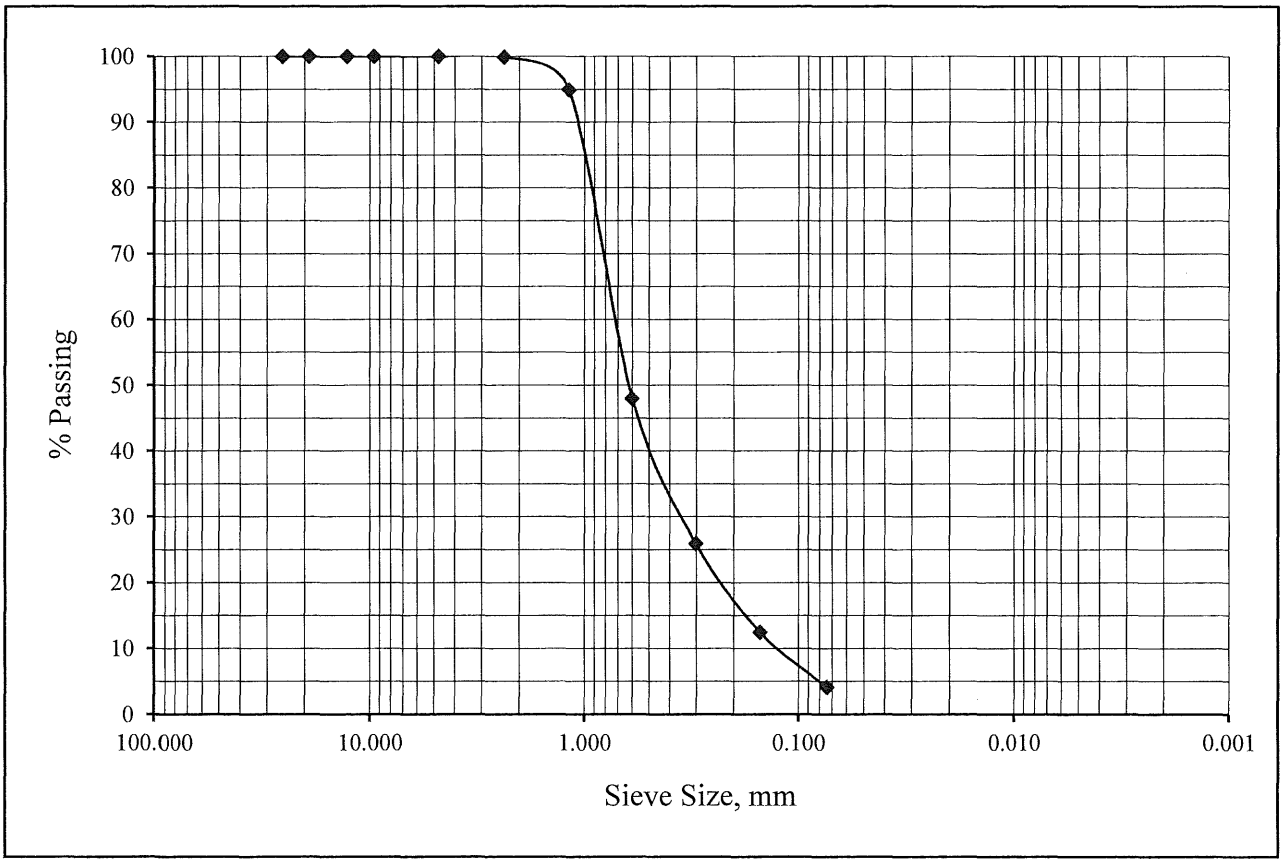
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Gradation

ASTM C117 & C136

Project Number: 544-21557 July 5, 2022
Project Name: Palm Drive
Lab ID Number: LN6-22246
Sample ID: BH-1 R-4 @ 15' Soil Classification: SP

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	99.9
#16	1.18	94.9
#30	0.60	48.0
#50	0.30	25.9
#100	0.15	12.5
#200	0.074	4.2



Sladden Engineering

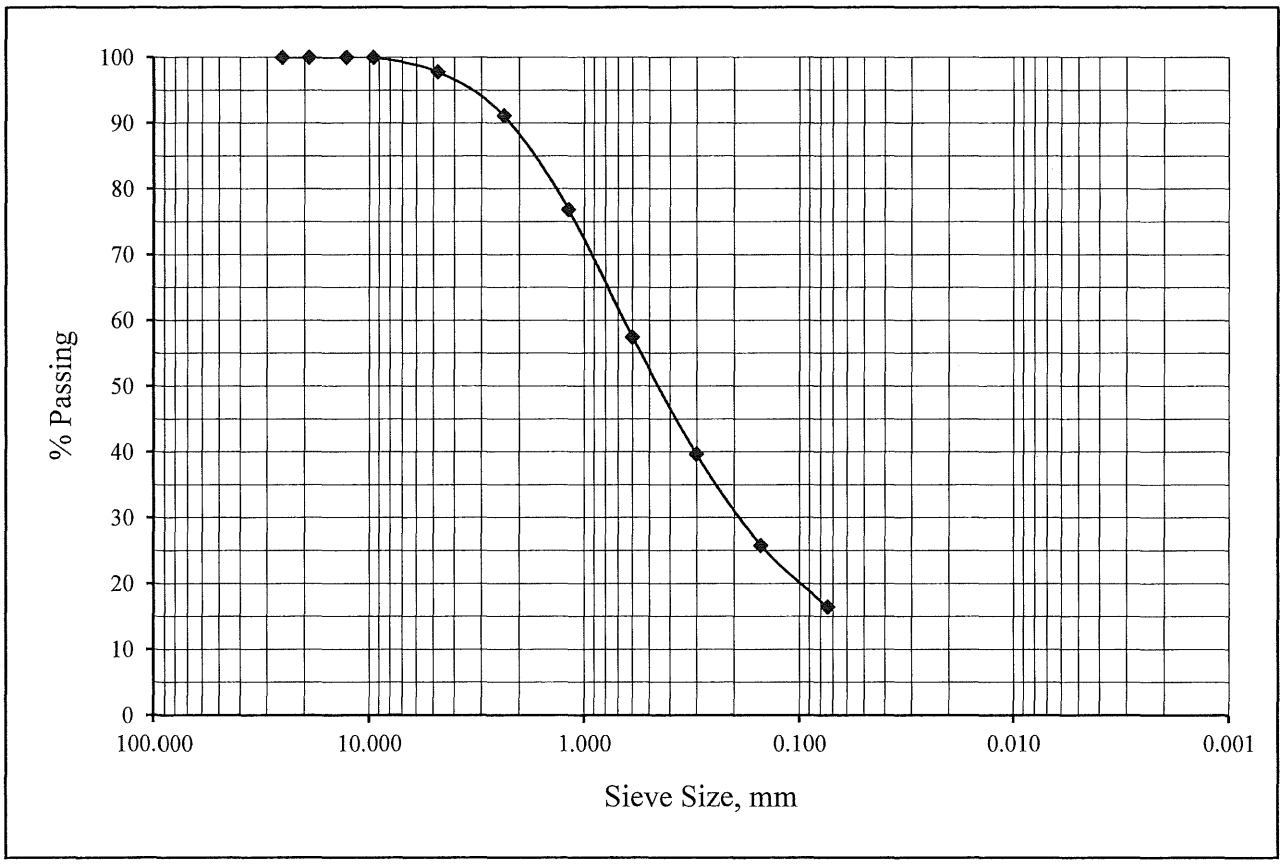
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Gradation

ASTM C117 & C136

Project Number: 544-21557 July 5, 2022
Project Name: Palm Drive
Lab ID Number: LN6-22246
Sample ID: BH-2 R-4 @ 20' Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	97.8
#8	2.36	91.1
#16	1.18	76.9
#30	0.60	57.4
#50	0.30	39.6
#100	0.15	25.8
#200	0.074	16.5



Sladden Engineering

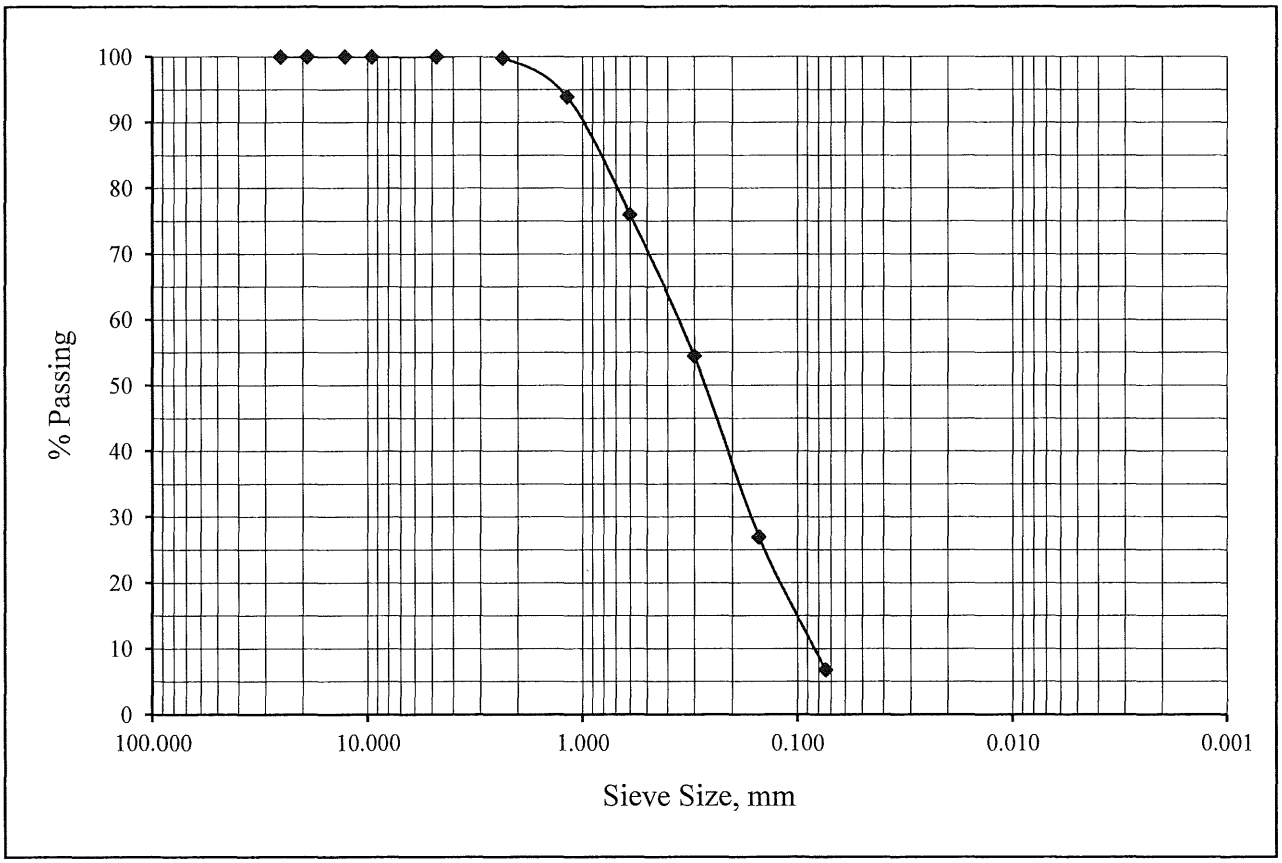
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Gradation

ASTM C117 & C136

Project Number: 544-21557 July 5, 2022
Project Name: Palm Drive
Lab ID Number: LN6-22246
Sample ID: BH-3 S-2 @ 10' Soil Classification: SP-SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	99.8
#16	1.18	93.9
#30	0.60	76.0
#50	0.30	54.5
#100	0.15	26.9
#200	0.074	6.8



Sladden Engineering

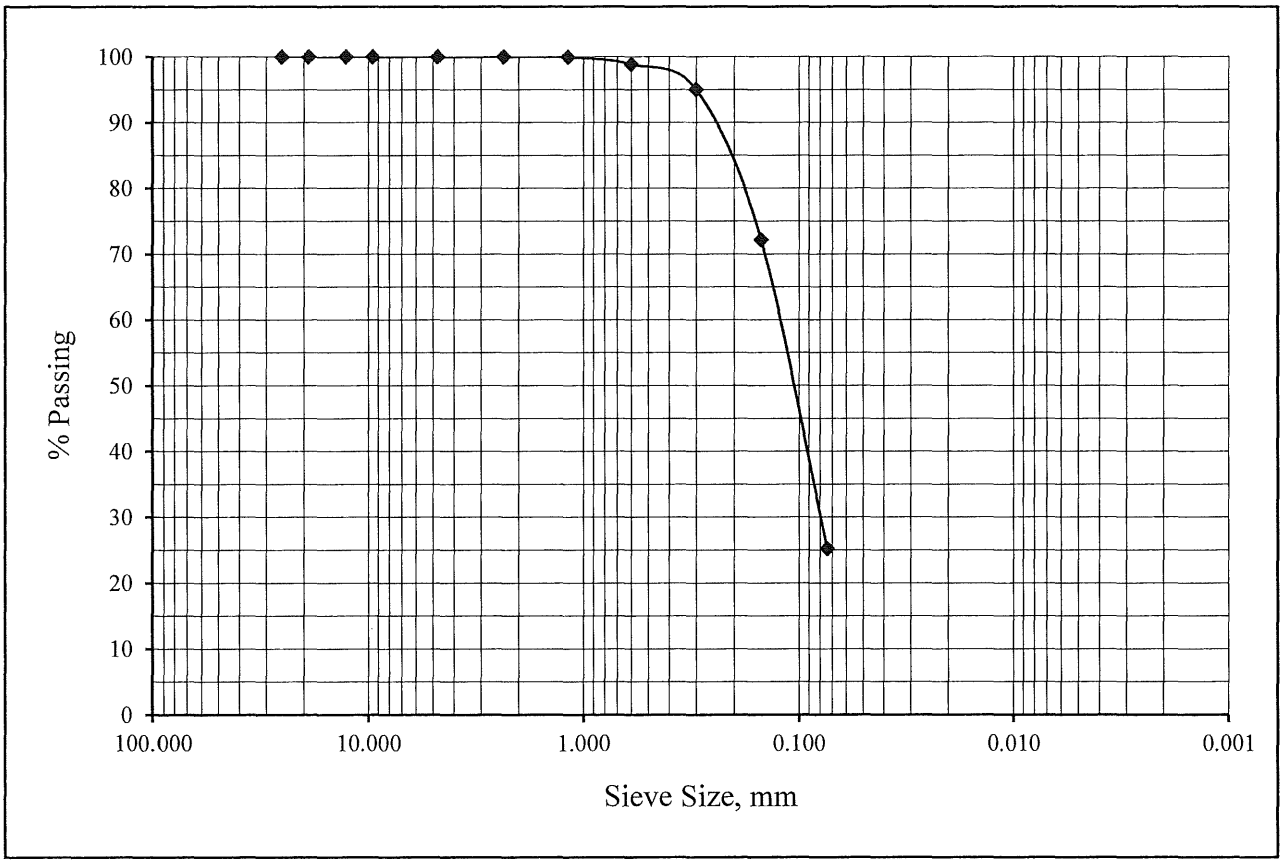
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Gradation

ASTM C117 & C136

Project Number: 544-21557 July 5, 2022
Project Name: Palm Drive
Lab ID Number: LN6-22246
Sample ID: BH-5 R-1 @ 5' Soil Classification: SM

Sieve Size, in	Sieve Size, mm	Percent Passing
1"	25.4	100.0
3/4"	19.1	100.0
1/2"	12.7	100.0
3/8"	9.53	100.0
#4	4.75	100.0
#8	2.36	100.0
#16	1.18	99.9
#30	0.60	98.9
#50	0.30	95.0
#100	0.15	72.2
#200	0.074	25.3



Sladden Engineering

450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

One Dimensional Consolidation

ASTM D2435 & D5333

Job Number: 544-21557
Job Name: Palm Drive

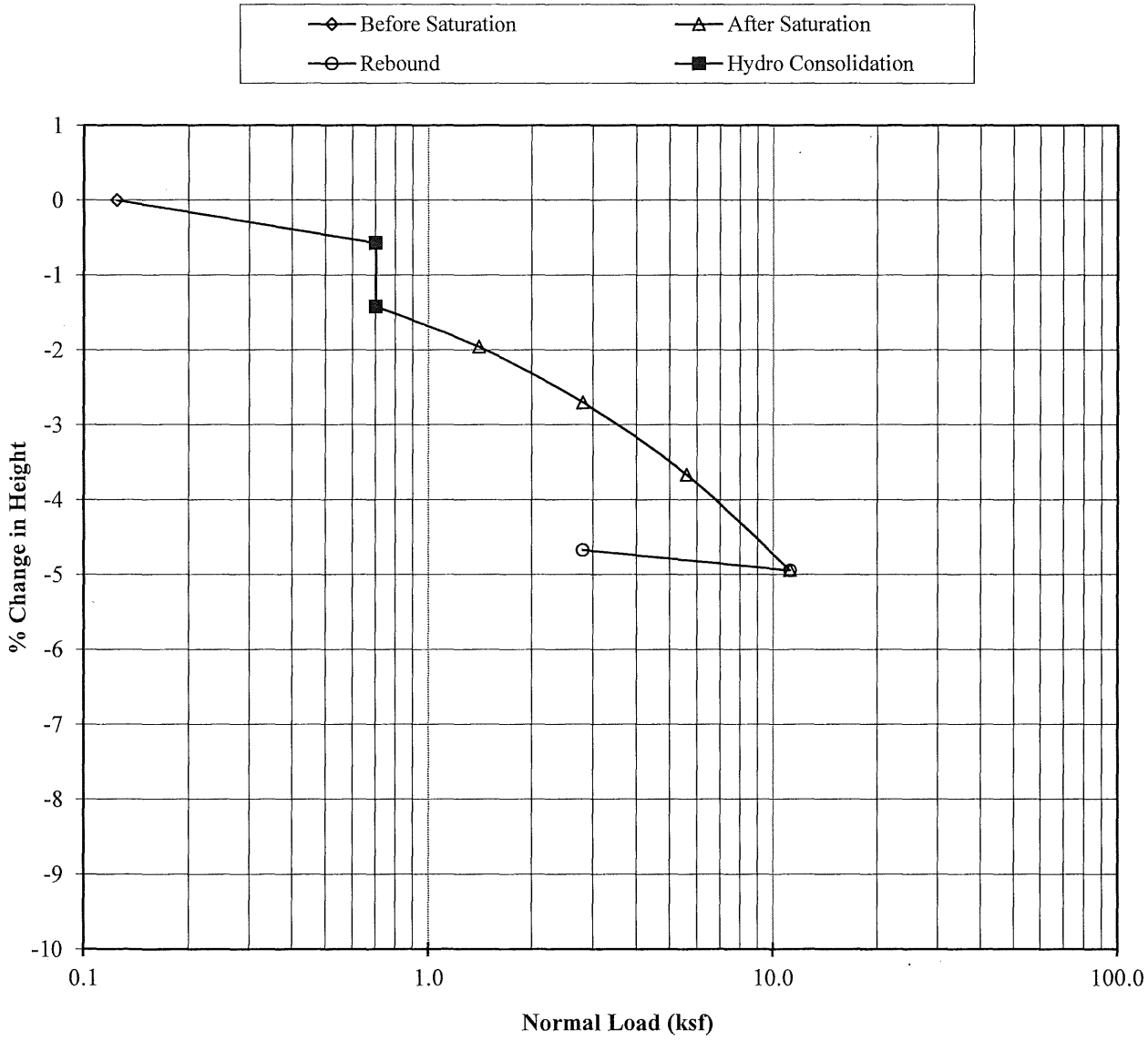
July 5, 2022

Lab ID Number: LN6-22246
Sample ID: BH-5 R-1 @ 5'
Soil Description: Dark Brown Silty Sand (SM)

Initial Dry Density, pcf:	92.3
Initial Moisture, %:	0.6
Initial Void Ratio:	0.805
Specific Gravity:	2.67

Hydrocollapse: 0.8% @ 0.702 ksf

% Change in Height vs Normal Presssure Diagram



Sladden Engineering

6782 Stanton Ave., Suite C, Buena Park, CA 90621 (714) 523-0952 Fax (714) 523-1369
45090 Golf Center Pkwy, Suite F, Indio, CA 92201 (760) 863-0713 Fax (760) 863-0847
450 Egan Avenue, Beaumont, CA 92223 (951) 845-7743 Fax (951) 845-8863

Date: July 5, 2022

Account No.: 544-21557

Customer: LA World Construction

Location: APN 657-280-003, Palm Drive, Desert Hot Springs

Analytical Report

Corrosion Series

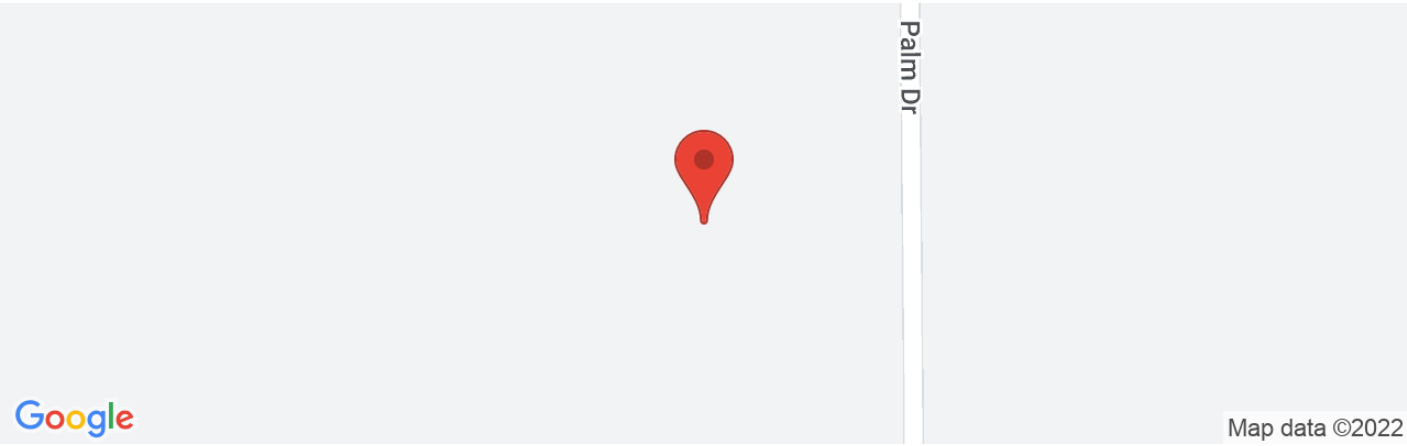
	pH per CA 643	Soluble Sulfates per CA 417 ppm	Soluble Chloride per CA 422 ppm	Min. Resistivity per CA 643 ohm-cm
BH-1 @ 0-5'	9.4	200	330	1200

APPENDIX C

SEISMIC DESIGN MAP AND REPORT
SEISMIC HAZARD ANALYSIS (SHA)

PROPOSED GREEN DAY VILLAGE, DESERT HOT SPRINGS; APN 657-280-003

Latitude, Longitude: 33.9125, -116.5037



Date	6/29/2022, 3:25:20 PM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Stiff Soil

Type	Value	Description
S_S	2.499	MCE_R ground motion. (for 0.2 second period)
S_1	0.985	MCE_R ground motion. (for 1.0s period)
S_{MS}	2.499	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	1.666	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	1.028	MCE_G peak ground acceleration
F_{PGA}	1.1	Site amplification factor at PGA
PGA_M	1.13	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	2.589	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	2.901	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	2.499	Factored deterministic acceleration value. (0.2 second)
S1RT	1.043	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	1.19	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	0.985	Factored deterministic acceleration value. (1.0 second)

Type	Value	Description
PGAd	1.028	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.892	Mapped value of the risk coefficient at short periods
C_{R1}	0.877	Mapped value of the risk coefficient at a period of 1 s

DISCLAIMER

While the information presented on this website is believed to be correct, SEAOC /OSHPD and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in this web application should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. SEAOC / OSHPD do not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the seismic data provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the search results of this website.

Project: PROPOSED GREEN DAY VILLAGE; APN 657-280-003
Project Number: 544-21557
Client: LA WORLD CONSTRUCTION
Site Lat/Long: 33.9125/-116.5037
Controlling Seismic Source: SAF South Branch / SAF North Branch

REFERENCE	NOTATION	VALUE
Site Class	C, D, D default, or E	D measured
Site Class D - Table 11.4-1	F_a	1.0
Site Class D - 21.3(ii)	F_v	2.5
$0.2*(S_{D1}/S_{DS})$	T_0	0.134
S_{D1}/S_{DS}	T_S	0.670
Fundamental Period (12.8.2)	T	Period
Seismic Design Maps or Fig 22-14	T_L	8
Equation 11.4-4 - $2/3*S_{M1}$	S_{D1}	1.1163*
Equation 11.4-2 - F_V*S_1	S_{M1}	1.6745*

REFERENCE	NOTATION	VALUE
Fv (Table 11.4-2)[Used for General Spectrum]	F_v	1.7
Design Maps	S_s	2.499
Design Maps	S_1	0.985
Equation 11.4-1 - F_A*S_S	S_{MS}	2.499*
Equation 11.4-3 - $2/3*S_{MS}$	S_{DS}	1.666*
Design Maps	PGA	1.028
Table 11.8-1	F_{PGA}	1.1
Equation 11.8-1 - $F_{PGA}*PGA$	PGA_M	1.131*
Section 21.5.3	80% of PGA_M	0.905
Design Maps	C_{RS}	0.892
Design Maps	C_{R1}	0.877

RISK COEFFICIENT

Cr - At Perods <=0.2, Cr=C_{RS}	C_{RS}	0.892
Cr - At Periods >=1.0, Cr=C_{R1}	C_{R1}	0.877

Cr - At Periods between 0.2 and 1.0 use trendline formula to complete

Period	Cr
0.200	0.892
0.300	0.890
0.400	0.888
0.500	0.886
0.600	0.885
0.680	0.883
1.000	0.877

* **Code based design value**. See accompanying data for Site Specific Design values.

Mapped values from https://seismicmaps.org/

Sladden Engineering

PROBABILISTIC SPECTRA[1]
2% in 50 year Exceedence

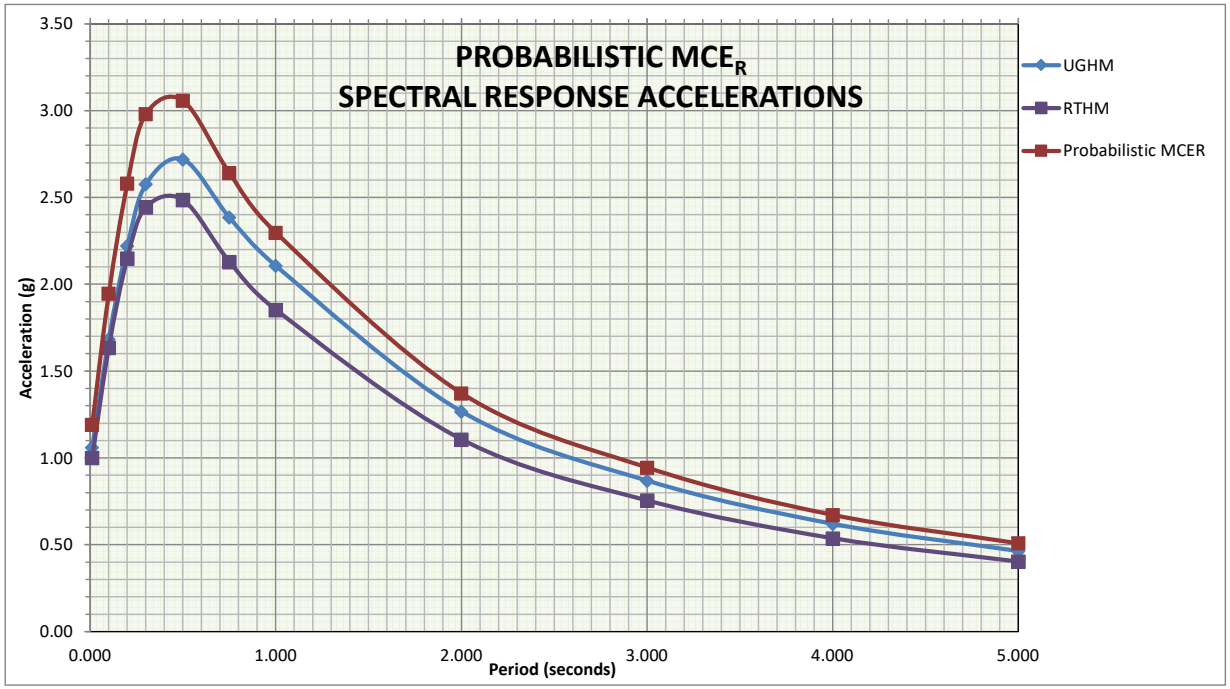
Project No: 544-21557

Period	UGHM	RTHM	Max Directional Scale Factor[2]	Probabilistic MCE
0.010	1.061	1.001	1.19	1.191
0.100	1.684	1.636	1.19	1.947
0.200	2.221	2.150	1.20	2.580
0.300	2.577	2.444	1.22	2.982
0.500	2.720	2.486	1.23	3.058
0.750	2.385	2.130	1.24	2.641
1.000	2.107	1.853	1.24	2.298
2.000	1.267	1.107	1.24	1.373
3.000	0.869	0.756	1.25	0.945
4.000	0.621	0.538	1.25	0.673
5.000	0.464	0.404	1.26	0.509

Probabilistic PGA: 1.061
Is Probabilistic $Sa_{(max)}$<$1.2F_a$? NO

[1] Data Sources:
https://earthquake.usgs.gov/hazards/interactive/
https://earthquake.usgs.gov/designmaps/rtgm/

[2] Shahi-Baker RotD100/RotD50 Factors (2014)



Sladden Engineering

DETERMINISTIC SPECTRUM

Largest Amplitudes of Ground Motions Considering All Sources Calculated using Weighted Mean of Attenuation Equations[1]

Controlling Source: SAF South Branch / SAF North Branch

Is Probabilistic $Sa_{(max)}$<1.2Fa? NO

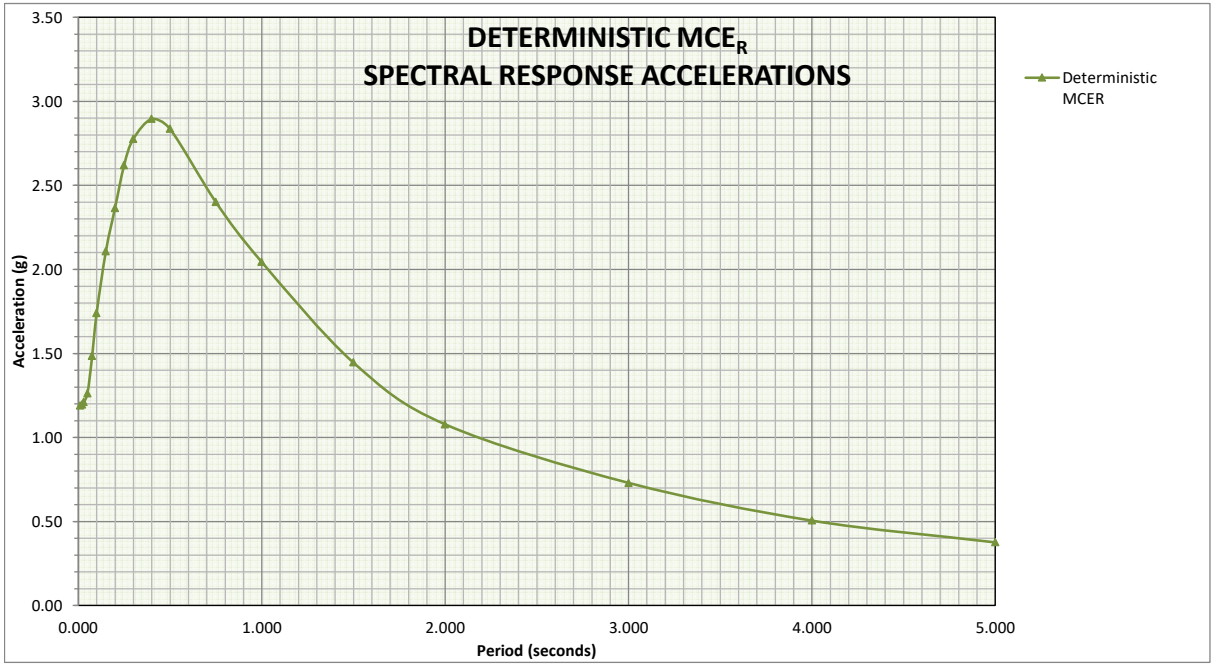
Period	Deterministic PSa Median + 1.σ for 5% Damping	Max Directional Scale Factor[2]	Deterministic MCE	Section 21.2.2 Scaling Factor Applied
0.010	1.000	1.19	1.190	1.190
0.020	1.005	1.19	1.196	1.196
0.030	1.017	1.19	1.210	1.210
0.050	1.061	1.19	1.263	1.263
0.075	1.247	1.19	1.484	1.484
0.100	1.462	1.19	1.740	1.740
0.150	1.757	1.20	2.108	2.108
0.200	1.970	1.20	2.364	2.364
0.250	2.165	1.21	2.620	2.620
0.300	2.276	1.22	2.777	2.777
0.400	2.354	1.23	2.895	2.895
0.500	2.306	1.23	2.837	2.837
0.750	1.936	1.24	2.401	2.401
1.000	1.649	1.24	2.045	2.045
1.500	1.166	1.24	1.446	1.446
2.000	0.869	1.24	1.077	1.077
3.000	0.584	1.25	0.730	0.730
4.000	0.405	1.25	0.506	0.506
5.000	0.299	1.26	0.376	0.376

Project No: 544-21557

Is Determinstic $Sa_{(max)}$<1.5*Fa?	NO
Section 21.2.2 Scaling Factor:	N/A
Deterministic PGA:	1.000
Is Deterministic PGA >=F_{PGA}*0.5?	YES

[1] NGAWest 2 GMPE worksheet and Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3) - Time Dependent Model

[2] Shahi-Baker RotD100/RotD50 Factors (2014)



Sladden Engineering

SITE SPECIFIC SPECTRA

Period	Probabilistic MCE	Deterministic MCE	Site-Specific MCE	Design Response Spectrum (Sa)
0.010	1.191	1.190	1.190	0.793
0.100	1.947	1.740	1.740	1.160
0.200	2.580	2.364	2.364	1.576
0.300	2.982	2.777	2.777	1.851
0.500	3.058	2.837	2.837	1.891
0.750	2.641	2.401	2.401	1.601
1.000	2.298	2.045	2.045	1.363
2.000	1.373	1.077	1.077	0.718
3.000	0.945	0.730	0.730	0.487
4.000	0.673	0.506	0.506	0.337
5.000	0.509	0.376	0.376	0.251

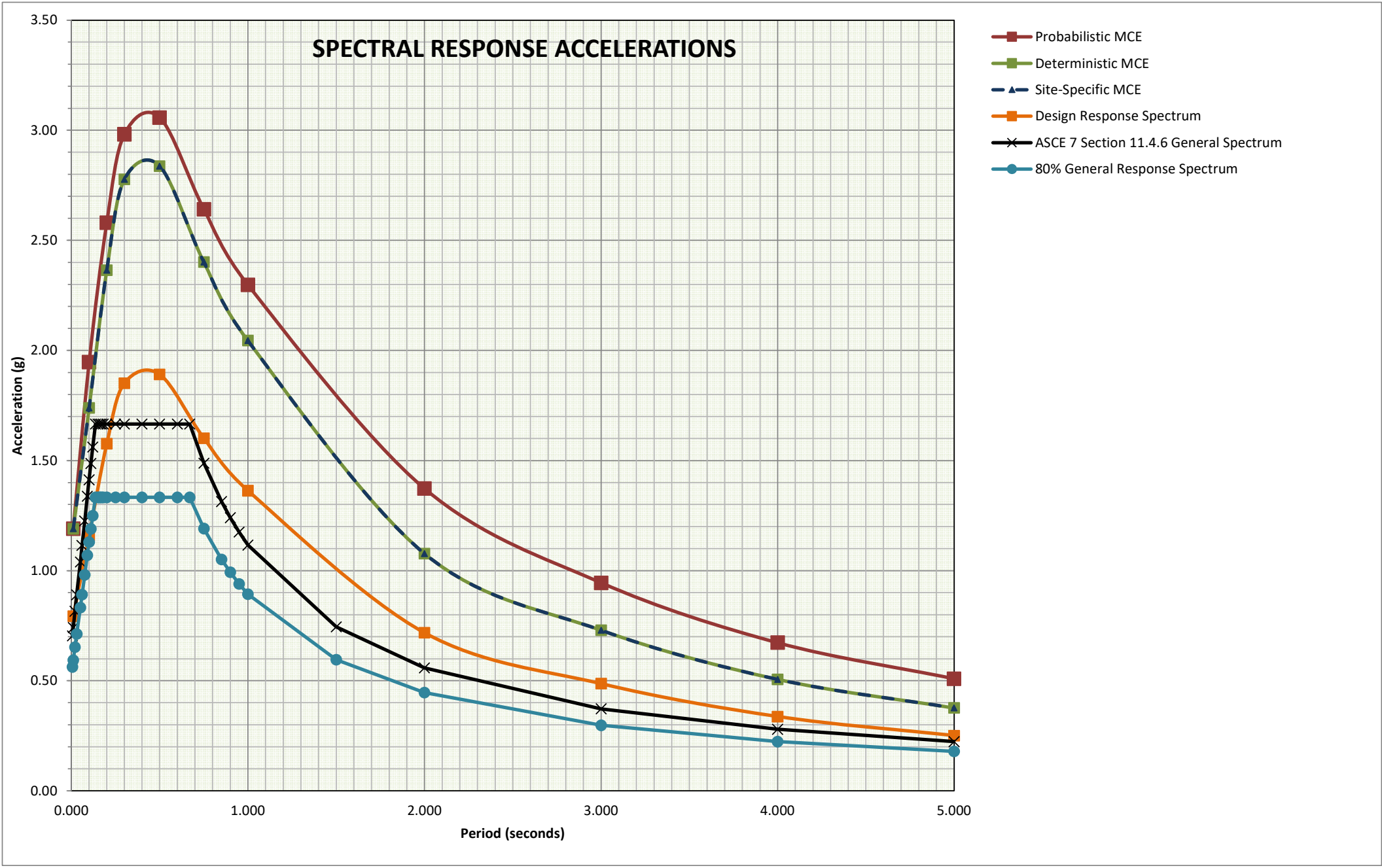
ASCE 7-16: Section 21.4
Site Specific

	Calculated Value	Design Value
SDS:	1.702	1.702
SD1:	1.460	1.460
SMS:	2.553	2.553
SM1:	2.189	2.189
Site Specific PGAm:	1.000	1.000
Site Class:	D measured	

Seismic Design Category - Short* E
Seismic Design Category - 1s* E
* Risk Categories I, II, or III

Period	ASCE 7 SECTION 11.4.6 General Spectrum	80% General Response Spectrum
0.005	0.704	0.563
0.010	0.741	0.593
0.020	0.816	0.652
0.030	0.890	0.712
0.050	1.039	0.831
0.060	1.114	0.891
0.075	1.226	0.981
0.090	1.338	1.070
0.100	1.412	1.130
0.110	1.487	1.190
0.120	1.561	1.249
0.136	1.666	1.333
0.150	1.666	1.333
0.160	1.666	1.333
0.170	1.666	1.333
0.180	1.666	1.333
0.200	1.666	1.333
0.250	1.666	1.333
0.300	1.666	1.333
0.400	1.666	1.333
0.500	1.666	1.333
0.600	1.666	1.333
0.670	1.666	1.333
0.750	1.488	1.191
0.850	1.313	1.051
0.900	1.240	0.992
0.950	1.175	0.940
1.000	1.116	0.893
1.500	0.744	0.595
2.000	0.558	0.447
3.000	0.372	0.298
4.000	0.279	0.223
5.000	0.223	0.179

Project No: 544-21557


SPECTRAL RESPONSE ACCELERATIONS
Acceleration (g)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0.000
1.000
2.000
3.000
4.000
5.000
Period (seconds)
Probabilistic MCE
Deterministic MCE
Site-Specific MCE
Design Response Spectrum
ASCE 7 Section 11.4.6 General Spectrum
80% General Response Spectrum

APPENDIX D

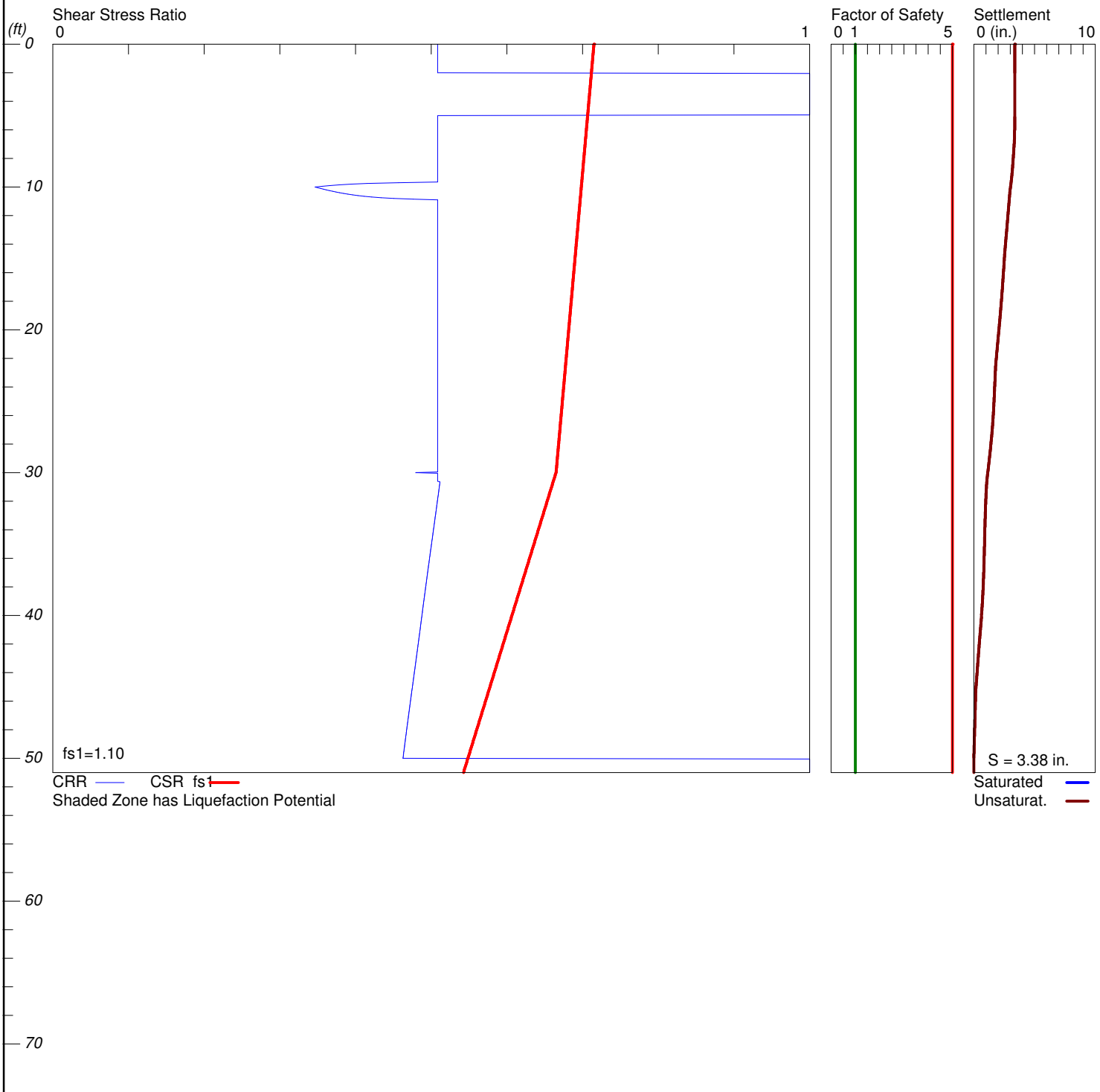
DYNAMIC SETTLEMENT ANALYSIS

SEISMIC SETTLEMENT ANALYSIS

Green Day Village, Desert Hot Springs; APN 657-280-003

Hole No.=BH-1 Water Depth=80 ft Surface Elev.=750

Magnitude=7.45
Acceleration=1g



LiquefyPro CivilTech Software USA www.civiltech.com

****
LIQUEFACTION ANALYSIS SUMMARY

Copyright by CivilTech Software
www.civiltech.com

****
Font: Courier New, Regular, Size 8 is recommended for this report.
Licensed to , 7/6/2022 3:24:20 PM

Input File Name: D:\Liquefy5\544-21557 BH-1.liq
Title: Green Day Village, Desert Hot Springs; APN 657-280-003
Subtitle:

Surface Elev.=750
Hole No.=BH-1
Depth of Hole= 51.00 ft
Water Table during Earthquake= 80.00 ft
Water Table during In-Situ Testing= 80.00 ft
Max. Acceleration= 1 g
Earthquake Magnitude= 7.45

Input Data:
Surface Elev.=750
Hole No.=BH-1
Depth of Hole=51.00 ft
Water Table during Earthquake= 80.00 ft
Water Table during In-Situ Testing= 80.00 ft
Max. Acceleration=1 g
Earthquake Magnitude=7.45
No-Liquefiable Soils: Based on Analysis

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Tokimatsu, M-correction
3. Fines Correction for Liquefaction: Modify Stark/Olson
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.25
7. Borehole Diameter, Cb= 1.15
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1.1
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:
Depth SPT gamma Fines

ft		pcf	%
0.00	20.00	107.30	22.70
2.00	20.00	107.30	NoLiq
5.00	20.00	112.60	NoLiq
10.00	11.00	112.60	43.90
15.00	27.30	105.50	4.20
20.00	26.00	105.50	4.20
25.00	28.60	99.80	16.00
30.00	25.00	99.80	8.30
35.00	66.60	109.50	6.00
40.00	13.00	109.50	NoLiq
45.00	36.00	122.60	24.40
50.00	17.00	122.60	NoLiq

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=3.38 in.
Total Settlement of Saturated and Unsaturated Sands=3.38 in.
Differential Settlement=1.688 to 2.229 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.51	0.71	5.00	0.00	3.38	3.38
0.05	0.51	0.71	5.00	0.00	3.38	3.38
0.10	0.51	0.71	5.00	0.00	3.38	3.38
0.15	0.51	0.71	5.00	0.00	3.38	3.38
0.20	0.51	0.71	5.00	0.00	3.38	3.38
0.25	0.51	0.71	5.00	0.00	3.38	3.38
0.30	0.51	0.71	5.00	0.00	3.38	3.38
0.35	0.51	0.71	5.00	0.00	3.38	3.38
0.40	0.51	0.71	5.00	0.00	3.38	3.38
0.45	0.51	0.71	5.00	0.00	3.38	3.38
0.50	0.51	0.71	5.00	0.00	3.38	3.38
0.55	0.51	0.71	5.00	0.00	3.38	3.38
0.60	0.51	0.71	5.00	0.00	3.38	3.38
0.65	0.51	0.71	5.00	0.00	3.38	3.38
0.70	0.51	0.71	5.00	0.00	3.38	3.38
0.75	0.51	0.71	5.00	0.00	3.38	3.38
0.80	0.51	0.71	5.00	0.00	3.38	3.38
0.85	0.51	0.71	5.00	0.00	3.38	3.38
0.90	0.51	0.71	5.00	0.00	3.38	3.38
0.95	0.51	0.71	5.00	0.00	3.38	3.38
1.00	0.51	0.71	5.00	0.00	3.38	3.38
1.05	0.51	0.71	5.00	0.00	3.38	3.38
1.10	0.51	0.71	5.00	0.00	3.38	3.38
1.15	0.51	0.71	5.00	0.00	3.38	3.38
1.20	0.51	0.71	5.00	0.00	3.38	3.38

1.25	0.51	0.71	5.00	0.00	3.38	3.38
1.30	0.51	0.71	5.00	0.00	3.38	3.38
1.35	0.51	0.71	5.00	0.00	3.38	3.38
1.40	0.51	0.71	5.00	0.00	3.37	3.37
1.45	0.51	0.71	5.00	0.00	3.37	3.37
1.50	0.51	0.71	5.00	0.00	3.37	3.37
1.55	0.51	0.71	5.00	0.00	3.37	3.37
1.60	0.51	0.71	5.00	0.00	3.37	3.37
1.65	0.51	0.71	5.00	0.00	3.37	3.37
1.70	0.51	0.71	5.00	0.00	3.37	3.37
1.75	0.51	0.71	5.00	0.00	3.37	3.37
1.80	0.51	0.71	5.00	0.00	3.37	3.37
1.85	0.51	0.71	5.00	0.00	3.37	3.37
1.90	0.51	0.71	5.00	0.00	3.37	3.37
1.95	0.51	0.71	5.00	0.00	3.37	3.37
2.00	0.51	0.71	5.00	0.00	3.37	3.37
2.05	2.00	0.71	5.00	0.00	3.37	3.37
2.10	2.00	0.71	5.00	0.00	3.37	3.37
2.15	2.00	0.71	5.00	0.00	3.37	3.37
2.20	2.00	0.71	5.00	0.00	3.37	3.37
2.25	2.00	0.71	5.00	0.00	3.37	3.37
2.30	2.00	0.71	5.00	0.00	3.37	3.37
2.35	2.00	0.71	5.00	0.00	3.37	3.37
2.40	2.00	0.71	5.00	0.00	3.37	3.37
2.45	2.00	0.71	5.00	0.00	3.37	3.37
2.50	2.00	0.71	5.00	0.00	3.37	3.37
2.55	2.00	0.71	5.00	0.00	3.37	3.37
2.60	2.00	0.71	5.00	0.00	3.37	3.37
2.65	2.00	0.71	5.00	0.00	3.37	3.37
2.70	2.00	0.71	5.00	0.00	3.37	3.37
2.75	2.00	0.71	5.00	0.00	3.37	3.37
2.80	2.00	0.71	5.00	0.00	3.37	3.37
2.85	2.00	0.71	5.00	0.00	3.37	3.37
2.90	2.00	0.71	5.00	0.00	3.37	3.37
2.95	2.00	0.71	5.00	0.00	3.37	3.37
3.00	2.00	0.71	5.00	0.00	3.37	3.37
3.05	2.00	0.71	5.00	0.00	3.37	3.37
3.10	2.00	0.71	5.00	0.00	3.37	3.37
3.15	2.00	0.71	5.00	0.00	3.37	3.37
3.20	2.00	0.71	5.00	0.00	3.37	3.37
3.25	2.00	0.71	5.00	0.00	3.37	3.37
3.30	2.00	0.71	5.00	0.00	3.37	3.37
3.35	2.00	0.71	5.00	0.00	3.37	3.37
3.40	2.00	0.71	5.00	0.00	3.37	3.37
3.45	2.00	0.71	5.00	0.00	3.37	3.37
3.50	2.00	0.71	5.00	0.00	3.37	3.37
3.55	2.00	0.71	5.00	0.00	3.37	3.37
3.60	2.00	0.71	5.00	0.00	3.37	3.37
3.65	2.00	0.71	5.00	0.00	3.37	3.37
3.70	2.00	0.71	5.00	0.00	3.37	3.37

3.75	2.00	0.71	5.00	0.00	3.37	3.37
3.80	2.00	0.71	5.00	0.00	3.37	3.37
3.85	2.00	0.71	5.00	0.00	3.37	3.37
3.90	2.00	0.71	5.00	0.00	3.37	3.37
3.95	2.00	0.71	5.00	0.00	3.37	3.37
4.00	2.00	0.71	5.00	0.00	3.37	3.37
4.05	2.00	0.71	5.00	0.00	3.37	3.37
4.10	2.00	0.71	5.00	0.00	3.37	3.37
4.15	2.00	0.71	5.00	0.00	3.37	3.37
4.20	2.00	0.71	5.00	0.00	3.37	3.37
4.25	2.00	0.71	5.00	0.00	3.37	3.37
4.30	2.00	0.71	5.00	0.00	3.37	3.37
4.35	2.00	0.71	5.00	0.00	3.37	3.37
4.40	2.00	0.71	5.00	0.00	3.37	3.37
4.45	2.00	0.71	5.00	0.00	3.37	3.37
4.50	2.00	0.71	5.00	0.00	3.37	3.37
4.55	2.00	0.71	5.00	0.00	3.37	3.37
4.60	2.00	0.71	5.00	0.00	3.37	3.37
4.65	2.00	0.71	5.00	0.00	3.37	3.37
4.70	2.00	0.71	5.00	0.00	3.37	3.37
4.75	2.00	0.71	5.00	0.00	3.37	3.37
4.80	2.00	0.71	5.00	0.00	3.37	3.37
4.85	2.00	0.71	5.00	0.00	3.37	3.37
4.90	2.00	0.71	5.00	0.00	3.37	3.37
4.95	2.00	0.71	5.00	0.00	3.37	3.37
5.00	0.51	0.71	5.00	0.00	3.37	3.37
5.05	0.51	0.71	5.00	0.00	3.37	3.37
5.10	0.51	0.71	5.00	0.00	3.37	3.37
5.15	0.51	0.71	5.00	0.00	3.37	3.37
5.20	0.51	0.71	5.00	0.00	3.37	3.37
5.25	0.51	0.71	5.00	0.00	3.37	3.37
5.30	0.51	0.71	5.00	0.00	3.37	3.37
5.35	0.51	0.71	5.00	0.00	3.37	3.37
5.40	0.51	0.71	5.00	0.00	3.37	3.37
5.45	0.51	0.71	5.00	0.00	3.37	3.37
5.50	0.51	0.71	5.00	0.00	3.37	3.37
5.55	0.51	0.71	5.00	0.00	3.37	3.37
5.60	0.51	0.71	5.00	0.00	3.37	3.37
5.65	0.51	0.71	5.00	0.00	3.37	3.37
5.70	0.51	0.71	5.00	0.00	3.37	3.37
5.75	0.51	0.71	5.00	0.00	3.37	3.37
5.80	0.51	0.71	5.00	0.00	3.37	3.37
5.85	0.51	0.71	5.00	0.00	3.37	3.37
5.90	0.51	0.71	5.00	0.00	3.37	3.37
5.95	0.51	0.71	5.00	0.00	3.36	3.36
6.00	0.51	0.70	5.00	0.00	3.36	3.36
6.05	0.51	0.70	5.00	0.00	3.36	3.36
6.10	0.51	0.70	5.00	0.00	3.36	3.36
6.15	0.51	0.70	5.00	0.00	3.36	3.36
6.20	0.51	0.70	5.00	0.00	3.36	3.36

6.25	0.51	0.70	5.00	0.00	3.36	3.36
6.30	0.51	0.70	5.00	0.00	3.36	3.36
6.35	0.51	0.70	5.00	0.00	3.36	3.36
6.40	0.51	0.70	5.00	0.00	3.35	3.35
6.45	0.51	0.70	5.00	0.00	3.35	3.35
6.50	0.51	0.70	5.00	0.00	3.35	3.35
6.55	0.51	0.70	5.00	0.00	3.35	3.35
6.60	0.51	0.70	5.00	0.00	3.35	3.35
6.65	0.51	0.70	5.00	0.00	3.34	3.34
6.70	0.51	0.70	5.00	0.00	3.34	3.34
6.75	0.51	0.70	5.00	0.00	3.34	3.34
6.80	0.51	0.70	5.00	0.00	3.34	3.34
6.85	0.51	0.70	5.00	0.00	3.33	3.33
6.90	0.51	0.70	5.00	0.00	3.33	3.33
6.95	0.51	0.70	5.00	0.00	3.33	3.33
7.00	0.51	0.70	5.00	0.00	3.32	3.32
7.05	0.51	0.70	5.00	0.00	3.32	3.32
7.10	0.51	0.70	5.00	0.00	3.31	3.31
7.15	0.51	0.70	5.00	0.00	3.31	3.31
7.20	0.51	0.70	5.00	0.00	3.31	3.31
7.25	0.51	0.70	5.00	0.00	3.30	3.30
7.30	0.51	0.70	5.00	0.00	3.30	3.30
7.35	0.51	0.70	5.00	0.00	3.29	3.29
7.40	0.51	0.70	5.00	0.00	3.29	3.29
7.45	0.51	0.70	5.00	0.00	3.29	3.29
7.50	0.51	0.70	5.00	0.00	3.28	3.28
7.55	0.51	0.70	5.00	0.00	3.28	3.28
7.60	0.51	0.70	5.00	0.00	3.27	3.27
7.65	0.51	0.70	5.00	0.00	3.27	3.27
7.70	0.51	0.70	5.00	0.00	3.27	3.27
7.75	0.51	0.70	5.00	0.00	3.26	3.26
7.80	0.51	0.70	5.00	0.00	3.26	3.26
7.85	0.51	0.70	5.00	0.00	3.25	3.25
7.90	0.51	0.70	5.00	0.00	3.25	3.25
7.95	0.51	0.70	5.00	0.00	3.25	3.25
8.00	0.51	0.70	5.00	0.00	3.24	3.24
8.05	0.51	0.70	5.00	0.00	3.24	3.24
8.10	0.51	0.70	5.00	0.00	3.23	3.23
8.15	0.51	0.70	5.00	0.00	3.23	3.23
8.20	0.51	0.70	5.00	0.00	3.22	3.22
8.25	0.51	0.70	5.00	0.00	3.22	3.22
8.30	0.51	0.70	5.00	0.00	3.22	3.22
8.35	0.51	0.70	5.00	0.00	3.21	3.21
8.40	0.51	0.70	5.00	0.00	3.21	3.21
8.45	0.51	0.70	5.00	0.00	3.20	3.20
8.50	0.51	0.70	5.00	0.00	3.20	3.20
8.55	0.51	0.70	5.00	0.00	3.20	3.20
8.60	0.51	0.70	5.00	0.00	3.19	3.19
8.65	0.51	0.70	5.00	0.00	3.19	3.19
8.70	0.51	0.70	5.00	0.00	3.18	3.18

8.75	0.51	0.70	5.00	0.00	3.18	3.18
8.80	0.51	0.70	5.00	0.00	3.17	3.17
8.85	0.51	0.70	5.00	0.00	3.17	3.17
8.90	0.51	0.70	5.00	0.00	3.16	3.16
8.95	0.51	0.70	5.00	0.00	3.16	3.16
9.00	0.51	0.70	5.00	0.00	3.15	3.15
9.05	0.51	0.70	5.00	0.00	3.15	3.15
9.10	0.51	0.70	5.00	0.00	3.14	3.14
9.15	0.51	0.70	5.00	0.00	3.13	3.13
9.20	0.51	0.70	5.00	0.00	3.13	3.13
9.25	0.51	0.70	5.00	0.00	3.12	3.12
9.30	0.51	0.70	5.00	0.00	3.12	3.12
9.35	0.51	0.70	5.00	0.00	3.11	3.11
9.40	0.51	0.70	5.00	0.00	3.10	3.10
9.45	0.51	0.70	5.00	0.00	3.10	3.10
9.50	0.51	0.70	5.00	0.00	3.09	3.09
9.55	0.51	0.70	5.00	0.00	3.08	3.08
9.60	0.51	0.70	5.00	0.00	3.08	3.08
9.65	0.51	0.70	5.00	0.00	3.07	3.07
9.70	0.46	0.70	5.00	0.00	3.06	3.06
9.75	0.42	0.70	5.00	0.00	3.06	3.06
9.80	0.39	0.70	5.00	0.00	3.05	3.05
9.85	0.38	0.70	5.00	0.00	3.04	3.04
9.90	0.37	0.70	5.00	0.00	3.03	3.03
9.95	0.36	0.70	5.00	0.00	3.03	3.03
10.00	0.35	0.70	5.00	0.00	3.02	3.02
10.05	0.35	0.70	5.00	0.00	3.01	3.01
10.10	0.35	0.70	5.00	0.00	3.00	3.00
10.15	0.36	0.70	5.00	0.00	3.00	3.00
10.20	0.36	0.70	5.00	0.00	2.99	2.99
10.25	0.37	0.70	5.00	0.00	2.98	2.98
10.30	0.37	0.70	5.00	0.00	2.97	2.97
10.35	0.37	0.70	5.00	0.00	2.97	2.97
10.40	0.38	0.70	5.00	0.00	2.96	2.96
10.45	0.38	0.70	5.00	0.00	2.96	2.96
10.50	0.39	0.70	5.00	0.00	2.95	2.95
10.55	0.40	0.70	5.00	0.00	2.95	2.95
10.60	0.40	0.70	5.00	0.00	2.94	2.94
10.65	0.41	0.70	5.00	0.00	2.94	2.94
10.70	0.42	0.70	5.00	0.00	2.93	2.93
10.75	0.43	0.70	5.00	0.00	2.93	2.93
10.80	0.45	0.70	5.00	0.00	2.92	2.92
10.85	0.48	0.70	5.00	0.00	2.92	2.92
10.90	0.51	0.70	5.00	0.00	2.91	2.91
10.95	0.51	0.70	5.00	0.00	2.91	2.91
11.00	0.51	0.70	5.00	0.00	2.90	2.90
11.05	0.51	0.70	5.00	0.00	2.90	2.90
11.10	0.51	0.70	5.00	0.00	2.89	2.89
11.15	0.51	0.70	5.00	0.00	2.89	2.89
11.20	0.51	0.70	5.00	0.00	2.88	2.88

11.25	0.51	0.70	5.00	0.00	2.88	2.88
11.30	0.51	0.70	5.00	0.00	2.87	2.87
11.35	0.51	0.70	5.00	0.00	2.87	2.87
11.40	0.51	0.70	5.00	0.00	2.86	2.86
11.45	0.51	0.70	5.00	0.00	2.86	2.86
11.50	0.51	0.70	5.00	0.00	2.85	2.85
11.55	0.51	0.70	5.00	0.00	2.85	2.85
11.60	0.51	0.70	5.00	0.00	2.84	2.84
11.65	0.51	0.70	5.00	0.00	2.84	2.84
11.70	0.51	0.70	5.00	0.00	2.84	2.84
11.75	0.51	0.70	5.00	0.00	2.83	2.83
11.80	0.51	0.70	5.00	0.00	2.83	2.83
11.85	0.51	0.70	5.00	0.00	2.82	2.82
11.90	0.51	0.70	5.00	0.00	2.82	2.82
11.95	0.51	0.70	5.00	0.00	2.81	2.81
12.00	0.51	0.69	5.00	0.00	2.81	2.81
12.05	0.51	0.69	5.00	0.00	2.80	2.80
12.10	0.51	0.69	5.00	0.00	2.80	2.80
12.15	0.51	0.69	5.00	0.00	2.79	2.79
12.20	0.51	0.69	5.00	0.00	2.79	2.79
12.25	0.51	0.69	5.00	0.00	2.78	2.78
12.30	0.51	0.69	5.00	0.00	2.78	2.78
12.35	0.51	0.69	5.00	0.00	2.77	2.77
12.40	0.51	0.69	5.00	0.00	2.77	2.77
12.45	0.51	0.69	5.00	0.00	2.76	2.76
12.50	0.51	0.69	5.00	0.00	2.76	2.76
12.55	0.51	0.69	5.00	0.00	2.75	2.75
12.60	0.51	0.69	5.00	0.00	2.75	2.75
12.65	0.51	0.69	5.00	0.00	2.74	2.74
12.70	0.51	0.69	5.00	0.00	2.74	2.74
12.75	0.51	0.69	5.00	0.00	2.73	2.73
12.80	0.51	0.69	5.00	0.00	2.73	2.73
12.85	0.51	0.69	5.00	0.00	2.72	2.72
12.90	0.51	0.69	5.00	0.00	2.72	2.72
12.95	0.51	0.69	5.00	0.00	2.71	2.71
13.00	0.51	0.69	5.00	0.00	2.71	2.71
13.05	0.51	0.69	5.00	0.00	2.70	2.70
13.10	0.51	0.69	5.00	0.00	2.70	2.70
13.15	0.51	0.69	5.00	0.00	2.69	2.69
13.20	0.51	0.69	5.00	0.00	2.69	2.69
13.25	0.51	0.69	5.00	0.00	2.68	2.68
13.30	0.51	0.69	5.00	0.00	2.68	2.68
13.35	0.51	0.69	5.00	0.00	2.67	2.67
13.40	0.51	0.69	5.00	0.00	2.67	2.67
13.45	0.51	0.69	5.00	0.00	2.66	2.66
13.50	0.51	0.69	5.00	0.00	2.66	2.66
13.55	0.51	0.69	5.00	0.00	2.65	2.65
13.60	0.51	0.69	5.00	0.00	2.65	2.65
13.65	0.51	0.69	5.00	0.00	2.64	2.64
13.70	0.51	0.69	5.00	0.00	2.64	2.64

13.75	0.51	0.69	5.00	0.00	2.63	2.63
13.80	0.51	0.69	5.00	0.00	2.63	2.63
13.85	0.51	0.69	5.00	0.00	2.62	2.62
13.90	0.51	0.69	5.00	0.00	2.62	2.62
13.95	0.51	0.69	5.00	0.00	2.61	2.61
14.00	0.51	0.69	5.00	0.00	2.61	2.61
14.05	0.51	0.69	5.00	0.00	2.60	2.60
14.10	0.51	0.69	5.00	0.00	2.60	2.60
14.15	0.51	0.69	5.00	0.00	2.59	2.59
14.20	0.51	0.69	5.00	0.00	2.59	2.59
14.25	0.51	0.69	5.00	0.00	2.58	2.58
14.30	0.51	0.69	5.00	0.00	2.58	2.58
14.35	0.51	0.69	5.00	0.00	2.57	2.57
14.40	0.51	0.69	5.00	0.00	2.57	2.57
14.45	0.51	0.69	5.00	0.00	2.56	2.56
14.50	0.51	0.69	5.00	0.00	2.56	2.56
14.55	0.51	0.69	5.00	0.00	2.55	2.55
14.60	0.51	0.69	5.00	0.00	2.55	2.55
14.65	0.51	0.69	5.00	0.00	2.54	2.54
14.70	0.51	0.69	5.00	0.00	2.54	2.54
14.75	0.51	0.69	5.00	0.00	2.53	2.53
14.80	0.51	0.69	5.00	0.00	2.53	2.53
14.85	0.51	0.69	5.00	0.00	2.52	2.52
14.90	0.51	0.69	5.00	0.00	2.52	2.52
14.95	0.51	0.69	5.00	0.00	2.52	2.52
15.00	0.51	0.69	5.00	0.00	2.51	2.51
15.05	0.51	0.69	5.00	0.00	2.51	2.51
15.10	0.51	0.69	5.00	0.00	2.51	2.51
15.15	0.51	0.69	5.00	0.00	2.50	2.50
15.20	0.51	0.69	5.00	0.00	2.50	2.50
15.25	0.51	0.69	5.00	0.00	2.50	2.50
15.30	0.51	0.69	5.00	0.00	2.49	2.49
15.35	0.51	0.69	5.00	0.00	2.49	2.49
15.40	0.51	0.69	5.00	0.00	2.48	2.48
15.45	0.51	0.69	5.00	0.00	2.48	2.48
15.50	0.51	0.69	5.00	0.00	2.48	2.48
15.55	0.51	0.69	5.00	0.00	2.47	2.47
15.60	0.51	0.69	5.00	0.00	2.47	2.47
15.65	0.51	0.69	5.00	0.00	2.46	2.46
15.70	0.51	0.69	5.00	0.00	2.46	2.46
15.75	0.51	0.69	5.00	0.00	2.46	2.46
15.80	0.51	0.69	5.00	0.00	2.45	2.45
15.85	0.51	0.69	5.00	0.00	2.45	2.45
15.90	0.51	0.69	5.00	0.00	2.44	2.44
15.95	0.51	0.69	5.00	0.00	2.44	2.44
16.00	0.51	0.69	5.00	0.00	2.44	2.44
16.05	0.51	0.69	5.00	0.00	2.43	2.43
16.10	0.51	0.69	5.00	0.00	2.43	2.43
16.15	0.51	0.69	5.00	0.00	2.43	2.43
16.20	0.51	0.69	5.00	0.00	2.42	2.42

16.25	0.51	0.69	5.00	0.00	2.42	2.42
16.30	0.51	0.69	5.00	0.00	2.41	2.41
16.35	0.51	0.69	5.00	0.00	2.41	2.41
16.40	0.51	0.69	5.00	0.00	2.41	2.41
16.45	0.51	0.69	5.00	0.00	2.40	2.40
16.50	0.51	0.69	5.00	0.00	2.40	2.40
16.55	0.51	0.69	5.00	0.00	2.39	2.39
16.60	0.51	0.69	5.00	0.00	2.39	2.39
16.65	0.51	0.69	5.00	0.00	2.39	2.39
16.70	0.51	0.69	5.00	0.00	2.38	2.38
16.75	0.51	0.69	5.00	0.00	2.38	2.38
16.80	0.51	0.69	5.00	0.00	2.37	2.37
16.85	0.51	0.69	5.00	0.00	2.37	2.37
16.90	0.51	0.69	5.00	0.00	2.36	2.36
16.95	0.51	0.69	5.00	0.00	2.36	2.36
17.00	0.51	0.69	5.00	0.00	2.36	2.36
17.05	0.51	0.69	5.00	0.00	2.35	2.35
17.10	0.51	0.69	5.00	0.00	2.35	2.35
17.15	0.51	0.69	5.00	0.00	2.34	2.34
17.20	0.51	0.69	5.00	0.00	2.34	2.34
17.25	0.51	0.69	5.00	0.00	2.33	2.33
17.30	0.51	0.69	5.00	0.00	2.33	2.33
17.35	0.51	0.69	5.00	0.00	2.33	2.33
17.40	0.51	0.69	5.00	0.00	2.32	2.32
17.45	0.51	0.69	5.00	0.00	2.32	2.32
17.50	0.51	0.69	5.00	0.00	2.31	2.31
17.55	0.51	0.69	5.00	0.00	2.31	2.31
17.60	0.51	0.69	5.00	0.00	2.30	2.30
17.65	0.51	0.69	5.00	0.00	2.30	2.30
17.70	0.51	0.69	5.00	0.00	2.29	2.29
17.75	0.51	0.69	5.00	0.00	2.29	2.29
17.80	0.51	0.69	5.00	0.00	2.29	2.29
17.85	0.51	0.69	5.00	0.00	2.28	2.28
17.90	0.51	0.69	5.00	0.00	2.28	2.28
17.95	0.51	0.69	5.00	0.00	2.27	2.27
18.00	0.51	0.68	5.00	0.00	2.27	2.27
18.05	0.51	0.68	5.00	0.00	2.26	2.26
18.10	0.51	0.68	5.00	0.00	2.26	2.26
18.15	0.51	0.68	5.00	0.00	2.25	2.25
18.20	0.51	0.68	5.00	0.00	2.25	2.25
18.25	0.51	0.68	5.00	0.00	2.24	2.24
18.30	0.51	0.68	5.00	0.00	2.24	2.24
18.35	0.51	0.68	5.00	0.00	2.23	2.23
18.40	0.51	0.68	5.00	0.00	2.23	2.23
18.45	0.51	0.68	5.00	0.00	2.22	2.22
18.50	0.51	0.68	5.00	0.00	2.22	2.22
18.55	0.51	0.68	5.00	0.00	2.21	2.21
18.60	0.51	0.68	5.00	0.00	2.21	2.21
18.65	0.51	0.68	5.00	0.00	2.20	2.20
18.70	0.51	0.68	5.00	0.00	2.20	2.20

18.75	0.51	0.68	5.00	0.00	2.19	2.19
18.80	0.51	0.68	5.00	0.00	2.19	2.19
18.85	0.51	0.68	5.00	0.00	2.18	2.18
18.90	0.51	0.68	5.00	0.00	2.18	2.18
18.95	0.51	0.68	5.00	0.00	2.17	2.17
19.00	0.51	0.68	5.00	0.00	2.17	2.17
19.05	0.51	0.68	5.00	0.00	2.16	2.16
19.10	0.51	0.68	5.00	0.00	2.16	2.16
19.15	0.51	0.68	5.00	0.00	2.15	2.15
19.20	0.51	0.68	5.00	0.00	2.15	2.15
19.25	0.51	0.68	5.00	0.00	2.14	2.14
19.30	0.51	0.68	5.00	0.00	2.14	2.14
19.35	0.51	0.68	5.00	0.00	2.13	2.13
19.40	0.51	0.68	5.00	0.00	2.13	2.13
19.45	0.51	0.68	5.00	0.00	2.12	2.12
19.50	0.51	0.68	5.00	0.00	2.12	2.12
19.55	0.51	0.68	5.00	0.00	2.11	2.11
19.60	0.51	0.68	5.00	0.00	2.11	2.11
19.65	0.51	0.68	5.00	0.00	2.10	2.10
19.70	0.51	0.68	5.00	0.00	2.10	2.10
19.75	0.51	0.68	5.00	0.00	2.09	2.09
19.80	0.51	0.68	5.00	0.00	2.09	2.09
19.85	0.51	0.68	5.00	0.00	2.08	2.08
19.90	0.51	0.68	5.00	0.00	2.07	2.07
19.95	0.51	0.68	5.00	0.00	2.07	2.07
20.00	0.51	0.68	5.00	0.00	2.06	2.06
20.05	0.51	0.68	5.00	0.00	2.06	2.06
20.10	0.51	0.68	5.00	0.00	2.05	2.05
20.15	0.51	0.68	5.00	0.00	2.05	2.05
20.20	0.51	0.68	5.00	0.00	2.04	2.04
20.25	0.51	0.68	5.00	0.00	2.04	2.04
20.30	0.51	0.68	5.00	0.00	2.03	2.03
20.35	0.51	0.68	5.00	0.00	2.03	2.03
20.40	0.51	0.68	5.00	0.00	2.02	2.02
20.45	0.51	0.68	5.00	0.00	2.01	2.01
20.50	0.51	0.68	5.00	0.00	2.01	2.01
20.55	0.51	0.68	5.00	0.00	2.00	2.00
20.60	0.51	0.68	5.00	0.00	2.00	2.00
20.65	0.51	0.68	5.00	0.00	1.99	1.99
20.70	0.51	0.68	5.00	0.00	1.99	1.99
20.75	0.51	0.68	5.00	0.00	1.98	1.98
20.80	0.51	0.68	5.00	0.00	1.98	1.98
20.85	0.51	0.68	5.00	0.00	1.97	1.97
20.90	0.51	0.68	5.00	0.00	1.97	1.97
20.95	0.51	0.68	5.00	0.00	1.96	1.96
21.00	0.51	0.68	5.00	0.00	1.96	1.96
21.05	0.51	0.68	5.00	0.00	1.95	1.95
21.10	0.51	0.68	5.00	0.00	1.94	1.94
21.15	0.51	0.68	5.00	0.00	1.94	1.94
21.20	0.51	0.68	5.00	0.00	1.93	1.93

21.25	0.51	0.68	5.00	0.00	1.93	1.93
21.30	0.51	0.68	5.00	0.00	1.92	1.92
21.35	0.51	0.68	5.00	0.00	1.92	1.92
21.40	0.51	0.68	5.00	0.00	1.91	1.91
21.45	0.51	0.68	5.00	0.00	1.91	1.91
21.50	0.51	0.68	5.00	0.00	1.90	1.90
21.55	0.51	0.68	5.00	0.00	1.90	1.90
21.60	0.51	0.68	5.00	0.00	1.89	1.89
21.65	0.51	0.68	5.00	0.00	1.89	1.89
21.70	0.51	0.68	5.00	0.00	1.88	1.88
21.75	0.51	0.68	5.00	0.00	1.87	1.87
21.80	0.51	0.68	5.00	0.00	1.87	1.87
21.85	0.51	0.68	5.00	0.00	1.86	1.86
21.90	0.51	0.68	5.00	0.00	1.86	1.86
21.95	0.51	0.68	5.00	0.00	1.85	1.85
22.00	0.51	0.68	5.00	0.00	1.85	1.85
22.05	0.51	0.68	5.00	0.00	1.84	1.84
22.10	0.51	0.68	5.00	0.00	1.84	1.84
22.15	0.51	0.68	5.00	0.00	1.83	1.83
22.20	0.51	0.68	5.00	0.00	1.83	1.83
22.25	0.51	0.68	5.00	0.00	1.82	1.82
22.30	0.51	0.68	5.00	0.00	1.82	1.82
22.35	0.51	0.68	5.00	0.00	1.81	1.81
22.40	0.51	0.68	5.00	0.00	1.81	1.81
22.45	0.51	0.68	5.00	0.00	1.80	1.80
22.50	0.51	0.68	5.00	0.00	1.80	1.80
22.55	0.51	0.68	5.00	0.00	1.79	1.79
22.60	0.51	0.68	5.00	0.00	1.79	1.79
22.65	0.51	0.68	5.00	0.00	1.79	1.79
22.70	0.51	0.68	5.00	0.00	1.78	1.78
22.75	0.51	0.68	5.00	0.00	1.78	1.78
22.80	0.51	0.68	5.00	0.00	1.78	1.78
22.85	0.51	0.68	5.00	0.00	1.78	1.78
22.90	0.51	0.68	5.00	0.00	1.77	1.77
22.95	0.51	0.68	5.00	0.00	1.77	1.77
23.00	0.51	0.68	5.00	0.00	1.77	1.77
23.05	0.51	0.68	5.00	0.00	1.77	1.77
23.10	0.51	0.68	5.00	0.00	1.76	1.76
23.15	0.51	0.68	5.00	0.00	1.76	1.76
23.20	0.51	0.68	5.00	0.00	1.76	1.76
23.25	0.51	0.68	5.00	0.00	1.75	1.75
23.30	0.51	0.68	5.00	0.00	1.75	1.75
23.35	0.51	0.68	5.00	0.00	1.75	1.75
23.40	0.51	0.68	5.00	0.00	1.75	1.75
23.45	0.51	0.68	5.00	0.00	1.74	1.74
23.50	0.51	0.68	5.00	0.00	1.74	1.74
23.55	0.51	0.68	5.00	0.00	1.74	1.74
23.60	0.51	0.68	5.00	0.00	1.74	1.74
23.65	0.51	0.68	5.00	0.00	1.73	1.73
23.70	0.51	0.68	5.00	0.00	1.73	1.73

23.75	0.51	0.68	5.00	0.00	1.73	1.73
23.80	0.51	0.68	5.00	0.00	1.73	1.73
23.85	0.51	0.68	5.00	0.00	1.72	1.72
23.90	0.51	0.68	5.00	0.00	1.72	1.72
23.95	0.51	0.68	5.00	0.00	1.72	1.72
24.00	0.51	0.67	5.00	0.00	1.71	1.71
24.05	0.51	0.67	5.00	0.00	1.71	1.71
24.10	0.51	0.67	5.00	0.00	1.71	1.71
24.15	0.51	0.67	5.00	0.00	1.71	1.71
24.20	0.51	0.67	5.00	0.00	1.70	1.70
24.25	0.51	0.67	5.00	0.00	1.70	1.70
24.30	0.51	0.67	5.00	0.00	1.70	1.70
24.35	0.51	0.67	5.00	0.00	1.70	1.70
24.40	0.51	0.67	5.00	0.00	1.69	1.69
24.45	0.51	0.67	5.00	0.00	1.69	1.69
24.50	0.51	0.67	5.00	0.00	1.69	1.69
24.55	0.51	0.67	5.00	0.00	1.68	1.68
24.60	0.51	0.67	5.00	0.00	1.68	1.68
24.65	0.51	0.67	5.00	0.00	1.68	1.68
24.70	0.51	0.67	5.00	0.00	1.68	1.68
24.75	0.51	0.67	5.00	0.00	1.67	1.67
24.80	0.51	0.67	5.00	0.00	1.67	1.67
24.85	0.51	0.67	5.00	0.00	1.67	1.67
24.90	0.51	0.67	5.00	0.00	1.67	1.67
24.95	0.51	0.67	5.00	0.00	1.66	1.66
25.00	0.51	0.67	5.00	0.00	1.66	1.66
25.05	0.51	0.67	5.00	0.00	1.66	1.66
25.10	0.51	0.67	5.00	0.00	1.65	1.65
25.15	0.51	0.67	5.00	0.00	1.65	1.65
25.20	0.51	0.67	5.00	0.00	1.65	1.65
25.25	0.51	0.67	5.00	0.00	1.65	1.65
25.30	0.51	0.67	5.00	0.00	1.64	1.64
25.35	0.51	0.67	5.00	0.00	1.64	1.64
25.40	0.51	0.67	5.00	0.00	1.64	1.64
25.45	0.51	0.67	5.00	0.00	1.63	1.63
25.50	0.51	0.67	5.00	0.00	1.63	1.63
25.55	0.51	0.67	5.00	0.00	1.63	1.63
25.60	0.51	0.67	5.00	0.00	1.62	1.62
25.65	0.51	0.67	5.00	0.00	1.62	1.62
25.70	0.51	0.67	5.00	0.00	1.62	1.62
25.75	0.51	0.67	5.00	0.00	1.61	1.61
25.80	0.51	0.67	5.00	0.00	1.61	1.61
25.85	0.51	0.67	5.00	0.00	1.61	1.61
25.90	0.51	0.67	5.00	0.00	1.60	1.60
25.95	0.51	0.67	5.00	0.00	1.60	1.60
26.00	0.51	0.67	5.00	0.00	1.60	1.60
26.05	0.51	0.67	5.00	0.00	1.59	1.59
26.10	0.51	0.67	5.00	0.00	1.59	1.59
26.15	0.51	0.67	5.00	0.00	1.59	1.59
26.20	0.51	0.67	5.00	0.00	1.58	1.58

26.25	0.51	0.67	5.00	0.00	1.58	1.58
26.30	0.51	0.67	5.00	0.00	1.57	1.57
26.35	0.51	0.67	5.00	0.00	1.57	1.57
26.40	0.51	0.67	5.00	0.00	1.57	1.57
26.45	0.51	0.67	5.00	0.00	1.56	1.56
26.50	0.51	0.67	5.00	0.00	1.56	1.56
26.55	0.51	0.67	5.00	0.00	1.55	1.55
26.60	0.51	0.67	5.00	0.00	1.55	1.55
26.65	0.51	0.67	5.00	0.00	1.54	1.54
26.70	0.51	0.67	5.00	0.00	1.54	1.54
26.75	0.51	0.67	5.00	0.00	1.54	1.54
26.80	0.51	0.67	5.00	0.00	1.53	1.53
26.85	0.51	0.67	5.00	0.00	1.53	1.53
26.90	0.51	0.67	5.00	0.00	1.52	1.52
26.95	0.51	0.67	5.00	0.00	1.52	1.52
27.00	0.51	0.67	5.00	0.00	1.51	1.51
27.05	0.51	0.67	5.00	0.00	1.51	1.51
27.10	0.51	0.67	5.00	0.00	1.50	1.50
27.15	0.51	0.67	5.00	0.00	1.50	1.50
27.20	0.51	0.67	5.00	0.00	1.49	1.49
27.25	0.51	0.67	5.00	0.00	1.49	1.49
27.30	0.51	0.67	5.00	0.00	1.48	1.48
27.35	0.51	0.67	5.00	0.00	1.48	1.48
27.40	0.51	0.67	5.00	0.00	1.47	1.47
27.45	0.51	0.67	5.00	0.00	1.47	1.47
27.50	0.51	0.67	5.00	0.00	1.46	1.46
27.55	0.51	0.67	5.00	0.00	1.46	1.46
27.60	0.51	0.67	5.00	0.00	1.45	1.45
27.65	0.51	0.67	5.00	0.00	1.44	1.44
27.70	0.51	0.67	5.00	0.00	1.44	1.44
27.75	0.51	0.67	5.00	0.00	1.43	1.43
27.80	0.51	0.67	5.00	0.00	1.43	1.43
27.85	0.51	0.67	5.00	0.00	1.42	1.42
27.90	0.51	0.67	5.00	0.00	1.41	1.41
27.95	0.51	0.67	5.00	0.00	1.41	1.41
28.00	0.51	0.67	5.00	0.00	1.40	1.40
28.05	0.51	0.67	5.00	0.00	1.40	1.40
28.10	0.51	0.67	5.00	0.00	1.39	1.39
28.15	0.51	0.67	5.00	0.00	1.39	1.39
28.20	0.51	0.67	5.00	0.00	1.38	1.38
28.25	0.51	0.67	5.00	0.00	1.38	1.38
28.30	0.51	0.67	5.00	0.00	1.37	1.37
28.35	0.51	0.67	5.00	0.00	1.36	1.36
28.40	0.51	0.67	5.00	0.00	1.36	1.36
28.45	0.51	0.67	5.00	0.00	1.35	1.35
28.50	0.51	0.67	5.00	0.00	1.35	1.35
28.55	0.51	0.67	5.00	0.00	1.34	1.34
28.60	0.51	0.67	5.00	0.00	1.33	1.33
28.65	0.51	0.67	5.00	0.00	1.33	1.33
28.70	0.51	0.67	5.00	0.00	1.32	1.32

28.75	0.51	0.67	5.00	0.00	1.31	1.31
28.80	0.51	0.67	5.00	0.00	1.31	1.31
28.85	0.51	0.67	5.00	0.00	1.30	1.30
28.90	0.51	0.67	5.00	0.00	1.30	1.30
28.95	0.51	0.67	5.00	0.00	1.29	1.29
29.00	0.51	0.67	5.00	0.00	1.28	1.28
29.05	0.51	0.67	5.00	0.00	1.28	1.28
29.10	0.51	0.67	5.00	0.00	1.27	1.27
29.15	0.51	0.67	5.00	0.00	1.26	1.26
29.20	0.51	0.67	5.00	0.00	1.26	1.26
29.25	0.51	0.67	5.00	0.00	1.25	1.25
29.30	0.51	0.67	5.00	0.00	1.24	1.24
29.35	0.51	0.67	5.00	0.00	1.24	1.24
29.40	0.51	0.67	5.00	0.00	1.23	1.23
29.45	0.51	0.67	5.00	0.00	1.22	1.22
29.50	0.51	0.67	5.00	0.00	1.22	1.22
29.55	0.51	0.67	5.00	0.00	1.21	1.21
29.60	0.51	0.67	5.00	0.00	1.20	1.20
29.65	0.51	0.67	5.00	0.00	1.20	1.20
29.70	0.51	0.67	5.00	0.00	1.19	1.19
29.75	0.51	0.67	5.00	0.00	1.18	1.18
29.80	0.51	0.67	5.00	0.00	1.17	1.17
29.85	0.51	0.67	5.00	0.00	1.17	1.17
29.90	0.51	0.67	5.00	0.00	1.16	1.16
29.95	0.51	0.67	5.00	0.00	1.15	1.15
30.00	0.48	0.66	5.00	0.00	1.15	1.15
30.05	0.51	0.66	5.00	0.00	1.14	1.14
30.10	0.51	0.66	5.00	0.00	1.13	1.13
30.15	0.51	0.66	5.00	0.00	1.13	1.13
30.20	0.51	0.66	5.00	0.00	1.12	1.12
30.25	0.51	0.66	5.00	0.00	1.11	1.11
30.30	0.51	0.66	5.00	0.00	1.11	1.11
30.35	0.51	0.66	5.00	0.00	1.10	1.10
30.40	0.51	0.66	5.00	0.00	1.09	1.09
30.45	0.51	0.66	5.00	0.00	1.09	1.09
30.50	0.51	0.66	5.00	0.00	1.08	1.08
30.55	0.51	0.66	5.00	0.00	1.08	1.08
30.60	0.51	0.66	5.00	0.00	1.07	1.07
30.65	0.51	0.66	5.00	0.00	1.07	1.07
30.70	0.51	0.66	5.00	0.00	1.06	1.06
30.75	0.51	0.66	5.00	0.00	1.06	1.06
30.80	0.51	0.66	5.00	0.00	1.05	1.05
30.85	0.51	0.66	5.00	0.00	1.05	1.05
30.90	0.51	0.66	5.00	0.00	1.04	1.04
30.95	0.51	0.66	5.00	0.00	1.04	1.04
31.00	0.51	0.66	5.00	0.00	1.04	1.04
31.05	0.51	0.66	5.00	0.00	1.03	1.03
31.10	0.51	0.66	5.00	0.00	1.03	1.03
31.15	0.51	0.66	5.00	0.00	1.03	1.03
31.20	0.51	0.66	5.00	0.00	1.02	1.02

31.25	0.51	0.66	5.00	0.00	1.02	1.02
31.30	0.51	0.66	5.00	0.00	1.02	1.02
31.35	0.51	0.66	5.00	0.00	1.02	1.02
31.40	0.51	0.66	5.00	0.00	1.01	1.01
31.45	0.51	0.66	5.00	0.00	1.01	1.01
31.50	0.51	0.66	5.00	0.00	1.01	1.01
31.55	0.51	0.66	5.00	0.00	1.00	1.00
31.60	0.51	0.66	5.00	0.00	1.00	1.00
31.65	0.51	0.66	5.00	0.00	1.00	1.00
31.70	0.51	0.65	5.00	0.00	1.00	1.00
31.75	0.51	0.65	5.00	0.00	0.99	0.99
31.80	0.51	0.65	5.00	0.00	0.99	0.99
31.85	0.51	0.65	5.00	0.00	0.99	0.99
31.90	0.51	0.65	5.00	0.00	0.99	0.99
31.95	0.51	0.65	5.00	0.00	0.98	0.98
32.00	0.51	0.65	5.00	0.00	0.98	0.98
32.05	0.51	0.65	5.00	0.00	0.98	0.98
32.10	0.51	0.65	5.00	0.00	0.98	0.98
32.15	0.51	0.65	5.00	0.00	0.97	0.97
32.20	0.51	0.65	5.00	0.00	0.97	0.97
32.25	0.51	0.65	5.00	0.00	0.97	0.97
32.30	0.51	0.65	5.00	0.00	0.97	0.97
32.35	0.51	0.65	5.00	0.00	0.97	0.97
32.40	0.51	0.65	5.00	0.00	0.96	0.96
32.45	0.51	0.65	5.00	0.00	0.96	0.96
32.50	0.51	0.65	5.00	0.00	0.96	0.96
32.55	0.51	0.65	5.00	0.00	0.96	0.96
32.60	0.51	0.65	5.00	0.00	0.96	0.96
32.65	0.51	0.65	5.00	0.00	0.95	0.95
32.70	0.51	0.65	5.00	0.00	0.95	0.95
32.75	0.51	0.65	5.00	0.00	0.95	0.95
32.80	0.51	0.65	5.00	0.00	0.95	0.95
32.85	0.51	0.65	5.00	0.00	0.95	0.95
32.90	0.51	0.65	5.00	0.00	0.94	0.94
32.95	0.51	0.65	5.00	0.00	0.94	0.94
33.00	0.51	0.65	5.00	0.00	0.94	0.94
33.05	0.51	0.65	5.00	0.00	0.94	0.94
33.10	0.51	0.65	5.00	0.00	0.94	0.94
33.15	0.51	0.65	5.00	0.00	0.93	0.93
33.20	0.51	0.65	5.00	0.00	0.93	0.93
33.25	0.50	0.65	5.00	0.00	0.93	0.93
33.30	0.50	0.65	5.00	0.00	0.93	0.93
33.35	0.50	0.65	5.00	0.00	0.93	0.93
33.40	0.50	0.65	5.00	0.00	0.93	0.93
33.45	0.50	0.64	5.00	0.00	0.92	0.92
33.50	0.50	0.64	5.00	0.00	0.92	0.92
33.55	0.50	0.64	5.00	0.00	0.92	0.92
33.60	0.50	0.64	5.00	0.00	0.92	0.92
33.65	0.50	0.64	5.00	0.00	0.92	0.92
33.70	0.50	0.64	5.00	0.00	0.92	0.92

33.75	0.50	0.64	5.00	0.00	0.91	0.91
33.80	0.50	0.64	5.00	0.00	0.91	0.91
33.85	0.50	0.64	5.00	0.00	0.91	0.91
33.90	0.50	0.64	5.00	0.00	0.91	0.91
33.95	0.50	0.64	5.00	0.00	0.91	0.91
34.00	0.50	0.64	5.00	0.00	0.91	0.91
34.05	0.50	0.64	5.00	0.00	0.90	0.90
34.10	0.50	0.64	5.00	0.00	0.90	0.90
34.15	0.50	0.64	5.00	0.00	0.90	0.90
34.20	0.50	0.64	5.00	0.00	0.90	0.90
34.25	0.50	0.64	5.00	0.00	0.90	0.90
34.30	0.50	0.64	5.00	0.00	0.90	0.90
34.35	0.50	0.64	5.00	0.00	0.90	0.90
34.40	0.50	0.64	5.00	0.00	0.89	0.89
34.45	0.50	0.64	5.00	0.00	0.89	0.89
34.50	0.50	0.64	5.00	0.00	0.89	0.89
34.55	0.50	0.64	5.00	0.00	0.89	0.89
34.60	0.50	0.64	5.00	0.00	0.89	0.89
34.65	0.50	0.64	5.00	0.00	0.89	0.89
34.70	0.50	0.64	5.00	0.00	0.89	0.89
34.75	0.50	0.64	5.00	0.00	0.88	0.88
34.80	0.50	0.64	5.00	0.00	0.88	0.88
34.85	0.50	0.64	5.00	0.00	0.88	0.88
34.90	0.50	0.64	5.00	0.00	0.88	0.88
34.95	0.50	0.64	5.00	0.00	0.88	0.88
35.00	0.50	0.64	5.00	0.00	0.88	0.88
35.05	0.50	0.64	5.00	0.00	0.88	0.88
35.10	0.50	0.64	5.00	0.00	0.87	0.87
35.15	0.50	0.63	5.00	0.00	0.87	0.87
35.20	0.50	0.63	5.00	0.00	0.87	0.87
35.25	0.50	0.63	5.00	0.00	0.87	0.87
35.30	0.50	0.63	5.00	0.00	0.87	0.87
35.35	0.50	0.63	5.00	0.00	0.87	0.87
35.40	0.50	0.63	5.00	0.00	0.87	0.87
35.45	0.50	0.63	5.00	0.00	0.86	0.86
35.50	0.50	0.63	5.00	0.00	0.86	0.86
35.55	0.50	0.63	5.00	0.00	0.86	0.86
35.60	0.50	0.63	5.00	0.00	0.86	0.86
35.65	0.50	0.63	5.00	0.00	0.86	0.86
35.70	0.50	0.63	5.00	0.00	0.86	0.86
35.75	0.50	0.63	5.00	0.00	0.86	0.86
35.80	0.50	0.63	5.00	0.00	0.85	0.85
35.85	0.50	0.63	5.00	0.00	0.85	0.85
35.90	0.50	0.63	5.00	0.00	0.85	0.85
35.95	0.50	0.63	5.00	0.00	0.85	0.85
36.00	0.50	0.63	5.00	0.00	0.85	0.85
36.05	0.50	0.63	5.00	0.00	0.85	0.85
36.10	0.50	0.63	5.00	0.00	0.84	0.84
36.15	0.50	0.63	5.00	0.00	0.84	0.84
36.20	0.50	0.63	5.00	0.00	0.84	0.84

36.25	0.50	0.63	5.00	0.00	0.84	0.84
36.30	0.50	0.63	5.00	0.00	0.84	0.84
36.35	0.50	0.63	5.00	0.00	0.84	0.84
36.40	0.50	0.63	5.00	0.00	0.83	0.83
36.45	0.50	0.63	5.00	0.00	0.83	0.83
36.50	0.50	0.63	5.00	0.00	0.83	0.83
36.55	0.50	0.63	5.00	0.00	0.83	0.83
36.60	0.50	0.63	5.00	0.00	0.83	0.83
36.65	0.50	0.63	5.00	0.00	0.83	0.83
36.70	0.50	0.63	5.00	0.00	0.82	0.82
36.75	0.50	0.63	5.00	0.00	0.82	0.82
36.80	0.50	0.63	5.00	0.00	0.82	0.82
36.85	0.50	0.62	5.00	0.00	0.82	0.82
36.90	0.50	0.62	5.00	0.00	0.82	0.82
36.95	0.50	0.62	5.00	0.00	0.81	0.81
37.00	0.50	0.62	5.00	0.00	0.81	0.81
37.05	0.50	0.62	5.00	0.00	0.81	0.81
37.10	0.49	0.62	5.00	0.00	0.81	0.81
37.15	0.49	0.62	5.00	0.00	0.81	0.81
37.20	0.49	0.62	5.00	0.00	0.80	0.80
37.25	0.49	0.62	5.00	0.00	0.80	0.80
37.30	0.49	0.62	5.00	0.00	0.80	0.80
37.35	0.49	0.62	5.00	0.00	0.80	0.80
37.40	0.49	0.62	5.00	0.00	0.80	0.80
37.45	0.49	0.62	5.00	0.00	0.79	0.79
37.50	0.49	0.62	5.00	0.00	0.79	0.79
37.55	0.49	0.62	5.00	0.00	0.79	0.79
37.60	0.49	0.62	5.00	0.00	0.79	0.79
37.65	0.49	0.62	5.00	0.00	0.78	0.78
37.70	0.49	0.62	5.00	0.00	0.78	0.78
37.75	0.49	0.62	5.00	0.00	0.78	0.78
37.80	0.49	0.62	5.00	0.00	0.78	0.78
37.85	0.49	0.62	5.00	0.00	0.77	0.77
37.90	0.49	0.62	5.00	0.00	0.77	0.77
37.95	0.49	0.62	5.00	0.00	0.77	0.77
38.00	0.49	0.62	5.00	0.00	0.77	0.77
38.05	0.49	0.62	5.00	0.00	0.76	0.76
38.10	0.49	0.62	5.00	0.00	0.76	0.76
38.15	0.49	0.62	5.00	0.00	0.76	0.76
38.20	0.49	0.62	5.00	0.00	0.76	0.76
38.25	0.49	0.62	5.00	0.00	0.75	0.75
38.30	0.49	0.62	5.00	0.00	0.75	0.75
38.35	0.49	0.62	5.00	0.00	0.75	0.75
38.40	0.49	0.62	5.00	0.00	0.75	0.75
38.45	0.49	0.62	5.00	0.00	0.74	0.74
38.50	0.49	0.62	5.00	0.00	0.74	0.74
38.55	0.49	0.62	5.00	0.00	0.74	0.74
38.60	0.49	0.61	5.00	0.00	0.73	0.73
38.65	0.49	0.61	5.00	0.00	0.73	0.73
38.70	0.49	0.61	5.00	0.00	0.73	0.73

38.75	0.49	0.61	5.00	0.00	0.72	0.72
38.80	0.49	0.61	5.00	0.00	0.72	0.72
38.85	0.49	0.61	5.00	0.00	0.72	0.72
38.90	0.49	0.61	5.00	0.00	0.71	0.71
38.95	0.49	0.61	5.00	0.00	0.71	0.71
39.00	0.49	0.61	5.00	0.00	0.71	0.71
39.05	0.49	0.61	5.00	0.00	0.70	0.70
39.10	0.49	0.61	5.00	0.00	0.70	0.70
39.15	0.49	0.61	5.00	0.00	0.70	0.70
39.20	0.49	0.61	5.00	0.00	0.69	0.69
39.25	0.49	0.61	5.00	0.00	0.69	0.69
39.30	0.49	0.61	5.00	0.00	0.69	0.69
39.35	0.49	0.61	5.00	0.00	0.68	0.68
39.40	0.49	0.61	5.00	0.00	0.68	0.68
39.45	0.49	0.61	5.00	0.00	0.67	0.67
39.50	0.49	0.61	5.00	0.00	0.67	0.67
39.55	0.49	0.61	5.00	0.00	0.67	0.67
39.60	0.49	0.61	5.00	0.00	0.66	0.66
39.65	0.49	0.61	5.00	0.00	0.66	0.66
39.70	0.49	0.61	5.00	0.00	0.65	0.65
39.75	0.49	0.61	5.00	0.00	0.65	0.65
39.80	0.49	0.61	5.00	0.00	0.64	0.64
39.85	0.49	0.61	5.00	0.00	0.64	0.64
39.90	0.49	0.61	5.00	0.00	0.63	0.63
39.95	0.49	0.61	5.00	0.00	0.63	0.63
40.00	0.49	0.61	5.00	0.00	0.63	0.63
40.05	0.49	0.61	5.00	0.00	0.63	0.63
40.10	0.49	0.61	5.00	0.00	0.63	0.63
40.15	0.49	0.61	5.00	0.00	0.63	0.63
40.20	0.49	0.61	5.00	0.00	0.62	0.62
40.25	0.49	0.61	5.00	0.00	0.61	0.61
40.30	0.49	0.60	5.00	0.00	0.61	0.61
40.35	0.49	0.60	5.00	0.00	0.60	0.60
40.40	0.49	0.60	5.00	0.00	0.60	0.60
40.45	0.49	0.60	5.00	0.00	0.59	0.59
40.50	0.49	0.60	5.00	0.00	0.59	0.59
40.55	0.49	0.60	5.00	0.00	0.58	0.58
40.60	0.49	0.60	5.00	0.00	0.58	0.58
40.65	0.49	0.60	5.00	0.00	0.58	0.58
40.70	0.49	0.60	5.00	0.00	0.57	0.57
40.75	0.49	0.60	5.00	0.00	0.57	0.57
40.80	0.49	0.60	5.00	0.00	0.56	0.56
40.85	0.49	0.60	5.00	0.00	0.56	0.56
40.90	0.49	0.60	5.00	0.00	0.55	0.55
40.95	0.49	0.60	5.00	0.00	0.55	0.55
41.00	0.49	0.60	5.00	0.00	0.54	0.54
41.05	0.49	0.60	5.00	0.00	0.54	0.54
41.10	0.49	0.60	5.00	0.00	0.53	0.53
41.15	0.48	0.60	5.00	0.00	0.53	0.53
41.20	0.48	0.60	5.00	0.00	0.52	0.52

41.25	0.48	0.60	5.00	0.00	0.52	0.52
41.30	0.48	0.60	5.00	0.00	0.51	0.51
41.35	0.48	0.60	5.00	0.00	0.51	0.51
41.40	0.48	0.60	5.00	0.00	0.50	0.50
41.45	0.48	0.60	5.00	0.00	0.50	0.50
41.50	0.48	0.60	5.00	0.00	0.49	0.49
41.55	0.48	0.60	5.00	0.00	0.49	0.49
41.60	0.48	0.60	5.00	0.00	0.48	0.48
41.65	0.48	0.60	5.00	0.00	0.48	0.48
41.70	0.48	0.60	5.00	0.00	0.47	0.47
41.75	0.48	0.60	5.00	0.00	0.47	0.47
41.80	0.48	0.60	5.00	0.00	0.46	0.46
41.85	0.48	0.60	5.00	0.00	0.46	0.46
41.90	0.48	0.60	5.00	0.00	0.45	0.45
41.95	0.48	0.60	5.00	0.00	0.45	0.45
42.00	0.48	0.60	5.00	0.00	0.45	0.45
42.05	0.48	0.59	5.00	0.00	0.44	0.44
42.10	0.48	0.59	5.00	0.00	0.44	0.44
42.15	0.48	0.59	5.00	0.00	0.43	0.43
42.20	0.48	0.59	5.00	0.00	0.43	0.43
42.25	0.48	0.59	5.00	0.00	0.42	0.42
42.30	0.48	0.59	5.00	0.00	0.42	0.42
42.35	0.48	0.59	5.00	0.00	0.41	0.41
42.40	0.48	0.59	5.00	0.00	0.41	0.41
42.45	0.48	0.59	5.00	0.00	0.40	0.40
42.50	0.48	0.59	5.00	0.00	0.40	0.40
42.55	0.48	0.59	5.00	0.00	0.39	0.39
42.60	0.48	0.59	5.00	0.00	0.39	0.39
42.65	0.48	0.59	5.00	0.00	0.39	0.39
42.70	0.48	0.59	5.00	0.00	0.38	0.38
42.75	0.48	0.59	5.00	0.00	0.38	0.38
42.80	0.48	0.59	5.00	0.00	0.37	0.37
42.85	0.48	0.59	5.00	0.00	0.37	0.37
42.90	0.48	0.59	5.00	0.00	0.36	0.36
42.95	0.48	0.59	5.00	0.00	0.36	0.36
43.00	0.48	0.59	5.00	0.00	0.35	0.35
43.05	0.48	0.59	5.00	0.00	0.35	0.35
43.10	0.48	0.59	5.00	0.00	0.34	0.34
43.15	0.48	0.59	5.00	0.00	0.34	0.34
43.20	0.48	0.59	5.00	0.00	0.34	0.34
43.25	0.48	0.59	5.00	0.00	0.33	0.33
43.30	0.48	0.59	5.00	0.00	0.33	0.33
43.35	0.48	0.59	5.00	0.00	0.32	0.32
43.40	0.48	0.59	5.00	0.00	0.32	0.32
43.45	0.48	0.59	5.00	0.00	0.31	0.31
43.50	0.48	0.59	5.00	0.00	0.31	0.31
43.55	0.48	0.59	5.00	0.00	0.30	0.30
43.60	0.48	0.59	5.00	0.00	0.30	0.30
43.65	0.48	0.59	5.00	0.00	0.30	0.30
43.70	0.48	0.59	5.00	0.00	0.29	0.29

43.75	0.48	0.58	5.00	0.00	0.29	0.29
43.80	0.48	0.58	5.00	0.00	0.28	0.28
43.85	0.48	0.58	5.00	0.00	0.28	0.28
43.90	0.48	0.58	5.00	0.00	0.27	0.27
43.95	0.48	0.58	5.00	0.00	0.27	0.27
44.00	0.48	0.58	5.00	0.00	0.27	0.27
44.05	0.48	0.58	5.00	0.00	0.26	0.26
44.10	0.48	0.58	5.00	0.00	0.26	0.26
44.15	0.48	0.58	5.00	0.00	0.25	0.25
44.20	0.48	0.58	5.00	0.00	0.25	0.25
44.25	0.48	0.58	5.00	0.00	0.24	0.24
44.30	0.48	0.58	5.00	0.00	0.24	0.24
44.35	0.48	0.58	5.00	0.00	0.23	0.23
44.40	0.48	0.58	5.00	0.00	0.23	0.23
44.45	0.48	0.58	5.00	0.00	0.23	0.23
44.50	0.48	0.58	5.00	0.00	0.22	0.22
44.55	0.48	0.58	5.00	0.00	0.22	0.22
44.60	0.48	0.58	5.00	0.00	0.21	0.21
44.65	0.48	0.58	5.00	0.00	0.21	0.21
44.70	0.48	0.58	5.00	0.00	0.20	0.20
44.75	0.48	0.58	5.00	0.00	0.20	0.20
44.80	0.48	0.58	5.00	0.00	0.20	0.20
44.85	0.48	0.58	5.00	0.00	0.19	0.19
44.90	0.48	0.58	5.00	0.00	0.19	0.19
44.95	0.48	0.58	5.00	0.00	0.18	0.18
45.00	0.48	0.58	5.00	0.00	0.18	0.18
45.05	0.48	0.58	5.00	0.00	0.17	0.17
45.10	0.47	0.58	5.00	0.00	0.17	0.17
45.15	0.47	0.58	5.00	0.00	0.17	0.17
45.20	0.47	0.58	5.00	0.00	0.16	0.16
45.25	0.47	0.58	5.00	0.00	0.16	0.16
45.30	0.47	0.58	5.00	0.00	0.15	0.15
45.35	0.47	0.58	5.00	0.00	0.15	0.15
45.40	0.47	0.58	5.00	0.00	0.15	0.15
45.45	0.47	0.57	5.00	0.00	0.15	0.15
45.50	0.47	0.57	5.00	0.00	0.14	0.14
45.55	0.47	0.57	5.00	0.00	0.14	0.14
45.60	0.47	0.57	5.00	0.00	0.14	0.14
45.65	0.47	0.57	5.00	0.00	0.14	0.14
45.70	0.47	0.57	5.00	0.00	0.14	0.14
45.75	0.47	0.57	5.00	0.00	0.14	0.14
45.80	0.47	0.57	5.00	0.00	0.13	0.13
45.85	0.47	0.57	5.00	0.00	0.13	0.13
45.90	0.47	0.57	5.00	0.00	0.13	0.13
45.95	0.47	0.57	5.00	0.00	0.13	0.13
46.00	0.47	0.57	5.00	0.00	0.13	0.13
46.05	0.47	0.57	5.00	0.00	0.13	0.13
46.10	0.47	0.57	5.00	0.00	0.13	0.13
46.15	0.47	0.57	5.00	0.00	0.12	0.12
46.20	0.47	0.57	5.00	0.00	0.12	0.12

46.25	0.47	0.57	5.00	0.00	0.12	0.12
46.30	0.47	0.57	5.00	0.00	0.12	0.12
46.35	0.47	0.57	5.00	0.00	0.12	0.12
46.40	0.47	0.57	5.00	0.00	0.12	0.12
46.45	0.47	0.57	5.00	0.00	0.11	0.11
46.50	0.47	0.57	5.00	0.00	0.11	0.11
46.55	0.47	0.57	5.00	0.00	0.11	0.11
46.60	0.47	0.57	5.00	0.00	0.11	0.11
46.65	0.47	0.57	5.00	0.00	0.11	0.11
46.70	0.47	0.57	5.00	0.00	0.11	0.11
46.75	0.47	0.57	5.00	0.00	0.10	0.10
46.80	0.47	0.57	5.00	0.00	0.10	0.10
46.85	0.47	0.57	5.00	0.00	0.10	0.10
46.90	0.47	0.57	5.00	0.00	0.10	0.10
46.95	0.47	0.57	5.00	0.00	0.10	0.10
47.00	0.47	0.57	5.00	0.00	0.10	0.10
47.05	0.47	0.57	5.00	0.00	0.09	0.09
47.10	0.47	0.57	5.00	0.00	0.09	0.09
47.15	0.47	0.57	5.00	0.00	0.09	0.09
47.20	0.47	0.56	5.00	0.00	0.09	0.09
47.25	0.47	0.56	5.00	0.00	0.09	0.09
47.30	0.47	0.56	5.00	0.00	0.09	0.09
47.35	0.47	0.56	5.00	0.00	0.09	0.09
47.40	0.47	0.56	5.00	0.00	0.08	0.08
47.45	0.47	0.56	5.00	0.00	0.08	0.08
47.50	0.47	0.56	5.00	0.00	0.08	0.08
47.55	0.47	0.56	5.00	0.00	0.08	0.08
47.60	0.47	0.56	5.00	0.00	0.08	0.08
47.65	0.47	0.56	5.00	0.00	0.08	0.08
47.70	0.47	0.56	5.00	0.00	0.07	0.07
47.75	0.47	0.56	5.00	0.00	0.07	0.07
47.80	0.47	0.56	5.00	0.00	0.07	0.07
47.85	0.47	0.56	5.00	0.00	0.07	0.07
47.90	0.47	0.56	5.00	0.00	0.07	0.07
47.95	0.47	0.56	5.00	0.00	0.07	0.07
48.00	0.47	0.56	5.00	0.00	0.06	0.06
48.05	0.47	0.56	5.00	0.00	0.06	0.06
48.10	0.47	0.56	5.00	0.00	0.06	0.06
48.15	0.47	0.56	5.00	0.00	0.06	0.06
48.20	0.47	0.56	5.00	0.00	0.06	0.06
48.25	0.47	0.56	5.00	0.00	0.06	0.06
48.30	0.47	0.56	5.00	0.00	0.05	0.05
48.35	0.47	0.56	5.00	0.00	0.05	0.05
48.40	0.47	0.56	5.00	0.00	0.05	0.05
48.45	0.47	0.56	5.00	0.00	0.05	0.05
48.50	0.47	0.56	5.00	0.00	0.05	0.05
48.55	0.47	0.56	5.00	0.00	0.05	0.05
48.60	0.47	0.56	5.00	0.00	0.04	0.04
48.65	0.47	0.56	5.00	0.00	0.04	0.04
48.70	0.47	0.56	5.00	0.00	0.04	0.04

48.75	0.47	0.56	5.00	0.00	0.04	0.04
48.80	0.47	0.56	5.00	0.00	0.04	0.04
48.85	0.47	0.56	5.00	0.00	0.04	0.04
48.90	0.47	0.55	5.00	0.00	0.03	0.03
48.95	0.47	0.55	5.00	0.00	0.03	0.03
49.00	0.47	0.55	5.00	0.00	0.03	0.03
49.05	0.46	0.55	5.00	0.00	0.03	0.03
49.10	0.46	0.55	5.00	0.00	0.03	0.03
49.15	0.46	0.55	5.00	0.00	0.03	0.03
49.20	0.46	0.55	5.00	0.00	0.02	0.02
49.25	0.46	0.55	5.00	0.00	0.02	0.02
49.30	0.46	0.55	5.00	0.00	0.02	0.02
49.35	0.46	0.55	5.00	0.00	0.02	0.02
49.40	0.46	0.55	5.00	0.00	0.02	0.02
49.45	0.46	0.55	5.00	0.00	0.02	0.02
49.50	0.46	0.55	5.00	0.00	0.01	0.01
49.55	0.46	0.55	5.00	0.00	0.01	0.01
49.60	0.46	0.55	5.00	0.00	0.01	0.01
49.65	0.46	0.55	5.00	0.00	0.01	0.01
49.70	0.46	0.55	5.00	0.00	0.01	0.01
49.75	0.46	0.55	5.00	0.00	0.01	0.01
49.80	0.46	0.55	5.00	0.00	0.00	0.00
49.85	0.46	0.55	5.00	0.00	0.00	0.00
49.90	0.46	0.55	5.00	0.00	0.00	0.00
49.95	0.46	0.55	5.00	0.00	0.00	0.00
50.00	0.46	0.55	5.00	0.00	0.00	0.00
50.05	2.00	0.55	5.00	0.00	0.00	0.00
50.10	2.00	0.55	5.00	0.00	0.00	0.00
50.15	2.00	0.55	5.00	0.00	0.00	0.00
50.20	2.00	0.55	5.00	0.00	0.00	0.00
50.25	2.00	0.55	5.00	0.00	0.00	0.00
50.30	2.00	0.55	5.00	0.00	0.00	0.00
50.35	2.00	0.55	5.00	0.00	0.00	0.00
50.40	2.00	0.55	5.00	0.00	0.00	0.00
50.45	2.00	0.55	5.00	0.00	0.00	0.00
50.50	2.00	0.55	5.00	0.00	0.00	0.00
50.55	2.00	0.55	5.00	0.00	0.00	0.00
50.60	2.00	0.54	5.00	0.00	0.00	0.00
50.65	2.00	0.54	5.00	0.00	0.00	0.00
50.70	2.00	0.54	5.00	0.00	0.00	0.00
50.75	2.00	0.54	5.00	0.00	0.00	0.00
50.80	2.00	0.54	5.00	0.00	0.00	0.00
50.85	2.00	0.54	5.00	0.00	0.00	0.00
50.90	2.00	0.54	5.00	0.00	0.00	0.00
50.95	2.00	0.54	5.00	0.00	0.00	0.00
51.00	2.00	0.54	5.00	0.00	0.00	0.00

---

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

---

1 atm (atmosphere) = 1 tsf (ton/ft2)

CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils

APPENDIX E

SITE PLAN



SUMMARY

SITE AREA TOTAL 1,642,186 S.F. OR 37.29 ACRES

TENTATIVE TRACT

PARCEL #1 – COMMERCIAL	62,882 S.F.
PARCEL #2 – COMMERCIAL	167,494 S.F.
PARCEL #3 – COMMERCIAL	157,029 S.F.
PARCEL #4 – RESIDENTIAL	46,654 S.F.
PARCEL #5 – RESIDENTIAL	1,082,263 S.F.

COMMERCIAL	
BLDG. 1 – FAST FOOD W/DRIVE-THRU & OUTDOOR SEATING	4,608
BLDG. 2 – RETAIL CONVENIENCE STORE	1,024
BLDG. 3 – RETAIL STORE	20,000
BLDG. 4 – RESTAURANTS	6,144
BLDG. 5 – RETAIL	3,749
BLDG. 6 – RETAIL	2,592
BLDG. 7 – RETAIL	1,920
BLDG. 8 – RETAIL	15,360
BLDG. 9 – MEDICAL OFFICE 2-STORY (10,927 FOOTPRINT)	21,854
BLDG. 10 – RECYCLING CENTER	240
BLDG. 11 – RECYCLING CENTER	480
COMMERCIAL TOTAL SF	77,971

TYPICAL RESIDENTIAL BUILDING (92 BUILDINGS)		
UNIT 1 – ADU/STUDIO		208
UNIT 2 – TWO STORY (2 BDR.)		
LOWER LEVEL	388	
EXT. COVERED AREA	123	
UPPER LEVEL	375	
		886
UNIT 3 – TWO STORY (1 BDR.)		
LOWER LEVEL	378	
UPPER LEVEL	252.5	
		630.5
UNIT 4 – 1 BDR.		389
UNIT 5 – TWO STORY (1 BDR.)		
LOWER LEVEL	376	
UPPER LEVEL	252.5	
		628.5
UNIT 6 – TWO STORY (2 BDR.)		
LOWER LEVEL	373	
UPPER LEVEL	389	
		762
LOWER LEVEL TOTAL		2,235
UPPER LEVEL TOTAL		1,269
BUILDING TOTAL		3,504

RESIDENTIAL UNITS	
UNIT 1 – ADU'S	92
UNIT 2 – 2-STORY 2-BDR.	92
UNIT 3 – 2-STORY 1-BDR.	92
UNIT 4 – 1-BDR.	92
UNIT 5 – 2-STORY 1-BDR.	92
UNIT 6 – 2-STORY 2-BDR.	92
APT. – 1-BDR. LOFT	60
TOTAL	612

RESIDENTIAL	
PHASE A	
BLDGS. A1–A23	80,592
BLDG. AA – POOL HOUSE	1,200
PHASE B	
BLDGS. B1–B23	80,592
BLDG. BA – POOL HOUSE	1,200
PHASE C	
BLDG. C1–C10	35,040
BLDG. CA – BARN	384
BLDG. VILLAGE SERV. BLDG.	1,920
PHASE D	
BLDGS. D1–D14	49,056
BLDG. DA – POOL HOUSE	1,200
BLDG. DB – BARN	384
PHASE E	
BLDGS. E1–E14	49,056
BLDG. EA – POOL HOUSE	1,200
PHASE F	
BLDGS. F1–F8	28,032
BLDG. FA – POOL HOUSE	1,200
OTHERS	
FARM EQUIPMENT	1,620
COMMUNITY CENTER – 2-STORY	8,886
1-BDR LOFT APARTMENTS – 2-STORY+BASEMENT (16,425 FOOTPRINT)	32,850
VEGETABLE STANDS TOTAL OF 4 (72 EACH)	288

PARKING	REQ. RATIO	REQ. STALLS	PROVIDED
PARCEL #1			
BLDG. 1 (INCLUDES OUTDOOR SEATING)	1/100 + 6 STACK FOR WINDOW	58	61
PARCEL #2			
BLDG. 2	1/250	5	
BLDG. 3	1/250	80	
BLDG. 4	1/75	82	
BLDG. 5	1/250	15	
BLDG. 6	1/250	11	
BLDG. 11	1/300 + 1/10,000 GROSS YARD AREA	3	
PARCEL #2 SUB-TOTAL		196	199
PARCEL #3			
BLDG. 7	1/250	8	
BLDG. 8	1/250	62	
BLDG. 9	10 FOR FIRST 2,000 + 1/175 OVER 2,000	124	
BLDG. 10	1/300 + 1/10,000 GROSS YARD AREA	2	
PARCEL #3 SUB-TOTAL		196	218
PARCEL #4			
APARTMENTS	1.5 COVERED + 1 UNCOVERED GUEST FOR EVERY 5 UNITS	90 18	
PARCEL #4 SUB-TOTAL		108	64 (26+38 BSMT.)
R.O.W.			12
PARCEL #5			
PHASE A			115
PHASE B			115
PHASE C (VILLAGE SERV. BLDG.)			7
PHASE C			50
PHASE D			70
PHASE E			75
PHASE F			40
TOTAL			1,026

LEGEND

- PROPERTY LINE
- NEW PROPERTY LINE
- FH FIRE HYDRANT
- FENCE
- PERIMETER WALL
- WALKWAY POLE LIGHT 12' HIGH
- SOLAR PANEL CANOPIES @ RESIDENTIAL PARKING BAYS
- TYPICAL TRASH ENCLOSURE @ RESIDENTIAL AREAS
- TR TRASH ENCLOSURE @ COMMERCIAL AREAS
- STREET POLE LIGHT 18' HIGH

0' 60' 120' 180'
SCALE: 1" = 60'

SRK STEWART ROMBERGER KITE SRK ARCHITECTS INC.
2254 South Figueroa Street
Los Angeles, CA. 90007
Tel. (213) 747-1199
www.srkarchitectsinc.com

DEVELOPER:

LA WORLD CONSTRUCTION
2029 Century Park East #400
Century City, CA. 90067

CONSULTANT:

GREEN DAY VILLAGE
Desert Hot Springs, CA

NOT FOR CONSTRUCTION

DRAWINGS ISSUED

DELTA	DESCRIPTION	DATE
.	ENTITLEMENT SUBMITTAL	6/30/22

LICENSED ARCHITECT BRIAN A. KITE C-11258 REGISTRATION DATE 08/31/23 STATE OF CALIFORNIA

Scale: 1" = 60'-0"
Checked by: RH, BK
Drawn by: RH, HC
Project #: 22002.01

6/24/2022

Drawing Title & Number:

PROPOSED SITE PLAN

A-1.1

S:\L+SRK ARCHITECTS INC+L+V\PROJECTS\PROJECTS\2022\22002 - Green Day Village - Desert Hot Springs\DRAWINGS\CAD\ENTITLEMENTS PACKAGE\GDV_A-1.1_SITE PLAN.dwg Jun 27, 2022 - 3:17pm

© 2022 Ownership and use of documents: All drawings, specifications and copies thereof furnished by Stewart, Romberger & Kite are and shall remain its property. They are to be used in respect to this project and are not to be used on any other project. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the project is not to be construed as publication in derogation of Stewart, Romberger and Associates' common law copyright or other reserved rights.

© SRK Architects Inc. 2022 – 36"x24" Sheet

APPENDIX E5

PALEONTOLOGICAL RECORDS SEARCH

Natural History Museum
of Los Angeles County
900 Exposition Boulevard
Los Angeles, CA 90007

tel 213.763.DINO
www.nhm.org

Research & Collections

e-mail: paleorecords@nhm.org

February 13, 2022

UltraSystems Environmental
Attn: Stephen O'Neil

re: Paleontological resources for the Green Day Village Project (7129)

Dear Stephen:

I have conducted a thorough search of our paleontology collection records for the locality and specimen data for proposed development at the Green Day Village project area as outlined on the portion of the Desert Hot Springs USGS topographic quadrangle map that you sent to me via e-mail on February 8, 2022. We do not have any fossil localities that lie directly within the proposed project area, but we do have fossil localities nearby from the same sedimentary deposits that occur in the proposed project area, either at the surface or at depth.

The following table shows the closest known localities in the collection of the Natural History Museum of Los Angeles County (NHMLA).

Locality Number	Location	Formation	Taxa	Depth
LACM VP 1269	Near intersection of Varner Road and Edom Hill Road; west end of Indio Hills	Unknown formation (Pleistocene)	Horse (*Equus*)	Unknown
LACM VP 6922, LACM IP 5218	Near north end of Jackson St, Indio, CA	poss. Palm Springs Formation (diatomaceous shale)	freshwater Gastropods, uncatalogued vertebrates	Unknown
LACM IP 4779	N of El Dorado County Club, Indian Wells	Unknown formation (Pleistocene)	Invertebrates (unspecified)	Unknown
LACM VP 4281-4283	Campbell Hill; slightly more than 2 miles northeast of Four Corners at Twentynine Palms	Unknown formation (Pleistocene; lacustrine gray sand bed just above green silt & sand)	Horse (*Equus*)	Surface
LACM VP 6921	Box Canyon, Mecca Hills	Unknown Formation (Middle Pleistocene possible Palm Spring or Borrego Formations; coarse sandstone with interbedded grey silts & shales)	Vertebrates (unspecified)	Unknown
LACM VP 3414, CIT208	Pinto Wells	Pinto Formation (gravel terrace)	Horse (*Equus*); camel (*Camelops,Tanupolama*); bison (*Bison*); muskox tribe (Ovibovini)	Unknown

VP, Vertebrate Paleontology; IP, Invertebrate Paleontology; bgs, below ground surface

This records search covers only the records of the NHMLA. It is not intended as a

paleontological assessment of the project area for the purposes of CEQA or NEPA. Potentially fossil-bearing units are present in the project area, either at the surface or in the subsurface. As such, NHMLA recommends that a full paleontological assessment of the project area be conducted by a paleontologist meeting Bureau of Land Management or Society of Vertebrate Paleontology standards.

Sincerely,



Alyssa Bell, Ph.D.
Natural History Museum of Los Angeles County

enclosure: invoice

APPENDIX F1

PHASE I ESA

All Phase Environmental, Inc.

Phase I Environmental Site Assessment

Green Day Village
West of Palm Drive and 1,320 feet south of 18th Avenue
Desert Hot Springs, California, 92240



November 21, 2021

Prepared for:

LA World Construction
2029 Century Park East, Suite 400
Century City, California 90067

Prepared by:

All Phase Environmental, Inc.
8792 Lauder Circle, Suite 200
Huntington Beach, California 92646
(800) 567-7729
www.PhaseOneESA.com

APEI Project No. 14104.00

INDEX

1.0	SUMMARY	1
2.0	INTRODUCTION	1
2.1	Definitions	1
2.2	Purpose and Scope	2
2.3	Limitations, Exceptions and Methodology of Assessment	3
2.4	Data Gaps	4
2.5	Reliance	5
3.0	SITE DESCRIPTION	5
3.1	Location and Legal Description	5
3.2	Site and Vicinity Characteristics	6
3.2.1	Surface Characteristics	6
3.2.2	Drainage Patterns/Basins	6
3.2.3	Wetlands	6
3.2.4	Geology	7
3.2.5	Hydrogeology	7
3.2.6	Earthquake Induced Landslides, Liquefaction, and Fault Lines	7
3.2.7	Physical Setting Analysis	8
3.3	Structures, Roads and Other Improvements	8
3.4	Current Uses of the subject property	8
3.5	Tenant, User, and Owner Information	8
3.6	Historical Uses of the subject property	9
3.6.1	Sanborn Fire Insurance Maps	9
3.6.2	Historical Aerial Photographs	10
3.6.3	Topographic Map	11
3.6.4	Environmental Liens	11
3.6.5	Title Report	11
3.6.6	Previous Subject Property Inspection Reports	11
3.6.7	City Directories	12
3.6.8	Building Permits	12
3.7	Current Uses of Adjacent Sites	12
3.8	Past Uses of Adjoining Sites	12
3.8.1	North	12
3.8.2	Northeast	12
3.8.3	Southeast	13
3.8.4	South	13
3.8.7	Southwest	13
3.8.8	West	13
4.0	RECORDS REVIEW	14
4.1	Standard Environmental Record Sources, Federal and State	14
4.1.1	Subject Property Environmental Database Summary	14
4.1.2	Adjacent Sites Environmental Database Summary	14

4.1.3 Sites Within 0.125 miles of the Subject Property 14
4.1.4 Sites Between 0.125 miles and 0.25 miles of the Subject Property 14
4.1.5 Sites Located More than 0.25 miles from the Subject Property 14
4.1.6 Orphan (Unmapped) Sites 15
4.1.7 County of Riverside, Department of Environmental Health 15
4.1.8 Riverside County Fire Department 15
4.1.9 Desert Hot Springs Fire Department 15
4.1.10 South Coast Air Quality Management District (SCAQMD) 15
4.1.11 Colorado River Regional Water Quality Control Board 16
4.1.12 Department of Toxic Substances Control (DTSC) 16
4.1.13 State Water Resources Control Board (GeoTracker) 16
4.1.14 CalEPA Regulated Sites 17

5.0 INFORMATION FROM SITE RECONNAISSANCE 17
5.1 Hazardous Substances Connected with Identified Uses 17
5.2 Unidentified Substance Containers 17
5.3 Storage Tanks 17
5.4 Hydraulic Equipment 17
5.5 Indications of PCBs 18
5.6 Indications of Solid Waste Disposal 18
5.7 Surface Staining 18
5.8 Pipelines 18

6.0 NON-SCOPE ASTM CONSIDERATIONS 18
6.1 Asbestos 18
6.2 Lead Based Paint 18
6.3 Lead Contamination of Drinking Water 19
6.4 Radon 19
6.5 Urea-Formaldehyde 19
6.6 Mold 19
6.7 Fluorescent Light Tubes 19
6.8 Mercury 19
6.9 Vapor Intrusion 19

7.0 FINDINGS, OPINIONS, AND RECOMMENDATIONS 20

8.0 REFERENCES 20

9.0 SIGNATURE OF ENVIRONMENTAL PROFESSIONALS 22

10.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS PARTICIPATING IN THE PHASE I ESA 23

11.0 LIST OF APPENDIX SECTIONS 24

LIST OF APPENDIX SECTIONS

APPENDIX A Maps, Figures, Additional Information & Documentation

APPENDIX B Site Photographs

APPENDIX C Aerial Photographs

APPENDIX D Radius Profile Report

APPENDIX E Questionnaires

APPENDIX F All Phase Environmental, Inc. Certificate of Insurance

1.0 SUMMARY

LA World Construction (Client) retained All Phase Environmental, Inc. (APEI) to perform a Phase I Environmental Site Assessment (ESA) of the approximately 30.34-acre site located at west of Palm Drive and approximately 1,320 feet (¼ mile) south of 18th Avenue, in an unincorporated area of the County of Riverside, near the City of Desert Hot Springs, in the state of California, 92240 referred to herein as the "subject property."

APEI has conducted this Phase I ESA in conformance with the scope and limitations of ASTM Practice E1527-13 of the subject property. Any exceptions to or deletions from this practice are described in Section 2.2 of this report. This report also meets the requirements of All Appropriate Inquiries as defined in CERCLA 42, U.S.C. 9601(35) (B). The enclosed report and opinion are based on the intent to purchase the subject property. We understand that you will rely on our opinion for such purposes.

This assessment has revealed no evidence of recognized environmental conditions, historical recognized environmental conditions, controlled recognized environmental conditions, or de minimis conditions connected with the subject property. Based on our findings, no further assessment currently appears warranted.

2.0 INTRODUCTION

2.1 Definitions

To assist the reader with the interpretation of this report, APEI would like to provide the following definitions of significant ESA terminology as defined by ASTM E1527-13.

Recognized environmental condition

A recognized environmental condition is defined as*, "*the presence or likely presence of any hazardous substances or petroleum products in, on, or at a subject property: (*1*) due to any release to the environment; (*2*) under conditions indicative of a release to the environment; or (*3*) under conditions that pose a material threat of a future release to the environment."

Historical recognized environmental condition

A *historical recognized environmental condition* is defined as, *"*a past release of any hazardous substances or petroleum products that has occurred in connection with the subject property and has been addressed to the satisfaction of the applicable regulatory authority or meeting unrestricted use criteria established by a regulatory authority, without subjecting the subject property to any required controls (for example, subject property use restrictions, activity and use limitations, institutional controls, or engineering controls)."

Controlled recognized environmental condition

A controlled recognized environmental condition is defined as*, "*a *recognized environmental condition* resulting from a past release of hazardous substances or petroleum products that has been addressed to the satisfaction of the applicable regulatory authority (for example, as evidenced by the issuance of a no further action letter or equivalent, or meeting risk-based criteria established by regulatory authority), with *hazardous substances* or *petroleum products* allowed to remain in place subject to the implementation of required controls (for example, *property* use restrictions, *activity and use limitations*, *institutional controls*, or *engineering controls*)."

De minimis condition

A de minimis condition is defined as*, "*a condition that generally does not present a threat to human health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies. Conditions determined to be *de minimis conditions* are not *recognized environmental conditions* nor *controlled recognized environmental conditions*."

Business Environmental Risk

Business Environmental Risk is defined by ASTM as "a risk which can have a material environmental or environmentally-driven impact on the business associated with the current or planned use of a parcel of commercial real estate, not necessarily limited to those environmental issues required to be investigated in this practice (ESA, ASTM E1527-13). Consideration of *business environmental risk* issues may involve addressing one or more non-scope considerations such as asbestos, lead based paint, mold, endangered species, and other issues.

2.2 Purpose and Scope

A Phase I ESA is intended to provide a brief description of the subject property, its location and surroundings and to identify, to the extent feasible, associated r*ecognized environmental conditions, controlled recognized environmental conditions, historical recognized environmental condition,* and *de minimis conditions* associated with the subject property or surrounding land use and to create a list of the potential human and environmental receptors. The protocol followed for this assessment is in conformance with the requirements of All Appropriate Inquiries as defined in CERCLA 42, U.S.C. 9601(35) (B) and the American Society for Testing and Materials Standard Practice for Environmental Site Assessment for Commercial Real Estate Transactions, ASTM Standard E1527-13. Any exceptions are noted in Section 2.2 – Limiting Conditions and Methodology Used. APEI understands that this ESA will be used by LA World Construction to perform due diligence with respect to environmental conditions at the subject property.

2.3 Limitations, Exceptions and Methodology of Assessment

Due care was taken during this investigation, but as documented in Section 4.5.1 of ASTM E1527-13, "no environmental site assessment can wholly eliminate uncertainty regarding the potential for recognized environmental conditions in connection with a property." It should be noted that all Phase I ESAs are inherently limited in the sense that conclusions are arrived, and recommendations are derived from available information which are obtained from limited research and site evaluation. An environmental assessment as any "assessment" work is eventually the derived judgement of the professional. Performance of the ASTM E1527-13 practice is intended to reduce, but not eliminate, uncertainty regarding the potential for recognized environmental conditions in connection with a property, and this practice recognizes reasonable limits of time and cost. Therefore, there is always a potential that certain subsurface conditions beyond the ASTM practice may exist on the subject property that could not be identified through the scope of this investigation. APEI accepts no liability for hidden conditions, variations in composition of materials, and identification of materials not normally identified in sites typical of the subject property. Subsurface conditions were not field investigated as part of this study and may differ from the conditions implied by the surface observations.

APEI has relied on one or more documents developed by other parties and is not liable for any conclusions drawn using these sources if their findings or procedures were erroneous. APEI makes no warranty, guaranty, or certification regarding the quality, accuracy, or reliability of any prior reports reviewed and discussed in this report. APEI expressly disclaims all liability for any errors or omissions contained in any prior reports provided to APEI and discussed in this report. Additionally, the passage of time may result in a change in the environmental characteristics at this subject property and surrounding sites.

The scope of work for this report did not include testing of electrical equipment for the potential presence of polychlorinated biphenyls or the collection of other environmental samples. The scope of work did not include a detailed assessment of natural hazards such as naturally occurring asbestos, arsenic, radon gas or methane gas, an assessment of the potential presence of radionuclides, an assessment of nonchemical hazards such as the potential for damage from earthquakes or floods, or the presence of endangered species or wildlife habitats. The scope of work for this report did not include an assessment of the environmental compliance status of the subject property, the businesses operating at the subject property, or a health-based risk assessment. The scope of work for this report did not include any wetland studies, indoor air quality assessment, or vapor intrusion assessment beyond that required under ASTM 1527-13.

Our professional services have been performed, our findings obtained, and our recommendations have been prepared in accordance with customary principles and practices in the field of environmental science and engineering. The subject property boundaries and other drawings have been compiled from the best available recorded information and have not been verified by a field survey and may vary from actual conditions.

All areas of the subject property were visually inspected as part of this investigation except for some areas where thick vegetation prevented access. In addition, some of the vineyards and fallow areas were inspected by traversing the grounds in a crossing pattern intended to cover representative areas but not all areas were visually inspected. It is the opinion of APEI that the ability to identify conditions indicative of releases or threatened releases has not been hampered by the lack of the visual inspection in these areas.

2.4 Data Gaps

In accordance with the ASTM standard, an attempt to confirm the history and use of the subject property was performed from the present back to when the subject property was first developed with any structures or was used for residential, agricultural, commercial, industrial or governmental purposes. Referenced historical documents included all of some of the following: Sanborn fire insurance maps, historical topographic maps, historical city directories, historical aerial photographs, building department records, prior environmental reports, regulatory agency database information, and information from a subject property owner representative. These documents were consulted to fill in data gaps dating back to 1953, the first reasonably available information. Aerial photographs with coverage of the subject property were reviewed from the years 1953, 1972, 1975, 1984, 1996, 2002, 2005, 2009, 2012, 2016, and 2021. A USGS topographic map of the subject property was reviewed 2018.

Sanborn Fire Insurance Maps with coverage of the subject property were searched but no maps were made for this area. Due to the undeveloped nature of the subject property and its lack of a street address; city directories, building department records, fire department, and health department records could not be effectively researched. ASTM E1527-13 does not require the environmental professional to undertake a review of recorded land title records or search for environmental liens. This responsibility is placed upon the user. It is APEI's understanding that a lender will engage a title company or title professional to undertake a review of reasonably ascertainable recoded land title records and lien records relating to the subject property. Per the scope of work, APEI did not obtain recorded land title records or conduct an environmental lien search.

A subject property owner representative with specific knowledge of the subject property was not available for an interview and did not return the environmental questionnaire provided. Based on the undeveloped nature of the subject property and since the subject property has never been developed, APEI does not anticipate that there are any significant issues that the subject property owner can provide that would change the report findings.

Historical records dating back to 1940 were not reasonably available and represents a data gap. The oldest historical record of the subject property was dated 1953. The subject property was undeveloped and had no identified use in 1953. Based upon its lack of any identified use or development in 1953, this data gap did not affect APEI's ability to identify conditions indicative of releases and threatened releases.

It is the professional opinion of APEI that there were no data gaps with regards to the ability of APEI to identify conditions indicative of releases and threatened releases.

2.5 Reliance

This report was prepared for the sole use and benefit of LA World Construction. The information and opinions rendered in this report are for the exclusive use and reliance by LA World Construction. APEI will not distribute or publish this report without the consent of LA World Construction except as required by law and court order. The information and opinions expressed in this report are given in response to a limited assignment by LA World Construction and should be considered and implemented only in respects to that assignment. The services provided by APEI in completing this project have been provided in a manner consistent with normal standards of the profession. This report is not a legal opinion and does not offer warranties or guarantees expressed or implied.

3.0 SITE DESCRIPTION

3.1 Location and Legal Description

The subject property is a square parcel of approximately 30.34-acres with no assigned street address. The northeast corner of the subject property is located west of Palm Drive and approximately 1,320 feet (¼ mile) south of 18th Avenue, in an unincorporated area of Riverside County near the city of Desert Hot Springs, in the state of California, 92240. Palm Drive delimits the subject property to the east and vacant land delimits the remaining borders. Some resources have mapped "Blair Road" along the north subject property border, but this road has yet to be graded. The approximate latitude and longitude near the center of the subject property are 33°54'44.38" north and 116°30'14.32" west, respectively. The subject property is composed of one parcel. The APN number for the subject property is 657-280-003.

At the time of the subject property reconnaissance on November 20, 2021, the subject property was undeveloped, occupied by native vegetation, and appears to have never been developed. The owner's name was not provided to APEI and it was not available from the Riverside County Appraiser District due to state privacy laws. APEI was not provided with a legal description of the subject property.

3.2 Site and Vicinity Characteristics

3.2.1 Surface Characteristics

According to the U.S. Geological Survey (USGS) topographic map, Desert Hot Springs California Quadrangle, the finished elevation near the center of the subject property was approximately 763 feet above Mean Sea Level (MSL) and the general topography sloped to the south. The subject property was undeveloped and appears to have never been developed. There were no paved areas on the subject property.

3.2.2 Drainage Patterns/Basins

The subject property is in an area designated as "Zone AO" on the FEMA Q3 Flood Insurance Rate Map, Riverside County, map number 06065C0915G dated August 28, 2008. These areas are subject to inundation by 1-percent-annual-chance shallow flooding (usually sheet flow on sloping terrain) where average depths are between one and three feet.

There was no industrial or sanitary water discharge from the subject property into a sanitary sewer system. Stormwater drainage on the subject property was primarily downward surface percolation or during heavy rain events, is expected to move via sheet flow to the south, draining onto the adjacent site. Stormwater from adjacent sites was not expected to enter the subject property under normal conditions. There were no drinking water wells, groundwater monitoring wells, floor drains, clarifiers, sumps, septic system, or french drains noted, or reported to exist, on the subject property.

3.2.3 Wetlands

APEI screened the subject property for the presence of suspect wetlands during the site reconnaissance and by reviewing the U.S. Department of the Interior, Fish and Wildlife Service, *National Wetlands Inventory* online map researched on November 15, 2021, and the most recently available topographic map dated 2018. These sources indicated that the subject property is not in an area mapped as a potential wetlands area and there were no mapped bodies of water indicative of possible wetlands on the subject property. The nearest significant surface water is the Morongo Wash located approximately 0.16-miles west of the subject property. During APEI's site reconnaissance, no suspect wetlands areas were observed on the subject property. The Environmental Professional who performed the subject property reconnaissance is not a specialist trained in wetlands delineation. A wetland delineation was beyond the scope of this assessment. APEI notes that the Wetlands Inventory Map is prepared through the analysis of aerial photography and not by actual ground reconnaissance. It is normally used as a screening method to assess if potential wetland areas exist. No further assessment is recommended.

3.2.4 Geology

According to the *Geologic Map of California* published in 2010 by the California Geological Survey, the subject property is underlain by Pleistocene-Holocene age mostly nonmarine (continental) sedimentary rocks described as alluvium, lake, playa, and terrace deposits both unconsolidated and semi-consolidated.

According to the *Web Soil Survey* by the National Resources Conservation Service dated September 15, 2021, the primary soil type at the subject property is Myoma fine sand. The landform setting for this soil is described as alluvial fans with a slope of 0 to 5 percent. This soil is somewhat excessively drained and the depth to the water table is more than 80-inches.

3.2.5 Hydrogeology

The subject property lies within the Coachella Valley Groundwater Basin. Groundwater in the region is designated as being beneficial for municipal, agricultural, and industrial service supply (CRWQCB, 1994).

APEI reviewed subsurface data from investigations on a nearby site. The Expressway Market located at 17001 Palm Drive was located approximately 3,300 feet north of the subject property. In a report dated May 2, 2005, by County of Riverside, Department of Environmental Health, Hazardous Materials Management Division entitled "*Case Closure Summary, Expressway Market"* groundwater was reported to be at a depth of at least 142 feet below ground surface (bgs).

Shallow groundwater generally flows in directions subparallel to the ground surface slopes and under the influence of gravity toward points of discharge such as creeks, swamps, drainage swales, or pumped groundwater wells. Based solely upon the surface topography that drops to the south, the presumed groundwater flow direction in the uppermost water-bearing unit across the subject property would be to the south, following the surface topography. South is only the presumed groundwater flow direction and only physical testing can accurately state the true groundwater flow direction.

3.2.6 Earthquake Induced Landslides, Liquefaction, and Fault Lines

According to the California Earthquake Hazards Zone Application ("EQ Zapp") researched on November 16, 2021, the subject property was not located in an Earthquake Fault Zone and has not been evaluated for Liquefaction or Earthquake Induced Landslide Areas.

3.2.7 Physical Setting Analysis

The subject property is in an area surrounded by vacant land, sparce residential sites, and a golf course. The area around the subject property began to significantly develop in the 1960s.

According to a State of California, California Geologic Energy Management Division (CalGEM) Well Finder search, the subject property is not located within an oil or gas field. There were no oil wells depicted on the subject property, adjacent sites, or within one mile of the subject property.

3.3 Structures, Roads and Other Improvements

At the time of the subject property reconnaissance on November 20, 2021, the subject property was vacant, undeveloped, appeared to have never been developed, and was occupied by native vegetation. The subject property can be accessed from Palm Drive. There were no utilities being actively used on the subject property at the time of the subject property reconnaissance.

3.4 Current Uses of the subject property

At the time of the subject property reconnaissance on November 20, 2021, the subject property was vacant, undeveloped, appeared to have never been developed, and was occupied by native vegetation.

3.5 Tenant, User, and Owner Information

Tenant

There were no tenants on the subject property at the time of the site reconnaissance.

Owner

A subject property owner representative with specific knowledge of the subject property was not available for an interview and did not return the environmental questionnaire provided. Based on the undeveloped nature of the subject property and because it has never been developed, APEI does not anticipate that there are any significant issues that the subject property owner can provide that would change the report findings.

User

Mr. Avraham Farzan, CEO with LA World Construction, the users of this report, filled out an environmental questionnaire dated November 10, 2021. A copy of this form is provided in Appendix E. Mr. Farzan indicated that a search of recorded land title records or judicial records did not identify any environmental liens filed or recorded against the subject property under federal, tribal, state, or local law or such a search was not undertaken. He marked that a search of recorded land title records or judicial records where appropriate, did not identify any AULs, such as engineering controls, land use restrictions or institutional controls that are in place at the subject property and/or have been filed or recorded against the Subject property under federal, tribal, state or local law or such a search was not undertaken. Mr. Farzan had no specialized knowledge or experience related to the subject property or nearby properties. He was not involved in the same line of business as the current or former occupants of the subject property or adjoining sites and had no specialized knowledge of the chemicals and processes used by these types of businesses. Mr. Farzan believed that the purchase price being paid for the subject property reasonably reflected the fair market value of the subject property. Mr. Farzan was not aware of commonly known or reasonably ascertainable information about the subject property that would help the environmental professional identify conditions indicative of releases or threatened releases. He did not know the past uses of the subject property. He did not know of specific chemicals that are present or once were present at the subject property. Mr. Farzan did not know of spills or other chemical releases that have taken place at the subject property. He was not aware of any environmental cleanups that have taken place at the subject property. Based on his knowledge and experience related to the subject property, he stated that there were no obvious indicators that point to the presence or likely presence of releases at the subject property.

3.6 Historical Uses of the subject property

Historical information was obtained from aerial photographs (1953, 1972, 1975, 1984, 1996, 2002, 2005, 2009, 2012, 2016, and 2021) presented in Appendix Container and a USGS Topographic maps from 2018 presented in Appendix A.

The subject property appears to have never been developed and has had no obvious historical uses. There were no indications that the subject property had been used for an agricultural purpose. There were no past tenants that would be expected to have used significant quantities of hazardous materials or petroleum products and there were no records of such uses. There were no records of spills, releases, or violations from former subject property tenants. There were no historical recognized environmental conditions or controlled recognized environmental conditions identified in the historical documents reviewed.

3.6.1 Sanborn Fire Insurance Maps

Sanborn Fire Insurance Maps with coverage of the subject property area were searched but no maps were made for this area.

3.6.2 Historical Aerial Photographs

The following are descriptions of the historical aerial photographs taken at the subject property and reviewed by APEI. This review has been supplemented by geographic place names and other data obtained in other assessment activities of this ESA. These photographs can be found in Appendix C. Although it may be stated below that there were no obvious signs of the storage or disposal of hazardous materials or petroleum products in these photographs, specific uses, or the presence of materials, may not have been identifiable from the information contained in the photographs.

1953

In the 1953 aerial photograph, the subject property and all the adjacent sites appeared to have been undeveloped, had no obvious use, and were occupied by native vegetation. There were no roads adjacent to the subject property. There were no obvious signs of the storage or disposal of hazardous materials on the subject property in this photograph.

1972

In the 1972 aerial photograph, the subject property and all the adjacent sites appeared to have been undeveloped, had no obvious use, and were occupied by native vegetation. Residential uses were visible further to the south, southeast, and southwest of the adjacent sites. Palm Drive was now graded and paved. There were no obvious signs of the storage or disposal of hazardous materials on the subject property in this photograph.

1975

In the 1975 aerial photograph, the subject property and all the adjacent sites, except for the southwest adjacent site, appeared to have been undeveloped, had no obvious use, and were occupied by native vegetation. The southwest adjacent site had been cleared of native vegetation and appears to have been graded as it currently exists. There were no obvious signs of the storage or disposal of hazardous materials on the subject property in this photograph.

1984

There were no significant differences on the subject property or adjacent sites in the 1984 aerial photograph from the 1975 aerial photograph. There were no obvious signs of the storage or disposal of hazardous materials on the subject property in this photograph.

1996

In the 1996 aerial photograph, the subject property and all the adjacent sites, except for the southwest and southeast adjacent sites, appeared to have been undeveloped, had no obvious use, and were occupied by native vegetation. The southwest adjacent site had been cleared of native vegetation and appears to have been graded as it currently exists. The Desert Dunes Golf Club was now visible on the southeast adjacent site, across Palm Drive. There were no obvious signs of the storage or disposal of hazardous materials on the subject property in this photograph.

2002, 2005, 2009, 2012, 2016, and 2021

There were no significant differences on the subject property or adjacent sites in the 2002, 2005, 2009, 2012, 2016, and 2021 aerial photographs from the 1996 aerial photograph. The subject property was undeveloped, unpaved, and occupied by native vegetation in all of these photographs. There were no obvious signs of the storage or disposal of hazardous materials on the subject property in these photographs.

3.6.3 Topographic Map

The 7.5-minute topographic map from 2018, Desert Hot Springs Quadrangle, showed the subject property and surrounding area as undeveloped. There were no obvious signs of the storage or disposal of hazardous materials on the subject property or adjacent sites in this map. This map is presented in Appendix A.

3.6.4 Environmental Liens

No environmental liens were found during this investigation. The subject property was not listed in the search of the Federal NPL Liens database. For there to be an environmental lien against the subject property, it must be a suspected, or confirmed, contributor to subsurface contamination. Research conducted for this report did not find any uses that would have contributed to subsurface contamination on the subject property and no regulatory agencies identified it as such.

3.6.5 Title Report

It was not in the scope of work for APEI to obtain a Title report for the subject property. The Client did not provide APEI with a Title report for review.

3.6.6 Previous Subject Property Inspection Reports

The Client did not provide any previous inspection reports or Phase I Environmental Site Assessments for the subject property.

3.6.7 City Directories

Because the subject property has never been developed and has no specific street address, city directories were not researched.

3.6.8 Building Permits

Because the subject property has never been developed and has no specific street address, building permits were not researched.

3.7 Current Uses of Adjacent Sites

Current uses of the immediately adjacent sites and their addresses as noted on the buildings or researched on-line are as follows:

- North – Undeveloped land and native vegetation; no address assigned;
- Northeast – Palm Drive followed by undeveloped land and native vegetation; no address assigned;
- Southeast – Palm Drive followed by the Desert Dunes Golf Club; 19300 Palm Drive;
- South – Undeveloped land and native vegetation; no address assigned;
- Southwest– Undeveloped land that had been cleared of native vegetation; no address assigned, and;
- West – Undeveloped land and native vegetation; no address assigned.

Based on observations and research, there is a low likelihood that a recognized environmental condition exists at the subject property because of the current adjacent land use. APEI did not detect obvious indications that these adjacent sites store large quantities of hazardous materials, hazardous waste, have USTs, or are involved in a cleanup operation.

3.8 Past Uses of Adjoining Sites

3.8.1 North

Historical sources indicated that the site adjacent to and northwest of the subject property was undeveloped in 1953 and appears to have never been developed and was occupied by native vegetation.

There were no signs of the storage or disposal of hazardous materials on the northwest adjacent site in the historical information reviewed. There were no indications from any historical sources that the subject property has been impacted from this adjacent site.

3.8.2 Northeast

Historical sources indicated that the site adjacent to and northeast of the subject property, across Palm Drive, was undeveloped in 1953 and appears to have never been developed and was occupied by native vegetation.

There were no signs of the storage or disposal of hazardous materials on the northeast adjacent site in the historical information reviewed. There were no indications from any historical sources that the subject property has been impacted from this adjacent site.

3.8.3 Southeast

Historical sources indicated that the site adjacent to and southeast of the subject property, across Palm Drive, was undeveloped in 1953 and was occupied by native vegetation. Between 1984 and 1996, this site was developed with the existing Desert Dunes Golf Club.

There were no signs of the storage or disposal of hazardous materials on the southeast adjacent site in the historical information reviewed. There were no indications from any historical sources that the subject property has been impacted from this adjacent site.

3.8.4 South

Historical sources indicated that the site adjacent to and south of the subject property was undeveloped in 1953 and appears to have never been developed and was occupied by native vegetation.

There were no signs of the storage or disposal of hazardous materials on the south adjacent site in the historical information reviewed. There were no indications from any historical sources that the subject property has been impacted from this adjacent site.

3.8.7 Southwest

Historical sources indicated that the site adjacent to and southwest of the subject property was undeveloped in 1953 and was occupied by native vegetation. Between 1972 and 1975, this site was cleared of the native vegetation and graded but has remained undeveloped since.

There were no signs of the storage or disposal of hazardous materials on the southwest adjacent site in the historical information reviewed. There were no indications from any historical sources that the subject property has been impacted from this adjacent site.

3.8.8 West

Historical sources indicated that the site adjacent to and west of the subject property was undeveloped in 1953 and appears to have never been developed and was occupied by native vegetation.

There were no signs of the storage or disposal of hazardous materials on the west adjacent site in the historical information reviewed. There were no indications from any historical sources that the subject property has been impacted from this adjacent site.

4.0 RECORDS REVIEW

4.1 Standard Environmental Record Sources, Federal and State

A Federal, State and Local Radius Profile Report from Environmental Data Resources, Inc. dated November 11, 2021, was reviewed by APEI. The radius report, found in Appendix D, contains records of registered sites surrounding the subject property for the classifications and distances as required by ASTM Practice E1527-13. Descriptions of each database, their source, and publication dates are detailed in this appendix section.

4.1.1 Subject Property Environmental Database Summary

The subject property was not listed in any of the databases searched.

4.1.2 Adjacent Sites Environmental Database Summary

The adjacent sites were not listed in any of the databases searched.

4.1.3 Sites Within 0.125 miles of the Subject Property

There were no sites listed within 0.125 (1/8) miles of the subject property.

4.1.4 Sites Between 0.125 miles and 0.25 miles of the Subject Property

There were no sites listed between 0.125 (1/8) and 0.25 (1/4) miles of the subject property.

4.1.5 Sites Located More than 0.25 miles from the Subject Property

There were no sites listed more than 0.25 (1/4) miles of the subject property.

4.1.6 Orphan (Unmapped) Sites

The EDR Radius Map Report indicated that 14 sites could not be mapped due to poor or inadequate address information; they called these, “Orphan” sites. Through additional research, APEI was able to locate these sites, which were all located over one half mile of the subject property. Based upon APEI's area reconnaissance, types of regulatory listings identified for the orphan facilities, and conditions typical of the identified facilities activities, the orphan facilities were not considered suspect recognized environmental conditions to the subject property. No further action is recommended regarding the Orphan sites.

4.1.7 County of Riverside, Department of Environmental Health

The subject property and adjacent sites were not listed in the Underground Storage Tank List or the Underground Tank Cleanup Sites list published by the County of Riverside, Department of Environmental Health. Because the subject property has no street address, County of Riverside, Department of Environmental Health records could not be effectively researched. APEI does not anticipate that there are any records to be reviewed for the subject property at this agency that would change our opinion.

4.1.8 Riverside County Fire Department

The Riverside County Fire Department has referred APEI to the County of Riverside, Environmental Health, Hazardous Materials Division for any inquires for USTs, spills, or hazardous materials storage for the subject property area.

4.1.9 Desert Hot Springs Fire Department

Because the Property has never been developed and has no specific street address, Desert Hot Springs Fire Department records could not be effectively researched. APEI does not anticipate that there are any records to be reviewed for the subject property at this agency that would change our opinion.

4.1.10 South Coast Air Quality Management District (SCAQMD)

APEI performed a search of the SCAQMD Facility Information Detail database for records pertaining to the subject property. These records include air pollution permits, applications, and violations. Regularly scheduled updates are made to this database by the SCAQMD at least once per week. There were no records found pertaining to the subject property or any of the adjacent sites.

4.1.11 Colorado River Regional Water Quality Control Board

Because the subject property has no specific street address, a request for Colorado River Regional Water Quality Control Board files could not be sent. APEI does not anticipate that there are any records to be reviewed for the subject property at this agency that would change our opinion.

4.1.12 Department of Toxic Substances Control (DTSC)

DTSC Files

Because the subject property has no specific street address, a request for DTSC files could not be sent. APEI does not anticipate that there are any records to be reviewed for the subject property at this agency that would change our opinion.

Generator Information Services Section

Because the subject property has no specific street address, a search of the Generator Information Services Section files could not be performed. APEI does not anticipate that there are any records to be reviewed for the subject property at this agency that would change our opinion.

EnviroStor

APEI searched for the subject property and adjacent sites on the EnviroStor website published by the DTSC. This website contains listings of Federal Superfund sites, State Response sites, Voluntary Cleanup sites, School Cleanup sites, Evaluation sites, School Evaluation sites, Military Evaluation sites, Tiered Permit sites, Corrective Action sites, Operating Permit sites, Post Closure Permit sites, and Non-Operating Permit sites. The subject property and adjacent sites were not identified on the EnviroStor website.

4.1.13 State Water Resources Control Board (GeoTracker)

APEI searched for the subject property and adjacent sites on the GeoTracker website published by the State Water Resources Control Board. GeoTracker contains lists of DTSC cleanup sites, other cleanup sites, LUST sites, UST sites, land disposal sites, military sites, and DTSC Disposal Permit sites. The subject property and adjacent sites were not identified on the GeoTracker website.

4.1.14 CalEPA Regulated Sites

APEI searched for the subject property and adjacent sites on the CalEPA Regulated Site Portal. This site combines data about environmentally regulated sites and facilities in California. These activities include hazardous materials and wastes, state and federal cleanups, impacted ground and surface waters, and toxic materials. The subject property and adjacent site were not identified in the CalEPA Regulated Site Portal.

5.0 INFORMATION FROM SITE RECONNAISSANCE

5.1 Hazardous Substances Connected with Identified Uses

An unaccompanied site reconnaissance of the subject property was performed on November 20, 2021, by Mr. Doug Kochanowski, Biologist and Project Manager, that included a walk of the subject property to determine the presence of hazardous materials and environmental conditions. Mr. Kochanowski is an Environmental Professional as defined by ASTM E1527-13 and 40 CFR §312.10(b). All areas of the subject property were inspected as part of this investigation except for some small areas where vegetation prevented observation.

There were no signs of hazardous materials being used or stored on the subject property. There was no evidence noted of spills or releases of these materials during the site reconnaissance.

5.2 Unidentified Substance Containers

There were no unidentified substance containers observed on the subject property.

5.3 Storage Tanks

No USTs were noted on the subject property at the time of the subject property reconnaissance. There were no common indicators of USTs such as vent pipes, fill ports, manways, fuel gauges, or dispensers observed. In the regulatory information researched there were no USTs reportedly installed, removed, closed in place, or abandoned at the subject property and no common indicators of closed tanks were observed.

APEI observed no ASTs on the subject property and did not identify any equipment which would require such tanks. Moreover, visual indicators of former site ASTs such as tank cradles, secondary containment structures, and tank pedestals were not observed.

5.4 Hydraulic Equipment

There were no above or below-grade hydraulic lift systems observed on the subject property.

5.5 Indications of PCBs

There were no pad-mounted transformers, pole-mounted transformers, ballasts, or hydraulic lift systems located on the subject property.

5.6 Indications of Solid Waste Disposal

There was no evidence observed of buried drums, buried containers, free liquids, odors, unusual depressions, or excavations that would indicate solid waste disposal activity on the subject property. There was no evidence of fill material from an unknown source on the subject property. There was no surface evidence of spills, releases, or illegal disposal during the subject property reconnaissance.

Based on surface observations, other than typical engineered fill used in foundation construction, it did not appear that a significant amount of fill had been imported onto the subject property.

5.7 Surface Staining

There was no evidence noted of discolored soils, odors or surface staining on the subject property during the site reconnaissance. There was no evidence of sparse, stressed, or dead vegetation (from other than insufficient water). There was no visual evidence of improper handling or disposal of hazardous chemicals or materials on the grounds of the subject property.

5.8 Pipelines

APEI reviewed the online National Pipeline Mapping System published by the Pipeline and Hazardous Materials Safety Administration, a division of the Department of Transportation. According to this agency, there were no pipelines mapped on the subject property.

6.0 NON-SCOPE ASTM CONSIDERATIONS

6.1 Asbestos

The subject property was undeveloped at the time of the site reconnaissance, therefore, no suspect asbestos containing materials were noted on the subject property.

6.2 Lead Based Paint

The subject property was undeveloped at the time of the site reconnaissance; therefore, no suspect lead based paint was noted on the subject property.

6.3 Lead Contamination of Drinking Water

The condition of the drinking water at the subject property is unknown; the subject property was undeveloped at the time of the subject property reconnaissance.

6.4 Radon

Based on the results of the State of California Department of Health Services' 1990 California Statewide Radon Survey, the U.S. Environmental Protection Agency (U.S. EPA) lists Riverside County as being in Radon Zone 2. Zone 2 areas have a predicated average indoor radon screening potential of between 2.0 picocuries per liter (pCi/L) and 4.0 pCi/L. The level at which the U.S. EPA considers radon levels to be unhealthful is 4.0 pCi/L in residential structures.

There can be extreme variations of indoor radon levels within a local area based upon geologic, soil structure and building characteristics. The EPA recommends testing as the definitive method in determining the radon level within a specific structure. Radon testing was not part of this project's scope of work.

6.5 Urea-Formaldehyde

The subject property was undeveloped at the time of the site reconnaissance; therefore, no suspect urea-formaldehyde containing materials were noted on the subject property.

6.6 Mold

The subject property was undeveloped at the time of the site reconnaissance; therefore, no mold or water intrusion issues were observed that could potentially affect indoor air quality.

6.7 Fluorescent Light Tubes

The subject property was undeveloped at the time of the site reconnaissance, therefore, there were no fluorescent light tubes identified on the subject property.

6.8 Mercury

The subject property was undeveloped at the time of the site reconnaissance, therefore, no mercury containing components were identified on the subject property.

6.9 Vapor Intrusion

Based on a review of agency records, historical documents, and current site uses, there were no onsite sources identified that had the potential to have created a vapor intrusion issue on the subject property.

There were no offsite properties identified in the database research that had an open release of petroleum hydrocarbons within 528 feet (one-tenth of a mile (0.1-miles)) upgradient, 165-feet crossgradient, or 100 feet downgradient of the subject property. There were no offsite properties identified in the database research that had a documented release of other chemicals, such as VOCs, identified within 1,760-feet (one-third of a mile (⅓-mile)) upgradient, 365-feet crossgradient, or 100 feet downgradient of the subject property.

It should be noted that APEI was not contracted to perform an assessment of the subject property in accordance with ASTM Standard E2600 nor does this assessment meet the requirements of said standard.

7.0 FINDINGS, OPINIONS, AND RECOMMENDATIONS

APEI has conducted this Phase I ESA in conformance with the scope and limitations of ASTM Practice E1527-13 of the subject property. Any exceptions to or deletions from this practice are described in Section 2.2 of this report. This report also meets the requirements of All Appropriate Inquiries as defined in CERCLA 42, U.S.C. 9601(35) (B). The enclosed report and opinion are based on the intent to purchase the subject property. We understand that you will rely on our opinion for such purposes.

This assessment has revealed no evidence of recognized environmental conditions, historical recognized environmental conditions, controlled recognized environmental conditions, or de minimis conditions connected with the subject property. Based on our findings, no further assessment currently appears warranted.

8.0 REFERENCES

Aerial Photographs, EDR Collection; 1953, 1972, 1975, 1984, 1996, 2002, 2005, 2009, 2012, 2016, and 2021.

The EDR Radius Map Report with GeoCheck, Environmental Data Resources, Inc., November 11, 2021.

United States Geological Survey Topographic Map, 2018, *Desert Hot Springs California Quadrangles*.

California Statewide Radon Survey. 1990. California Department of Health Services.

EnviroStor website, Department of Toxic Substances Control, reviewed on November 20, 2021, http://www.envirostor.dtsc.ca.gov/public.

Federal Emergency Management Agency (FEMA) on-line "Flood Map Service Center" 06065C0915G, panel number panel#, August 28, 2008: https://msc.fema.gov/portal/search.

Hazardous Waste Tracking System (HWTS), Department of Toxic Substance Control (DTSC), reviewed on November 20, 2021, http://hwts.dtsc.ca.gov/report_search.cfm?id=5.

GeoTracker website, State Water Resources Control Board, reviewed on November 20, 2021, http://geotracker.waterboards.ca.gov.

CalEPA Regulated Site Portal, California Environmental Protection Agency, reviewed on November 20, 2021, https://siteportal.calepa.ca.

National Pipeline Mapping System, Pipeline and Hazardous Materials Safety Administration, Department of Transportation, reviewed on November 20, 2021.

Well Finder, State of California, California Geologic Energy Management Division (CalGEM), reviewed on November 20, 2021,
https://maps.conservation.ca.gov/doggr/wellfinder/#/-118.94276/37.10257/6

National Wetlands Inventory, Wetlands Mapper, U.S. Department of the Interior, Fish and Wildlife Service, November 15, 2021, http://www.fws.gov/wetlands/Data/Mapper.html.

Web Soil Survey, National Resources Conservation Service, September 15, 2021, http://websoilsurvey.nrcs.usda.gov/app/.

Facility Information Detail (FINDS), online database researched on November 20, 2021, South Coast Air Quality Management District,
http://www3.aqmd.gov/webappl/fim/prog/search.aspx.

California Earthquake Hazards Zone Application ("EQ Zapp"), California Department of Conservation, researched on November 16, 2021;
https://www.conservation.ca.gov/cgs/geohazards/eq-zapp

Case Closure Summary, Expressway Market, County of Riverside, Department of Environmental Health, Hazardous Materials Management Division, May 2, 2005.

9.0 SIGNATURE OF ENVIRONMENTAL PROFESSIONALS

The undersigned certifies that the professional services have been performed, our findings obtained, and our recommendations have been prepared in accordance with customary principles and practices in the field of environmental science and engineering. APEI has acted in good faith and has no relationship with sellers, buyers or agents of the subject property. There have been no conflicts of interest involved in the drawing of conclusions, which have been based solely on materials reviewed and visual inspections performed by APEI. The undersigned declares that to the best of our professional knowledge and belief, we meet the definition of Environmental Professional as defined in 40 CFR 312 Section 312.10. We have the specific qualifications based on education, training, and experience to assess a property of the nature, history and setting of the subject property. We have developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312 with any exceptions noted in Section 2.2 - Limitations, Exceptions and Methodology of Assessment.

Prepared by:



Douglas B. Kochanowski, CHMM, CAC
Biologist and Senior Environmental Scientist

Reviewed by:

Jeffrey B. Fleming
Senior Environmental Scientist

10.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS PARTICIPATING IN THE PHASE I ESA

Name: Douglas B. Kochanowski
Title: Biologist and Project Manager
Education: Degree(s)/Year/Specialization
B.S. San Diego State University/1988/Biology
Active Registrations: Senior Level Certified Hazardous Materials Manager (CHMM)
Certification Number: 9970
Secretary on Board of Directors for So CAL ACHMM
Member of the American Indoor Air Quality Council
Certifications: California Certified Asbestos Consultant (CAC)
Certification Number: 99-2699
Certified AHERA Asbestos Inspector
Certified AHERA Asbestos Management Planner
Certified AHERA Asbestos Designer
Certified AHERA Supervisor
OSHA HAZWOPR 1910.120/Site Supervisor
Certified Radiation Worker
Confined Space Entry Trained
Years in Environmental Practice: 33

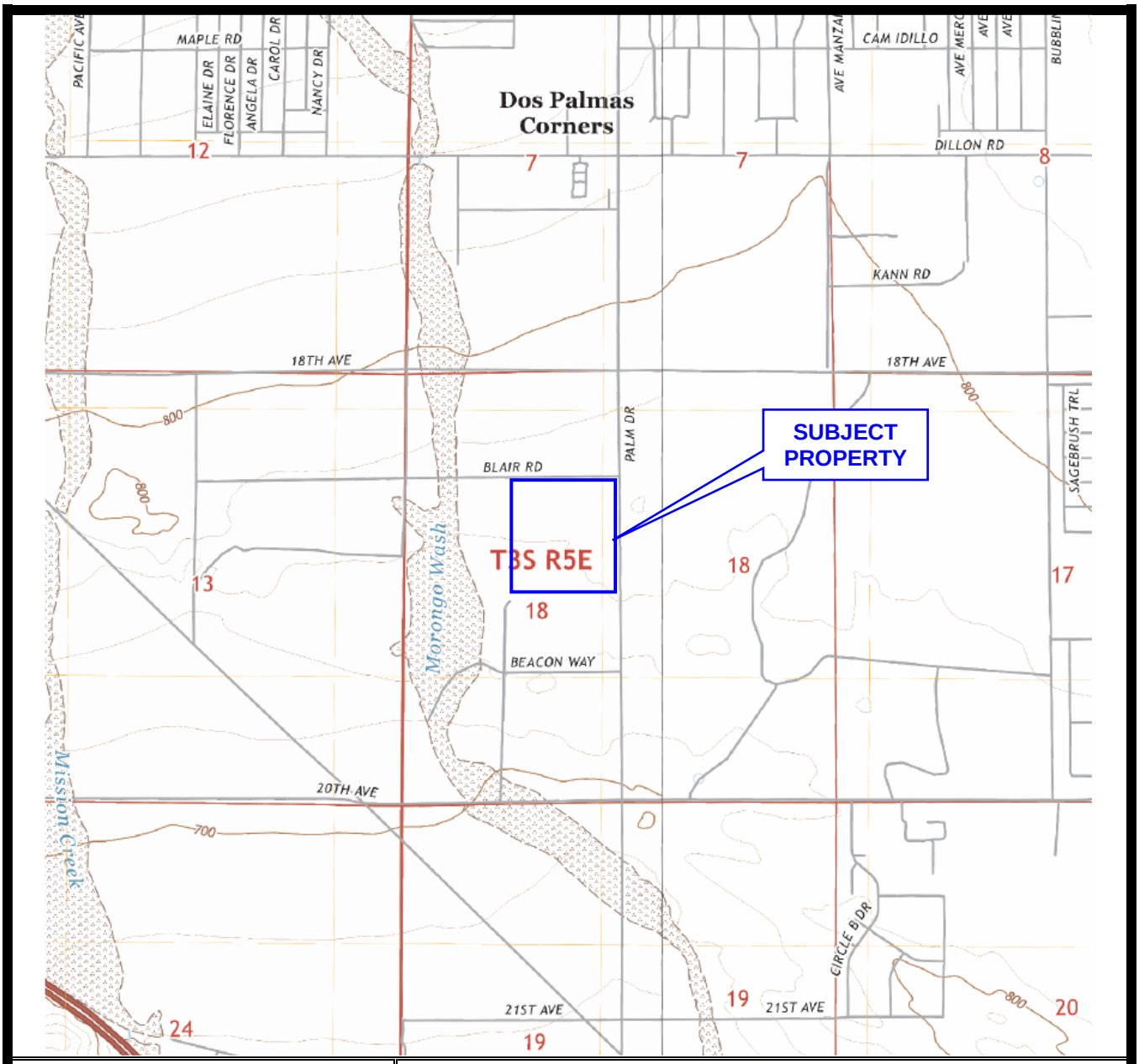
Name: Jeffrey B. Fleming
Title: Regional Manager
Education: Degree(s)/Year/Specialization
University of Washington, B.S./1988/Physics
San Diego State University, M.A./1990/Physical Geography
Certifications: AHERA Accredited Building Inspector
Certification Number: #298BIR3867
Years in Environmental Practice: 32

11.0 LIST OF APPENDIX SECTIONS

APPENDIX A	Maps, Figures, Additional Information & Documentation
APPENDIX B	Site Photographs
APPENDIX C	Aerial Photographs
APPENDIX D	Radius Profile Report
APPENDIX E	Questionnaires
APPENDIX F	All Phase Environmental, Inc. Certificate of Insurance

APPENDIX A

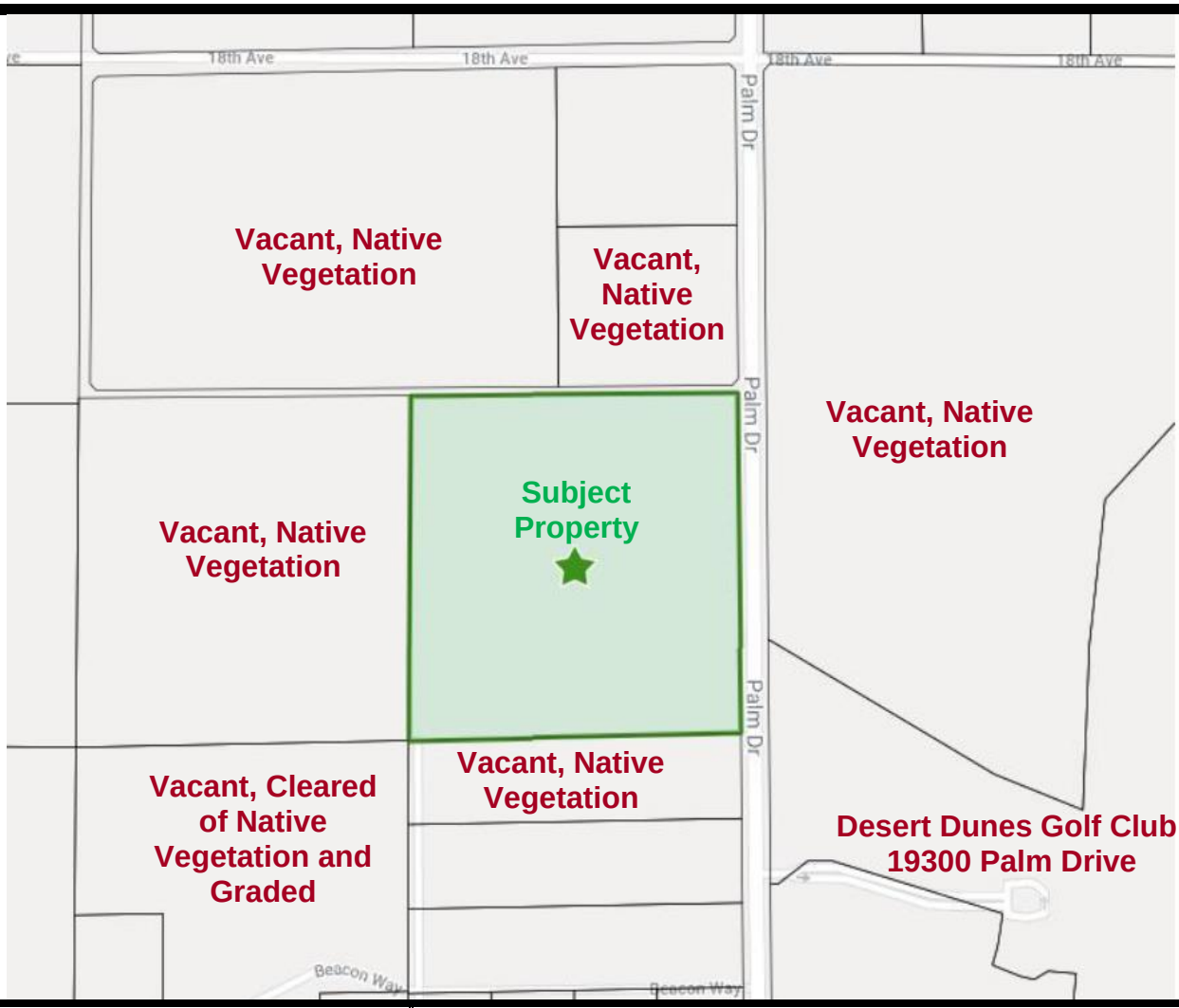
Maps, Figures, Additional Information & Documentation



Item: Desert Hot Springs Topographic Map
Date: 2018
Scale: 1:24,000
Project: Green Day Village ESA
Project Number: 14104.00

All Phase Environmental, Inc.

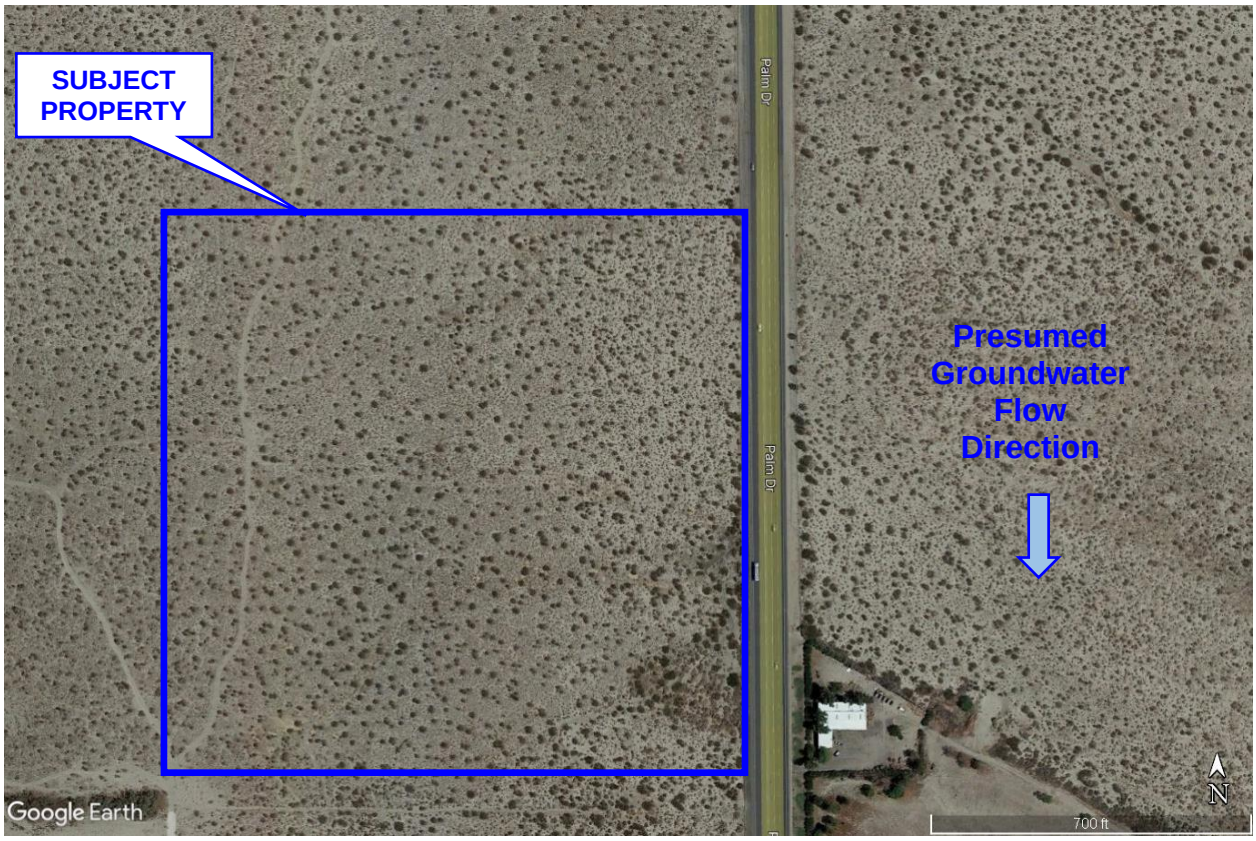
N



Item: Map of Subject Property & Adjacent Sites
Date: November 20, 2021
Scale: None
Project: Green Day Village ESA
Project Number: 14104.00

All Phase Environmental, Inc.

N



Item: Site Plan, Photo Courtesy of Google Earth
Date: November 20, 2021
Scale: None
Project: Green Day Village ESA
Project Number: 14104.00

All Phase Environmental, Inc.

N

APPENDIX B

Site Photographs

SUBJECT PROPERTY PHOTOGRAPHS



Subject property looking southwest from the northeast subject property corner.



Subject property looking southeast from the northwest subject property corner.



railroad passing through the southwest corner of the property



arroyo on the property looking north from the south property border



North subject property border looking east from the northwest subject property corner.



East subject property border looking south from the northeast subject property corner.



South subject property border looking north from the southwest subject property corner.



West subject property border looking north from the southwest subject property corner.

SUBJECT PROPERTY PHOTOGRAPHS



Northwest adjacent site looking northwest from the northwest subject property corner.



North adjacent site looking northeast from the northwest subject property corner.



Northeast adjacent site looking northeast from the northeast subject property corner.



Southwest adjacent site looking northeast from the southwest subject property corner.



South adjacent site looking southwest from the southeast subject property corner.



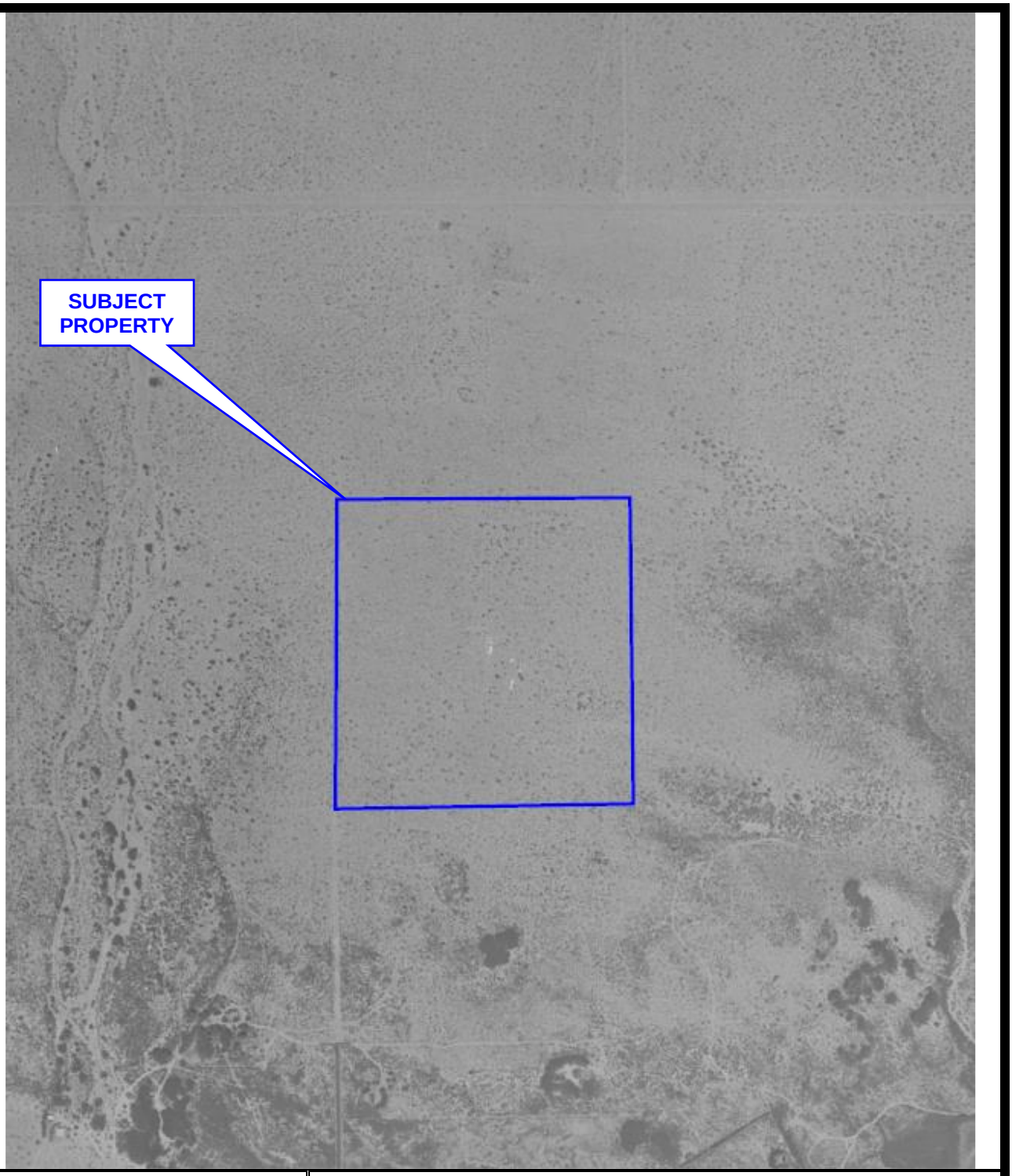
Southwest adjacent site looking southwest from the southwest subject property corner.



West adjacent site looking northwest from the southwest subject property corner.

APPENDIX C

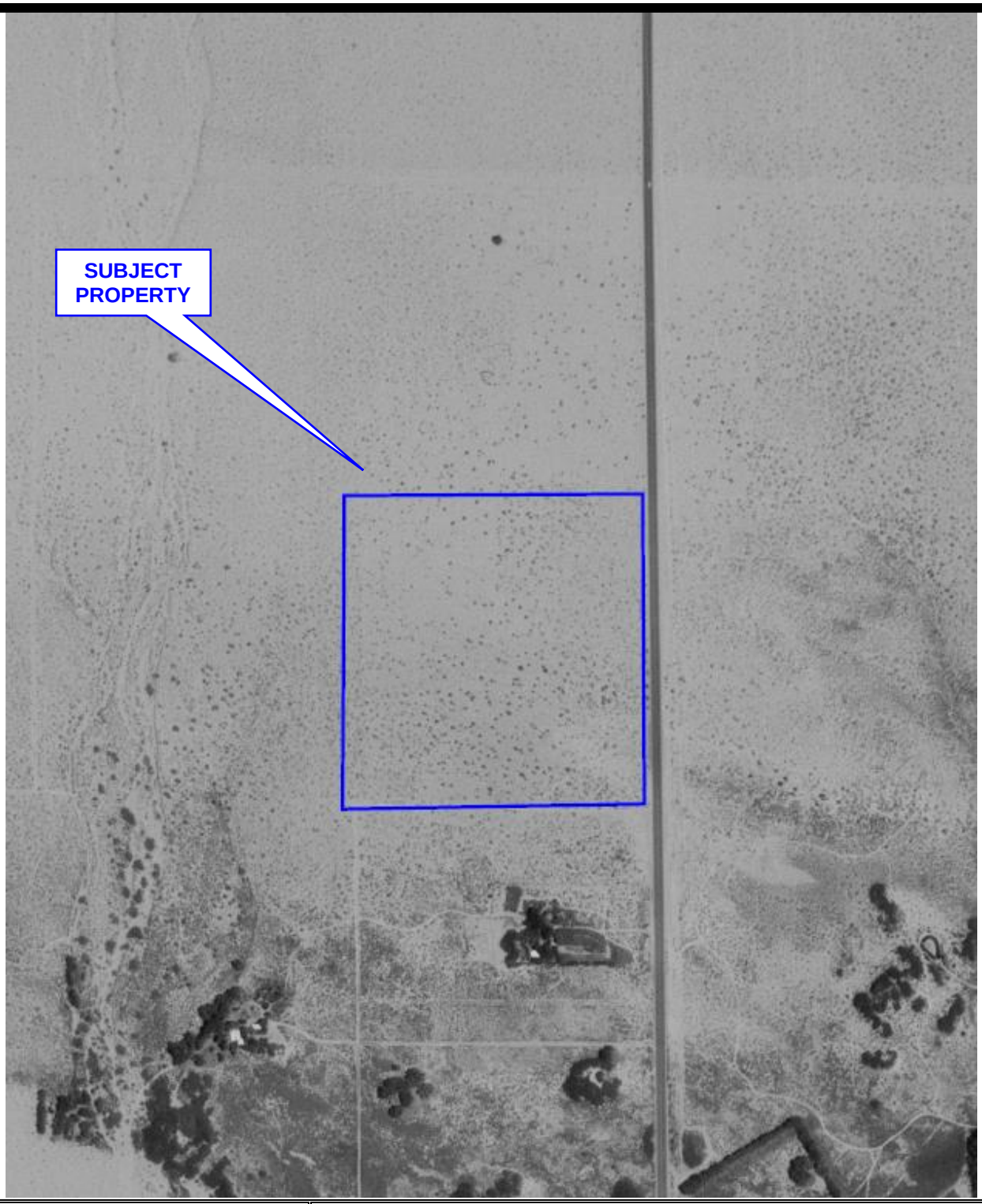
Aerial Photographs



Item: Aerial Photograph
Date: 1953
Scale: None
Project: Green Day Village ESA
Project Number: 14104.00

All Phase Environmental, Inc.

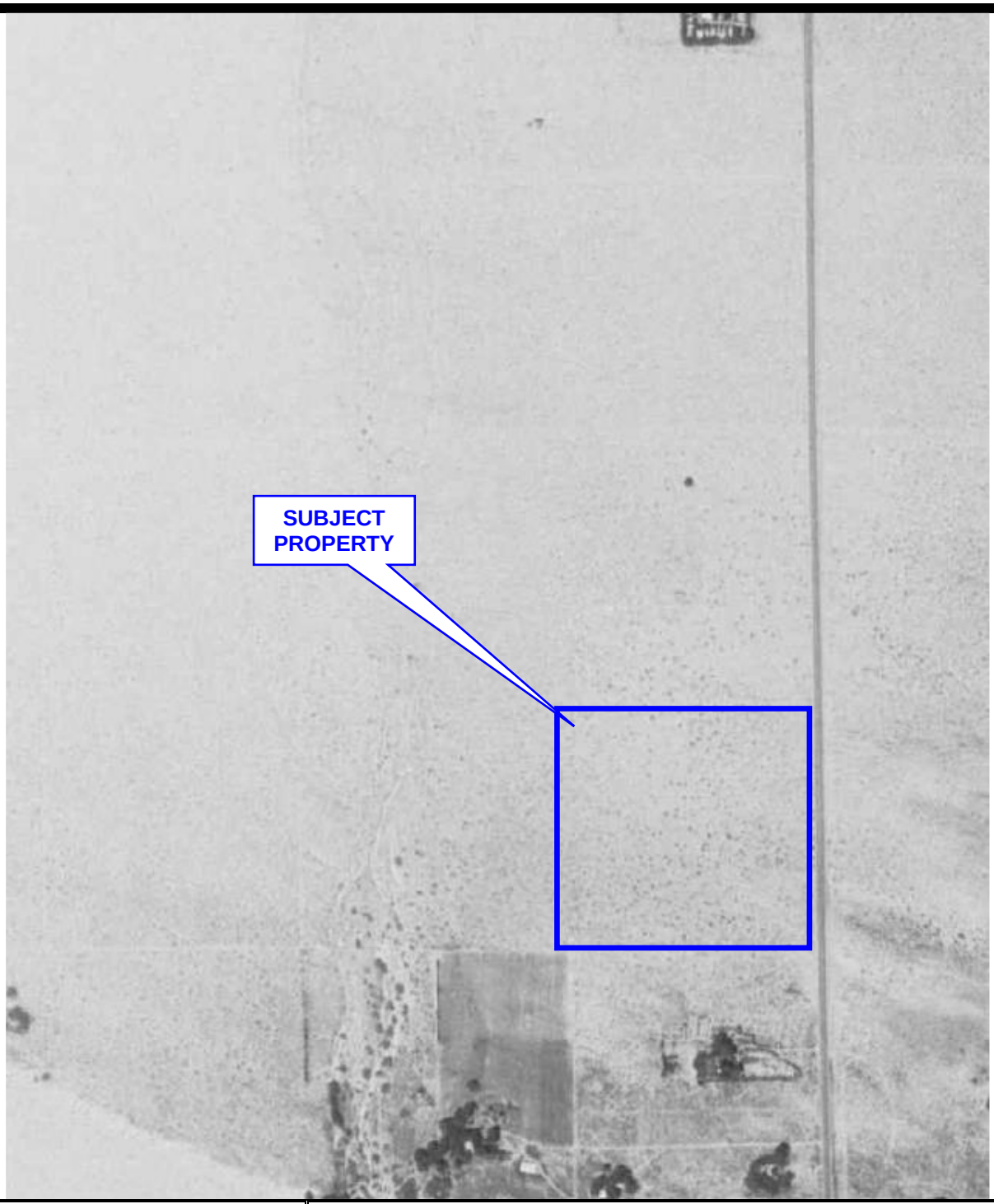
N



Item: Aerial Photograph
Date: 1972
Scale: None
Project: Green Day Village ESA
Project Number: 14104.00

All Phase Environmental, Inc.

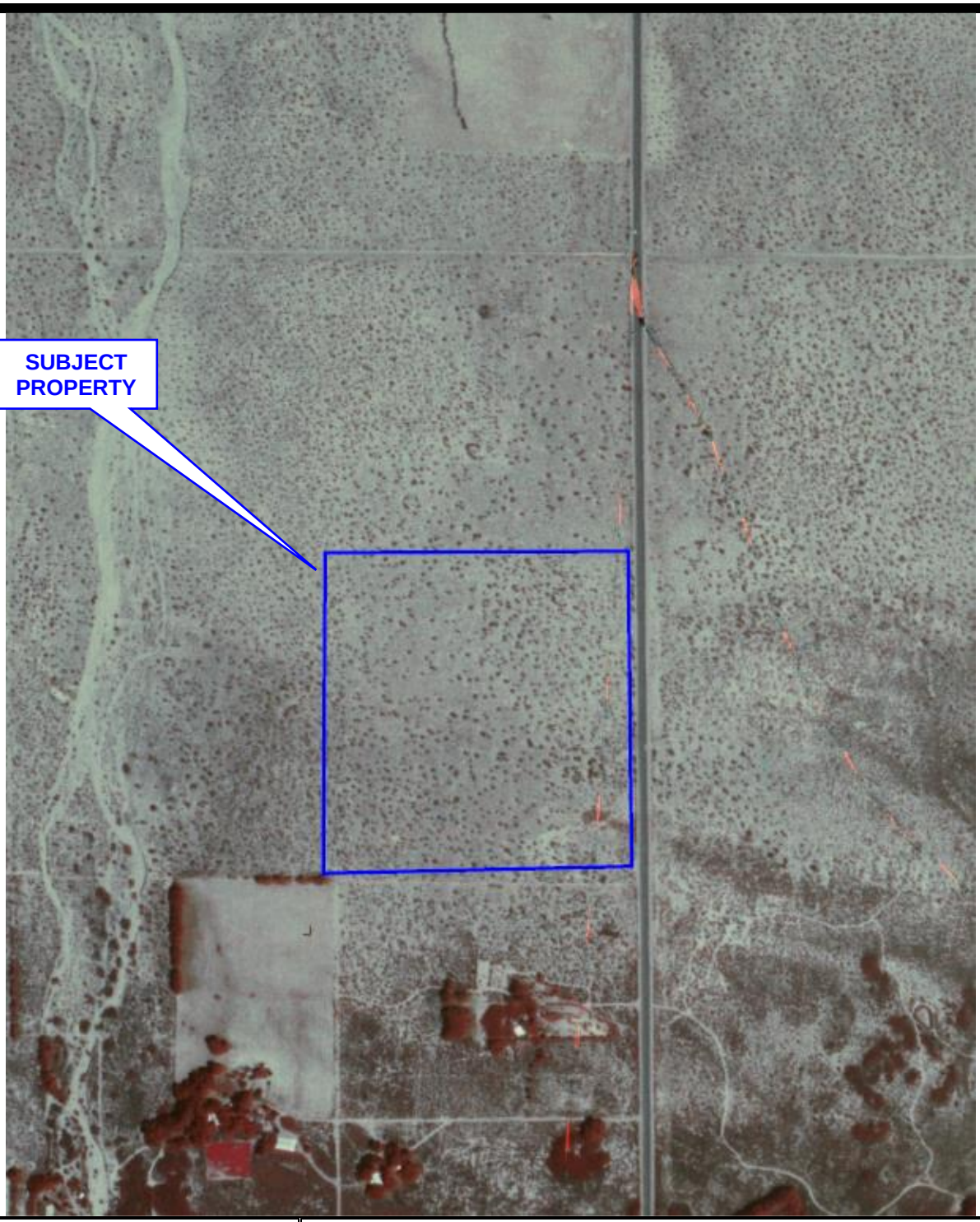
N



Item: Aerial Photograph
Date: 1975
Scale: None
Project: Green Day Village ESA
Project Number: 14104.00

All Phase Environmental, Inc.

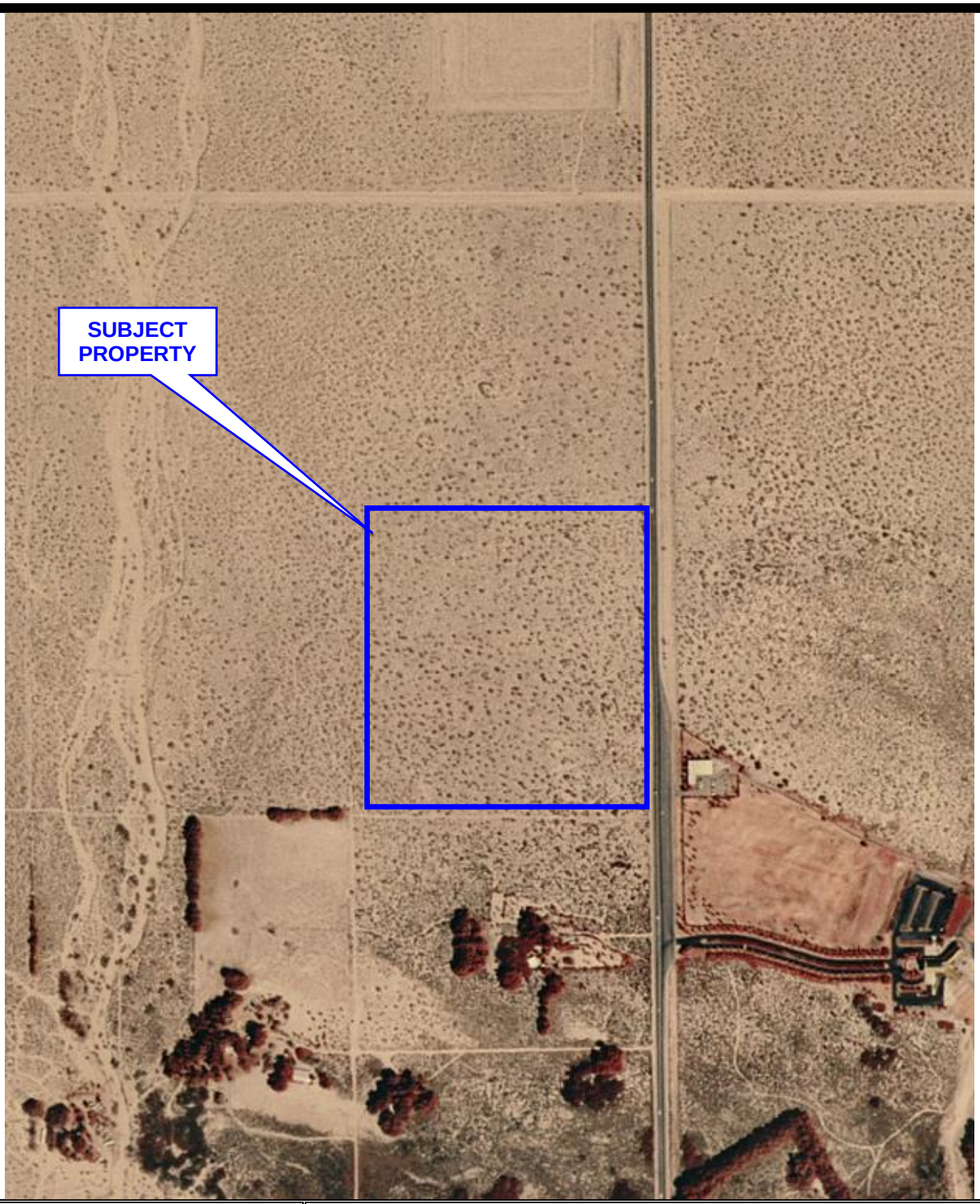
N



Item: Aerial Photograph
Date: 1984
Scale: None
Project: Green Day Village ESA
Project Number: 14104.00

All Phase Environmental, Inc.

N



Item: Aerial Photograph
Date: 1996
Scale: None
Project: Green Day Village ESA
Project Number: 14104.00

All Phase Environmental, Inc.

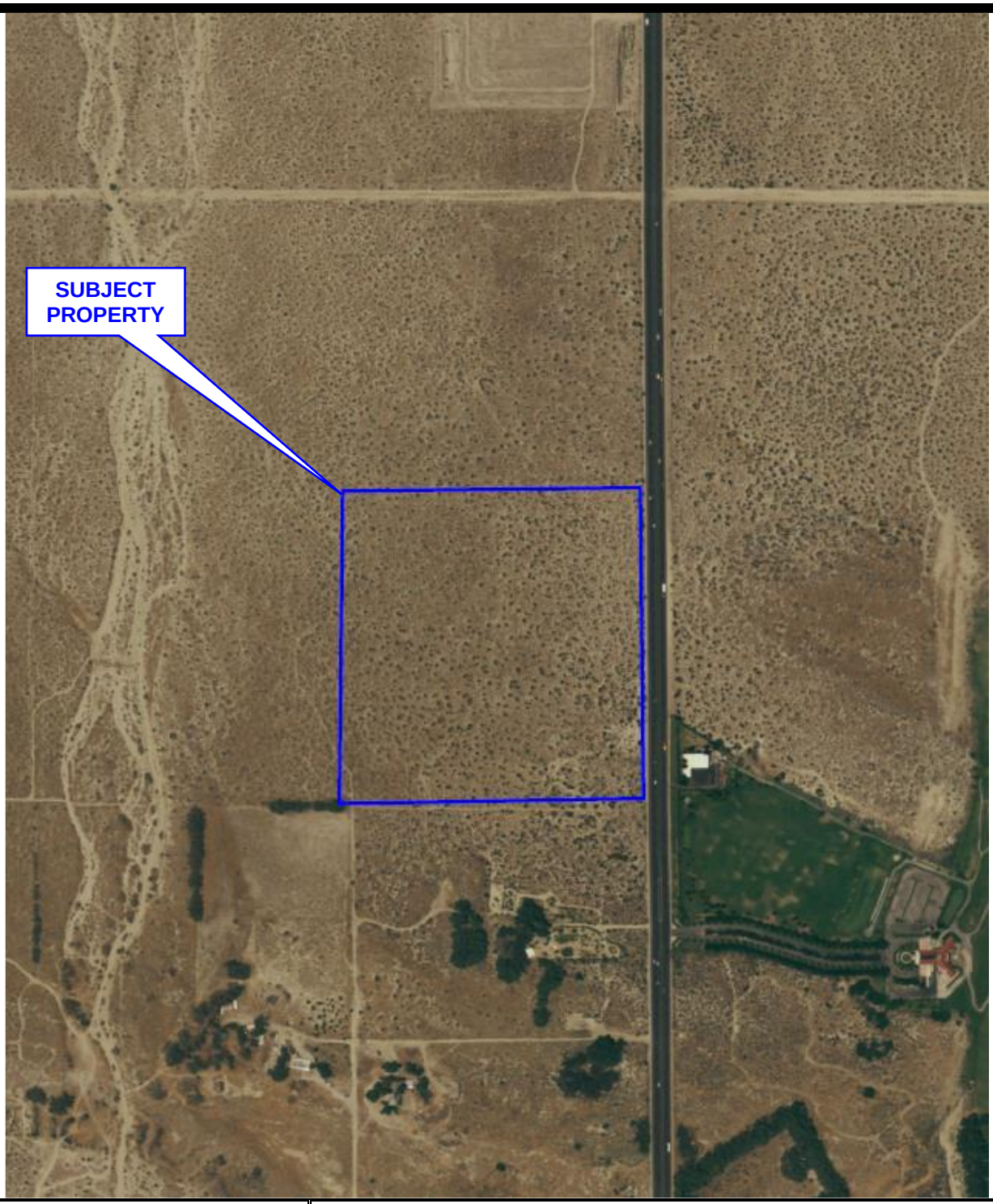
N



Item: Aerial Photograph
Date: 2002
Scale: None
Project: Green Day Village ESA
Project Number: 14104.00

All Phase Environmental, Inc.

N



Item: Aerial Photograph
Date: 2005
Scale: None
Project: Green Day Village ESA
Project Number: 14104.00

All Phase Environmental, Inc.

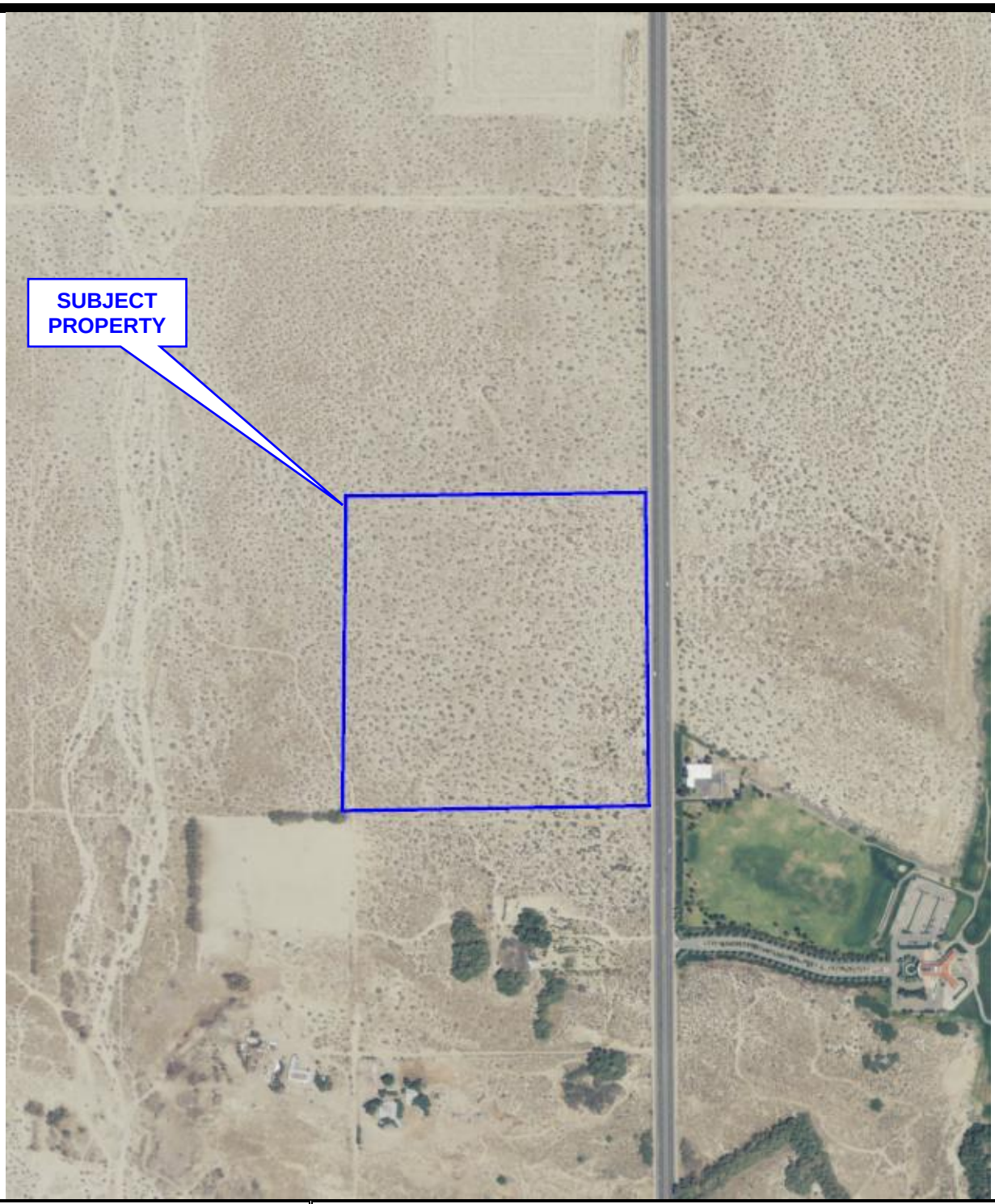
N



Item: Aerial Photograph
Date: 2009
Scale: None
Project: Green Day Village ESA
Project Number: 14104.00

All Phase Environmental, Inc.

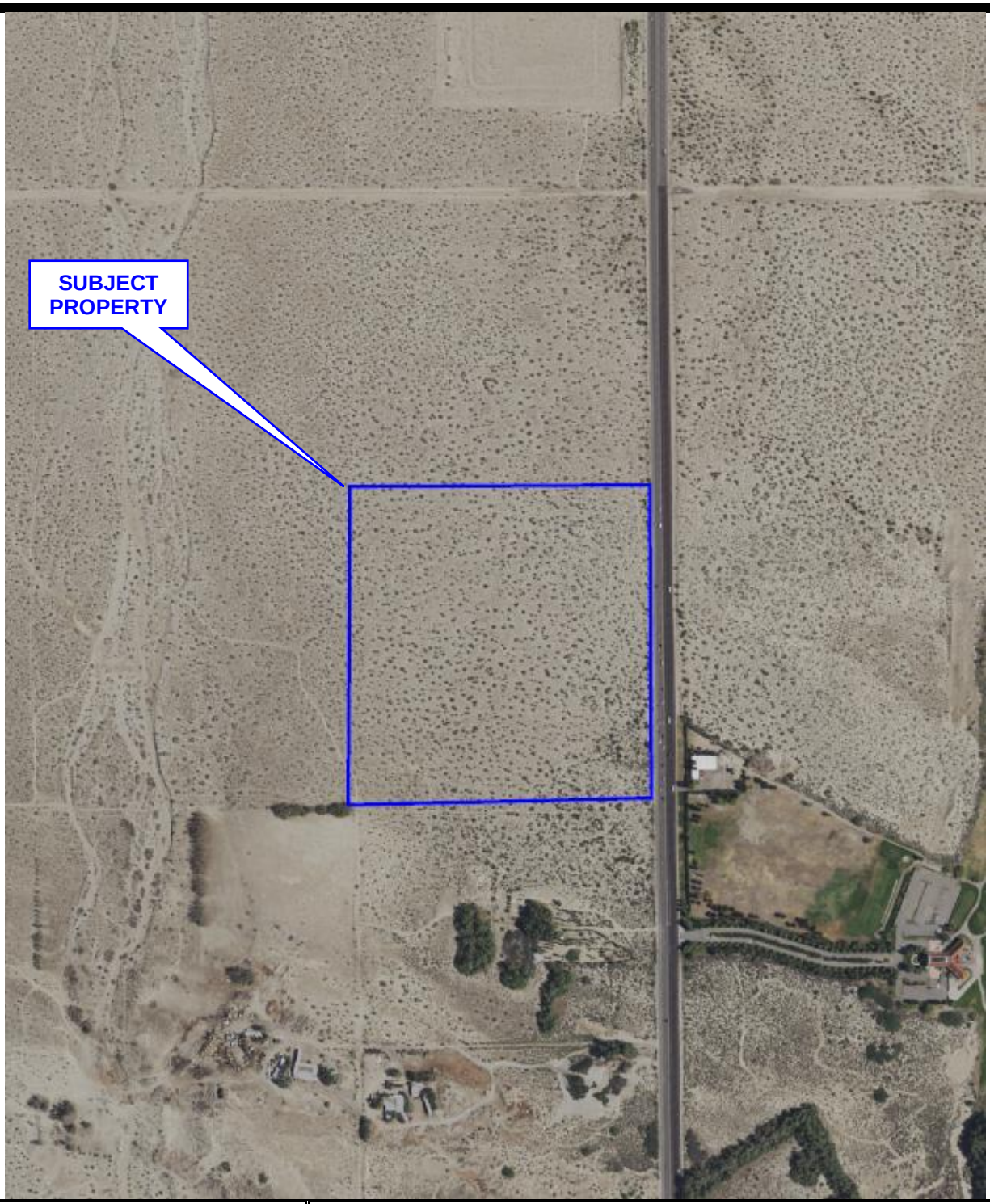
N



Item: Aerial Photograph
Date: 2012
Scale: None
Project: Green Day Village ESA
Project Number: 14104.00

All Phase Environmental, Inc.

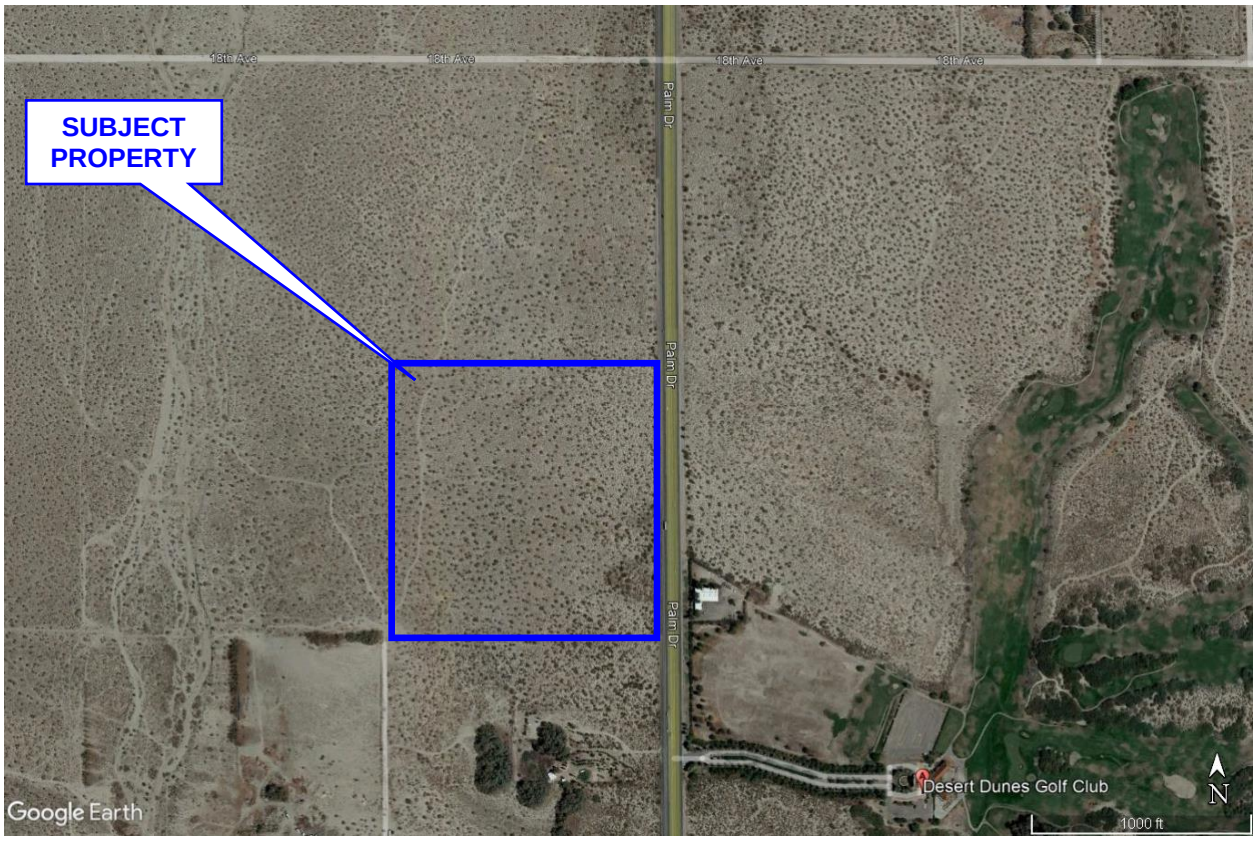
N



Item: Aerial Photograph
Date: 2016
Scale: None
Project: Green Day Village ESA
Project Number: 14104.00

All Phase Environmental, Inc.

N



Aerial Photograph, Courtesy of Google Earth
Date: 2021
Scale: None
Project: Green Day Village ESA
Project Number: 14104.00

All Phase Environmental, Inc.

N

APPENDIX D

Radius Profile Report

Green Day Village Desert Hot Springs
West of Palm Drive and 1,280 Feet South of 18th Ave
Desert Hot Springs, CA 92240

Inquiry Number: 6745970.2s
November 11, 2021

The EDR Radius Map™ Report with GeoCheck®

6 Armstrong Road, 4th floor
Shelton, CT 06484
Toll Free: 800.352.0050
www.edrnet.com

TABLE OF CONTENTS

SECTION	PAGE
Executive Summary	ES1
Overview Map	2
Detail Map	3
Map Findings Summary	4
Map Findings	9
Orphan Summary	10
Government Records Searched/Data Currency Tracking	GR-1

GEOCHECK ADDENDUM

Physical Setting Source Addendum	A-1
Physical Setting Source Summary	A-2
Physical Setting SSURGO Soil Map	A-5
Physical Setting Source Map	A-8
Physical Setting Source Map Findings	A-10
Physical Setting Source Records Searched	PSGR-1

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

Disclaimer - Copyright and Trademark Notice

This Report contains certain information obtained from a variety of public and other sources reasonably available to Environmental Data Resources, Inc. It cannot be concluded from this Report that coverage information for the target and surrounding properties does not exist from other sources. **NO WARRANTY EXPRESSED OR IMPLIED, IS MADE WHATSOEVER IN CONNECTION WITH THIS REPORT. ENVIRONMENTAL DATA RESOURCES, INC. SPECIFICALLY DISCLAIMS THE MAKING OF ANY SUCH WARRANTIES, INCLUDING WITHOUT LIMITATION, MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE. ALL RISK IS ASSUMED BY THE USER. IN NO EVENT SHALL ENVIRONMENTAL DATA RESOURCES, INC. BE LIABLE TO ANYONE, WHETHER ARISING OUT OF ERRORS OR OMISSIONS, NEGLIGENCE, ACCIDENT OR ANY OTHER CAUSE, FOR ANY LOSS OF DAMAGE, INCLUDING, WITHOUT LIMITATION, SPECIAL, INCIDENTAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES. ANY LIABILITY ON THE PART OF ENVIRONMENTAL DATA RESOURCES, INC. IS STRICTLY LIMITED TO A REFUND OF THE AMOUNT PAID FOR THIS REPORT.** Purchaser accepts this Report "AS IS". Any analyses, estimates, ratings, environmental risk levels or risk codes provided in this Report are provided for illustrative purposes only, and are not intended to provide, nor should they be interpreted as providing any facts regarding, or prediction or forecast of, any environmental risk for any property. Only a Phase I Environmental Site Assessment performed by an environmental professional can provide information regarding the environmental risk for any property. Additionally, the information provided in this Report is not to be construed as legal advice.

Copyright 2020 by Environmental Data Resources, Inc. All rights reserved. Reproduction in any media or format, in whole or in part, of any report or map of Environmental Data Resources, Inc., or its affiliates, is prohibited without prior written permission.

EDR and its logos (including Sanborn and Sanborn Map) are trademarks of Environmental Data Resources, Inc. or its affiliates. All other trademarks used herein are the property of their respective owners.

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc (EDR). The report was designed to assist parties seeking to meet the search requirements of EPA's Standards and Practices for All Appropriate Inquiries (40 CFR Part 312), the ASTM Standard Practice for Environmental Site Assessments (E 1527-13), the ASTM Standard Practice for Environmental Site Assessments for Forestland or Rural Property (E 2247-16), the ASTM Standard Practice for Limited Environmental Due Diligence: Transaction Screen Process (E 1528-14) or custom requirements developed for the evaluation of environmental risk associated with a parcel of real estate.

TARGET PROPERTY INFORMATION

ADDRESS

WEST OF PALM DRIVE AND 1,280 FEET SOUTH OF 18TH AVE
DESERT HOT SPRINGS, CA 92240

COORDINATES

Latitude (North):	33.9123280 - 33° 54' 44.38''
Longitude (West):	116.5039770 - 116° 30' 14.31''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	545854.9
UTM Y (Meters):	3752351.8
Elevation:	763 ft. above sea level

USGS TOPOGRAPHIC MAP ASSOCIATED WITH TARGET PROPERTY

Target Property Map:	12002832 DESERT HOT SPRINGS, CA
Version Date:	2018
Northeast Map:	12002902 SEVEN PALMS VALLEY, CA
Version Date:	2018

AERIAL PHOTOGRAPHY IN THIS REPORT

Portions of Photo from:	20140521
Source:	USDA

MAPPED SITES SUMMARY

Target Property Address:
WEST OF PALM DRIVE AND 1,280 FEET SOUTH OF 18TH AVE
DESERT HOT SPRINGS, CA 92240

Click on Map ID to see full detail.

MAP ID	SITE NAME	ADDRESS	DATABASE ACRONYMS	RELATIVE ELEVATION	DIST (ft. & mi.) DIRECTION

NO MAPPED SITES FOUND

EXECUTIVE SUMMARY

TARGET PROPERTY SEARCH RESULTS

The target property was not listed in any of the databases searched by EDR.

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records either on the target property or within the search radius around the target property for the following databases:

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL ---------- National Priority List
Proposed NPL ---------- Proposed National Priority List Sites
NPL LIENS ---------- Federal Superfund Liens

Federal Delisted NPL site list

Delisted NPL ---------- National Priority List Deletions

Federal CERCLIS list

FEDERAL FACILITY ---------- Federal Facility Site Information listing
SEMS ---------- Superfund Enterprise Management System

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE ---------- Superfund Enterprise Management System Archive

Federal RCRA CORRACTS facilities list

CORRACTS ---------- Corrective Action Report

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF ---------- RCRA - Treatment, Storage and Disposal

Federal RCRA generators list

RCRA-LQG ---------- RCRA - Large Quantity Generators
RCRA-SQG ---------- RCRA - Small Quantity Generators
RCRA-VSQG ---------- RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

Federal institutional controls / engineering controls registries

LUCIS ---------- Land Use Control Information System

US ENG CONTROLS..... Engineering Controls Sites List
US INST CONTROLS..... Institutional Controls Sites List

Federal ERNS list

ERNS..... Emergency Response Notification System

State- and tribal - equivalent NPL

RESPONSE..... State Response Sites

State- and tribal - equivalent CERCLIS

ENVIROSTOR..... EnviroStor Database

State and tribal landfill and/or solid waste disposal site lists

SWF/LF..... Solid Waste Information System

State and tribal leaking storage tank lists

LUST..... Geotracker's Leaking Underground Fuel Tank Report
INDIAN LUST..... Leaking Underground Storage Tanks on Indian Land
CPS-SLIC..... Statewide SLIC Cases

State and tribal registered storage tank lists

FEMA UST..... Underground Storage Tank Listing
UST..... Active UST Facilities
AST..... Aboveground Petroleum Storage Tank Facilities
INDIAN UST..... Underground Storage Tanks on Indian Land

State and tribal voluntary cleanup sites

INDIAN VCP..... Voluntary Cleanup Priority Listing
VCP..... Voluntary Cleanup Program Properties

State and tribal Brownfields sites

BROWNFIELDS..... Considered Brownfieds Sites Listing

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS..... A Listing of Brownfields Sites

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT..... Waste Management Unit Database
SWRCY..... Recycler Database
HAULERS..... Registered Waste Tire Haulers Listing
INDIAN ODI..... Report on the Status of Open Dumps on Indian Lands
ODI..... Open Dump Inventory

DEBRIS REGION 9 ---------- Torres Martinez Reservation Illegal Dump Site Locations
IHS OPEN DUMPS ---------- Open Dumps on Indian Land

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL ---------- Delisted National Clandestine Laboratory Register
HIST Cal-Sites ---------- Historical Calsites Database
SCH ---------- School Property Evaluation Program
CDL ---------- Clandestine Drug Labs
CERS HAZ WASTE ---------- CERS HAZ WASTE
Toxic Pits ---------- Toxic Pits Cleanup Act Sites
US CDL ---------- National Clandestine Laboratory Register
AQUEOUS FOAM ---------- Former Fire Training Facility Assessments Listing
PFAS ---------- PFAS Contamination Site Location Listing

Local Lists of Registered Storage Tanks

SWEEPS UST ---------- SWEEPS UST Listing
HIST UST ---------- Hazardous Substance Storage Container Database
CERS TANKS ---------- California Environmental Reporting System (CERS) Tanks
CA FID UST ---------- Facility Inventory Database

Local Land Records

LIENS ---------- Environmental Liens Listing
LIENS 2 ---------- CERCLA Lien Information
DEED ---------- Deed Restriction Listing

Records of Emergency Release Reports

HMIRS ---------- Hazardous Materials Information Reporting System
CHMIRS ---------- California Hazardous Material Incident Report System
LDS ---------- Land Disposal Sites Listing
MCS ---------- Military Cleanup Sites Listing
SPILLS 90 ---------- SPILLS 90 data from FirstSearch

Other Ascertainable Records

RCRA NonGen / NLR ---------- RCRA - Non Generators / No Longer Regulated
FUDS ---------- Formerly Used Defense Sites
DOD ---------- Department of Defense Sites
SCRD DRYCLEANERS ---------- State Coalition for Remediation of Drycleaners Listing
US FIN ASSUR ---------- Financial Assurance Information
EPA WATCH LIST ---------- EPA WATCH LIST
2020 COR ACTION ---------- 2020 Corrective Action Program List
TSCA ---------- Toxic Substances Control Act
TRIS ---------- Toxic Chemical Release Inventory System
SSTS ---------- Section 7 Tracking Systems
ROD ---------- Records Of Decision
RMP ---------- Risk Management Plans
RAATS ---------- RCRA Administrative Action Tracking System
PRP ---------- Potentially Responsible Parties
PADS ---------- PCB Activity Database System
ICIS ---------- Integrated Compliance Information System
FTTS ---------- FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

EXECUTIVE SUMMARY

MLTS	Material Licensing Tracking System
COAL ASH DOE	Steam-Electric Plant Operation Data
COAL ASH EPA	Coal Combustion Residues Surface Impoundments List
PCB TRANSFORMER	PCB Transformer Registration Database
RADINFO	Radiation Information Database
HIST FTTS	FIFRA/TSCA Tracking System Administrative Case Listing
DOT OPS	Incident and Accident Data
CONSENT	Superfund (CERCLA) Consent Decrees
INDIAN RESERV	Indian Reservations
FUSRAP	Formerly Utilized Sites Remedial Action Program
UMTRA	Uranium Mill Tailings Sites
LEAD SMELTERS	Lead Smelter Sites
US AIRS	Aerometric Information Retrieval System Facility Subsystem
US MINES	Mines Master Index File
ABANDONED MINES	Abandoned Mines
FINDS	Facility Index System/Facility Registry System
UXO	Unexploded Ordnance Sites
ECHO	Enforcement & Compliance History Information
DOCKET HWC	Hazardous Waste Compliance Docket Listing
FUELS PROGRAM	EPA Fuels Program Registered Listing
CA BOND EXP. PLAN	Bond Expenditure Plan
Cortese	"Cortese" Hazardous Waste & Substances Sites List
CUPA Listings	CUPA Resources List
DRYCLEANERS	Cleaner Facilities
EMI	Emissions Inventory Data
ENF	Enforcement Action Listing
Financial Assurance	Financial Assurance Information Listing
HAZNET	Facility and Manifest Data
ICE	ICE
HIST CORTESE	Hazardous Waste & Substance Site List
HWP	EnviroStor Permitted Facilities Listing
HWT	Registered Hazardous Waste Transporter Database
MINES	Mines Site Location Listing
MWMP	Medical Waste Management Program Listing
NPDES	NPDES Permits Listing
PEST LIC	Pesticide Regulation Licenses Listing
PROC	Certified Processors Database
Notify 65	Proposition 65 Records
UIC	UIC Listing
UIC GEO	UIC GEO (GEOTRACKER)
WASTEWATER PITS	Oil Wastewater Pits Listing
WDS	Waste Discharge System
WIP	Well Investigation Program Case List
MILITARY PRIV SITES	MILITARY PRIV SITES (GEOTRACKER)
PROJECT	PROJECT (GEOTRACKER)
WDR	Waste Discharge Requirements Listing
CIWQS	California Integrated Water Quality System
CERS	CERS
NON-CASE INFO	NON-CASE INFO (GEOTRACKER)
OTHER OIL GAS	OTHER OIL & GAS (GEOTRACKER)
PROD WATER PONDS	PROD WATER PONDS (GEOTRACKER)
SAMPLING POINT	SAMPLING POINT (GEOTRACKER)
WELL STIM PROJ	Well Stimulation Project (GEOTRACKER)
HWTS	Hazardous Waste Tracking System
MINES MRDS	Mineral Resources Data System

EXECUTIVE SUMMARY

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP ---------- EDR Proprietary Manufactured Gas Plants
EDR Hist Auto ---------- EDR Exclusive Historical Auto Stations
EDR Hist Cleaner ---------- EDR Exclusive Historical Cleaners

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF ---------- Recovered Government Archive Solid Waste Facilities List
RGA LUST ---------- Recovered Government Archive Leaking Underground Storage Tank

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.

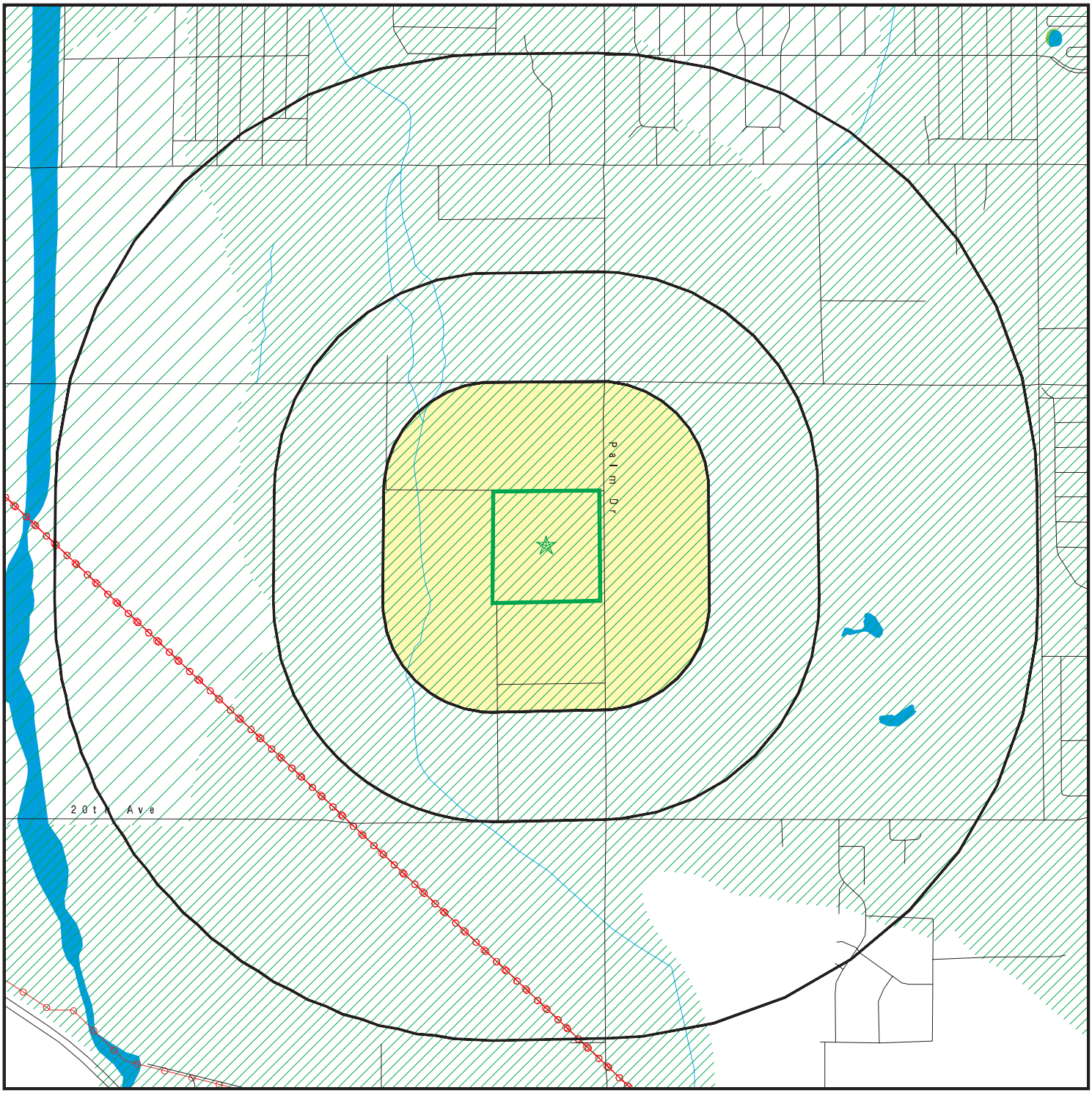
Unmappable (orphan) sites are not considered in the foregoing analysis.

EXECUTIVE SUMMARY

Due to poor or inadequate address information, the following sites were not mapped. Count: 14 records.

Site Name	Database(s)
THE CITY OF DESERT HOT SPRINGS	HAZNET, HWTS
DESERT HOT SPRINGS AKA RIVERSIDE C	CERS
DESERT HOT SPRINGS FRESH & EASY	CIWQS
	CDL
	CDL
	CDL
	CDL
	CDL
	CDL
	CDL
DESERT HOT SPRINGS DISP SITE	WMUDS/SWAT
DESERT HOT SPRINGS OIL CORP/ DBA C	RCRA NonGen / NLR
DESERT HOT SPRINGS DISP SITE	FINDS
DESERT HOT SPRINGS AKA RIVERSIDE C	RGA LF

OVERVIEW MAP - 6745970.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- National Priority List Sites
- Dept. Defense Sites

0 1/4 1/2 1 Miles

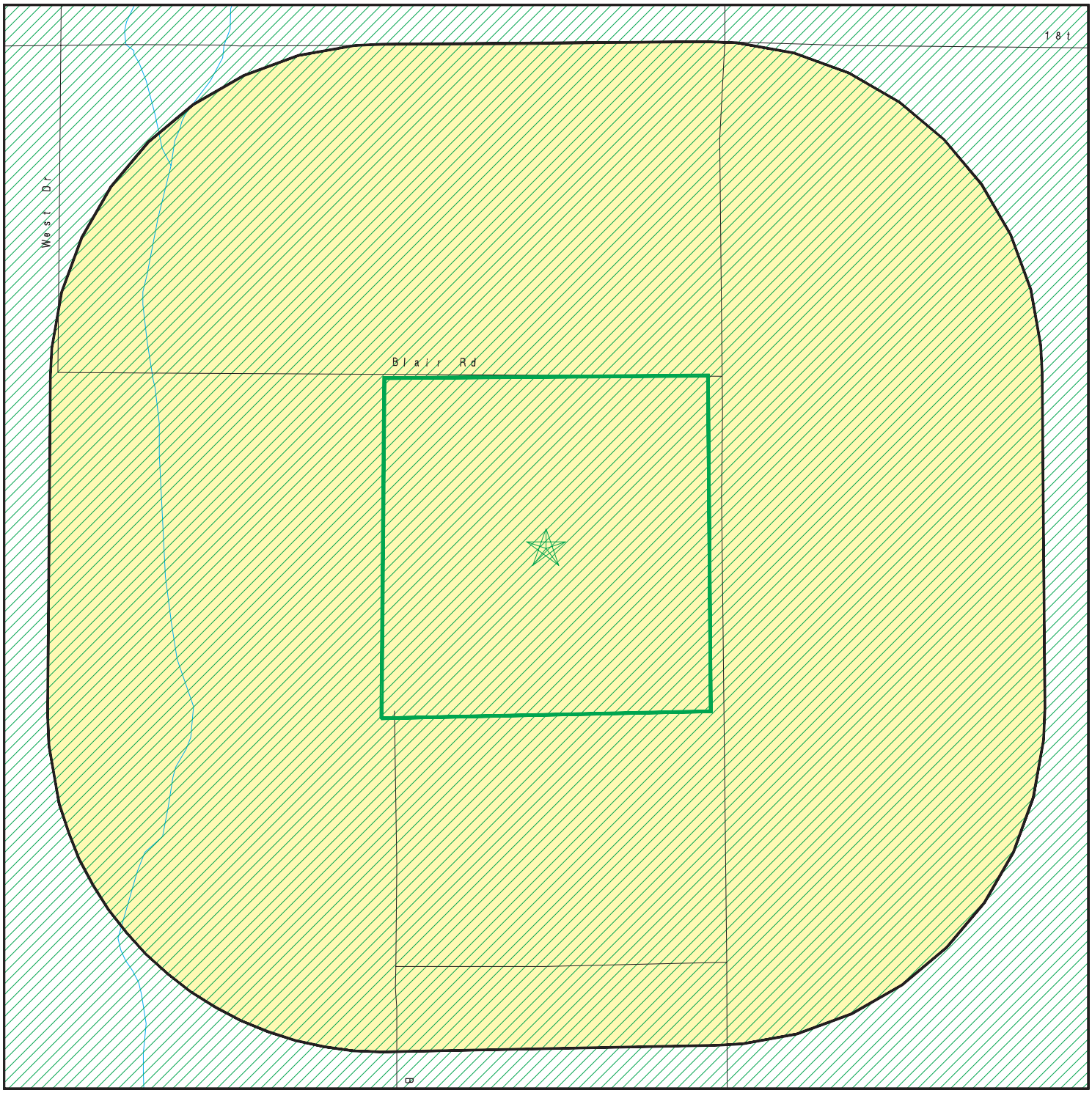
- Indian Reservations BIA
- Power transmission lines
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- National Wetland Inventory
- State Wetlands
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	Green Day Village Desert Hot Springs	CLIENT:	All Phase Environmental, Inc.
ADDRESS:	West of Palm Drive and 1,280 Feet South of 18th Ave Desert Hot Springs CA 92240	CONTACT:	Doug Kochanowski
LAT/LONG:	33.912328 / 116.503977	INQUIRY #:	6745970.2s
		DATE:	November 11, 2021 1:35 pm

Copyright © 2021 EDR, Inc. © 2015 TomTom Rel. 2015.

DETAIL MAP - 6745970.2S



- Target Property
- Sites at elevations higher than or equal to the target property
- Sites at elevations lower than the target property
- Manufactured Gas Plants
- Sensitive Receptors
- National Priority List Sites
- Dept. Defense Sites

0 1/16 1/8 1/4 Miles

- Indian Reservations BIA
- Special Flood Hazard Area (1%)
- 0.2% Annual Chance Flood Hazard
- Areas of Concern

This report includes Interactive Map Layers to display and/or hide map information. The legend includes only those icons for the default map view.

SITE NAME:	Green Day Village Desert Hot Springs	CLIENT:	All Phase Environmental, Inc.
ADDRESS:	West of Palm Drive and 1,280 Feet South of 18th Ave Desert Hot Springs CA 92240	CONTACT:	Doug Kochanowski
LAT/LONG:	33.912328 / 116.503977	INQUIRY #:	6745970.2s
		DATE:	November 11, 2021 1:38 pm

Copyright © 2021 EDR, Inc. © 2015 TomTom Rel. 2015.

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
STANDARD ENVIRONMENTAL RECORDS								
Federal NPL site list								
NPL	1.000		0	0	0	0	NR	0
Proposed NPL	1.000		0	0	0	0	NR	0
NPL LIENS	1.000		0	0	0	0	NR	0
Federal Delisted NPL site list								
Delisted NPL	1.000		0	0	0	0	NR	0
Federal CERCLIS list								
FEDERAL FACILITY	0.500		0	0	0	NR	NR	0
SEMS	0.500		0	0	0	NR	NR	0
Federal CERCLIS NFRAP site list								
SEMS-ARCHIVE	0.500		0	0	0	NR	NR	0
Federal RCRA CORRACTS facilities list								
CORRACTS	1.000		0	0	0	0	NR	0
Federal RCRA non-CORRACTS TSD facilities list								
RCRA-TSDF	0.500		0	0	0	NR	NR	0
Federal RCRA generators list								
RCRA-LQG	0.250		0	0	NR	NR	NR	0
RCRA-SQG	0.250		0	0	NR	NR	NR	0
RCRA-VSQG	0.250		0	0	NR	NR	NR	0
Federal institutional controls / engineering controls registries								
LUCIS	0.500		0	0	0	NR	NR	0
US ENG CONTROLS	0.500		0	0	0	NR	NR	0
US INST CONTROLS	0.500		0	0	0	NR	NR	0
Federal ERNS list								
ERNS	0.001		0	NR	NR	NR	NR	0
State- and tribal - equivalent NPL								
RESPONSE	1.000		0	0	0	0	NR	0
State- and tribal - equivalent CERCLIS								
ENVIROSTOR	1.000		0	0	0	0	NR	0
State and tribal landfill and/or solid waste disposal site lists								
SWF/LF	0.500		0	0	0	NR	NR	0
State and tribal leaking storage tank lists								
LUST	0.500		0	0	0	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
INDIAN LUST	0.500		0	0	0	NR	NR	0
CPS-SLIC	0.500		0	0	0	NR	NR	0
State and tribal registered storage tank lists								
FEMA UST	0.250		0	0	NR	NR	NR	0
UST	0.250		0	0	NR	NR	NR	0
AST	0.250		0	0	NR	NR	NR	0
INDIAN UST	0.250		0	0	NR	NR	NR	0
State and tribal voluntary cleanup sites								
INDIAN VCP	0.500		0	0	0	NR	NR	0
VCP	0.500		0	0	0	NR	NR	0
State and tribal Brownfields sites								
BROWNFIELDS	0.500		0	0	0	NR	NR	0
ADDITIONAL ENVIRONMENTAL RECORDS								
Local Brownfield lists								
US BROWNFIELDS	0.500		0	0	0	NR	NR	0
Local Lists of Landfill / Solid Waste Disposal Sites								
WMUDS/SWAT	0.500		0	0	0	NR	NR	0
SWRCY	0.500		0	0	0	NR	NR	0
HAULERS	0.001		0	NR	NR	NR	NR	0
INDIAN ODI	0.500		0	0	0	NR	NR	0
ODI	0.500		0	0	0	NR	NR	0
DEBRIS REGION 9	0.500		0	0	0	NR	NR	0
IHS OPEN DUMPS	0.500		0	0	0	NR	NR	0
Local Lists of Hazardous waste / Contaminated Sites								
US HIST CDL	0.001		0	NR	NR	NR	NR	0
HIST Cal-Sites	1.000		0	0	0	0	NR	0
SCH	0.250		0	0	NR	NR	NR	0
CDL	0.001		0	NR	NR	NR	NR	0
CERS HAZ WASTE	0.250		0	0	NR	NR	NR	0
Toxic Pits	1.000		0	0	0	0	NR	0
US CDL	0.001		0	NR	NR	NR	NR	0
AQUEOUS FOAM	TP		NR	NR	NR	NR	NR	0
PFAS	0.500		0	0	0	NR	NR	0
Local Lists of Registered Storage Tanks								
SWEEPS UST	0.250		0	0	NR	NR	NR	0
HIST UST	0.250		0	0	NR	NR	NR	0
CERS TANKS	0.250		0	0	NR	NR	NR	0
CA FID UST	0.250		0	0	NR	NR	NR	0
Local Land Records								
LIENS	0.001		0	NR	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
LIENS 2	0.001		0	NR	NR	NR	NR	0
DEED	0.500		0	0	0	NR	NR	0
Records of Emergency Release Reports								
HMIRS	0.001		0	NR	NR	NR	NR	0
CHMIRS	0.001		0	NR	NR	NR	NR	0
LDS	0.001		0	NR	NR	NR	NR	0
MCS	0.001		0	NR	NR	NR	NR	0
SPILLS 90	0.001		0	NR	NR	NR	NR	0
Other Ascertainable Records								
RCRA NonGen / NLR	0.250		0	0	NR	NR	NR	0
FUDS	1.000		0	0	0	0	NR	0
DOD	1.000		0	0	0	0	NR	0
SCRD DRYCLEANERS	0.500		0	0	0	NR	NR	0
US FIN ASSUR	0.001		0	NR	NR	NR	NR	0
EPA WATCH LIST	0.001		0	NR	NR	NR	NR	0
2020 COR ACTION	0.250		0	0	NR	NR	NR	0
TSCA	0.001		0	NR	NR	NR	NR	0
TRIS	0.001		0	NR	NR	NR	NR	0
SSTS	0.001		0	NR	NR	NR	NR	0
ROD	1.000		0	0	0	0	NR	0
RMP	0.001		0	NR	NR	NR	NR	0
RAATS	0.001		0	NR	NR	NR	NR	0
PRP	0.001		0	NR	NR	NR	NR	0
PADS	0.001		0	NR	NR	NR	NR	0
ICIS	0.001		0	NR	NR	NR	NR	0
FTTS	0.001		0	NR	NR	NR	NR	0
MLTS	0.001		0	NR	NR	NR	NR	0
COAL ASH DOE	0.001		0	NR	NR	NR	NR	0
COAL ASH EPA	0.500		0	0	0	NR	NR	0
PCB TRANSFORMER	0.001		0	NR	NR	NR	NR	0
RADINFO	0.001		0	NR	NR	NR	NR	0
HIST FTTS	0.001		0	NR	NR	NR	NR	0
DOT OPS	0.001		0	NR	NR	NR	NR	0
CONSENT	1.000		0	0	0	0	NR	0
INDIAN RESERV	1.000		0	0	0	0	NR	0
FUSRAP	1.000		0	0	0	0	NR	0
UMTRA	0.500		0	0	0	NR	NR	0
LEAD SMELTERS	0.001		0	NR	NR	NR	NR	0
US AIRS	0.001		0	NR	NR	NR	NR	0
US MINES	0.250		0	0	NR	NR	NR	0
ABANDONED MINES	0.250		0	0	NR	NR	NR	0
FINDS	0.001		0	NR	NR	NR	NR	0
UXO	1.000		0	0	0	0	NR	0
ECHO	0.001		0	NR	NR	NR	NR	0
DOCKET HWC	0.001		0	NR	NR	NR	NR	0
FUELS PROGRAM	0.250		0	0	NR	NR	NR	0
CA BOND EXP. PLAN	1.000		0	0	0	0	NR	0
Cortese	0.500		0	0	0	NR	NR	0
CUPA Listings	0.250		0	0	NR	NR	NR	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted
DRYCLEANERS	0.250		0	0	NR	NR	NR	0
EMI	0.001		0	NR	NR	NR	NR	0
ENF	0.001		0	NR	NR	NR	NR	0
Financial Assurance	0.001		0	NR	NR	NR	NR	0
HAZNET	0.001		0	NR	NR	NR	NR	0
ICE	0.001		0	NR	NR	NR	NR	0
HIST CORTESE	0.500		0	0	0	NR	NR	0
HWP	1.000		0	0	0	0	NR	0
HWT	0.250		0	0	NR	NR	NR	0
MINES	0.250		0	0	NR	NR	NR	0
MWMP	0.250		0	0	NR	NR	NR	0
NPDES	0.001		0	NR	NR	NR	NR	0
PEST LIC	0.001		0	NR	NR	NR	NR	0
PROC	0.500		0	0	0	NR	NR	0
Notify 65	1.000		0	0	0	0	NR	0
UIC	0.001		0	NR	NR	NR	NR	0
UIC GEO	0.001		0	NR	NR	NR	NR	0
WASTEWATER PITS	0.500		0	0	0	NR	NR	0
WDS	0.001		0	NR	NR	NR	NR	0
WIP	0.250		0	0	NR	NR	NR	0
MILITARY PRIV SITES	0.001		0	NR	NR	NR	NR	0
PROJECT	0.001		0	NR	NR	NR	NR	0
WDR	0.001		0	NR	NR	NR	NR	0
CIWQS	0.001		0	NR	NR	NR	NR	0
CERS	0.001		0	NR	NR	NR	NR	0
NON-CASE INFO	0.001		0	NR	NR	NR	NR	0
OTHER OIL GAS	0.001		0	NR	NR	NR	NR	0
PROD WATER PONDS	0.001		0	NR	NR	NR	NR	0
SAMPLING POINT	0.001		0	NR	NR	NR	NR	0
WELL STIM PROJ	0.001		0	NR	NR	NR	NR	0
HWTS	TP		NR	NR	NR	NR	NR	0
MINES MRDS	0.001		0	NR	NR	NR	NR	0
EDR HIGH RISK HISTORICAL RECORDS								
EDR Exclusive Records								
EDR MGP	1.000		0	0	0	0	NR	0
EDR Hist Auto	0.125		0	NR	NR	NR	NR	0
EDR Hist Cleaner	0.125		0	NR	NR	NR	NR	0
EDR RECOVERED GOVERNMENT ARCHIVES								
Exclusive Recovered Govt. Archives								
RGA LF	0.001		0	NR	NR	NR	NR	0
RGA LUST	0.001		0	NR	NR	NR	NR	0
- Totals --		0	0	0	0	0	0	0

MAP FINDINGS SUMMARY

Database	Search Distance (Miles)	Target Property	< 1/8	1/8 - 1/4	1/4 - 1/2	1/2 - 1	> 1	Total Plotted

NOTES:

TP = Target Property

NR = Not Requested at this Search Distance

Sites may be listed in more than one database

MAP FINDINGS

Map ID Direction Distance Elevation	Site	Database(s)	EDR ID Number EPA ID Number

NO SITES FOUND

Count: 14 records. ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)
DESERT HOT SPRINGS	S112979542	THE CITY OF DESERT HOT SPRINGS	12069 & 12073 PALM DR	92240	HAZNET, HWTS
DESERT HOT SPRINGS	S107539672		13TH AVE, 100 YDS W OF INDIAN	92240	CDL
DESERT HOT SPRINGS	S107538318		DOWELL LN, 100 YDS S OF DILLIO	92240	CDL
DESERT HOT SPRINGS	S107526558		1 MI E OF HWY 62 ON INDIAN AVE	92240	CDL
DESERT HOT SPRINGS	S114727173	DESERT HOT SPRINGS AKA RIVERSIDE C	1/2 MI EAST OF HACIENDA/LONG C		RGA LF
DESERT HOT SPRINGS	S123525284	DESERT HOT SPRINGS AKA RIVERSIDE C	1/2 MI EAST OF HACIENDA/LONG C	92240	CERS
DESERT HOT SPRINGS	S121633711	DESERT HOT SPRINGS FRESH & EASY	NEC PALM DR & HACIENDA AVE	92240	CIWQS
DESERT HOT SPRINGS	1023223539	DESERT HOT SPRINGS DISP SITE	N. OF I-10	92240	FINDS
DESERT HOT SPRINGS	1025869176	DESERT HOT SPRINGS OIL CORP/ DBA C	22600 PALM DR	92240	RCRA NonGen / NLR
DESERT HOT SPRINGS	S108723917		PALM DR, 100 YARDS S OF DILLON	92240	CDL
DESERT HOT SPRINGS C	S103442576	DESERT HOT SPRINGS DISP SITE	N. OF I-10	92240	WMUDS/SWAT
RIVERSIDE COUNTY	S107541240		WINEVILLE, SW CORNER OF GAGELE		CDL
SKY VALLEY	S107539161		LANGLOIS RD @ 19TH AVE, 1/2 MI	92241	CDL
SKY VALLEY	S107539508		NEAR CORNER OF LYONS BLVD & QU	92240	CDL

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Number of Days to Update: Provides confirmation that EDR is reporting records that have been updated within 90 days from the date the government agency made the information available to the public.

STANDARD ENVIRONMENTAL RECORDS

Federal NPL site list

NPL: National Priority List

National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 07/29/2021
Date Data Arrived at EDR: 08/04/2021
Date Made Active in Reports: 08/31/2021
Number of Days to Update: 27

Source: EPA
Telephone: N/A
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 01/10/2022
Data Release Frequency: Quarterly

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 5
Telephone 312-886-6686

EPA Region 6
Telephone: 214-655-6659

EPA Region 7
Telephone: 913-551-7247

EPA Region 8
Telephone: 303-312-6774

EPA Region 9
Telephone: 415-947-4246

EPA Region 10
Telephone 206-553-8665

Proposed NPL: Proposed National Priority List Sites

A site that has been proposed for listing on the National Priorities List through the issuance of a proposed rule in the Federal Register. EPA then accepts public comments on the site, responds to the comments, and places on the NPL those sites that continue to meet the requirements for listing.

Date of Government Version: 07/29/2021
Date Data Arrived at EDR: 08/04/2021
Date Made Active in Reports: 08/31/2021
Number of Days to Update: 27

Source: EPA
Telephone: N/A
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 01/10/2022
Data Release Frequency: Quarterly

NPL LIENS: Federal Superfund Liens

Federal Superfund Liens. Under the authority granted the USEPA by CERCLA of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner received notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/1991
Date Data Arrived at EDR: 02/02/1994
Date Made Active in Reports: 03/30/1994
Number of Days to Update: 56

Source: EPA
Telephone: 202-564-4267
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

Federal Delisted NPL site list

Delisted NPL: National Priority List Deletions

The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 07/29/2021
Date Data Arrived at EDR: 08/04/2021
Date Made Active in Reports: 08/31/2021
Number of Days to Update: 27

Source: EPA
Telephone: N/A
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 01/10/2022
Data Release Frequency: Quarterly

Federal CERCLIS list

FEDERAL FACILITY: Federal Facility Site Information listing

A listing of National Priority List (NPL) and Base Realignment and Closure (BRAC) sites found in the Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS) Database where EPA Federal Facilities Restoration and Reuse Office is involved in cleanup activities.

Date of Government Version: 05/25/2021
Date Data Arrived at EDR: 06/24/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 703-603-8704
Last EDR Contact: 10/01/2021
Next Scheduled EDR Contact: 01/10/2022
Data Release Frequency: Varies

SEMS: Superfund Enterprise Management System

SEMS (Superfund Enterprise Management System) tracks hazardous waste sites, potentially hazardous waste sites, and remedial activities performed in support of EPA's Superfund Program across the United States. The list was formerly know as CERCLIS, renamed to SEMS by the EPA in 2015. The list contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). This dataset also contains sites which are either proposed to or on the National Priorities List (NPL) and the sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 07/29/2021
Date Data Arrived at EDR: 08/04/2021
Date Made Active in Reports: 08/31/2021
Number of Days to Update: 27

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 01/24/2022
Data Release Frequency: Quarterly

Federal CERCLIS NFRAP site list

SEMS-ARCHIVE: Superfund Enterprise Management System Archive

SEMS-ARCHIVE (Superfund Enterprise Management System Archive) tracks sites that have no further interest under the Federal Superfund Program based on available information. The list was formerly known as the CERCLIS-NFRAP, renamed to SEMS ARCHIVE by the EPA in 2015. EPA may perform a minimal level of assessment work at a site while it is archived if site conditions change and/or new information becomes available. Archived sites have been removed and archived from the inventory of SEMS sites. Archived status indicates that, to the best of EPA's knowledge, assessment at a site has been completed and that EPA has determined no further steps will be taken to list the site on the National Priorities List (NPL), unless information indicates this decision was not appropriate or other considerations require a recommendation for listing at a later time. The decision does not necessarily mean that there is no hazard associated with a given site; it only means that. based upon available information, the location is not judged to be potential NPL site.

Date of Government Version: 07/29/2021
Date Data Arrived at EDR: 08/04/2021
Date Made Active in Reports: 08/31/2021
Number of Days to Update: 27

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 01/24/2022
Data Release Frequency: Quarterly

Federal RCRA CORRACTS facilities list

CORRACTS: Corrective Action Report

CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 10/12/2021
Number of Days to Update: 27

Source: EPA
Telephone: 800-424-9346
Last EDR Contact: 09/15/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Quarterly

Federal RCRA non-CORRACTS TSD facilities list

RCRA-TSDF: RCRA - Treatment, Storage and Disposal

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Transporters are individuals or entities that move hazardous waste from the generator offsite to a facility that can recycle, treat, store, or dispose of the waste. TSDFs treat, store, or dispose of the waste.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 10/12/2021
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/15/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Quarterly

Federal RCRA generators list

RCRA-LQG: RCRA - Large Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Large quantity generators (LQGs) generate over 1,000 kilograms (kg) of hazardous waste, or over 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 10/12/2021
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/15/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Quarterly

RCRA-SQG: RCRA - Small Quantity Generators

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Small quantity generators (SQGs) generate between 100 kg and 1,000 kg of hazardous waste per month.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 10/12/2021
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/15/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Quarterly

RCRA-VSQG: RCRA - Very Small Quantity Generators (Formerly Conditionally Exempt Small Quantity Generators)

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Very small quantity generators (VSQGs) generate less than 100 kg of hazardous waste, or less than 1 kg of acutely hazardous waste per month.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 10/12/2021
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/15/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Quarterly

Federal institutional controls / engineering controls registries

LUCIS: Land Use Control Information System

LUCIS contains records of land use control information pertaining to the former Navy Base Realignment and Closure properties.

Date of Government Version: 07/12/2021
Date Data Arrived at EDR: 08/06/2021
Date Made Active in Reports: 10/22/2021
Number of Days to Update: 77

Source: Department of the Navy
Telephone: 843-820-7326
Last EDR Contact: 11/08/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: Varies

US ENG CONTROLS: Engineering Controls Sites List

A listing of sites with engineering controls in place. Engineering controls include various forms of caps, building foundations, liners, and treatment methods to create pathway elimination for regulated substances to enter environmental media or effect human health.

Date of Government Version: 05/17/2021
Date Data Arrived at EDR: 05/21/2021
Date Made Active in Reports: 08/11/2021
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 08/23/2021
Next Scheduled EDR Contact: 12/06/2021
Data Release Frequency: Varies

US INST CONTROLS: Institutional Controls Sites List

A listing of sites with institutional controls in place. Institutional controls include administrative measures, such as groundwater use restrictions, construction restrictions, property use restrictions, and post remediation care requirements intended to prevent exposure to contaminants remaining on site. Deed restrictions are generally required as part of the institutional controls.

Date of Government Version: 05/17/2021
Date Data Arrived at EDR: 05/21/2021
Date Made Active in Reports: 08/11/2021
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 703-603-0695
Last EDR Contact: 08/23/2021
Next Scheduled EDR Contact: 12/06/2021
Data Release Frequency: Varies

Federal ERNS list

ERNS: Emergency Response Notification System

Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 06/14/2021
Date Data Arrived at EDR: 06/17/2021
Date Made Active in Reports: 08/17/2021
Number of Days to Update: 61

Source: National Response Center, United States Coast Guard
Telephone: 202-267-2180
Last EDR Contact: 09/21/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Quarterly

State- and tribal - equivalent NPL

RESPONSE: State Response Sites

Identifies confirmed release sites where DTSC is involved in remediation, either in a lead or oversight capacity. These confirmed release sites are generally high-priority and high potential risk.

Date of Government Version: 07/22/2021
Date Data Arrived at EDR: 07/22/2021
Date Made Active in Reports: 10/08/2021
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 10/26/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Quarterly

State- and tribal - equivalent CERCLIS

ENVIROSTOR: EnviroStor Database

The Department of Toxic Substances Control's (DTSC's) Site Mitigation and Brownfields Reuse Program's (SMBRP's) EnviroStor database identifes sites that have known contamination or sites for which there may be reasons to investigate further. The database includes the following site types: Federal Superfund sites (National Priorities List (NPL)); State Response, including Military Facilities and State Superfund; Voluntary Cleanup; and School sites. EnviroStor provides similar information to the information that was available in CalSites, and provides additional site information, including, but not limited to, identification of formerly-contaminated properties that have been released for reuse, properties where environmental deed restrictions have been recorded to prevent inappropriate land uses, and risk characterization information that is used to assess potential impacts to public health and the environment at contaminated sites.

Date of Government Version: 07/22/2021
Date Data Arrived at EDR: 07/22/2021
Date Made Active in Reports: 10/08/2021
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 10/26/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Quarterly

State and tribal landfill and/or solid waste disposal site lists

SWF/LF (SWIS): Solid Waste Information System

Active, Closed and Inactive Landfills. SWF/LF records typically contain an inve ntory of solid waste disposal facilities or landfills. These may be active or i nactive facilities or open dumps that failed to meet RCRA Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 08/09/2021
Date Data Arrived at EDR: 08/10/2021
Date Made Active in Reports: 11/05/2021
Number of Days to Update: 87

Source: Department of Resources Recycling and Recovery
Telephone: 916-341-6320
Last EDR Contact: 11/09/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: Quarterly

State and tribal leaking storage tank lists

LUST REG 9: Leaking Underground Storage Tank Report
Orange, Riverside, San Diego counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 03/01/2001
Date Data Arrived at EDR: 04/23/2001
Date Made Active in Reports: 05/21/2001
Number of Days to Update: 28

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-637-5595
Last EDR Contact: 09/26/2011
Next Scheduled EDR Contact: 01/09/2012
Data Release Frequency: No Update Planned

LUST REG 8: Leaking Underground Storage Tanks
California Regional Water Quality Control Board Santa Ana Region (8). For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/14/2005
Date Data Arrived at EDR: 02/15/2005
Date Made Active in Reports: 03/28/2005
Number of Days to Update: 41

Source: California Regional Water Quality Control Board Santa Ana Region (8)
Telephone: 909-782-4496
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

LUST REG 7: Leaking Underground Storage Tank Case Listing
Leaking Underground Storage Tank locations. Imperial, Riverside, San Diego, Santa Barbara counties.

Date of Government Version: 02/26/2004
Date Data Arrived at EDR: 02/26/2004
Date Made Active in Reports: 03/24/2004
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Colorado River Basin Region (7)
Telephone: 760-776-8943
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 5: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Alameda, Alpine, Amador, Butte, Colusa, Contra Costa, Calveras, El Dorado, Fresno, Glenn, Kern, Kings, Lake, Lassen, Madera, Mariposa, Merced, Modoc, Napa, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Solano, Stanislaus, Sutter, Tehama, Tulare, Tuolumne, Yolo, Yuba counties.

Date of Government Version: 07/01/2008
Date Data Arrived at EDR: 07/22/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 9

Source: California Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-4834
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

LUST REG 3: Leaking Underground Storage Tank Database
Leaking Underground Storage Tank locations. Monterey, San Benito, San Luis Obispo, Santa Barbara, Santa Cruz counties.

Date of Government Version: 05/19/2003
Date Data Arrived at EDR: 05/19/2003
Date Made Active in Reports: 06/02/2003
Number of Days to Update: 14

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-542-4786
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

LUST REG 2: Fuel Leak List
Leaking Underground Storage Tank locations. Alameda, Contra Costa, Marin, Napa, San Francisco, San Mateo, Santa Clara, Solano, Sonoma counties.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: California Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-622-2433
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

LUST REG 1: Active Toxic Site Investigation

Del Norte, Humboldt, Lake, Mendocino, Modoc, Siskiyou, Sonoma, Trinity counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 02/01/2001
Date Data Arrived at EDR: 02/28/2001
Date Made Active in Reports: 03/29/2001
Number of Days to Update: 29

Source: California Regional Water Quality Control Board North Coast (1)
Telephone: 707-570-3769
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

LUST REG 6V: Leaking Underground Storage Tank Case Listing

Leaking Underground Storage Tank locations. Inyo, Kern, Los Angeles, Mono, San Bernardino counties.

Date of Government Version: 06/07/2005
Date Data Arrived at EDR: 06/07/2005
Date Made Active in Reports: 06/29/2005
Number of Days to Update: 22

Source: California Regional Water Quality Control Board Victorville Branch Office (6)
Telephone: 760-241-7365
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 6L: Leaking Underground Storage Tank Case Listing

For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/09/2003
Date Data Arrived at EDR: 09/10/2003
Date Made Active in Reports: 10/07/2003
Number of Days to Update: 27

Source: California Regional Water Quality Control Board Lahontan Region (6)
Telephone: 530-542-5572
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

LUST REG 4: Underground Storage Tank Leak List

Los Angeles, Ventura counties. For more current information, please refer to the State Water Resources Control Board's LUST database.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6710
Last EDR Contact: 09/06/2011
Next Scheduled EDR Contact: 12/19/2011
Data Release Frequency: No Update Planned

LUST: Leaking Underground Fuel Tank Report (GEOTRACKER)

Leaking Underground Storage Tank (LUST) Sites included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/24/2021
Number of Days to Update: 82

Source: State Water Resources Control Board
Telephone: see region list
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Quarterly

INDIAN LUST R6: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in New Mexico and Oklahoma.

Date of Government Version: 05/17/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 6
Telephone: 214-665-6597
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INDIAN LUST R4: Leaking Underground Storage Tanks on Indian Land

LUSTs on Indian land in Florida, Mississippi and North Carolina.

Date of Government Version: 05/28/2021
Date Data Arrived at EDR: 06/22/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 90
Source: EPA Region 4
Telephone: 404-562-8677
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INDIAN LUST R8: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming.

Date of Government Version: 05/27/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88
Source: EPA Region 8
Telephone: 303-312-6271
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INDIAN LUST R5: Leaking Underground Storage Tanks on Indian Land
Leaking underground storage tanks located on Indian Land in Michigan, Minnesota and Wisconsin.

Date of Government Version: 04/06/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88
Source: EPA, Region 5
Telephone: 312-886-7439
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INDIAN LUST R10: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Alaska, Idaho, Oregon and Washington.

Date of Government Version: 04/27/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88
Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INDIAN LUST R9: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Arizona, California, New Mexico and Nevada

Date of Government Version: 05/27/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88
Source: Environmental Protection Agency
Telephone: 415-972-3372
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INDIAN LUST R7: Leaking Underground Storage Tanks on Indian Land
LUSTs on Indian land in Iowa, Kansas, and Nebraska

Date of Government Version: 06/01/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88
Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INDIAN LUST R1: Leaking Underground Storage Tanks on Indian Land
A listing of leaking underground storage tank locations on Indian Land.

Date of Government Version: 04/28/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88
Source: EPA Region 1
Telephone: 617-918-1313
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

CPS-SLIC: Statewide SLIC Cases (GEOTRACKER)

Cleanup Program Sites (CPS; also known as Site Cleanups [SC] and formerly known as Spills, Leaks, Investigations, and Cleanups [SLIC] sites) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/24/2021
Number of Days to Update: 82

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Varies

SLIC REG 1: Active Toxic Site Investigations

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2003
Date Data Arrived at EDR: 04/07/2003
Date Made Active in Reports: 04/25/2003
Number of Days to Update: 18

Source: California Regional Water Quality Control Board, North Coast Region (1)
Telephone: 707-576-2220
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 2: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/30/2004
Date Data Arrived at EDR: 10/20/2004
Date Made Active in Reports: 11/19/2004
Number of Days to Update: 30

Source: Regional Water Quality Control Board San Francisco Bay Region (2)
Telephone: 510-286-0457
Last EDR Contact: 09/19/2011
Next Scheduled EDR Contact: 01/02/2012
Data Release Frequency: No Update Planned

SLIC REG 3: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/18/2006
Date Data Arrived at EDR: 05/18/2006
Date Made Active in Reports: 06/15/2006
Number of Days to Update: 28

Source: California Regional Water Quality Control Board Central Coast Region (3)
Telephone: 805-549-3147
Last EDR Contact: 07/18/2011
Next Scheduled EDR Contact: 10/31/2011
Data Release Frequency: No Update Planned

SLIC REG 4: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/17/2004
Date Data Arrived at EDR: 11/18/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 47

Source: Region Water Quality Control Board Los Angeles Region (4)
Telephone: 213-576-6600
Last EDR Contact: 07/01/2011
Next Scheduled EDR Contact: 10/17/2011
Data Release Frequency: No Update Planned

SLIC REG 5: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing

The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/01/2005
Date Data Arrived at EDR: 04/05/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 16

Source: Regional Water Quality Control Board Central Valley Region (5)
Telephone: 916-464-3291
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

SLIC REG 6V: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 05/24/2005
Date Data Arrived at EDR: 05/25/2005
Date Made Active in Reports: 06/16/2005
Number of Days to Update: 22

Source: Regional Water Quality Control Board, Victorville Branch
Telephone: 619-241-6583
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 6L: SLIC Sites
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/07/2004
Date Data Arrived at EDR: 09/07/2004
Date Made Active in Reports: 10/12/2004
Number of Days to Update: 35

Source: California Regional Water Quality Control Board, Lahontan Region
Telephone: 530-542-5574
Last EDR Contact: 08/15/2011
Next Scheduled EDR Contact: 11/28/2011
Data Release Frequency: No Update Planned

SLIC REG 7: SLIC List
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 11/24/2004
Date Data Arrived at EDR: 11/29/2004
Date Made Active in Reports: 01/04/2005
Number of Days to Update: 36

Source: California Regional Quality Control Board, Colorado River Basin Region
Telephone: 760-346-7491
Last EDR Contact: 08/01/2011
Next Scheduled EDR Contact: 11/14/2011
Data Release Frequency: No Update Planned

SLIC REG 8: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 04/03/2008
Date Data Arrived at EDR: 04/03/2008
Date Made Active in Reports: 04/14/2008
Number of Days to Update: 11

Source: California Region Water Quality Control Board Santa Ana Region (8)
Telephone: 951-782-3298
Last EDR Contact: 09/12/2011
Next Scheduled EDR Contact: 12/26/2011
Data Release Frequency: No Update Planned

SLIC REG 9: Spills, Leaks, Investigation & Cleanup Cost Recovery Listing
The SLIC (Spills, Leaks, Investigations and Cleanup) program is designed to protect and restore water quality from spills, leaks, and similar discharges.

Date of Government Version: 09/10/2007
Date Data Arrived at EDR: 09/11/2007
Date Made Active in Reports: 09/28/2007
Number of Days to Update: 17

Source: California Regional Water Quality Control Board San Diego Region (9)
Telephone: 858-467-2980
Last EDR Contact: 08/08/2011
Next Scheduled EDR Contact: 11/21/2011
Data Release Frequency: No Update Planned

State and tribal registered storage tank lists

FEMA UST: Underground Storage Tank Listing
A listing of all FEMA owned underground storage tanks.

Date of Government Version: 01/29/2021
Date Data Arrived at EDR: 02/17/2021
Date Made Active in Reports: 03/22/2021
Number of Days to Update: 33

Source: FEMA
Telephone: 202-646-5797
Last EDR Contact: 11/01/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Varies

MILITARY UST SITES: Military UST Sites (GEOTRACKER)
Military ust sites

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/24/2021
Number of Days to Update: 82

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Varies

UST: Active UST Facilities
Active UST facilities gathered from the local regulatory agencies

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/24/2021
Number of Days to Update: 82

Source: SWRCB
Telephone: 916-341-5851
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Semi-Annually

UST CLOSURE: Proposed Closure of Underground Storage Tank (UST) Cases
UST cases that are being considered for closure by either the State Water Resources Control Board or the Executive Director have been posted for a 60-day public comment period. UST Case Closures being proposed for consideration by the State Water Resources Control Board. These are primarily UST cases that meet closure criteria under the decisional framework in State Water Board Resolution No. 92-49 and other Board orders. UST Case Closures proposed for consideration by the Executive Director pursuant to State Water Board Resolution No. 2012-0061. These are cases that meet the criteria of the Low-Threat UST Case Closure Policy. UST Case Closure Review Denials and Approved Orders.

Date of Government Version: 05/20/2021
Date Data Arrived at EDR: 06/04/2021
Date Made Active in Reports: 08/30/2021
Number of Days to Update: 87

Source: State Water Resources Control Board
Telephone: 916-327-7844
Last EDR Contact: 09/08/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Varies

AST: Aboveground Petroleum Storage Tank Facilities
A listing of aboveground storage tank petroleum storage tank locations.

Date of Government Version: 07/06/2016
Date Data Arrived at EDR: 07/12/2016
Date Made Active in Reports: 09/19/2016
Number of Days to Update: 69

Source: California Environmental Protection Agency
Telephone: 916-327-5092
Last EDR Contact: 09/09/2021
Next Scheduled EDR Contact: 12/27/2021
Data Release Frequency: Varies

INDIAN UST R4: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 4 (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee and Tribal Nations)

Date of Government Version: 05/28/2021
Date Data Arrived at EDR: 06/22/2021
Date Made Active in Reports: 09/20/2021
Number of Days to Update: 90

Source: EPA Region 4
Telephone: 404-562-9424
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INDIAN UST R8: Underground Storage Tanks on Indian Land
The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 8 (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming and 27 Tribal Nations).

Date of Government Version: 05/27/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 8
Telephone: 303-312-6137
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INDIAN UST R10: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 10 (Alaska, Idaho, Oregon, Washington, and Tribal Nations).

Date of Government Version: 04/27/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 10
Telephone: 206-553-2857
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INDIAN UST R5: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 5 (Michigan, Minnesota and Wisconsin and Tribal Nations).

Date of Government Version: 04/06/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 5
Telephone: 312-886-6136
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INDIAN UST R7: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 7 (Iowa, Kansas, Missouri, Nebraska, and 9 Tribal Nations).

Date of Government Version: 06/01/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 7
Telephone: 913-551-7003
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INDIAN UST R6: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 6 (Louisiana, Arkansas, Oklahoma, New Mexico, Texas and 65 Tribes).

Date of Government Version: 05/17/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 6
Telephone: 214-665-7591
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INDIAN UST R1: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 1 (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont and ten Tribal Nations).

Date of Government Version: 04/28/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA, Region 1
Telephone: 617-918-1313
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INDIAN UST R9: Underground Storage Tanks on Indian Land

The Indian Underground Storage Tank (UST) database provides information about underground storage tanks on Indian land in EPA Region 9 (Arizona, California, Hawaii, Nevada, the Pacific Islands, and Tribal Nations).

Date of Government Version: 05/27/2021
Date Data Arrived at EDR: 06/11/2021
Date Made Active in Reports: 09/07/2021
Number of Days to Update: 88

Source: EPA Region 9
Telephone: 415-972-3368
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

State and tribal voluntary cleanup sites

VCP: Voluntary Cleanup Program Properties

Contains low threat level properties with either confirmed or unconfirmed releases and the project proponents have request that DTSC oversee investigation and/or cleanup activities and have agreed to provide coverage for DTSC's costs.

Date of Government Version: 07/22/2021
Date Data Arrived at EDR: 07/22/2021
Date Made Active in Reports: 10/08/2021
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 10/26/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Quarterly

INDIAN VCP R1: Voluntary Cleanup Priority Listing

A listing of voluntary cleanup priority sites located on Indian Land located in Region 1.

Date of Government Version: 07/27/2015
Date Data Arrived at EDR: 09/29/2015
Date Made Active in Reports: 02/18/2016
Number of Days to Update: 142

Source: EPA, Region 1
Telephone: 617-918-1102
Last EDR Contact: 09/15/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Varies

INDIAN VCP R7: Voluntary Cleanup Priority Lisitng

A listing of voluntary cleanup priority sites located on Indian Land located in Region 7.

Date of Government Version: 03/20/2008
Date Data Arrived at EDR: 04/22/2008
Date Made Active in Reports: 05/19/2008
Number of Days to Update: 27

Source: EPA, Region 7
Telephone: 913-551-7365
Last EDR Contact: 07/08/2021
Next Scheduled EDR Contact: 07/20/2009
Data Release Frequency: Varies

State and tribal Brownfields sites

BROWNFIELDS: Considered Brownfieds Sites Listing

A listing of sites the SWRCB considers to be Brownfields since these are sites have come to them through the MOA Process.

Date of Government Version: 06/17/2021
Date Data Arrived at EDR: 06/17/2021
Date Made Active in Reports: 09/13/2021
Number of Days to Update: 88

Source: State Water Resources Control Board
Telephone: 916-323-7905
Last EDR Contact: 09/21/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Quarterly

ADDITIONAL ENVIRONMENTAL RECORDS

Local Brownfield lists

US BROWNFIELDS: A Listing of Brownfields Sites

Brownfields are real property, the expansion, redevelopment, or reuse of which may be complicated by the presence or potential presence of a hazardous substance, pollutant, or contaminant. Cleaning up and reinvesting in these properties takes development pressures off of undeveloped, open land, and both improves and protects the environment. Assessment, Cleanup and Redevelopment Exchange System (ACRES) stores information reported by EPA Brownfields grant recipients on brownfields properties assessed or cleaned up with grant funding as well as information on Targeted Brownfields Assessments performed by EPA Regions. A listing of ACRES Brownfield sites is obtained from Cleanups in My Community. Cleanups in My Community provides information on Brownfields properties for which information is reported back to EPA, as well as areas served by Brownfields grant programs.

Date of Government Version: 06/10/2021
Date Data Arrived at EDR: 06/10/2021
Date Made Active in Reports: 08/17/2021
Number of Days to Update: 68

Source: Environmental Protection Agency
Telephone: 202-566-2777
Last EDR Contact: 09/14/2021
Next Scheduled EDR Contact: 12/27/2021
Data Release Frequency: Semi-Annually

Local Lists of Landfill / Solid Waste Disposal Sites

WMUDS/SWAT: Waste Management Unit Database

Waste Management Unit Database System. WMUDS is used by the State Water Resources Control Board staff and the Regional Water Quality Control Boards for program tracking and inventory of waste management units. WMUDS is composed of the following databases: Facility Information, Scheduled Inspections Information, Waste Management Unit Information, SWAT Program Information, SWAT Report Summary Information, SWAT Report Summary Data, Chapter 15 (formerly Subchapter 15) Information, Chapter 15 Monitoring Parameters, TPCA Program Information, RCRA Program Information, Closure Information, and Interested Parties Information.

Date of Government Version: 04/01/2000
Date Data Arrived at EDR: 04/10/2000
Date Made Active in Reports: 05/10/2000
Number of Days to Update: 30

Source: State Water Resources Control Board
Telephone: 916-227-4448
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: No Update Planned

SWRCY: Recycler Database

A listing of recycling facilities in California.

Date of Government Version: 06/04/2021
Date Data Arrived at EDR: 06/04/2021
Date Made Active in Reports: 08/27/2021
Number of Days to Update: 84

Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 09/08/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Quarterly

HAULERS: Registered Waste Tire Haulers Listing

A listing of registered waste tire haulers.

Date of Government Version: 11/23/2020
Date Data Arrived at EDR: 11/23/2020
Date Made Active in Reports: 02/08/2021
Number of Days to Update: 77

Source: Integrated Waste Management Board
Telephone: 916-341-6422
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: Varies

INDIAN ODI: Report on the Status of Open Dumps on Indian Lands

Location of open dumps on Indian land.

Date of Government Version: 12/31/1998
Date Data Arrived at EDR: 12/03/2007
Date Made Active in Reports: 01/24/2008
Number of Days to Update: 52

Source: Environmental Protection Agency
Telephone: 703-308-8245
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Varies

DEBRIS REGION 9: Torres Martinez Reservation Illegal Dump Site Locations

A listing of illegal dump sites location on the Torres Martinez Indian Reservation located in eastern Riverside County and northern Imperial County, California.

Date of Government Version: 01/12/2009
Date Data Arrived at EDR: 05/07/2009
Date Made Active in Reports: 09/21/2009
Number of Days to Update: 137

Source: EPA, Region 9
Telephone: 415-947-4219
Last EDR Contact: 10/14/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: No Update Planned

ODI: Open Dump Inventory

An open dump is defined as a disposal facility that does not comply with one or more of the Part 257 or Part 258 Subtitle D Criteria.

Date of Government Version: 06/30/1985
Date Data Arrived at EDR: 08/09/2004
Date Made Active in Reports: 09/17/2004
Number of Days to Update: 39

Source: Environmental Protection Agency
Telephone: 800-424-9346
Last EDR Contact: 06/09/2004
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

IHS OPEN DUMPS: Open Dumps on Indian Land

A listing of all open dumps located on Indian Land in the United States.

Date of Government Version: 04/01/2014
Date Data Arrived at EDR: 08/06/2014
Date Made Active in Reports: 01/29/2015
Number of Days to Update: 176

Source: Department of Health & Human Serivces, Indian Health Service
Telephone: 301-443-1452
Last EDR Contact: 10/28/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Varies

Local Lists of Hazardous waste / Contaminated Sites

US HIST CDL: National Clandestine Laboratory Register

A listing of clandestine drug lab locations that have been removed from the DEAs National Clandestine Laboratory Register.

Date of Government Version: 05/18/2021
Date Data Arrived at EDR: 05/18/2021
Date Made Active in Reports: 08/03/2021
Number of Days to Update: 77

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 08/17/2021
Next Scheduled EDR Contact: 12/06/2021
Data Release Frequency: No Update Planned

HIST CAL-SITES: Calsites Database

The Calsites database contains potential or confirmed hazardous substance release properties. In 1996, California EPA reevaluated and significantly reduced the number of sites in the Calsites database. No longer updated by the state agency. It has been replaced by ENVIROSTOR.

Date of Government Version: 08/08/2005
Date Data Arrived at EDR: 08/03/2006
Date Made Active in Reports: 08/24/2006
Number of Days to Update: 21

Source: Department of Toxic Substance Control
Telephone: 916-323-3400
Last EDR Contact: 02/23/2009
Next Scheduled EDR Contact: 05/25/2009
Data Release Frequency: No Update Planned

SCH: School Property Evaluation Program

This category contains proposed and existing school sites that are being evaluated by DTSC for possible hazardous materials contamination. In some cases, these properties may be listed in the CalSites category depending on the level of threat to public health and safety or the environment they pose.

Date of Government Version: 07/22/2021
Date Data Arrived at EDR: 07/22/2021
Date Made Active in Reports: 10/08/2021
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 10/26/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Quarterly

CDL: Clandestine Drug Labs

A listing of drug lab locations. Listing of a location in this database does not indicate that any illegal drug lab materials were or were not present there, and does not constitute a determination that the location either requires or does not require additional cleanup work.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 01/20/2021
Date Made Active in Reports: 04/08/2021
Number of Days to Update: 78

Source: Department of Toxic Substances Control
Telephone: 916-255-6504
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Varies

TOXIC PITS: Toxic Pits Cleanup Act Sites

Toxic PITS Cleanup Act Sites. TOXIC PITS identifies sites suspected of containing hazardous substances where cleanup has not yet been completed.

Date of Government Version: 07/01/1995
Date Data Arrived at EDR: 08/30/1995
Date Made Active in Reports: 09/26/1995
Number of Days to Update: 27

Source: State Water Resources Control Board
Telephone: 916-227-4364
Last EDR Contact: 01/26/2009
Next Scheduled EDR Contact: 04/27/2009
Data Release Frequency: No Update Planned

CERS HAZ WASTE: CERS HAZ WASTE

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Hazardous Chemical Management, Hazardous Waste Onsite Treatment, Household Hazardous Waste Collection, Hazardous Waste Generator, and RCRA LQ HW Generator programs.

Date of Government Version: 07/15/2021
Date Data Arrived at EDR: 07/15/2021
Date Made Active in Reports: 10/06/2021
Number of Days to Update: 83

Source: CalEPA
Telephone: 916-323-2514
Last EDR Contact: 10/19/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Quarterly

US CDL: Clandestine Drug Labs

A listing of clandestine drug lab locations. The U.S. Department of Justice ("the Department") provides this web site as a public service. It contains addresses of some locations where law enforcement agencies reported they found chemicals or other items that indicated the presence of either clandestine drug laboratories or dumpsites. In most cases, the source of the entries is not the Department, and the Department has not verified the entry and does not guarantee its accuracy. Members of the public must verify the accuracy of all entries by, for example, contacting local law enforcement and local health departments.

Date of Government Version: 05/18/2021
Date Data Arrived at EDR: 05/18/2021
Date Made Active in Reports: 08/03/2021
Number of Days to Update: 77

Source: Drug Enforcement Administration
Telephone: 202-307-1000
Last EDR Contact: 08/17/2021
Next Scheduled EDR Contact: 12/06/2021
Data Release Frequency: Quarterly

PFAS: PFAS Contamination Site Location Listing

A listing of PFAS contaminated sites included in the GeoTracker database.

Date of Government Version: 06/04/2021
Date Data Arrived at EDR: 06/04/2021
Date Made Active in Reports: 08/27/2021
Number of Days to Update: 84

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 09/08/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Varies

AQUEOUS FOAM: Former Fire Training Facility Assessments Listing

Airports shown on this list are those believed to use Aqueous Film Forming Foam (AFFF), and certified by the Federal Aviation Administration (FAA) under Title 14, Code of Federal Regulations (CFR), Part 139 (14 CFR Part 139). This list was created by SWRCB using information available from the FAA. Location points shown are from the latitude and longitude listed on the FAA airport master record.

Date of Government Version: 12/01/2019
Date Data Arrived at EDR: 08/19/2021
Date Made Active in Reports: 10/28/2021
Number of Days to Update: 70

Source: State Water Resources Control Board
Telephone: 916-341-5455
Last EDR Contact: 08/19/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Varies

Local Lists of Registered Storage Tanks

SWEEPS UST: SWEEPS UST Listing

Statewide Environmental Evaluation and Planning System. This underground storage tank listing was updated and maintained by a company contacted by the SWRCB in the early 1990's. The listing is no longer updated or maintained. The local agency is the contact for more information on a site on the SWEEPS list.

Date of Government Version: 06/01/1994
Date Data Arrived at EDR: 07/07/2005
Date Made Active in Reports: 08/11/2005
Number of Days to Update: 35

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/03/2005
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HIST UST: Hazardous Substance Storage Container Database

The Hazardous Substance Storage Container Database is a historical listing of UST sites. Refer to local/county source for current data.

Date of Government Version: 10/15/1990
Date Data Arrived at EDR: 01/25/1991
Date Made Active in Reports: 02/12/1991
Number of Days to Update: 18

Source: State Water Resources Control Board
Telephone: 916-341-5851
Last EDR Contact: 07/26/2001
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

SAN FRANCISCO AST: Aboveground Storage Tank Site Listing

Aboveground storage tank sites

Date of Government Version: 08/05/2021
Date Data Arrived at EDR: 08/05/2021
Date Made Active in Reports: 10/29/2021
Number of Days to Update: 85

Source: San Francisco County Department of Public Health
Telephone: 415-252-3896
Last EDR Contact: 10/31/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

CERS TANKS: California Environmental Reporting System (CERS) Tanks

List of sites in the California Environmental Protection Agency (CalEPA) Regulated Site Portal which fall under the Aboveground Petroleum Storage and Underground Storage Tank regulatory programs.

Date of Government Version: 07/15/2021
Date Data Arrived at EDR: 07/15/2021
Date Made Active in Reports: 10/06/2021
Number of Days to Update: 83

Source: California Environmental Protection Agency
Telephone: 916-323-2514
Last EDR Contact: 10/19/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Quarterly

CA FID UST: Facility Inventory Database

The Facility Inventory Database (FID) contains a historical listing of active and inactive underground storage tank locations from the State Water Resource Control Board. Refer to local/county source for current data.

Date of Government Version: 10/31/1994
Date Data Arrived at EDR: 09/05/1995
Date Made Active in Reports: 09/29/1995
Number of Days to Update: 24

Source: California Environmental Protection Agency
Telephone: 916-341-5851
Last EDR Contact: 12/28/1998
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Local Land Records

LIENS: Environmental Liens Listing

A listing of property locations with environmental liens for California where DTSC is a lien holder.

Date of Government Version: 05/27/2021
Date Data Arrived at EDR: 05/28/2021
Date Made Active in Reports: 08/20/2021
Number of Days to Update: 84

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 08/24/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Varies

LIENS 2: CERCLA Lien Information

A Federal CERCLA ('Superfund') lien can exist by operation of law at any site or property at which EPA has spent Superfund monies. These monies are spent to investigate and address releases and threatened releases of contamination. CERCLIS provides information as to the identity of these sites and properties.

Date of Government Version: 07/29/2021
Date Data Arrived at EDR: 08/04/2021
Date Made Active in Reports: 08/31/2021
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 202-564-6023
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 01/10/2022
Data Release Frequency: Semi-Annually

DEED: Deed Restriction Listing

Site Mitigation and Brownfields Reuse Program Facility Sites with Deed Restrictions & Hazardous Waste Management Program Facility Sites with Deed / Land Use Restriction. The DTSC Site Mitigation and Brownfields Reuse Program (SMBRP) list includes sites cleaned up under the program's oversight and generally does not include current or former hazardous waste facilities that required a hazardous waste facility permit. The list represents deed restrictions that are active. Some sites have multiple deed restrictions. The DTSC Hazardous Waste Management Program (HWMP) has developed a list of current or former hazardous waste facilities that have a recorded land use restriction at the local county recorder's office. The land use restrictions on this list were required by the DTSC HWMP as a result of the presence of hazardous substances that remain on site after the facility (or part of the facility) has been closed or cleaned up. The types of land use restriction include deed notice, deed restriction, or a land use restriction that binds current and future owners.

Date of Government Version: 05/28/2021
Date Data Arrived at EDR: 05/28/2021
Date Made Active in Reports: 08/20/2021
Number of Days to Update: 84

Source: DTSC and SWRCB
Telephone: 916-323-3400
Last EDR Contact: 08/31/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Semi-Annually

Records of Emergency Release Reports

HMIRS: Hazardous Materials Information Reporting System

Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 09/12/2021
Date Data Arrived at EDR: 09/13/2021
Date Made Active in Reports: 09/28/2021
Number of Days to Update: 15

Source: U.S. Department of Transportation
Telephone: 202-366-4555
Last EDR Contact: 09/13/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Quarterly

CHMIRS: California Hazardous Material Incident Report System

California Hazardous Material Incident Reporting System. CHMIRS contains information on reported hazardous material incidents (accidental releases or spills).

Date of Government Version: 06/30/2021
Date Data Arrived at EDR: 07/15/2021
Date Made Active in Reports: 10/06/2021
Number of Days to Update: 83

Source: Office of Emergency Services
Telephone: 916-845-8400
Last EDR Contact: 10/19/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Semi-Annually

LDS: Land Disposal Sites Listing (GEOTRACKER)

Land Disposal sites (Landfills) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/24/2021
Number of Days to Update: 82

Source: State Water Qualilty Control Board
Telephone: 866-480-1028
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Quarterly

MCS: Military Cleanup Sites Listing (GEOTRACKER)

Military sites (consisting of: Military UST sites; Military Privatized sites; and Military Cleanup sites [formerly known as DoD non UST]) included in GeoTracker. GeoTracker is the Water Boards data management system for sites that impact, or have the potential to impact, water quality in California, with emphasis on groundwater.

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/24/2021
Number of Days to Update: 82

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Quarterly

SPILLS 90: SPILLS90 data from FirstSearch

Spills 90 includes those spill and release records available exclusively from FirstSearch databases. Typically, they may include chemical, oil and/or hazardous substance spills recorded after 1990. Duplicate records that are already included in EDR incident and release records are not included in Spills 90.

Date of Government Version: 06/06/2012
Date Data Arrived at EDR: 01/03/2013
Date Made Active in Reports: 02/22/2013
Number of Days to Update: 50

Source: FirstSearch
Telephone: N/A
Last EDR Contact: 01/03/2013
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

Other Ascertainable Records

RCRA NonGen / NLR: RCRA - Non Generators / No Longer Regulated

RCRAInfo is EPA's comprehensive information system, providing access to data supporting the Resource Conservation and Recovery Act (RCRA) of 1976 and the Hazardous and Solid Waste Amendments (HSWA) of 1984. The database includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA). Non-Generators do not presently generate hazardous waste.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 10/12/2021
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: (415) 495-8895
Last EDR Contact: 09/15/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Quarterly

FUDS: Formerly Used Defense Sites

The listing includes locations of Formerly Used Defense Sites properties where the US Army Corps of Engineers is actively working or will take necessary cleanup actions.

Date of Government Version: 08/10/2021
Date Data Arrived at EDR: 08/17/2021
Date Made Active in Reports: 10/22/2021
Number of Days to Update: 66

Source: U.S. Army Corps of Engineers
Telephone: 202-528-4285
Last EDR Contact: 08/17/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Varies

DOD: Department of Defense Sites

This data set consists of federally owned or administered lands, administered by the Department of Defense, that have any area equal to or greater than 640 acres of the United States, Puerto Rico, and the U.S. Virgin Islands.

Date of Government Version: 12/31/2005
Date Data Arrived at EDR: 11/10/2006
Date Made Active in Reports: 01/11/2007
Number of Days to Update: 62

Source: USGS
Telephone: 888-275-8747
Last EDR Contact: 10/15/2021
Next Scheduled EDR Contact: 01/24/2022
Data Release Frequency: Semi-Annually

FEDLAND: Federal and Indian Lands

Federally and Indian administrated lands of the United States. Lands included are administrated by: Army Corps of Engineers, Bureau of Reclamation, National Wild and Scenic River, National Wildlife Refuge, Public Domain Land, Wilderness, Wilderness Study Area, Wildlife Management Area, Bureau of Indian Affairs, Bureau of Land Management, Department of Justice, Forest Service, Fish and Wildlife Service, National Park Service.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/11/2018
Date Made Active in Reports: 11/06/2019
Number of Days to Update: 574

Source: U.S. Geological Survey
Telephone: 888-275-8747
Last EDR Contact: 10/05/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: N/A

SCRD DRYCLEANERS: State Coalition for Remediation of Drycleaners Listing

The State Coalition for Remediation of Drycleaners was established in 1998, with support from the U.S. EPA Office of Superfund Remediation and Technology Innovation. It is comprised of representatives of states with established drycleaner remediation programs. Currently the member states are Alabama, Connecticut, Florida, Illinois, Kansas, Minnesota, Missouri, North Carolina, Oregon, South Carolina, Tennessee, Texas, and Wisconsin.

Date of Government Version: 01/01/2017
Date Data Arrived at EDR: 02/03/2017
Date Made Active in Reports: 04/07/2017
Number of Days to Update: 63

Source: Environmental Protection Agency
Telephone: 615-532-8599
Last EDR Contact: 11/08/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: Varies

US FIN ASSUR: Financial Assurance Information

All owners and operators of facilities that treat, store, or dispose of hazardous waste are required to provide proof that they will have sufficient funds to pay for the clean up, closure, and post-closure care of their facilities.

Date of Government Version: 09/13/2021
Date Data Arrived at EDR: 09/15/2021
Date Made Active in Reports: 09/28/2021
Number of Days to Update: 13

Source: Environmental Protection Agency
Telephone: 202-566-1917
Last EDR Contact: 09/15/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Quarterly

EPA WATCH LIST: EPA WATCH LIST

EPA maintains a "Watch List" to facilitate dialogue between EPA, state and local environmental agencies on enforcement matters relating to facilities with alleged violations identified as either significant or high priority. Being on the Watch List does not mean that the facility has actually violated the law only that an investigation by EPA or a state or local environmental agency has led those organizations to allege that an unproven violation has in fact occurred. Being on the Watch List does not represent a higher level of concern regarding the alleged violations that were detected, but instead indicates cases requiring additional dialogue between EPA, state and local agencies - primarily because of the length of time the alleged violation has gone unaddressed or unresolved.

Date of Government Version: 08/30/2013
Date Data Arrived at EDR: 03/21/2014
Date Made Active in Reports: 06/17/2014
Number of Days to Update: 88

Source: Environmental Protection Agency
Telephone: 617-520-3000
Last EDR Contact: 11/01/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Quarterly

2020 COR ACTION: 2020 Corrective Action Program List

The EPA has set ambitious goals for the RCRA Corrective Action program by creating the 2020 Corrective Action Universe. This RCRA cleanup baseline includes facilities expected to need corrective action. The 2020 universe contains a wide variety of sites. Some properties are heavily contaminated while others were contaminated but have since been cleaned up. Still others have not been fully investigated yet, and may require little or no remediation. Inclusion in the 2020 Universe does not necessarily imply failure on the part of a facility to meet its RCRA obligations.

Date of Government Version: 09/30/2017
Date Data Arrived at EDR: 05/08/2018
Date Made Active in Reports: 07/20/2018
Number of Days to Update: 73

Source: Environmental Protection Agency
Telephone: 703-308-4044
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

TSCA: Toxic Substances Control Act

Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/2016
Date Data Arrived at EDR: 06/17/2020
Date Made Active in Reports: 09/10/2020
Number of Days to Update: 85

Source: EPA
Telephone: 202-260-5521
Last EDR Contact: 09/17/2021
Next Scheduled EDR Contact: 12/27/2021
Data Release Frequency: Every 4 Years

TRIS: Toxic Chemical Release Inventory System

Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 08/14/2020
Date Made Active in Reports: 11/04/2020
Number of Days to Update: 82

Source: EPA
Telephone: 202-566-0250
Last EDR Contact: 08/17/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Annually

SSTS: Section 7 Tracking Systems

Section 7 of the Federal Insecticide, Fungicide and Rodenticide Act, as amended (92 Stat. 829) requires all registered pesticide-producing establishments to submit a report to the Environmental Protection Agency by March 1st each year. Each establishment must report the types and amounts of pesticides, active ingredients and devices being produced, and those having been produced and sold or distributed in the past year.

Date of Government Version: 07/19/2021
Date Data Arrived at EDR: 07/19/2021
Date Made Active in Reports: 10/12/2021
Number of Days to Update: 85

Source: EPA
Telephone: 202-564-4203
Last EDR Contact: 10/20/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Annually

ROD: Records Of Decision

Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 07/29/2021
Date Data Arrived at EDR: 08/04/2021
Date Made Active in Reports: 08/31/2021
Number of Days to Update: 27

Source: EPA
Telephone: 703-416-0223
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Annually

RMP: Risk Management Plans

When Congress passed the Clean Air Act Amendments of 1990, it required EPA to publish regulations and guidance for chemical accident prevention at facilities using extremely hazardous substances. The Risk Management Program Rule (RMP Rule) was written to implement Section 112(r) of these amendments. The rule, which built upon existing industry codes and standards, requires companies of all sizes that use certain flammable and toxic substances to develop a Risk Management Program, which includes a(n): Hazard assessment that details the potential effects of an accidental release, an accident history of the last five years, and an evaluation of worst-case and alternative accidental releases; Prevention program that includes safety precautions and maintenance, monitoring, and employee training measures; and Emergency response program that spells out emergency health care, employee training measures and procedures for informing the public and response agencies (e.g the fire department) should an accident occur.

Date of Government Version: 05/07/2021
Date Data Arrived at EDR: 05/13/2021
Date Made Active in Reports: 08/03/2021
Number of Days to Update: 82

Source: Environmental Protection Agency
Telephone: 202-564-8600
Last EDR Contact: 10/18/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

RAATS: RCRA Administrative Action Tracking System

RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/1995
Date Data Arrived at EDR: 07/03/1995
Date Made Active in Reports: 08/07/1995
Number of Days to Update: 35

Source: EPA
Telephone: 202-564-4104
Last EDR Contact: 06/02/2008
Next Scheduled EDR Contact: 09/01/2008
Data Release Frequency: No Update Planned

PRP: Potentially Responsible Parties
A listing of verified Potentially Responsible Parties

Date of Government Version: 12/30/2020
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 03/05/2021
Number of Days to Update: 50
Source: EPA
Telephone: 202-564-6023
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Quarterly

PADS: PCB Activity Database System
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 11/19/2020
Date Data Arrived at EDR: 01/08/2021
Date Made Active in Reports: 03/22/2021
Number of Days to Update: 73
Source: EPA
Telephone: 202-566-0500
Last EDR Contact: 10/08/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Annually

ICIS: Integrated Compliance Information System
The Integrated Compliance Information System (ICIS) supports the information needs of the national enforcement and compliance program as well as the unique needs of the National Pollutant Discharge Elimination System (NPDES) program.

Date of Government Version: 11/18/2016
Date Data Arrived at EDR: 11/23/2016
Date Made Active in Reports: 02/10/2017
Number of Days to Update: 79
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 09/30/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Quarterly

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
A listing of FIFRA/TSCA Tracking System (FTTS) inspections and enforcements.

Date of Government Version: 04/09/2009
Date Data Arrived at EDR: 04/16/2009
Date Made Active in Reports: 05/11/2009
Number of Days to Update: 25
Source: EPA
Telephone: 202-566-1667
Last EDR Contact: 08/18/2017
Next Scheduled EDR Contact: 12/04/2017
Data Release Frequency: No Update Planned

MLTS: Material Licensing Tracking System
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 03/08/2021
Date Data Arrived at EDR: 03/11/2021
Date Made Active in Reports: 05/11/2021
Number of Days to Update: 61
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
Last EDR Contact: 10/18/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Quarterly

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

COAL ASH DOE: Steam-Electric Plant Operation Data
A listing of power plants that store ash in surface ponds.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 12/01/2020
Date Made Active in Reports: 02/09/2021
Number of Days to Update: 70
Source: Department of Energy
Telephone: 202-586-8719
Last EDR Contact: 09/03/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Varies

COAL ASH EPA: Coal Combustion Residues Surface Impoundments List
A listing of coal combustion residues surface impoundments with high hazard potential ratings.

Date of Government Version: 01/12/2017
Date Data Arrived at EDR: 03/05/2019
Date Made Active in Reports: 11/11/2019
Number of Days to Update: 251
Source: Environmental Protection Agency
Telephone: N/A
Last EDR Contact: 08/31/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Varies

PCB TRANSFORMER: PCB Transformer Registration Database
The database of PCB transformer registrations that includes all PCB registration submittals.

Date of Government Version: 09/13/2019
Date Data Arrived at EDR: 11/06/2019
Date Made Active in Reports: 02/10/2020
Number of Days to Update: 96
Source: Environmental Protection Agency
Telephone: 202-566-0517
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

RADINFO: Radiation Information Database
The Radiation Information Database (RADINFO) contains information about facilities that are regulated by U.S. Environmental Protection Agency (EPA) regulations for radiation and radioactivity.

Date of Government Version: 07/01/2019
Date Data Arrived at EDR: 07/01/2019
Date Made Active in Reports: 09/23/2019
Number of Days to Update: 84
Source: Environmental Protection Agency
Telephone: 202-343-9775
Last EDR Contact: 09/27/2021
Next Scheduled EDR Contact: 01/10/2022
Data Release Frequency: Quarterly

HIST FTTS: FIFRA/TSCA Tracking System Administrative Case Listing
A complete administrative case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40
Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2007
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

HIST FTTS INSP: FIFRA/TSCA Tracking System Inspection & Enforcement Case Listing
A complete inspection and enforcement case listing from the FIFRA/TSCA Tracking System (FTTS) for all ten EPA regions. The information was obtained from the National Compliance Database (NCDB). NCDB supports the implementation of FIFRA (Federal Insecticide, Fungicide, and Rodenticide Act) and TSCA (Toxic Substances Control Act). Some EPA regions are now closing out records. Because of that, and the fact that some EPA regions are not providing EPA Headquarters with updated records, it was decided to create a HIST FTTS database. It included records that may not be included in the newer FTTS database updates. This database is no longer updated.

Date of Government Version: 10/19/2006
Date Data Arrived at EDR: 03/01/2007
Date Made Active in Reports: 04/10/2007
Number of Days to Update: 40

Source: Environmental Protection Agency
Telephone: 202-564-2501
Last EDR Contact: 12/17/2008
Next Scheduled EDR Contact: 03/17/2008
Data Release Frequency: No Update Planned

DOT OPS: Incident and Accident Data

Department of Transporation, Office of Pipeline Safety Incident and Accident data.

Date of Government Version: 01/02/2020
Date Data Arrived at EDR: 01/28/2020
Date Made Active in Reports: 04/17/2020
Number of Days to Update: 80

Source: Department of Transporation, Office of Pipeline Safety
Telephone: 202-366-4595
Last EDR Contact: 10/26/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Quarterly

CONSENT: Superfund (CERCLA) Consent Decrees

Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: 06/30/2021
Date Data Arrived at EDR: 07/14/2021
Date Made Active in Reports: 07/16/2021
Number of Days to Update: 2

Source: Department of Justice, Consent Decree Library
Telephone: Varies
Last EDR Contact: 09/30/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Varies

BRS: Biennial Reporting System

The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/2017
Date Data Arrived at EDR: 06/22/2020
Date Made Active in Reports: 11/20/2020
Number of Days to Update: 151

Source: EPA/NTIS
Telephone: 800-424-9346
Last EDR Contact: 09/15/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Biennially

INDIAN RESERV: Indian Reservations

This map layer portrays Indian administered lands of the United States that have any area equal to or greater than 640 acres.

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 07/14/2015
Date Made Active in Reports: 01/10/2017
Number of Days to Update: 546

Source: USGS
Telephone: 202-208-3710
Last EDR Contact: 10/05/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Semi-Annually

FUSRAP: Formerly Utilized Sites Remedial Action Program

DOE established the Formerly Utilized Sites Remedial Action Program (FUSRAP) in 1974 to remediate sites where radioactive contamination remained from Manhattan Project and early U.S. Atomic Energy Commission (AEC) operations.

Date of Government Version: 07/26/2021
Date Data Arrived at EDR: 07/27/2021
Date Made Active in Reports: 10/22/2021
Number of Days to Update: 87

Source: Department of Energy
Telephone: 202-586-3559
Last EDR Contact: 11/01/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

UMTRA: Uranium Mill Tailings Sites

Uranium ore was mined by private companies for federal government use in national defense programs. When the mills shut down, large piles of the sand-like material (mill tailings) remain after uranium has been extracted from the ore. Levels of human exposure to radioactive materials from the piles are low; however, in some cases tailings were used as construction materials before the potential health hazards of the tailings were recognized.

Date of Government Version: 08/30/2019
Date Data Arrived at EDR: 11/15/2019
Date Made Active in Reports: 01/28/2020
Number of Days to Update: 74

Source: Department of Energy
Telephone: 505-845-0011
Last EDR Contact: 08/12/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Varies

LEAD SMELTER 1: Lead Smelter Sites

A listing of former lead smelter site locations.

Date of Government Version: 07/29/2021
Date Data Arrived at EDR: 08/04/2021
Date Made Active in Reports: 08/31/2021
Number of Days to Update: 27

Source: Environmental Protection Agency
Telephone: 703-603-8787
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 01/10/2022
Data Release Frequency: Varies

LEAD SMELTER 2: Lead Smelter Sites

A list of several hundred sites in the U.S. where secondary lead smelting was done from 1931and 1964. These sites may pose a threat to public health through ingestion or inhalation of contaminated soil or dust

Date of Government Version: 04/05/2001
Date Data Arrived at EDR: 10/27/2010
Date Made Active in Reports: 12/02/2010
Number of Days to Update: 36

Source: American Journal of Public Health
Telephone: 703-305-6451
Last EDR Contact: 12/02/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

US AIRS (AFS): Aerometric Information Retrieval System Facility Subsystem (AFS)

The database is a sub-system of Aerometric Information Retrieval System (AIRS). AFS contains compliance data on air pollution point sources regulated by the U.S. EPA and/or state and local air regulatory agencies. This information comes from source reports by various stationary sources of air pollution, such as electric power plants, steel mills, factories, and universities, and provides information about the air pollutants they produce. Action, air program, air program pollutant, and general level plant data. It is used to track emissions and compliance data from industrial plants.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

US AIRS MINOR: Air Facility System Data

A listing of minor source facilities.

Date of Government Version: 10/12/2016
Date Data Arrived at EDR: 10/26/2016
Date Made Active in Reports: 02/03/2017
Number of Days to Update: 100

Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/26/2017
Next Scheduled EDR Contact: 01/08/2018
Data Release Frequency: Annually

MINES VIOLATIONS: MSHA Violation Assessment Data

Mines violation and assessment information. Department of Labor, Mine Safety & Health Administration.

Date of Government Version: 06/30/2021
Date Data Arrived at EDR: 07/01/2021
Date Made Active in Reports: 09/28/2021
Number of Days to Update: 89

Source: DOL, Mine Safety & Health Admi
Telephone: 202-693-9424
Last EDR Contact: 09/09/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Quarterly

US MINES: Mines Master Index File

Contains all mine identification numbers issued for mines active or opened since 1971. The data also includes violation information.

Date of Government Version: 05/03/2021
Date Data Arrived at EDR: 05/25/2021
Date Made Active in Reports: 08/11/2021
Number of Days to Update: 78

Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959
Last EDR Contact: 08/24/2021
Next Scheduled EDR Contact: 12/06/2021
Data Release Frequency: Semi-Annually

US MINES 2: Ferrous and Nonferrous Metal Mines Database Listing

This map layer includes ferrous (ferrous metal mines are facilities that extract ferrous metals, such as iron ore or molybdenum) and nonferrous (Nonferrous metal mines are facilities that extract nonferrous metals, such as gold, silver, copper, zinc, and lead) metal mines in the United States.

Date of Government Version: 05/06/2020
Date Data Arrived at EDR: 05/27/2020
Date Made Active in Reports: 08/13/2020
Number of Days to Update: 78

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 08/26/2021
Next Scheduled EDR Contact: 12/06/2021
Data Release Frequency: Varies

US MINES 3: Active Mines & Mineral Plants Database Listing

Active Mines and Mineral Processing Plant operations for commodities monitored by the Minerals Information Team of the USGS.

Date of Government Version: 04/14/2011
Date Data Arrived at EDR: 06/08/2011
Date Made Active in Reports: 09/13/2011
Number of Days to Update: 97

Source: USGS
Telephone: 703-648-7709
Last EDR Contact: 08/26/2021
Next Scheduled EDR Contact: 12/06/2021
Data Release Frequency: Varies

ABANDONED MINES: Abandoned Mines

An inventory of land and water impacted by past mining (primarily coal mining) is maintained by OSMRE to provide information needed to implement the Surface Mining Control and Reclamation Act of 1977 (SMCRA). The inventory contains information on the location, type, and extent of AML impacts, as well as, information on the cost associated with the reclamation of those problems. The inventory is based upon field surveys by State, Tribal, and OSMRE program officials. It is dynamic to the extent that it is modified as new problems are identified and existing problems are reclaimed.

Date of Government Version: 06/15/2021
Date Data Arrived at EDR: 06/16/2021
Date Made Active in Reports: 08/17/2021
Number of Days to Update: 62

Source: Department of Interior
Telephone: 202-208-2609
Last EDR Contact: 09/14/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Quarterly

FINDS: Facility Index System/Facility Registry System

Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 05/05/2021
Date Data Arrived at EDR: 05/18/2021
Date Made Active in Reports: 08/17/2021
Number of Days to Update: 91

Source: EPA
Telephone: (415) 947-8000
Last EDR Contact: 08/31/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Quarterly

UXO: Unexploded Ordnance Sites

A listing of unexploded ordnance site locations

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 07/02/2020
Date Made Active in Reports: 09/17/2020
Number of Days to Update: 77

Source: Department of Defense
Telephone: 703-704-1564
Last EDR Contact: 10/07/2021
Next Scheduled EDR Contact: 01/24/2022
Data Release Frequency: Varies

DOCKET HWC: Hazardous Waste Compliance Docket Listing
A complete list of the Federal Agency Hazardous Waste Compliance Docket Facilities.

Date of Government Version: 05/06/2021
Date Data Arrived at EDR: 05/21/2021
Date Made Active in Reports: 08/11/2021
Number of Days to Update: 82
Source: Environmental Protection Agency
Telephone: 202-564-0527
Last EDR Contact: 08/26/2021
Next Scheduled EDR Contact: 12/06/2021
Data Release Frequency: Varies

ECHO: Enforcement & Compliance History Information
ECHO provides integrated compliance and enforcement information for about 800,000 regulated facilities nationwide.

Date of Government Version: 06/26/2021
Date Data Arrived at EDR: 07/01/2021
Date Made Active in Reports: 09/28/2021
Number of Days to Update: 89
Source: Environmental Protection Agency
Telephone: 202-564-2280
Last EDR Contact: 10/05/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Quarterly

FUELS PROGRAM: EPA Fuels Program Registered Listing
This listing includes facilities that are registered under the Part 80 (Code of Federal Regulations) EPA Fuels Programs. All companies now are required to submit new and updated registrations.

Date of Government Version: 08/13/2021
Date Data Arrived at EDR: 08/13/2021
Date Made Active in Reports: 10/22/2021
Number of Days to Update: 70
Source: EPA
Telephone: 800-385-6164
Last EDR Contact: 08/13/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Quarterly

CA BOND EXP. PLAN: Bond Expenditure Plan
Department of Health Services developed a site-specific expenditure plan as the basis for an appropriation of Hazardous Substance Cleanup Bond Act funds. It is not updated.

Date of Government Version: 01/01/1989
Date Data Arrived at EDR: 07/27/1994
Date Made Active in Reports: 08/02/1994
Number of Days to Update: 6
Source: Department of Health Services
Telephone: 916-255-2118
Last EDR Contact: 05/31/1994
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

CORTESE: "Cortese" Hazardous Waste & Substances Sites List
The sites for the list are designated by the State Water Resource Control Board (LUST), the Integrated Waste Board (SWF/LS), and the Department of Toxic Substances Control (Cal-Sites).

Date of Government Version: 06/17/2021
Date Data Arrived at EDR: 06/17/2021
Date Made Active in Reports: 09/14/2021
Number of Days to Update: 89
Source: CAL EPA/Office of Emergency Information
Telephone: 916-323-3400
Last EDR Contact: 09/21/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Quarterly

CUPA LIVERMORE-PLEASANTON: CUPA Facility Listing
list of facilities associated with the various CUPA programs in Livermore-Pleasanton

Date of Government Version: 05/01/2019
Date Data Arrived at EDR: 05/14/2019
Date Made Active in Reports: 07/17/2019
Number of Days to Update: 64
Source: Livermore-Pleasanton Fire Department
Telephone: 925-454-2361
Last EDR Contact: 11/09/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: Varies

DRYCLEAN AVAQMD: Antelope Valley Air Quality Management District Drycleaner Listing
A listing of dry cleaners in the Antelope Valley Air Quality Management District.

Date of Government Version: 05/25/2021
Date Data Arrived at EDR: 05/26/2021
Date Made Active in Reports: 08/18/2021
Number of Days to Update: 84

Source: Antelope Valley Air Quality Management District
Telephone: 661-723-8070
Last EDR Contact: 08/24/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Varies

DRYCLEANERS: Cleaner Facilities

A list of drycleaner related facilities that have EPA ID numbers. These are facilities with certain SIC codes: power laundries, family and commercial; garment pressing and cleaner's agents; linen supply; coin-operated laundries and cleaning; drycleaning plants, except rugs; carpet and upholster cleaning; industrial launderers; laundry and garment services.

Date of Government Version: 05/25/2021
Date Data Arrived at EDR: 05/28/2021
Date Made Active in Reports: 08/20/2021
Number of Days to Update: 84

Source: Department of Toxic Substance Control
Telephone: 916-327-4498
Last EDR Contact: 08/24/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Annually

DRYCLEAN SOUTH COAST: South Coast Air Quality Management District Drycleaner Listing

A listing of dry cleaners in the South Coast Air Quality Management District

Date of Government Version: 05/18/2021
Date Data Arrived at EDR: 05/19/2021
Date Made Active in Reports: 08/05/2021
Number of Days to Update: 78

Source: South Coast Air Quality Management District
Telephone: 909-396-3211
Last EDR Contact: 08/17/2021
Next Scheduled EDR Contact: 12/06/2021
Data Release Frequency: Varies

EMI: Emissions Inventory Data

Toxics and criteria pollutant emissions data collected by the ARB and local air pollution agencies.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 06/10/2021
Date Made Active in Reports: 08/27/2021
Number of Days to Update: 78

Source: California Air Resources Board
Telephone: 916-322-2990
Last EDR Contact: 09/17/2021
Next Scheduled EDR Contact: 12/27/2021
Data Release Frequency: Varies

ENF: Enforcement Action Listing

A listing of Water Board Enforcement Actions. Formal is everything except Oral/Verbal Communication, Notice of Violation, Expedited Payment Letter, and Staff Enforcement Letter.

Date of Government Version: 04/16/2021
Date Data Arrived at EDR: 04/20/2021
Date Made Active in Reports: 07/07/2021
Number of Days to Update: 78

Source: State Water Resoruces Control Board
Telephone: 916-445-9379
Last EDR Contact: 11/04/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

Financial Assurance 1: Financial Assurance Information Listing

Financial Assurance information

Date of Government Version: 04/14/2021
Date Data Arrived at EDR: 04/15/2021
Date Made Active in Reports: 07/06/2021
Number of Days to Update: 82

Source: Department of Toxic Substances Control
Telephone: 916-255-3628
Last EDR Contact: 10/05/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

Financial Assurance 2: Financial Assurance Information Listing

A listing of financial assurance information for solid waste facilities. Financial assurance is intended to ensure that resources are available to pay for the cost of closure, post-closure care, and corrective measures if the owner or operator of a regulated facility is unable or unwilling to pay.

Date of Government Version: 08/13/2021
Date Data Arrived at EDR: 08/13/2021
Date Made Active in Reports: 11/05/2021
Number of Days to Update: 84

Source: California Integrated Waste Management Board
Telephone: 916-341-6066
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: Varies

HAZNET: Facility and Manifest Data

Facility and Manifest Data. The data is extracted from the copies of hazardous waste manifests received each year by the DTSC. The annual volume of manifests is typically 700,000 - 1,000,000 annually, representing approximately 350,000 - 500,000 shipments. Data are from the manifests submitted without correction, and therefore many contain some invalid values for data elements such as generator ID, TSD ID, waste category, and disposal method. This database begins with calendar year 1993.

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 04/15/2020
Date Made Active in Reports: 07/02/2020
Number of Days to Update: 78

Source: California Environmental Protection Agency
Telephone: 916-255-1136
Last EDR Contact: 10/08/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Annually

ICE: ICE

Contains data pertaining to the Permitted Facilities with Inspections / Enforcements sites tracked in Envirostor.

Date of Government Version: 08/13/2021
Date Data Arrived at EDR: 08/13/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 87

Source: Department of Toxic Subsances Control
Telephone: 877-786-9427
Last EDR Contact: 08/13/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Quarterly

HIST CORTESE: Hazardous Waste & Substance Site List

The sites for the list are designated by the State Water Resource Control Board [LUST], the Integrated Waste Board [SWF/LS], and the Department of Toxic Substances Control [CALSITES]. This listing is no longer updated by the state agency.

Date of Government Version: 04/01/2001
Date Data Arrived at EDR: 01/22/2009
Date Made Active in Reports: 04/08/2009
Number of Days to Update: 76

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 01/22/2009
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

HWP: EnviroStor Permitted Facilities Listing

Detailed information on permitted hazardous waste facilities and corrective action ("cleanups") tracked in EnviroStor.

Date of Government Version: 08/13/2021
Date Data Arrived at EDR: 08/13/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 87

Source: Department of Toxic Substances Control
Telephone: 916-323-3400
Last EDR Contact: 08/13/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Quarterly

HWT: Registered Hazardous Waste Transporter Database

A listing of hazardous waste transporters. In California, unless specifically exempted, it is unlawful for any person to transport hazardous wastes unless the person holds a valid registration issued by DTSC. A hazardous waste transporter registration is valid for one year and is assigned a unique registration number.

Date of Government Version: 07/01/2021
Date Data Arrived at EDR: 07/01/2021
Date Made Active in Reports: 09/24/2021
Number of Days to Update: 85

Source: Department of Toxic Substances Control
Telephone: 916-440-7145
Last EDR Contact: 10/05/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Quarterly

MINES: Mines Site Location Listing
A listing of mine site locations from the Office of Mine Reclamation.

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/24/2021
Number of Days to Update: 82
Source: Department of Conservation
Telephone: 916-322-1080
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Quarterly

MWMP: Medical Waste Management Program Listing
The Medical Waste Management Program (MWMP) ensures the proper handling and disposal of medical waste by permitting and inspecting medical waste Offsite Treatment Facilities (PDF) and Transfer Stations (PDF) throughout the state. MWMP also oversees all Medical Waste Transporters.

Date of Government Version: 05/06/2021
Date Data Arrived at EDR: 05/28/2021
Date Made Active in Reports: 08/20/2021
Number of Days to Update: 84
Source: Department of Public Health
Telephone: 916-558-1784
Last EDR Contact: 08/31/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Varies

NPDES: NPDES Permits Listing
A listing of NPDES permits, including stormwater.

Date of Government Version: 05/10/2021
Date Data Arrived at EDR: 05/11/2021
Date Made Active in Reports: 07/27/2021
Number of Days to Update: 77
Source: State Water Resources Control Board
Telephone: 916-445-9379
Last EDR Contact: 11/09/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: Quarterly

PEST LIC: Pesticide Regulation Licenses Listing
A listing of licenses and certificates issued by the Department of Pesticide Regulation. The DPR issues licenses and/or certificates to: Persons and businesses that apply or sell pesticides; Pest control dealers and brokers; Persons who advise on agricultural pesticide applications.

Date of Government Version: 05/28/2021
Date Data Arrived at EDR: 05/28/2021
Date Made Active in Reports: 08/20/2021
Number of Days to Update: 84
Source: Department of Pesticide Regulation
Telephone: 916-445-4038
Last EDR Contact: 08/31/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Quarterly

PROC: Certified Processors Database
A listing of certified processors.

Date of Government Version: 06/04/2021
Date Data Arrived at EDR: 06/04/2021
Date Made Active in Reports: 08/27/2021
Number of Days to Update: 84
Source: Department of Conservation
Telephone: 916-323-3836
Last EDR Contact: 09/08/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Quarterly

NOTIFY 65: Proposition 65 Records
Listings of all Proposition 65 incidents reported to counties by the State Water Resources Control Board and the Regional Water Quality Control Board. This database is no longer updated by the reporting agency.

Date of Government Version: 03/12/2021
Date Data Arrived at EDR: 03/16/2021
Date Made Active in Reports: 06/01/2021
Number of Days to Update: 77
Source: State Water Resources Control Board
Telephone: 916-445-3846
Last EDR Contact: 08/26/2021
Next Scheduled EDR Contact: 12/27/2021
Data Release Frequency: No Update Planned

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

UIC: UIC Listing
A listing of wells identified as underground injection wells, in the California Oil and Gas Wells database.

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/25/2021
Number of Days to Update: 83
Source: Deaprtment of Conservation
Telephone: 916-445-2408
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Varies

UIC GEO: Underground Injection Control Sites (GEOTRACKER)
Underground control injection sites

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/24/2021
Number of Days to Update: 82
Source: State Water Resource Control Board
Telephone: 866-480-1028
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Varies

WASTEWATER PITS: Oil Wastewater Pits Listing
Water officials discovered that oil producers have been dumping chemical-laden wastewater into hundreds of unlined pits that are operating without proper permits. Inspections completed by the Central Valley Regional Water Quality Control Board revealed the existence of previously unidentified waste sites. The water boards review found that more than one-third of the region's active disposal pits are operating without permission.

Date of Government Version: 02/11/2021
Date Data Arrived at EDR: 07/01/2021
Date Made Active in Reports: 09/29/2021
Number of Days to Update: 90
Source: RWQCB, Central Valley Region
Telephone: 559-445-5577
Last EDR Contact: 10/08/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Varies

WDS: Waste Discharge System
Sites which have been issued waste discharge requirements.

Date of Government Version: 06/19/2007
Date Data Arrived at EDR: 06/20/2007
Date Made Active in Reports: 06/29/2007
Number of Days to Update: 9
Source: State Water Resources Control Board
Telephone: 916-341-5227
Last EDR Contact: 08/10/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: No Update Planned

WIP: Well Investigation Program Case List
Well Investigation Program case in the San Gabriel and San Fernando Valley area.

Date of Government Version: 07/03/2009
Date Data Arrived at EDR: 07/21/2009
Date Made Active in Reports: 08/03/2009
Number of Days to Update: 13
Source: Los Angeles Water Quality Control Board
Telephone: 213-576-6726
Last EDR Contact: 09/14/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: No Update Planned

MILITARY PRIV SITES: Military Privatized Sites (GEOTRACKER)
Military privatized sites

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/24/2021
Number of Days to Update: 82
Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Varies

PROJECT: Project Sites (GEOTRACKER)
Projects sites

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/24/2021
Number of Days to Update: 82

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Varies

WDR: Waste Discharge Requirements Listing

In general, the Waste Discharge Requirements (WDRs) Program (sometimes also referred to as the "Non Chapter 15 (Non 15) Program") regulates point discharges that are exempt pursuant to Subsection 20090 of Title 27 and not subject to the Federal Water Pollution Control Act. Exemptions from Title 27 may be granted for nine categories of discharges (e.g., sewage, wastewater, etc.) that meet, and continue to meet, the preconditions listed for each specific exemption. The scope of the WDRs Program also includes the discharge of wastes classified as inert, pursuant to section 20230 of Title 27.

Date of Government Version: 06/07/2021
Date Data Arrived at EDR: 06/07/2021
Date Made Active in Reports: 08/27/2021
Number of Days to Update: 81

Source: State Water Resources Control Board
Telephone: 916-341-5810
Last EDR Contact: 09/08/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Quarterly

CIWQS: California Integrated Water Quality System

The California Integrated Water Quality System (CIWQS) is a computer system used by the State and Regional Water Quality Control Boards to track information about places of environmental interest, manage permits and other orders, track inspections, and manage violations and enforcement activities.

Date of Government Version: 05/19/2021
Date Data Arrived at EDR: 05/19/2021
Date Made Active in Reports: 08/12/2021
Number of Days to Update: 85

Source: State Water Resources Control Board
Telephone: 866-794-4977
Last EDR Contact: 08/31/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Varies

CERS: CalEPA Regulated Site Portal Data

The CalEPA Regulated Site Portal database combines data about environmentally regulated sites and facilities in California into a single database. It combines data from a variety of state and federal databases, and provides an overview of regulated activities across the spectrum of environmental programs for any given location in California. These activities include hazardous materials and waste, state and federal cleanups, impacted ground and surface waters, and toxic materials

Date of Government Version: 07/15/2021
Date Data Arrived at EDR: 07/15/2021
Date Made Active in Reports: 10/06/2021
Number of Days to Update: 83

Source: California Environmental Protection Agency
Telephone: 916-323-2514
Last EDR Contact: 10/19/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

NON-CASE INFO: Non-Case Information Sites (GEOTRACKER)

Non-Case Information sites

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/24/2021
Number of Days to Update: 82

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Varies

OTHER OIL GAS: Other Oil & Gas Projects Sites (GEOTRACKER)

Other Oil & Gas Projects sites

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/24/2021
Number of Days to Update: 82

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

PROD WATER PONDS: Produced Water Ponds Sites (GEOTRACKER)
Produced water ponds sites

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/24/2021
Number of Days to Update: 82

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Varies

SAMPLING POINT: Sampling Point ? Public Sites (GEOTRACKER)
Sampling point - public sites

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/24/2021
Number of Days to Update: 82

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Varies

WELL STIM PROJ: Well Stimulation Project (GEOTRACKER)
Includes areas of groundwater monitoring plans, a depiction of the monitoring network, and the facilities, boundaries, and subsurface characteristics of the oilfield and the features (oil and gas wells, produced water ponds, UIC wells, water supply wells, etc?) being monitored

Date of Government Version: 06/03/2021
Date Data Arrived at EDR: 06/03/2021
Date Made Active in Reports: 08/25/2021
Number of Days to Update: 83

Source: State Water Resources Control Board
Telephone: 866-480-1028
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Varies

MINES MRDS: Mineral Resources Data System
Mineral Resources Data System

Date of Government Version: 04/06/2018
Date Data Arrived at EDR: 10/21/2019
Date Made Active in Reports: 10/24/2019
Number of Days to Update: 3

Source: USGS
Telephone: 703-648-6533
Last EDR Contact: 08/26/2021
Next Scheduled EDR Contact: 12/06/2021
Data Release Frequency: Varies

HWTS: Hazardous Waste Tracking System
DTSC maintains the Hazardous Waste Tracking System that stores ID number information since the early 1980s and manifest data since 1993. The system collects both manifest copies from the generator and destination facility.

Date of Government Version: 07/13/2021
Date Data Arrived at EDR: 07/14/2021
Date Made Active in Reports: 10/06/2021
Number of Days to Update: 84

Source: Department of Toxic Substances Control
Telephone: 916-324-2444
Last EDR Contact: 09/30/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Varies

PCS: Permit Compliance System
PCS is a computerized management information system that contains data on National Pollutant Discharge Elimination System (NPDES) permit holding facilities. PCS tracks the permit, compliance, and enforcement status of NPDES facilities.

Date of Government Version: 07/14/2011
Date Data Arrived at EDR: 08/05/2011
Date Made Active in Reports: 09/29/2011
Number of Days to Update: 55

Source: EPA, Office of Water
Telephone: 202-564-2496
Last EDR Contact: 09/30/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Semi-Annually

PCS INACTIVE: Listing of Inactive PCS Permits
An inactive permit is a facility that has shut down or is no longer discharging.

Date of Government Version: 11/05/2014
Date Data Arrived at EDR: 01/06/2015
Date Made Active in Reports: 05/06/2015
Number of Days to Update: 120
Source: EPA
Telephone: 202-564-2496
Last EDR Contact: 09/30/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Semi-Annually

PCS ENF: Enforcement data
No description is available for this data

Date of Government Version: 12/31/2014
Date Data Arrived at EDR: 02/05/2015
Date Made Active in Reports: 03/06/2015
Number of Days to Update: 29
Source: EPA
Telephone: 202-564-2497
Last EDR Contact: 09/30/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Varies

EDR HIGH RISK HISTORICAL RECORDS

EDR Exclusive Records

EDR MGP: EDR Proprietary Manufactured Gas Plants
The EDR Proprietary Manufactured Gas Plant Database includes records of coal gas plants (manufactured gas plants) compiled by EDR's researchers. Manufactured gas sites were used in the United States from the 1800's to 1950's to produce a gas that could be distributed and used as fuel. These plants used whale oil, rosin, coal, or a mixture of coal, oil, and water that also produced a significant amount of waste. Many of the byproducts of the gas production, such as coal tar (oily waste containing volatile and non-volatile chemicals), sludges, oils and other compounds are potentially hazardous to human health and the environment. The byproduct from this process was frequently disposed of directly at the plant site and can remain or spread slowly, serving as a continuous source of soil and groundwater contamination.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A
Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: No Update Planned

EDR Hist Auto: EDR Exclusive Historical Auto Stations
EDR has searched selected national collections of business directories and has collected listings of potential gas station/filling station/service station sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include gas station/filling station/service station establishments. The categories reviewed included, but were not limited to gas, gas station, gasoline station, filling station, auto, automobile repair, auto service station, service station, etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A
Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR Hist Cleaner: EDR Exclusive Historical Cleaners
EDR has searched selected national collections of business directories and has collected listings of potential dry cleaner sites that were available to EDR researchers. EDR's review was limited to those categories of sources that might, in EDR's opinion, include dry cleaning establishments. The categories reviewed included, but were not limited to dry cleaners, cleaners, laundry, laundromat, cleaning/laundry, wash & dry etc. This database falls within a category of information EDR classifies as "High Risk Historical Records", or HRHR. EDR's HRHR effort presents unique and sometimes proprietary data about past sites and operations that typically create environmental concerns, but may not show up in current government records searches.

Date of Government Version: N/A
Date Data Arrived at EDR: N/A
Date Made Active in Reports: N/A
Number of Days to Update: N/A

Source: EDR, Inc.
Telephone: N/A
Last EDR Contact: N/A
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

EDR RECOVERED GOVERNMENT ARCHIVES

Exclusive Recovered Govt. Archives

RGA LF: Recovered Government Archive Solid Waste Facilities List

The EDR Recovered Government Archive Landfill database provides a list of landfills derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the Department of Resources Recycling and Recovery in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 01/13/2014
Number of Days to Update: 196

Source: Department of Resources Recycling and Recovery
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

RGA LUST: Recovered Government Archive Leaking Underground Storage Tank

The EDR Recovered Government Archive Leaking Underground Storage Tank database provides a list of LUST incidents derived from historical databases and includes many records that no longer appear in current government lists. Compiled from Records formerly available from the State Water Resources Control Board in California.

Date of Government Version: N/A
Date Data Arrived at EDR: 07/01/2013
Date Made Active in Reports: 12/30/2013
Number of Days to Update: 182

Source: State Water Resources Control Board
Telephone: N/A
Last EDR Contact: 06/01/2012
Next Scheduled EDR Contact: N/A
Data Release Frequency: Varies

COUNTY RECORDS

ALAMEDA COUNTY:

CS ALAMEDA: Contaminated Sites

A listing of contaminated sites overseen by the Toxic Release Program (oil and groundwater contamination from chemical releases and spills) and the Leaking Underground Storage Tank Program (soil and ground water contamination from leaking petroleum USTs).

Date of Government Version: 01/09/2019
Date Data Arrived at EDR: 01/11/2019
Date Made Active in Reports: 03/05/2019
Number of Days to Update: 53

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 09/30/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Semi-Annually

UST ALAMEDA: Underground Tanks

Underground storage tank sites located in Alameda county.

Date of Government Version: 06/29/2021
Date Data Arrived at EDR: 06/30/2021
Date Made Active in Reports: 09/22/2021
Number of Days to Update: 84

Source: Alameda County Environmental Health Services
Telephone: 510-567-6700
Last EDR Contact: 09/30/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Semi-Annually

AMADOR COUNTY:

CUPA AMADOR: CUPA Facility List
Cupa Facility List

Date of Government Version: 08/05/2021
Date Data Arrived at EDR: 08/06/2021
Date Made Active in Reports: 09/17/2021
Number of Days to Update: 42

Source: Amador County Environmental Health
Telephone: 209-223-6439
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

BUTTE COUNTY:

CUPA BUTTE: CUPA Facility Listing
Cupa facility list.

Date of Government Version: 04/21/2017
Date Data Arrived at EDR: 04/25/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 106

Source: Public Health Department
Telephone: 530-538-7149
Last EDR Contact: 09/30/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: No Update Planned

CALVERAS COUNTY:

CUPA CALVERAS: CUPA Facility Listing
Cupa Facility Listing

Date of Government Version: 06/15/2021
Date Data Arrived at EDR: 06/16/2021
Date Made Active in Reports: 07/02/2021
Number of Days to Update: 16

Source: Calveras County Environmental Health
Telephone: 209-754-6399
Last EDR Contact: 09/14/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Quarterly

COLUSA COUNTY:

CUPA COLUSA: CUPA Facility List
Cupa facility list.

Date of Government Version: 04/06/2020
Date Data Arrived at EDR: 04/23/2020
Date Made Active in Reports: 07/10/2020
Number of Days to Update: 78

Source: Health & Human Services
Telephone: 530-458-0396
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Semi-Annually

CONTRA COSTA COUNTY:

SL CONTRA COSTA: Site List
List includes sites from the underground tank, hazardous waste generator and business plan/2185 programs.

Date of Government Version: 07/20/2021
Date Data Arrived at EDR: 07/20/2021
Date Made Active in Reports: 10/11/2021
Number of Days to Update: 83

Source: Contra Costa Health Services Department
Telephone: 925-646-2286
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Semi-Annually

DEL NORTE COUNTY:

CUPA DEL NORTE: CUPA Facility List
Cupa Facility list

Date of Government Version: 06/29/2021
Date Data Arrived at EDR: 07/23/2021
Date Made Active in Reports: 10/08/2021
Number of Days to Update: 77

Source: Del Norte County Environmental Health Division
Telephone: 707-465-0426
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Varies

EL DORADO COUNTY:

CUPA EL DORADO: CUPA Facility List
CUPA facility list.

Date of Government Version: 07/30/2021
Date Data Arrived at EDR: 08/03/2021
Date Made Active in Reports: 10/26/2021
Number of Days to Update: 84

Source: El Dorado County Environmental Management Department
Telephone: 530-621-6623
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Varies

FRESNO COUNTY:

CUPA FRESNO: CUPA Resources List
Certified Unified Program Agency. CUPA's are responsible for implementing a unified hazardous materials and hazardous waste management regulatory program. The agency provides oversight of businesses that deal with hazardous materials, operate underground storage tanks or aboveground storage tanks.

Date of Government Version: 04/09/2021
Date Data Arrived at EDR: 06/23/2021
Date Made Active in Reports: 09/17/2021
Number of Days to Update: 86

Source: Dept. of Community Health
Telephone: 559-445-3271
Last EDR Contact: 10/01/2021
Next Scheduled EDR Contact: 01/10/2022
Data Release Frequency: Semi-Annually

GLENN COUNTY:

CUPA GLENN: CUPA Facility List
Cupa facility list

Date of Government Version: 01/22/2018
Date Data Arrived at EDR: 01/24/2018
Date Made Active in Reports: 03/14/2018
Number of Days to Update: 49

Source: Glenn County Air Pollution Control District
Telephone: 830-934-6500
Last EDR Contact: 07/13/2021
Next Scheduled EDR Contact: 11/01/2021
Data Release Frequency: No Update Planned

HUMBOLDT COUNTY:

CUPA HUMBOLDT: CUPA Facility List
CUPA facility list.

Date of Government Version: 08/12/2021
Date Data Arrived at EDR: 08/12/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 88

Source: Humboldt County Environmental Health
Telephone: N/A
Last EDR Contact: 08/10/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Semi-Annually

IMPERIAL COUNTY:

CUPA IMPERIAL: CUPA Facility List
Cupa facility list.

Date of Government Version: 07/13/2021
Date Data Arrived at EDR: 07/15/2021
Date Made Active in Reports: 10/06/2021
Number of Days to Update: 83

Source: San Diego Border Field Office
Telephone: 760-339-2777
Last EDR Contact: 10/15/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

INYO COUNTY:

CUPA INYO: CUPA Facility List
Cupa facility list.

Date of Government Version: 04/02/2018
Date Data Arrived at EDR: 04/03/2018
Date Made Active in Reports: 06/14/2018
Number of Days to Update: 72

Source: Inyo County Environmental Health Services
Telephone: 760-878-0238
Last EDR Contact: 08/10/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Varies

KERN COUNTY:

CUPA KERN: CUPA Facility List
A listing of sites included in the Kern County Hazardous Material Business Plan.

Date of Government Version: 07/06/2021
Date Data Arrived at EDR: 08/12/2021
Date Made Active in Reports: 10/07/2021
Number of Days to Update: 56

Source: Kern County Public Health
Telephone: 661-321-3000
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

UST KERN: Underground Storage Tank Sites & Tank Listing
Kern County Sites and Tanks Listing.

Date of Government Version: 07/06/2021
Date Data Arrived at EDR: 08/12/2021
Date Made Active in Reports: 08/18/2021
Number of Days to Update: 6

Source: Kern County Environment Health Services Department
Telephone: 661-862-8700
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Quarterly

KINGS COUNTY:

CUPA KINGS: CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 12/03/2020
Date Data Arrived at EDR: 01/26/2021
Date Made Active in Reports: 04/14/2021
Number of Days to Update: 78

Source: Kings County Department of Public Health
Telephone: 559-584-1411
Last EDR Contact: 09/07/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Varies

LAKE COUNTY:

CUPA LAKE: CUPA Facility List
Cupa facility list

Date of Government Version: 07/27/2021
Date Data Arrived at EDR: 07/28/2021
Date Made Active in Reports: 10/21/2021
Number of Days to Update: 85

Source: Lake County Environmental Health
Telephone: 707-263-1164
Last EDR Contact: 10/06/2021
Next Scheduled EDR Contact: 01/24/2022
Data Release Frequency: Varies

LASSEN COUNTY:

CUPA LASSEN: CUPA Facility List
Cupa facility list

Date of Government Version: 07/31/2020
Date Data Arrived at EDR: 08/21/2020
Date Made Active in Reports: 11/09/2020
Number of Days to Update: 80

Source: Lassen County Environmental Health
Telephone: 530-251-8528
Last EDR Contact: 11/04/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

LOS ANGELES COUNTY:

AOCONCERN: Key Areas of Concerns in Los Angeles County
San Gabriel Valley areas where VOC contamination is at or above the MCL as designated by region 9 EPA office. Date of Government Version: 3/30/2009 Exide Site area is a cleanup plan of lead-impacted soil surrounding the former Exide Facility as designated by the DTSC. Date of Government Version: 7/17/2017

Date of Government Version: 03/30/2009
Date Data Arrived at EDR: 03/31/2009
Date Made Active in Reports: 10/23/2009
Number of Days to Update: 206

Source: N/A
Telephone: N/A
Last EDR Contact: 09/09/2021
Next Scheduled EDR Contact: 12/27/2021
Data Release Frequency: No Update Planned

HMS LOS ANGELES: HMS: Street Number List
Industrial Waste and Underground Storage Tank Sites.

Date of Government Version: 07/08/2021
Date Data Arrived at EDR: 07/09/2021
Date Made Active in Reports: 09/29/2021
Number of Days to Update: 82

Source: Department of Public Works
Telephone: 626-458-3517
Last EDR Contact: 10/15/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Semi-Annually

LF LOS ANGELES: List of Solid Waste Facilities
Solid Waste Facilities in Los Angeles County.

Date of Government Version: 07/09/2021
Date Data Arrived at EDR: 07/09/2021
Date Made Active in Reports: 09/29/2021
Number of Days to Update: 82

Source: La County Department of Public Works
Telephone: 818-458-5185
Last EDR Contact: 10/08/2021
Next Scheduled EDR Contact: 01/24/2022
Data Release Frequency: Varies

LF LOS ANGELES CITY: City of Los Angeles Landfills
Landfills owned and maintained by the City of Los Angeles.

Date of Government Version: 01/01/2021
Date Data Arrived at EDR: 02/18/2021
Date Made Active in Reports: 05/10/2021
Number of Days to Update: 81

Source: Engineering & Construction Division
Telephone: 213-473-7869
Last EDR Contact: 10/05/2021
Next Scheduled EDR Contact: 01/24/2022
Data Release Frequency: Varies

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

LOS ANGELES AST: Active & Inactive AST Inventory
A listing of active & inactive above ground petroleum storage tank site locations, located in the City of Los Angeles.

Date of Government Version: 06/01/2019
Date Data Arrived at EDR: 06/25/2019
Date Made Active in Reports: 08/22/2019
Number of Days to Update: 58

Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 09/24/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Varies

LOS ANGELES CO LF METHANE: Methane Producing Landfills
This data was created on April 30, 2012 to represent known disposal sites in Los Angeles County that may produce and emanate methane gas. The shapefile contains disposal sites within Los Angeles County that once accepted degradable refuse material. Information used to create this data was extracted from a landfill survey performed by County Engineers (Major Waste System Map, 1973) as well as historical records from CalRecycle, Regional Water Quality Control Board, and Los Angeles County Department of Public Health

Date of Government Version: 02/04/2021
Date Data Arrived at EDR: 04/16/2021
Date Made Active in Reports: 04/21/2021
Number of Days to Update: 5

Source: Los Angeles County Department of Public Works
Telephone: 626-458-6973
Last EDR Contact: 10/08/2021
Next Scheduled EDR Contact: 01/24/2022
Data Release Frequency: No Update Planned

LOS ANGELES HM: Active & Inactive Hazardous Materials Inventory
A listing of active & inactive hazardous materials facility locations, located in the City of Los Angeles.

Date of Government Version: 04/19/2021
Date Data Arrived at EDR: 06/17/2021
Date Made Active in Reports: 06/28/2021
Number of Days to Update: 11

Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 09/24/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Varies

LOS ANGELES UST: Active & Inactive UST Inventory
A listing of active & inactive underground storage tank site locations and underground storage tank historical sites, located in the City of Los Angeles.

Date of Government Version: 04/19/2021
Date Data Arrived at EDR: 06/17/2021
Date Made Active in Reports: 09/14/2021
Number of Days to Update: 89

Source: Los Angeles Fire Department
Telephone: 213-978-3800
Last EDR Contact: 09/24/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Varies

SITE MIT LOS ANGELES: Site Mitigation List
Industrial sites that have had some sort of spill or complaint.

Date of Government Version: 05/26/2021
Date Data Arrived at EDR: 07/09/2021
Date Made Active in Reports: 09/29/2021
Number of Days to Update: 82

Source: Community Health Services
Telephone: 323-890-7806
Last EDR Contact: 10/15/2021
Next Scheduled EDR Contact: 01/24/2022
Data Release Frequency: Annually

UST EL SEGUNDO: City of El Segundo Underground Storage Tank
Underground storage tank sites located in El Segundo city.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 04/19/2017
Date Made Active in Reports: 05/10/2017
Number of Days to Update: 21

Source: City of El Segundo Fire Department
Telephone: 310-524-2236
Last EDR Contact: 10/06/2021
Next Scheduled EDR Contact: 01/24/2022
Data Release Frequency: No Update Planned

UST LONG BEACH: City of Long Beach Underground Storage Tank
Underground storage tank sites located in the city of Long Beach.

Date of Government Version: 04/22/2019
Date Data Arrived at EDR: 04/23/2019
Date Made Active in Reports: 06/27/2019
Number of Days to Update: 65

Source: City of Long Beach Fire Department
Telephone: 562-570-2563
Last EDR Contact: 10/14/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

UST TORRANCE: City of Torrance Underground Storage Tank
Underground storage tank sites located in the city of Torrance.

Date of Government Version: 02/02/2021
Date Data Arrived at EDR: 04/28/2021
Date Made Active in Reports: 07/13/2021
Number of Days to Update: 76

Source: City of Torrance Fire Department
Telephone: 310-618-2973
Last EDR Contact: 10/15/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Semi-Annually

MADERA COUNTY:

CUPA MADERA: CUPA Facility List
A listing of sites included in the county's Certified Unified Program Agency database. California's Secretary for Environmental Protection established the unified hazardous materials and hazardous waste regulatory program as required by chapter 6.11 of the California Health and Safety Code. The Unified Program consolidates the administration, permits, inspections, and enforcement activities.

Date of Government Version: 08/10/2020
Date Data Arrived at EDR: 08/12/2020
Date Made Active in Reports: 10/23/2020
Number of Days to Update: 72

Source: Madera County Environmental Health
Telephone: 559-675-7823
Last EDR Contact: 08/10/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Varies

MARIN COUNTY:

UST MARIN: Underground Storage Tank Sites
Currently permitted USTs in Marin County.

Date of Government Version: 09/26/2018
Date Data Arrived at EDR: 10/04/2018
Date Made Active in Reports: 11/02/2018
Number of Days to Update: 29

Source: Public Works Department Waste Management
Telephone: 415-473-6647
Last EDR Contact: 09/23/2021
Next Scheduled EDR Contact: 01/10/2022
Data Release Frequency: Semi-Annually

MENDOCINO COUNTY:

UST MENDOCINO: Mendocino County UST Database
A listing of underground storage tank locations in Mendocino County.

Date of Government Version: 03/24/2021
Date Data Arrived at EDR: 04/07/2021
Date Made Active in Reports: 06/24/2021
Number of Days to Update: 78

Source: Department of Public Health
Telephone: 707-463-4466
Last EDR Contact: 08/17/2021
Next Scheduled EDR Contact: 12/06/2021
Data Release Frequency: Annually

MERCED COUNTY:

CUPA MERCED: CUPA Facility List
CUPA facility list.

Date of Government Version: 08/11/2021
Date Data Arrived at EDR: 08/12/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 88

Source: Merced County Environmental Health
Telephone: 209-381-1094
Last EDR Contact: 08/09/2021
Next Scheduled EDR Contact: 11/28/2021
Data Release Frequency: Varies

MONO COUNTY:

CUPA MONO: CUPA Facility List
CUPA Facility List

Date of Government Version: 02/22/2021
Date Data Arrived at EDR: 03/02/2021
Date Made Active in Reports: 05/19/2021
Number of Days to Update: 78

Source: Mono County Health Department
Telephone: 760-932-5580
Last EDR Contact: 08/31/2021
Next Scheduled EDR Contact: 12/06/3021
Data Release Frequency: Varies

MONTEREY COUNTY:

CUPA MONTEREY: CUPA Facility Listing
CUPA Program listing from the Environmental Health Division.

Date of Government Version: 06/23/2021
Date Data Arrived at EDR: 06/23/2021
Date Made Active in Reports: 06/24/2021
Number of Days to Update: 1

Source: Monterey County Health Department
Telephone: 831-796-1297
Last EDR Contact: 09/23/2021
Next Scheduled EDR Contact: 01/10/2022
Data Release Frequency: Varies

NAPA COUNTY:

LUST NAPA: Sites With Reported Contamination
A listing of leaking underground storage tank sites located in Napa county.

Date of Government Version: 01/09/2017
Date Data Arrived at EDR: 01/11/2017
Date Made Active in Reports: 03/02/2017
Number of Days to Update: 50

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 08/17/2021
Next Scheduled EDR Contact: 12/06/2021
Data Release Frequency: No Update Planned

UST NAPA: Closed and Operating Underground Storage Tank Sites
Underground storage tank sites located in Napa county.

Date of Government Version: 09/05/2019
Date Data Arrived at EDR: 09/09/2019
Date Made Active in Reports: 10/31/2019
Number of Days to Update: 52

Source: Napa County Department of Environmental Management
Telephone: 707-253-4269
Last EDR Contact: 08/17/2021
Next Scheduled EDR Contact: 12/06/2021
Data Release Frequency: No Update Planned

NEVADA COUNTY:

CUPA NEVADA: CUPA Facility List
CUPA facility list.

Date of Government Version: 07/28/2021
Date Data Arrived at EDR: 07/28/2021
Date Made Active in Reports: 10/21/2021
Number of Days to Update: 85

Source: Community Development Agency
Telephone: 530-265-1467
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Varies

ORANGE COUNTY:

IND_SITE ORANGE: List of Industrial Site Cleanups
Petroleum and non-petroleum spills.

Date of Government Version: 07/09/2021
Date Data Arrived at EDR: 08/03/2021
Date Made Active in Reports: 10/26/2021
Number of Days to Update: 84

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Annually

LUST ORANGE: List of Underground Storage Tank Cleanups
Orange County Underground Storage Tank Cleanups (LUST).

Date of Government Version: 07/09/2021
Date Data Arrived at EDR: 08/03/2021
Date Made Active in Reports: 10/26/2021
Number of Days to Update: 84

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Quarterly

UST ORANGE: List of Underground Storage Tank Facilities
Orange County Underground Storage Tank Facilities (UST).

Date of Government Version: 07/09/2021
Date Data Arrived at EDR: 07/29/2021
Date Made Active in Reports: 10/19/2021
Number of Days to Update: 82

Source: Health Care Agency
Telephone: 714-834-3446
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Quarterly

PLACER COUNTY:

MS PLACER: Master List of Facilities
List includes aboveground tanks, underground tanks and cleanup sites.

Date of Government Version: 05/25/2021
Date Data Arrived at EDR: 05/26/2021
Date Made Active in Reports: 06/01/2021
Number of Days to Update: 6

Source: Placer County Health and Human Services
Telephone: 530-745-2363
Last EDR Contact: 08/24/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Semi-Annually

PLUMAS COUNTY:

CUPA PLUMAS: CUPA Facility List
Plumas County CUPA Program facilities.

Date of Government Version: 03/31/2019
Date Data Arrived at EDR: 04/23/2019
Date Made Active in Reports: 06/26/2019
Number of Days to Update: 64

Source: Plumas County Environmental Health
Telephone: 530-283-6355
Last EDR Contact: 10/14/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

RIVERSIDE COUNTY:

LUST RIVERSIDE: Listing of Underground Tank Cleanup Sites
Riverside County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 06/29/2021
Date Data Arrived at EDR: 06/30/2021
Date Made Active in Reports: 07/14/2021
Number of Days to Update: 14
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 09/09/2021
Next Scheduled EDR Contact: 12/27/2021
Data Release Frequency: Quarterly

UST RIVERSIDE: Underground Storage Tank Tank List
Underground storage tank sites located in Riverside county.

Date of Government Version: 06/29/2021
Date Data Arrived at EDR: 06/30/2021
Date Made Active in Reports: 07/14/2021
Number of Days to Update: 14
Source: Department of Environmental Health
Telephone: 951-358-5055
Last EDR Contact: 09/09/2021
Next Scheduled EDR Contact: 12/27/2021
Data Release Frequency: Quarterly

SACRAMENTO COUNTY:

CS SACRAMENTO: Toxic Site Clean-Up List
List of sites where unauthorized releases of potentially hazardous materials have occurred.

Date of Government Version: 03/30/2021
Date Data Arrived at EDR: 04/01/2021
Date Made Active in Reports: 06/23/2021
Number of Days to Update: 83
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 09/28/2021
Next Scheduled EDR Contact: 01/10/2022
Data Release Frequency: Quarterly

ML SACRAMENTO: Master Hazardous Materials Facility List
Any business that has hazardous materials on site - hazardous material storage sites, underground storage tanks, waste generators.

Date of Government Version: 08/02/2021
Date Data Arrived at EDR: 08/04/2021
Date Made Active in Reports: 11/02/2021
Number of Days to Update: 90
Source: Sacramento County Environmental Management
Telephone: 916-875-8406
Last EDR Contact: 10/01/2021
Next Scheduled EDR Contact: 01/10/2022
Data Release Frequency: Quarterly

SAN BENITO COUNTY:

CUPA SAN BENITO: CUPA Facility List
Cupa facility list

Date of Government Version: 07/27/2021
Date Data Arrived at EDR: 07/28/2021
Date Made Active in Reports: 10/21/2021
Number of Days to Update: 85
Source: San Benito County Environmental Health
Telephone: N/A
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

SAN BERNARDINO COUNTY:

PERMITS SAN BERNARDINO: Hazardous Material Permits
This listing includes underground storage tanks, medical waste handlers/generators, hazardous materials handlers, hazardous waste generators, and waste oil generators/handlers.

Date of Government Version: 08/11/2021
Date Data Arrived at EDR: 08/12/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 88

Source: San Bernardino County Fire Department Hazardous Materials Division
Telephone: 909-387-3041
Last EDR Contact: 11/01/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Quarterly

SAN DIEGO COUNTY:

HMMD SAN DIEGO: Hazardous Materials Management Division Database

The database includes: HE58 - This report contains the business name, site address, business phone number, establishment 'H' permit number, type of permit, and the business status. HE17 - In addition to providing the same information provided in the HE58 listing, HE17 provides inspection dates, violations received by the establishment, hazardous waste generated, the quantity, method of storage, treatment/disposal of waste and the hauler, and information on underground storage tanks. Unauthorized Release List - Includes a summary of environmental contamination cases in San Diego County (underground tank cases, non-tank cases, groundwater contamination, and soil contamination are included.)

Date of Government Version: 05/28/2021
Date Data Arrived at EDR: 05/28/2021
Date Made Active in Reports: 08/20/2021
Number of Days to Update: 84

Source: Hazardous Materials Management Division
Telephone: 619-338-2268
Last EDR Contact: 08/31/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Quarterly

LF SAN DIEGO: Solid Waste Facilities

San Diego County Solid Waste Facilities.

Date of Government Version: 10/01/2020
Date Data Arrived at EDR: 11/23/2020
Date Made Active in Reports: 02/08/2021
Number of Days to Update: 77

Source: Department of Health Services
Telephone: 619-338-2209
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

SAN DIEGO CO LOP: Local Oversight Program Listing

A listing of all LOP release sites that are or were under the County of San Diego's jurisdiction. Included are closed or transferred cases, open cases, and cases that did not have a case type indicated. The cases without a case type are mostly complaints; however, some of them could be LOP cases.

Date of Government Version: 07/14/2020
Date Data Arrived at EDR: 07/16/2020
Date Made Active in Reports: 09/29/2020
Number of Days to Update: 75

Source: Department of Environmental Health
Telephone: 858-505-6874
Last EDR Contact: 10/15/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

SAN DIEGO CO SAM: Environmental Case Listing

The listing contains all underground tank release cases and projects pertaining to properties contaminated with hazardous substances that are actively under review by the Site Assessment and Mitigation Program.

Date of Government Version: 03/23/2010
Date Data Arrived at EDR: 06/15/2010
Date Made Active in Reports: 07/09/2010
Number of Days to Update: 24

Source: San Diego County Department of Environmental Health
Telephone: 619-338-2371
Last EDR Contact: 08/24/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: No Update Planned

SAN FRANCISCO COUNTY:

CUPA SAN FRANCISCO CO: CUPA Facility Listing

Cupa facilities

Date of Government Version: 08/05/2021
Date Data Arrived at EDR: 08/05/2021
Date Made Active in Reports: 10/29/2021
Number of Days to Update: 85

Source: San Francisco County Department of Environmental Health
Telephone: 415-252-3896
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

LUST SAN FRANCISCO: Local Oversite Facilities
A listing of leaking underground storage tank sites located in San Francisco county.

Date of Government Version: 09/19/2008
Date Data Arrived at EDR: 09/19/2008
Date Made Active in Reports: 09/29/2008
Number of Days to Update: 10

Source: Department Of Public Health San Francisco County
Telephone: 415-252-3920
Last EDR Contact: 11/01/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: No Update Planned

UST SAN FRANCISCO: Underground Storage Tank Information
Underground storage tank sites located in San Francisco county.

Date of Government Version: 08/05/2021
Date Data Arrived at EDR: 08/05/2021
Date Made Active in Reports: 10/29/2021
Number of Days to Update: 85

Source: Department of Public Health
Telephone: 415-252-3920
Last EDR Contact: 10/31/2021
Next Scheduled EDR Contact: 02/13/2022
Data Release Frequency: Quarterly

SAN JOAQUIN COUNTY:

UST SAN JOAQUIN: San Joaquin Co. UST
A listing of underground storage tank locations in San Joaquin county.

Date of Government Version: 06/22/2018
Date Data Arrived at EDR: 06/26/2018
Date Made Active in Reports: 07/11/2018
Number of Days to Update: 15

Source: Environmental Health Department
Telephone: N/A
Last EDR Contact: 09/09/2021
Next Scheduled EDR Contact: 12/27/2021
Data Release Frequency: Semi-Annually

SAN LUIS OBISPO COUNTY:

CUPA SAN LUIS OBISPO: CUPA Facility List
Cupa Facility List.

Date of Government Version: 08/10/2021
Date Data Arrived at EDR: 08/11/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 89

Source: San Luis Obispo County Public Health Department
Telephone: 805-781-5596
Last EDR Contact: 08/10/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Varies

SAN MATEO COUNTY:

BI SAN MATEO: Business Inventory
List includes Hazardous Materials Business Plan, hazardous waste generators, and underground storage tanks.

Date of Government Version: 02/20/2020
Date Data Arrived at EDR: 02/20/2020
Date Made Active in Reports: 04/24/2020
Number of Days to Update: 64

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 09/10/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Annually

LUST SAN MATEO: Fuel Leak List
A listing of leaking underground storage tank sites located in San Mateo county.

Date of Government Version: 03/29/2019
Date Data Arrived at EDR: 03/29/2019
Date Made Active in Reports: 05/29/2019
Number of Days to Update: 61

Source: San Mateo County Environmental Health Services Division
Telephone: 650-363-1921
Last EDR Contact: 08/31/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Semi-Annually

SANTA BARBARA COUNTY:

CUPA SANTA BARBARA: CUPA Facility Listing
CUPA Program Listing from the Environmental Health Services division.

Date of Government Version: 09/08/2011
Date Data Arrived at EDR: 09/09/2011
Date Made Active in Reports: 10/07/2011
Number of Days to Update: 28

Source: Santa Barbara County Public Health Department
Telephone: 805-686-8167
Last EDR Contact: 08/10/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: No Update Planned

SANTA CLARA COUNTY:

CUPA SANTA CLARA: Cupa Facility List
Cupa facility list

Date of Government Version: 08/04/2021
Date Data Arrived at EDR: 08/05/2021
Date Made Active in Reports: 10/29/2021
Number of Days to Update: 85

Source: Department of Environmental Health
Telephone: 408-918-1973
Last EDR Contact: 08/04/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Varies

HIST LUST SANTA CLARA: HIST LUST - Fuel Leak Site Activity Report
A listing of open and closed leaking underground storage tanks. This listing is no longer updated by the county. Leaking underground storage tanks are now handled by the Department of Environmental Health.

Date of Government Version: 03/29/2005
Date Data Arrived at EDR: 03/30/2005
Date Made Active in Reports: 04/21/2005
Number of Days to Update: 22

Source: Santa Clara Valley Water District
Telephone: 408-265-2600
Last EDR Contact: 03/23/2009
Next Scheduled EDR Contact: 06/22/2009
Data Release Frequency: No Update Planned

LUST SANTA CLARA: LOP Listing
A listing of leaking underground storage tanks located in Santa Clara county.

Date of Government Version: 03/03/2014
Date Data Arrived at EDR: 03/05/2014
Date Made Active in Reports: 03/18/2014
Number of Days to Update: 13

Source: Department of Environmental Health
Telephone: 408-918-3417
Last EDR Contact: 08/17/2021
Next Scheduled EDR Contact: 12/06/2021
Data Release Frequency: No Update Planned

SAN JOSE HAZMAT: Hazardous Material Facilities
Hazardous material facilities, including underground storage tank sites.

Date of Government Version: 11/03/2020
Date Data Arrived at EDR: 11/05/2020
Date Made Active in Reports: 01/26/2021
Number of Days to Update: 82

Source: City of San Jose Fire Department
Telephone: 408-535-7694
Last EDR Contact: 11/01/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Annually

SANTA CRUZ COUNTY:

CUPA SANTA CRUZ: CUPA Facility List
CUPA facility listing.

Date of Government Version: 01/21/2017
Date Data Arrived at EDR: 02/22/2017
Date Made Active in Reports: 05/23/2017
Number of Days to Update: 90

Source: Santa Cruz County Environmental Health
Telephone: 831-464-2761
Last EDR Contact: 08/10/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Varies

SHASTA COUNTY:

CUPA SHASTA: CUPA Facility List
Cupa Facility List.

Date of Government Version: 06/15/2017
Date Data Arrived at EDR: 06/19/2017
Date Made Active in Reports: 08/09/2017
Number of Days to Update: 51

Source: Shasta County Department of Resource Management
Telephone: 530-225-5789
Last EDR Contact: 08/10/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Varies

SOLANO COUNTY:

LUST SOLANO: Leaking Underground Storage Tanks
A listing of leaking underground storage tank sites located in Solano county.

Date of Government Version: 06/04/2019
Date Data Arrived at EDR: 06/06/2019
Date Made Active in Reports: 08/13/2019
Number of Days to Update: 68

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 08/24/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Quarterly

UST SOLANO: Underground Storage Tanks
Underground storage tank sites located in Solano county.

Date of Government Version: 06/22/2021
Date Data Arrived at EDR: 06/23/2021
Date Made Active in Reports: 09/17/2021
Number of Days to Update: 86

Source: Solano County Department of Environmental Management
Telephone: 707-784-6770
Last EDR Contact: 09/09/2021
Next Scheduled EDR Contact: 12/12/2021
Data Release Frequency: Quarterly

SONOMA COUNTY:

CUPA SONOMA: Cupa Facility List
Cupa Facility list

Date of Government Version: 07/02/2021
Date Data Arrived at EDR: 07/06/2021
Date Made Active in Reports: 07/14/2021
Number of Days to Update: 8

Source: County of Sonoma Fire & Emergency Services Department
Telephone: 707-565-1174
Last EDR Contact: 09/14/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Varies

LUST SONOMA: Leaking Underground Storage Tank Sites
A listing of leaking underground storage tank sites located in Sonoma county.

Date of Government Version: 06/30/2021
Date Data Arrived at EDR: 06/30/2021
Date Made Active in Reports: 09/24/2021
Number of Days to Update: 86

Source: Department of Health Services
Telephone: 707-565-6565
Last EDR Contact: 09/14/2021
Next Scheduled EDR Contact: 01/03/2022
Data Release Frequency: Quarterly

STANISLAUS COUNTY:

CUPA STANISLAUS: CUPA Facility List
Cupa facility list

Date of Government Version: 05/14/2021
Date Data Arrived at EDR: 05/17/2021
Date Made Active in Reports: 08/03/2021
Number of Days to Update: 78

Source: Stanislaus County Department of Ennvironmental Protection
Telephone: 209-525-6751
Last EDR Contact: 10/06/2021
Next Scheduled EDR Contact: 01/24/2022
Data Release Frequency: Varies

SUTTER COUNTY:

UST SUTTER: Underground Storage Tanks
Underground storage tank sites located in Sutter county.

Date of Government Version: 05/25/2021
Date Data Arrived at EDR: 05/26/2021
Date Made Active in Reports: 08/18/2021
Number of Days to Update: 84

Source: Sutter County Environmental Health Services
Telephone: 530-822-7500
Last EDR Contact: 08/24/2021
Next Scheduled EDR Contact: 12/13/2021
Data Release Frequency: Semi-Annually

TEHAMA COUNTY:

CUPA TEHAMA: CUPA Facility List
Cupa facilities

Date of Government Version: 01/13/2021
Date Data Arrived at EDR: 01/14/2021
Date Made Active in Reports: 04/06/2021
Number of Days to Update: 82

Source: Tehama County Department of Environmental Health
Telephone: 530-527-8020
Last EDR Contact: 11/01/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

TRINITY COUNTY:

CUPA TRINITY: CUPA Facility List
Cupa facility list

Date of Government Version: 07/14/2021
Date Data Arrived at EDR: 07/15/2021
Date Made Active in Reports: 10/06/2021
Number of Days to Update: 83

Source: Department of Toxic Substances Control
Telephone: 760-352-0381
Last EDR Contact: 10/15/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

TULARE COUNTY:

CUPA TULARE: CUPA Facility List
Cupa program facilities

Date of Government Version: 04/26/2021
Date Data Arrived at EDR: 04/28/2021
Date Made Active in Reports: 07/13/2021
Number of Days to Update: 76

Source: Tulare County Environmental Health Services Division
Telephone: 559-624-7400
Last EDR Contact: 11/01/2021
Next Scheduled EDR Contact: 02/14/2022
Data Release Frequency: Varies

TUOLUMNE COUNTY:

CUPA TUOLUMNE: CUPA Facility List
Cupa facility list

Date of Government Version: 04/23/2018
Date Data Arrived at EDR: 04/25/2018
Date Made Active in Reports: 06/25/2018
Number of Days to Update: 61

Source: Divison of Environmental Health
Telephone: 209-533-5633
Last EDR Contact: 10/14/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Varies

VENTURA COUNTY:

BWT VENTURA: Business Plan, Hazardous Waste Producers, and Operating Underground Tanks
The BWT list indicates by site address whether the Environmental Health Division has Business Plan (B), Waste Producer (W), and/or Underground Tank (T) information.

Date of Government Version: 05/26/2021
Date Data Arrived at EDR: 07/19/2021
Date Made Active in Reports: 10/08/2021
Number of Days to Update: 81

Source: Ventura County Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 10/18/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Quarterly

LF VENTURA: Inventory of Illegal Abandoned and Inactive Sites
Ventura County Inventory of Closed, Illegal Abandoned, and Inactive Sites.

Date of Government Version: 12/01/2011
Date Data Arrived at EDR: 12/01/2011
Date Made Active in Reports: 01/19/2012
Number of Days to Update: 49

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 09/23/2021
Next Scheduled EDR Contact: 01/10/2022
Data Release Frequency: No Update Planned

LUST VENTURA: Listing of Underground Tank Cleanup Sites
Ventura County Underground Storage Tank Cleanup Sites (LUST).

Date of Government Version: 05/29/2008
Date Data Arrived at EDR: 06/24/2008
Date Made Active in Reports: 07/31/2008
Number of Days to Update: 37

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 11/05/2021
Next Scheduled EDR Contact: 02/21/2022
Data Release Frequency: No Update Planned

MED WASTE VENTURA: Medical Waste Program List
To protect public health and safety and the environment from potential exposure to disease causing agents, the Environmental Health Division Medical Waste Program regulates the generation, handling, storage, treatment and disposal of medical waste throughout the County.

Date of Government Version: 05/26/2021
Date Data Arrived at EDR: 07/19/2021
Date Made Active in Reports: 10/07/2021
Number of Days to Update: 80

Source: Ventura County Resource Management Agency
Telephone: 805-654-2813
Last EDR Contact: 10/18/2021
Next Scheduled EDR Contact: 01/31/2022
Data Release Frequency: Quarterly

UST VENTURA: Underground Tank Closed Sites List
Ventura County Operating Underground Storage Tank Sites (UST)/Underground Tank Closed Sites List.

Date of Government Version: 05/26/2021
Date Data Arrived at EDR: 06/04/2021
Date Made Active in Reports: 08/27/2021
Number of Days to Update: 84

Source: Environmental Health Division
Telephone: 805-654-2813
Last EDR Contact: 09/08/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Quarterly

YOLO COUNTY:

UST YOLO: Underground Storage Tank Comprehensive Facility Report
Underground storage tank sites located in Yolo county.

Date of Government Version: 06/22/2021
Date Data Arrived at EDR: 06/28/2021
Date Made Active in Reports: 09/21/2021
Number of Days to Update: 85

Source: Yolo County Department of Health
Telephone: 530-666-8646
Last EDR Contact: 09/23/2021
Next Scheduled EDR Contact: 01/10/2022
Data Release Frequency: Annually

YUBA COUNTY:

CUPA YUBA: CUPA Facility List
CUPA facility listing for Yuba County.

Date of Government Version: 07/20/2021
Date Data Arrived at EDR: 07/20/2021
Date Made Active in Reports: 10/08/2021
Number of Days to Update: 80

Source: Yuba County Environmental Health Department
Telephone: 530-749-7523
Last EDR Contact: 10/22/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Varies

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

CT MANIFEST: Hazardous Waste Manifest Data
Facility and manifest data. Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a tsd facility.

Date of Government Version: 07/23/2021
Date Data Arrived at EDR: 08/10/2021
Date Made Active in Reports: 11/08/2021
Number of Days to Update: 90

Source: Department of Energy & Environmental Protection
Telephone: 860-424-3375
Last EDR Contact: 08/10/2021
Next Scheduled EDR Contact: 11/22/2021
Data Release Frequency: No Update Planned

NJ MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 12/31/2018
Date Data Arrived at EDR: 04/10/2019
Date Made Active in Reports: 05/16/2019
Number of Days to Update: 36

Source: Department of Environmental Protection
Telephone: N/A
Last EDR Contact: 10/05/2021
Next Scheduled EDR Contact: 01/17/2022
Data Release Frequency: Annually

NY MANIFEST: Facility and Manifest Data
Manifest is a document that lists and tracks hazardous waste from the generator through transporters to a TSD facility.

Date of Government Version: 01/01/2019
Date Data Arrived at EDR: 04/29/2020
Date Made Active in Reports: 07/10/2020
Number of Days to Update: 72

Source: Department of Environmental Conservation
Telephone: 518-402-8651
Last EDR Contact: 10/29/2021
Next Scheduled EDR Contact: 02/07/2022
Data Release Frequency: Quarterly

PA MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 06/30/2018
Date Data Arrived at EDR: 07/19/2019
Date Made Active in Reports: 09/10/2019
Number of Days to Update: 53

Source: Department of Environmental Protection
Telephone: 717-783-8990
Last EDR Contact: 10/07/2021
Next Scheduled EDR Contact: 01/24/2022
Data Release Frequency: Annually

RI MANIFEST: Manifest information
Hazardous waste manifest information

Date of Government Version: 12/31/2019
Date Data Arrived at EDR: 02/11/2021
Date Made Active in Reports: 02/24/2021
Number of Days to Update: 13

Source: Department of Environmental Management
Telephone: 401-222-2797
Last EDR Contact: 08/11/2021
Next Scheduled EDR Contact: 11/29/2021
Data Release Frequency: Annually

WI MANIFEST: Manifest Information
Hazardous waste manifest information.

Date of Government Version: 05/31/2018
Date Data Arrived at EDR: 06/19/2019
Date Made Active in Reports: 09/03/2019
Number of Days to Update: 76

Source: Department of Natural Resources
Telephone: N/A
Last EDR Contact: 09/01/2021
Next Scheduled EDR Contact: 12/20/2021
Data Release Frequency: Annually

Oil/Gas Pipelines
Source: Endeavor Business Media
Petroleum Bundle (Crude Oil, Refined Products, Petrochemicals, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)) N = Natural Gas Bundle (Natural Gas, Gas Liquids (LPG/NGL), and Specialty Gases (Miscellaneous)). This map includes information copyrighted by Endeavor Business Media. This information is provided on a best effort basis and Endeavor Business Media does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of Endeavor Business Media.

Electric Power Transmission Line Data
Source: Endeavor Business Media
This map includes information copyrighted by Endeavor Business Media. This information is provided on a best effort basis and Endeavor Business Media does not guarantee its accuracy nor warrant its fitness for any particular purpose. Such information has been reprinted with the permission of Endeavor Business Media.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

AHA Hospitals:
Source: American Hospital Association, Inc.
Telephone: 312-280-5991
The database includes a listing of hospitals based on the American Hospital Association's annual survey of hospitals.

Medical Centers: Provider of Services Listing
Source: Centers for Medicare & Medicaid Services
Telephone: 410-786-3000
A listing of hospitals with Medicare provider number, produced by Centers of Medicare & Medicaid Services, a federal agency within the U.S. Department of Health and Human Services.

Nursing Homes
Source: National Institutes of Health
Telephone: 301-594-6248
Information on Medicare and Medicaid certified nursing homes in the United States.

Public Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on elementary and secondary public education in the United States. It is a comprehensive, annual, national statistical database of all public elementary and secondary schools and school districts, which contains data that are comparable across all states.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Private Schools
Source: National Center for Education Statistics
Telephone: 202-502-7300
The National Center for Education Statistics' primary database on private school locations in the United States.
Daycare Centers: Licensed Facilities
Source: Department of Social Services
Telephone: 916-657-4041

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish and Wildlife
Telephone: 916-445-0411

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

STREET AND ADDRESS INFORMATION

© 2015 TomTom North America, Inc. All rights reserved. This material is proprietary and the subject of copyright protection and other intellectual property rights owned by or licensed to Tele Atlas North America, Inc. The use of this material is subject to the terms of a license agreement. You will be held liable for any unauthorized copying or disclosure of this material.

GEOCHECK ®- PHYSICAL SETTING SOURCE ADDENDUM

TARGET PROPERTY ADDRESS

GREEN DAY VILLAGE DESERT HOT SPRINGS
WEST OF PALM DRIVE AND 1,280 FEET SOUTH OF 18TH AVE
DESERT HOT SPRINGS, CA 92240

TARGET PROPERTY COORDINATES

Latitude (North):	33.912328 - 33° 54' 44.38''
Longitude (West):	116.503977 - 116° 30' 14.32''
Universal Tranverse Mercator:	Zone 11
UTM X (Meters):	545854.9
UTM Y (Meters):	3752351.8
Elevation:	763 ft. above sea level

USGS TOPOGRAPHIC MAP

Target Property Map:	12002832 DESERT HOT SPRINGS, CA
Version Date:	2018
Northeast Map:	12002902 SEVEN PALMS VALLEY, CA
Version Date:	2018

EDR's GeoCheck Physical Setting Source Addendum is provided to assist the environmental professional in forming an opinion about the impact of potential contaminant migration.

Assessment of the impact of contaminant migration generally has two principle investigative components:

1. Groundwater flow direction, and
2. Groundwater flow velocity.

Groundwater flow direction may be impacted by surface topography, hydrology, hydrogeology, characteristics of the soil, and nearby wells. Groundwater flow velocity is generally impacted by the nature of the geologic strata.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW DIRECTION INFORMATION

Groundwater flow direction for a particular site is best determined by a qualified environmental professional using site-specific well data. If such data is not reasonably ascertainable, it may be necessary to rely on other sources of information, such as surface topographic information, hydrologic information, hydrogeologic data collected on nearby properties, and regional groundwater flow information (from deep aquifers).

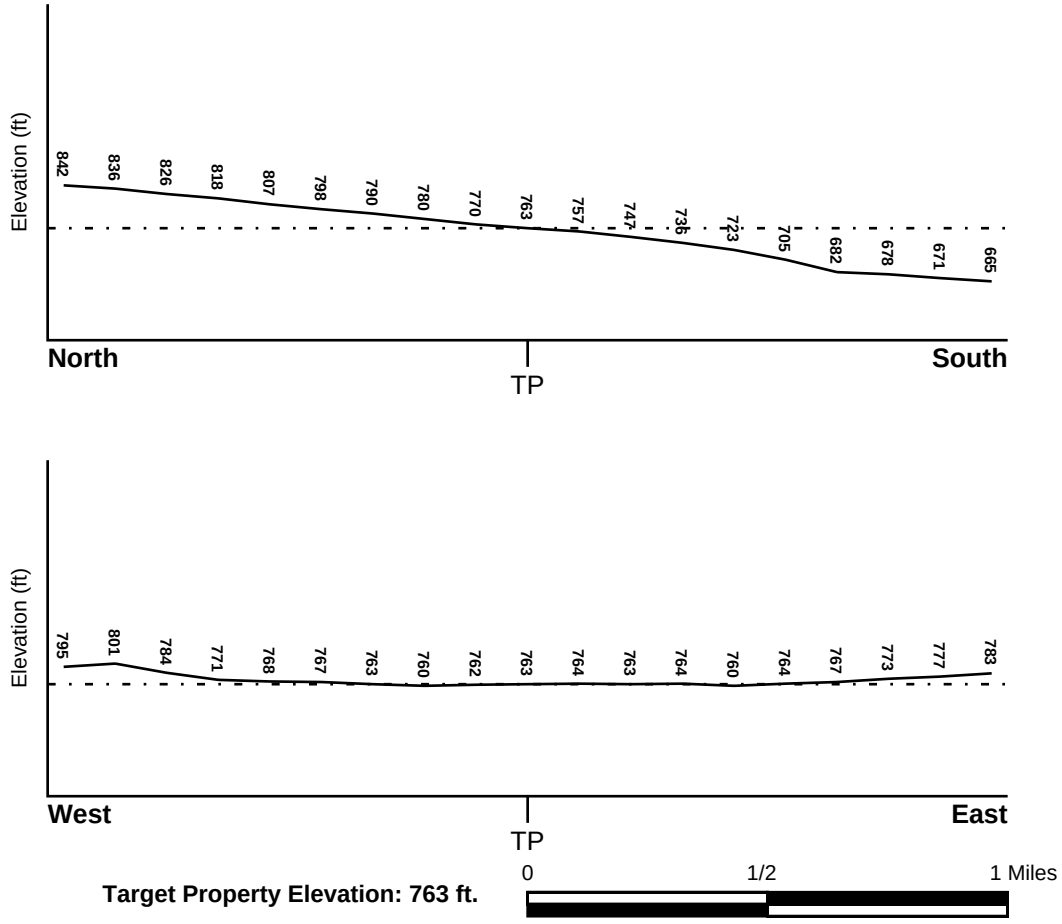
TOPOGRAPHIC INFORMATION

Surface topography may be indicative of the direction of surficial groundwater flow. This information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

TARGET PROPERTY TOPOGRAPHY

General Topographic Gradient: General South

SURROUNDING TOPOGRAPHY: ELEVATION PROFILES



Source: Topography has been determined from the USGS 7.5' Digital Elevation Model and should be evaluated on a relative (not an absolute) basis. Relative elevation information between sites of close proximity should be field verified.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

HYDROLOGIC INFORMATION

Surface water can act as a hydrologic barrier to groundwater flow. Such hydrologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Refer to the Physical Setting Source Map following this summary for hydrologic information (major waterways and bodies of water).

FEMA FLOOD ZONE

Flood Plain Panel at Target Property	FEMA Source Type
06065C0895G	FEMA FIRM Flood data

Additional Panels in search area:	FEMA Source Type
06065C0915G	FEMA FIRM Flood data

NATIONAL WETLAND INVENTORY

NWI Quad at Target Property	NWI Electronic Data Coverage
DESERT HOT SPRINGS	YES - refer to the Overview Map and Detail Map

HYDROGEOLOGIC INFORMATION

Hydrogeologic information obtained by installation of wells on a specific site can often be an indicator of groundwater flow direction in the immediate area. Such hydrogeologic information can be used to assist the environmental professional in forming an opinion about the impact of nearby contaminated properties or, should contamination exist on the target property, what downgradient sites might be impacted.

Site-Specific Hydrogeological Data*:

Search Radius:	1.25 miles
Status:	Not found

AQUIFLOW®

Search Radius: 1.000 Mile.

EDR has developed the AQUIFLOW Information System to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted by environmental professionals to regulatory authorities at select sites and has extracted the date of the report, groundwater flow direction as determined hydrogeologically, and the depth to water table.

MAP ID	LOCATION FROM TP	GENERAL DIRECTION GROUNDWATER FLOW
Not Reported		

* ©1996 Site−specific hydrogeological data gathered by CERCLIS Alerts, Inc., Bainbridge Island, WA. All rights reserved. All of the information and opinions presented are those of the cited EPA report(s), which were completed under a Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS) investigation.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

GROUNDWATER FLOW VELOCITY INFORMATION

Groundwater flow velocity information for a particular site is best determined by a qualified environmental professional using site specific geologic and soil strata data. If such data are not reasonably ascertainable, it may be necessary to rely on other sources of information, including geologic age identification, rock stratigraphic unit and soil characteristics data collected on nearby properties and regional soil information. In general, contaminant plumes move more quickly through sandy-gravelly types of soils than silty-clayey types of soils.

GEOLOGIC INFORMATION IN GENERAL AREA OF TARGET PROPERTY

Geologic information can be used by the environmental professional in forming an opinion about the relative speed at which contaminant migration may be occurring.

ROCK STRATIGRAPHIC UNIT

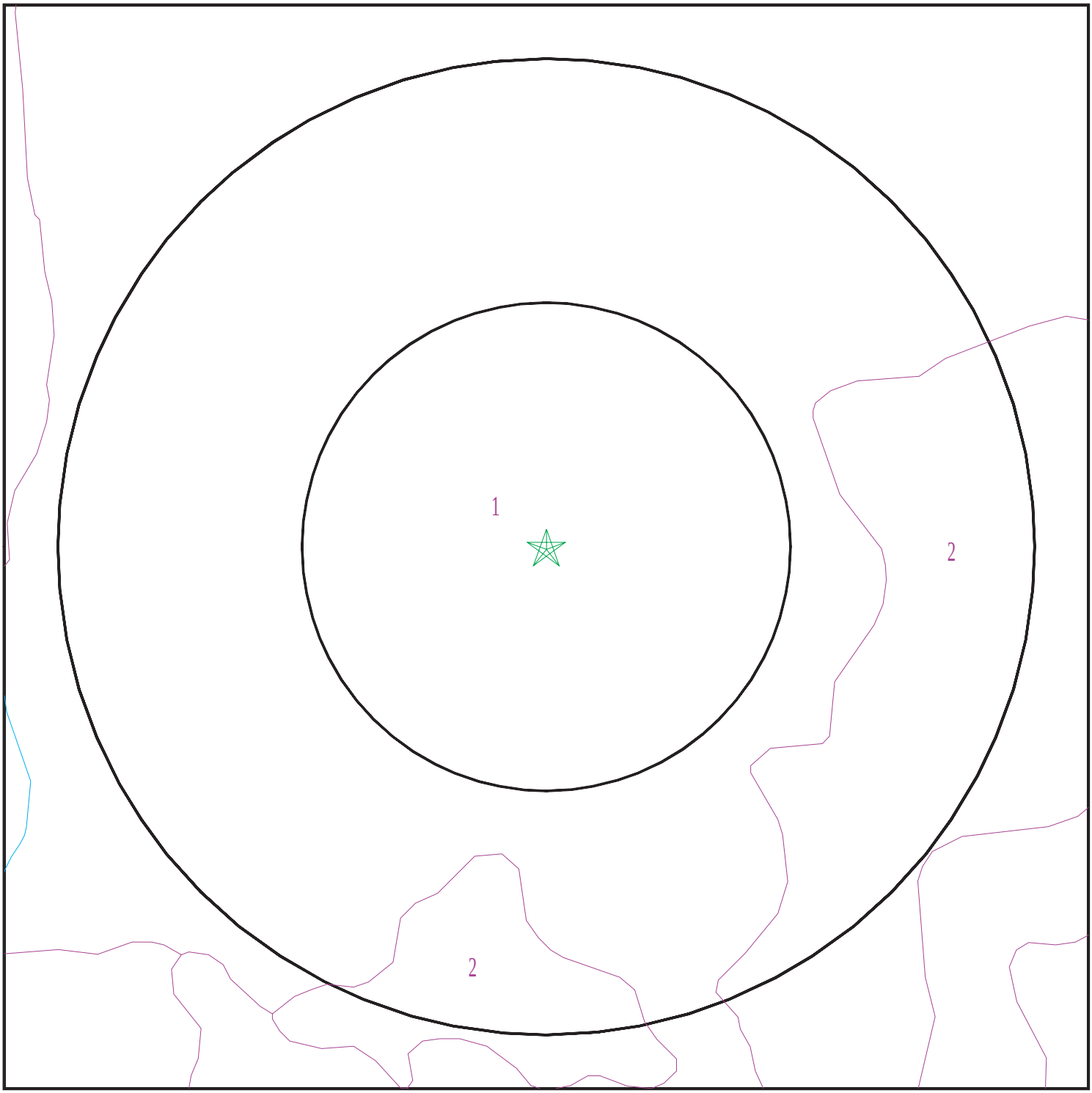
Era:	Cenozoic
System:	Quaternary
Series:	Quaternary
Code:	Q *(decoded above as Era, System & Series)*

GEOLOGIC AGE IDENTIFICATION

Category: Stratifed Sequence

Geologic Age and Rock Stratigraphic Unit Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - a digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

SSURGO SOIL MAP - 6745970.2s



SITE NAME:	Green Day Village Desert Hot Springs	CLIENT:	All Phase Environmental, Inc.
ADDRESS:	West of Palm Drive and 1,280 Feet South of 18th Ave Desert Hot Springs CA 92240	CONTACT:	Doug Kochanowski
LAT/LONG:	33.912328 / 116.503977	INQUIRY #:	6745970.2s
		DATE:	November 11, 2021 1:40 pm

Copyright © 2021 EDR, Inc. © 2015 TomTom Rel. 2015.

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

DOMINANT SOIL COMPOSITION IN GENERAL AREA OF TARGET PROPERTY

The U.S. Department of Agriculture's (USDA) Soil Conservation Service (SCS) leads the National Cooperative Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. The following information is based on Soil Conservation Service SSURGO data.

Soil Map ID: 1

Soil Component Name: Myoma

Soil Surface Texture: fine sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Somewhat excessively drained

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	18 inches	fine sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 9 Min: 7.9
2	18 inches	59 inches	sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 9 Min: 7.9

Soil Map ID: 2

Soil Component Name: Myoma

Soil Surface Texture: fine sand

Hydrologic Group: Class A - High infiltration rates. Soils are deep, well drained to excessively drained sands and gravels.

Soil Drainage Class: Somewhat excessively drained

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

Hydric Status: Partially hydric

Corrosion Potential - Uncoated Steel: High

Depth to Bedrock Min: > 0 inches

Depth to Watertable Min: > 0 inches

Soil Layer Information							
	Boundary			Classification		Saturated hydraulic conductivity micro m/sec	Soil Reaction (pH)
Layer	Upper	Lower	Soil Texture Class	AASHTO Group	Unified Soil		
1	0 inches	18 inches	fine sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 9 Min: 7.9
2	18 inches	59 inches	sand	Granular materials (35 pct. or less passing No. 200), Silty, or Clayey Gravel and Sand.	COARSE-GRAINED SOILS, Sands, Sands with fines, Silty Sand.	Max: 141 Min: 42	Max: 9 Min: 7.9

LOCAL / REGIONAL WATER AGENCY RECORDS

EDR Local/Regional Water Agency records provide water well information to assist the environmental professional in assessing sources that may impact ground water flow direction, and in forming an opinion about the impact of contaminant migration on nearby drinking water wells.

WELL SEARCH DISTANCE INFORMATION

DATABASE	SEARCH DISTANCE (miles)
Federal USGS	1.000
Federal FRDS PWS	Nearest PWS within 1 mile
State Database	1.000

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
A3	USGS40000138917	1/4 - 1/2 Mile SSW
B6	USGS40000138918	1/2 - 1 Mile SE

GEOCHECK® - PHYSICAL SETTING SOURCE SUMMARY

FEDERAL USGS WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
C12	USGS40000138908	1/2 - 1 Mile SE
D16	USGS40000139047	1/2 - 1 Mile North
E17	USGS40000138882	1/2 - 1 Mile SSE
F21	USGS40000139067	1/2 - 1 Mile North
G24	USGS40000139077	1/2 - 1 Mile North
H25	USGS40000138888	1/2 - 1 Mile SE

FEDERAL FRDS PUBLIC WATER SUPPLY SYSTEM INFORMATION

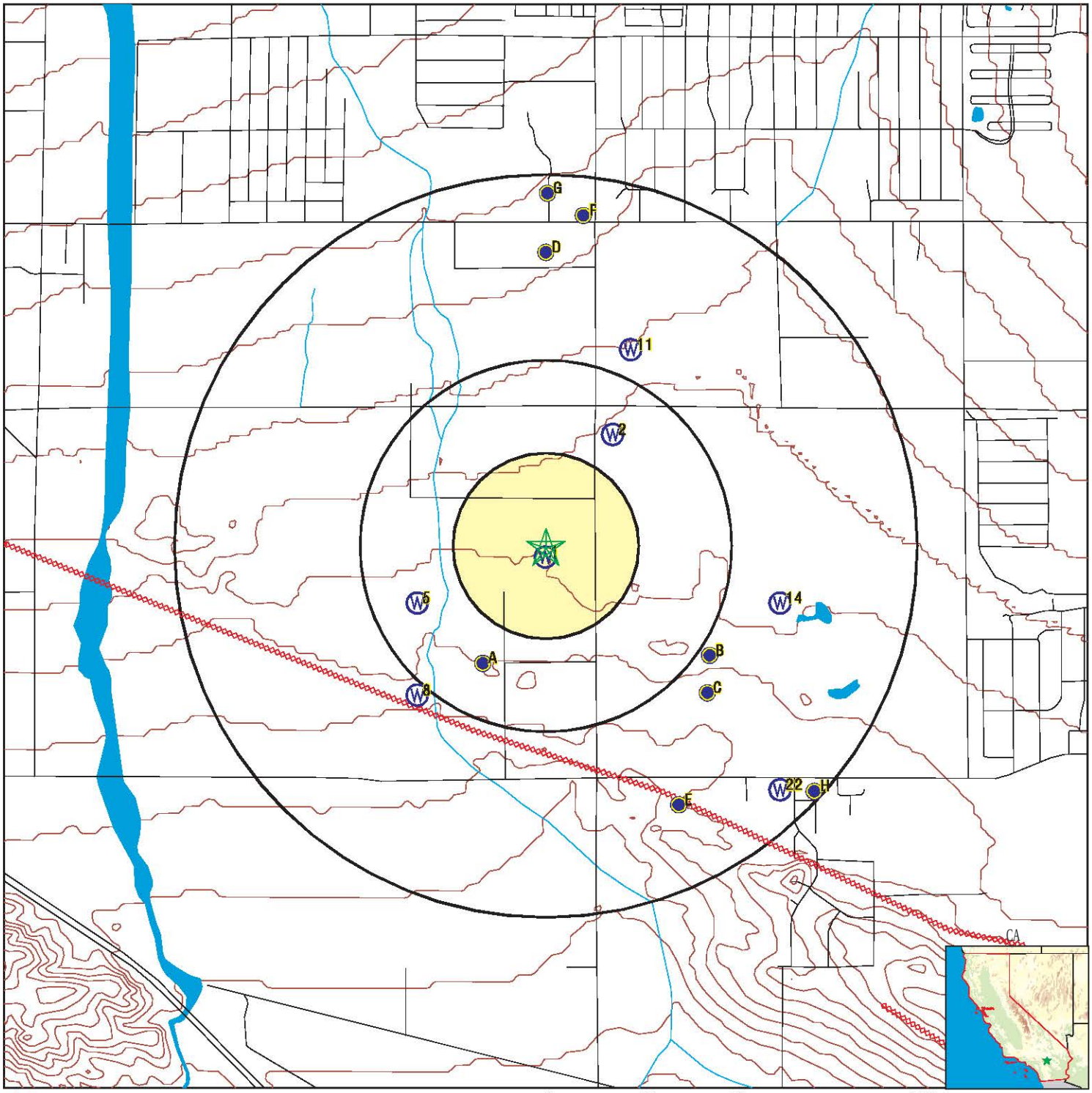
MAP ID	WELL ID	LOCATION FROM TP
No PWS System Found		

Note: PWS System location is not always the same as well location.

STATE DATABASE WELL INFORMATION

MAP ID	WELL ID	LOCATION FROM TP
1	CADWR0000025133	0 - 1/8 Mile South
2	3530	1/4 - 1/2 Mile NNE
A4	CAUSGSN00001276	1/4 - 1/2 Mile SSW
5	CADWR0000003497	1/4 - 1/2 Mile WSW
B7	CAUSGSN00012829	1/2 - 1 Mile SE
8	CADWR0000000009	1/2 - 1 Mile SW
B9	CADDW0000010192	1/2 - 1 Mile ESE
C10	CADWR0000023913	1/2 - 1 Mile SE
11	CADDW0000005020	1/2 - 1 Mile NNE
C13	CAUSGSN00009122	1/2 - 1 Mile SE
14	CADWR0000032348	1/2 - 1 Mile ESE
D15	CAUSGSN00009121	1/2 - 1 Mile North
E18	CAUSGSN00017699	1/2 - 1 Mile SSE
D19	3531	1/2 - 1 Mile North
F20	CAUSGSN00006746	1/2 - 1 Mile North
22	CADWR0000009614	1/2 - 1 Mile SE
G23	CAUSGSN00012849	1/2 - 1 Mile North
H26	CAUSGSN00007316	1/2 - 1 Mile SE

PHYSICAL SETTING SOURCE MAP - 6745970.2s



- County Boundary
- Major Roads
- Contour Lines
- Earthquake Fault Lines
- Earthquake epicenter, Richter 5 or greater
- Water Wells
- Public Water Supply Wells
- Cluster of Multiple Icons

- Groundwater Flow Direction
- GI Indeterminate Groundwater Flow at Location
- GV Groundwater Flow Varies at Location
- HD Closest Hydrogeological Data
- Oil, gas or related wells

SITE NAME:	Green Day Village Desert Hot Springs	CLIENT:	All Phase Environmental, Inc.
ADDRESS:	West of Palm Drive and 1,280 Feet South of 18th Ave Desert Hot Springs CA 92240	CONTACT:	Doug Kochanowski
LAT/LONG:	33.912328 / 116.503977	INQUIRY #:	6745970.2s
		DATE:	November 11, 2021 1:40 pm

Copyright © 2021 EDR, Inc. © 2015 TomTom Rel. 2015.

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

1
South **CA WELLS** **CADWR0000025133**
0 - 1/8 Mile
Lower

Well ID:	03S05E18X001S	Well Type:	UNK
Source:	Department of Water Resources		
Other Name:	03S05E18X001S	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=DWR&samp_date=&global_id=&assigned_name=03S05E18X001S&store_num=		
GeoTracker Data:	Not Reported		

2
NNE **CA WELLS** **3530**
1/4 - 1/2 Mile
Higher

Seq:	3530	Prim sta c:	03S/05E-07K01 S
Frds no:	3310081002	County:	33
District:	14	User id:	WAT
System no:	3310081	Water type:	G
Source nam:	WELL 25	Station ty:	WELL/AMBNT/MUN/INTAKE/SUPPLY
Latitude:	335500.0	Longitude:	1163000.0
Precision:	8	Status:	AU
Comment 1:	Not Reported	Comment 2:	Not Reported
Comment 3:	Not Reported	Comment 4:	Not Reported
Comment 5:	Not Reported	Comment 6:	Not Reported
Comment 7:	Not Reported		

System no:	3310081	System nam:	Palm Springs Crest
Hqname:	Not Reported	Address:	Not Reported
City:	DESERT HOT SPRINGS	State:	CA
Zip:	92240	Zip ext:	Not Reported
Pop serv:	200	Connection:	80
Area serve:	Not Reported		

Sample date:	07-JUN-17	Finding:	3.3
Chemical:	CHROMIUM, HEXAVALENT	Report units:	UG/L
Dlr:	1.		

Sample date:	05-JUN-17	Finding:	8.6
Chemical:	CHLORIDE	Report units:	MG/L
Dlr:	0.		

Sample date:	05-JUN-17	Finding:	0.88
Chemical:	URANIUM MDA95	Report units:	PCI/L
Dlr:	0.		

Sample date:	05-JUN-17	Finding:	2.1
Chemical:	GROSS ALPHA MDA95	Report units:	PCI/L
Dlr:	0.		

Sample date:	05-JUN-17	Finding:	20.
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		

Sample date:	05-JUN-17	Finding:	430.
Chemical:	SPECIFIC CONDUCTANCE	Report units:	US

Dlr:	0.		
Sample date:	05-JUN-17	Finding:	7.6
Chemical:	PH, LABORATORY	Report units:	Not Reported
Dlr:	0.		
Sample date:	05-JUN-17	Finding:	190.
Chemical:	ALKALINITY (TOTAL) AS CACO3	Report units:	MG/L
Dlr:	0.		
Sample date:	05-JUN-17	Finding:	230.
Chemical:	BICARBONATE ALKALINITY	Report units:	MG/L
Dlr:	0.		
Sample date:	05-JUN-17	Finding:	1.
Chemical:	NITRATE (AS N)	Report units:	MG/L
Dlr:	0.4		
Sample date:	05-JUN-17	Finding:	190.
Chemical:	HARDNESS (TOTAL) AS CACO3	Report units:	MG/L
Dlr:	0.		
Sample date:	05-JUN-17	Finding:	53.
Chemical:	CALCIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	05-JUN-17	Finding:	13.
Chemical:	MAGNESIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	05-JUN-17	Finding:	18.
Chemical:	SODIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	05-JUN-17	Finding:	4.
Chemical:	POTASSIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	05-JUN-17	Finding:	20.
Chemical:	SULFATE	Report units:	MG/L
Dlr:	0.5		
Sample date:	05-JUN-17	Finding:	1.3
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)	Report units:	MG/L
Dlr:	0.1		
Sample date:	05-JUN-17	Finding:	8.1
Chemical:	VANADIUM	Report units:	UG/L
Dlr:	3.		
Sample date:	05-JUN-17	Finding:	4.6
Chemical:	GROSS ALPHA	Report units:	PCI/L
Dlr:	3.		
Sample date:	05-JUN-17	Finding:	2.3
Chemical:	GROSS ALPHA COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	05-JUN-17	Finding:	5.5
Chemical:	URANIUM (PCI/L)	Report units:	PCI/L
Dlr:	1.		

Sample date:	05-JUN-17	Finding:	220.
Chemical:	TOTAL DISSOLVED SOLIDS	Report units:	MG/L
Dlr:	0.		
Sample date:	05-JUN-17	Finding:	0.81
Chemical:	LANGELIER INDEX @ 60 C	Report units:	Not Reported
Dlr:	0.		
Sample date:	05-JUN-17	Finding:	0.2
Chemical:	LANGELIER INDEX AT SOURCE TEMP.	Report units:	Not Reported
Dlr:	0.		
Sample date:	05-JUN-17	Finding:	12.01
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)	Report units:	Not Reported
Dlr:	0.		
Sample date:	05-JUN-17	Finding:	1.1
Chemical:	URANIUM COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	05-JUN-17	Finding:	1.
Chemical:	NITRATE + NITRITE (AS N)	Report units:	MG/L
Dlr:	0.4		
Sample date:	14-SEP-16	Finding:	0.93
Chemical:	NITRATE (AS N)	Report units:	MG/L
Dlr:	0.4		
Sample date:	24-FEB-16	Finding:	1.
Chemical:	NITRATE (AS N)	Report units:	MG/L
Dlr:	0.4		
Sample date:	09-JUL-14	Finding:	2.7
Chemical:	CHROMIUM, HEXAVALENT	Report units:	UG/L
Dlr:	1.		
Sample date:	01-JUL-14	Finding:	20.
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	440.
Chemical:	SPECIFIC CONDUCTANCE	Report units:	US
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	7.6
Chemical:	PH, LABORATORY	Report units:	Not Reported
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	190.
Chemical:	ALKALINITY (TOTAL) AS CACO3	Report units:	MG/L
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	230.
Chemical:	BICARBONATE ALKALINITY	Report units:	MG/L
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	190.
Chemical:	HARDNESS (TOTAL) AS CACO3	Report units:	MG/L
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	52.
Chemical:	CALCIUM	Report units:	MG/L

Dlr:	0.		
Sample date:	01-JUL-14	Finding:	14.
Chemical:	MAGNESIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	17.
Chemical:	SODIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	3.7
Chemical:	POTASSIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	8.6
Chemical:	CHLORIDE	Report units:	MG/L
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	20.
Chemical:	SULFATE	Report units:	MG/L
Dlr:	0.5		
Sample date:	01-JUL-14	Finding:	1.4
Chemical:	FLUORIDE (F) (NATURAL-SOURCE)	Report units:	MG/L
Dlr:	0.1		
Sample date:	01-JUL-14	Finding:	7.4
Chemical:	VANADIUM	Report units:	UG/L
Dlr:	3.		
Sample date:	01-JUL-14	Finding:	5.4
Chemical:	GROSS ALPHA	Report units:	PCI/L
Dlr:	3.		
Sample date:	01-JUL-14	Finding:	1.6
Chemical:	GROSS ALPHA COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	5.4
Chemical:	URANIUM (PCI/L)	Report units:	PCI/L
Dlr:	1.		
Sample date:	01-JUL-14	Finding:	250.
Chemical:	TOTAL DISSOLVED SOLIDS	Report units:	MG/L
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	0.81
Chemical:	LANGELIER INDEX @ 60 C	Report units:	Not Reported
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	0.2
Chemical:	LANGELIER INDEX AT SOURCE TEMP.	Report units:	Not Reported
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	4.4
Chemical:	NITRATE (AS NO3)	Report units:	MG/L
Dlr:	2.		
Sample date:	01-JUL-14	Finding:	0.3
Chemical:	TURBIDITY, LABORATORY	Report units:	NTU
Dlr:	0.1		

Sample date:	01-JUL-14	Finding:	12.01
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)	Report units:	Not Reported
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	1.
Chemical:	URANIUM COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	1000.
Chemical:	NITRATE + NITRITE (AS N)	Report units:	MG/L
Dlr:	0.4		
Sample date:	01-JUL-14	Finding:	1.1
Chemical:	GROSS ALPHA MDA95	Report units:	PCI/L
Dlr:	0.		
Sample date:	01-JUL-14	Finding:	0.88
Chemical:	URANIUM MDA95	Report units:	PCI/L
Dlr:	0.		
Sample date:	13-JAN-14	Finding:	4.4
Chemical:	NITRATE (AS NO3)	Report units:	MG/L
Dlr:	2.		
Sample date:	08-JAN-14	Finding:	0.47
Chemical:	RADIUM, TOTAL, MDA95-NTNC ONLY, BY 903.0		
Report units:	PCI/L	Dlr:	0.
Sample date:	08-JAN-14	Finding:	0.245
Chemical:	RA-226 OR TOTAL RA BY 903.0 C.E.	Report units:	PCI/L
Dlr:	0.		
Sample date:	08-JAN-14	Finding:	0.2
Chemical:	RADIUM 228 MDA95	Report units:	PCI/L
Dlr:	0.		
Sample date:	08-JAN-14	Finding:	0.562
Chemical:	RADIUM 228 COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	08-JAN-14	Finding:	7.7e-002
Chemical:	RADIUM 228	Report units:	PCI/L
Dlr:	1.		
Sample date:	07-JAN-14	Finding:	1.7
Chemical:	GROSS ALPHA COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	07-JAN-14	Finding:	0.88
Chemical:	URANIUM MDA95	Report units:	PCI/L
Dlr:	0.		
Sample date:	07-JAN-14	Finding:	1.1
Chemical:	GROSS ALPHA MDA95	Report units:	PCI/L
Dlr:	0.		
Sample date:	07-JAN-14	Finding:	0.99
Chemical:	URANIUM COUNTING ERROR	Report units:	PCI/L
Dlr:	0.		
Sample date:	07-JAN-14	Finding:	4.9
Chemical:	URANIUM (PCI/L)	Report units:	PCI/L

Dlr:	1.		
Sample date:	07-JAN-14	Finding:	7.4
Chemical:	GROSS ALPHA	Report units:	PCI/L
Dlr:	3.		
Sample date:	09-JUL-12	Finding:	7.8
Chemical:	PH, LABORATORY	Report units:	Not Reported
Dlr:	0.		
Sample date:	09-JUL-12	Finding:	420.
Chemical:	SPECIFIC CONDUCTANCE	Report units:	US
Dlr:	0.		
Sample date:	09-JUL-12	Finding:	20.
Chemical:	SOURCE TEMPERATURE C	Report units:	C
Dlr:	0.		
Sample date:	09-JUL-12	Finding:	190.
Chemical:	ALKALINITY (TOTAL) AS CACO3	Report units:	MG/L
Dlr:	0.		
Sample date:	09-JUL-12	Finding:	0.4
Chemical:	LANGELIER INDEX AT SOURCE TEMP.	Report units:	Not Reported
Dlr:	0.		
Sample date:	09-JUL-12	Finding:	53.
Chemical:	CALCIUM	Report units:	MG/L
Dlr:	0.		
Sample date:	09-JUL-12	Finding:	12.2
Chemical:	AGGRSSIVE INDEX (CORROSIVITY)	Report units:	Not Reported
Dlr:	0.		
Sample date:	09-JUL-12	Finding:	3.9
Chemical:	NITRATE (AS NO3)	Report units:	MG/L
Dlr:	2.		
Sample date:	09-JUL-12	Finding:	1.
Chemical:	LANGELIER INDEX @ 60 C	Report units:	Not Reported
Dlr:	0.		

A3
SSW **FED USGS** **USGS40000138917**
1/4 - 1/2 Mile
Lower

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	003S005E18M001S	Type:	Well
Description:	Not Reported	HUC:	18100200
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	124
Well Depth Units:	ft	Well Hole Depth:	140
Well Hole Depth Units:	ft		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

A4
SSW
1/4 - 1/2 Mile
Lower

CA WELLS **CAUSGSN00001276**

Well ID:	USGS-335428116302201	Well Type:	UNK
Source:	United States Geological Survey		
Other Name:	USGS-335428116302201	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=USGSNEW&samp_date=&global_id=&assigned_name=USGS-335428116302201&store_num=		
GeoTracker Data:	Not Reported		

5
WSW
1/4 - 1/2 Mile
Lower

CA WELLS **CADWR0000003497**

Well ID:	03S05E18M001S	Well Type:	UNK
Source:	Department of Water Resources		
Other Name:	03S05E18M001S	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=DWR&samp_date=&global_id=&assigned_name=03S05E18M001S&store_num=		
GeoTracker Data:	Not Reported		

B6
SE
1/2 - 1 Mile
Lower

FED USGS **USGS40000138918**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	003S005E18J001S	Type:	Well
Description:	Not Reported	HUC:	18100200
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	Not Reported
Well Depth Units:	Not Reported	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

B7
SE
1/2 - 1 Mile
Lower

CA WELLS **CAUSGSN00012829**

Well ID:	USGS-335429116294401	Well Type:	UNK
Source:	United States Geological Survey		
Other Name:	USGS-335429116294401	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=USGSNEW&samp_date=&global_id=&assigned_name=USGS-335429116294401&store_num=		
GeoTracker Data:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

8
SW
1/2 - 1 Mile
Lower

CA WELLS **CADWR0000000009**

Well ID:	03S05E18N001S	Well Type:	UNK
Source:	Department of Water Resources		
Other Name:	03S05E18N001S	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=DWR&samp_date=&global_id=&assigned_name=03S05E18N001S&store_num=		
GeoTracker Data:	Not Reported		

B9
ESE
1/2 - 1 Mile
Lower

CA WELLS **CADDW0000010192**

Well ID:	3301388-001	Well Type:	MUNICIPAL
Source:	Department of Health Services		
Other Name:	WELL #1	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=DHS&samp_date=&global_id=&assigned_name=3301388-001&store_num=		
GeoTracker Data:	Not Reported		

C10
SE
1/2 - 1 Mile
Lower

CA WELLS **CADWR0000023913**

Well ID:	03S05E18R001S	Well Type:	UNK
Source:	Department of Water Resources		
Other Name:	03S05E18R001S	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=DWR&samp_date=&global_id=&assigned_name=03S05E18R001S&store_num=		
GeoTracker Data:	Not Reported		

11
NNE
1/2 - 1 Mile
Lower

CA WELLS **CADDW0000005020**

Well ID:	3301170-001	Well Type:	MUNICIPAL
Source:	Department of Health Services		
Other Name:	WELL 01 WEST - PENDING	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=DHS&samp_date=&global_id=&assigned_name=3301170-001&store_num=		
GeoTracker Data:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

C12
SE
1/2 - 1 Mile
Lower

FED USGS **USGS40000138908**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	003S005E18R001S	Type:	Well
Description:	Not Reported	HUC:	18100200
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	340
Well Depth Units:	ft	Well Hole Depth:	340
Well Hole Depth Units:	ft		

C13
SE
1/2 - 1 Mile
Lower

CA WELLS **CAUSGSN00009122**

Well ID:	USGS-335424116294301	Well Type:	UNK
Source:	United States Geological Survey		
Other Name:	USGS-335424116294301	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=USGSNEW&samp_date=&global_id=&assigned_name=USGS-335424116294301&store_num=		
GeoTracker Data:	Not Reported		

14
ESE
1/2 - 1 Mile
Higher

CA WELLS **CADWR0000032348**

Well ID:	03S05E17M001S	Well Type:	UNK
Source:	Department of Water Resources		
Other Name:	03S05E17M001S	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=DWR&samp_date=&global_id=&assigned_name=03S05E17M001S&store_num=		
GeoTracker Data:	Not Reported		

D15
North
1/2 - 1 Mile
Higher

CA WELLS **CAUSGSN00009121**

Well ID:	USGS-335525116301201	Well Type:	UNK
Source:	United States Geological Survey		
Other Name:	USGS-335525116301201	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=USGSNEW&samp_date=&global_id=&assigned_name=USGS-335525116301201&store_num=		
GeoTracker Data:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

D16
North
1/2 - 1 Mile
Higher | **FED USGS** | **USGS40000139047**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	003S005E07L001S	Type:	Well
Description:	Not Reported	HUC:	18100200
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	Not Reported
Well Depth Units:	Not Reported	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

E17
SSE
1/2 - 1 Mile
Lower | **FED USGS** | **USGS40000138882**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	003S005E19B001S	Type:	Well
Description:	Not Reported	HUC:	18100200
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	Not Reported
Well Depth Units:	Not Reported	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

E18
SSE
1/2 - 1 Mile
Lower | **CA WELLS** | **CAUSGSN00017699**

Well ID:	USGS-335408116294901	Well Type:	UNK
Source:	United States Geological Survey		
Other Name:	USGS-335408116294901	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=USGSNEW&samp_date=&global_id=&assigned_name=USGS-335408116294901&store_num=		
GeoTracker Data:	Not Reported		

D19
North
1/2 - 1 Mile
Higher | **CA WELLS** | **3531**

Seq:	3531	Prim sta c:	03S/05E-07L03 S
Frds no:	3301170001	County:	33
District:	63	User id:	33C

System no:	3301170	Water type:	G
Source nam:	WELL 01 WEST	Station ty:	WELL/AMBNT/MUN/INTAKE
Latitude:	335527.0	Longitude:	1163010.0
Precision:	2	Status:	AR
Comment 1:	66-455 DILLON RD., DESERT HOT SPRINGS, CA 92240		
Comment 2:	Not Reported	Comment 3:	Not Reported
Comment 4:	Not Reported	Comment 5:	Not Reported
Comment 6:	Not Reported	Comment 7:	Not Reported

System no:	3301170	System nam:	Country Squire Trailer Park
Hqname:	Not Reported	Address:	Not Reported
City:	Not Reported	State:	Not Reported
Zip:	Not Reported	Zip ext:	Not Reported
Pop serv:	0	Connection:	0
Area serve:	Not Reported		

F20
North
1/2 - 1 Mile
Higher

CA WELLS **CAUSGSN00006746**

Well ID:	USGS-335531116300501	Well Type:	UNK
Source:	United States Geological Survey		
Other Name:	USGS-335531116300501	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=USGSNEW&samp_date=&global_id=&assigned_name=USGS-335531116300501&store_num=		
GeoTracker Data:	Not Reported		

F21
North
1/2 - 1 Mile
Higher

FED USGS **USGS40000139067**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	003S005E07F001S	Type:	Well
Description:	Not Reported	HUC:	18100100
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	Not Reported
Well Depth Units:	Not Reported	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

22
SE
1/2 - 1 Mile
Lower

CA WELLS **CADWR0000009614**

Well ID:	03S05E20D001S	Well Type:	UNK
Source:	Department of Water Resources		
Other Name:	03S05E20D001S	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=DWR&samp_date=&global_id=&assigned_name=03S05E20D001S&store_num=		
GeoTracker Data:	Not Reported		

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Map ID
Direction
Distance
Elevation | Database | EDR ID Number

G23
North
1/2 - 1 Mile
Higher

CA WELLS **CAUSGSN00012849**

Well ID:	USGS-335534116301101	Well Type:	UNK
Source:	United States Geological Survey		
Other Name:	USGS-335534116301101	GAMA PFAS Testing:	Not Reported
Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=USGSNEW&samp_date=&global_id=&assigned_name=USGS-335534116301101&store_num=		
GeoTracker Data:	Not Reported		

G24
North
1/2 - 1 Mile
Higher

FED USGS **USGS40000139077**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	003S005E07F002S	Type:	Well
Description:	Not Reported	HUC:	18100200
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	Not Reported
Well Depth Units:	Not Reported	Well Hole Depth:	Not Reported
Well Hole Depth Units:	Not Reported		

H25
SE
1/2 - 1 Mile
Lower

FED USGS **USGS40000138888**

Organization ID:	USGS-CA		
Organization Name:	USGS California Water Science Center		
Monitor Location:	003S005E20D001S	Type:	Well
Description:	Not Reported	HUC:	18100200
Drainage Area:	Not Reported	Drainage Area Units:	Not Reported
Contrib Drainage Area:	Not Reported	Contrib Drainage Area Unts:	Not Reported
Aquifer:	Basin and Range basin-fill aquifers		
Formation Type:	Not Reported	Aquifer Type:	Not Reported
Construction Date:	Not Reported	Well Depth:	351
Well Depth Units:	ft	Well Hole Depth:	351
Well Hole Depth Units:	ft		

H26
SE
1/2 - 1 Mile
Lower

CA WELLS **CAUSGSN00007316**

Well ID:	USGS-335410116292601	Well Type:	UNK
Source:	United States Geological Survey		
Other Name:	USGS-335410116292601	GAMA PFAS Testing:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS

Groundwater Quality Data:	https://gamagroundwater.waterboards.ca.gov/gama/gamamap/public/GamaDataDisplay.asp?dataset=USGSNEW&samp_date=&global_id=&assigned_name=USGS-335410116292601&store_num=
GeoTracker Data:	Not Reported

GEOCHECK® - PHYSICAL SETTING SOURCE MAP FINDINGS
RADON

AREA RADON INFORMATION

State Database: CA Radon

Radon Test Results

Zipcode	Num Tests	> 4 pCi/L
92240	6	0

Federal EPA Radon Zone for RIVERSIDE County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

Federal Area Radon Information for RIVERSIDE COUNTY, CA

Number of sites tested: 12

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.117 pCi/L	100%	0%	0%
Living Area - 2nd Floor	0.450 pCi/L	100%	0%	0%
Basement	1.700 pCi/L	100%	0%	0%

PHYSICAL SETTING SOURCE RECORDS SEARCHED

TOPOGRAPHIC INFORMATION

USGS 7.5' Digital Elevation Model (DEM)
Source: United States Geologic Survey
EDR acquired the USGS 7.5' Digital Elevation Model in 2002 and updated it in 2006. The 7.5 minute DEM corresponds to the USGS 1:24,000- and 1:25,000-scale topographic quadrangle maps. The DEM provides elevation data with consistent elevation units and projection.

Current USGS 7.5 Minute Topographic Map
Source: U.S. Geological Survey

HYDROLOGIC INFORMATION

Flood Zone Data: This data was obtained from the Federal Emergency Management Agency (FEMA). It depicts 100-year and 500-year flood zones as defined by FEMA. It includes the National Flood Hazard Layer (NFHL) which incorporates Flood Insurance Rate Map (FIRM) data and Q3 data from FEMA in areas not covered by NFHL.
Source: FEMA
Telephone: 877-336-2627
Date of Government Version: 2003, 2015

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 2002, 2005 and 2010 from the U.S. Fish and Wildlife Service.

State Wetlands Data: Wetland Inventory
Source: Department of Fish and Wildlife
Telephone: 916-445-0411

HYDROGEOLOGIC INFORMATION

AQUIFLOW^{R} Information System
Source: EDR proprietary database of groundwater flow information
EDR has developed the AQUIFLOW Information System (AIS) to provide data on the general direction of groundwater flow at specific points. EDR has reviewed reports submitted to regulatory authorities at select sites and has extracted the date of the report, hydrogeologically determined groundwater flow direction and depth to water table information.

GEOLOGIC INFORMATION

Geologic Age and Rock Stratigraphic Unit
Source: P.G. Schruben, R.E. Arndt and W.J. Bawiec, Geology of the Conterminous U.S. at 1:2,500,000 Scale - A digital representation of the 1974 P.B. King and H.M. Beikman Map, USGS Digital Data Series DDS - 11 (1994).

STATSGO: State Soil Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
The U.S. Department of Agriculture's (USDA) Natural Resources Conservation Service (NRCS) leads the national Conservation Soil Survey (NCSS) and is responsible for collecting, storing, maintaining and distributing soil survey information for privately owned lands in the United States. A soil map in a soil survey is a representation of soil patterns in a landscape. Soil maps for STATSGO are compiled by generalizing more detailed (SSURGO) soil survey maps.

SSURGO: Soil Survey Geographic Database
Source: Department of Agriculture, Natural Resources Conservation Service (NRCS)
Telephone: 800-672-5559
SSURGO is the most detailed level of mapping done by the Natural Resources Conservation Service, mapping scales generally range from 1:12,000 to 1:63,360. Field mapping methods using national standards are used to construct the soil maps in the Soil Survey Geographic (SSURGO) database. SSURGO digitizing duplicates the original soil survey maps. This level of mapping is designed for use by landowners, townships and county natural resource planning and management.

PHYSICAL SETTING SOURCE RECORDS SEARCHED

LOCAL / REGIONAL WATER AGENCY RECORDS

FEDERAL WATER WELLS

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-564-3750
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

USGS Water Wells: USGS National Water Inventory System (NWIS)
This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on wells, springs, and other sources of groundwater.

OTHER STATE DATABASE INFORMATION

Groundwater Ambient Monitoring & Assessment Program
State Water Resources Control Board
Telephone: 916-341-5577
The GAMA Program is Californias comprehensive groundwater quality monitoring program. GAMA collects data by testing the untreated, raw water in different types of wells for naturally-occurring and man-made chemicals. The GAMA data includes Domestic, Monitoring and Municipal well types from the following sources, Department of Water Resources, Department of Heath Services, EDF, Agricultural Lands, Lawrence Livermore National Laboratory, Department of Pesticide Regulation, United States Geological Survey, Groundwater Ambient Monitoring and Assessment Program and Local Groundwater Projects.

Water Well Database
Source: Department of Water Resources
Telephone: 916-651-9648

California Drinking Water Quality Database
Source: Department of Public Health
Telephone: 916-324-2319
The database includes all drinking water compliance and special studies monitoring for the state of California since 1984. It consists of over 3,200,000 individual analyses along with well and water system information.

California Oil and Gas Well Locations
Source: Dept of Conservation, Geologic Energy Management Division
Telephone: 916-323-1779
Oil and Gas well locations in the state.

California Earthquake Fault Lines
Source: California Division of Mines and Geology
The fault lines displayed on EDR's Topographic map are digitized quaternary fault lines prepared in 1975 by the United State Geological Survey. Additional information (also from 1975) regarding activity at specific fault lines comes from California's Preliminary Fault Activity Map prepared by the California Division of Mines and Geology.

RADON

State Database: CA Radon
Source: Department of Public Health
Telephone: 916-210-8558
Radon Database for California

APPENDIX E

Questionnaires

All Phase Environmental, Inc.

USER-BUYER

All Phase Environmental, Inc. is conducting a Phase I ESA of the site located west of Palm Drive and 1,280 feet south of 18th Avenue, Desert Hot Springs, California (APN 657-280-003) hereinafter referred to as the "Property." Please answer the following questions to the best of your knowledge, scan and e-mail to: ***Doug@PhaseOneESA.com*** *or FAX to:* ***(714) 593-0012.***

1. Did a search of recorded land title records or judicial records identify any environmental liens filed or recorded against the Property under federal, tribal, state, or local law?
   No/I Don't Know [X] Yes, describe:

2. Did a search of recorded land title records or judicial records where appropriate, identify any AULs, such as engineering controls, land use restrictions or institutional controls that are in place at the Property and/or have been filed or recorded against the Property under federal, tribal, state or local law?
   No/I Don't Know [X] Yes, describe:

3. Do you have any specialized knowledge or experience related to the Property or nearby properties? For example, are you involved in the same line of business as the current or former occupants of the Property or an adjoining property so that you would have specialized knowledge of the chemicals and processes used by this type of business?
   No/I Don't Know [X] Yes, describe:

4. To the best of your knowledge, does the purchase price being paid for the Property reasonably reflect the fair market value of the property?
   Yes [ ] No [ ]
   Dont know

5. If you conclude that there is a difference, have you considered whether the lower purchase price is because contamination is known or believed to be present at the Property?
   [X] Not Applipicale, the price appears to reflect the fair market value of the property.

6. Are you aware of commonly known or reasonably ascertainable information about the Property that would help the environmental professional to identify conditions indicative of releases or threatened releases? This includes the following:

   Do you know the past uses of the Property?
   No/I Don't Know [X] Yes, describe:

   Do you know of specific chemicals that are present or once were present at the Property?
   No/I Don't Know [X] Yes, describe:

   Do you know of spills or other chemical releases that have taken place at the Property?
   No/I Don't Know [X] Yes, describe:

   Do you know of any environmental cleanups that have taken place at the Property?
   No/I Don't Know [X] Yes, describe:

7. Based on your knowledge and experience related to the Property are there any obvious indicators that point to the presence or likely presence of releases at the Property?
   No/I Don't Know [X] Yes, describe:

Completed By (Signature)	CEO Title
Avraham Farzan Printed Name	11/10/2021 Date
LA World Construction Company	

APPENDIX F

All Phase Environmental, Inc. Certificate of Insurance

CERTIFICATE OF LIABILITY INSURANCE

DATE(MM/DD/YYYY): 7/22/2021

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
ISU INS SERV - BC ENV BROKERAGE
1037 Suncast Ln Ste 103
El Dorado Hills, CA 95762

CONTACT NAME: DINA ATHEY
PHONE (A/C, No, Ext): (916)939-1080 FAX (A/C, No): (916)939-1085
E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC#
INSURER A : ADMIRAL INSURANCE COMPANY	24856
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
ALL PHASE ENVIRONMENTAL, INC.
8792 LAUDER CIRCLE, SUITE 200
HUNTINGTON BEACH, CA 92646

COVERAGES CERTIFICATE NUMBER: REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY [ ] CLAIMS-MADE [X] OCCUR X CONT.POLLUTION GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY [ ] PRO-JECT [ ] LOC OTHER:			FEI-ECC-16625-08	07/22/21	07/22/22	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 1,000,000 $ 50,000 $ 5,000 $ 1,000,000 $ 2,000,000 $ 2,000,000
A	AUTOMOBILE LIABILITY ANY AUTO ALL OWNED AUTOS [ ] SCHEDULED AUTOS X HIRED AUTOS [X] NON-OWNED AUTOS			FEI-ECC-16625-08 INCL. IN GL	07/22/21	07/22/22	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 1,000,000 $ $ $
	[ ] UMBRELLA LIAB [ ] OCCUR [ ] EXCESS LIAB [ ] CLAIMS-MADE [ ] DED [ ] RETENTION $						EACH OCCURRENCE AGGREGATE	$ $
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N [ ] (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	N / A					[ ] PER STATUTE [ ] OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ $ $
A	E&O LIAB. CLAIMS MADE			FEI-ECC-16625-08 RETRO: 07/22/04	07/22/21	07/22/22	$1,000,000 OCCURRENCE $2,000,000 AGGREGATE	

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

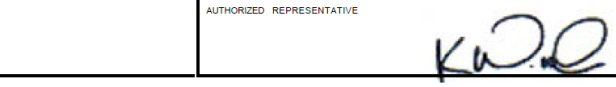
CERTIFICATE HOLDER

-FOR INFORMATION ONLY

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE



All Phase Environmental, Inc.

APPENDIX G1

WATER QUALITY MANAGEMENT PLAN

Project Specific
Preliminary Water Quality Management Plan (P-WQMP)

For: **Green Day Village**

Along Palm Avenue across Desert Dunes Golf Course, Desert Hot Springs, CA

DEVELOPMENT NO. **APN 657-280-003**
DESIGN REVIEW NO. **TBD**

Prepared for:

LA World Construction
2029 Century Park East #400
Century City CA 90067
Telephone: 702-460-3650

Prepared by:
Prasad Kasturi, PE QSD CFM
ASAP Consulting
6533 Cattleman Dr
Eastvale CA 92880
Telephone: 951-254-3536

Original Date Prepared: July 7, 2022

Revision Date(s):

OWNER'S CERTIFICATION - TO BE PROVIDED IN FINAL WQMP

This project-specific Preliminary Water Quality Management Plan (WQMP) has been prepared for:

LA World Construction
by **ASAP Consulting**
for the project known as **Green Day Village (APN 657-280-003)** at **Along Palm Avenue across**

This WQMP is intended to comply with the requirements of **City of Desert Hot Springs** for **APN 657-280-003**, which includes the requirement for the preparation and implementation of a project-specific WQMP.

The undersigned, while owning the property/project described in the preceding paragraph, shall be responsible for the implementation of this WQMP and will ensure that this WQMP is amended as appropriate to reflect up-to-date conditions on the site. This WQMP will be reviewed with the facility operator, facility supervisors, employees, tenants, maintenance and service contractors, or any other party (or parties) having responsibility for implementing portions of this WQMP. At least one copy of this WQMP will be maintained at the project site or project office in perpetuity.

The undersigned is authorized to certify and to approve implementation of this WQMP. The undersigned is aware that implementation of this WQMP is enforceable under **City of Desert Hot Springs, CA** Storm Water Ordinance (Municipal Code Section 13.08.100).

If the undersigned transfers its interest in the subject property/project, the undersigned shall notify the successor in interest of its responsibility to implement this WQMP.

"I, the undersigned, certify under penalty of law that I am the owner of the property that is the subject of this WQMP, and that the provisions of this WQMP have been reviewed and accepted and that the WQMP will be transferred to future successors in interest."

_____
Owner's Signature

_____
Owner's Printed Name

_____
Owner's Title/Position

_____
Date

LA World Construction
2029 Century Park East #400
Century City CA 90067

ATTEST

_____
Notary Signature

_____
Printed Name

_____
Title/Position

_____
Date

THIS FORM SHALL BE NOTARIZED BEFORE ACCEPTANCE OF THE
FINAL PROJECT SPECIFIC WQMP

Contents

SECTION **PAGE**

I. Project Description 1
II. Site Characterization 4
III. Pollutants of Concern 6
IV. Hydrologic Conditions of Concern 7
V. Best Management Practices 8
V.1 Site Design BMP Concepts, LID/Site Design and Treatment Control BMPs 8
V.1.A Site Design BMP Concepts and LID/Site Design BMPs 10
V.1.B Treatment Control BMPs 18
V.1.C Measurable Goal Summary 20
V.2 Source Control BMPs 21
V.3 Equivalent Treatment Control BMP Alternatives 24
V.4 Regionally-Based BMPs 24
VI. Operation and Maintenance Responsibility for BMPs 25
VII. Funding 27

TABLES

Table 1. Pollutant of Concern Summary 6
Table 2. BMP Selection Matrix Based Upon Pollutant of Concern Removal Efficiency 9
Table 3. Implementation of Site Design BMP Concepts 11
Table 4. LID/Site Design BMPs Meeting the LID/Site Design Measurable Goal 15
Table 5: Treatment Control BMP Summary 19
Table 6: Measurable Goal Summary 20
Table 7. Source Control BMPs 21

APPENDICES

A. Conditions of Approval
B. Vicinity Map, WQMP Site Plan, and Receiving Waters Map
C. Supporting Detail Related to Hydrologic Conditions of Concern (If Applicable)
D. Educational Materials
E. Soils Report (if applicable)
F. Structural BMP and/or Retention Facility Sizing Calculations and Design Details
G. Agreements – CC&Rs, Covenant and Agreements, BMP Maintenance Agreements and/or Other Mechanisms for ensuring ongoing Operation, Maintenance, Funding and Transfer of Requirements for this project-specific WQMP
H. Phase 1 Environmental Site Assessment – Summary of Site Remediation Conducted and Use Restrictions
I. Project-Specific WQMP Summary Data Form

I. Project Description

Project Owner: LA World Construction
2029 Century Park East #400
Century City CA 90067
702-460-3650

WQMP Preparer: ASAP Consulting
6533 Cattleman Dr
Eastvale CA 92880
951-254-3536

Project Site Address:	**Along Palm Ave across Desert Dunes Golf Course**
	City of Desert Hot Springs
Planning Area/	**Coachella Valley Planning Area**
Community Name/	**City of Desert Hot Springs**
Development Name:	**Green Day Village**
APN Number(s):	**657-280-003**
Latitude & Longitude:	**33.913296, -116.504552**
Thomas Bros. Map Page/	**N/A**
Corresponding Grid(s):	
Receiving Water:	**Coachella Valley Stormwater Channel**
Project Site Size:	**Approx. 38 acres**

Standard Industrial Classification (SIC) Code: **1521**

Formation of Home Owners' Association (HOA) or Property Owners Association (POA): Y ☒ N ☐

Additional Permits/Approvals required for the Project:

AGENCY	Permit required
State Department of Fish and Wildlife, Fish and Game Code §1602 Streambed Alteration Agreement	Y ☐ N☒
State Water Resources Control Board, Clean Water Act (CWA) Section 401 Water Quality Certification	Y ☐ N☒
US Army Corps of Engineers, CWA Section 404 permit	Y ☐ N☒
US Fish and Wildlife, Endangered Species Act Section 7 biological opinion	Y ☐ N☒
Statewide Construction General Permit Coverage	Y ☒ N☐
Statewide Industrial General Permit Coverage	Y ☐ N☒
Other *(please list in the space below as required)* City of Desert Hot Springs Grading Permit	Y ☒ N☐
City of Desert Hot Springs Building Permit	Y ☒ N☐

This report prepared by ASAP Consulting for LA World Construction, addresses the Green Day Village (APN 657-280-003) project. The project is located at Palm Avenue, across Desert Dunes Golf Course in the City of Desert Hot Springs. The site is approximately 38 acres and includes a 92 residential buildings totaling 612 units, 11 commercial buildings totaling 77,971 square feet, farming fields, parking and streets. Typical activities associated with this type of residential and commercial development include incoming and outgoing vehicle traffic, landscape irrigation and maintenance, and use of trash/recycle bins. The potential pollutants generated by this land use type include sediments, nutrients, trash and debris, bacteria and viruses, oil and grease, and pesticides. See Appendix B for Project Vicinity Map, WQMP Site Plan, and Receiving Waters Map.

Appendix A of this project-specific WQMP includes a complete copy of the final Conditions of Approval. Appendix B of this project-specific WQMP includes:

a. A Vicinity Map identifying the project site and surrounding planning areas in sufficient detail; and

b. A Site Plan for the project. The Site Plan included as part of Appendix B depicts the following project features:

- Location and identification of all structural BMPs, including Source Control, LID/Site Design and Treatment Control BMPs.
- Landscaped areas.
- Paved areas and intended uses (i.e., parking, outdoor work area, outdoor material storage area, sidewalks, patios, tennis courts, etc.).
- Number and type of structures and intended uses (i.e., buildings, tenant spaces, dwelling units, community facilities such as pools, recreation facilities, tot lots, etc.).
- Infrastructure (i.e., streets, storm drains, etc.) that will revert to public agency ownership and operation.
- Location of existing and proposed public and private storm drainage facilities (i.e., storm drains, channels, basins, etc.), including catch basins and other inlets/outlet structures. Existing and proposed drainage facilities should be clearly differentiated.
- Location(s) of Receiving Waters to which the project directly or indirectly discharges.
- Location of points where onsite (or tributary offsite) flows exit the property/project site.
- Delineation of proposed drainage area boundaries, including tributary offsite areas, for each location where flows exit the project site and existing site (where existing site flows are required to be addressed). Each tributary area should be clearly denoted.
- Pre- and post-project topography.

Appendix I is a one page form that summarizes pertinent information relative to this project-specific WQMP.

II. Site Characterization

Land Use Designation or Zoning: **MU-C Mixed Use Corridor**

Current Property Use: **Vacant**

Proposed Property Use: **Multi-Family Residential and Commercial**

Availability of Soils Report: Y ☒ N ☐ *Note: A soils report is required if infiltration BMPs are utilized. Attach report in Appendix E.*

Phase 1 Site Assessment: Y ☐ N ☒ *Note: If prepared, attached remediation summary and use restrictions in Appendix H.*

Receiving Waters for Urban Runoff from Site

Receiving Waters	EPA Approved 303(d) List Impairments	Designated Beneficial Uses	Proximity to RARE Beneficial Use Designated Receiving Waters
Mission Creek Channel	N/A	MUN, AGR, GWR, REC I, REC II, WARM, WILD	Not Applicable
Whitewater River	N/A	MUN. AGR. GWR, REC I, REC II, COLD, WILD, POW	Not Applicable
Coachella Valley Stormwater Channel	DDT, Dieldrin, Indicator Bacteria, Nitrogen, PCBS, Toxaphene, Toxicity	FRSH, REC I, REC II, WARM, WILD, RARE	Approximately 25 miles

III. Pollutants of Concern

Table 1. Pollutant of Concern Summary

Pollutant Category	Potential for Project and/or Existing Site	Causing Receiving Water Impairment
Bacteria/Virus /Pathogens	YES	YES (Pathogen)
Heavy Metals	YES	NO
Nutrients	YES	NO
Toxic Organic Compounds	NO	NO
Sediment/Turbidity	YES	NO
Trash & Debris	YES	NO
Oil & Grease	YES	NO
Other (Toxaphene):	NO	NO
Other (Dieldrin):	NO	NO
Other (DDT):	NO	NO
Other (PCBs):	NO	NO

NOTE: TOXAPHENE, DIELDRIN, DDT, AND PCBs ARE BANNED SUBSTANCES IN THE UNITED STATES.

IV. Hydrologic Conditions of Concern

Local Jurisdiction Requires On-Site Retention of Urban Runoff:

Yes ☒ The project will be required to retain urban runoff onsite in conformance with local ordinance (See Table 6 of the WQMP Guidance document, "Local Land use Authorities Requiring Onsite Retention of Stormwater"). This section does not need to be completed; however, retention facility design details and sizing calculations must be included in Appendix F.

No ☐ This section must be completed.

This Project meets the following condition:

☒ **Condition A**: 1) Runoff from the Project is discharged directly to a publicly-owned, operated and maintained MS4 or engineered and maintained channel, 2) the discharge is in full compliance with local land use authority requirements for connections and discharges to the MS4 (including both quality and quantity requirements), 3) the discharge would not significantly impact stream habitat in proximate Receiving Waters, **and** 4) the discharge is authorized by the local land use authority.

☐ **Condition B**: The project disturbs less than 1 acre and is not part of a larger common plan of development that exceeds 1 acre of disturbance. The disturbed area calculation must include all disturbances associated with larger plans of development.

☐ **Condition C**: The project's runoff flow rate, volume, velocity and duration for the post-development condition do not exceed the pre-development condition for the 2-year, 24-hour and 10-year 24-hour rainfall events. This condition can be achieved by, where applicable, complying with the local land use authority's on-site retention ordinance, or minimizing impervious area on a site and incorporating other Site-Design BMP concepts and LID/Site Design BMPs that assure non-exceedance of pre-development conditions. This condition must be substantiated by hydrologic modeling methods acceptable to the local land use authority.

☐ **None:** Refer to Section 3.4 of the Whitewater River Region WQMP Guidance document for additional requirements.

Supporting engineering studies, calculations, and reports are included in Appendix C.

	2 year – 24 hour		10 year – 24 hour	
	Precondition	**Post-condition**	**Precondition**	**Post-condition**
Discharge (cfs)				
Velocity (fps)				
Volume (cubic feet)				
Duration (minutes)				

V. Best Management Practices

This project implements Best Management Practices (BMPs) to address the Pollutants of Concern that may potentially be generated from the use of the Project site. These BMPs have been selected and implemented to comply with Section 3.5 of the WQMP Guidance document, and consist of Site Design BMP concepts, Source Control, LID/Site Design and, if/where necessary, Treatment Control BMPs as described herein.

V.1 Site Design BMP Concepts, LID/Site Design and Treatment Control BMPs

Local Jurisdiction Requires On-Site Retention of Urban Runoff:

Yes ☒ The project will be required to retain Urban Runoff onsite in conformance with local ordinance (See Table 6 of the WQMP Guidance document, "Local Land use Authorities Requiring Onsite Retention of Stormwater). **The LID/Site Design measurable goal has thus been met (100%), and Sections V.1.A and V.1.B do not need to be completed**; however, retention facility design details and sizing calculations must be included in Appendix F, and '100%' should be entered into Column 3 of Table 6 below.

No ☐ Section V.1 must be completed.

This section of the Project-Specific WQMP documents the LID/Site Design BMPs and, if/where necessary, the Treatment Control BMPs that will be implemented on the project to meet the requirements detailed within Section 3.5.1 of the WQMP Guidance document. Section 3.5.1 includes requirements to implement Site Design Concepts and BMPs, and includes requirements to address Pollutants of Concern with BMPs. Further, sub-section 3.5.1.1 specifically requires that Pollutants of Concern be addressed with LID/Site Design BMPs to the extent feasible.

LID/Site Design BMPs are those BMPs listed within Table 2 below which promote retention and/or feature a natural treatment mechanism; off-site and regionally-based BMPs are also LID/Site Design BMPs, and therefore count towards the measurable goal, if they fit these criteria. This project incorporates LID/Site Design BMPs to fully address the Treatment Control BMP requirement where and to the extent feasible. If and where it has been acceptably demonstrated to the local land use authority that it is infeasible to fully meet this requirement with LID/Site Design BMPs, Section V.1.B (below) includes a description of the conventional Treatment Control BMPs that will be substituted to meet the same requirements.

In addressing Pollutants of Concern, BMPs are selected using Table 2 below.

Table 2. BMP Selection Matrix Based Upon Pollutant of Concern Removal Efficiency (1)

(Sources: Riverside County Flood Control & Water Conservation District Design Handbook for Low Impact Development Best Management Practices, dated September 2011, the Orange County Technical Guidance Document for Water Quality Management Plans, dated May 19, 2011, and the Caltrans Treatment BMP Technology Report, dated April 2010 and April 2008)

Pollutant of Concern	Landscape Swale[2, 3]	Landscape Strip[2, 3]	Biofiltration (with underdrain)[2, 3]	Extended Detention Basin[2]	Sand Filter Basin[2]	Infiltration Basin[2]	Infiltration Trench[2]	Permeable Pavement[2]	Bioretention (w/o underdrain)[2, 3]	Other BMPs Including Proprietary BMPs[4, 6]
Sediment & Turbidity	M	M	H	M	H	H	H	H	H	Varies by Product[5]
Nutrients	L/M	L/M	M	L/M	L/M	H	H	H	H	
Toxic Organic Compounds	M/H	M/H	M/H	L	L/M	H	H	H	H	
Trash & Debris	L	L	H	H	H	H	H	L	H	
Bacteria & Viruses (also: Pathogens)	L	M	H	L	M	H	H	H	H	
Oil & Grease	M	M	H	M	H	H	H	H	H	
Heavy Metals	M	M/H	M/H	L/M	M	H	H	H	H	

Abbreviations:
L: Low removal efficiency M: Medium removal efficiency H: High removal efficiency

Notes:
(1) Periodic performance assessment and updating of the guidance provided by this table may be necessary.
(2) Expected performance when designed in accordance with the most current edition of the document, "Riverside County, Whitewater River Region Stormwater Quality Best Management Practice Design Handbook".
(3) Performance dependent upon design which includes implementation of thick vegetative cover. Local water conservation and/or landscaping requirements should be considered; approval is based on the discretion of the local land use authority.
(4) Includes proprietary stormwater treatment devices as listed in the CASQA Stormwater Best Management Practices Handbooks, other stormwater treatment BMPs not specifically listed in this WQMP (including proprietary filters, hydrodynamic separators, inserts, etc.), or newly developed/emerging stormwater treatment technologies.
(5) Expected performance should be based on evaluation of unit processes provided by BMP and available testing data. Approval is based on the discretion of the local land use authority.
(6) When used for primary treatment as opposed to pre-treatment, requires site-specific approval by the local land use authority.

V.1.A SITE DESIGN BMP CONCEPTS AND LID/SITE DESIGN BMPS

This section documents the Site Design BMP concepts and LID/Site Design BMPs that will be implemented on this project to comply with the requirements detailed in Section 3.5.1 of the WQMP Guidance document.

- Table 3 herein documents the implementation of the Site Design BMP Concepts described in sub-sections 3.5.1.3 and 3.5.1.4.
- Table 4 herein documents the extent to which this project has implemented the LID/Site Design goals described in sub-section 3.5.1.1.

***(NOTE: Sections V.1.A and V.1.B do not need to be completed since flow is retained onsite)**

Table 3. Implementation of Site Design BMP Concepts

Design Concept	Technique	Specific BMP	Included			Brief Reason for BMPs Indicated as No or N/A
			Yes	No	N/A	
Site Design BMP Concept 1	**Minimize Urban Runoff, Minimize Impervious Footprint, and Conserve Natural Areas (See WQMP Section 3.5.1.3)**	Conserve natural areas by concentrating or clustering development on the least environmentally sensitive portions of a site while leaving the remaining land in a natural, undisturbed condition.	☐	☐	☒	Site does not contain environmentally sensitive portions
		Conserve natural areas by incorporating the goals of the Multi-Species Habitat Conservation Plan or other natural resource plans.	☐	☐	☒	Site does not include habitats for any species.
		Preserve natural drainage features and natural depressional storage areas on the site.	☒	☐	☐	
		Maximize canopy interception and water conservation by preserving existing native trees and shrubs, and planting additional native or drought tolerant trees and large shrubs.	☒	☐	☐	
		Use natural drainage systems.	☒	☐	☐	
		Where applicable, incorporate Self-Treating Areas	☐	☒	☐	Proposed basins will capture all runoff onsite.
		Where applicable, incorporate Self-Retaining Areas	☐	☒	☐	Proposed basins will capture all runoff onsite.
		Increase the building floor to area ratio (i.e., number of stories above or below ground).	☐	☒	☐	Open space lots are located throughout the site.
		Construct streets, sidewalks and parking lot aisles to minimum widths necessary, provided that public safety and a walkable environment for pedestrians are not compromised.	☒	☐	☐	
		Reduce widths of streets where off-street parking is available.	☐	☐	☒	Off-street public parking is not available onsite.
		Minimize the use of impervious surfaces, such as decorative concrete, in the landscape design.	☐	☒	☐	Impervious surfaces are implemented as needed for access to each unit.
		Other comparable and equally effective Site Design BMP concept(s) as approved by the local land use authority (Note: Additional narrative required to describe BMP and how it addresses site design concept).	☒	☐	☐	

Table 3. Site Design BMP Concepts (continued)

Design Concept	Technique	Specific BMP	Included			Brief Reason for Each BMP Indicated as No or N/A
			Yes	No	N/A	
Site Design BMP Concept 2	**Minimize Directly Connected Impervious Area (See WQMP Section 3.5.1.4)**	Design residential and commercial sites to contain and infiltrate roof runoff, or direct roof runoff to landscaped swales or buffer areas.	☒	☐	☐	
		Drain impervious sidewalks, walkways, trails, and patios into adjacent landscaping.	☒	☐	☐	
		Incorporate landscaped buffer areas between sidewalks and streets.	☒	☐	☐	
		Use natural or landscaped drainage swales in lieu of underground piping or imperviously lined swales.	☐	☒	☐	Underground piping is incorporated to prevent flooding in certain areas.
		Where soil conditions are suitable, use perforated pipe or gravel filtration pits for low flow infiltration.	☐	☒	☐	All flows are directed to designated locations with above ground basins.
		Maximize the permeable area by constructing walkways, trails, patios, overflow parking, alleys, driveways, low-traffic streets, and other low-traffic areas with open-jointed paving materials or permeable surfaces such as pervious concrete, porous asphalt, unit pavers, and granular materials.	☐	☒	☐	Proposed basins will capture all runoff onsite.
		Use one or more of the following:				
		Rural swale system: street sheet flows to landscaped swale or gravel shoulder, curbs used at street corners, and culverts used under driveways and street crossings.	☐	☒	☐	Rural swale system not implemented
		Urban curb/swale system: street slopes to curb; periodic swale inlets drain to landscaped swale or biofilter.	☒	☐	☐	
		Dual drainage system: first flush captured in street catch basins and discharged to adjacent vegetated swale or gravel shoulder; high flows connect directly to MS4s.	☐	☒	☐	Grading does not allow for high flows to travel directly to BMPs at every catch basin.
		Other comparable and equally effective Site Design BMP concept(s) as approved by the local land use authority (Note: Additional narrative required to describe BMP and how it addresses site design concept).	☒	☐	☐	
		Use one or more of the following for design of driveways and private residential parking areas:				
		Design driveways with shared access, flared (single lane at street), or wheel strips (paving only under the tires).	☐	☐	☒	Driveways with shared access are not implemented.
		Uncovered temporary or guest parking on residential lots paved with a permeable surface, or designed to drain into landscaping.	☐	☐	☒	Permeable surfaces are not incorporated in parking areas.

Table 3. Site Design BMP Concepts (continued)

Design Concept	Technique	Specific BMP	Included			Brief Reason for Each BMP Indicated as No or N/A
			Yes	No	N/A	
Site Design BMP Concept 2 (cont'd)	**Minimize Directly Connected Impervious Area** **(See WQMP Section 3.5.1.4)**	Other comparable and equally effective Site Design BMP concept(s) as approved by the local land use authority (Note: Additional narrative required to describe BMP and how it addresses site design concept).	☒	☐	☐	
		Use one or more of the following for design of parking areas:				
		Where landscaping is proposed in parking areas, incorporate parking area landscaping into the drainage design.	☒	☐	☐	
		Overflow parking (parking stalls provided in excess of the Permittee's minimum parking requirements) may be constructed with permeable pavement.	☐	☐	☒	Excess parking stalls will not be permitted.
		Other comparable and equally effective Site Design BMP (or BMPs) as approved by the local land use authority (Note: Additional narrative required describing BMP and how it addresses site design concept).	☒	☐	☐	

Project Site Design BMP Concepts:

For the on-site condition, five infiltration basins (one above ground and four underground) are proposed throughout the site to manage storm water runoff and improve water quality. Catch basins collect storm water runoff and convey the flows through pipes to the on-site infiltration basins. The project will retain 100% of the difference between the 100-year pre-development and post-development conditions. Therefore, the project satisfies the local ordinance requirement for 100% on-site retention for the 100-year, 24-hour storm event

Alternative Project Site Design BMP Concepts:

N/A

Table 4. LID/Site Design BMPs Meeting the LID/Site Design Measurable Goal

(1) DRAINAGE SUB-AREA ID OR NO.	(2) LID/SITE DESIGN BMP TYPE* (See Table 2)	(3) POTENTIAL POLLUTANTS OF CONCERN WITHIN DRAINAGE SUB-AREA (Refer to Table 1)	(4) POTENTIAL POLLUTANTS WITHIN SUB-AREA CAUSING RECEIVING WATER IMPAIRMENTS (Refer to Table 1)	(5) EFFECTIVENESS OF LID/SITE DESIGN BMP AT ADDRESSING IDENTIFIED POTENTIAL POLLUTANTS (U, L, M, H/M, H; see Table 2)	(6) BMP MEETS WHICH DESIGN CRITERIA? (Identify as V_{BMP} OR Q_{BMP})	(7) TOTAL AREA WITHIN DRAINAGE SUB-AREA (Nearest 0.1 acre)
A	ABOVE INFILTRATION BASIN	BACTERIA / VIRUS/ PATHOGENS, HEAVY METALS, NUTRIENTS, TOXIC ORAGNIC COMPOUNDS, SEDIMENT / TURBIDITY, TRASH & DEBRIS, OIL AND GREASE	N/A (ALL RUNOFF RETAINED ON-SITE)	H	V_{BMP}	26.34
B	UNDERGROUND INFILTRATION BASIN	BACTERIA / VIRUS/ PATHOGENS, HEAVY METALS, NUTRIENTS, TOXIC ORAGNIC COMPOUNDS, SEDIMENT / TURBIDITY, TRASH & DEBRIS, OIL AND GREASE	N/A (ALL RUNOFF RETAINED ON-SITE)	H	V_{BMP}	1.07
C	UNDERGROUND INFILTRATION BASIN	BACTERIA / VIRUS/ PATHOGENS, HEAVY METALS, NUTRIENTS, TOXIC ORAGNIC COMPOUNDS, SEDIMENT / TURBIDITY, TRASH & DEBRIS, OIL AND GREASE	N/A (ALL RUNOFF RETAINED ON-SITE)	H	V_{BMP}	1.24

D	UNDERGROUND INFILTRATION BASIN	BACTERIA / VIRUS/ PATHOGENS, HEAVY METALS, NUTRIENTS, TOXIC ORAGNIC COMPOUNDS, SEDIMENT / TURBIDITY, TRASH & DEBRIS, OIL AND GREASE	N/A (ALL RUNOFF RETAINED ON-SITE)	H	V_{BMP}	3.85
E	UNDERGROUND INFILTRATION BASIN	BACTERIA / VIRUS/ PATHOGENS, HEAVY METALS, NUTRIENTS, TOXIC ORAGNIC COMPOUNDS, SEDIMENT / TURBIDITY, TRASH & DEBRIS, OIL AND GREASE	N/A (ALL RUNOFF RETAINED ON-SITE)	H	V_{BMP}	3.60
TOTAL PROJECT AREA TREATED WITH LID/SITE DESIGN BMPs (NEAREST 0.1 ACRE)						**36.1**

*** LID/Site Design BMPs listed in this table are those that <u>completely</u> address the 'Treatment Control BMP requirement' for their drainage sub-area.**

V.1.B TREATMENT CONTROL BMPS

Conventional Treatment Control BMPs shall be implemented to address the project's Pollutants of Concern as required in WQMP Section 3.5.1 where, and to the extent that, Section V.1.A has demonstrated that it is infeasible to meet these requirements through implementation of LID/Site Design BMPs.

☒ The LID/Site Design BMPs described in Section V.1.A of this project-specific WQMP completely address the 'Treatment Control BMP requirement' for the entire project site (and where applicable, entire existing site) as required in Section 3.5.1.1 of the WQMP Guidance document. Supporting documentation for the sizing of these LID/Site Design BMPs is included in Appendix F. ***Section V.1.B does not need to be completed**.

☐ The LID/Site Design BMPs described in Section V.1.A of this project-specific WQMP do **NOT** completely address the 'Treatment Control BMP requirement' for the entire project site (or where applicable, entire existing site) as required in Section 3.5.1.1 of the WQMP. ***Section V.1.B must be completed.**

The Treatment Control BMPs identified in this section are selected, sized and implemented to treat the design criteria of V_{BMP} and/or Q_{BMP} for all project (and if required, existing site) drainage sub-areas which were not fully addressed using LID/Site Design BMPs. Supporting documentation for the sizing of these Treatment Control BMPs is included in Appendix F.

Table 5: Treatment Control BMP Summary

(1) DRAINAGE SUB-AREA ID OR NO.	(2) TREATMENT CONTROL BMP TYPE* (See Table 2)	(3) POTENTIAL POLLUTANTS OF CONCERN WITHIN DRAINAGE SUB-AREA (Refer to Table 1)	(4) POTENTIAL POLLUTANTS WITHIN SUB-AREA CAUSING RECEIVING WATER IMPAIRMENTS (Refer to Table 1)	(5) EFFECTIVENESS OF TREATMENT CONTROL BMP AT ADDRESSING IDENTIFIED POTENTIAL POLLUTANTS (U, L, M, H/M, H; see Table 2)	(6) BMP MEETS WHICH DESIGN CRITERIA? (Identify as V_{BMP} OR Q_{BMP})	(7) TOTAL AREA WITHIN DRAINAGE SUB-AREA (Nearest 0.1 acre)
	TOTAL PROJECT AREA TREATED WITH TREATMENT CONTROL BMPs (NEAREST 0.1 ACRE)					

V.1.C MEASURABLE GOAL SUMMARY

This section documents the extent to which this project has met the measurable goal described in WQMP Section 3.5.1.1 of addressing 100% of the project's 'Treatment Control BMP requirement' with LID/Site Design BMPs. Projects required to retain Urban Runoff onsite in conformance with local ordinance are considered to have met the measurable goal; for these instances, '100%' is entered into Column 3 of the Table.

Table 6: Measurable Goal Summary

(1) **Total Area Treated with LID/Site Design BMPs** (Last row of Table 4)	(2) **Total Area Treated with Treatment Control BMPs** (Last row of Table 5)	(3) **% of Treatment Control BMP Requirement addressed with LID/Site Design BMPs**
36.1 AC	N/A	100%

V.2 SOURCE CONTROL BMPS

This section identifies and describes the Source Control BMPs applicable and implemented on this project.

Table 7. Source Control BMPs

BMP Name	Check One		If not applicable, state brief reason
	Included	Not Applicable	
Non-Structural Source Control BMPs			
Education for Property Owners, Operators, Tenants, Occupants, or Employees	☒	☐	
Activity Restrictions	☒	☐	
Irrigation System and Landscape Maintenance	☒	☐	
Common Area Litter Control	☒	☐	
Street Sweeping Private Streets and Parking Lots	☒	☐	
Drainage Facility Inspection and Maintenance	☒	☐	
Structural Source Control BMPs			
Storm Drain Inlet Stenciling and Signage	☒	☐	
Landscape and Irrigation System Design	☒	☐	
Protect Slopes and Channels	☒	☐	
Provide Community Car Wash Racks	☐	☒	No car wash racks
Properly Design*:			
Fueling Areas	☐	☒	No Fueling Areas
Air/Water Supply Area Drainage	☐	☒	No Air/Water Suppy Area Drainage area
Trash Storage Areas	☒	☐	
Loading Docks	☒	☐	
Maintenance Bays	☐	☒	No maintenance bays
Vehicle and Equipment Wash Areas	☐	☒	No wash areas
Outdoor Material Storage Areas	☐	☒	No storage areas
Outdoor Work Areas or Processing Areas	☐	☒	No outdoor work or processing areas
Provide Wash Water Controls for Food Preparation Areas	☒	☐	

*Details demonstrating proper design must be included in Appendix F.

See attached Source Control BMP's for Implementation.

Non-Structural Source Control BMPs:

- Education for Property Owners, Operators, Tenants, Occupants, or Employees: Property owners will be informed of site specific storm water requirements and appropriate BMPs to follow.
- Activity Restrictions: As dictated by Property owners
- Irrigation System and Landscape Maintenance: 24-hour onsite maintenance staff will provide ongoing irrigation system inspection and maintenance to ensure that timers and smart controllers are working as desired. (SD-10, SD-11, refer to Appendix C regarding maintenance and inspection requirements.)
- Common Area Litter Control: 24-hour onsite maintenance staff will provide ongoing inspection of common areas to ensure that litter and trash are not excessive in common areas.
- Street Sweeping Private Streets and Parking Lots: 24-hour onsite maintenance staff will provide maintenance for streets and parking lots. Parking lots will be cleaned at least quarterly, including prior to the start of the rainy season (Oct.1st)
- Drainage Facility Inspection and Maintenance: Property owner will be responsible for retention basins. Regular inspection should occur before the wet season begins (September) and after the wet season (April) ends. Performance inspections should occur after rainfall events greater than 0.5 inches or any rainfall that fills the basins. Any structures that are observed to be damaged shall be repaired. Any sediment accumulation over 18" or fills 25 percent of the basin volume (whichever is greater) should be removed. Additionally, if there is standing water in the basin during the dry season, the basin should be drained. If the basin cannot be drained, or if standing water persists, notify vector control. Rodent infestation, trash, debris or litter present in the basins shall be monitored and removed. (TC-11, TC-20, refer to Appendix C regarding maintenance and inspection requirements.)

Structural Source Control BMPs:

- MS4 Stenciling and Signage: Stenciling and signage will be provided (where practical) and maintained for the onsite storm drains by the 24-hour onsite maintenance staff. (SD-13, refer to Appendix C regarding maintenance and inspection requirements.)
- Landscape and Irrigation Systems Design: 24-hour onsite maintenance staff will provide ongoing irrigation system inspection and maintenance to reduce excessive watering and overspray. Timers will be set to irrigate early morning to reduce evaporation. Smart controllers will be utilized to not irrigate during rainfall events. (SD-10, SD-11, refer to Appendix C regarding maintenance and inspection requirements.)
- Slope and Channel Protection: 24-hour onsite maintenance staff will stabilize disturbed slopes as quickly as possible, control and treat flows in landscaping and or/ other controls prior to reaching existing natural drainage systems, maintain native and drought tolerant vegetation of slopes, convey runoff safely from tops of slopes and stabilize temporary and

permanent channel crossings as quickly as possible, and ensure that increases in run-off velocity and frequency caused by the project do not erode the channel. (SD-13, refer to Appendix C regarding maintenance and inspection requirements.)

Properly Design:

- Trash Storage Areas: The integrity of structural elements that are subject to damage (ie., screens, covers, and signs) will be maintained by the 24-hour onsite maintenance staff. Roofs, awnings, attached lids will be provided on all trash containers to minimize direct precipitation into containers. Use lined bins or dumpster to prevent leaking of liquid waste. Pave trash storage area with impervious surface to mitigate spills. Post signs on all dumpster s informing users that hazardous materials are not to be disposed of therein. Trash enclosures are elevated to prevent storm water runoff from entering. (SD-32, refer to Appendix C regarding maintenance and inspection requirements.)
- Loading docks: Docking areas are located onsite for one commercial building. Docking areas shall be sweep of debris to prevent pollutants and trash from entering the on-site storm drain system. Loading and unloading occurs indoors to prevent exposure to rain. Appropriate cleaning material shall be readily accessible if leaks or spills were to occur (SD-31, refer to Appendix D regarding spill response and prevention).

Appendix D includes copies of the educational materials (described in Section 3.5.2.1 of the WQMP Guidance document) that will be used in implementing this project-specific WQMP.

V.3 EQUIVALENT TREATMENT CONTROL BMP ALTERNATIVES

N/A

V.4 REGIONALLY-BASED BMPS

N/A

VI. Operation and Maintenance Responsibility for BMPs

Appendix G of this project-specific WQMP includes copies of CC&Rs, Covenant and Agreements, BMP Maintenance Agreement and/or other mechanisms used to ensure the ongoing operation, maintenance, funding, transfer and implementation of the project-specific WQMP requirements.

The retention basins will require operation and maintenance. 24-hour onsite maintenance staff will be available and responsible for maintaining the retention basins. Regular inspection should occur before the wet season begins (September) and after the wet season ends (April)). Performance inspections should occur after rainfall events greater than 0.5 inches and after any rainfall that fills the basins. Any structures that are observed to be damaged shall be repaired. Any sediment accumulation over 18 inches or fills 25 percent of the basin volume (whichever is greater) shall be removed. Additionally, if there is standing water in the basin during dry weather, the basin should be drained. If the basin cannot be drained, or standing water persists, notify vector control. Rodent infestation, trash, debris or litter present in the basin shall be monitored and removed. Start-up dates correspond to completion of the development. The owner (who usually hires a maintenance company) will be the responsible party for all O&M activities, including inspections and record keeping for a minimum of 50 years. This maintenance company has not been appointed, nor will it be appointed during the entitlement phase.

Retention Basin (Infiltration BMP):

O and M Activities	Schedule and Frequency
1. Inspect all outlets to the Retention area. Make sure outlets are free of debris and sediment. Inspect outlets for sediment accumulation and clean and remove trash when encountered.	Inspect prior to the rainy season (September) and after the rainy season (April). Inspect prior and after all rain events.
2. Inspect Retention Basin (Infiltration BMP). Replace landscaping as needed within basins. Remove silt/blowsand, debris in basins.	Retention Basins should be kept clear of trash, debris and silt/blowsand buildup on a **weekly** basis. This should be given high priority.

Irrigation System and Landscape:

O and M Activities	Schedule and Frequency
1. Inspect and repair broken sprinklers.	Inspect weekly and replace immediately
2. Repair broken water lines.	Inspect daily and repair immediately.
3. Inspect irrigated areas for signs of erosion and/ or discharge	Inspect weekly repair source of erosion or discharge immediately.

Street Sweeping Private Streets and Parking Lots:

O and M Activities	Schedule and Frequency
4. Inspect Storage Area for tracked sediment or blow sand. Visible sediment tracking should be swept immediately.	Inspect monthly. Sweeping operations should occur as needed.
5. Adjust brooms frequently; maximize efficiency of sweeping efforts	As needed.

Protect Slopes and Channels

O and M Activities	Schedule and Frequency
6. Inspect slopes	Inspect monthly to ensure that slopes and vegetation isn't disturbed, if they are repair immediately.

Trash Storage Areas:

O and M Activities	Schedule and Frequency
7. Inspect Trash Storage Area.	Inspect daily. Insure that the trash receptacles are emptied on a weekly basis. Recyclables should be separated from disposable trash.

Responsible Party: LA World Construction
2029 Century Park East #400
Century City CA 90067
Telephone: 702-460-3650

Note: Sediment, other pollutants, and all other waste shall be properly disposed of in a licensed landfill or by another appropriate disposal method in accordance with local, state, and federal regulations.

The owner (who usually hires a maintenance company) will be the responsible party for all O&M activities, including inspections and record keeping for a minimum of 50 years. This maintenance company has not been appointed, nor will it be appointed during the entitlement phase.

VII. Funding

The Property title holder shall carry primary responsibility for the initial funding of installations, design and implementation of site-specific BMP's. Ongoing inspections, routine maintenance, and some instances of reactionary maintenance shall be funded by the property owner, in such that he will make an agreement with contractors, tenants, or other parties in direct access and knowledge of the property to pay for any and all aspects of the necessary maintenance and inspections.

Continued funding for ongoing inspections and maintenance shall be passed to any and all future title holders and awareness must be made of this obligation in conjunction with the title. In addition, any future property owners, managers, tenants, or contractors must be made aware of the sites structural BMP's and have access to their associated educational materials that are to be kept on site, within the site's respective building as well as held by the property owner, and title company or others who may possess the title or deed to the property.

Any amended versions of the funding declaration may be submitted to all applicable parties in the future, should such an action be warranted. All changes must be submitted for review by the LA World Construction., as per their standards and requirements for altering this document.

Appendix G of this project-specific WQMP also includes copies of Covenants and Agreements, BMP Maintenance Agreement and/or other mechanisms used to ensure the ongoing operation, maintenance, funding, transfer and implementation of the project-specific WQMP requirements.

Responsible Party: LA World Construction
2029 Century Park East #400
Century City CA 90067
Telephone: 702-460-3650

Appendix A

Conditions of Approval

Planning Commission Resolution TBD

Dated _____

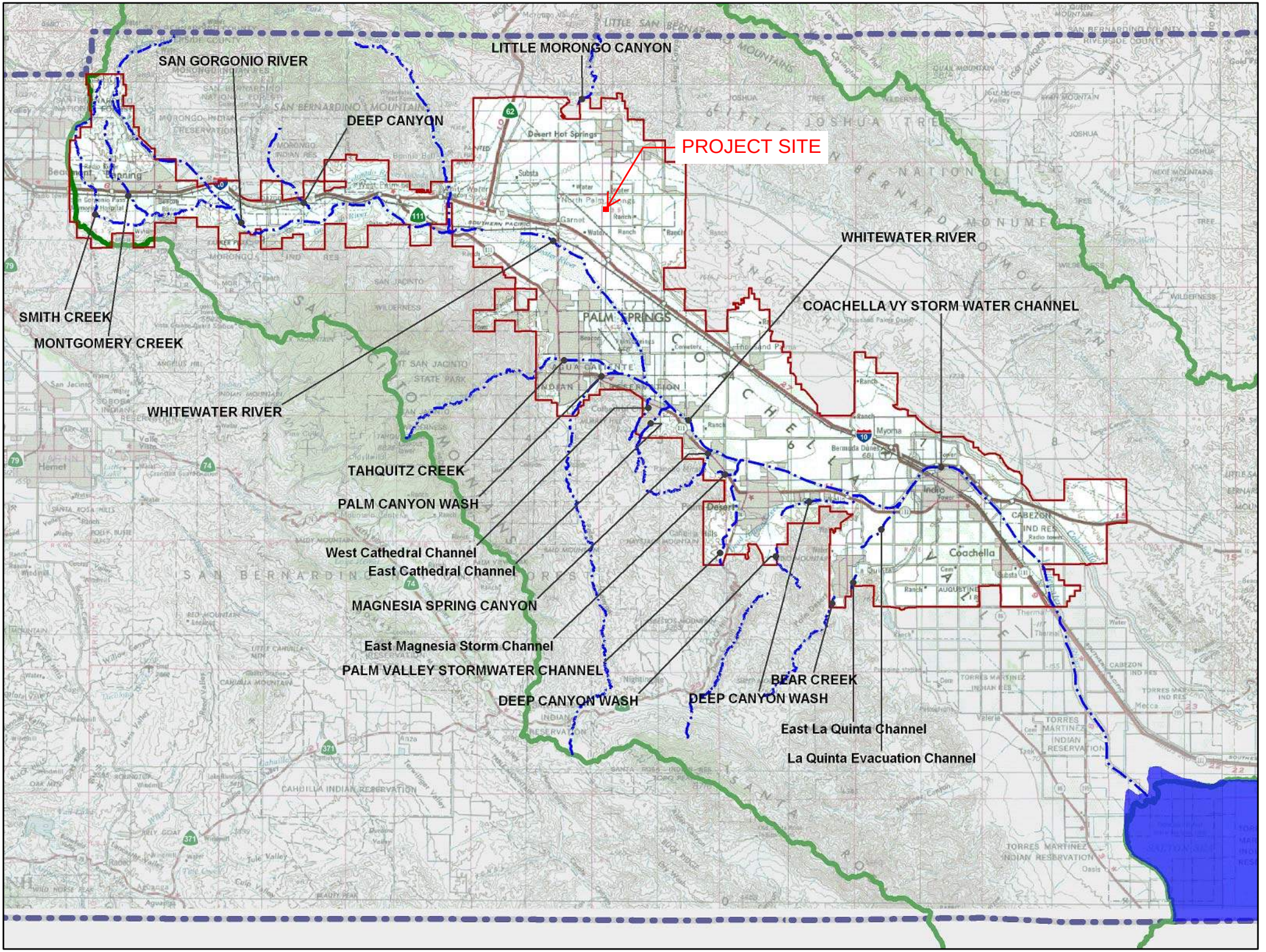
TO BE PROVIDED IN FINAL WQMP

Appendix B

Vicinity Map, Receiving Waters Map, WQMP Site Plan



VICINITY MAP


SAN GORGONIO RIVER
LITTLE MORONGO CANYON
DEEP CANYON
PROJECT SITE
WHITEWATER RIVER
COACHELLA VY STORM WATER CHANNEL
SMITH CREEK
MONTGOMERY CREEK
WHITEWATER RIVER
TAHQUITZ CREEK
PALM CANYON WASH
West Cathedral Channel
East Cathedral Channel
MAGNESIA SPRING CANYON
East Magnesia Storm Channel
PALM VALLEY STORMWATER CHANNEL
DEEP CANYON WASH
DEEP CANYON WASH
BEAR CREEK
East La Quinta Channel
La Quinta Evacuation Channel



SUMMARY

COMMERCIAL

BLDG. 1 – FAST FOOD W/DRIVE-THRU & OUTDOOR SEATING	4,608
BLDG. 2 – RETAIL CONVENIENCE STORE	1,024
BLDG. 3 – RETAIL STORE	20,000
BLDG. 4 – RESTAURANTS	6,144
BLDG. 5 – RETAIL	3,749
BLDG. 6 – RETAIL	2,592
BLDG. 7 – RETAIL	1,920
BLDG. 8 – RETAIL	15,360
BLDG. 9 – MEDICAL OFFICE 2-STORY (10,927 FOOTPRINT)	21,854
BLDG. 10 – RECYCLING CENTER	240
BLDG. 11 – RECYCLING CENTER	480
COMMERCIAL TOTAL SF	77,971

TYPICAL RESIDENTIAL BUILDING (92 BUILDINGS)

UNIT 1 – ADU		208
UNIT 2 – TWO STORY		
LOWER LEVEL	388	
EXT. COVERED AREA	123	
UPPER LEVEL	375	
		886
UNIT 3 – TWO STORY		
LOWER LEVEL	378	
UPPER LEVEL	252.5	
		630.5
UNIT 4 – STUDIO		389
UNIT 5 – TWO STORY		
LOWER LEVEL	376	
UPPER LEVEL	252.5	
		628.5
UNIT 6 – TWO STORY		
LOWER LEVEL	373	
UPPER LEVEL	389	
		762
LOWER LEVEL TOTAL		2,235
UPPER LEVEL TOTAL		1,269
BUILDING TOTAL		3,504

RESIDENTIAL

PHASE A	
BLDG. A1–A23	80,592
BLDG. AA – POOL HOUSE	1,200
PHASE B	
BLDG. B1–B22	77,088
BLDG. BA – POOL HOUSE	1,200
PHASE C	
BLDG. C1–C10	35,040
BLDG. CA – BARN	384
BLDG. CB – EQUIPMENT	1,920
PHASE D	
BLDG. D1–D14	49,056
BLDG. DA – POOL HOUSE	1,200
BLDG. DB – BARN	384
PHASE E	
BLDG. E1–E14	49,056
BLDG. EA – POOL HOUSE	1,200
PHASE F	
BLDG. F1–F9	31,536
BLDG. FA – POOL HOUSE	1,200
OTHERS	
FARM EQUIPMENT	1,620
COMMUNITY CENTER – 2–STORY	8,886
ASSISTED LIVING – 2–STORY + BASEMENT (16,867 FOOTPRINT)	33,734
VEGETABLE STANDS TOTAL OF 4 (72 EACH)	288

PARKING REQUIRED

PARCEL #1	REQ. RATIO	REQ. STALLS
BLDG. 1 (INCLUDES OUTDOOR SEATING)	1/100 + 6 STACK FOR WINDOW	58
PARCEL #2		
BLDG. 2	1/250	5
BLDG. 3	1/250	80
BLDG. 4	1/75	82
BLDG. 5	1/250	15
BLDG. 6	1/250	11
BLDG. 11	1/300 + 1/10,000 GROSS YARD AREA	3
	PARCEL #2 SUB-TOTAL	196
PARCEL #3		
BLDG. 7	1/250	8
BLDG. 8	1/250	62
BLDG. 9	10 FOR FIRST 2,000 + 1/175 OVER 2,000	124
BLDG. 10	1/300 + 1/10,000 GROSS YARD AREA	2
	PARCEL #3 SUB-TOTAL	196
PARCEL #4		
ASSISTED LIVING	0.75 COVERED SPACE PER UNIT	48

PARKING PROVIDED

PARCEL #1		61
PARCEL #2		199
PARCEL #3		223
PARCEL #4	(5+38 BASEMENT)	43
R.O.W.		13
PHASE A		115
PHASE B		110
PHASE C (BLDG. CB)		7
PHASE C		50
PHASE D		70
PHASE E		75
PHASE F		45

SRK
STEWART ROMBERGER KITE
SRK ARCHITECTS INC.
2254 South Figueroa Street
Los Angeles, CA. 90007
Tel. (213) 747-1199
www.srkarchtectsinc.com

LA WORLD CONSTRUCTION
2029 Century Park East #400
Century City, CA, 90067

GREEN DAY VILLAGE
D□□r□H□□ S□r□□□□ CA

NOT FOR CONSTRUCTION

DRAWINGS ISSUED

DELTA	DESCRIPTION	DATE
–	–	–

LICENSED ARCHITECT
BRIAN A. KITE
C-11258
DATE: 08/31/23
STATE OF CALIFORNIA

Scale: 1/64" = 1'-0"
Checked by: RH, BK
Drawn by: RH, HC
Project #: 22002.01

Drawing Title & Number:

PROPOSED SITE PLAN

A-1.1

S:\1+ORK ARCHITECTS INC\1+PROJECTS\ACTIVE PROJECTS\2022\22002- Green Day Village- Desert Hot Springs\00 PRE-DESIGN\A-ARCHITECTURAL\A00\SP01-<GN>-SITE ANALYSIS-1.dwg Jun 10, 2022 10:07am

© 2022 Ownership and use of documents: All drawings, specifications and copies thereof furnished by Stewart, Romberger & Kite are and shall remain its property. They are to be used in respect to this project and are not to be used on any other project. Submission or distribution to meet official regulatory requirements or for other purposes in connection with the project is not to be construed as publication in derogation of Stewart, Romberger and Associates' common law copyright or other reserved rights.

© SRK Architects Inc. 2022 – 36"x24" Sheet

DRAINAGE BOUNDARY

X
3.85

DRNG AREA ID

AREA IN ACRES

CATCH BASIN

SD

STORM DRAIN

A
26.34

B
1.07

C
1.24

D
3.85

E
3.60

STORAGE CHAMBER

BASIN "A"
BOTTOM=57.5
(AREA=3051.34 SF.)

BASIN "B"
BOTTOM=44.0
(AREA=28167.66 SF.)

TRACT BOUNDARY

1' TO 3' MAX. RETAINING WALL

4' RETAINING WALL

HEADWALL OUTLET STRUCTURE

2:1 SLOPE

SWIMMING POOL

Drive

Palm

N

0 20' 40' 80'
SCALE: 1"=40'

UNIT HYDROGRAPH
HYDROLOGY EXHIBIT
GREEN DAY VILLAGE, DHS CA

Appendix C

Supporting Detail Related to Hydrologic Conditions of Concern

Appendix D

Educational Materials

Helpful telephone numbers and links:

WATER AGENCY LIST in Riverside County

City of Banning	(951) 922-3130
City of Beaumont	(951) 769-8520
City of Blythe	(760) 922-6161
City of Coachella	(760) 398-3502
Coachella Valley Water District	(760) 398-2651
City of Corona	(951) 736-2259
Desert Center, CSA #51	(760) 227-3203
Eastern Municipal Water District	(951) 928-3777
Elsinore Valley MWD	(951) 674-3146
Farm Mutual Water Company	(951) 244-4198
City of Hemet	(951) 765-3712
Idyllwild Water District	(951) 659-2143
Jurupa Community Services District	(951) 360-8795
Lake Hemet MWD	(951) 658-3241
Lee Lake Water District	(951) 277-1414
March Air Force Base	(951) 656-7000
Mission Springs Water District	(760) 329-6448
City of Palm Springs	(760) 323-8253
Rancho Caballero	(951) 780-9272
Rancho California Water District	(951) 296-6900
Ripley, CSA #62	(760) 922-4951
City of Riverside	(951) 351-6170
Rubidoux Services District	(951) 684-7580
Silent Valley Club, Inc	(951) 849-4501
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

REPORT ILLEGAL STORM DRAIN DISPOSAL
1-800-506-2555 or online at
www.rcflood.org

Online resources include:

- Riverside County Flood Control and Water Conservation District **www.rcflood.org**
- California Storm Water Quality Association **www.casqa.org**
- State Water Resources Control Board **www.swrcb.ca.gov/**
- Power Washers of North America **www.thepwna.org**

StormWater Pollution

What you should know for...

OUTDOOR CLEANING ACTIVITIES AND PROFESSIONAL MOBILE SERVICE PROVIDERS



Storm drain pollution prevention information for:

- Car Washing / Mobile Detailers
- Window and Carpet Cleaners
- Power Washers
- Waterproofers / Street Sweepers
- Equipment cleaners or degreasers and all mobile service providers

Do you know where street flows actually go?

Storm Drains are NOT connected to sanitary sewer systems and treatment plants!



The primary purpose of storm drains is to carry rain water away from developed areas to prevent flooding. Pollutants discharged to storm drains are transported directly into rivers, lakes and streams. Soaps, degreasers, automotive fluids, litter and a host of materials are washed off buildings, sidewalks, plazas and parking areas. Vehicles and equipment must be properly managed to prevent the pollution of local waterways.

Unintentional spills by mobile service operators can flow into storm drains and pollute our waterways. **Avoid mishaps.** *Always* have a **Spill Response Kit** on hand to clean up unintentional spills**.** Only emergency **Mechanical** repairs should be done in City streets and use drip pans for spills. **Plumbing** should be done on private property. Always store chemicals in a leak-proof container and keep covered when not in use. **Window/Power Washing** waste water shouldn't be released into the streets, but should be disposed of in a sanitary sewer, landscaped area or in the soil. Soiled **Carpet Cleaning** wash water should be filtered before being discharged into the sanitary sewer. Dispose of all filter debris properly. **Car Washing/Detailing** operators should wash cars on private property and use a regulated hose nozzle for water flow control and runoff prevention. Capture and dispose of waste water and chemicals properly. Always prevent runoff water from entering storm drains.

REPORT ILLEGAL STORM DRAIN DISPOSAL
1-800-506-2555



Help Protect Our Waterways!

Use These Guidelines For Outdoor Cleaning Activities and Wash Water Disposal

Did you know that disposing of pollutants into the street, gutter, storm drain or nearest body of water is ***PROHIBITED*** by law and can bring about stiff penalties.

Best Management Practices

Waste wash water from Mechanics, Plumbers, Window/Power Washers, Carpet Cleaners, Car Washing and Mobile Detailing activities may contain significant quantities of motor oil, grease, chemicals, dirt, detergents, brake pad dust, litter and other materials.

Best Management Practices, or BMPs as they are known, are guides to prevent pollutants from entering the storm drains. *Each of us* can do our part to keep storm water clean by using the suggested BMPs below:

Simple solutions for both light and heavy duty jobs:

Do...consider dry cleaning methods first such as a mop, broom, rag or wire brush. Always keep a spill response kit on site.

Do...prepare the work area before power cleaning by using sand bags, rubber mats, vacuum booms, containment pads or temporary berms to keep wash water away from the gutters and storm drains.

Do...use vacuums or other machines to remove and collect loose debris or litter before applying water.

Do...obtain the property owner's permission to dispose *small amounts* of power washing waste water to landscaped, gravel or unpaved surfaces.

Do...check with your local sanitary sewer agency's policies on wash water disposal regulations. (See list on reverse side).

Do...be aware that if discharging to landscape areas, soapy wash water may damage landscaping. Residual wash water may remain on paved surfaces to evaporate. Sweep up solid residuals and dispose of properly. Vacuum booms are another option for capturing and collecting wash water.

Do not let...wash or waste water from sidewalk, plaza or building cleaning go into a street or storm drain.



Report illegal storm drain disposal,
Call Toll Free
1-800-506-2555

Using Cleaning Agents

Try using biodegradable/phosphate-free products. They are easier on the environment, but don't confuse them for being toxic free. Soapy water entering the storm drain system can impact the delicate aquatic environment.



When cleaning surfaces with a *high-pressure washer* or *steam cleaner*, additional precautions should be taken to prevent the discharge of pollutants into the storm drain system. These two methods of surface cleaning can loosen additional material that can contaminate local waterways.

Think Water Conservation

Minimize water use by using high pressure, low volume nozzles. Be sure to check all hoses for leaks.

Screening Wash Water

A thorough dry cleanup before washing exterior surfaces, such as buildings and decks *without loose paint*, sidewalks, or plaza areas should be sufficient to protect receiving waters. Keep debris from entering the storm drain after cleaning by first passing the wash water first through a "20 mesh" or finer screen to catch the solid materials, then disposing the mesh in a refuse container.

Drain Inlet Protection & Collection of Wash Water

- Prior to any washing, block all storm drains with an impervious barrier such as sandbags or berms, or seal the storm drain with plugs or rubber mats.
- Create a containment area with berms and traps or take advantage of a low spot to keep wash water contained.
- Wash vehicles and equipment on grassy or gravel areas so that the wash water can seep into the ground.
- Pump or vacuum up all wash water in the contained area.

Equipment and Supplies

For special materials, equipment and supplies:

- New Pig — (800) 468-4647
- Lab Safety Supply — (800) 356-0783
- C&H — (800) 558-90966
- W.W. Grainger — (800) 994-9174
- Cleaning Equipment Trade Association — (800) 441-0111

Adopt a pet from your local animal shelter or adoption centers at pet stores. A variety of animals, from purebred to mixed breed are waiting for loving arms and good homes. Consider volunteering at your local animal shelters. Volunteers, donations, food, newspapers, old towels and linens are needed to help the animals.



RIVERSIDE COUNTY ANIMAL SHELTER LOCATIONS:

BLYTHE
16450 West Hobson Way
Blythe, CA 92225
760-921-7857

HEMET
800 South Sanderson
Hemet, CA 92545
909 925-8025

INDIO
45-355 Van Buren
Indio, CA 92201
760-347-2319

RIVERSIDE
5950 Wilderness Avenue
Riverside, CA 92504
909-358-7387

FOR ALL OTHER AREAS CALL 1-888-636-7387

Riverside County gratefully acknowledges the City of Los Angeles Stormwater Program for the design concept of this brochure.

What's the Scoop?



TIPS FOR A HEALTHY PET AND A HEALTHIER ENVIRONMENT

CREATE A HEALTHY ENVIRONMENT in and around your home by following these simple pet practices. Your pet, family and neighbors will appreciate their clean comfortable surroundings.

HOUSEHOLD PETS

We all love our pets, but pet waste is a subject everyone likes to avoid. Pet waste left on trails, sidewalks, streets, and grassy areas is immediately flushed into the nearest waterway when it rains. Even if you can't see water near you, the rain or waste water WASHES all that PET WASTE and BACTERIA INTO THE STORMDRAIN, where it travels to your neighborhood creek or lake untreated. These animal droppings also contain nutrients that can promote the growth of algae, if they enter our streams and lakes. The risk of STORMWATER CONTAMINATION INCREASES, if pet wastes is allowed to accumulate in animal pen areas or left on sidewalks, streets, or driveways where runoff can carry them to storm sewers.

Some of the DISEASES THAT CAN SPREAD from pet waste are:
Campylobacteriosis — a bacterial infection that causes diarrhea in humans.
Salmonellosis — the most common bacterial infection transmitted to humans from animals.
Toxocarisis — roundworms transmitted from animals to humans.

Flies and other pest insects can also increase when pet waste is disposed of improperly, becoming a nuisance and adding yet another vector for disease transmission.

WHAT CAN YOU DO?

- SCOOP up pet waste and flush it down the toilet.
- NEVER DUMP pet waste into a storm drain or catch basin.
- USE the complimentary BAGS or mutt mitts offered in dispensers at local parks.
- CARRY EXTRA BAGS when walking your dog and make them available to other pet owners who are without.
- TEACH CHILDREN how to properly clean up after a pet.
- TELL FRIENDS AND NEIGHBORS about the ill effects of animal waste on the environment. Encourage them to clean up after pets.

Did You Know ...
that Californians illegally dump about 80 million gallons of motor oil each year?

Many communities have "Scoop the Poop" laws that govern pet waste cleanup. Some of these laws specifically require anyone who walks an animal off of their property to carry a bag, shovel, or scooper. Any waste left by the animal must be cleaned up immediately. CALL YOUR LOCAL CODE ENFORCEMENT OFFICER to find out more about pet waste regulations.

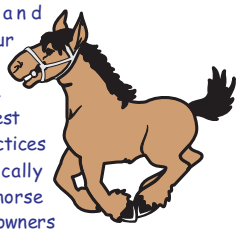


Pets are only one of the many fixtures of suburban America that add to water pollution. Lawn fertilizers, rinse water from driveways and motor oil commonly end up in streams and lakes. **CALL 1-800-506-2555 FOR HOUSEHOLD HAZARDOUS WASTE COLLECTION LOCATION AND DATES.** Maintain your automobile to avoid leaks. Dispose of used vehicle fluids properly. Your pets can be poisoned if they ingest gas, oil or antifreeze that drips onto the pavement or is stored in open containers.

NEVER HOSE VEHICLE FLUIDS into the street or gutter. USE ABSORBENT MATERIALS such as cat litter to clean-up spills. SWEEP UP used absorbent materials and place in the trash.

HORSES AND LIVESTOCK

Fortunate enough to own a horse or livestock? You, too, can play a part in protecting and cleaning up our water resources. The following are a few simple Best Management Practices (BMPs) specifically designed for horse owners and landowners with horses.



- STORE your manure properly. Do not store unprotected piles of manure in places where runoff may enter streams, or flood waters may wash the manure away. Place a cover or tarp over the pile to keep rainwater out.
- CHECK with your local conservation district to design manure storage facilities to protect water quality. These structures usually consist of a concrete pad to protect ground water and a short wall on one or two sides to make manure handling easier.
- TRY composting – A vegetative cover placed around buildings or on steeper slopes can help minimize erosion and absorb nutrients while improving the appearance of your property. In addition, avoid costlier erosion controls, vegetative covers will provide animals with better traction during wet or icy conditions.



- KEEP animals out of steams – Designed stream crossings provide a safe, easy way for horses and livestock to ford streams. Fencing encourages the use of the crossing instead of the streambed to navigate streams. This will allow vegetation to stabilize stream banks and reduce sediment pollution.
- MOW pastures to proper height, six inches is typically recommended.
- Material STORAGE SAFETY TIPS – Many of the chemicals found in barns require careful handling and proper disposal. When using these chemicals, be certain to follow these common sense guidelines:
  - Buy only what you need.
  - Treat spills of hoof oils like fuel spill. Use kitty litter to soak up the oil and dispose in a tightly sealed plastic bag.
  - Store pesticides in a locked, dry, well-ventilated area.
  - Protect stored fertilizer and pesticides from rain and surface water.

Call 1-800-506-2555 to locate your local conservation district to find out what to do with your current backyard manure pile, how to re-establish a healthy pasture, what to do about weeds, and what grasses grow best in your soils.

Thank you for doing your part to protect your watershed, the environment, and the equestrian way of life in your community!



Helpful telephone numbers and links:

Riverside County Water Agencies:

City of Banning	(951) 922-3130
City of Beaumont	(951) 769-8520
City of Blythe	(760) 922-6161
City of Coachella	(760) 398-3502
Coachella Valley Water District	(760) 398-2651
City of Corona	(951) 736-2259
Desert Center, CSA #51	(760) 227-3203
Eastern Municipal Water District	(951) 928-3777
Elsinore Valley MWD	(951) 674-3146
Farm Mutual Water Company	(951) 244-4196
City of Hemet	(951) 765-3712
Idyllwild Water District	(951) 659-2143
Jurupa Community Services District	(951) 360-8795
Lake Hemet MWD	(951) 658-3241
Lee Lake Water District	(951) 277-1414
March Air Force Base	(951) 656-7000
Missior Springs Water District	(760) 329-6448
City of Palm Springs	(760) 323-8253
Rancho Cahuilla	(951) 780-9773
Rancho California Water District	(951) 296-6900
Ripley, CSA #62	(760) 922-4861
City of Riverside	(951) 351-6170
Rubidoux Community Services District	(951) 684-7580
Silver Valley Club, Inc.	(951) 849-4501
Valley Sanitary District	(760) 347-2356
Western Municipal Water District	(951) 789-5000
Yucaipa Valley Water District	(909) 797-5117

CALL 1-800-506-2555 to:

- Report clogged storm drains or illegal storm drain disposal from residential, industrial, construction and commercial sites into public streets, storm drains and/or water bodies.
- Find out about our various storm drain pollution prevention materials.
- Locate the dates and times of Household Hazardous Waste (HHW) Collection Event.
- Request adult neighborhood or classroom presentations.
- Locate other County environmental services.
- Receive grasscycling information and composting workshop information.

Or visit our (Riverside County Flood Control District website at: **www.floodcontrol.co.riverside.ca.us**

Other links to additional storm drain pollution information:

- County of Riverside Environmental Health: www.rivcoeh.org
- California State Water Resource Conservation Board: www.swrcb.ca.gov/stormwtr/links.html
- California Water Quality Task Force: www.cabmphandbooks.com/
- United State Environmental Protection Agency (EPA): www.epa.gov/oppfead1/cb/2home/programs/busprc.htm (compliance assistance information)

Riverside County Only Rain in the Storm Drain Pollution Protection Program gratefully acknowledges the Bay Area Stormwater Management Agencies Association and the Cleaning Equipment Trade Association for information provided in this brochure.

StormWater Pollution

What you should know for...



Swimming Pool, Jacuzzi and Fountain Maintenance

Do you know . . . where the water actually goes?



Storm Drains are not connected to sanitary sewer systems and treatment plants!

The primary purpose of storm drains is to carry rain water away from developed areas to prevent flooding. Untreated storm water and the pollutants it carries flow directly into rivers, lakes, and streams. Wastewater from residential swimming pools, jacuzzis, fishponds, and fountains often contain chemicals used for sanitizing or cleansing purposes. Toxic chemicals (such as chlorine or copper-based algaecides) can damage the environment when wastewater is allowed to flow into our local rivers, lakes, and streams by way of the storm drain system. Each of us can do our part to help clean our water, and that adds up to a pollution solution.

The Cities and County of Riverside have adopted ordinances for storm drain pollution management to maintain discharge control and prevent illegal storm drain discharge. In accordance with state and federal law, these local storm water ordinances prohibit the discharge of pollutants into the storm drain system or local surface waters. The Only Rain in the Storm Drain Pollution Program informs residents and businesses of storm drain pollution prevention activities such as those described in this brochure.



PLEASE NOTE: The discharge of pollutants into the street, gutters, storm drain system, or waterways – without a Regional Water Quality Control board permit or waiver – is strictly prohibited by local ordinances and state and federal law.

Do Your Part to Protect Our Waterways!

Use These Guidelines For Proper Draining of Your Swimming Pool, Jacuzzi and Fountain Water

Discharge Regulations



Requirements for pool draining may differ from city to city. Check with your water agency to see if disposal to the sanitary sewer line is allowed for pool discharges (see reverse side for Riverside County water purveyors).

If sewer discharge is allowed, a hose can be run from your swimming pool pump to the washing machine drain or a sink or bathtub. If sewer discharge is not allowed, or if your house is served by a septic tank, review the options presented below.

Discharge Options

If your local sewer agency will not accept pool water into their system, or if you are on a septic tank system, follow these guidelines:



1. Reduce or eliminate solids (e.g., debris, leaves or dirt) in the pool water.
2. Allow the chemicals in the pool water to dissipate. This could take up to seven (7) days depending on the time of year. Create a co-op; let your neighbor share your pool while theirs is being prepared for draining, then use their pool while yours is being drained. Chlorinated water should not be discharged into the storm drain or surface waters. This includes large pools such as community swimming pools or spas.
3. When the pool water is free of all chemicals (verify by a home pool water test kit) drain pool water to landscaped areas, lawns, yards, or any areas that will absorb the water.
4. You may have to drain the pool water over a period of a few days to allow the landscape areas to absorb most of the water.
5. Control the flow of the draining pool water to prevent soil erosion. Do not allow sediment to enter the street, gutter or storm drain.
6. Avoid discharging pool water into the street and storm drain system. Water runoff that enters the street can pick up motor oil, pet waste, trash and other pollutants, eventually carrying them into the storm drain system and local surface waters.

Refinishing Pool Surfaces

If you are resurfacing your pool, or resurfacing the pool patio area, be sure to hose down mixers, tools and trailers in a dirt area where rinse water won't flow into the street, gutter or storm drain. Local storm water ordinances strictly prohibit the discharge of pollutants into the storm drain system.

Residues from acid washing and similar activities require special handling. Never discharge low or high pH wastewater into the street, gutter or storm drain.

Cleaning Filters

Discharge of pool filter rinse water and backflush to a stream, ditch, or storm drain is prohibited. Backflush from pool filters must be discharged to the sanitary sewer, on-site septic tank and drainfield system (if properly designed and adequately sized), or a seepage pit. Alternatively, pool filter rinse water and backwash may be diverted to dirt or landscaped areas. Filter media and other solids should be picked up and disposed of in the trash.

Algaecides



Avoid using copper-based algaecides unless absolutely necessary. Control algae with chlorine, organic polymers or other alternatives to copper-based pool chemicals. Copper is a heavy metal that can be toxic to aquatic life.

Chemical Storage and Handling



- Use only the amount indicated on product labels.
- Store chlorine and other chemicals in a covered area to prevent runoff. Keep out of reach of children and pets.
- Chlorine kits, available at retail swimming pool equipment and supply stores, should be used to monitor the chlorine and pH levels.
- Chlorine and other pool chemicals should never be allowed to flow into the gutter or the storm drain system.

Proper Disposal of Pool Chemicals

If you need to dispose of unwanted pool chemicals, first try giving them to a neighbor with a pool. If that doesn't work, bring unwanted pool chemicals to a Household Hazardous Waste (HHW) Collection Event. There's no cost for bringing HHW items to collection events - it's FREE! Call **1-800-506-2555** for a schedule of HHW events in your community.

NEVER put unused chemicals into the trash, onto the ground or down a storm drain.

Building & Grounds Maintenance SC-41

Description

Stormwater runoff from building and grounds maintenance activities can be contaminated with toxic hydrocarbons in solvents, fertilizers and pesticides, suspended solids, heavy metals, abnormal pH, and oils and greases. Utilizing the protocols in this fact sheet will prevent or reduce the discharge of pollutants to stormwater from building and grounds maintenance activities by washing and cleaning up with as little water as possible, following good landscape management practices, preventing and cleaning up spills immediately, keeping debris from entering the storm drains, and maintaining the stormwater collection system.

Approach

Reduce potential for pollutant discharge through source control pollution prevention and BMP implementation. Successful implementation depends on effective training of employees on applicable BMPs and general pollution prevention strategies and objectives.

General Pollution Prevention Protocols

- Switch to non-toxic chemicals for maintenance to the maximum extent possible.
- Choose cleaning agents that can be recycled.
- Encourage proper lawn management and landscaping, including use of native vegetation.
- Encourage use of Integrated Pest Management techniques for pest control.
- Encourage proper onsite recycling of yard trimmings.
- Recycle residual paints, solvents, lumber, and other material as much as possible.

Objectives
Cover
Contain
Educate
Reduce/Minimize
Product Substitution

Targeted Constituents	
Sediment	✓
Nutrients	✓
Trash	
Metals	✓
Bacteria	✓
Oil and Grease	
Organics	

Minimum BMPs Covered	
Good Housekeeping	✓
Preventative Maintenance	
Spill and Leak Prevention and Response	✓
Material Handling & Waste Management	✓
Erosion and Sediment Controls	
Employee Training Program	✓
Quality Assurance Record Keeping	✓

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION®

- Clean work areas at the end of each work shift using dry cleaning methods such as sweeping and vacuuming.



Good Housekeeping

Pressure Washing of Buildings, Rooftops, and Other Large Objects

- In situations where soaps or detergents are used and the surrounding area is paved, pressure washers must use a water collection device that enables collection of wash water and associated solids. A sump pump, wet vacuum or similarly effective device must be used to collect the runoff and loose materials. The collected runoff and solids must be disposed of properly.

- If soaps or detergents are not used, and the surrounding area is paved, wash runoff does not have to be collected but must be screened. Pressure washers must use filter fabric or some other type of screen on the ground and/or in the catch basin to trap the particles in wash water runoff.

- If you are pressure washing on a grassed area (with or without soap), runoff must be dispersed as sheet flow as much as possible, rather than as a concentrated stream. The wash runoff must remain on the grass and not drain to pavement.

Landscaping Activities

- Dispose of grass clippings, leaves, sticks, or other collected vegetation as garbage, or by composting. Do not dispose of collected vegetation into waterways or storm drainage systems.

- Use mulch or other erosion control measures on exposed soils. See also SC-40, Contaminated and Erodible Areas, for more information.

Building Repair, Remodeling, and Construction

- Do not dump any toxic substance or liquid waste on the pavement, the ground, or toward a storm drain.

- Use ground or drop cloths underneath outdoor painting, scraping, and sandblasting work, and properly dispose of collected material daily.

- Use a ground cloth or oversized tub for activities such as paint mixing and tool cleaning.

- Clean paintbrushes and tools covered with water-based paints in sinks connected to sanitary sewers or in portable containers that can be dumped into a sanitary sewer drain. Brushes and tools covered with non-water-based paints, finishes, or other materials must be cleaned in a manner that enables collection of used solvents (e.g., paint thinner, turpentine, etc.) for recycling or proper disposal.

- Use a storm drain cover, filter fabric, or similarly effective runoff control mechanism if dust, grit, wash water, or other pollutants may escape the work area and enter a catch basin. This is particularly necessary on rainy days. The containment device(s) must be in place at the beginning of the work day, and accumulated dirty runoff and

solids must be collected and disposed of before removing the containment device(s) at the end of the work day.

- If you need to de-water an excavation site, you may need to filter the water before discharging to a catch basin or off-site. If directed off-site, you should direct the water through hay bales and filter fabric or use other sediment filters or traps.
- Store toxic material under cover during precipitation events and when not in use. A cover would include tarps or other temporary cover material.

Mowing, Trimming, and Planting

- Dispose of leaves, sticks, or other collected vegetation as garbage, by composting or at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Use mulch or other erosion control measures when soils are exposed.
- Place temporarily stockpiled material away from watercourses and drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Consider an alternative approach when bailing out muddy water: do not put it in the storm drain; pour over landscaped areas.
- Use hand weeding where practical.

Fertilizer and Pesticide Management

- Do not use pesticides if rain is expected.
- Do not mix or prepare pesticides for application near storm drains.
- Use the minimum amount needed for the job.
- Calibrate fertilizer distributors to avoid excessive application.
- Employ techniques to minimize off-target application (e.g., spray drift) of pesticides, including consideration of alternative application techniques.
- Apply pesticides only when wind speeds are low.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Irrigate slowly to prevent runoff and then only as much as is needed.
- Clean pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering and repair leaks in the irrigation system as soon as they are observed.

Building & Grounds Maintenance SC-41



Spill Response and Prevention Procedures

- Keep your Spill Prevention Control and Countermeasure (SPCC) Plan up-to-date.
- Place a stockpile of spill cleanup materials, such as brooms, dustpans, and vacuum sweepers (if desired) near the storage area where it will be readily accessible.
- Have employees trained in spill containment and cleanup present during the loading/unloading of dangerous wastes, liquid chemicals, or other materials.
- Familiarize employees with the Spill Prevention Control and Countermeasure Plan.
- Clean up spills immediately.



Material Handling and Waste Management

- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.
- Use less toxic pesticides that will do the job when applicable. Avoid use of copper-based pesticides if possible.
- Dispose of empty pesticide containers according to the instructions on the container label.
- Use up the pesticides. Rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Implement storage requirements for pesticide products with guidance from the local fire department and County Agricultural Commissioner. Provide secondary containment for pesticides.



Employee Training Program

- Educate and train employees on pesticide use and in pesticide application techniques to prevent pollution.
- Train employees and contractors in proper techniques for spill containment and cleanup.
- Be sure the frequency of training takes into account the complexity of the operations and the needs of individual staff.



Quality Assurance and Record Keeping

- Keep accurate logs that document maintenance activities performed and minimum BMP measures implemented.
- Keep accurate logs of spill response actions that document what was spilled, how it was cleaned up, and how the waste was disposed.
- Establish procedures to complete logs and file them in the central office.

Potential Capital Facility Costs and Operation & Maintenance Requirements

Facilities

- Additional capital costs are not anticipated for building and grounds maintenance. Implementation of the minimum BMPs described above should be conducted as part of regular site operations.

Maintenance

- Maintenance activities for the BMPs described above will be minimal, and no additional cost is anticipated.

Supplemental Information

Fire Sprinkler Line Flushing

Site fire sprinkler line flushing may be a source of non-stormwater runoff pollution. The water entering the system is usually potable water, though in some areas it may be non-potable reclaimed wastewater. There are subsequent factors that may drastically reduce the quality of the water in such systems. Black iron pipe is usually used since it is cheaper than potable piping, but it is subject to rusting and results in lower quality water. Initially, the black iron pipe has an oil coating to protect it from rusting between manufacture and installation; this will contaminate the water from the first flush but not from subsequent flushes. Nitrates, poly-phosphates and other corrosion inhibitors, as well as fire suppressants and antifreeze may be added to the sprinkler water system. Water generally remains in the sprinkler system a long time (typically a year) and between flushes may accumulate iron, manganese, lead, copper, nickel, and zinc. The water generally becomes anoxic and contains living and dead bacteria and breakdown products from chlorination. This may result in a significant BOD problem and the water often smells. Consequently dispose fire sprinkler line flush water into the sanitary sewer. Do not allow discharge to storm drain or infiltration due to potential high levels of pollutants in fire sprinkler line water.

References and Resources

City of Seattle, Seattle Public Utilities Department of Planning and Development, 2009. *Stormwater Manual Vol. 1 Source Control Technical Requirements Manual.*

Kennedy/Jenks Consultants, 2007. *The Truckee Meadows Industrial and Commercial Storm Water Best Management Practices Handbook*. Available online at: http://www.cityofsparks.us/sites/default/files/assets/documents/env-control/construction/TM-I-C_BMP_Handbook_2-07-final.pdf.

Orange County Stormwater Program, Best Management Practices for Industrial/Commercial Business Activities. Available online at: http://ocwatersheds.com/documents/bmp/industrialcommercialbusinessesactivities.

Sacramento Stormwater Management Program. *Best Management Practices for Industrial Storm Water Pollution Control*. Available online at:

http://www.msa.saccounty.net/sactostormwater/documents/guides/industrial-BMP-manual.pdf.

US EPA, 1997. *Best Management Practices Handbook for Hazardous Waste Containers*. Available online at: http://www.epa.gov/region6/6en/h/handbk4.pdf.

Ventura Countywide Stormwater Management Program Clean Business Fact Sheets. Available online at: http://www.vcstormwater.org/documents/programs_business/building.pdf.

Landscape Maintenance SC-73



Objectives

- Contain
- Educate
- Reduce/Minimize
- Product Substitution

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	
Bacteria	
Oil and Grease	
Organics	
Oxygen Demanding	☑

Description

Landscape maintenance activities include vegetation removal; herbicide and insecticide application; fertilizer application; watering; and other gardening and lawn care practices. Vegetation control typically involves a combination of chemical (herbicide) application and mechanical methods. All of these maintenance practices have the potential to contribute pollutants to the storm drain system. The major objectives of this BMP are to minimize the discharge of pesticides, herbicides and fertilizers to the storm drain system and receiving waters; prevent the disposal of landscape waste into the storm drain system by collecting and properly disposing of clippings and cuttings, and educating employees and the public.

Approach

Pollution Prevention

- Implement an integrated pest management (IPM) program. IPM is a sustainable approach to managing pests by combining biological, cultural, physical, and chemical tools.
- Choose low water using flowers, trees, shrubs, and groundcover.
- Consider alternative landscaping techniques such as naturescaping and xeriscaping.
- Conduct appropriate maintenance (i.e. properly timed fertilizing, weeding, pest control, and pruning) to help preserve the landscapes water efficiency.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Consider grass cycling (grass cycling is the natural recycling of grass by leaving the clippings on the lawn when mowing. Grass clippings decompose quickly and release valuable nutrients back into the lawn).

Suggested Protocols

Mowing, Trimming, and Weeding

- Whenever possible use mechanical methods of vegetation removal (e.g mowing with tractor-type or push mowers, hand cutting with gas or electric powered weed trimmers) rather than applying herbicides. Use hand weeding where practical.
- Avoid loosening the soil when conducting mechanical or manual weed control, this could lead to erosion. Use mulch or other erosion control measures when soils are exposed.
- Performing mowing at optimal times. Mowing should not be performed if significant rain events are predicted.
- Mulching mowers may be recommended for certain flat areas. Other techniques may be employed to minimize mowing such as selective vegetative planting using low maintenance grasses and shrubs.
- Collect lawn and garden clippings, pruning waste, tree trimmings, and weeds. Chip if necessary, and compost or dispose of at a landfill (see waste management section of this fact sheet).
- Place temporarily stockpiled material away from watercourses, and berm or cover stockpiles to prevent material releases to storm drains.

Planting

- Determine existing native vegetation features (location, species, size, function, importance) and consider the feasibility of protecting them. Consider elements such as their effect on drainage and erosion, hardiness, maintenance requirements, and possible conflicts between preserving vegetation and the resulting maintenance needs.
- Retain and/or plant selected native vegetation whose features are determined to be beneficial, where feasible. Native vegetation usually requires less maintenance (e.g., irrigation, fertilizer) than planting new vegetation.
- Consider using low water use groundcovers when planting or replanting.

Waste Management

- Compost leaves, sticks, or other collected vegetation or dispose of at a permitted landfill. Do not dispose of collected vegetation into waterways or storm drainage systems.
- Place temporarily stockpiled material away from watercourses and storm drain inlets, and berm or cover stockpiles to prevent material releases to the storm drain system.
- Reduce the use of high nitrogen fertilizers that produce excess growth requiring more frequent mowing or trimming.

- Avoid landscape wastes in and around storm drain inlets by either using bagging equipment or by manually picking up the material.

Irrigation

- Where practical, use automatic timers to minimize runoff.
- Use popup sprinkler heads in areas with a lot of activity or where there is a chance the pipes may be broken. Consider the use of mechanisms that reduce water flow to sprinkler heads if broken.
- Ensure that there is no runoff from the landscaped area(s) if re-claimed water is used for irrigation.
- If bailing of muddy water is required (e.g. when repairing a water line leak), do not put it in the storm drain; pour over landscaped areas.
- Irrigate slowly or pulse irrigate to prevent runoff and then only irrigate as much as is needed.
- Apply water at rates that do not exceed the infiltration rate of the soil.

Fertilizer and Pesticide Management

- Utilize a comprehensive management system that incorporates integrated pest management (IPM) techniques. There are many methods and types of IPM, including the following:
  - Mulching can be used to prevent weeds where turf is absent, fencing installed to keep rodents out, and netting used to keep birds and insects away from leaves and fruit.
  - Visible insects can be removed by hand (with gloves or tweezers) and placed in soapy water or vegetable oil. Alternatively, insects can be sprayed off the plant with water or in some cases vacuumed off of larger plants.
  - Store-bought traps, such as species-specific, pheromone-based traps or colored sticky cards, can be used.
  - Slugs can be trapped in small cups filled with beer that are set in the ground so the slugs can get in easily.
  - In cases where microscopic parasites, such as bacteria and fungi, are causing damage to plants, the affected plant material can be removed and disposed of (pruning equipment should be disinfected with bleach to prevent spreading the disease organism).
  - Small mammals and birds can be excluded using fences, netting, tree trunk guards.
  - Beneficial organisms, such as bats, birds, green lacewings, ladybugs, praying mantis, ground beetles, parasitic nematodes, trichogramma wasps, seed head weevils, and spiders that prey on detrimental pest species can be promoted.
- Follow all federal, state, and local laws and regulations governing the use, storage, and disposal of fertilizers and pesticides and training of applicators and pest control advisors.

- Use pesticides only if there is an actual pest problem (not on a regular preventative schedule).
- Do not use pesticides if rain is expected. Apply pesticides only when wind speeds are low (less than 5 mph).
- Do not mix or prepare pesticides for application near storm drains.
- Prepare the minimum amount of pesticide needed for the job and use the lowest rate that will effectively control the pest.
- Employ techniques to minimize off-target application (e.g. spray drift) of pesticides, including consideration of alternative application techniques.
- Fertilizers should be worked into the soil rather than dumped or broadcast onto the surface.
- Calibrate fertilizer and pesticide application equipment to avoid excessive application.
- Periodically test soils for determining proper fertilizer use.
- Sweep pavement and sidewalk if fertilizer is spilled on these surfaces before applying irrigation water.
- Purchase only the amount of pesticide that you can reasonably use in a given time period (month or year depending on the product).
- Triple rinse containers, and use rinse water as product. Dispose of unused pesticide as hazardous waste.
- Dispose of empty pesticide containers according to the instructions on the container label.

Inspection

- Inspect irrigation system periodically to ensure that the right amount of water is being applied and that excessive runoff is not occurring. Minimize excess watering, and repair leaks in the irrigation system as soon as they are observed.
- Inspect pesticide/fertilizer equipment and transportation vehicles daily.

Training

- Educate and train employees on use of pesticides and in pesticide application techniques to prevent pollution. Pesticide application must be under the supervision of a California qualified pesticide applicator.
- Train/encourage municipal maintenance crews to use IPM techniques for managing public green areas.
- Annually train employees within departments responsible for pesticide application on the appropriate portions of the agency's IPM Policy, SOPs, and BMPs, and the latest IPM techniques.

- Employees who are not authorized and trained to apply pesticides should be periodically (at least annually) informed that they cannot use over-the-counter pesticides in or around the workplace.
- Use a training log or similar method to document training.

Spill Response and Prevention

- Refer to SC-11, Spill Prevention, Control & Cleanup
- Have spill cleanup materials readily available and in a know in location
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- The Federal Pesticide, Fungicide, and Rodenticide Act and California Title 3, Division 6, Pesticides and Pest Control Operations place strict controls over pesticide application and handling and specify training, annual refresher, and testing requirements. The regulations generally cover: a list of approved pesticides and selected uses, updated regularly; general application information; equipment use and maintenance procedures; and record keeping. The California Department of Pesticide Regulations and the County Agricultural Commission coordinate and maintain the licensing and certification programs. All public agency employees who apply pesticides and herbicides in "agricultural use" areas such as parks, golf courses, rights-of-way and recreation areas should be properly certified in accordance with state regulations. Contracts for landscape maintenance should include similar requirements.
- All employees who handle pesticides should be familiar with the most recent material safety data sheet (MSDS) files.
- Municipalities do not have the authority to regulate the use of pesticides by school districts, however the California Healthy Schools Act of 2000 (AB 2260) has imposed requirements on California school districts regarding pesticide use in schools. Posting of notification prior to the application of pesticides is now required, and IPM is stated as the preferred approach to pest management in schools.

Requirements

Costs

Additional training of municipal employees will be required to address IPM techniques and BMPs. IPM methods will likely increase labor cost for pest control which may be offset by lower chemical costs.

Maintenance

Not applicable

Supplemental Information

Further Detail of the BMP

Waste Management

Composting is one of the better disposal alternatives if locally available. Most municipalities either have or are planning yard waste composting facilities as a means of reducing the amount of waste going to the landfill. Lawn clippings from municipal maintenance programs as well as private sources would probably be compatible with most composting facilities

Contractors and Other Pesticide Users

Municipal agencies should develop and implement a process to ensure that any contractor employed to conduct pest control and pesticide application on municipal property engages in pest control methods consistent with the IPM Policy adopted by the agency. Specifically, municipalities should require contractors to follow the agency's IPM policy, SOPs, and BMPs; provide evidence to the agency of having received training on current IPM techniques when feasible; provide documentation of pesticide use on agency property to the agency in a timely manner.

References and Resources

King County Stormwater Pollution Control Manual. Best Management Practices for Businesses. 1995. King County Surface Water Management. July. On-line: http://dnr.metrokc.gov/wlr/dss/spcm.htm

Los Angeles County Stormwater Quality Model Programs. Public Agency Activities http://ladpw.org/wmd/npdes/model_links.cfm

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July. 1998.

Orange County Stormwater Program http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1997 Urban Runoff Management Plan. September 1997, updated October 2000.

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Landscaping and Lawn Care. Office of Water. Office of Wastewater Management. On-line: http://www.epa.gov/npdes/menuofbmps/poll_8.htm

Drainage System Maintenance SC-74



Photo Credit: Geoff Brosseau

Objectives

- Contain
- Educate
- Reduce/Minimize

Description

As a consequence of its function, the stormwater conveyance system collects and transports urban runoff that may contain certain pollutants. Maintaining catch basins, stormwater inlets, and other stormwater conveyance structures on a regular basis will remove pollutants, prevent clogging of the downstream conveyance system, restore catch basins' sediment trapping capacity, and ensure the system functions properly hydraulically to avoid flooding.

Targeted Constituents

Sediment	☑
Nutrients	☑
Trash	☑
Metals	☑
Bacteria	☑
Oil and Grease	☑
Organics	☑
Oxygen Demanding	☑

Approach

Suggested Protocols

Catch Basins/Inlet Structures

- Municipal staff should regularly inspect facilities to ensure the following:
  - Immediate repair of any deterioration threatening structural integrity.
  - Cleaning before the sump is 40% full. Catch basins should be cleaned as frequently as needed to meet this standard.
  - Stenciling of catch basins and inlets (see SC-75 Waste Handling and Disposal).
- Clean catch basins, storm drain inlets, and other conveyance structures in high pollutant load areas just before the wet season to remove sediments and debris accumulated during the summer.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Conduct inspections more frequently during the wet season for problem areas where sediment or trash accumulates more often. Clean and repair as needed.
- Keep accurate logs of the number of catch basins cleaned.
- Record the amount of waste collected.
- Store wastes collected from cleaning activities of the drainage system in appropriate containers or temporary storage sites in a manner that prevents discharge to the storm drain.
- Dewater the wastes with outflow into the sanitary sewer if permitted. Water should be treated with an appropriate filtering device prior to discharge to the sanitary sewer. If discharge to the sanitary sewer is not allowed, water should be pumped or vacuumed to a tank and properly disposed of. Do not dewater near a storm drain or stream.
- Except for small communities with relatively few catch basins that may be cleaned manually, most municipalities will require mechanical cleaners such as eductors, vacuums, or bucket loaders.

Storm Drain Conveyance System

- Locate reaches of storm drain with deposit problems and develop a flushing schedule that keeps the pipe clear of excessive buildup.
- Collect flushed effluent and pump to the sanitary sewer for treatment.

Pump Stations

- Clean all storm drain pump stations prior to the wet season to remove silt and trash.
- Do not allow discharge from cleaning a storm drain pump station or other facility to reach the storm drain system.
- Conduct quarterly routine maintenance at each pump station.
- Inspect, clean, and repair as necessary all outlet structures prior to the wet season.
- Sample collected sediments to determine if landfill disposal is possible, or illegal discharges in the watershed are occurring.

Open Channel

- Consider modification of storm channel characteristics to improve channel hydraulics, to increase pollutant removals, and to enhance channel/creek aesthetic and habitat value.
- Conduct channel modification/improvement in accordance with existing laws. Any person, government agency, or public utility proposing an activity that will change the natural (emphasis added) state of any river, stream, or lake in California, must enter into a steam or Lake Alteration Agreement with the Department of Fish and Game. The developer-applicant should also contact local governments (city, county, special districts), other state agencies

(SWRCB, RWQCB, Department of Forestry, Department of Water Resources), and Federal Corps of Engineers and USFWS

Illicit Connections and Discharges

- During routine maintenance of conveyance system and drainage structures field staff should look for evidence of illegal discharges or illicit connections:
  - Is there evidence of spills such as paints, discoloring, etc.
  - Are there any odors associated with the drainage system
  - Record locations of apparent illegal discharges/illicit connections
  - Track flows back to potential dischargers and conduct aboveground inspections. This can be done through visual inspection of up gradient manholes or alternate techniques including zinc chloride smoke testing, fluorometric dye testing, physical inspection testing, or television camera inspection.
  - Once the origin of flow is established, require illicit discharger to eliminate the discharge.
- Stencil storm drains, where applicable, to prevent illegal disposal of pollutants. Storm drain inlets should have messages such as "Dump No Waste Drains to Stream" stenciled next to them to warn against ignorant or intentional dumping of pollutants into the storm drainage system.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

Illegal Dumping

- Regularly inspect and clean up hot spots and other storm drainage areas where illegal dumping and disposal occurs.
- Establish a system for tracking incidents. The system should be designed to identify the following:
  - Illegal dumping hot spots
  - Types and quantities (in some cases) of wastes
  - Patterns in time of occurrence (time of day/night, month, or year)
  - Mode of dumping (abandoned containers, "midnight dumping" from moving vehicles, direct dumping of materials, accidents/spills)
  - Responsible parties
- Post "No Dumping" signs in problem areas with a phone number for reporting dumping and disposal. Signs should also indicate fines and penalties for illegal dumping.
- Refer to fact sheet SC-10 Non-Stormwater Discharges.

- The State Department of Fish and Game has a hotline for reporting violations called Cal TIP (1-800-952-5400). The phone number may be used to report any violation of a Fish and Game code (illegal dumping, poaching, etc.).
- The California Department of Toxic Substances Control's Waste Alert Hotline, 1-800-69TOXIC, can be used to report hazardous waste violations.

Training

- Train crews in proper maintenance activities, including record keeping and disposal.
- Only properly trained individuals are allowed to handle hazardous materials/wastes.
- Train municipal employees from all departments (public works, utilities, street cleaning, parks and recreation, industrial waste inspection, hazardous waste inspection, sewer maintenance) to recognize and report illegal dumping.
- Train municipal employees and educate businesses, contractors, and the general public in proper and consistent methods for disposal.
- Train municipal staff regarding non-stormwater discharges (See SC-10 Non-Stormwater Discharges).

Spill Response and Prevention

- Refer to SC-11, Prevention, Control & Cleanup
- Have spill cleanup materials readily available and in a known location.
- Cleanup spills immediately and use dry methods if possible.
- Properly dispose of spill cleanup material.

Other Considerations

- Cleanup activities may create a slight disturbance for local aquatic species. Access to items and material on private property may be limited. Trade-offs may exist between channel hydraulics and water quality/riparian habitat. If storm channels or basins are recognized as wetlands, many activities, including maintenance, may be subject to regulation and permitting.
- Storm drain flushing is most effective in small diameter pipes (36-inch diameter pipe or less, depending on water supply and sediment collection capacity). Other considerations associated with storm drain flushing may include the availability of a water source, finding a downstream area to collect sediments, liquid/sediment disposal, and disposal of flushed effluent to sanitary sewer may be prohibited in some areas.
- Regulations may include adoption of substantial penalties for illegal dumping and disposal.
- Municipal codes should include sections prohibiting the discharge of soil, debris, refuse, hazardous wastes, and other pollutants into the storm drain system.
- Private property access rights may be needed to track illegal discharges up gradient.

- Requirements of municipal ordinance authority for suspected source verification testing for illicit connections necessary for guaranteed rights of entry.

Requirements

Costs

- An aggressive catch basin cleaning program could require a significant capital and O&M budget. A careful study of cleaning effectiveness should be undertaken before increased cleaning is implemented. Catch basin cleaning costs are less expensive if vacuum street sweepers are available; cleaning catch basins manually can cost approximately twice as much as cleaning the basins with a vacuum attached to a sweeper.

- Methods used for illicit connection detection (smoke testing, dye testing, visual inspection, and flow monitoring) can be costly and time-consuming. Site-specific factors, such as the level of impervious area, the density and ages of buildings, and type of land use will determine the level of investigation necessary. Encouraging reporting of illicit discharges by employees can offset costs by saving expense on inspectors and directing resources more efficiently. Some programs have used funds available from "environmental fees" or special assessment districts to fund their illicit connection elimination programs.

Maintenance

- Two-person teams may be required to clean catch basins with vactor trucks.

- Identifying illicit discharges requires teams of at least two people (volunteers can be used), plus administrative personnel, depending on the complexity of the storm sewer system.

- Arrangements must be made for proper disposal of collected wastes.

- Requires technical staff to detect and investigate illegal dumping violations, and to coordinate public education.

Supplemental Information

Further Detail of the BMP

Storm Drain flushing

Sanitary sewer flushing is a common maintenance activity used to improve pipe hydraulics and to remove pollutants in sanitary sewer systems. The same principles that make sanitary sewer flushing effective can be used to flush storm drains. Flushing may be designed to hydraulically convey accumulated material to strategic locations, such as to an open channel, to another point where flushing will be initiated, or over to the sanitary sewer and on to the treatment facilities, thus preventing re-suspension and overflow of a portion of the solids during storm events. Flushing prevents "plug flow" discharges of concentrated pollutant loadings and sediments. The deposits can hinder the designed conveyance capacity of the storm drain system and potentially cause backwater conditions in severe cases of clogging.

Storm drain flushing usually takes place along segments of pipe with grades that are too flat to maintain adequate velocity to keep particles in suspension. An upstream manhole is selected to place an inflatable device that temporarily plugs the pipe. Further upstream, water is pumped into the line to create a flushing wave. When the upstream reach of pipe is sufficiently full to

cause a flushing wave, the inflated device is rapidly deflated with the assistance of a vacuum pump, releasing the backed up water and resulting in the cleaning of the storm drain segment.

To further reduce the impacts of stormwater pollution, a second inflatable device, placed well downstream, may be used to re-collect the water after the force of the flushing wave has dissipated. A pump may then be used to transfer the water and accumulated material to the sanitary sewer for treatment. In some cases, an interceptor structure may be more practical or required to re-collect the flushed waters.

It has been found that cleansing efficiency of periodic flush waves is dependent upon flush volume, flush discharge rate, sewer slope, sewer length, sewer flow rate, sewer diameter, and population density. As a rule of thumb, the length of line to be flushed should not exceed 700 feet. At this maximum recommended length, the percent removal efficiency ranges between 65-75 percent for organics and 55-65 percent for dry weather grit/inorganic material. The percent removal efficiency drops rapidly beyond that. Water is commonly supplied by a water truck, but fire hydrants can also supply water. To make the best use of water, it is recommended that reclaimed water be used or that fire hydrant line flushing coincide with storm drain flushing.

Flow Management

Flow management has been one of the principal motivations for designing urban stream corridors in the past. Such needs may or may not be compatible with the stormwater quality goals in the stream corridor.

Downstream flood peaks can be suppressed by reducing through flow velocity. This can be accomplished by reducing gradient with grade control structures or increasing roughness with boulders, dense vegetation, or complex banks forms. Reducing velocity correspondingly increases flood height, so all such measures have a natural association with floodplain open space. Flood elevations laterally adjacent to the stream can be lowered by increasing through flow velocity.

However, increasing velocity increases flooding downstream and inherently conflicts with channel stability and human safety. Where topography permits, another way to lower flood elevation is to lower the level of the floodway with drop structures into a large but subtly excavated bowl where flood flows we allowed to spread out.

Stream Corridor Planning

Urban streams receive and convey stormwater flows from developed or developing watersheds. Planning of stream corridors thus interacts with urban stormwater management programs. If local programs are intended to control or protect downstream environments by managing flows delivered to the channels, then it is logical that such programs should be supplemented by management of the materials, forms, and uses of the downstream riparian corridor. Any proposal for steam alteration or management should be investigated for its potential flow and stability effects on upstream, downstream, and laterally adjacent areas. The timing and rate of flow from various tributaries can combine in complex ways to alter flood hazards. Each section of channel is unique, influenced by its own distribution of roughness elements, management activities, and stream responses.

Flexibility to adapt to stream features and behaviors as they evolve must be included in stream reclamation planning. The amenity and ecology of streams may be enhanced through the landscape design options of 1) corridor reservation, 2) bank treatment, 3) geomorphic restoration, and 4) grade control.

Corridor reservation - Reserving stream corridors and valleys to accommodate natural stream meandering, aggradation, degradation, and over bank flows allows streams to find their own form and generate less ongoing erosion. In California, open stream corridors in recent urban developments have produced recreational open space, irrigation of streamside plantings, and the aesthetic amenity of flowing water.

Bank treatment - The use of armoring, vegetative cover, and flow deflection may be used to influence a channel's form, stability, and biotic habitat. To prevent bank erosion, armoring can be done with rigid construction materials, such as concrete, masonry, wood planks and logs, riprap, and gabions. Concrete linings have been criticized because of their lack of provision of biotic habitat. In contrast, riprap and gabions make relatively porous and flexible linings. Boulders, placed in the bed reduce velocity and erosive power.

Riparian vegetation can stabilize the banks of streams that are at or near a condition of equilibrium. Binding networks of roots increase bank shear strength. During flood flows, resilient vegetation is forced into erosion-inhibiting mats. The roughness of vegetation leads to lower velocity, further reducing erosive effects. Structural flow deflection can protect banks from erosion or alter fish habitat. By concentrating flow, a deflector causes a pool to be scoured in the bed.

Geomorphic restoration – Restoration refers to alteration of disturbed streams so their form and behavior emulate those of undisturbed streams. Natural meanders are retained, with grading to gentle slopes on the inside of curves to allow point bars and riffle-pool sequences to develop. Trees are retained to provide scenic quality, biotic productivity, and roots for bank stabilization, supplemented by plantings where necessary.

A restorative approach can be successful where the stream is already approaching equilibrium. However, if upstream urbanization continues new flow regimes will be generated that could disrupt the equilibrium of the treated system.

Grade Control - A grade control structure is a level shelf of a permanent material, such as stone, masonry, or concrete, over which stream water flows. A grade control structure is called a sill, weir, or drop structure, depending on the relation of its invert elevation to upstream and downstream channels.

A sill is installed at the preexisting channel bed elevation to prevent upstream migration of nick points. It establishes a firm base level below which the upstream channel can not erode.

A weir or check dam is installed with invert above the preexisting bed elevation. A weir raises the local base level of the stream and causes aggradation upstream. The gradient, velocity, and erosive potential of the stream channel are reduced. A drop structure lowers the downstream invert below its preexisting elevation, reducing downstream gradient and velocity. Weirs and drop structure control erosion by dissipating energy and reducing slope velocity.

When carefully applied, grade control structures can be highly versatile in establishing human and environmental benefits in stabilized channels. To be successful, application of grade control structures should be guided by analysis of the stream system both upstream and downstream from the area to he reclaimed.

Examples

The California Department of Water Resources began the Urban Stream Restoration Program in 1985. The program provides grant funds to municipalities and community groups to implement stream restoration projects. The projects reduce damages from streambank aid watershed instability arid floods while restoring streams' aesthetic, recreational, and fish and wildlife values.

In Buena Vista Park, upper floodway slopes are gentle and grassed to achieve continuity of usable park land across the channel of small boulders at the base of the slopes.

The San Diego River is a large, vegetative lined channel, which was planted in a variety of species to support riparian wildlife while stabilizing the steep banks of the floodway.

References and Resources

Ferguson, B.K. 1991. Urban Stream Reclamation, p. 324-322, Journal of Soil and Water Conservation.

Los Angeles County Stormwater Quality. Public Agency Activities Model Program. On-line: http://ladpw.org/wmd/npdes/public_TC.cfm

Model Urban Runoff Program: A How-To Guide for Developing Urban Runoff Programs for Small Municipalities. Prepared by City of Monterey, City of Santa Cruz, California Coastal Commission, Monterey Bay National Marine Sanctuary, Association of Monterey Bay Area Governments, Woodward-Clyde, Central Coast Regional Water Quality Control Board. July. 1998.

Orange County Stormwater Program
http://www.ocwatersheds.com/StormWater/swp_introduction.asp

Santa Clara Valley Urban Runoff Pollution Prevention Program. 1997 Urban Runoff Management Plan. September 1997, updated October 2000.

San Diego Stormwater Co-permittees Jurisdictional Urban Runoff Management Program (URMP) Municipal Activities Model Program Guidance. 2001. Project Clean Water. November.

United States Environmental Protection Agency (USEPA). 1999. Stormwater Management Fact Sheet Non-stormwater Discharges to Storm Sewers. EPA 832-F-99-022. Office of Water, Washington, D.C. September.

United States Environmental Protection Agency (USEPA). 1999. Stormwater O&M Fact Sheet Catch Basin Cleaning. EPA 832-F-99-011. Office of Water, Washington, D.C. September.

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Illegal Dumping Control. On line: http://www.epa.gov/npdes/menuofbmps/poll_7.htm

United States Environmental Protection Agency (USEPA). 2002. Pollution Prevention/Good Housekeeping for Municipal Operations Storm Drain System Cleaning. On line: http://www.epa.gov/npdes/menuofbmps/poll_16.htm

Efficient Irrigation SD-12



Design Objectives

- ☑ Maximize Infiltration
- ☑ Provide Retention
- ☑ Slow Runoff
- Minimize Impervious Land Coverage
- Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Irrigation water provided to landscaped areas may result in excess irrigation water being conveyed into stormwater drainage systems.

Approach

Project plan designs for development and redevelopment should include application methods of irrigation water that minimize runoff of excess irrigation water into the stormwater conveyance system.

Suitable Applications

Appropriate applications include residential, commercial and industrial areas planned for development or redevelopment. (Detached residential single-family homes are typically excluded from this requirement.)

Design Considerations

Designing New Installations

The following methods to reduce excessive irrigation runoff should be considered, and incorporated and implemented where determined applicable and feasible by the Permittee:

- Employ rain-triggered shutoff devices to prevent irrigation after precipitation.
- Design irrigation systems to each landscape area's specific water requirements.
- Include design featuring flow reducers or shutoff valves triggered by a pressure drop to control water loss in the event of broken sprinkler heads or lines.
- Implement landscape plans consistent with County or City water conservation resolutions, which may include provision of water sensors, programmable irrigation times (for short cycles), etc.

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

- Design timing and application methods of irrigation water to minimize the runoff of excess irrigation water into the storm water drainage system.
- Group plants with similar water requirements in order to reduce excess irrigation runoff and promote surface filtration. Choose plants with low irrigation requirements (for example, native or drought tolerant species). Consider design features such as:
  - Using mulches (such as wood chips or bar) in planter areas without ground cover to minimize sediment in runoff
  - Installing appropriate plant materials for the location, in accordance with amount of sunlight and climate, and use native plant materials where possible and/or as recommended by the landscape architect
  - Leaving a vegetative barrier along the property boundary and interior watercourses, to act as a pollutant filter, where appropriate and feasible
  - Choosing plants that minimize or eliminate the use of fertilizer or pesticides to sustain growth
- Employ other comparable, equally effective methods to reduce irrigation water runoff.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. The definition of " redevelopment" must be consulted to determine whether or not the requirements for new development apply to areas intended for redevelopment. If the definition applies, the steps outlined under "designing new installations" above should be followed.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Storm Drain Signage SD-13



Design Objectives

- Maximize Infiltration
- Provide Retention
- Slow Runoff
- Minimize Impervious Land Coverage
- ☑ Prohibit Dumping of Improper Materials
- Contain Pollutants
- Collect and Convey

Description

Waste materials dumped into storm drain inlets can have severe impacts on receiving and ground waters. Posting notices regarding discharge prohibitions at storm drain inlets can prevent waste dumping. Storm drain signs and stencils are highly visible source controls that are typically placed directly adjacent to storm drain inlets.

Approach

The stencil or affixed sign contains a brief statement that prohibits dumping of improper materials into the urban runoff conveyance system. Storm drain messages have become a popular method of alerting the public about the effects of and the prohibitions against waste disposal.

Suitable Applications

Stencils and signs alert the public to the destination of pollutants discharged to the storm drain. Signs are appropriate in residential, commercial, and industrial areas, as well as any other area where contributions or dumping to storm drains is likely.

Design Considerations

Storm drain message markers or placards are recommended at all storm drain inlets within the boundary of a development project. The marker should be placed in clear sight facing toward anyone approaching the inlet from either side. All storm drain inlet locations should be identified on the development site map.

Designing New Installations

The following methods should be considered for inclusion in the project design and show on project plans:

- Provide stenciling or labeling of all storm drain inlets and catch basins, constructed or modified, within the project area with prohibitive language. Examples include "NO DUMPING

CASQA
CALIFORNIA STORMWATER QUALITY ASSOCIATION

– DRAINS TO OCEAN" and/or other graphical icons to discourage illegal dumping.

- Post signs with prohibitive language and/or graphical icons, which prohibit illegal dumping at public access points along channels and creeks within the project area.

Note - Some local agencies have approved specific signage and/or storm drain message placards for use. Consult local agency stormwater staff to determine specific requirements for placard types and methods of application.

Redeveloping Existing Installations

Various jurisdictional stormwater management and mitigation plans (SUSMP, WQMP, etc.) define "redevelopment" in terms of amounts of additional impervious area, increases in gross floor area and/or exterior construction, and land disturbing activities with structural or impervious surfaces. If the project meets the definition of "redevelopment", then the requirements stated under " designing new installations" above should be included in all project design plans.

Additional Information

Maintenance Considerations

- Legibility of markers and signs should be maintained. If required by the agency with jurisdiction over the project, the owner/operator or homeowner's association should enter into a maintenance agreement with the agency or record a deed restriction upon the property title to maintain the legibility of placards or signs.

Placement

- Signage on top of curbs tends to weather and fade.

- Signage on face of curbs tends to be worn by contact with vehicle tires and sweeper brooms.

Supplemental Information

Examples

- Most MS4 programs have storm drain signage programs. Some MS4 programs will provide stencils, or arrange for volunteers to stencil storm drains as part of their outreach program.

Other Resources

A Manual for the Standard Urban Stormwater Mitigation Plan (SUSMP), Los Angeles County Department of Public Works, May 2002.

Model Standard Urban Storm Water Mitigation Plan (SUSMP) for San Diego County, Port of San Diego, and Cities in San Diego County, February 14, 2002.

Model Water Quality Management Plan (WQMP) for County of Orange, Orange County Flood Control District, and the Incorporated Cities of Orange County, Draft February 2003.

Ventura Countywide Technical Guidance Manual for Stormwater Quality Control Measures, July 2002.

Infiltration Basin TC-11



Maintenance Concerns, Objectives, and Goals

- Vector Control
- Clogged soil or outlet structures
- Vegetation/Landscape Maintenance
- Groundwater contamination
- Accumulation of metals
- Aesthetics

General Description

An infiltration basin is a shallow impoundment that is designed to infiltrate stormwater. Infiltration basins use the natural filtering ability of the soil to remove pollutants in stormwater runoff. Infiltration facilities store runoff until it gradually infiltrates into the soil and eventually into the water table. This practice has high pollutant removal efficiency and can also help recharge groundwater, thus helping to maintain low flows in stream systems. Infiltration basins can be challenging to apply on many sites, however, because of soils requirements. In addition, some studies have shown relatively high failure rates compared with other management practices.

Targeted Constituents

✓	Sediment	■
✓	Nutrients	■
✓	Trash	■
✓	Metals	■
✓	Bacteria	■
✓	Oil and Grease	■
✓	Organics	■
✓	Oxygen Demanding	■

Legend ***(Removal Effectiveness)***

● Low ■ High

▲ Medium

Inspection/Maintenance Considerations

Infiltration basins perform better in well-drained permeable soils. Infiltration basins in areas of low permeability can clog within a couple years, and require more frequent inspections and maintenance. The use and regular maintenance of pretreatment BMPs will significantly minimize maintenance requirements for the basin. Spill response procedures and controls should be implemented to prevent spills from reaching the infiltration system.

Scarification or other disturbance should only be performed when there are actual signs of clogging or significant loss of infiltrative capacity, rather than on a routine basis. Always remove deposited sediments before scarification, and use a hand-guided rotary tiller, if possible, or a disc harrow pulled by a light tractor. This BMP may require groundwater monitoring. Basins cannot be put into operation until the upstream tributary area stabilized.

CASQA California Stormwater Quality Association is

TC-11 Infiltration Basin

Clogged infiltration basins with surface standing water can become a breeding area for mosquitoes and midges. Maintenance efforts associated with infiltration basins should include frequent inspections to ensure that water infiltrates into the subsurface completely (recommended infiltration rate of 72 hours or less) and that vegetation is carefully managed to prevent creating mosquito and other vector habitats.

Inspection Activities	Suggested Frequency
■ Observe drain time for a storm after completion or modification of the facility to confirm that the desired drain time has been obtained. ■ Newly established vegetation should be inspected several times to determine if any landscape maintenance (reseeding, irrigation, etc.) is necessary.	Post construction
■ Inspect for the following issues: differential accumulation of sediment, signs of wetness or damage to structures, erosion of the basin floor, dead or dying grass on the bottom, condition of riprap, drain time, signs of petroleum hydrocarbon contamination, standing water, trash and debris, sediment accumulation, slope stability, pretreatment device condition	Semi-annual and after extreme events
Maintenance Activities	**Suggested Frequency**
■ Factors responsible for clogging should be repaired immediately. ■ Weed once monthly during the first two growing seasons.	Post construction
■ Stabilize eroded banks. ■ Repair undercut and eroded areas at inflow and outflow structures. ■ Maintain access to the basin for regular maintenance activities. ■ Mow as appropriate for vegetative cover species. ■ Monitor health of vegetation and replace as necessary. ■ Control mosquitoes as necessary. ■ Remove litter and debris from infiltration basin area as required.	Standard maintenance (as needed)
■ Mow and remove grass clippings, litter, and debris. ■ Trim vegetation at the beginning and end of the wet season to prevent establishment of woody vegetation and for aesthetic and vector reasons. ■ Replant eroded or barren spots to prevent erosion and accumulation of sediment.	Semi-annual
■ Scrape bottom and remove sediment when accumulated sediment reduces original infiltration rate by 25-50%. Restore original cross-section and infiltration rate. Properly dispose of sediment. ■ Seed or sod to restore ground cover. ■ Disc or otherwise aerate bottom. ■ Dethatch basin bottom.	3-5 year maintenance

Additional Information

In most cases, sediment from an infiltration basin does not contain toxins at levels posing a hazardous concern. Studies to date indicate that pond sediments are generally below toxicity limits and can be safely landfilled or disposed onsite. Onsite sediment disposal is always preferable (if local authorities permit) as long as the sediments are deposited away from the shoreline to prevent their reentry into the pond and away from recreation areas, where they could possibly be ingested by young children. Sediments should be tested for toxicants in compliance with current disposal requirements if land uses in the catchment include commercial or industrial zones, or if visual or olfactory indications of pollution are noticed. Sediments containing high levels of pollutants should be disposed of properly.

Light equipment, which will not compact the underlying soil, should be used to remove the top layer of sediment. The remaining soil should be tilled and revegetated as soon as possible.

Sediment removal within the basin should be performed when the sediment is dry enough so that it is cracked and readily separates from the basin floor. This also prevents smearing of the basin floor.

References

King County, Stormwater Pollution Control Manual – Best Management Practices for Businesses. July, 1995 Available at: ftp://dnr metrokc.gov/wlr/dss/spcm/SPCM.HTM

Metropolitan Council, Urban Small Sites Best Management Practices Manual. Available at: http://www.metrocouncil.org/environment/Watershed/BMP/manual.htm

U.S. Environmental Protection Agency, Post-Construction Stormwater Management in New Development & Redevelopment BMP Factsheets. Available at: http://www.cfpub.epa.gov/npdes/stormwater/menuofbmps/bmp_files.cfm

Ventura Countywide Stormwater Quality Management Program, Technical Guidance Manual for Stormwater Quality Control Measures. July, 2002.

Appendix E

Soils Report

Sladden Engineering

45090 Golf Center Parkway, Suite F, Indio, CA. 92201 (760) 863-0713 Fax (760) 863-0847
6782 Stanton Avenue, Suite C, Buena Park, CA. 90621 (714) 523-0952 Fax (714) 523-1369
450 Egan Avenue, Beaumont, CA. 92223 (951) 845-7743 Fax (951) 845-8863
www.sladdenengineering.com

June 29, 2022

Project No. 544-21557
22-06-375

LA World Construction
2029 Century Park East, Suite 400
Century City, California 90067

Project: Proposed Green Day Village
APN 657-280-003
Palm Drive
Desert Hot Springs, California

Subject: Percolation/Infiltration Testing for On-Site Storm Water Management

In accordance with your request, we have performed percolation testing on the subject site to evaluate the infiltration potential of the near surface soil to assist in storm water management system design. It is our understanding that on-site storm water retention including infiltration is planned for the proposed mixed-use development.

Percolation testing was performed on June 15, 2022 within two (2) shallow test holes excavated on the site. Testing was performed at depths of approximately 5 and 10 feet below existing grade. The approximate locations of the test holes are presented on the attached Percolation Test Location Plan (Figure 3). Testing was performed by placing water within the test bores and recording the drop in the water surface with time. Testing was performed in general accordance with the *United States Bureau of Reclamation (BOR) Procedure 7300-89 (1999)*. Test results are summarized in the following table.

PERCOLATION TEST RESULTS

Test No.	Depth (Ft)	Percolation Rate (in/hr)	Infiltration Rate (in/hr)
P-1	10.00	120	20
P-2	5.00	120	20

The percolation rates determined represent the ultimate field rates that do not include a safety factor. The corresponding infiltration rates were calculated using the Porchet Method. An appropriate safety factor should be incorporated into design. The favorable infiltration rates are considered representative of the sandy soil throughout the site..

Groundwater was not encountered to the maximum explored depth of approximately 51.5 feet bgs during our geotechnical investigation. Based upon our field investigation it is our opinion that groundwater should not be factor in stormwater retention/infiltration system design.

If you have any questions regarding this memo, please contact the undersigned.

Respectfully submitted,
SLADDEN ENGINEERING

Matthew J. Cohrt
Principal Geologist

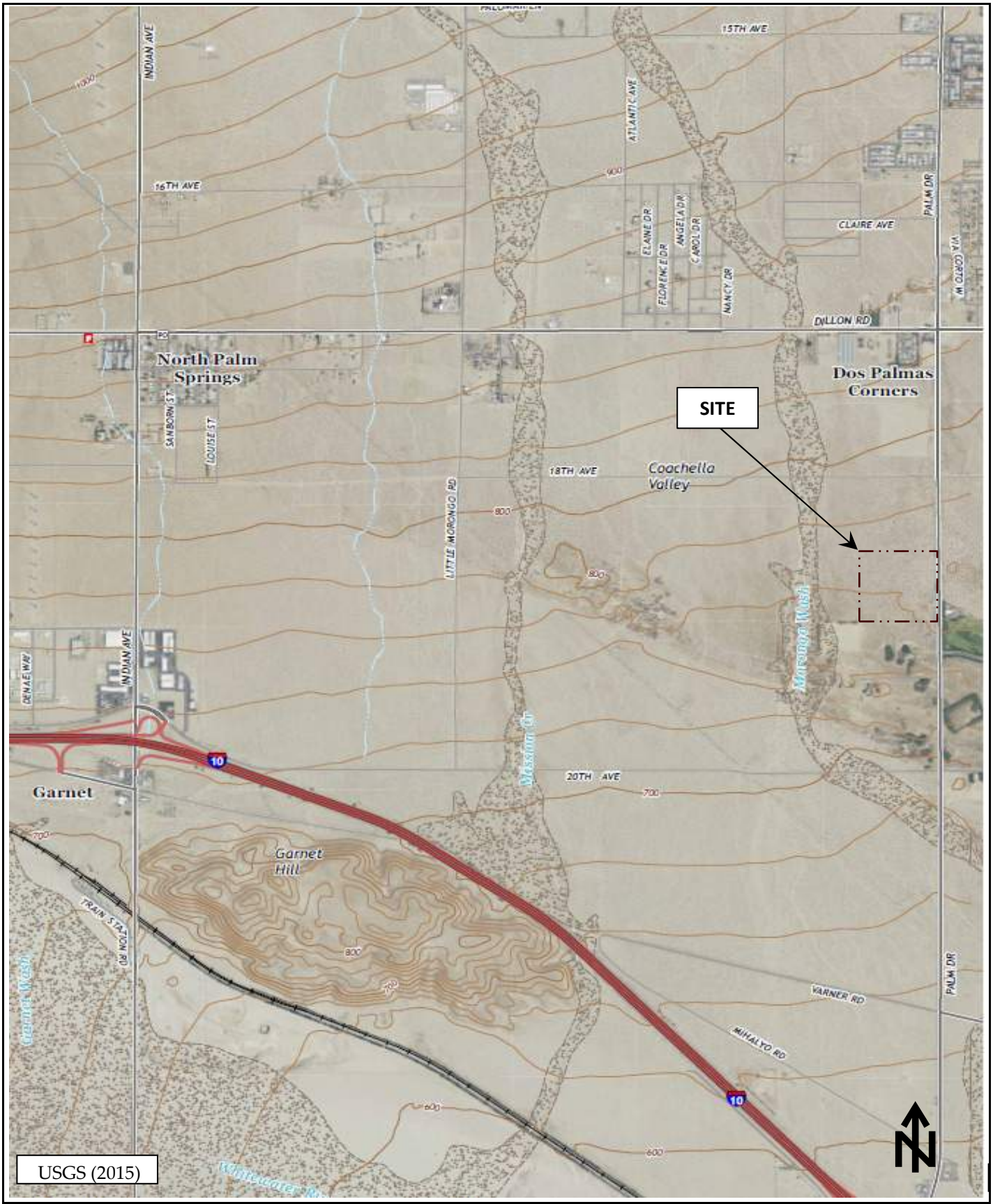
CERTIFIED ENGINEERING GEOLOGIST
MATTHEW J. COHRT
2634
STATE OF CALIFORNIA

Brett L. Anderson
Principal Engineer

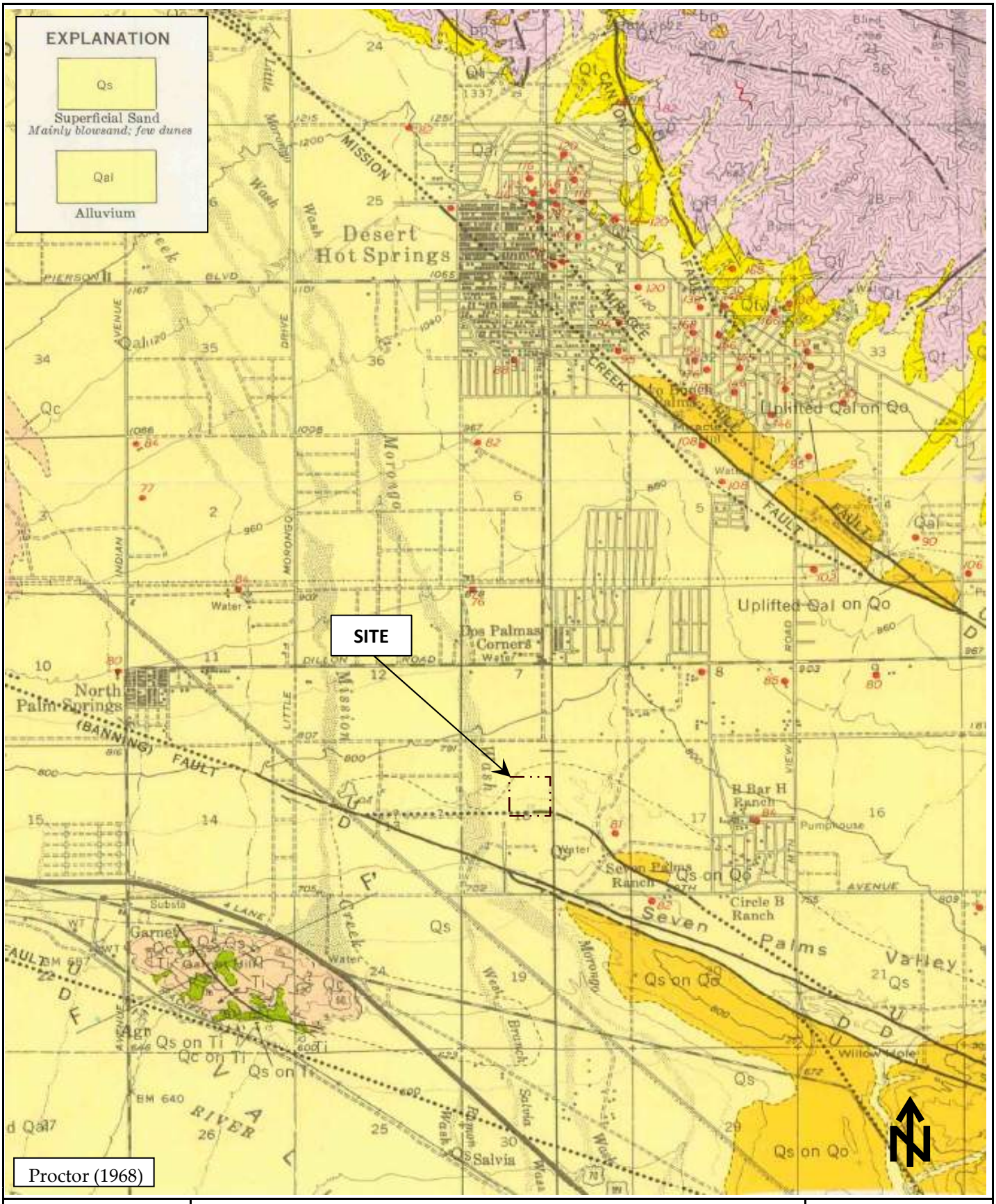
REGISTERED PROFESSIONAL ENGINEER
BRETT L. ANDERSON
No. C45389
CIVIL ENGINEERING
STATE OF CALIFORNIA

Copies: 4/Addressee

SITE LOCATION MAP
REGIONAL GEOLOGIC MAP
PERCOLATION TEST LOCATION PLAN



Sladden Engineering	SITE LOCATION MAP	FIGURE 1
	Project Number: 544-21557	
	Report Number: 22-06-375	
	Date: June 29, 2022	



Sladden Engineering	REGIONAL GEOLOGIC MAP	FIGURE 2
	Project Number: 544-21557	
	Report Number: 22-06-375	
	Date: June 29, 2022	



LEGEND

P-2 Percolation Test Location

Sladden Engineering	PERCOLATION TEST LOCATION PLAN	FIGURE 3
	Project Number: 544-21557	
	Report Number: 22-06-375	
	Date: June 29, 2022	

BORELOGS

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	5/17/2022
Elevation:	750 FT. MSL	Boring No:	BH6/P-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
	3 3 5						0–12		Silty Sand to Sand (SM/SW); light yellowish brown, dry, fine- to coarse-grained
	8 14 18								
							12–50		Terminated at ~11.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.

Completion Notes:

PROPOSED GREEN DAY VILLAGE
PALM DRIVE, DESERT HOT SPRINGS; APN 657-280-003

Project No:	544-21557	Page	1
Report No:	22-06-375		

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	5/17/2022
Elevation:	750 FT. MSL	Boring No:	P-2

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand to Sand (SM/SW); light yellowish brown, dry, fine- to coarse-grained
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED GREEN DAY VILLAGE
PALM DRIVE, DESERT HOT SPRINGS; APN 657-280-003

Project No:	544-21557	Page	2
Report No:	22-06-375		

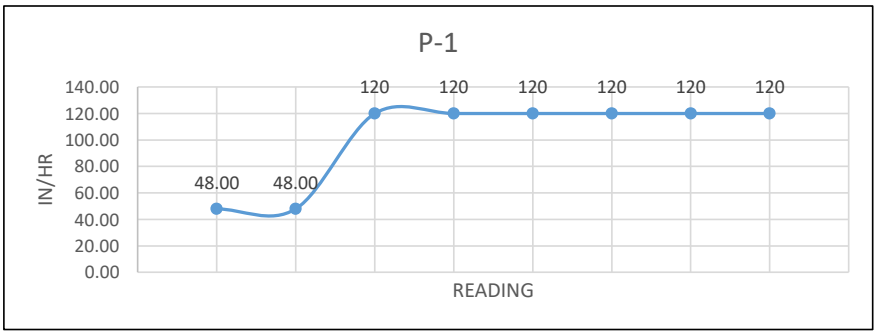
RIVERSIDE COUNTY STORMWATER TESTING DATA SHEETS

STORMWATER PERCOLATION SHEET (LESS THAN 10 FT)

Project:	APN 657-280-003	Depth (ft):	10.00
Job No. :	544-21557	USCS Soil Class:	SM
Date:	6/15/2022	Sandy Soil:	R.F.
Test Hole #:	P-1	Tested By:	R.F.

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
A	25.00	10.00	20	0	20	48.00
B	25.00	10.00	20	0	20	48.00

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
1	10.00	10.00	20	0	20	120
2	10.00	10.00	20	0	20	120
3	10.00	10.00	20	0	20	120
4	10.00	10.00	20	0	20	120
5	10.00	10.00	20	0	20	120
6	10.00	10.00	20	0	20	120



PERCOLATION RATE CONVERSION (PORCHET METHOD)

$$I_{t=} \quad \frac{\Delta H\ 60\ R}{\Delta t(r+2H_{avg})}$$

Δt =	10.00
D_f =	120.00
r =	4.00
D_0 =	100
D_t =	120.00
H_0 =	20
H_f =	0
ΔH =	20.00
H_{avg} =	10.00

Δt (minutes)
D_f (Final Depth to water)
r (hole radius in inches)
D_0 (Initial Depth to water)
D_t (Total Depth of test hole)
H_0 (initial height of water at selected time interval)

$$H_0 = D_t - D_0$$

H_f (final height of water at the selected time interval)

$$H_f = D_t - D_f$$

ΔH (change in head over the time interval)

$$\Delta H = H_0 - H_f$$

H_{avg} (average head height over the time interval)

$$H_{avg} = (H_0 + H_f)/2$$

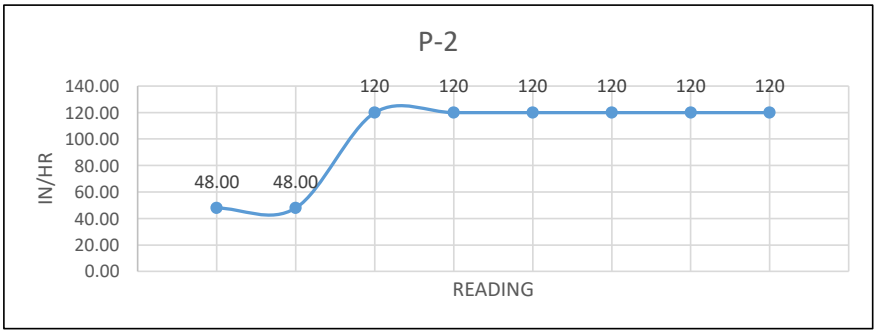
Field Rate:	120 in/hr
Infiltration Rate:	20.00 in/hr

STORMWATER PERCOLATION SHEET (LESS THAN 10 FT)

Project:	APN 657-280-003	Depth (ft):	5.00
Job No. :	544-21557	USCS Soil Class:	SM
Date:	6/15/2022	Sandy Soil:	R.F.
Test Hole #:	P-2	Tested By:	R.F.

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
A	25.00	5.00	20	0	20	48.00
B	25.00	5.00	20	0	20	48.00

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
1	10.00	5.00	20	0	20	120
2	10.00	5.00	20	0	20	120
3	10.00	5.00	20	0	20	120
4	10.00	5.00	20	0	20	120
5	10.00	5.00	20	0	20	120
6	10.00	5.00	20	0	20	120



PERCOLATION RATE CONVERSION (PORCHET METHOD)

$$I_{t=} \quad \frac{\Delta H\ 60\ R}{\Delta t(r+2H_{avg})}$$

Δt =	10.00
D_f =	60.00
r =	4.00
D_0 =	40
D_t =	60.00
H_0 =	20
H_f =	0
ΔH =	20.00
H_{avg} =	10.00

Δt (minutes)
D_f (Final Depth to water)
r (hole radius in inches)
D_0 (Initial Depth to water)
D_t (Total Depth of test hole)
H_0 (initial height of water at selected time interval)

$$H_0 = D_t - D_0$$

H_f (final height of water at the selected time interval)

$$H_f = D_t - D_f$$

ΔH (change in head over the time interval)

$$\Delta H = H_0 - H_f$$

H_{avg} (average head height over the time interval)

$$H_{avg} = (H_0 + H_f)/2$$

Field Rate:	120 in/hr
Infiltration Rate:	20.00 in/hr

Appendix F

Structural BMP and/or Retention Facility Sizing Calculations
and Design Details

Per Section V.1 of this report:
Since the project will be required to retain urban runoff onsite in conformance with local ordinance (see Table 6, Permittees Requiring Onsite Retention of Stormwater, of the Whitewater River Region WQMP), Site Design and Treatment Control BMPs are not required. Design Calculations for the runoff retention are contained in the project Drainage Study.

Appendix G

AGREEMENTS – CC&RS, COVENANT AND AGREEMENTS, BMP MAINTENANCE AGREEMENTS AND/OR OTHER MECHANISMS FOR ENSURING ONGOING OPERATION, MAINTENANCE, FUNDING AND TRANSFER OF REQUIREMENTS FOR THIS PROJECT-SPECIFIC WQMP

TO BE PROVIDED IN FINAL WQMP

Appendix H

PHASE 1 ENVIRONMENTAL SITE ASSESSMENT – SUMMARY OF SITE REMEDIATION CONDUCTED AND USE RESTRICTIONS

Appendix I

PROJECT-SPECIFIC WQMP SUMMARY DATA FORM

Project-Specific WQMP Summary Data Form

Applicant Information	
Name and Title	Prasad Kasturi, P.E. Project Manager
Company	ASAP Consulting
Phone	951 254 3536
Email	Asapcpnsulting2017@gmail.com

Project Information	
Project Name (as shown on project application/project-specific WQMP)	Green Day Village
Street Address	N/A
Nearest Cross Streets	Along Palm Ave across Desert Dunes Golf Course
Municipality (City or Unincorporated County)	Desert Hot Springs
Zip Code	92240
Tract Number(s) and/or Assessor Parcel Number(s)	APN: 657-280-003
Other (other information to help identify location of project)	

Indicate type of project.	**Priority Development Projects (Use an "X" in cell preceding project type):**
	SF hillside residence; impervious area ≥ 10,000 sq. ft.; Slope ≥ 25%
	SF hillside residence; impervious area ≥ 10,000 sq. ft.; Slope ≥ 10% & erosive soils
x	Commercial or Industrial ≥ 100,000 sq. ft.
	Automotive repair shop
	Retail Gasoline Outlet disturbing > 5,000 sq. ft.
x	Restaurant disturbing > 5,000 sq. ft.
x	Home subdivision ≥ 10 housing units
x	Parking lot ≥ 5,000 sq. ft. or ≥ 25 parking spaces

Date Project-Specific WQMP Submitted	
Size of Project Area (nearest 0.1 acre)	36.1 Acres
Will the project replace more than 50% of the impervious surfaces on an existing developed site?	No
Project Area managed with LID/Site Design BMPs (nearest 0.1 acre)	36.1 Acres
Are Treatment Control BMPs required?	No
Is the project subject to onsite retention by ordinance or policy?	Yes
Did the project meet the 100% LID/Site Design Measurable Goal?	Yes
Name of the entity that will implement, operate, and maintain the post-construction BMPs	LA World Construction
Contact Name	Avraham Farzan
Street or Mailing Address	2029 Century Park East #400
City	Century City CA
Zip Code	90067
Phone	702-460-3650

Space Below for Use by City/County Staff Only	
Preceding Information Verified by (consistent with information in project-specific WQMP)	**Name:** **Date:**
Date Project-Specific WQMP Approved:	
Data Entered by	**Name:** **Date:**
Other Comments	

APPENDIX G2

DRAINAGE STUDY

PRELIMINARY DRAINAGE STUDY FOR TENTATIVE PARCEL MAP NO. TBD GREEN DAY VILLAGE PROJECT CITY OF DESERT HOT SPRINGS

Date: July 8, 2022

Prepared for:
LA World Construction
2029 Century Park East #400
Century City CA 90067

Revision History	
Date	Comment

Prepared by:
ASAP Consulting
6533 Cattleman Drive
Eastvale CA 92880

Engineer of Work/ Contact Person:
Prasad Kasturi, P.E.
Phone: 951-234-3435

SECTION 1 – INTRODUCTION

1.1 BACKGROUND

ASAP Consulting has been retained by LA World Construction to prepare Entitlement engineering for a new Residential/Commercial development known as Green Day Village, Tentative Parcel Map No. XXXXX with parking lot improvements and proposed private streets which requires a drainage report to show how storm water runoff from the 100 year storm shall be handled on-site for proper storm water handling and safety to the general public.

The project site is located in the City of Desert Hot Springs, California along Palm Drive across the Desert Dunes Golf Course with APN 657-280-003 and approximately 38.34 acres. Figure 1 shows the general vicinity of the project location.

The site is vacant and undeveloped and currently lies within a FEMA mapped flood plain Zone AO, Depth 3 foot. Existing land cover consists mostly of desert shrubbery and blow sand. There are no existing utilities on-site but will be designed and connected to the proposed wet utilities proposed in Palm Drive along the project frontage and storm water infrastructure onsite will discharge to onsite storm water basins for infiltration.

1.2 OBJECTIVE

1.) The objective of this drainage study is to determine the 100-year onsite discharges in accordance with the criteria and procedures described in the Riverside County Flood Control & Water Conservation District (RCFCD&WCD) Hydrology Manual. The included calculations have been prepared so as to show the required storage volume for on-site retention.

2.) As of June 15, 2009, developers must comply with the Colorado River Basin Regional Water Quality Control Board (CRBRWCB) requiring the preparation, approval, and implementation of a project-specific WQMP for discretionary New Developments and Redevelopment projects that fall into four (4) of the eight (8) Priority Development Project categories. This project falls into Category 3; “Commercial or Industrial ≥ 100,000 sq. ft., Category 6; “Restaurant disturbing > 5,000 sq. ft., Category 7; “Home subdivision ≥ 10 housing units, and Category 8; “Parking lots of 5,000 square feet or more of impervious surface exposed to storm water”. A separate submittal will be made for the Final project-specific WQMP.

SECTION 2 – HYDROLOGY

2.1 APPROACH AND METHODOLOGY

The hydrologic analysis described in this report was performed in accordance with the criteria and procedures outlined in the Riverside County Flood Control and Water Conservation District Hydrology Manual dated April 1978, referred to hereafter as “Hydrology Manual”.

The websoil survey (NRCS) Soil Map, shows the site lies entirely within hydrologic soil type “A”. A copy of the report is included in the appendix.

Precipitation data used in this study was taken from NOAA atlas 14 precipitation data at the site locations and a copy of that is included in the appendix as well.

The developed site will consist lot of impervious area and were analyzed with appropriate runoff coefficients for the residential and commercial land uses of the project. See RCFC&WCD hydrology manual E Plates included in Appendix A.

The design of the retention basins and other facilities as required in this drainage study shall be designed and installed per City of Desert Hot Springs and Riverside County Hydrology Manual requirements.

2.2 RATIONAL METHOD HYDROLOGY RESULTS

The peak 100-year discharges will be calculated using the rational method, as prescribed by the RCFC&WCD Hydrology Manual. Detailed calculations will be provided in the next submittal. For entitlements, unit hydrograph calculations are provided to make sure the storm water basins are sized adequately to store the 100-year storm runoff.

2.3 STORAGE VOLUMES

The project is required to retain 100% of the Q100 storm event onsite. A spreadsheet based on the Shortcut Method Synthetic Unit Hydrograph approach as prescribed by the RCFC&WCD Hydrology Manual has been utilized to perform the calculations. Basin storage capacity is modeled based on manual integration of the basin area at 1 foot contour intervals. Rainfall input data for the 100 year, 3, 6, and 24 hour storms is input per said Hydrology Manual. Basin Inflow is modeled in 5 minute intervals for the 3 and 6 hour storms, and 15 minute intervals for the 24 hour storm, based on the design storm unit hydrographs presented in the manual.

The full calculations can be found in the Synthetic Unit Hydrograph Calculations Section of this Report. A brief summary is provided below:

Basin Name: Basin “A”
Top (WSE): 347.27
Depth: 4 Feet
Area @ top: 46,870 sq ft
Available Volume: 153,579 Cu Ft
Required Flood Volume: 117,655 Cu Ft
100 Year Water Surface: 3 Hour: 346.88 6 Hour: 347.27 24 Hour: 346.57

Basin Name: Basin “B”
Top (WSE): 349.99
Depth: 4 feet
Area @ top: 2,200 sq ft
Available Volume: 7,038 Cu Ft
Required Flood Volume: 5,979 Cu Ft
100 Year Water Surface: 3 Hour: 349.99 6 Hour: 349.82 24 Hour: 349.74

Basin Name: Basin “C”
Top (WSE): 362.74
Depth: 4 foot
Area @ top: 2,200 sq ft
Available Volume: 15,446 Cu Ft
Required Flood Volume: 8,559 Cu Ft
100 Year Water Surface: 3 Hour: 362.56 6 Hour: 362.69 24 Hour: 362.74

Basin Name: Basin “D”
Top (WSE): 356.57
Depth: 5 feet
Area @ top: 6,000 sq ft
Available Volume: 43,956 Cu Ft
Required Flood Volume: 28,240 Cu Ft
100 Year Water Surface: 3 Hour: 356.12 6 Hour: 356.34 24 Hour: 356.57

Basin Name: Basin “E”
Top (WSE): 349.13
Depth: 5 feet
Area @ top: 6,000 sq ft
Available Volume: 44,842 Cu Ft
Required Flood Volume: 25,623 Cu Ft
100 Year Water Surface: 3 Hour: 248.82 6 Hour: 348.99 24 Hour: 349.13

2.4 DEVELOPMENT TYPE

The proposed development is based upon residential and commercial land use.

2.5 DRAINAGE AREA AND FLOW PATTERNS

The proposed development provides for 5 different retention locations on the site. Therefore, the proposed site grading contains a series of high points and low point collection locations carefully planned to proportionately collect and convey runoff to different portions of the site. Please see the Exhibit “A” (Hydrology map) for the Synthetic Unit Hydrograph Calculations as they clearly detail the various subareas and collection systems to be employed.

2.6 MANNING’S EQUATION “N” VALUES

Manning’s “N” values for asphalt with a smooth texture are typically taken as 0.015. N values for troweled finished Concrete Gutter are typically taken as 0.013. It was considered appropriate to utilize a manning’s value of 0.013 for all curb/gutter/pavement cross sections.

SECTION 3 – CONCLUSION

Methodology used in this study is in compliance with the Riverside County Flood Control and Water Conservation District criteria.

The Hydrology report contained herein does not account for any off-site runoff entering and being stored on-site. At the date of the preparation of this Preliminary Hydrology Report, upstream storm water mitigation measures are being prepared to drastically reduce the storm flows coming from the north which, may have an impact on the project site. As part of the upstream measures, a storm water channel is proposed along the north and west property lines to divert any offsite storm water impacting the site.

The pad and finish floor elevations that are shown on the Preliminary Grading plans which is also part of this report may need to be raised or lowered once the upstream mitigations have been conditionally approved and off-site storm water runoff flows can be modeled so that the final design will mitigate the off-site flows.

There are no anticipated negative downstream or upstream impacts.

SECTION 4 – REFERENCES

1. Riverside County Flood Control and Water Conservation District Hydrology Manual, 1978.
2. City of Desert Hot Springs Standard Details and Specifications
3. Civil Design – Rational Method calculation software
4. Hydraflow Express Extension for Civil 3D, Hydraulic sizing/calculation program

VICINITY MAP



VICINITY MAP

SYNTHETIC UNIT HYDROGRAPH CALCULATIONS

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN A		
10	AREA DESIGNATION	SUBAREAS A		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE	24.88		
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN	1.46		
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	52%		
27				
28	LENGTH OF WATERCOURSE (L)	1926		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	1400		
30				
31	ELEVATION OF HEADWATER	363.44		
32	ELEVATION OF CONCENTRATION POINT	345		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		344	28168	
45		345	32805	
46		346	37469	
47		347	42157	
48		348	46870	
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN A
[2] AREA DESIGNATION	SUBAREAS A
[3] AREA - ACRES	26.340
[4] L-FEET	1926
[5] L-MILES	0.365
[6] La-FEET	1400
[7] La-MILES	0.265
[8] ELEVATION OF HEADWATER	363.44
[9] ELEVATION OF CONCENTRATION POINT	345
[10] H-FEET	18.44
[11] S-FEET/MILE	50.6
[12] S^0.5	7.11
[13] L*LCA/S^0.5	0.01360
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.070
[16] LAG TIME-MINUTES	4.22
[17] 25% OF LAG-MINUTES	1.05
[18] 40% OF LAG-MINUTES	1.69
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	1.63

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	26.340	1.00	2.42	3.13	26.340	1.00	3.13	5.06	26.340	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	26.34	SUM [7]	2.42	SUM [9]	26.34	SUM [11]	3.13	SUM [13]	26.34	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.25	1.61	2.06
FLOOD VOLUME	(cu-ft)	119,267	153,579	196,746
	(acre-ft)	2.74	3.53	4.52
REQUIRED STORAGE	(cu-ft)	102,270	117,655	89,748
	(acre-ft)	2.35	2.70	2.06
PEAK FLOW	(cfs)	51.68	44.36	8.62
MAXIMUM WSEL	(ft)	346.88	347.27	346.57

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN A
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
	COMMERCIAL			90%	0.00	0.00	0.000	0.0000
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
A	SF - 1/4 ACRE	32	0.74	50%	0.41	24.88	0.945	0.3844
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
	MF - APARTMENTS			80%	0.00	0.00	0.000	0.0000
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
A	RETENTION BASINS	44	0.63	0%	0.63	1.46	0.055	0.0349
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	26.34	SUM	0.4194

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.209680334

C= 0.00388

Ft=C(24-(T/60))^1.55 = 0.00388 (24-(T/60))^1.55 + 0.21 in/hr

LOW LOSS RATE (80-90 PERCENT) = 52%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN A

BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	26.34
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	4.22
UNIT TIME-PERCENT OF LAG	118.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.42
CONSTANT LOSS RATE-in/hr	0.42
LOW LOSS RATE - PERCENT	52%

TOTAL PERCOLATION RATE (cfs) 1.63 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.42	0.20	0.180	4.75	937.07
2	10	0.17	1.3	0.378	0.42	0.20	0.180	4.75	937.07
3	15	0.25	1.1	0.319	0.42	0.17	0.153	4.02	717.77
4	20	0.33	1.5	0.436	0.42	0.23	0.016	0.43	0.00
5	25	0.42	1.5	0.436	0.42	0.23	0.016	0.43	0.00
6	30	0.50	1.8	0.523	0.42	0.27	0.103	2.72	328.38
7	35	0.58	1.5	0.436	0.42	0.23	0.016	0.43	0.00
8	40	0.67	1.8	0.523	0.42	0.27	0.103	2.72	328.38
9	45	0.75	1.8	0.523	0.42	0.27	0.103	2.72	328.38
10	50	0.83	1.5	0.436	0.42	0.23	0.016	0.43	0.00
11	55	0.92	1.6	0.465	0.42	0.24	0.045	1.19	0.00
12	60	1.00	1.8	0.523	0.42	0.27	0.103	2.72	328.38
13	65	1.08	2.2	0.639	0.42	0.33	0.220	5.78	1246.27
14	70	1.17	2.2	0.639	0.42	0.33	0.220	5.78	1246.27
15	75	1.25	2.2	0.639	0.42	0.33	0.220	5.78	1246.27
16	80	1.33	2.0	0.581	0.42	0.30	0.161	4.25	787.33
17	85	1.42	2.6	0.755	0.42	0.39	0.336	8.84	2164.17
18	90	1.50	2.7	0.784	0.42	0.41	0.365	9.61	2393.64
19	95	1.58	2.4	0.697	0.42	0.36	0.278	7.31	1705.22
20	100	1.67	2.7	0.784	0.42	0.41	0.365	9.61	2393.64
21	105	1.75	3.3	0.958	0.42	0.50	0.539	14.20	3770.49
22	110	1.83	3.1	0.900	0.42	0.47	0.481	12.67	3311.54
23	115	1.92	2.9	0.842	0.42	0.44	0.423	11.14	2852.59
24	120	2.00	3.0	0.871	0.42	0.45	0.452	11.90	3082.07
25	125	2.08	3.1	0.900	0.42	0.47	0.481	12.67	3311.54
26	130	2.17	4.2	1.220	0.42	0.64	0.800	21.08	5835.76
27	135	2.25	5.0	1.452	0.42	0.76	1.033	27.20	7671.55
28	140	2.33	3.5	1.016	0.42	0.53	0.597	15.73	4229.44
29	145	2.42	6.8	1.975	0.42	1.03	1.555	40.97	11802.08
30	150	2.50	7.3	2.120	0.42	1.11	1.701	44.79	12949.45
31	155	2.58	8.2	2.381	0.42	1.24	1.962	51.68	15014.72
32	160	2.67	5.9	1.713	0.42	0.89	1.294	34.08	9736.81
33	165	2.75	2.0	0.581	0.42	0.30	0.161	4.25	787.33
34	170	2.83	1.8	0.523	0.42	0.27	0.103	2.72	328.38
35	175	2.92	1.8	0.523	0.42	0.27	0.103	2.72	328.38
36	180	3.00	0.6	0.174	0.42	0.09	0.083	2.19	169.53
							14.968		102269.90

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.25
FLOOD VOLUME (acft)	2.74
FLOOD VOLUME (cuft)	119266.53
REQUIRED STORAGE (acft)	2.35
REQUIRED STORAGE (cuft)	102269.90
PEAK FLOW RATE (cfs)	51.68

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN A BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	26.34		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	4.22		
UNIT TIME-PERCENT OF LAG	118.5		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.419		
LOW LOSS RATE - PERCENT	52%	TOTAL PERCOLATION RATE (cfs)	1.63 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.188	0.42	0.10	0.09	2.36	220.73
2	10	0.17	0.6	0.225	0.42	0.12	0.11	2.84	362.55
3	15	0.25	0.6	0.225	0.42	0.12	0.11	2.84	362.55
4	20	0.33	0.6	0.225	0.42	0.12	0.11	2.84	362.55
5	25	0.42	0.6	0.225	0.42	0.12	0.11	2.84	362.55
6	30	0.50	0.7	0.263	0.42	0.14	0.13	3.31	504.37
7	35	0.58	0.7	0.263	0.42	0.14	0.13	3.31	504.37
8	40	0.67	0.7	0.263	0.42	0.14	0.13	3.31	504.37
9	45	0.75	0.7	0.263	0.42	0.14	0.13	3.31	504.37
10	50	0.83	0.7	0.263	0.42	0.14	0.13	3.31	504.37
11	55	0.92	0.7	0.263	0.42	0.14	0.13	3.31	504.37
12	60	1.00	0.8	0.300	0.42	0.16	0.14	3.78	646.18
13	65	1.08	0.8	0.300	0.42	0.16	0.14	3.78	646.18
14	70	1.17	0.8	0.300	0.42	0.16	0.14	3.78	646.18
15	75	1.25	0.8	0.300	0.42	0.16	0.14	3.78	646.18
16	80	1.33	0.8	0.300	0.42	0.16	0.14	3.78	646.18
17	85	1.42	0.8	0.300	0.42	0.16	0.14	3.78	646.18
18	90	1.50	0.8	0.300	0.42	0.16	0.14	3.78	646.18
19	95	1.58	0.8	0.300	0.42	0.16	0.14	3.78	646.18
20	100	1.67	0.8	0.300	0.42	0.16	0.14	3.78	646.18
21	105	1.75	0.8	0.300	0.42	0.16	0.14	3.78	646.18
22	110	1.83	0.8	0.300	0.42	0.16	0.14	3.78	646.18
23	115	1.92	0.8	0.300	0.42	0.16	0.14	3.78	646.18
24	120	2.00	0.9	0.338	0.42	0.18	0.16	4.25	788.00
25	125	2.08	0.8	0.300	0.42	0.16	0.14	3.78	646.18
26	130	2.17	0.9	0.338	0.42	0.18	0.16	4.25	788.00
27	135	2.25	0.9	0.338	0.42	0.18	0.16	4.25	788.00
28	140	2.33	0.9	0.338	0.42	0.18	0.16	4.25	788.00
29	145	2.42	0.9	0.338	0.42	0.18	0.16	4.25	788.00
30	150	2.50	0.9	0.338	0.42	0.18	0.16	4.25	788.00
31	155	2.58	0.9	0.338	0.42	0.18	0.16	4.25	788.00
32	160	2.67	0.9	0.338	0.42	0.18	0.16	4.25	788.00
33	165	2.75	1.0	0.376	0.42	0.20	0.18	4.73	929.82
34	170	2.83	1.0	0.376	0.42	0.20	0.18	4.73	929.82
35	175	2.92	1.0	0.376	0.42	0.20	0.18	4.73	929.82
36	180	3.00	1.0	0.376	0.42	0.20	0.18	4.73	929.82
37	185	3.08	1.0	0.376	0.42	0.20	0.18	4.73	929.82
38	190	3.17	1.1	0.413	0.42	0.22	0.20	5.20	1071.64
39	195	3.25	1.1	0.413	0.42	0.22	0.20	5.20	1071.64
40	200	3.33	1.1	0.413	0.42	0.22	0.20	5.20	1071.64
41	205	3.42	1.2	0.451	0.42	0.24	0.03	0.83	0.00
42	210	3.50	1.3	0.488	0.42	0.25	0.07	1.82	56.23
43	215	3.58	1.4	0.526	0.42	0.27	0.11	2.80	353.03
44	220	3.67	1.4	0.526	0.42	0.27	0.11	2.80	353.03
45	225	3.75	1.5	0.563	0.42	0.29	0.14	3.79	649.83
46	230	3.83	1.5	0.563	0.42	0.29	0.14	3.79	649.83
47	235	3.92	1.6	0.601	0.42	0.31	0.18	4.78	946.63
48	240	4.00	1.6	0.601	0.42	0.31	0.18	4.78	946.63
49	245	4.08	1.7	0.639	0.42	0.33	0.22	5.77	1243.43
50	250	4.17	1.8	0.676	0.42	0.35	0.26	6.76	1540.23
51	255	4.25	1.9	0.714	0.42	0.37	0.29	7.75	1837.03
52	260	4.33	2.0	0.751	0.42	0.39	0.33	8.74	2133.83
53	265	4.42	2.1	0.789	0.42	0.41	0.37	9.73	2430.63
54	270	4.50	2.1	0.789	0.42	0.41	0.37	9.73	2430.63
55	275	4.58	2.2	0.826	0.42	0.43	0.41	10.72	2727.42
56	280	4.67	2.3	0.864	0.42	0.45	0.44	11.71	3024.22

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN A BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	26.34		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	4.22		
UNIT TIME-PERCENT OF LAG	118.5		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.419		
LOW LOSS RATE - PERCENT	52%	TOTAL PERCOLATION RATE (cfs)	1.63 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.901	0.42	0.47	0.48	12.70	3321.02
58	290	4.83	2.4	0.901	0.42	0.47	0.48	12.70	3321.02
59	295	4.92	2.5	0.939	0.42	0.49	0.52	13.69	3617.82
60	300	5.00	2.6	0.977	0.42	0.51	0.56	14.68	3914.62
61	305	5.08	3.1	1.164	0.42	0.61	0.74	19.62	5398.62
62	310	5.17	3.6	1.352	0.42	0.71	0.93	24.57	6882.61
63	315	5.25	3.9	1.465	0.42	0.76	1.05	27.54	7773.01
64	320	5.33	4.2	1.578	0.42	0.82	1.16	30.51	8663.41
65	325	5.42	4.7	1.765	0.42	0.92	1.35	35.45	10147.40
66	330	5.50	5.6	2.103	0.42	1.10	1.68	44.36	12818.59
67	335	5.58	1.9	0.714	0.42	0.37	0.29	7.75	1837.03
68	340	5.67	0.9	0.338	0.42	0.18	0.16	4.25	788.00
69	345	5.75	0.6	0.225	0.42	0.12	0.11	2.84	362.55
70	350	5.83	0.5	0.188	0.42	0.10	0.09	2.36	220.73
71	355	5.92	0.3	0.113	0.42	0.06	0.05	1.42	0.00
72	360	6.00	0.2	0.075	0.42	0.04	0.04	0.95	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.61
FLOOD VOLUME (acft)	3.53
FLOOD VOLUME (cuft)	153578.76
REQUIRED STORAGE (acft)	2.70
REQUIRED STORAGE (cuft)	117654.63
PEAK FLOW RATE (cfs)	44.36

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 24 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN A
BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	26.340	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.4194
LAG TIME - MINUTES	4.22	MINIMUM LOSS RATE (for var. loss) - in/hr	0.210
UNIT TIME-PERCENT OF LAG	355.5	LOW LOSS RATE - DECIMAL	0.52
TOTAL ADJUSTED STORM RAIN-INCHES	5.06	C	0.00388
		PERCOLATION RATE (cfs)	1.63

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.040	0.741	0.021	0.019	0.51	0.00
2	30	0.50	0.3	0.061	0.732	0.032	0.029	0.76	0.00
3	45	0.75	0.3	0.061	0.723	0.032	0.029	0.76	0.00
4	60	1.00	0.4	0.081	0.715	0.042	0.039	1.02	0.00
5	75	1.25	0.3	0.061	0.706	0.032	0.029	0.76	0.00
6	90	1.50	0.3	0.061	0.698	0.032	0.029	0.76	0.00
7	105	1.75	0.3	0.061	0.690	0.032	0.029	0.76	0.00
8	120	2.00	0.4	0.081	0.681	0.042	0.039	1.02	0.00
9	135	2.25	0.4	0.081	0.673	0.042	0.039	1.02	0.00
10	150	2.50	0.4	0.081	0.665	0.042	0.039	1.02	0.00
11	165	2.75	0.5	0.101	0.657	0.053	0.048	1.27	0.00
12	180	3.00	0.5	0.101	0.649	0.053	0.048	1.27	0.00
13	195	3.25	0.5	0.101	0.641	0.053	0.048	1.27	0.00
14	210	3.50	0.5	0.101	0.633	0.053	0.048	1.27	0.00
15	225	3.75	0.5	0.101	0.625	0.053	0.048	1.27	0.00
16	240	4.00	0.6	0.121	0.617	0.063	0.058	1.53	0.00
17	255	4.25	0.6	0.121	0.609	0.063	0.058	1.53	0.00
18	270	4.50	0.7	0.142	0.601	0.074	0.068	1.78	139.76
19	285	4.75	0.7	0.142	0.594	0.074	0.068	1.78	139.76
20	300	5.00	0.8	0.162	0.586	0.085	0.077	2.04	369.03
21	315	5.25	0.6	0.121	0.578	0.063	0.058	1.53	0.00
22	330	5.50	0.7	0.142	0.571	0.074	0.068	1.78	139.76
23	345	5.75	0.8	0.162	0.563	0.085	0.077	2.04	369.03
24	360	6.00	0.8	0.162	0.556	0.085	0.077	2.04	369.03
25	375	6.25	0.9	0.182	0.549	0.095	0.087	2.29	598.30
26	390	6.50	0.9	0.182	0.541	0.095	0.087	2.29	598.30
27	405	6.75	1.0	0.202	0.534	0.106	0.097	2.55	827.56
28	420	7.00	1.0	0.202	0.527	0.106	0.097	2.55	827.56
29	435	7.25	1.0	0.202	0.520	0.106	0.097	2.55	827.56
30	450	7.50	1.1	0.223	0.513	0.116	0.106	2.80	1056.83
31	465	7.75	1.2	0.243	0.506	0.127	0.116	3.06	1286.09
32	480	8.00	1.3	0.263	0.499	0.137	0.126	3.31	1515.36
33	495	8.25	1.5	0.304	0.492	0.159	0.145	3.82	1973.89
34	510	8.50	1.5	0.304	0.485	0.159	0.145	3.82	1973.89
35	525	8.75	1.6	0.324	0.478	0.169	0.155	4.08	2203.16
36	540	9.00	1.7	0.344	0.471	0.180	0.164	4.33	2432.43
37	555	9.25	1.9	0.385	0.465	0.201	0.184	4.84	2890.96
38	570	9.50	2.0	0.405	0.458	0.211	0.193	5.09	3120.23
39	585	9.75	2.1	0.425	0.451	0.222	0.203	5.35	3349.49
40	600	10.00	2.2	0.445	0.445	0.233	0.000	0.01	0.00
41	615	10.25	1.5	0.304	0.439	0.159	0.145	3.82	1973.89
42	630	10.50	1.5	0.304	0.432	0.159	0.145	3.82	1973.89
43	645	10.75	2.0	0.405	0.426	0.211	0.193	5.09	3120.23
44	660	11.00	2.0	0.405	0.420	0.211	0.193	5.09	3120.23
45	675	11.25	1.9	0.385	0.414	0.201	0.184	4.84	2890.96
46	690	11.50	1.9	0.385	0.407	0.201	0.184	4.84	2890.96
47	705	11.75	1.7	0.344	0.401	0.180	0.164	4.33	2432.43
48	720	12.00	1.8	0.364	0.395	0.190	0.174	4.59	2661.69
49	735	12.25	2.5	0.506	0.390	0.264	0.116	3.07	1296.56
50	750	12.50	2.6	0.526	0.384	0.275	0.143	3.76	1914.66
51	765	12.75	2.8	0.567	0.378	0.296	0.189	4.97	3010.95
52	780	13.00	2.9	0.587	0.372	0.306	0.215	5.66	3625.79
53	795	13.25	3.4	0.688	0.367	0.359	0.322	8.47	6158.21
54	810	13.50	3.4	0.688	0.361	0.359	0.327	8.62	6289.90
55	825	13.75	2.3	0.466	0.356	0.243	0.110	2.90	1142.00
56	840	14.00	2.3	0.466	0.350	0.243	0.115	3.04	1270.29
57	855	14.25	2.7	0.546	0.345	0.285	0.202	5.31	3316.08
58	870	14.50	2.6	0.526	0.340	0.275	0.187	4.92	2961.08
59	885	14.75	2.6	0.526	0.334	0.275	0.192	5.05	3084.12
60	900	15.00	2.5	0.506	0.329	0.264	0.177	4.66	2725.56

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN A BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			26.340	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.4194		
LAG TIME - MINUTES			4.22	MINIMUM LOSS RATE (for var. loss) - in/hr			0.210		
UNIT TIME-PERCENT OF LAG			355.5	LOW LOSS RATE - DECIMAL			0.52		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00388		
				PERCOLATION RATE (cfs)			1.63		
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
61	915	15.25	2.4	0.486	0.324	0.254	0.162	4.26	2365.18
62	930	15.50	2.3	0.466	0.319	0.243	0.146	3.85	2002.97
63	945	15.75	1.9	0.385	0.314	0.201	0.070	1.85	199.47
64	960	16.00	1.9	0.385	0.310	0.201	0.075	1.98	313.32
65	975	16.25	0.4	0.081	0.305	0.042	0.039	1.02	0.00
66	990	16.50	0.4	0.081	0.300	0.042	0.039	1.02	0.00
67	1005	16.75	0.3	0.061	0.296	0.032	0.029	0.76	0.00
68	1020	17.00	0.3	0.061	0.291	0.032	0.029	0.76	0.00
69	1035	17.25	0.5	0.101	0.287	0.053	0.048	1.27	0.00
70	1050	17.50	0.5	0.101	0.282	0.053	0.048	1.27	0.00
71	1065	17.75	0.5	0.101	0.278	0.053	0.048	1.27	0.00
72	1080	18.00	0.4	0.081	0.274	0.042	0.039	1.02	0.00
73	1095	18.25	0.4	0.081	0.270	0.042	0.039	1.02	0.00
74	1110	18.50	0.4	0.081	0.266	0.042	0.039	1.02	0.00
75	1125	18.75	0.3	0.061	0.262	0.032	0.029	0.76	0.00
76	1140	19.00	0.2	0.040	0.259	0.021	0.019	0.51	0.00
77	1155	19.25	0.3	0.061	0.255	0.032	0.029	0.76	0.00
78	1170	19.50	0.4	0.081	0.251	0.042	0.039	1.02	0.00
79	1185	19.75	0.3	0.061	0.248	0.032	0.029	0.76	0.00
80	1200	20.00	0.2	0.040	0.245	0.021	0.019	0.51	0.00
81	1215	20.25	0.3	0.061	0.241	0.032	0.029	0.76	0.00
82	1230	20.50	0.3	0.061	0.238	0.032	0.029	0.76	0.00
83	1245	20.75	0.3	0.061	0.235	0.032	0.029	0.76	0.00
84	1260	21.00	0.2	0.040	0.232	0.021	0.019	0.51	0.00
85	1275	21.25	0.3	0.061	0.230	0.032	0.029	0.76	0.00
86	1290	21.50	0.2	0.040	0.227	0.021	0.019	0.51	0.00
87	1305	21.75	0.3	0.061	0.225	0.032	0.029	0.76	0.00
88	1320	22.00	0.2	0.040	0.222	0.021	0.019	0.51	0.00
89	1335	22.25	0.3	0.061	0.220	0.032	0.029	0.76	0.00
90	1350	22.50	0.2	0.040	0.218	0.021	0.019	0.51	0.00
91	1365	22.75	0.2	0.040	0.216	0.021	0.019	0.51	0.00
92	1380	23.00	0.2	0.040	0.214	0.021	0.019	0.51	0.00
93	1395	23.25	0.2	0.040	0.213	0.021	0.019	0.51	0.00
94	1410	23.50	0.2	0.040	0.212	0.021	0.019	0.51	0.00
95	1425	23.75	0.2	0.040	0.211	0.021	0.019	0.51	0.00
96	1440	24.00	0.2	0.040	0.210	0.021	0.019	0.51	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	2.06
FLOOD VOLUME (acft)	4.52
FLOOD VOLUME (cuft)	196745.52
REQUIRED STORAGE (acft)	2.06
REQUIRED STORAGE (cuft)	89748.43
PEAK FLOW (cfs)	8.62

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN A

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
344	0	0		28168	0	0	0.00
345	1	1	4637	32805	30487	30487	0.70
346	1	2	4664	37469	35137	65624	1.51
347	1	3	4688	42157	39813	105437	2.42
348	1	4	4713	46870	44514	149950	3.44

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	1.62789	cfs

MAXWELL IV DRYWELLS

NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		1.62789	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	110301	cu ft (100-yr 6-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	1.62789	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**19**	hrs < 36 hrs

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	4.75	1,425	1,425	488	937	344.03	937	0.02
2	10	4.75	1,425	2,363	488	1,874	344.06	1,874	0.04
3	15	4.02	1,206	3,080	488	2,592	344.09	2,592	0.06
4	20	0.43	128	2,720	488	2,232	344.07	2,232	0.05
5	25	0.43	128	2,360	488	1,872	344.06	1,872	0.04
6	30	2.72	817	2,689	488	2,200	344.07	2,200	0.05
7	35	0.43	128	2,329	488	1,840	344.06	1,840	0.04
8	40	2.72	817	2,657	488	2,169	344.07	2,169	0.05
9	45	2.72	817	2,985	488	2,497	344.08	2,497	0.06
10	50	0.43	128	2,625	488	2,137	344.07	2,137	0.05
11	55	1.19	358	2,495	488	2,006	344.07	2,006	0.05
12	60	2.72	817	2,823	488	2,335	344.08	2,335	0.05
13	65	5.78	1,735	4,069	488	3,581	344.12	3,581	0.08
14	70	5.78	1,735	5,316	488	4,827	344.16	4,827	0.11
15	75	5.78	1,735	6,562	488	6,073	344.20	6,073	0.14
16	80	4.25	1,276	7,349	488	6,861	344.23	6,861	0.16
17	85	8.84	2,653	9,513	488	9,025	344.30	9,025	0.21
18	90	9.61	2,882	11,907	488	11,419	344.37	11,419	0.26
19	95	7.31	2,194	13,612	488	13,124	344.43	13,124	0.30
20	100	9.61	2,882	16,006	488	15,518	344.51	15,518	0.36
21	105	14.20	4,259	19,776	488	19,288	344.63	19,288	0.44
22	110	12.67	3,800	23,088	488	22,600	344.74	22,600	0.52
23	115	11.14	3,341	25,940	488	25,452	344.83	25,452	0.58
24	120	11.90	3,570	29,023	488	28,534	344.94	28,534	0.66
25	125	12.67	3,800	32,334	488	31,846	345.04	31,846	0.73
26	130	21.08	6,324	38,170	488	37,681	345.20	37,681	0.87
27	135	27.20	8,160	45,841	488	45,353	345.42	45,353	1.04
28	140	15.73	4,718	50,071	488	49,582	345.54	49,582	1.14
29	145	40.97	12,290	61,873	488	61,385	345.88	61,385	1.41
30	150	44.79	13,438	74,822	488	74,334	346.22	74,334	1.71
31	155	51.68	15,503	89,837	488	89,349	346.60	89,349	2.05
32	160	34.08	10,225	99,574	488	99,086	346.84	99,086	2.27
33	165	4.25	1,276	100,361	488	99,873	346.86	99,873	2.29
34	170	2.72	817	100,690	488	100,201	346.87	100,201	2.30
35	175	2.72	817	101,018	488	100,530	346.88	100,530	2.31
36	180	2.19	658	101,188	488	100,699	346.88	100,699	2.31

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	2.36	709	709	488	221	344.01	221	0.01
2	10	2.84	851	1,072	488	583	344.02	583	0.01
3	15	2.84	851	1,434	488	946	344.03	946	0.02
4	20	2.84	851	1,797	488	1,308	344.04	1,308	0.03
5	25	2.84	851	2,159	488	1,671	344.05	1,671	0.04
6	30	3.31	993	2,664	488	2,175	344.07	2,175	0.05
7	35	3.31	993	3,168	488	2,680	344.09	2,680	0.06
8	40	3.31	993	3,672	488	3,184	344.10	3,184	0.07
9	45	3.31	993	4,177	488	3,688	344.12	3,688	0.08
10	50	3.31	993	4,681	488	4,193	344.14	4,193	0.10
11	55	3.31	993	5,185	488	4,697	344.15	4,697	0.11
12	60	3.78	1,135	5,832	488	5,343	344.18	5,343	0.12
13	65	3.78	1,135	6,478	488	5,989	344.20	5,989	0.14
14	70	3.78	1,135	7,124	488	6,636	344.22	6,636	0.15
15	75	3.78	1,135	7,770	488	7,282	344.24	7,282	0.17
16	80	3.78	1,135	8,416	488	7,928	344.26	7,928	0.18
17	85	3.78	1,135	9,063	488	8,574	344.28	8,574	0.20
18	90	3.78	1,135	9,709	488	9,220	344.30	9,220	0.21
19	95	3.78	1,135	10,355	488	9,867	344.32	9,867	0.23
20	100	3.78	1,135	11,001	488	10,513	344.34	10,513	0.24
21	105	3.78	1,135	11,647	488	11,159	344.37	11,159	0.26
22	110	3.78	1,135	12,293	488	11,805	344.39	11,805	0.27
23	115	3.78	1,135	12,940	488	12,451	344.41	12,451	0.29
24	120	4.25	1,276	13,728	488	13,239	344.43	13,239	0.30
25	125	3.78	1,135	14,374	488	13,886	344.46	13,886	0.32
26	130	4.25	1,276	15,162	488	14,674	344.48	14,674	0.34
27	135	4.25	1,276	15,950	488	15,462	344.51	15,462	0.35
28	140	4.25	1,276	16,738	488	16,250	344.53	16,250	0.37
29	145	4.25	1,276	17,526	488	17,038	344.56	17,038	0.39
30	150	4.25	1,276	18,314	488	17,826	344.58	17,826	0.41
31	155	4.25	1,276	19,102	488	18,614	344.61	18,614	0.43
32	160	4.25	1,276	19,890	488	19,402	344.64	19,402	0.45
33	165	4.73	1,418	20,820	488	20,331	344.67	20,331	0.47
34	170	4.73	1,418	21,750	488	21,261	344.70	21,261	0.49
35	175	4.73	1,418	22,679	488	22,191	344.73	22,191	0.51
36	180	4.73	1,418	23,609	488	23,121	344.76	23,121	0.53
37	185	4.73	1,418	24,539	488	24,051	344.79	24,051	0.55
38	190	5.20	1,560	25,611	488	25,122	344.82	25,122	0.58
39	195	5.20	1,560	26,682	488	26,194	344.86	26,194	0.60
40	200	5.20	1,560	27,754	488	27,266	344.89	27,266	0.63
41	205	0.83	248	27,513	488	27,025	344.89	27,025	0.62
42	210	1.82	545	27,570	488	27,081	344.89	27,081	0.62
43	215	2.80	841	27,923	488	27,434	344.90	27,434	0.63
44	220	2.80	841	28,276	488	27,787	344.91	27,787	0.64
45	225	3.79	1,138	28,925	488	28,437	344.93	28,437	0.65
46	230	3.79	1,138	29,575	488	29,087	344.95	29,087	0.67
47	235	4.78	1,435	30,522	488	30,034	344.99	30,034	0.69
48	240	4.78	1,435	31,469	488	30,980	345.01	30,980	0.71
49	245	5.77	1,732	32,712	488	32,224	345.05	32,224	0.74
50	250	6.76	2,029	34,252	488	33,764	345.09	33,764	0.78
51	255	7.75	2,325	36,089	488	35,601	345.15	35,601	0.82
52	260	8.74	2,622	38,223	488	37,735	345.21	37,735	0.87
53	265	9.73	2,919	40,654	488	40,165	345.28	40,165	0.92
54	270	9.73	2,919	43,084	488	42,596	345.34	42,596	0.98
55	275	10.72	3,216	45,812	488	45,323	345.42	45,323	1.04

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	11.71	3,513	48,836	488	48,348	345.51	48,348	1.11
57	285	12.70	3,809	52,157	488	51,669	345.60	51,669	1.19
58	290	12.70	3,809	55,478	488	54,990	345.70	54,990	1.26
59	295	13.69	4,106	59,096	488	58,607	345.80	58,607	1.35
60	300	14.68	4,403	63,010	488	62,522	345.91	62,522	1.44
61	305	19.62	5,887	68,409	488	67,921	346.06	67,921	1.56
62	310	24.57	7,371	75,292	488	74,803	346.23	74,803	1.72
63	315	27.54	8,261	83,065	488	82,576	346.43	82,576	1.90
64	320	30.51	9,152	91,728	488	91,240	346.64	91,240	2.09
65	325	35.45	10,636	101,876	488	101,387	346.90	101,387	2.33
66	330	44.36	13,307	114,694	488	114,206	347.20	114,206	2.62
67	335	7.75	2,325	116,531	488	116,043	347.24	116,043	2.66
68	340	4.25	1,276	117,319	488	116,831	347.26	116,831	2.68
69	345	2.84	851	117,682	488	117,193	347.26	117,193	2.69
70	350	2.36	709	117,902	488	117,414	347.27	117,414	2.70
71	355	1.42	425	117,840	488	117,351	347.27	117,351	2.69
72	360	0.95	284	117,635	488	117,146	347.26	117,146	2.69

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.51	459	459	1465	-	344.00	-	0.00
2	30	0.76	688	688	1465	-	344.00	-	0.00
3	45	0.76	688	688	1465	-	344.00	-	0.00
4	60	1.02	917	917	1465	-	344.00	-	0.00
5	75	0.76	688	688	1465	-	344.00	-	0.00
6	90	0.76	688	688	1465	-	344.00	-	0.00
7	105	0.76	688	688	1465	-	344.00	-	0.00
8	120	1.02	917	917	1465	-	344.00	-	0.00
9	135	1.02	917	917	1465	-	344.00	-	0.00
10	150	1.02	917	917	1465	-	344.00	-	0.00
11	165	1.27	1,146	1,146	1465	-	344.00	-	0.00
12	180	1.27	1,146	1,146	1465	-	344.00	-	0.00
13	195	1.27	1,146	1,146	1465	-	344.00	-	0.00
14	210	1.27	1,146	1,146	1465	-	344.00	-	0.00
15	225	1.27	1,146	1,146	1465	-	344.00	-	0.00
16	240	1.53	1,376	1,376	1465	-	344.00	-	0.00
17	255	1.53	1,376	1,376	1465	-	344.00	-	0.00
18	270	1.78	1,605	1,605	1465	140	344.00	140	0.00
19	285	1.78	1,605	1,745	1465	280	344.01	280	0.01
20	300	2.04	1,834	2,114	1465	649	344.02	649	0.01
21	315	1.53	1,376	2,024	1465	559	344.02	559	0.01
22	330	1.78	1,605	2,164	1465	699	344.02	699	0.02
23	345	2.04	1,834	2,533	1465	1,068	344.04	1,068	0.02
24	360	2.04	1,834	2,902	1465	1,437	344.05	1,437	0.03
25	375	2.29	2,063	3,500	1465	2,035	344.07	2,035	0.05
26	390	2.29	2,063	4,099	1465	2,633	344.09	2,633	0.06
27	405	2.55	2,293	4,926	1465	3,461	344.11	3,461	0.08
28	420	2.55	2,293	5,754	1465	4,289	344.14	4,289	0.10
29	435	2.55	2,293	6,581	1465	5,116	344.17	5,116	0.12
30	450	2.80	2,522	7,638	1465	6,173	344.20	6,173	0.14
31	465	3.06	2,751	8,924	1465	7,459	344.24	7,459	0.17
32	480	3.31	2,980	10,440	1465	8,974	344.29	8,974	0.21
33	495	3.82	3,439	12,413	1465	10,948	344.36	10,948	0.25
34	510	3.82	3,439	14,387	1465	12,922	344.42	12,922	0.30
35	525	4.08	3,668	16,590	1465	15,125	344.50	15,125	0.35
36	540	4.33	3,898	19,023	1465	17,558	344.58	17,558	0.40
37	555	4.84	4,356	21,914	1465	20,449	344.67	20,449	0.47
38	570	5.09	4,585	25,034	1465	23,569	344.77	23,569	0.54
39	585	5.35	4,815	28,384	1465	26,918	344.88	26,918	0.62
40	600	0.01	7	26,925	1465	25,460	344.84	25,460	0.58
41	615	3.82	3,439	28,899	1465	27,434	344.90	27,434	0.63
42	630	3.82	3,439	30,873	1465	29,408	344.96	29,408	0.68
43	645	5.09	4,585	33,993	1465	32,528	345.06	32,528	0.75
44	660	5.09	4,585	37,114	1465	35,648	345.15	35,648	0.82
45	675	4.84	4,356	40,004	1465	38,539	345.23	38,539	0.88
46	690	4.84	4,356	42,895	1465	41,430	345.31	41,430	0.95
47	705	4.33	3,898	45,328	1465	43,863	345.38	43,863	1.01
48	720	4.59	4,127	47,990	1465	46,524	345.46	46,524	1.07
49	735	3.07	2,762	49,286	1465	47,821	345.49	47,821	1.10
50	750	3.76	3,380	51,201	1465	49,736	345.55	49,736	1.14
51	765	4.97	4,476	54,212	1465	52,747	345.63	52,747	1.21
52	780	5.66	5,091	57,838	1465	56,372	345.74	56,372	1.29
53	795	8.47	7,623	63,996	1465	62,531	345.91	62,531	1.44
54	810	8.62	7,755	70,286	1465	68,821	346.08	68,821	1.58
55	825	2.90	2,607	71,428	1465	69,963	346.11	69,963	1.61
56	840	3.04	2,735	72,698	1465	71,233	346.14	71,233	1.64
57	855	5.31	4,781	76,014	1465	74,549	346.22	74,549	1.71
58	870	4.92	4,426	78,975	1465	77,510	346.30	77,510	1.78

RETENTION BASIN A
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	5.05	4,549	82,059	1465	80,594	346.38	80,594	1.85
60	900	4.66	4,191	84,785	1465	83,320	346.44	83,320	1.91
61	915	4.26	3,830	87,150	1465	85,685	346.50	85,685	1.97
62	930	3.85	3,468	89,153	1465	87,688	346.55	87,688	2.01
63	945	1.85	1,665	89,352	1465	87,887	346.56	87,887	2.02
64	960	1.98	1,778	89,666	1465	88,201	346.57	88,201	2.02
65	975	1.02	917	89,118	1465	87,653	346.55	87,653	2.01
66	990	1.02	917	88,570	1465	87,105	346.54	87,105	2.00
67	1005	0.76	688	87,792	1465	86,327	346.52	86,327	1.98
68	1020	0.76	688	87,015	1465	85,550	346.50	85,550	1.96
69	1035	1.27	1,146	86,696	1465	85,231	346.49	85,231	1.96
70	1050	1.27	1,146	86,377	1465	84,912	346.48	84,912	1.95
71	1065	1.27	1,146	86,059	1465	84,594	346.48	84,594	1.94
72	1080	1.02	917	85,511	1465	84,046	346.46	84,046	1.93
73	1095	1.02	917	84,963	1465	83,498	346.45	83,498	1.92
74	1110	1.02	917	84,415	1465	82,950	346.44	82,950	1.90
75	1125	0.76	688	83,637	1465	82,172	346.42	82,172	1.89
76	1140	0.51	459	82,631	1465	81,166	346.39	81,166	1.86
77	1155	0.76	688	81,853	1465	80,388	346.37	80,388	1.85
78	1170	1.02	917	81,305	1465	79,840	346.36	79,840	1.83
79	1185	0.76	688	80,528	1465	79,063	346.34	79,063	1.82
80	1200	0.51	459	79,522	1465	78,056	346.31	78,056	1.79
81	1215	0.76	688	78,744	1465	77,279	346.29	77,279	1.77
82	1230	0.76	688	77,967	1465	76,502	346.27	76,502	1.76
83	1245	0.76	688	77,190	1465	75,724	346.25	75,724	1.74
84	1260	0.51	459	76,183	1465	74,718	346.23	74,718	1.72
85	1275	0.76	688	75,406	1465	73,941	346.21	73,941	1.70
86	1290	0.51	459	74,399	1465	72,934	346.18	72,934	1.67
87	1305	0.76	688	73,622	1465	72,157	346.16	72,157	1.66
88	1320	0.51	459	72,615	1465	71,150	346.14	71,150	1.63
89	1335	0.76	688	71,838	1465	70,373	346.12	70,373	1.62
90	1350	0.51	459	70,831	1465	69,366	346.09	69,366	1.59
91	1365	0.51	459	69,825	1465	68,360	346.07	68,360	1.57
92	1380	0.51	459	68,818	1465	67,353	346.04	67,353	1.55
93	1395	0.51	459	67,812	1465	66,347	346.02	66,347	1.52
94	1410	0.51	459	66,805	1465	65,340	345.99	65,340	1.50
95	1425	0.51	459	65,799	1465	64,333	345.96	64,333	1.48
96	1440	0.51	459	64,792	1465	63,327	345.93	63,327	1.45

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN B		
10	AREA DESIGNATION	SUBAREA B (APARTMENTS)		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL			
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS	1.07		
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	26%		
27				
28	LENGTH OF WATERCOURSE (L)	410		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	200		
30				
31	ELEVATION OF HEADWATER	355.67		
32	ELEVATION OF CONCENTRATION POINT	352.68		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		347	2000	
45		348	2000	
46		349	2000	
47		350	2000	
48		351	2000	
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN B
[2] AREA DESIGNATION	SUBAREA B (APARTMENTS)
[3] AREA - ACRES	1.070
[4] L-FEET	410
[5] L-MILES	0.078
[6] La-FEET	200
[7] La-MILES	0.038
[8] ELEVATION OF HEADWATER	355.67
[9] ELEVATION OF CONCENTRATION POINT	352.68
[10] H-FEET	2.99
[11] S-FEET/MILE	38.5
[12] S^0.5	6.21
[13] L*LCA/S^0.5	0.00047
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.020
[16] LAG TIME-MINUTES	1.18
[17] 25% OF LAG-MINUTES	0.29
[18] 40% OF LAG-MINUTES	0.47
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.09

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	1.070	1.00	2.42	3.13	1.070	1.00	3.13	5.06	1.070	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	1.07	SUM [7]	2.42	SUM [9]	1.07	SUM [11]	3.13	SUM [13]	1.07	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	1.81	1.94	3.06
FLOOD VOLUME	(cu-ft)	7,038	7,549	11,873
	(acre-ft)	0.16	0.17	0.27
REQUIRED STORAGE	(cu-ft)	5,979	5,667	5,584
	(acre-ft)	0.14	0.13	0.13
PEAK FLOW	(cfs)	2.33	2.03	0.55
MAXIMUM WSEL	(ft)	349.99	349.82	349.74

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN B
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
	COMMERCIAL			90%	0.00	0.00	0.000	0.0000
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
	SF - 1/4 ACRE			50%	0.00	0.00	0.000	0.0000
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
A	MF - APARTMENTS	32	0.74	80%	0.21	1.07	1.000	0.2072
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
	RETENTION BASINS			0%	0.00	0.00	0.000	0.0000
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	1.07	SUM	0.2072

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.1036
C= 0.00192

Ft=C(24-(T/60))^1.55 = 0.00192 (24-(T/60))^1.55 + 0.10 in/hr

LOW LOSS RATE (80-90 PERCENT) = 26%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 3 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.07		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.18		
UNIT TIME-PERCENT OF LAG	424.3		
TOTAL ADJUSTED STORM RAIN-INCHES	2.42		
CONSTANT LOSS RATE-in/hr	0.21		
LOW LOSS RATE - PERCENT	26%	TOTAL PERCOLATION RATE (cfs)	0.09 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.21	0.10	0.170	0.18	26.89
2	10	0.17	1.3	0.378	0.21	0.10	0.170	0.18	26.89
3	15	0.25	1.1	0.319	0.21	0.08	0.112	0.12	8.25
4	20	0.33	1.5	0.436	0.21	0.11	0.228	0.24	45.54
5	25	0.42	1.5	0.436	0.21	0.11	0.228	0.24	45.54
6	30	0.50	1.8	0.523	0.21	0.14	0.316	0.34	73.50
7	35	0.58	1.5	0.436	0.21	0.11	0.228	0.24	45.54
8	40	0.67	1.8	0.523	0.21	0.14	0.316	0.34	73.50
9	45	0.75	1.8	0.523	0.21	0.14	0.316	0.34	73.50
10	50	0.83	1.5	0.436	0.21	0.11	0.228	0.24	45.54
11	55	0.92	1.6	0.465	0.21	0.12	0.257	0.28	54.86
12	60	1.00	1.8	0.523	0.21	0.14	0.316	0.34	73.50
13	65	1.08	2.2	0.639	0.21	0.17	0.432	0.46	110.79
14	70	1.17	2.2	0.639	0.21	0.17	0.432	0.46	110.79
15	75	1.25	2.2	0.639	0.21	0.17	0.432	0.46	110.79
16	80	1.33	2.0	0.581	0.21	0.15	0.374	0.40	92.15
17	85	1.42	2.6	0.755	0.21	0.20	0.548	0.59	148.08
18	90	1.50	2.7	0.784	0.21	0.20	0.577	0.62	157.40
19	95	1.58	2.4	0.697	0.21	0.18	0.490	0.52	129.44
20	100	1.67	2.7	0.784	0.21	0.20	0.577	0.62	157.40
21	105	1.75	3.3	0.958	0.21	0.25	0.751	0.80	213.33
22	110	1.83	3.1	0.900	0.21	0.23	0.693	0.74	194.69
23	115	1.92	2.9	0.842	0.21	0.22	0.635	0.68	176.04
24	120	2.00	3.0	0.871	0.21	0.23	0.664	0.71	185.37
25	125	2.08	3.1	0.900	0.21	0.23	0.693	0.74	194.69
26	130	2.17	4.2	1.220	0.21	0.32	1.012	1.08	297.23
27	135	2.25	5.0	1.452	0.21	0.38	1.245	1.33	371.80
28	140	2.33	3.5	1.016	0.21	0.26	0.809	0.87	231.98
29	145	2.42	6.8	1.975	0.21	0.51	1.768	1.89	539.60
30	150	2.50	7.3	2.120	0.21	0.55	1.913	2.05	586.21
31	155	2.58	8.2	2.381	0.21	0.62	2.174	2.33	670.10
32	160	2.67	5.9	1.713	0.21	0.45	1.506	1.61	455.70
33	165	2.75	2.0	0.581	0.21	0.15	0.374	0.40	92.15
34	170	2.83	1.8	0.523	0.21	0.14	0.316	0.34	73.50
35	175	2.92	1.8	0.523	0.21	0.14	0.316	0.34	73.50
36	180	3.00	0.6	0.174	0.21	0.05	0.129	0.14	13.61
							21.743		5979.41

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.81
FLOOD VOLUME (acft)	0.16
FLOOD VOLUME (cuft)	7037.60
REQUIRED STORAGE (acft)	0.14
REQUIRED STORAGE (cuft)	5979.41
PEAK FLOW RATE (cfs)	2.33

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.07		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.18		
UNIT TIME-PERCENT OF LAG	424.3		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.207		
LOW LOSS RATE - PERCENT	26%	TOTAL PERCOLATION RATE (cfs)	0.09 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	5	0.08	0.5	0.188	0.21	0.05	0.14	0.15	16.83
2	10	0.17	0.6	0.225	0.21	0.06	0.02	0.02	0.00
3	15	0.25	0.6	0.225	0.21	0.06	0.02	0.02	0.00
4	20	0.33	0.6	0.225	0.21	0.06	0.02	0.02	0.00
5	25	0.42	0.6	0.225	0.21	0.06	0.02	0.02	0.00
6	30	0.50	0.7	0.263	0.21	0.07	0.06	0.06	0.00
7	35	0.58	0.7	0.263	0.21	0.07	0.06	0.06	0.00
8	40	0.67	0.7	0.263	0.21	0.07	0.06	0.06	0.00
9	45	0.75	0.7	0.263	0.21	0.07	0.06	0.06	0.00
10	50	0.83	0.7	0.263	0.21	0.07	0.06	0.06	0.00
11	55	0.92	0.7	0.263	0.21	0.07	0.06	0.06	0.00
12	60	1.00	0.8	0.300	0.21	0.08	0.09	0.10	2.17
13	65	1.08	0.8	0.300	0.21	0.08	0.09	0.10	2.17
14	70	1.17	0.8	0.300	0.21	0.08	0.09	0.10	2.17
15	75	1.25	0.8	0.300	0.21	0.08	0.09	0.10	2.17
16	80	1.33	0.8	0.300	0.21	0.08	0.09	0.10	2.17
17	85	1.42	0.8	0.300	0.21	0.08	0.09	0.10	2.17
18	90	1.50	0.8	0.300	0.21	0.08	0.09	0.10	2.17
19	95	1.58	0.8	0.300	0.21	0.08	0.09	0.10	2.17
20	100	1.67	0.8	0.300	0.21	0.08	0.09	0.10	2.17
21	105	1.75	0.8	0.300	0.21	0.08	0.09	0.10	2.17
22	110	1.83	0.8	0.300	0.21	0.08	0.09	0.10	2.17
23	115	1.92	0.8	0.300	0.21	0.08	0.09	0.10	2.17
24	120	2.00	0.9	0.338	0.21	0.09	0.13	0.14	14.22
25	125	2.08	0.8	0.300	0.21	0.08	0.09	0.10	2.17
26	130	2.17	0.9	0.338	0.21	0.09	0.13	0.14	14.22
27	135	2.25	0.9	0.338	0.21	0.09	0.13	0.14	14.22
28	140	2.33	0.9	0.338	0.21	0.09	0.13	0.14	14.22
29	145	2.42	0.9	0.338	0.21	0.09	0.13	0.14	14.22
30	150	2.50	0.9	0.338	0.21	0.09	0.13	0.14	14.22
31	155	2.58	0.9	0.338	0.21	0.09	0.13	0.14	14.22
32	160	2.67	0.9	0.338	0.21	0.09	0.13	0.14	14.22
33	165	2.75	1.0	0.376	0.21	0.10	0.17	0.18	26.28
34	170	2.83	1.0	0.376	0.21	0.10	0.17	0.18	26.28
35	175	2.92	1.0	0.376	0.21	0.10	0.17	0.18	26.28
36	180	3.00	1.0	0.376	0.21	0.10	0.17	0.18	26.28
37	185	3.08	1.0	0.376	0.21	0.10	0.17	0.18	26.28
38	190	3.17	1.1	0.413	0.21	0.11	0.21	0.22	38.34
39	195	3.25	1.1	0.413	0.21	0.11	0.21	0.22	38.34
40	200	3.33	1.1	0.413	0.21	0.11	0.21	0.22	38.34
41	205	3.42	1.2	0.451	0.21	0.12	0.24	0.26	50.39
42	210	3.50	1.3	0.488	0.21	0.13	0.28	0.30	62.45
43	215	3.58	1.4	0.526	0.21	0.14	0.32	0.34	74.51
44	220	3.67	1.4	0.526	0.21	0.14	0.32	0.34	74.51
45	225	3.75	1.5	0.563	0.21	0.15	0.36	0.38	86.56
46	230	3.83	1.5	0.563	0.21	0.15	0.36	0.38	86.56
47	235	3.92	1.6	0.601	0.21	0.16	0.39	0.42	98.62
48	240	4.00	1.6	0.601	0.21	0.16	0.39	0.42	98.62
49	245	4.08	1.7	0.639	0.21	0.17	0.43	0.46	110.68
50	250	4.17	1.8	0.676	0.21	0.18	0.47	0.50	122.73
51	255	4.25	1.9	0.714	0.21	0.19	0.51	0.54	134.79
52	260	4.33	2.0	0.751	0.21	0.20	0.54	0.58	146.85
53	265	4.42	2.1	0.789	0.21	0.21	0.58	0.62	158.90
54	270	4.50	2.1	0.789	0.21	0.21	0.58	0.62	158.90
55	275	4.58	2.2	0.826	0.21	0.21	0.62	0.66	170.96
56	280	4.67	2.3	0.864	0.21	0.22	0.66	0.70	183.02

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.07
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.18
UNIT TIME-PERCENT OF LAG	424.3
TOTAL ADJUSTED STORM RAIN-INCHES	3.13
CONSTANT LOSS RATE-in/hr	0.207
LOW LOSS RATE - PERCENT	26%

TOTAL PERCOLATION RATE (cfs) 0.09 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.901	0.21	0.23	0.69	0.74	195.07
58	290	4.83	2.4	0.901	0.21	0.23	0.69	0.74	195.07
59	295	4.92	2.5	0.939	0.21	0.24	0.73	0.78	207.13
60	300	5.00	2.6	0.977	0.21	0.25	0.77	0.82	219.19
61	305	5.08	3.1	1.164	0.21	0.30	0.96	1.02	279.47
62	310	5.17	3.6	1.352	0.21	0.35	1.14	1.23	339.75
63	315	5.25	3.9	1.465	0.21	0.38	1.26	1.35	375.92
64	320	5.33	4.2	1.578	0.21	0.41	1.37	1.47	412.09
65	325	5.42	4.7	1.765	0.21	0.46	1.56	1.67	472.38
66	330	5.50	5.6	2.103	0.21	0.55	1.90	2.03	580.89
67	335	5.58	1.9	0.714	0.21	0.19	0.51	0.54	134.79
68	340	5.67	0.9	0.338	0.21	0.09	0.13	0.14	14.22
69	345	5.75	0.6	0.225	0.21	0.06	0.02	0.02	0.00
70	350	5.83	0.5	0.188	0.21	0.05	0.14	0.15	16.83
71	355	5.92	0.3	0.113	0.21	0.03	0.08	0.09	0.00
72	360	6.00	0.2	0.075	0.21	0.02	0.06	0.06	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	1.94
FLOOD VOLUME (acft)	0.17
FLOOD VOLUME (cuft)	7549.40
REQUIRED STORAGE (acft)	0.13
REQUIRED STORAGE (cuft)	5667.01
PEAK FLOW RATE (cfs)	2.03

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES 1.070 UNIT TIME-MINUTES 15 LAG TIME - MINUTES 1.18 UNIT TIME-PERCENT OF LAG 1273.0 TOTAL ADJUSTED STORM RAIN-INCHES 5.06					CONSTANT LOSS RATE-in/hr n/a VARIABLE LOSS RATE (AVG) in/hr 0.2072 MINIMUM LOSS RATE (for var. loss) - in/hr 0.104 LOW LOSS RATE - DECIMAL 0.26 C 0.00192 PERCOLATION RATE (cfs) 0.09				
Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.040	0.366	0.011	0.030	0.03	0.00
2	30	0.50	0.3	0.061	0.362	0.016	0.045	0.05	0.00
3	45	0.75	0.3	0.061	0.357	0.016	0.045	0.05	0.00
4	60	1.00	0.4	0.081	0.353	0.021	0.060	0.06	0.00
5	75	1.25	0.3	0.061	0.349	0.016	0.045	0.05	0.00
6	90	1.50	0.3	0.061	0.345	0.016	0.045	0.05	0.00
7	105	1.75	0.3	0.061	0.341	0.016	0.045	0.05	0.00
8	120	2.00	0.4	0.081	0.337	0.021	0.060	0.06	0.00
9	135	2.25	0.4	0.081	0.333	0.021	0.060	0.06	0.00
10	150	2.50	0.4	0.081	0.329	0.021	0.060	0.06	0.00
11	165	2.75	0.5	0.101	0.325	0.026	0.075	0.08	0.00
12	180	3.00	0.5	0.101	0.321	0.026	0.075	0.08	0.00
13	195	3.25	0.5	0.101	0.317	0.026	0.075	0.08	0.00
14	210	3.50	0.5	0.101	0.313	0.026	0.075	0.08	0.00
15	225	3.75	0.5	0.101	0.309	0.026	0.075	0.08	0.00
16	240	4.00	0.6	0.121	0.305	0.032	0.090	0.10	3.21
17	255	4.25	0.6	0.121	0.301	0.032	0.090	0.10	3.21
18	270	4.50	0.7	0.142	0.297	0.037	0.105	0.11	17.63
19	285	4.75	0.7	0.142	0.293	0.037	0.105	0.11	17.63
20	300	5.00	0.8	0.162	0.290	0.042	0.120	0.13	32.05
21	315	5.25	0.6	0.121	0.286	0.032	0.090	0.10	3.21
22	330	5.50	0.7	0.142	0.282	0.037	0.105	0.11	17.63
23	345	5.75	0.8	0.162	0.278	0.042	0.120	0.13	32.05
24	360	6.00	0.8	0.162	0.275	0.042	0.120	0.13	32.05
25	375	6.25	0.9	0.182	0.271	0.047	0.135	0.14	46.48
26	390	6.50	0.9	0.182	0.267	0.047	0.135	0.14	46.48
27	405	6.75	1.0	0.202	0.264	0.053	0.150	0.16	60.90
28	420	7.00	1.0	0.202	0.260	0.053	0.150	0.16	60.90
29	435	7.25	1.0	0.202	0.257	0.053	0.150	0.16	60.90
30	450	7.50	1.1	0.223	0.253	0.058	0.165	0.18	75.32
31	465	7.75	1.2	0.243	0.250	0.063	0.180	0.19	89.75
32	480	8.00	1.3	0.263	0.246	0.068	0.017	0.02	0.00
33	495	8.25	1.5	0.304	0.243	0.079	0.061	0.06	0.00
34	510	8.50	1.5	0.304	0.240	0.079	0.064	0.07	0.00
35	525	8.75	1.6	0.324	0.236	0.084	0.088	0.09	1.07
36	540	9.00	1.7	0.344	0.233	0.089	0.111	0.12	23.76
37	555	9.25	1.9	0.385	0.230	0.100	0.155	0.17	65.92
38	570	9.50	2.0	0.405	0.226	0.105	0.178	0.19	88.56
39	585	9.75	2.1	0.425	0.223	0.111	0.202	0.22	111.16
40	600	10.00	2.2	0.445	0.220	0.116	0.225	0.24	133.74
41	615	10.25	1.5	0.304	0.217	0.079	0.087	0.09	0.36
42	630	10.50	1.5	0.304	0.214	0.079	0.090	0.10	3.39
43	645	10.75	2.0	0.405	0.210	0.105	0.194	0.21	103.84
44	660	11.00	2.0	0.405	0.207	0.105	0.197	0.21	106.80
45	675	11.25	1.9	0.385	0.204	0.100	0.180	0.19	90.25
46	690	11.50	1.9	0.385	0.201	0.100	0.183	0.20	93.15
47	705	11.75	1.7	0.344	0.198	0.089	0.146	0.16	57.04
48	720	12.00	1.8	0.364	0.195	0.095	0.169	0.18	79.37
49	735	12.25	2.5	0.506	0.192	0.132	0.314	0.34	218.62
50	750	12.50	2.6	0.526	0.190	0.137	0.337	0.36	240.88
51	765	12.75	2.8	0.567	0.187	0.147	0.380	0.41	282.61
52	780	13.00	2.9	0.587	0.184	0.153	0.403	0.43	304.81
53	795	13.25	3.4	0.688	0.181	0.179	0.507	0.54	404.94
54	810	13.50	3.4	0.688	0.178	0.179	0.510	0.55	407.59
55	825	13.75	2.3	0.466	0.176	0.121	0.290	0.31	195.79
56	840	14.00	2.3	0.466	0.173	0.121	0.293	0.31	198.37
57	855	14.25	2.7	0.546	0.170	0.142	0.376	0.40	278.87
58	870	14.50	2.6	0.526	0.168	0.137	0.358	0.38	261.89
59	885	14.75	2.6	0.526	0.165	0.137	0.361	0.39	264.36
60	900	15.00	2.5	0.506	0.163	0.132	0.343	0.37	247.30

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN B BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.070	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.2072
LAG TIME - MINUTES	1.18	MINIMUM LOSS RATE (for var. loss) - in/hr	0.104
UNIT TIME-PERCENT OF LAG	1273.0	LOW LOSS RATE - DECIMAL	0.26
TOTAL ADJUSTED STORM RAIN-INCHES	5.06	C	0.00192
		PERCOLATION RATE (cfs)	0.09

Unit Time Period	Time		Pattern	Storm Rain	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	Percent (Plate E-5.9)	in/hr	Max	Low	in/hr	cfs	cf
61	915	15.25	2.4	0.486	0.160	0.126	0.326	0.35	230.20
62	930	15.50	2.3	0.466	0.158	0.121	0.308	0.33	213.07
63	945	15.75	1.9	0.385	0.155	0.100	0.229	0.25	137.43
64	960	16.00	1.9	0.385	0.153	0.100	0.232	0.25	139.72
65	975	16.25	0.4	0.081	0.151	0.021	0.060	0.06	0.00
66	990	16.50	0.4	0.081	0.148	0.021	0.060	0.06	0.00
67	1005	16.75	0.3	0.061	0.146	0.016	0.045	0.05	0.00
68	1020	17.00	0.3	0.061	0.144	0.016	0.045	0.05	0.00
69	1035	17.25	0.5	0.101	0.142	0.026	0.075	0.08	0.00
70	1050	17.50	0.5	0.101	0.140	0.026	0.075	0.08	0.00
71	1065	17.75	0.5	0.101	0.137	0.026	0.075	0.08	0.00
72	1080	18.00	0.4	0.081	0.135	0.021	0.060	0.06	0.00
73	1095	18.25	0.4	0.081	0.133	0.021	0.060	0.06	0.00
74	1110	18.50	0.4	0.081	0.132	0.021	0.060	0.06	0.00
75	1125	18.75	0.3	0.061	0.130	0.016	0.045	0.05	0.00
76	1140	19.00	0.2	0.040	0.128	0.011	0.030	0.03	0.00
77	1155	19.25	0.3	0.061	0.126	0.016	0.045	0.05	0.00
78	1170	19.50	0.4	0.081	0.124	0.021	0.060	0.06	0.00
79	1185	19.75	0.3	0.061	0.123	0.016	0.045	0.05	0.00
80	1200	20.00	0.2	0.040	0.121	0.011	0.030	0.03	0.00
81	1215	20.25	0.3	0.061	0.119	0.016	0.045	0.05	0.00
82	1230	20.50	0.3	0.061	0.118	0.016	0.045	0.05	0.00
83	1245	20.75	0.3	0.061	0.116	0.016	0.045	0.05	0.00
84	1260	21.00	0.2	0.040	0.115	0.011	0.030	0.03	0.00
85	1275	21.25	0.3	0.061	0.113	0.016	0.045	0.05	0.00
86	1290	21.50	0.2	0.040	0.112	0.011	0.030	0.03	0.00
87	1305	21.75	0.3	0.061	0.111	0.016	0.045	0.05	0.00
88	1320	22.00	0.2	0.040	0.110	0.011	0.030	0.03	0.00
89	1335	22.25	0.3	0.061	0.109	0.016	0.045	0.05	0.00
90	1350	22.50	0.2	0.040	0.108	0.011	0.030	0.03	0.00
91	1365	22.75	0.2	0.040	0.107	0.011	0.030	0.03	0.00
92	1380	23.00	0.2	0.040	0.106	0.011	0.030	0.03	0.00
93	1395	23.25	0.2	0.040	0.105	0.011	0.030	0.03	0.00
94	1410	23.50	0.2	0.040	0.105	0.011	0.030	0.03	0.00
95	1425	23.75	0.2	0.040	0.104	0.011	0.030	0.03	0.00
96	1440	24.00	0.2	0.040	0.104	0.011	0.030	0.03	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	3.06
FLOOD VOLUME (acft)	0.27
FLOOD VOLUME (cuft)	11873.23
REQUIRED STORAGE (acft)	0.13
REQUIRED STORAGE (cuft)	5584.27
PEAK FLOW (cfs)	0.55

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN B

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
347	0	0		2000	0	0	0.00
348	1	1	0	2000	2000	2000	0.05
349	1	2	0	2000	2000	4000	0.09
350	1	3	0	2000	2000	6000	0.14
351	1	4	0	2000	2000	8000	0.18

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	0.09259	cfs
MAXWELL IV DRYWELLS			
NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		0.09259	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	5979	cu ft (100-yr 3-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	0.09259	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**18**	hrs < 36 hrs

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.18	55	55	28	27	347.01	27	0.00
2	10	0.18	55	82	28	54	347.03	54	0.00
3	15	0.12	36	90	28	62	347.03	62	0.00
4	20	0.24	73	135	28	108	347.05	108	0.00
5	25	0.24	73	181	28	153	347.08	153	0.00
6	30	0.34	101	254	28	227	347.11	227	0.01
7	35	0.24	73	300	28	272	347.14	272	0.01
8	40	0.34	101	373	28	346	347.17	346	0.01
9	45	0.34	101	447	28	419	347.21	419	0.01
10	50	0.24	73	492	28	465	347.23	465	0.01
11	55	0.28	83	547	28	520	347.26	520	0.01
12	60	0.34	101	621	28	593	347.30	593	0.01
13	65	0.46	139	732	28	704	347.35	704	0.02
14	70	0.46	139	842	28	815	347.41	815	0.02
15	75	0.46	139	953	28	925	347.46	925	0.02
16	80	0.40	120	1,045	28	1,018	347.51	1,018	0.02
17	85	0.59	176	1,193	28	1,166	347.58	1,166	0.03
18	90	0.62	185	1,351	28	1,323	347.66	1,323	0.03
19	95	0.52	157	1,480	28	1,453	347.73	1,453	0.03
20	100	0.62	185	1,638	28	1,610	347.80	1,610	0.04
21	105	0.80	241	1,851	28	1,823	347.91	1,823	0.04
22	110	0.74	222	2,046	28	2,018	348.01	2,018	0.05
23	115	0.68	204	2,222	28	2,194	348.10	2,194	0.05
24	120	0.71	213	2,407	28	2,379	348.19	2,379	0.05
25	125	0.74	222	2,602	28	2,574	348.29	2,574	0.06
26	130	1.08	325	2,899	28	2,871	348.44	2,871	0.07
27	135	1.33	400	3,271	28	3,243	348.62	3,243	0.07
28	140	0.87	260	3,503	28	3,475	348.74	3,475	0.08
29	145	1.89	567	4,042	28	4,015	349.01	4,015	0.09
30	150	2.05	614	4,629	28	4,601	349.30	4,601	0.11
31	155	2.33	698	5,299	28	5,271	349.64	5,271	0.12
32	160	1.61	483	5,754	28	5,727	349.86	5,727	0.13
33	165	0.40	120	5,847	28	5,819	349.91	5,819	0.13
34	170	0.34	101	5,920	28	5,892	349.95	5,892	0.14
35	175	0.34	101	5,994	28	5,966	349.98	5,966	0.14
36	180	0.14	41	6,007	28	5,979	349.99	5,979	0.14

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.15	45	45	28	17	347.01	17	0.00
2	10	0.02	6	23	28	-	347.00	-	0.00
3	15	0.02	6	6	28	-	347.00	-	0.00
4	20	0.02	6	6	28	-	347.00	-	0.00
5	25	0.02	6	6	28	-	347.00	-	0.00
6	30	0.06	18	18	28	-	347.00	-	0.00
7	35	0.06	18	18	28	-	347.00	-	0.00
8	40	0.06	18	18	28	-	347.00	-	0.00
9	45	0.06	18	18	28	-	347.00	-	0.00
10	50	0.06	18	18	28	-	347.00	-	0.00
11	55	0.06	18	18	28	-	347.00	-	0.00
12	60	0.10	30	30	28	2	347.00	2	0.00
13	65	0.10	30	32	28	4	347.00	4	0.00
14	70	0.10	30	34	28	6	347.00	6	0.00
15	75	0.10	30	36	28	9	347.00	9	0.00
16	80	0.10	30	39	28	11	347.01	11	0.00
17	85	0.10	30	41	28	13	347.01	13	0.00
18	90	0.10	30	43	28	15	347.01	15	0.00
19	95	0.10	30	45	28	17	347.01	17	0.00
20	100	0.10	30	47	28	19	347.01	19	0.00
21	105	0.10	30	49	28	22	347.01	22	0.00
22	110	0.10	30	52	28	24	347.01	24	0.00
23	115	0.10	30	54	28	26	347.01	26	0.00
24	120	0.14	42	68	28	40	347.02	40	0.00
25	125	0.10	30	70	28	42	347.02	42	0.00
26	130	0.14	42	84	28	57	347.03	57	0.00
27	135	0.14	42	99	28	71	347.04	71	0.00
28	140	0.14	42	113	28	85	347.04	85	0.00
29	145	0.14	42	127	28	99	347.05	99	0.00
30	150	0.14	42	141	28	113	347.06	113	0.00
31	155	0.14	42	155	28	128	347.06	128	0.00
32	160	0.14	42	170	28	142	347.07	142	0.00
33	165	0.18	54	196	28	168	347.08	168	0.00
34	170	0.18	54	222	28	194	347.10	194	0.00
35	175	0.18	54	249	28	221	347.11	221	0.01
36	180	0.18	54	275	28	247	347.12	247	0.01
37	185	0.18	54	301	28	273	347.14	273	0.01
38	190	0.22	66	339	28	312	347.16	312	0.01
39	195	0.22	66	378	28	350	347.17	350	0.01
40	200	0.22	66	416	28	388	347.19	388	0.01
41	205	0.26	78	466	28	439	347.22	439	0.01
42	210	0.30	90	529	28	501	347.25	501	0.01
43	215	0.34	102	603	28	576	347.29	576	0.01
44	220	0.34	102	678	28	650	347.33	650	0.01
45	225	0.38	114	765	28	737	347.37	737	0.02
46	230	0.38	114	851	28	823	347.41	823	0.02
47	235	0.42	126	950	28	922	347.46	922	0.02
48	240	0.42	126	1,048	28	1,021	347.51	1,021	0.02
49	245	0.46	138	1,159	28	1,131	347.57	1,131	0.03
50	250	0.50	151	1,282	28	1,254	347.63	1,254	0.03
51	255	0.54	163	1,417	28	1,389	347.69	1,389	0.03
52	260	0.58	175	1,563	28	1,536	347.77	1,536	0.04
53	265	0.62	187	1,722	28	1,694	347.85	1,694	0.04
54	270	0.62	187	1,881	28	1,853	347.93	1,853	0.04
55	275	0.66	199	2,052	28	2,024	348.01	2,024	0.05

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	0.70	211	2,235	28	2,207	348.10	2,207	0.05
57	285	0.74	223	2,430	28	2,402	348.20	2,402	0.06
58	290	0.74	223	2,625	28	2,598	348.30	2,598	0.06
59	295	0.78	235	2,832	28	2,805	348.40	2,805	0.06
60	300	0.82	247	3,052	28	3,024	348.51	3,024	0.07
61	305	1.02	307	3,331	28	3,303	348.65	3,303	0.08
62	310	1.23	368	3,671	28	3,643	348.82	3,643	0.08
63	315	1.35	404	4,047	28	4,019	349.01	4,019	0.09
64	320	1.47	440	4,459	28	4,431	349.22	4,431	0.10
65	325	1.67	500	4,931	28	4,903	349.45	4,903	0.11
66	330	2.03	609	5,512	28	5,484	349.74	5,484	0.13
67	335	0.54	163	5,647	28	5,619	349.81	5,619	0.13
68	340	0.14	42	5,661	28	5,633	349.82	5,633	0.13
69	345	0.02	6	5,639	28	5,611	349.81	5,611	0.13
70	350	0.15	45	5,656	28	5,628	349.81	5,628	0.13
71	355	0.09	27	5,655	28	5,627	349.81	5,627	0.13
72	360	0.06	18	5,645	28	5,617	349.81	5,617	0.13

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.03	29	29	83	-	347.00	-	0.00
2	30	0.05	43	43	83	-	347.00	-	0.00
3	45	0.05	43	43	83	-	347.00	-	0.00
4	60	0.06	58	58	83	-	347.00	-	0.00
5	75	0.05	43	43	83	-	347.00	-	0.00
6	90	0.05	43	43	83	-	347.00	-	0.00
7	105	0.05	43	43	83	-	347.00	-	0.00
8	120	0.06	58	58	83	-	347.00	-	0.00
9	135	0.06	58	58	83	-	347.00	-	0.00
10	150	0.06	58	58	83	-	347.00	-	0.00
11	165	0.08	72	72	83	-	347.00	-	0.00
12	180	0.08	72	72	83	-	347.00	-	0.00
13	195	0.08	72	72	83	-	347.00	-	0.00
14	210	0.08	72	72	83	-	347.00	-	0.00
15	225	0.08	72	72	83	-	347.00	-	0.00
16	240	0.10	87	87	83	3	347.00	3	0.00
17	255	0.10	87	90	83	6	347.00	6	0.00
18	270	0.11	101	107	83	24	347.01	24	0.00
19	285	0.11	101	125	83	42	347.02	42	0.00
20	300	0.13	115	157	83	74	347.04	74	0.00
21	315	0.10	87	160	83	77	347.04	77	0.00
22	330	0.11	101	178	83	95	347.05	95	0.00
23	345	0.13	115	210	83	127	347.06	127	0.00
24	360	0.13	115	242	83	159	347.08	159	0.00
25	375	0.14	130	288	83	205	347.10	205	0.00
26	390	0.14	130	335	83	252	347.13	252	0.01
27	405	0.16	144	396	83	313	347.16	313	0.01
28	420	0.16	144	457	83	373	347.19	373	0.01
29	435	0.16	144	518	83	434	347.22	434	0.01
30	450	0.18	159	593	83	510	347.25	510	0.01
31	465	0.19	173	683	83	599	347.30	599	0.01
32	480	0.02	16	616	83	532	347.27	532	0.01
33	495	0.06	58	591	83	507	347.25	507	0.01
34	510	0.07	62	569	83	486	347.24	486	0.01
35	525	0.09	84	570	83	487	347.24	487	0.01
36	540	0.12	107	594	83	510	347.26	510	0.01
37	555	0.17	149	660	83	576	347.29	576	0.01
38	570	0.19	172	748	83	665	347.33	665	0.02
39	585	0.22	194	859	83	776	347.39	776	0.02
40	600	0.24	217	993	83	910	347.45	910	0.02
41	615	0.09	84	994	83	910	347.46	910	0.02
42	630	0.10	87	997	83	914	347.46	914	0.02
43	645	0.21	187	1,101	83	1,017	347.51	1,017	0.02
44	660	0.21	190	1,208	83	1,124	347.56	1,124	0.03
45	675	0.19	174	1,298	83	1,214	347.61	1,214	0.03
46	690	0.20	176	1,391	83	1,308	347.65	1,308	0.03
47	705	0.16	140	1,448	83	1,365	347.68	1,365	0.03
48	720	0.18	163	1,527	83	1,444	347.72	1,444	0.03
49	735	0.34	302	1,746	83	1,663	347.83	1,663	0.04
50	750	0.36	324	1,987	83	1,904	347.95	1,904	0.04
51	765	0.41	366	2,270	83	2,186	348.09	2,186	0.05
52	780	0.43	388	2,574	83	2,491	348.25	2,491	0.06
53	795	0.54	488	2,979	83	2,896	348.45	2,896	0.07
54	810	0.55	491	3,387	83	3,304	348.65	3,304	0.08
55	825	0.31	279	3,583	83	3,499	348.75	3,499	0.08
56	840	0.31	282	3,781	83	3,698	348.85	3,698	0.08
57	855	0.40	362	4,060	83	3,977	348.99	3,977	0.09
58	870	0.38	345	4,322	83	4,238	349.12	4,238	0.10

RETENTION BASIN B
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.39	348	4,586	83	4,503	349.25	4,503	0.10
60	900	0.37	331	4,833	83	4,750	349.38	4,750	0.11
61	915	0.35	314	5,064	83	4,980	349.49	4,980	0.11
62	930	0.33	296	5,277	83	5,193	349.60	5,193	0.12
63	945	0.25	221	5,414	83	5,331	349.67	5,331	0.12
64	960	0.25	223	5,554	83	5,471	349.74	5,471	0.13
65	975	0.06	58	5,528	83	5,445	349.72	5,445	0.12
66	990	0.06	58	5,503	83	5,419	349.71	5,419	0.12
67	1005	0.05	43	5,463	83	5,379	349.69	5,379	0.12
68	1020	0.05	43	5,422	83	5,339	349.67	5,339	0.12
69	1035	0.08	72	5,411	83	5,328	349.66	5,328	0.12
70	1050	0.08	72	5,400	83	5,317	349.66	5,317	0.12
71	1065	0.08	72	5,389	83	5,305	349.65	5,305	0.12
72	1080	0.06	58	5,363	83	5,280	349.64	5,280	0.12
73	1095	0.06	58	5,338	83	5,254	349.63	5,254	0.12
74	1110	0.06	58	5,312	83	5,229	349.61	5,229	0.12
75	1125	0.05	43	5,272	83	5,188	349.59	5,188	0.12
76	1140	0.03	29	5,217	83	5,134	349.57	5,134	0.12
77	1155	0.05	43	5,177	83	5,094	349.55	5,094	0.12
78	1170	0.06	58	5,152	83	5,068	349.53	5,068	0.12
79	1185	0.05	43	5,112	83	5,028	349.51	5,028	0.12
80	1200	0.03	29	5,057	83	4,974	349.49	4,974	0.11
81	1215	0.05	43	5,017	83	4,934	349.47	4,934	0.11
82	1230	0.05	43	4,977	83	4,894	349.45	4,894	0.11
83	1245	0.05	43	4,937	83	4,854	349.43	4,854	0.11
84	1260	0.03	29	4,882	83	4,799	349.40	4,799	0.11
85	1275	0.05	43	4,842	83	4,759	349.38	4,759	0.11
86	1290	0.03	29	4,788	83	4,705	349.35	4,705	0.11
87	1305	0.05	43	4,748	83	4,664	349.33	4,664	0.11
88	1320	0.03	29	4,693	83	4,610	349.30	4,610	0.11
89	1335	0.05	43	4,653	83	4,570	349.28	4,570	0.10
90	1350	0.03	29	4,599	83	4,515	349.26	4,515	0.10
91	1365	0.03	29	4,544	83	4,461	349.23	4,461	0.10
92	1380	0.03	29	4,490	83	4,406	349.20	4,406	0.10
93	1395	0.03	29	4,435	83	4,352	349.18	4,352	0.10
94	1410	0.03	29	4,381	83	4,297	349.15	4,297	0.10
95	1425	0.03	29	4,326	83	4,243	349.12	4,243	0.10
96	1440	0.03	29	4,272	83	4,188	349.09	4,188	0.10

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN C		
10	AREA DESIGNATION	SUBAREA C (DRIVE-THRU)		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL	1.24		
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	18%		
27				
28	LENGTH OF WATERCOURSE (L)	334		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	160		
30				
31	ELEVATION OF HEADWATER	366		
32	ELEVATION OF CONCENTRATION POINT	364.58		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		359	2200	
45		360	2200	
46		361	2200	
47		362	2200	
48		363	2200	
49				
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN C
[2] AREA DESIGNATION	SUBAREA C (DRIVE-THRU)
[3] AREA - ACRES	1.240
[4] L-FEET	334
[5] L-MILES	0.063
[6] La-FEET	160
[7] La-MILES	0.030
[8] ELEVATION OF HEADWATER	366
[9] ELEVATION OF CONCENTRATION POINT	364.58
[10] H-FEET	1.42
[11] S-FEET/MILE	22.4
[12] S^0.5	4.74
[13] L*LCA/S^0.5	0.00040
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.018
[16] LAG TIME-MINUTES	1.11
[17] 25% OF LAG-MINUTES	0.28
[18] 40% OF LAG-MINUTES	0.44
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.10

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	1.240	1.00	2.42	3.13	1.240	1.00	3.13	5.06	1.240	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	1.24	SUM [7]	2.42	SUM [9]	1.24	SUM [11]	3.13	SUM [13]	1.24	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	2.00	2.31	3.43
FLOOD VOLUME	(cu-ft)	8,994	10,384	15,446
	(acre-ft)	0.21	0.24	0.35
REQUIRED STORAGE	(cu-ft)	7,838	8,132	8,559
	(acre-ft)	0.18	0.19	0.20
PEAK FLOW	(cfs)	2.78	2.43	0.70
MAXIMUM WSEL	(ft)	362.56	362.69	362.74

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN C
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
A	COMMERCIAL	32	0.74	90%	0.14	1.24	1.000	0.1406
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
	SF - 1/4 ACRE			50%	0.00	0.00	0.000	0.0000
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
	MF - APARTMENTS			80%	0.00	0.00	0.000	0.0000
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
	RETENTION BASINS			0%	0.00	0.00	0.000	0.0000
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	1.24	SUM	0.1406

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.0703
C= 0.00130

Ft=C(24-(T/60))^1.55 = 0.00130 (24-(T/60))^1.55 + 0.07 in/hr

LOW LOSS RATE (80-90 PERCENT) = 18%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN C
BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.24
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.11
UNIT TIME-PERCENT OF LAG	450.7
TOTAL ADJUSTED STORM RAIN-INCHES	2.42
CONSTANT LOSS RATE-in/hr	0.14
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.10 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.14	0.07	0.237	0.29	57.58
2	10	0.17	1.3	0.378	0.14	0.07	0.237	0.29	57.58
3	15	0.25	1.1	0.319	0.14	0.06	0.179	0.22	35.97
4	20	0.33	1.5	0.436	0.14	0.08	0.295	0.37	79.18
5	25	0.42	1.5	0.436	0.14	0.08	0.295	0.37	79.18
6	30	0.50	1.8	0.523	0.14	0.09	0.382	0.47	111.59
7	35	0.58	1.5	0.436	0.14	0.08	0.295	0.37	79.18
8	40	0.67	1.8	0.523	0.14	0.09	0.382	0.47	111.59
9	45	0.75	1.8	0.523	0.14	0.09	0.382	0.47	111.59
10	50	0.83	1.5	0.436	0.14	0.08	0.295	0.37	79.18
11	55	0.92	1.6	0.465	0.14	0.08	0.324	0.40	89.99
12	60	1.00	1.8	0.523	0.14	0.09	0.382	0.47	111.59
13	65	1.08	2.2	0.639	0.14	0.11	0.498	0.62	154.80
14	70	1.17	2.2	0.639	0.14	0.11	0.498	0.62	154.80
15	75	1.25	2.2	0.639	0.14	0.11	0.498	0.62	154.80
16	80	1.33	2.0	0.581	0.14	0.10	0.440	0.55	133.20
17	85	1.42	2.6	0.755	0.14	0.14	0.614	0.76	198.02
18	90	1.50	2.7	0.784	0.14	0.14	0.643	0.80	208.82
19	95	1.58	2.4	0.697	0.14	0.13	0.556	0.69	176.41
20	100	1.67	2.7	0.784	0.14	0.14	0.643	0.80	208.82
21	105	1.75	3.3	0.958	0.14	0.17	0.818	1.01	273.64
22	110	1.83	3.1	0.900	0.14	0.16	0.760	0.94	252.03
23	115	1.92	2.9	0.842	0.14	0.15	0.702	0.87	230.42
24	120	2.00	3.0	0.871	0.14	0.16	0.731	0.91	241.23
25	125	2.08	3.1	0.900	0.14	0.16	0.760	0.94	252.03
26	130	2.17	4.2	1.220	0.14	0.22	1.079	1.34	370.86
27	135	2.25	5.0	1.452	0.14	0.26	1.311	1.63	457.29
28	140	2.33	3.5	1.016	0.14	0.18	0.876	1.09	295.24
29	145	2.42	6.8	1.975	0.14	0.36	1.834	2.27	651.74
30	150	2.50	7.3	2.120	0.14	0.38	1.979	2.45	705.75
31	155	2.58	8.2	2.381	0.14	0.43	2.241	2.78	802.98
32	160	2.67	5.9	1.713	0.14	0.31	1.573	1.95	554.51
33	165	2.75	2.0	0.581	0.14	0.10	0.440	0.55	133.20
34	170	2.83	1.8	0.523	0.14	0.09	0.382	0.47	111.59
35	175	2.92	1.8	0.523	0.14	0.09	0.382	0.47	111.59
36	180	3.00	0.6	0.174	0.14	0.03	0.034	0.04	0.00
							23.978		7838.01

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.00
FLOOD VOLUME (acft)	0.21
FLOOD VOLUME (cuft)	8994.33
REQUIRED STORAGE (acft)	0.18
REQUIRED STORAGE (cuft)	7838.01
PEAK FLOW RATE (cfs)	2.78

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN C

BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.24
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.11
UNIT TIME-PERCENT OF LAG	450.7
TOTAL ADJUSTED STORM RAIN-INCHES	3.13
CONSTANT LOSS RATE-in/hr	0.141
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.10 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.188	0.14	0.03	0.05	0.06	0.00
2	10	0.17	0.6	0.225	0.14	0.04	0.08	0.11	0.98
3	15	0.25	0.6	0.225	0.14	0.04	0.08	0.11	0.98
4	20	0.33	0.6	0.225	0.14	0.04	0.08	0.11	0.98
5	25	0.42	0.6	0.225	0.14	0.04	0.08	0.11	0.98
6	30	0.50	0.7	0.263	0.14	0.05	0.12	0.15	14.95
7	35	0.58	0.7	0.263	0.14	0.05	0.12	0.15	14.95
8	40	0.67	0.7	0.263	0.14	0.05	0.12	0.15	14.95
9	45	0.75	0.7	0.263	0.14	0.05	0.12	0.15	14.95
10	50	0.83	0.7	0.263	0.14	0.05	0.12	0.15	14.95
11	55	0.92	0.7	0.263	0.14	0.05	0.12	0.15	14.95
12	60	1.00	0.8	0.300	0.14	0.05	0.16	0.20	28.92
13	65	1.08	0.8	0.300	0.14	0.05	0.16	0.20	28.92
14	70	1.17	0.8	0.300	0.14	0.05	0.16	0.20	28.92
15	75	1.25	0.8	0.300	0.14	0.05	0.16	0.20	28.92
16	80	1.33	0.8	0.300	0.14	0.05	0.16	0.20	28.92
17	85	1.42	0.8	0.300	0.14	0.05	0.16	0.20	28.92
18	90	1.50	0.8	0.300	0.14	0.05	0.16	0.20	28.92
19	95	1.58	0.8	0.300	0.14	0.05	0.16	0.20	28.92
20	100	1.67	0.8	0.300	0.14	0.05	0.16	0.20	28.92
21	105	1.75	0.8	0.300	0.14	0.05	0.16	0.20	28.92
22	110	1.83	0.8	0.300	0.14	0.05	0.16	0.20	28.92
23	115	1.92	0.8	0.300	0.14	0.05	0.16	0.20	28.92
24	120	2.00	0.9	0.338	0.14	0.06	0.20	0.24	42.89
25	125	2.08	0.8	0.300	0.14	0.05	0.16	0.20	28.92
26	130	2.17	0.9	0.338	0.14	0.06	0.20	0.24	42.89
27	135	2.25	0.9	0.338	0.14	0.06	0.20	0.24	42.89
28	140	2.33	0.9	0.338	0.14	0.06	0.20	0.24	42.89
29	145	2.42	0.9	0.338	0.14	0.06	0.20	0.24	42.89
30	150	2.50	0.9	0.338	0.14	0.06	0.20	0.24	42.89
31	155	2.58	0.9	0.338	0.14	0.06	0.20	0.24	42.89
32	160	2.67	0.9	0.338	0.14	0.06	0.20	0.24	42.89
33	165	2.75	1.0	0.376	0.14	0.07	0.24	0.29	56.86
34	170	2.83	1.0	0.376	0.14	0.07	0.24	0.29	56.86
35	175	2.92	1.0	0.376	0.14	0.07	0.24	0.29	56.86
36	180	3.00	1.0	0.376	0.14	0.07	0.24	0.29	56.86
37	185	3.08	1.0	0.376	0.14	0.07	0.24	0.29	56.86
38	190	3.17	1.1	0.413	0.14	0.07	0.27	0.34	70.84
39	195	3.25	1.1	0.413	0.14	0.07	0.27	0.34	70.84
40	200	3.33	1.1	0.413	0.14	0.07	0.27	0.34	70.84
41	205	3.42	1.2	0.451	0.14	0.08	0.31	0.38	84.81
42	210	3.50	1.3	0.488	0.14	0.09	0.35	0.43	98.78
43	215	3.58	1.4	0.526	0.14	0.09	0.39	0.48	112.75
44	220	3.67	1.4	0.526	0.14	0.09	0.39	0.48	112.75
45	225	3.75	1.5	0.563	0.14	0.10	0.42	0.52	126.73
46	230	3.83	1.5	0.563	0.14	0.10	0.42	0.52	126.73
47	235	3.92	1.6	0.601	0.14	0.11	0.46	0.57	140.70
48	240	4.00	1.6	0.601	0.14	0.11	0.46	0.57	140.70
49	245	4.08	1.7	0.639	0.14	0.11	0.50	0.62	154.67
50	250	4.17	1.8	0.676	0.14	0.12	0.54	0.66	168.64
51	255	4.25	1.9	0.714	0.14	0.13	0.57	0.71	182.62
52	260	4.33	2.0	0.751	0.14	0.14	0.61	0.76	196.59
53	265	4.42	2.1	0.789	0.14	0.14	0.65	0.80	210.56
54	270	4.50	2.1	0.789	0.14	0.14	0.65	0.80	210.56
55	275	4.58	2.2	0.826	0.14	0.15	0.69	0.85	224.53
56	280	4.67	2.3	0.864	0.14	0.16	0.72	0.90	238.50

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN C BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.24		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.11		
UNIT TIME-PERCENT OF LAG	450.7		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.141		
LOW LOSS RATE - PERCENT	18%	TOTAL PERCOLATION RATE (cfs)	0.10 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.901	0.14	0.16	0.76	0.94	252.48
58	290	4.83	2.4	0.901	0.14	0.16	0.76	0.94	252.48
59	295	4.92	2.5	0.939	0.14	0.17	0.80	0.99	266.45
60	300	5.00	2.6	0.977	0.14	0.18	0.84	1.04	280.42
61	305	5.08	3.1	1.164	0.14	0.21	1.02	1.27	350.28
62	310	5.17	3.6	1.352	0.14	0.24	1.21	1.50	420.14
63	315	5.25	3.9	1.465	0.14	0.26	1.32	1.64	462.06
64	320	5.33	4.2	1.578	0.14	0.28	1.44	1.78	503.98
65	325	5.42	4.7	1.765	0.14	0.32	1.62	2.01	573.84
66	330	5.50	5.6	2.103	0.14	0.38	1.96	2.43	699.59
67	335	5.58	1.9	0.714	0.14	0.13	0.57	0.71	182.62
68	340	5.67	0.9	0.338	0.14	0.06	0.20	0.24	42.89
69	345	5.75	0.6	0.225	0.14	0.04	0.08	0.11	0.98
70	350	5.83	0.5	0.188	0.14	0.03	0.05	0.06	0.00
71	355	5.92	0.3	0.113	0.14	0.02	0.09	0.11	3.82
72	360	6.00	0.2	0.075	0.14	0.01	0.06	0.08	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.31
FLOOD VOLUME (acft)	0.24
FLOOD VOLUME (cuft)	10384.38
REQUIRED STORAGE (acft)	0.19
REQUIRED STORAGE (cuft)	8132.16
PEAK FLOW RATE (cfs)	2.43

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN C BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			1.240	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.1406		
LAG TIME - MINUTES			1.11	MINIMUM LOSS RATE (for var. loss) - in/hr			0.070		
UNIT TIME-PERCENT OF LAG			1352.0	LOW LOSS RATE - DECIMAL			0.18		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00130		
				PERCOLATION RATE (cfs)			0.10		
Unit Time Period	Time		Pattern	Storm	Loss Rate		Effective	Flood	Required
	Minutes	Hours	Percent	Rain in/hr	in/hr		Rain	Hydrograph Flow	Storage
			(Plate E-5.9)		Max	Low	in/hr	cfs	cf
1	15	0.25	0.2	0.040	0.248	0.007	0.033	0.04	0.00
2	30	0.50	0.3	0.061	0.245	0.011	0.050	0.06	0.00
3	45	0.75	0.3	0.061	0.243	0.011	0.050	0.06	0.00
4	60	1.00	0.4	0.081	0.240	0.015	0.066	0.08	0.00
5	75	1.25	0.3	0.061	0.237	0.011	0.050	0.06	0.00
6	90	1.50	0.3	0.061	0.234	0.011	0.050	0.06	0.00
7	105	1.75	0.3	0.061	0.231	0.011	0.050	0.06	0.00
8	120	2.00	0.4	0.081	0.228	0.015	0.066	0.08	0.00
9	135	2.25	0.4	0.081	0.226	0.015	0.066	0.08	0.00
10	150	2.50	0.4	0.081	0.223	0.015	0.066	0.08	0.00
11	165	2.75	0.5	0.101	0.220	0.018	0.083	0.10	0.94
12	180	3.00	0.5	0.101	0.218	0.018	0.083	0.10	0.94
13	195	3.25	0.5	0.101	0.215	0.018	0.083	0.10	0.94
14	210	3.50	0.5	0.101	0.212	0.018	0.083	0.10	0.94
15	225	3.75	0.5	0.101	0.210	0.018	0.083	0.10	0.94
16	240	4.00	0.6	0.121	0.207	0.022	0.100	0.12	19.47
17	255	4.25	0.6	0.121	0.204	0.022	0.100	0.12	19.47
18	270	4.50	0.7	0.142	0.202	0.026	0.116	0.14	37.99
19	285	4.75	0.7	0.142	0.199	0.026	0.116	0.14	37.99
20	300	5.00	0.8	0.162	0.196	0.029	0.133	0.16	56.51
21	315	5.25	0.6	0.121	0.194	0.022	0.100	0.12	19.47
22	330	5.50	0.7	0.142	0.191	0.026	0.116	0.14	37.99
23	345	5.75	0.8	0.162	0.189	0.029	0.133	0.16	56.51
24	360	6.00	0.8	0.162	0.186	0.029	0.133	0.16	56.51
25	375	6.25	0.9	0.182	0.184	0.033	0.149	0.19	75.03
26	390	6.50	0.9	0.182	0.181	0.033	0.001	0.00	0.00
27	405	6.75	1.0	0.202	0.179	0.036	0.023	0.03	0.00
28	420	7.00	1.0	0.202	0.177	0.036	0.026	0.03	0.00
29	435	7.25	1.0	0.202	0.174	0.036	0.028	0.03	0.00
30	450	7.50	1.1	0.223	0.172	0.040	0.051	0.06	0.00
31	465	7.75	1.2	0.243	0.170	0.044	0.073	0.09	0.00
32	480	8.00	1.3	0.263	0.167	0.047	0.096	0.12	15.41
33	495	8.25	1.5	0.304	0.165	0.055	0.139	0.17	63.18
34	510	8.50	1.5	0.304	0.163	0.055	0.141	0.17	65.74
35	525	8.75	1.6	0.324	0.160	0.058	0.164	0.20	90.87
36	540	9.00	1.7	0.344	0.158	0.062	0.186	0.23	115.98
37	555	9.25	1.9	0.385	0.156	0.069	0.229	0.28	163.65
38	570	9.50	2.0	0.405	0.154	0.073	0.251	0.31	188.71
39	585	9.75	2.1	0.425	0.151	0.077	0.274	0.34	213.75
40	600	10.00	2.2	0.445	0.149	0.080	0.296	0.37	238.77
41	615	10.25	1.5	0.304	0.147	0.055	0.157	0.19	83.05
42	630	10.50	1.5	0.304	0.145	0.055	0.159	0.20	85.43
43	645	10.75	2.0	0.405	0.143	0.073	0.262	0.32	200.73
44	660	11.00	2.0	0.405	0.141	0.073	0.264	0.33	203.06
45	675	11.25	1.9	0.385	0.139	0.069	0.246	0.30	182.78
46	690	11.50	1.9	0.385	0.137	0.069	0.248	0.31	185.06
47	705	11.75	1.7	0.344	0.135	0.062	0.210	0.26	142.15
48	720	12.00	1.8	0.364	0.133	0.066	0.232	0.29	166.97
49	735	12.25	2.5	0.506	0.131	0.091	0.375	0.47	327.29
50	750	12.50	2.6	0.526	0.129	0.095	0.398	0.49	352.06
51	765	12.75	2.8	0.567	0.127	0.102	0.440	0.55	399.39
52	780	13.00	2.9	0.587	0.125	0.106	0.462	0.57	424.11
53	795	13.25	3.4	0.688	0.123	0.124	0.565	0.70	539.16
54	810	13.50	3.4	0.688	0.121	0.124	0.567	0.70	541.24
55	825	13.75	2.3	0.466	0.119	0.084	0.346	0.43	294.82
56	840	14.00	2.3	0.466	0.117	0.084	0.348	0.43	296.85
57	855	14.25	2.7	0.546	0.116	0.098	0.431	0.53	389.20
58	870	14.50	2.6	0.526	0.114	0.095	0.412	0.51	368.58
59	885	14.75	2.6	0.526	0.112	0.095	0.414	0.51	370.52
60	900	15.00	2.5	0.506	0.110	0.091	0.396	0.49	349.85

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN C BY: PK DATE: 7/4/2022				

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	1.240	CONSTANT LOSS RATE-in/hr	n/a
UNIT TIME-MINUTES	15	VARIABLE LOSS RATE (AVG) in/hr	0.1406
LAG TIME - MINUTES	1.11	MINIMUM LOSS RATE (for var. loss) - in/hr	0.070
UNIT TIME-PERCENT OF LAG	1352.0	LOW LOSS RATE - DECIMAL	0.18
TOTAL ADJUSTED STORM RAIN-INCHES	5.06	C	0.00130
		PERCOLATION RATE (cfs)	0.10

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
61	915	15.25	2.4	0.486	0.109	0.087	0.377	0.47	329.14
62	930	15.50	2.3	0.466	0.107	0.084	0.358	0.44	308.41
63	945	15.75	1.9	0.385	0.105	0.069	0.279	0.35	219.89
64	960	16.00	1.9	0.385	0.104	0.069	0.281	0.35	221.68
65	975	16.25	0.4	0.081	0.102	0.015	0.066	0.08	0.00
66	990	16.50	0.4	0.081	0.101	0.015	0.066	0.08	0.00
67	1005	16.75	0.3	0.061	0.099	0.011	0.050	0.06	0.00
68	1020	17.00	0.3	0.061	0.098	0.011	0.050	0.06	0.00
69	1035	17.25	0.5	0.101	0.096	0.018	0.005	0.01	0.00
70	1050	17.50	0.5	0.101	0.095	0.018	0.006	0.01	0.00
71	1065	17.75	0.5	0.101	0.093	0.018	0.008	0.01	0.00
72	1080	18.00	0.4	0.081	0.092	0.015	0.066	0.08	0.00
73	1095	18.25	0.4	0.081	0.091	0.015	0.066	0.08	0.00
74	1110	18.50	0.4	0.081	0.089	0.015	0.066	0.08	0.00
75	1125	18.75	0.3	0.061	0.088	0.011	0.050	0.06	0.00
76	1140	19.00	0.2	0.040	0.087	0.007	0.033	0.04	0.00
77	1155	19.25	0.3	0.061	0.085	0.011	0.050	0.06	0.00
78	1170	19.50	0.4	0.081	0.084	0.015	0.066	0.08	0.00
79	1185	19.75	0.3	0.061	0.083	0.011	0.050	0.06	0.00
80	1200	20.00	0.2	0.040	0.082	0.007	0.033	0.04	0.00
81	1215	20.25	0.3	0.061	0.081	0.011	0.050	0.06	0.00
82	1230	20.50	0.3	0.061	0.080	0.011	0.050	0.06	0.00
83	1245	20.75	0.3	0.061	0.079	0.011	0.050	0.06	0.00
84	1260	21.00	0.2	0.040	0.078	0.007	0.033	0.04	0.00
85	1275	21.25	0.3	0.061	0.077	0.011	0.050	0.06	0.00
86	1290	21.50	0.2	0.040	0.076	0.007	0.033	0.04	0.00
87	1305	21.75	0.3	0.061	0.075	0.011	0.050	0.06	0.00
88	1320	22.00	0.2	0.040	0.074	0.007	0.033	0.04	0.00
89	1335	22.25	0.3	0.061	0.074	0.011	0.050	0.06	0.00
90	1350	22.50	0.2	0.040	0.073	0.007	0.033	0.04	0.00
91	1365	22.75	0.2	0.040	0.072	0.007	0.033	0.04	0.00
92	1380	23.00	0.2	0.040	0.072	0.007	0.033	0.04	0.00
93	1395	23.25	0.2	0.040	0.071	0.007	0.033	0.04	0.00
94	1410	23.50	0.2	0.040	0.071	0.007	0.033	0.04	0.00
95	1425	23.75	0.2	0.040	0.071	0.007	0.033	0.04	0.00
96	1440	24.00	0.2	0.040	0.070	0.007	0.033	0.04	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	3.43
FLOOD VOLUME (acft)	0.35
FLOOD VOLUME (cuft)	15445.60
REQUIRED STORAGE (acft)	0.20
REQUIRED STORAGE (cuft)	8559.12
PEAK FLOW (cfs)	0.70

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN C

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
359	0	0		2200	0	0	0.00
360	1	1	0	2200	2200	2200	0.05
361	1	2	0	2200	2200	4400	0.10
362	1	3	0	2200	2200	6600	0.15
363	1	4	0	2200	2200	8800	0.20

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	0.10185	cfs
MAXWELL IV DRYWELLS			
NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		0.10185	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	8559	cu ft (100-yr 24-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	0.10185	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**23**	hrs < 36 hrs

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.29	88	88	31	58	359.03	58	0.00
2	10	0.29	88	146	31	115	359.05	115	0.00
3	15	0.22	67	182	31	151	359.07	151	0.00
4	20	0.37	110	261	31	230	359.10	230	0.01
5	25	0.37	110	340	31	309	359.14	309	0.01
6	30	0.47	142	452	31	421	359.19	421	0.01
7	35	0.37	110	531	31	500	359.23	500	0.01
8	40	0.47	142	642	31	612	359.28	612	0.01
9	45	0.47	142	754	31	723	359.33	723	0.02
10	50	0.37	110	833	31	803	359.36	803	0.02
11	55	0.40	121	923	31	893	359.41	893	0.02
12	60	0.47	142	1,035	31	1,004	359.46	1,004	0.02
13	65	0.62	185	1,190	31	1,159	359.53	1,159	0.03
14	70	0.62	185	1,344	31	1,314	359.60	1,314	0.03
15	75	0.62	185	1,499	31	1,469	359.67	1,469	0.03
16	80	0.55	164	1,632	31	1,602	359.73	1,602	0.04
17	85	0.76	229	1,830	31	1,800	359.82	1,800	0.04
18	90	0.80	239	2,039	31	2,009	359.91	2,009	0.05
19	95	0.69	207	2,216	31	2,185	359.99	2,185	0.05
20	100	0.80	239	2,424	31	2,394	360.09	2,394	0.05
21	105	1.01	304	2,698	31	2,668	360.21	2,668	0.06
22	110	0.94	283	2,950	31	2,920	360.33	2,920	0.07
23	115	0.87	261	3,181	31	3,150	360.43	3,150	0.07
24	120	0.91	272	3,422	31	3,391	360.54	3,391	0.08
25	125	0.94	283	3,674	31	3,643	360.66	3,643	0.08
26	130	1.34	401	4,045	31	4,014	360.82	4,014	0.09
27	135	1.63	488	4,502	31	4,471	361.03	4,471	0.10
28	140	1.09	326	4,797	31	4,767	361.17	4,767	0.11
29	145	2.27	682	5,449	31	5,418	361.46	5,418	0.12
30	150	2.45	736	6,155	31	6,124	361.78	6,124	0.14
31	155	2.78	834	6,958	31	6,927	362.15	6,927	0.16
32	160	1.95	585	7,512	31	7,482	362.40	7,482	0.17
33	165	0.55	164	7,645	31	7,615	362.46	7,615	0.17
34	170	0.47	142	7,757	31	7,726	362.51	7,726	0.18
35	175	0.47	142	7,869	31	7,838	362.56	7,838	0.18
36	180	0.04	13	7,851	31	7,820	362.55	7,820	0.18

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.06	18	18	31	-	359.00	-	0.00
2	10	0.11	32	32	31	1	359.00	1	0.00
3	15	0.11	32	33	31	2	359.00	2	0.00
4	20	0.11	32	33	31	3	359.00	3	0.00
5	25	0.11	32	34	31	4	359.00	4	0.00
6	30	0.15	46	49	31	19	359.01	19	0.00
7	35	0.15	46	64	31	34	359.02	34	0.00
8	40	0.15	46	79	31	49	359.02	49	0.00
9	45	0.15	46	94	31	64	359.03	64	0.00
10	50	0.15	46	109	31	79	359.04	79	0.00
11	55	0.15	46	124	31	94	359.04	94	0.00
12	60	0.20	59	153	31	123	359.06	123	0.00
13	65	0.20	59	182	31	151	359.07	151	0.00
14	70	0.20	59	211	31	180	359.08	180	0.00
15	75	0.20	59	240	31	209	359.10	209	0.00
16	80	0.20	59	269	31	238	359.11	238	0.01
17	85	0.20	59	298	31	267	359.12	267	0.01
18	90	0.20	59	327	31	296	359.13	296	0.01
19	95	0.20	59	355	31	325	359.15	325	0.01
20	100	0.20	59	384	31	354	359.16	354	0.01
21	105	0.20	59	413	31	383	359.17	383	0.01
22	110	0.20	59	442	31	412	359.19	412	0.01
23	115	0.20	59	471	31	441	359.20	441	0.01
24	120	0.24	73	514	31	484	359.22	484	0.01
25	125	0.20	59	543	31	512	359.23	512	0.01
26	130	0.24	73	586	31	555	359.25	555	0.01
27	135	0.24	73	629	31	598	359.27	598	0.01
28	140	0.24	73	672	31	641	359.29	641	0.01
29	145	0.24	73	715	31	684	359.31	684	0.02
30	150	0.24	73	757	31	727	359.33	727	0.02
31	155	0.24	73	800	31	770	359.35	770	0.02
32	160	0.24	73	843	31	813	359.37	813	0.02
33	165	0.29	87	900	31	870	359.40	870	0.02
34	170	0.29	87	957	31	926	359.42	926	0.02
35	175	0.29	87	1,014	31	983	359.45	983	0.02
36	180	0.29	87	1,071	31	1,040	359.47	1,040	0.02
37	185	0.29	87	1,128	31	1,097	359.50	1,097	0.03
38	190	0.34	101	1,198	31	1,168	359.53	1,168	0.03
39	195	0.34	101	1,269	31	1,239	359.56	1,239	0.03
40	200	0.34	101	1,340	31	1,310	359.60	1,310	0.03
41	205	0.38	115	1,425	31	1,394	359.63	1,394	0.03
42	210	0.43	129	1,524	31	1,493	359.68	1,493	0.03
43	215	0.48	143	1,636	31	1,606	359.73	1,606	0.04
44	220	0.48	143	1,749	31	1,719	359.78	1,719	0.04
45	225	0.52	157	1,876	31	1,845	359.84	1,845	0.04
46	230	0.52	157	2,003	31	1,972	359.90	1,972	0.05
47	235	0.57	171	2,143	31	2,113	359.96	2,113	0.05
48	240	0.57	171	2,284	31	2,253	360.02	2,253	0.05
49	245	0.62	185	2,439	31	2,408	360.09	2,408	0.06
50	250	0.66	199	2,607	31	2,577	360.17	2,577	0.06
51	255	0.71	213	2,790	31	2,759	360.25	2,759	0.06
52	260	0.76	227	2,987	31	2,956	360.34	2,956	0.07
53	265	0.80	241	3,197	31	3,167	360.44	3,167	0.07
54	270	0.80	241	3,408	31	3,377	360.54	3,377	0.08
55	275	0.85	255	3,632	31	3,602	360.64	3,602	0.08

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	0.90	269	3,871	31	3,840	360.75	3,840	0.09
57	285	0.94	283	4,123	31	4,093	360.86	4,093	0.09
58	290	0.94	283	4,376	31	4,345	360.98	4,345	0.10
59	295	0.99	297	4,642	31	4,612	361.10	4,612	0.11
60	300	1.04	311	4,923	31	4,892	361.22	4,892	0.11
61	305	1.27	381	5,273	31	5,242	361.38	5,242	0.12
62	310	1.50	451	5,693	31	5,662	361.57	5,662	0.13
63	315	1.64	493	6,155	31	6,124	361.78	6,124	0.14
64	320	1.78	535	6,659	31	6,628	362.01	6,628	0.15
65	325	2.01	604	7,233	31	7,202	362.27	7,202	0.17
66	330	2.43	730	7,932	31	7,902	362.59	7,902	0.18
67	335	0.71	213	8,115	31	8,084	362.67	8,084	0.19
68	340	0.24	73	8,158	31	8,127	362.69	8,127	0.19
69	345	0.11	32	8,159	31	8,128	362.69	8,128	0.19
70	350	0.06	18	8,146	31	8,115	362.69	8,115	0.19
71	355	0.11	34	8,150	31	8,119	362.69	8,119	0.19
72	360	0.08	23	8,142	31	8,112	362.69	8,112	0.19

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.04	37	37	92	-	359.00	-	0.00
2	30	0.06	56	56	92	-	359.00	-	0.00
3	45	0.06	56	56	92	-	359.00	-	0.00
4	60	0.08	74	74	92	-	359.00	-	0.00
5	75	0.06	56	56	92	-	359.00	-	0.00
6	90	0.06	56	56	92	-	359.00	-	0.00
7	105	0.06	56	56	92	-	359.00	-	0.00
8	120	0.08	74	74	92	-	359.00	-	0.00
9	135	0.08	74	74	92	-	359.00	-	0.00
10	150	0.08	74	74	92	-	359.00	-	0.00
11	165	0.10	93	93	92	1	359.00	1	0.00
12	180	0.10	93	94	92	2	359.00	2	0.00
13	195	0.10	93	94	92	3	359.00	3	0.00
14	210	0.10	93	95	92	4	359.00	4	0.00
15	225	0.10	93	96	92	5	359.00	5	0.00
16	240	0.12	111	116	92	24	359.01	24	0.00
17	255	0.12	111	135	92	44	359.02	44	0.00
18	270	0.14	130	173	92	82	359.04	82	0.00
19	285	0.14	130	211	92	120	359.05	120	0.00
20	300	0.16	148	268	92	176	359.08	176	0.00
21	315	0.12	111	287	92	196	359.09	196	0.00
22	330	0.14	130	325	92	234	359.11	234	0.01
23	345	0.16	148	382	92	290	359.13	290	0.01
24	360	0.16	148	438	92	347	359.16	347	0.01
25	375	0.19	167	513	92	422	359.19	422	0.01
26	390	0.00	1	422	92	331	359.15	331	0.01
27	405	0.03	26	357	92	265	359.12	265	0.01
28	420	0.03	29	294	92	202	359.09	202	0.00
29	435	0.03	31	234	92	142	359.06	142	0.00
30	450	0.06	57	199	92	107	359.05	107	0.00
31	465	0.09	82	189	92	97	359.04	97	0.00
32	480	0.12	107	204	92	113	359.05	113	0.00
33	495	0.17	155	267	92	176	359.08	176	0.00
34	510	0.17	157	333	92	241	359.11	241	0.01
35	525	0.20	183	424	92	332	359.15	332	0.01
36	540	0.23	208	540	92	448	359.20	448	0.01
37	555	0.28	255	704	92	612	359.28	612	0.01
38	570	0.31	280	892	92	801	359.36	801	0.02
39	585	0.34	305	1,106	92	1,014	359.46	1,014	0.02
40	600	0.37	330	1,345	92	1,253	359.57	1,253	0.03
41	615	0.19	175	1,428	92	1,336	359.61	1,336	0.03
42	630	0.20	177	1,513	92	1,422	359.65	1,422	0.03
43	645	0.32	292	1,714	92	1,622	359.74	1,622	0.04
44	660	0.33	295	1,917	92	1,826	359.83	1,826	0.04
45	675	0.30	274	2,100	92	2,008	359.91	2,008	0.05
46	690	0.31	277	2,285	92	2,193	360.00	2,193	0.05
47	705	0.26	234	2,427	92	2,335	360.06	2,335	0.05
48	720	0.29	259	2,594	92	2,502	360.14	2,502	0.06
49	735	0.47	419	2,921	92	2,830	360.29	2,830	0.06
50	750	0.49	444	3,273	92	3,182	360.45	3,182	0.07
51	765	0.55	491	3,673	92	3,581	360.63	3,581	0.08
52	780	0.57	516	4,097	92	4,005	360.82	4,005	0.09
53	795	0.70	631	4,636	92	4,544	361.07	4,544	0.10
54	810	0.70	633	5,177	92	5,086	361.31	5,086	0.12
55	825	0.43	386	5,472	92	5,381	361.45	5,381	0.12
56	840	0.43	389	5,769	92	5,677	361.58	5,677	0.13
57	855	0.53	481	6,158	92	6,067	361.76	6,067	0.14
58	870	0.51	460	6,527	92	6,435	361.93	6,435	0.15

RETENTION BASIN C
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	0.51	462	6,897	92	6,806	362.09	6,806	0.16
60	900	0.49	442	7,247	92	7,156	362.25	7,156	0.16
61	915	0.47	421	7,576	92	7,485	362.40	7,485	0.17
62	930	0.44	400	7,885	92	7,793	362.54	7,793	0.18
63	945	0.35	312	8,105	92	8,013	362.64	8,013	0.18
64	960	0.35	313	8,326	92	8,235	362.74	8,235	0.19
65	975	0.08	74	8,309	92	8,217	362.74	8,217	0.19
66	990	0.08	74	8,291	92	8,199	362.73	8,199	0.19
67	1005	0.06	56	8,255	92	8,163	362.71	8,163	0.19
68	1020	0.06	56	8,219	92	8,127	362.69	8,127	0.19
69	1035	0.01	6	8,133	92	8,041	362.66	8,041	0.18
70	1050	0.01	7	8,049	92	7,957	362.62	7,957	0.18
71	1065	0.01	9	7,966	92	7,874	362.58	7,874	0.18
72	1080	0.08	74	7,948	92	7,856	362.57	7,856	0.18
73	1095	0.08	74	7,931	92	7,839	362.56	7,839	0.18
74	1110	0.08	74	7,913	92	7,821	362.56	7,821	0.18
75	1125	0.06	56	7,877	92	7,785	362.54	7,785	0.18
76	1140	0.04	37	7,822	92	7,731	362.51	7,731	0.18
77	1155	0.06	56	7,786	92	7,694	362.50	7,694	0.18
78	1170	0.08	74	7,769	92	7,677	362.49	7,677	0.18
79	1185	0.06	56	7,732	92	7,641	362.47	7,641	0.18
80	1200	0.04	37	7,678	92	7,586	362.45	7,586	0.17
81	1215	0.06	56	7,642	92	7,550	362.43	7,550	0.17
82	1230	0.06	56	7,606	92	7,514	362.42	7,514	0.17
83	1245	0.06	56	7,570	92	7,478	362.40	7,478	0.17
84	1260	0.04	37	7,515	92	7,423	362.37	7,423	0.17
85	1275	0.06	56	7,479	92	7,387	362.36	7,387	0.17
86	1290	0.04	37	7,424	92	7,333	362.33	7,333	0.17
87	1305	0.06	56	7,388	92	7,296	362.32	7,296	0.17
88	1320	0.04	37	7,333	92	7,242	362.29	7,242	0.17
89	1335	0.06	56	7,297	92	7,206	362.28	7,206	0.17
90	1350	0.04	37	7,243	92	7,151	362.25	7,151	0.16
91	1365	0.04	37	7,188	92	7,096	362.23	7,096	0.16
92	1380	0.04	37	7,133	92	7,042	362.20	7,042	0.16
93	1395	0.04	37	7,079	92	6,987	362.18	6,987	0.16
94	1410	0.04	37	7,024	92	6,933	362.15	6,933	0.16
95	1425	0.04	37	6,970	92	6,878	362.13	6,878	0.16
96	1440	0.04	37	6,915	92	6,823	362.10	6,823	0.16

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN D		
10	AREA DESIGNATION	SUBAREA D (ANCHOR STORE)		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL	3.85		
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	18%		
27				
28	LENGTH OF WATERCOURSE (L)	610		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	420		
30				
31	ELEVATION OF HEADWATER	361.67		
32	ELEVATION OF CONCENTRATION POINT	358.66		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		352	6000	
45		353	6000	
46		354	6000	
47		355	6000	
48		356	6000	
49		357	6000	
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN D
[2] AREA DESIGNATION	SUBAREA D (ANCHOR STORE)
[3] AREA - ACRES	3.850
[4] L-FEET	610
[5] L-MILES	0.116
[6] La-FEET	420
[7] La-MILES	0.080
[8] ELEVATION OF HEADWATER	361.67
[9] ELEVATION OF CONCENTRATION POINT	358.66
[10] H-FEET	3.01
[11] S-FEET/MILE	26.1
[12] S^0.5	5.10
[13] L*LCA/S^0.5	0.00180
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.033
[16] LAG TIME-MINUTES	1.96
[17] 25% OF LAG-MINUTES	0.49
[18] 40% OF LAG-MINUTES	0.78
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.28

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	3.850	1.00	2.42	3.13	3.850	1.00	3.13	5.06	3.850	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	3.85	SUM [7]	2.42	SUM [9]	3.85	SUM [11]	3.13	SUM [13]	3.85	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	2.00	2.31	3.43
FLOOD VOLUME	(cu-ft)	27,926	32,242	47,956
	(acre-ft)	0.64	0.74	1.10
REQUIRED STORAGE	(cu-ft)	24,740	26,045	28,240
	(acre-ft)	0.57	0.60	0.65
PEAK FLOW	(cfs)	8.63	7.56	2.18
MAXIMUM WSEL	(ft)	356.12	356.34	356.57

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN D
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
A	COMMERCIAL	32	0.74	90%	0.14	3.85	1.000	0.1406
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
	SF - 1/4 ACRE			50%	0.00	0.00	0.000	0.0000
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
	MF - APARTMENTS			80%	0.00	0.00	0.000	0.0000
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
	RETENTION BASINS			0%	0.00	0.00	0.000	0.0000
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	3.85	SUM	0.1406

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.0703

C= 0.00130

Ft=C(24-(T/60))^1.55 = 0.00130 (24-(T/60))^1.55 + 0.07 in/hr

LOW LOSS RATE (80-90 PERCENT) = 18%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period,
T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 3 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN D
BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.85
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.96
UNIT TIME-PERCENT OF LAG	255.5
TOTAL ADJUSTED STORM RAIN-INCHES	2.42
CONSTANT LOSS RATE-in/hr	0.14
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.14	0.07	0.237	0.91	190.31
2	10	0.17	1.3	0.378	0.14	0.07	0.237	0.91	190.31
3	15	0.25	1.1	0.319	0.14	0.06	0.179	0.69	123.23
4	20	0.33	1.5	0.436	0.14	0.08	0.295	1.14	257.39
5	25	0.42	1.5	0.436	0.14	0.08	0.295	1.14	257.39
6	30	0.50	1.8	0.523	0.14	0.09	0.382	1.47	358.02
7	35	0.58	1.5	0.436	0.14	0.08	0.295	1.14	257.39
8	40	0.67	1.8	0.523	0.14	0.09	0.382	1.47	358.02
9	45	0.75	1.8	0.523	0.14	0.09	0.382	1.47	358.02
10	50	0.83	1.5	0.436	0.14	0.08	0.295	1.14	257.39
11	55	0.92	1.6	0.465	0.14	0.08	0.324	1.25	290.93
12	60	1.00	1.8	0.523	0.14	0.09	0.382	1.47	358.02
13	65	1.08	2.2	0.639	0.14	0.11	0.498	1.92	492.18
14	70	1.17	2.2	0.639	0.14	0.11	0.498	1.92	492.18
15	75	1.25	2.2	0.639	0.14	0.11	0.498	1.92	492.18
16	80	1.33	2.0	0.581	0.14	0.10	0.440	1.69	425.10
17	85	1.42	2.6	0.755	0.14	0.14	0.614	2.37	626.34
18	90	1.50	2.7	0.784	0.14	0.14	0.643	2.48	659.89
19	95	1.58	2.4	0.697	0.14	0.13	0.556	2.14	559.26
20	100	1.67	2.7	0.784	0.14	0.14	0.643	2.48	659.89
21	105	1.75	3.3	0.958	0.14	0.17	0.818	3.15	861.13
22	110	1.83	3.1	0.900	0.14	0.16	0.760	2.92	794.05
23	115	1.92	2.9	0.842	0.14	0.15	0.702	2.70	726.97
24	120	2.00	3.0	0.871	0.14	0.16	0.731	2.81	760.51
25	125	2.08	3.1	0.900	0.14	0.16	0.760	2.92	794.05
26	130	2.17	4.2	1.220	0.14	0.22	1.079	4.15	1163.00
27	135	2.25	5.0	1.452	0.14	0.26	1.311	5.05	1431.33
28	140	2.33	3.5	1.016	0.14	0.18	0.876	3.37	928.22
29	145	2.42	6.8	1.975	0.14	0.36	1.834	7.06	2035.08
30	150	2.50	7.3	2.120	0.14	0.38	1.979	7.62	2202.78
31	155	2.58	8.2	2.381	0.14	0.43	2.241	8.63	2504.65
32	160	2.67	5.9	1.713	0.14	0.31	1.573	6.06	1733.20
33	165	2.75	2.0	0.581	0.14	0.10	0.440	1.69	425.10
34	170	2.83	1.8	0.523	0.14	0.09	0.382	1.47	358.02
35	175	2.92	1.8	0.523	0.14	0.09	0.382	1.47	358.02
36	180	3.00	0.6	0.174	0.14	0.03	0.034	0.13	0.00
							23.978		24739.53

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.00
FLOOD VOLUME (acft)	0.64
FLOOD VOLUME (cuft)	27925.95
REQUIRED STORAGE (acft)	0.57
REQUIRED STORAGE (cuft)	24739.53
PEAK FLOW RATE (cfs)	8.63

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN D

BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.85
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.96
UNIT TIME-PERCENT OF LAG	255.5
TOTAL ADJUSTED STORM RAIN-INCHES	3.13
CONSTANT LOSS RATE-in/hr	0.141
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.188	0.14	0.03	0.05	0.18	0.00
2	10	0.17	0.6	0.225	0.14	0.04	0.08	0.33	14.56
3	15	0.25	0.6	0.225	0.14	0.04	0.08	0.33	14.56
4	20	0.33	0.6	0.225	0.14	0.04	0.08	0.33	14.56
5	25	0.42	0.6	0.225	0.14	0.04	0.08	0.33	14.56
6	30	0.50	0.7	0.263	0.14	0.05	0.12	0.47	57.95
7	35	0.58	0.7	0.263	0.14	0.05	0.12	0.47	57.95
8	40	0.67	0.7	0.263	0.14	0.05	0.12	0.47	57.95
9	45	0.75	0.7	0.263	0.14	0.05	0.12	0.47	57.95
10	50	0.83	0.7	0.263	0.14	0.05	0.12	0.47	57.95
11	55	0.92	0.7	0.263	0.14	0.05	0.12	0.47	57.95
12	60	1.00	0.8	0.300	0.14	0.05	0.16	0.62	101.33
13	65	1.08	0.8	0.300	0.14	0.05	0.16	0.62	101.33
14	70	1.17	0.8	0.300	0.14	0.05	0.16	0.62	101.33
15	75	1.25	0.8	0.300	0.14	0.05	0.16	0.62	101.33
16	80	1.33	0.8	0.300	0.14	0.05	0.16	0.62	101.33
17	85	1.42	0.8	0.300	0.14	0.05	0.16	0.62	101.33
18	90	1.50	0.8	0.300	0.14	0.05	0.16	0.62	101.33
19	95	1.58	0.8	0.300	0.14	0.05	0.16	0.62	101.33
20	100	1.67	0.8	0.300	0.14	0.05	0.16	0.62	101.33
21	105	1.75	0.8	0.300	0.14	0.05	0.16	0.62	101.33
22	110	1.83	0.8	0.300	0.14	0.05	0.16	0.62	101.33
23	115	1.92	0.8	0.300	0.14	0.05	0.16	0.62	101.33
24	120	2.00	0.9	0.338	0.14	0.06	0.20	0.76	144.71
25	125	2.08	0.8	0.300	0.14	0.05	0.16	0.62	101.33
26	130	2.17	0.9	0.338	0.14	0.06	0.20	0.76	144.71
27	135	2.25	0.9	0.338	0.14	0.06	0.20	0.76	144.71
28	140	2.33	0.9	0.338	0.14	0.06	0.20	0.76	144.71
29	145	2.42	0.9	0.338	0.14	0.06	0.20	0.76	144.71
30	150	2.50	0.9	0.338	0.14	0.06	0.20	0.76	144.71
31	155	2.58	0.9	0.338	0.14	0.06	0.20	0.76	144.71
32	160	2.67	0.9	0.338	0.14	0.06	0.20	0.76	144.71
33	165	2.75	1.0	0.376	0.14	0.07	0.24	0.90	188.09
34	170	2.83	1.0	0.376	0.14	0.07	0.24	0.90	188.09
35	175	2.92	1.0	0.376	0.14	0.07	0.24	0.90	188.09
36	180	3.00	1.0	0.376	0.14	0.07	0.24	0.90	188.09
37	185	3.08	1.0	0.376	0.14	0.07	0.24	0.90	188.09
38	190	3.17	1.1	0.413	0.14	0.07	0.27	1.05	231.47
39	195	3.25	1.1	0.413	0.14	0.07	0.27	1.05	231.47
40	200	3.33	1.1	0.413	0.14	0.07	0.27	1.05	231.47
41	205	3.42	1.2	0.451	0.14	0.08	0.31	1.19	274.86
42	210	3.50	1.3	0.488	0.14	0.09	0.35	1.34	318.24
43	215	3.58	1.4	0.526	0.14	0.09	0.39	1.48	361.62
44	220	3.67	1.4	0.526	0.14	0.09	0.39	1.48	361.62
45	225	3.75	1.5	0.563	0.14	0.10	0.42	1.63	405.00
46	230	3.83	1.5	0.563	0.14	0.10	0.42	1.63	405.00
47	235	3.92	1.6	0.601	0.14	0.11	0.46	1.77	448.38
48	240	4.00	1.6	0.601	0.14	0.11	0.46	1.77	448.38
49	245	4.08	1.7	0.639	0.14	0.11	0.50	1.92	491.76
50	250	4.17	1.8	0.676	0.14	0.12	0.54	2.06	535.15
51	255	4.25	1.9	0.714	0.14	0.13	0.57	2.21	578.53
52	260	4.33	2.0	0.751	0.14	0.14	0.61	2.35	621.91
53	265	4.42	2.1	0.789	0.14	0.14	0.65	2.50	665.29
54	270	4.50	2.1	0.789	0.14	0.14	0.65	2.50	665.29
55	275	4.58	2.2	0.826	0.14	0.15	0.69	2.64	708.67
56	280	4.67	2.3	0.864	0.14	0.16	0.72	2.78	752.06

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN D BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.85		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.96		
UNIT TIME-PERCENT OF LAG	255.5		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.141		
LOW LOSS RATE - PERCENT	18%	TOTAL PERCOLATION RATE (cfs)	0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
57	285	4.75	2.4	0.901	0.14	0.16	0.76	2.93	795.44
58	290	4.83	2.4	0.901	0.14	0.16	0.76	2.93	795.44
59	295	4.92	2.5	0.939	0.14	0.17	0.80	3.07	838.82
60	300	5.00	2.6	0.977	0.14	0.18	0.84	3.22	882.20
61	305	5.08	3.1	1.164	0.14	0.21	1.02	3.94	1099.11
62	310	5.17	3.6	1.352	0.14	0.24	1.21	4.66	1316.02
63	315	5.25	3.9	1.465	0.14	0.26	1.32	5.10	1446.16
64	320	5.33	4.2	1.578	0.14	0.28	1.44	5.53	1576.31
65	325	5.42	4.7	1.765	0.14	0.32	1.62	6.26	1793.22
66	330	5.50	5.6	2.103	0.14	0.38	1.96	7.56	2183.65
67	335	5.58	1.9	0.714	0.14	0.13	0.57	2.21	578.53
68	340	5.67	0.9	0.338	0.14	0.06	0.20	0.76	144.71
69	345	5.75	0.6	0.225	0.14	0.04	0.08	0.33	14.56
70	350	5.83	0.5	0.188	0.14	0.03	0.05	0.18	0.00
71	355	5.92	0.3	0.113	0.14	0.02	0.09	0.36	23.39
72	360	6.00	0.2	0.075	0.14	0.01	0.06	0.24	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.31
FLOOD VOLUME (acft)	0.74
FLOOD VOLUME (cuft)	32241.83
REQUIRED STORAGE (acft)	0.60
REQUIRED STORAGE (cuft)	26045.07
PEAK FLOW RATE (cfs)	7.56

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN D BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES 3.850 UNIT TIME-MINUTES 15 LAG TIME - MINUTES 1.96 UNIT TIME-PERCENT OF LAG 766.6 TOTAL ADJUSTED STORM RAIN-INCHES 5.06					CONSTANT LOSS RATE-in/hr n/a VARIABLE LOSS RATE (AVG) in/hr 0.1406 MINIMUM LOSS RATE (for var. loss) - in/hr 0.070 LOW LOSS RATE - DECIMAL 0.18 C 0.00130 PERCOLATION RATE (cfs) 0.28				
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.040	0.248	0.007	0.033	0.13	0.00
2	30	0.50	0.3	0.061	0.245	0.011	0.050	0.19	0.00
3	45	0.75	0.3	0.061	0.243	0.011	0.050	0.19	0.00
4	60	1.00	0.4	0.081	0.240	0.015	0.066	0.26	0.00
5	75	1.25	0.3	0.061	0.237	0.011	0.050	0.19	0.00
6	90	1.50	0.3	0.061	0.234	0.011	0.050	0.19	0.00
7	105	1.75	0.3	0.061	0.231	0.011	0.050	0.19	0.00
8	120	2.00	0.4	0.081	0.228	0.015	0.066	0.26	0.00
9	135	2.25	0.4	0.081	0.226	0.015	0.066	0.26	0.00
10	150	2.50	0.4	0.081	0.223	0.015	0.066	0.26	0.00
11	165	2.75	0.5	0.101	0.220	0.018	0.083	0.32	37.54
12	180	3.00	0.5	0.101	0.218	0.018	0.083	0.32	37.54
13	195	3.25	0.5	0.101	0.215	0.018	0.083	0.32	37.54
14	210	3.50	0.5	0.101	0.212	0.018	0.083	0.32	37.54
15	225	3.75	0.5	0.101	0.210	0.018	0.083	0.32	37.54
16	240	4.00	0.6	0.121	0.207	0.022	0.100	0.38	95.05
17	255	4.25	0.6	0.121	0.204	0.022	0.100	0.38	95.05
18	270	4.50	0.7	0.142	0.202	0.026	0.116	0.45	152.56
19	285	4.75	0.7	0.142	0.199	0.026	0.116	0.45	152.56
20	300	5.00	0.8	0.162	0.196	0.029	0.133	0.51	210.06
21	315	5.25	0.6	0.121	0.194	0.022	0.100	0.38	95.05
22	330	5.50	0.7	0.142	0.191	0.026	0.116	0.45	152.56
23	345	5.75	0.8	0.162	0.189	0.029	0.133	0.51	210.06
24	360	6.00	0.8	0.162	0.186	0.029	0.133	0.51	210.06
25	375	6.25	0.9	0.182	0.184	0.033	0.149	0.58	267.57
26	390	6.50	0.9	0.182	0.181	0.033	0.001	0.00	0.00
27	405	6.75	1.0	0.202	0.179	0.036	0.023	0.09	0.00
28	420	7.00	1.0	0.202	0.177	0.036	0.026	0.10	0.00
29	435	7.25	1.0	0.202	0.174	0.036	0.028	0.11	0.00
30	450	7.50	1.1	0.223	0.172	0.040	0.051	0.20	0.00
31	465	7.75	1.2	0.243	0.170	0.044	0.073	0.28	4.24
32	480	8.00	1.3	0.263	0.167	0.047	0.096	0.37	82.47
33	495	8.25	1.5	0.304	0.165	0.055	0.139	0.53	230.76
34	510	8.50	1.5	0.304	0.163	0.055	0.141	0.54	238.73
35	525	8.75	1.6	0.324	0.160	0.058	0.164	0.63	316.75
36	540	9.00	1.7	0.344	0.158	0.062	0.186	0.72	394.70
37	555	9.25	1.9	0.385	0.156	0.069	0.229	0.88	542.72
38	570	9.50	2.0	0.405	0.154	0.073	0.251	0.97	620.53
39	585	9.75	2.1	0.425	0.151	0.077	0.274	1.05	698.27
40	600	10.00	2.2	0.445	0.149	0.080	0.296	1.14	775.94
41	615	10.25	1.5	0.304	0.147	0.055	0.157	0.60	292.48
42	630	10.50	1.5	0.304	0.145	0.055	0.159	0.61	299.87
43	645	10.75	2.0	0.405	0.143	0.073	0.262	1.01	657.84
44	660	11.00	2.0	0.405	0.141	0.073	0.264	1.02	665.08
45	675	11.25	1.9	0.385	0.139	0.069	0.246	0.95	602.12
46	690	11.50	1.9	0.385	0.137	0.069	0.248	0.95	609.20
47	705	11.75	1.7	0.344	0.135	0.062	0.210	0.81	475.95
48	720	12.00	1.8	0.364	0.133	0.066	0.232	0.89	553.02
49	735	12.25	2.5	0.506	0.131	0.091	0.375	1.45	1050.80
50	750	12.50	2.6	0.526	0.129	0.095	0.398	1.53	1127.71
51	765	12.75	2.8	0.567	0.127	0.102	0.440	1.69	1274.67
52	780	13.00	2.9	0.587	0.125	0.106	0.462	1.78	1351.41
53	795	13.25	3.4	0.688	0.123	0.124	0.565	2.18	1708.61
54	810	13.50	3.4	0.688	0.121	0.124	0.567	2.18	1715.06
55	825	13.75	2.3	0.466	0.119	0.084	0.346	1.33	949.99
56	840	14.00	2.3	0.466	0.117	0.084	0.348	1.34	956.27
57	855	14.25	2.7	0.546	0.116	0.098	0.431	1.66	1243.00
58	870	14.50	2.6	0.526	0.114	0.095	0.412	1.59	1178.99
59	885	14.75	2.6	0.526	0.112	0.095	0.414	1.59	1185.01
60	900	15.00	2.5	0.506	0.110	0.091	0.396	1.52	1120.82

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT				PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN D BY: PK DATE: 7/4/2022					
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			3.850	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.1406		
LAG TIME - MINUTES			1.96	MINIMUM LOSS RATE (for var. loss) - in/hr			0.070		
UNIT TIME-PERCENT OF LAG			766.6	LOW LOSS RATE - DECIMAL			0.18		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00130		
				PERCOLATION RATE (cfs)			0.28		
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
61	915	15.25	2.4	0.486	0.109	0.087	0.377	1.45	1056.55
62	930	15.50	2.3	0.466	0.107	0.084	0.358	1.38	992.18
63	945	15.75	1.9	0.385	0.105	0.069	0.279	1.07	717.32
64	960	16.00	1.9	0.385	0.104	0.069	0.281	1.08	722.90
65	975	16.25	0.4	0.081	0.102	0.015	0.066	0.26	0.00
66	990	16.50	0.4	0.081	0.101	0.015	0.066	0.26	0.00
67	1005	16.75	0.3	0.061	0.099	0.011	0.050	0.19	0.00
68	1020	17.00	0.3	0.061	0.098	0.011	0.050	0.19	0.00
69	1035	17.25	0.5	0.101	0.096	0.018	0.005	0.02	0.00
70	1050	17.50	0.5	0.101	0.095	0.018	0.006	0.03	0.00
71	1065	17.75	0.5	0.101	0.093	0.018	0.008	0.03	0.00
72	1080	18.00	0.4	0.081	0.092	0.015	0.066	0.26	0.00
73	1095	18.25	0.4	0.081	0.091	0.015	0.066	0.26	0.00
74	1110	18.50	0.4	0.081	0.089	0.015	0.066	0.26	0.00
75	1125	18.75	0.3	0.061	0.088	0.011	0.050	0.19	0.00
76	1140	19.00	0.2	0.040	0.087	0.007	0.033	0.13	0.00
77	1155	19.25	0.3	0.061	0.085	0.011	0.050	0.19	0.00
78	1170	19.50	0.4	0.081	0.084	0.015	0.066	0.26	0.00
79	1185	19.75	0.3	0.061	0.083	0.011	0.050	0.19	0.00
80	1200	20.00	0.2	0.040	0.082	0.007	0.033	0.13	0.00
81	1215	20.25	0.3	0.061	0.081	0.011	0.050	0.19	0.00
82	1230	20.50	0.3	0.061	0.080	0.011	0.050	0.19	0.00
83	1245	20.75	0.3	0.061	0.079	0.011	0.050	0.19	0.00
84	1260	21.00	0.2	0.040	0.078	0.007	0.033	0.13	0.00
85	1275	21.25	0.3	0.061	0.077	0.011	0.050	0.19	0.00
86	1290	21.50	0.2	0.040	0.076	0.007	0.033	0.13	0.00
87	1305	21.75	0.3	0.061	0.075	0.011	0.050	0.19	0.00
88	1320	22.00	0.2	0.040	0.074	0.007	0.033	0.13	0.00
89	1335	22.25	0.3	0.061	0.074	0.011	0.050	0.19	0.00
90	1350	22.50	0.2	0.040	0.073	0.007	0.033	0.13	0.00
91	1365	22.75	0.2	0.040	0.072	0.007	0.033	0.13	0.00
92	1380	23.00	0.2	0.040	0.072	0.007	0.033	0.13	0.00
93	1395	23.25	0.2	0.040	0.071	0.007	0.033	0.13	0.00
94	1410	23.50	0.2	0.040	0.071	0.007	0.033	0.13	0.00
95	1425	23.75	0.2	0.040	0.071	0.007	0.033	0.13	0.00
96	1440	24.00	0.2	0.040	0.070	0.007	0.033	0.13	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	3.43
FLOOD VOLUME (acft)	1.10
FLOOD VOLUME (cuft)	47956.10
REQUIRED STORAGE (acft)	0.65
REQUIRED STORAGE (cuft)	28240.23
PEAK FLOW (cfs)	2.18

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN D

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
352	0	0		6000	0	0	0.00
353	1	1	0	6000	6000	6000	0.14
354	1	2	0	6000	6000	12000	0.28
355	1	3	0	6000	6000	18000	0.41
356	1	4	0	6000	6000	24000	0.55
357	1	5	0	6000	6000	30000	0.69

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	0.27778	cfs
MAXWELL IV DRYWELLS			
NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		0.27778	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	28240	cu ft (100-yr 3-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	0.27778	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**28**	hrs < 26 hrs

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.91	274	274	83	190	352.03	190	0.00
2	10	0.91	274	464	83	381	352.06	381	0.01
3	15	0.69	207	587	83	504	352.08	504	0.01
4	20	1.14	341	845	83	761	352.13	761	0.02
5	25	1.14	341	1,102	83	1,019	352.17	1,019	0.02
6	30	1.47	441	1,460	83	1,377	352.23	1,377	0.03
7	35	1.14	341	1,717	83	1,634	352.27	1,634	0.04
8	40	1.47	441	2,075	83	1,992	352.33	1,992	0.05
9	45	1.47	441	2,433	83	2,350	352.39	2,350	0.05
10	50	1.14	341	2,691	83	2,607	352.43	2,607	0.06
11	55	1.25	374	2,982	83	2,898	352.48	2,898	0.07
12	60	1.47	441	3,340	83	3,256	352.54	3,256	0.07
13	65	1.92	576	3,832	83	3,749	352.62	3,749	0.09
14	70	1.92	576	4,324	83	4,241	352.71	4,241	0.10
15	75	1.92	576	4,816	83	4,733	352.79	4,733	0.11
16	80	1.69	508	5,241	83	5,158	352.86	5,158	0.12
17	85	2.37	710	5,868	83	5,784	352.96	5,784	0.13
18	90	2.48	743	6,528	83	6,444	353.07	6,444	0.15
19	95	2.14	643	7,087	83	7,004	353.17	7,004	0.16
20	100	2.48	743	7,747	83	7,663	353.28	7,663	0.18
21	105	3.15	944	8,608	83	8,525	353.42	8,525	0.20
22	110	2.92	877	9,402	83	9,319	353.55	9,319	0.21
23	115	2.70	810	10,129	83	10,046	353.67	10,046	0.23
24	120	2.81	844	10,889	83	10,806	353.80	10,806	0.25
25	125	2.92	877	11,683	83	11,600	353.93	11,600	0.27
26	130	4.15	1,246	12,846	83	12,763	354.13	12,763	0.29
27	135	5.05	1,515	14,278	83	14,194	354.37	14,194	0.33
28	140	3.37	1,012	15,206	83	15,123	354.52	15,123	0.35
29	145	7.06	2,118	17,241	83	17,158	354.86	17,158	0.39
30	150	7.62	2,286	19,444	83	19,361	355.23	19,361	0.44
31	155	8.63	2,588	21,949	83	21,865	355.64	21,865	0.50
32	160	6.06	1,817	23,682	83	23,598	355.93	23,598	0.54
33	165	1.69	508	24,107	83	24,024	356.00	24,024	0.55
34	170	1.47	441	24,465	83	24,382	356.06	24,382	0.56
35	175	1.47	441	24,823	83	24,740	356.12	24,740	0.57
36	180	0.13	39	24,778	83	24,695	356.12	24,695	0.57

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.18	55	55	83	-	352.00	-	0.00
2	10	0.33	98	98	83	15	352.00	15	0.00
3	15	0.33	98	112	83	29	352.00	29	0.00
4	20	0.33	98	127	83	44	352.01	44	0.00
5	25	0.33	98	142	83	58	352.01	58	0.00
6	30	0.47	141	200	83	116	352.02	116	0.00
7	35	0.47	141	257	83	174	352.03	174	0.00
8	40	0.47	141	315	83	232	352.04	232	0.01
9	45	0.47	141	373	83	290	352.05	290	0.01
10	50	0.47	141	431	83	348	352.06	348	0.01
11	55	0.47	141	489	83	406	352.07	406	0.01
12	60	0.62	185	591	83	507	352.08	507	0.01
13	65	0.62	185	692	83	609	352.10	609	0.01
14	70	0.62	185	793	83	710	352.12	710	0.02
15	75	0.62	185	895	83	811	352.14	811	0.02
16	80	0.62	185	996	83	913	352.15	913	0.02
17	85	0.62	185	1,097	83	1,014	352.17	1,014	0.02
18	90	0.62	185	1,199	83	1,115	352.19	1,115	0.03
19	95	0.62	185	1,300	83	1,217	352.20	1,217	0.03
20	100	0.62	185	1,401	83	1,318	352.22	1,318	0.03
21	105	0.62	185	1,503	83	1,419	352.24	1,419	0.03
22	110	0.62	185	1,604	83	1,521	352.25	1,521	0.03
23	115	0.62	185	1,705	83	1,622	352.27	1,622	0.04
24	120	0.76	228	1,850	83	1,767	352.29	1,767	0.04
25	125	0.62	185	1,951	83	1,868	352.31	1,868	0.04
26	130	0.76	228	2,096	83	2,013	352.34	2,013	0.05
27	135	0.76	228	2,241	83	2,157	352.36	2,157	0.05
28	140	0.76	228	2,385	83	2,302	352.38	2,302	0.05
29	145	0.76	228	2,530	83	2,447	352.41	2,447	0.06
30	150	0.76	228	2,675	83	2,591	352.43	2,591	0.06
31	155	0.76	228	2,820	83	2,736	352.46	2,736	0.06
32	160	0.76	228	2,964	83	2,881	352.48	2,881	0.07
33	165	0.90	271	3,152	83	3,069	352.51	3,069	0.07
34	170	0.90	271	3,340	83	3,257	352.54	3,257	0.07
35	175	0.90	271	3,528	83	3,445	352.57	3,445	0.08
36	180	0.90	271	3,717	83	3,633	352.61	3,633	0.08
37	185	0.90	271	3,905	83	3,821	352.64	3,821	0.09
38	190	1.05	315	4,136	83	4,053	352.68	4,053	0.09
39	195	1.05	315	4,368	83	4,284	352.71	4,284	0.10
40	200	1.05	315	4,599	83	4,516	352.75	4,516	0.10
41	205	1.19	358	4,874	83	4,791	352.80	4,791	0.11
42	210	1.34	402	5,192	83	5,109	352.85	5,109	0.12
43	215	1.48	445	5,554	83	5,470	352.91	5,470	0.13
44	220	1.48	445	5,915	83	5,832	352.97	5,832	0.13
45	225	1.63	488	6,320	83	6,237	353.04	6,237	0.14
46	230	1.63	488	6,725	83	6,642	353.11	6,642	0.15
47	235	1.77	532	7,174	83	7,090	353.18	7,090	0.16
48	240	1.77	532	7,622	83	7,539	353.26	7,539	0.17
49	245	1.92	575	8,114	83	8,031	353.34	8,031	0.18
50	250	2.06	618	8,649	83	8,566	353.43	8,566	0.20
51	255	2.21	662	9,228	83	9,144	353.52	9,144	0.21
52	260	2.35	705	9,850	83	9,766	353.63	9,766	0.22
53	265	2.50	749	10,515	83	10,431	353.74	10,431	0.24
54	270	2.50	749	11,180	83	11,097	353.85	11,097	0.25
55	275	2.64	792	11,889	83	11,805	353.97	11,805	0.27

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	2.78	835	12,641	83	12,558	354.09	12,558	0.29
57	285	2.93	879	13,436	83	13,353	354.23	13,353	0.31
58	290	2.93	879	14,232	83	14,148	354.36	14,148	0.32
59	295	3.07	922	15,071	83	14,987	354.50	14,987	0.34
60	300	3.22	966	15,953	83	15,869	354.64	15,869	0.36
61	305	3.94	1,182	17,052	83	16,969	354.83	16,969	0.39
62	310	4.66	1,399	18,368	83	18,285	355.05	18,285	0.42
63	315	5.10	1,529	19,814	83	19,731	355.29	19,731	0.45
64	320	5.53	1,660	21,390	83	21,307	355.55	21,307	0.49
65	325	6.26	1,877	23,184	83	23,100	355.85	23,100	0.53
66	330	7.56	2,267	25,367	83	25,284	356.21	25,284	0.58
67	335	2.21	662	25,946	83	25,862	356.31	25,862	0.59
68	340	0.76	228	26,090	83	26,007	356.33	26,007	0.60
69	345	0.33	98	26,105	83	26,022	356.34	26,022	0.60
70	350	0.18	55	26,076	83	25,993	356.33	25,993	0.60
71	355	0.36	107	26,100	83	26,016	356.34	26,016	0.60
72	360	0.24	71	26,087	83	26,004	356.33	26,004	0.60

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.13	115	115	250	-	352.00	-	0.00
2	30	0.19	173	173	250	-	352.00	-	0.00
3	45	0.19	173	173	250	-	352.00	-	0.00
4	60	0.26	230	230	250	-	352.00	-	0.00
5	75	0.19	173	173	250	-	352.00	-	0.00
6	90	0.19	173	173	250	-	352.00	-	0.00
7	105	0.19	173	173	250	-	352.00	-	0.00
8	120	0.26	230	230	250	-	352.00	-	0.00
9	135	0.26	230	230	250	-	352.00	-	0.00
10	150	0.26	230	230	250	-	352.00	-	0.00
11	165	0.32	288	288	250	38	352.01	38	0.00
12	180	0.32	288	325	250	75	352.01	75	0.00
13	195	0.32	288	363	250	113	352.02	113	0.00
14	210	0.32	288	400	250	150	352.03	150	0.00
15	225	0.32	288	438	250	188	352.03	188	0.00
16	240	0.38	345	533	250	283	352.05	283	0.01
17	255	0.38	345	628	250	378	352.06	378	0.01
18	270	0.45	403	780	250	530	352.09	530	0.01
19	285	0.45	403	933	250	683	352.11	683	0.02
20	300	0.51	460	1,143	250	893	352.15	893	0.02
21	315	0.38	345	1,238	250	988	352.16	988	0.02
22	330	0.45	403	1,391	250	1,141	352.19	1,141	0.03
23	345	0.51	460	1,601	250	1,351	352.23	1,351	0.03
24	360	0.51	460	1,811	250	1,561	352.26	1,561	0.04
25	375	0.58	518	2,078	250	1,828	352.30	1,828	0.04
26	390	0.00	2	1,831	250	1,581	352.26	1,581	0.04
27	405	0.09	81	1,661	250	1,411	352.24	1,411	0.03
28	420	0.10	89	1,501	250	1,251	352.21	1,251	0.03
29	435	0.11	98	1,348	250	1,098	352.18	1,098	0.03
30	450	0.20	176	1,274	250	1,024	352.17	1,024	0.02
31	465	0.28	254	1,278	250	1,028	352.17	1,028	0.02
32	480	0.37	332	1,361	250	1,111	352.19	1,111	0.03
33	495	0.53	481	1,592	250	1,342	352.22	1,342	0.03
34	510	0.54	489	1,830	250	1,580	352.26	1,580	0.04
35	525	0.63	567	2,147	250	1,897	352.32	1,897	0.04
36	540	0.72	645	2,542	250	2,292	352.38	2,292	0.05
37	555	0.88	793	3,085	250	2,835	352.47	2,835	0.07
38	570	0.97	871	3,705	250	3,455	352.58	3,455	0.08
39	585	1.05	948	4,403	250	4,153	352.69	4,153	0.10
40	600	1.14	1,026	5,179	250	4,929	352.82	4,929	0.11
41	615	0.60	542	5,472	250	5,222	352.87	5,222	0.12
42	630	0.61	550	5,772	250	5,522	352.92	5,522	0.13
43	645	1.01	908	6,430	250	6,180	353.03	6,180	0.14
44	660	1.02	915	7,095	250	6,845	353.14	6,845	0.16
45	675	0.95	852	7,697	250	7,447	353.24	7,447	0.17
46	690	0.95	859	8,306	250	8,056	353.34	8,056	0.18
47	705	0.81	726	8,782	250	8,532	353.42	8,532	0.20
48	720	0.89	803	9,335	250	9,085	353.51	9,085	0.21
49	735	1.45	1,301	10,386	250	10,136	353.69	10,136	0.23
50	750	1.53	1,378	11,513	250	11,263	353.88	11,263	0.26
51	765	1.69	1,525	12,788	250	12,538	354.09	12,538	0.29
52	780	1.78	1,601	14,140	250	13,890	354.31	13,890	0.32
53	795	2.18	1,959	15,848	250	15,598	354.60	15,598	0.36
54	810	2.18	1,965	17,563	250	17,313	354.89	17,313	0.40
55	825	1.33	1,200	18,513	250	18,263	355.04	18,263	0.42
56	840	1.34	1,206	19,469	250	19,219	355.20	19,219	0.44
57	855	1.66	1,493	20,712	250	20,462	355.41	20,462	0.47
58	870	1.59	1,429	21,891	250	21,641	355.61	21,641	0.50

RETENTION BASIN D
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	1.59	1,435	23,076	250	22,826	355.80	22,826	0.52
60	900	1.52	1,371	24,197	250	23,947	355.99	23,947	0.55
61	915	1.45	1,307	25,254	250	25,004	356.17	25,004	0.57
62	930	1.38	1,242	26,246	250	25,996	356.33	25,996	0.60
63	945	1.07	967	26,963	250	26,713	356.45	26,713	0.61
64	960	1.08	973	27,686	250	27,436	356.57	27,436	0.63
65	975	0.26	230	27,666	250	27,416	356.57	27,416	0.63
66	990	0.26	230	27,646	250	27,396	356.57	27,396	0.63
67	1005	0.19	173	27,569	250	27,319	356.55	27,319	0.63
68	1020	0.19	173	27,491	250	27,241	356.54	27,241	0.63
69	1035	0.02	18	27,259	250	27,009	356.50	27,009	0.62
70	1050	0.03	23	27,031	250	26,781	356.46	26,781	0.61
71	1065	0.03	27	26,809	250	26,559	356.43	26,559	0.61
72	1080	0.26	230	26,789	250	26,539	356.42	26,539	0.61
73	1095	0.26	230	26,769	250	26,519	356.42	26,519	0.61
74	1110	0.26	230	26,749	250	26,499	356.42	26,499	0.61
75	1125	0.19	173	26,671	250	26,421	356.40	26,421	0.61
76	1140	0.13	115	26,536	250	26,286	356.38	26,286	0.60
77	1155	0.19	173	26,459	250	26,209	356.37	26,209	0.60
78	1170	0.26	230	26,439	250	26,189	356.36	26,189	0.60
79	1185	0.19	173	26,362	250	26,112	356.35	26,112	0.60
80	1200	0.13	115	26,227	250	25,977	356.33	25,977	0.60
81	1215	0.19	173	26,149	250	25,899	356.32	25,899	0.59
82	1230	0.19	173	26,072	250	25,822	356.30	25,822	0.59
83	1245	0.19	173	25,994	250	25,744	356.29	25,744	0.59
84	1260	0.13	115	25,859	250	25,609	356.27	25,609	0.59
85	1275	0.19	173	25,782	250	25,532	356.26	25,532	0.59
86	1290	0.13	115	25,647	250	25,397	356.23	25,397	0.58
87	1305	0.19	173	25,569	250	25,319	356.22	25,319	0.58
88	1320	0.13	115	25,434	250	25,184	356.20	25,184	0.58
89	1335	0.19	173	25,357	250	25,107	356.18	25,107	0.58
90	1350	0.13	115	25,222	250	24,972	356.16	24,972	0.57
91	1365	0.13	115	25,087	250	24,837	356.14	24,837	0.57
92	1380	0.13	115	24,952	250	24,702	356.12	24,702	0.57
93	1395	0.13	115	24,817	250	24,567	356.09	24,567	0.56
94	1410	0.13	115	24,682	250	24,432	356.07	24,432	0.56
95	1425	0.13	115	24,547	250	24,297	356.05	24,297	0.56
96	1440	0.13	115	24,412	250	24,162	356.03	24,162	0.55

	A	B	C	D
1	**RCFCD SYNTHETIC UNIT HYDROGRAPH**			
2	DATA INPUT SHEET			
3				
4	WORKSHEET PREPARED BY:	PK		
5				
6	PROJECT NAME	GREEN DAY VILLAGE		
7	ASAP CONSULTING. JOB#	2022.09		
8				
9	CONCENTRATION POINT DESIGNATION	RETENTION BASIN E		
10	AREA DESIGNATION	SUBAREA E (OFFICE BLDG)		
11				
12	TRIBUTARY AREAS	ACRES		
13				
14	COMMERCIAL	3.6		
15	PAVING/HARDSCAPE			
16	SF - 1 ACRE			
17	SF - 1/2 ACRE			
18	SF - 1/4 ACRE			
19	MF - CONDOMINIUMS			
20	MF - APARTMENTS			
21	MOBILE HOME PARK			
22	LANDSCAPING			
23	RETENTION BASIN			
24	GOLF COURSE			
25	MOUNTAINOUS			
26	LOW LOSS RATE (PERCENT)	18%		
27				
28	LENGTH OF WATERCOURSE (L)	598		
29	LENGTH TO POINT OPPOSITE CENTROID (Lca)	410		
30				
31	ELEVATION OF HEADWATER	357.1		
32	ELEVATION OF CONCENTRATION POINT	352.2		
33				
34	AVERAGE MANNINGS 'N' VALUE	0.015		
35				
36	STORM FREQUENCY (YEAR)	100		
37				
38	POINT RAIN			
39	3-HOUR	2.42		
40	6-HOUR	3.13		
41	24-HOUR	5.06		
42				
43	BASIN CHARACTERISTICS:	ELEVATION	AREA	
44		345	6000	
45		346	6000	
46		347	6000	
47		348	6000	
48		349	6000	
49		350	6000	
50				
51				
52				
53				
54				
55				
56				
57				
58				
59				
60				
61	PERCOLATION RATE (in/hr)	2		
62				
63	DRYWELL DATA			
64	NUMBER USED	0		
65	PERCOLATION RATE (cfs)	0.000000		

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
BASIC DATA CALCULATION FORM
SHORTCUT METHOD

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
BY PK DATE 7/4/2022

PHYSICAL DATA

[1] CONCENTRATION POINT	RETENTION BASIN E
[2] AREA DESIGNATION	SUBAREA E (OFFICE BLDG)
[3] AREA - ACRES	3.600
[4] L-FEET	598
[5] L-MILES	0.113
[6] La-FEET	410
[7] La-MILES	0.078
[8] ELEVATION OF HEADWATER	357.1
[9] ELEVATION OF CONCENTRATION POINT	352.2
[10] H-FEET	4.9
[11] S-FEET/MILE	43.3
[12] S^0.5	6.58
[13] L*LCA/S^0.5	0.00134
[14] AVERAGE MANNINGS 'N'	0.015
[15] LAG TIME-HOURS	0.029
[16] LAG TIME-MINUTES	1.75
[17] 25% OF LAG-MINUTES	0.44
[18] 40% OF LAG-MINUTES	0.70
[19] UNIT TIME-MINUTES (25%-40% OF LAG)	5
[24] TOTAL PERCOLATION RATE (cfs)	0.28

RAINFALL DATA

[1] SOURCE
[2] FREQUENCY-YEARS 100
[3] DURATION:

3-HOURS				6-HOURS				24-HOURS			
[4] POINT RAIN INCHES (Plate E-5.2)	[5] AREA	[6]	[7] AVERAGE POINT RAIN INCHES	[8] POINT RAIN INCHES (Plate E-5.4)	[9] AREA	[10]	[11] AVERAGE POINT RAIN INCHES	[12] POINT RAIN INCHES (Plate E-5.6)	[13] AREA	[14]	[15] AVERAGE POINT RAIN INCHES
2.42	3.600	1.00	2.42	3.13	3.600	1.00	3.13	5.06	3.600	1.00	5.06
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
		0.00	0.00			0.00	0.00			0.00	0.00
SUM [5]	3.6	SUM [7]	2.42	SUM [9]	3.60	SUM [11]	3.13	SUM [13]	3.60	SUM [15]	5.06
[16] AREA ADJ FACTOR			1.000				1.000				1.000
[17] ADJ AVG POINT RAIN			2.42				3.13				5.06

STORM EVENT SUMMARY

DURATION		3-HOUR	6-HOUR	24-HOUR
EFFECTIVE RAIN	(in)	2.00	2.31	3.43
FLOOD VOLUME	(cu-ft)	26,113	30,148	44,842
	(acre-ft)	0.60	0.69	1.03
REQUIRED STORAGE	(cu-ft)	22,944	23,980	25,623
	(acre-ft)	0.53	0.55	0.59
PEAK FLOW	(cfs)	8.07	7.07	2.04
MAXIMUM WSEL	(ft)	348.82	348.99	349.13

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD

PROJECT GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN E
BY PK DATE 7/4/2022

ADJUSTED LOSS RATE

SOIL GROUP [Plate C-1]	LAND USE	RI NUMBER (AMC II) [Plate E-6.1]	PERVIOUS AREA INFILTRATION RATE (Fp) (in/hr) [Plate E-6.2]	DECIMAL PERCENT OF AREA IMPERVIOUS (Ai) [Plate E-6.3]	ADJUSTED INFILTRATION RATE (F) (in/hr)	AREA		AVERAGE ADJUSTED INFILTRATION RATE (in/hr)
A	COMMERCIAL	32	0.74	90%	0.14	3.60	1.000	0.1406
	PAVING/HARDSCAPE			100%	0.00	0.00	0.000	0.0000
	SF - 1 ACRE			20%	0.00	0.00	0.000	0.0000
	SF - 1/2 ACRE			40%	0.00	0.00	0.000	0.0000
	SF - 1/4 ACRE			50%	0.00	0.00	0.000	0.0000
	MF - COND0MINIUMS			65%	0.00	0.00	0.000	0.0000
	MF - APARTMENTS			80%	0.00	0.00	0.000	0.0000
	MOBILE HOME PARKS			75%	0.00	0.00	0.000	0.0000
	LANDSCAPING			0%	0.00	0.00	0.000	0.0000
	RETENTION BASINS			0%	0.00	0.00	0.000	0.0000
	GOLF COURSE			0%	0.00	0.00	0.000	0.0000
	MOUNTAINOUS			90%	0.00	0.00	0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					0.00		0.000	0.0000
					SUM	3.6	SUM	0.1406

VARIABLE LOSS RATE CURVE (24-HOUR STORM ONLY)

Fm= 0.0703
C= 0.00130

Ft=C(24-(T/60))^1.55 = 0.00130 (24-(T/60))^1.55 + 0.07 in/hr

LOW LOSS RATE (80-90 PERCENT) = 18%

Where:

T=Time in minutes. To get an average value for each unit time period, Use T=1/2 the unit time for the first time period, T=1 1/2 unit time for the second period, etc.

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 3 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN E BY: PK DATE 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.75
UNIT TIME-PERCENT OF LAG	286.1
TOTAL ADJUSTED STORM RAIN-INCHES	2.42
CONSTANT LOSS RATE-in/hr	0.14
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	1.3	0.378	0.14	0.07	0.237	0.85	172.54
2	10	0.17	1.3	0.378	0.14	0.07	0.237	0.85	172.54
3	15	0.25	1.1	0.319	0.14	0.06	0.179	0.64	109.81
4	20	0.33	1.5	0.436	0.14	0.08	0.295	1.06	235.27
5	25	0.42	1.5	0.436	0.14	0.08	0.295	1.06	235.27
6	30	0.50	1.8	0.523	0.14	0.09	0.382	1.38	329.36
7	35	0.58	1.5	0.436	0.14	0.08	0.295	1.06	235.27
8	40	0.67	1.8	0.523	0.14	0.09	0.382	1.38	329.36
9	45	0.75	1.8	0.523	0.14	0.09	0.382	1.38	329.36
10	50	0.83	1.5	0.436	0.14	0.08	0.295	1.06	235.27
11	55	0.92	1.6	0.465	0.14	0.08	0.324	1.17	266.63
12	60	1.00	1.8	0.523	0.14	0.09	0.382	1.38	329.36
13	65	1.08	2.2	0.639	0.14	0.11	0.498	1.79	454.81
14	70	1.17	2.2	0.639	0.14	0.11	0.498	1.79	454.81
15	75	1.25	2.2	0.639	0.14	0.11	0.498	1.79	454.81
16	80	1.33	2.0	0.581	0.14	0.10	0.440	1.58	392.08
17	85	1.42	2.6	0.755	0.14	0.14	0.614	2.21	580.26
18	90	1.50	2.7	0.784	0.14	0.14	0.643	2.32	611.63
19	95	1.58	2.4	0.697	0.14	0.13	0.556	2.00	517.54
20	100	1.67	2.7	0.784	0.14	0.14	0.643	2.32	611.63
21	105	1.75	3.3	0.958	0.14	0.17	0.818	2.94	799.80
22	110	1.83	3.1	0.900	0.14	0.16	0.760	2.73	737.08
23	115	1.92	2.9	0.842	0.14	0.15	0.702	2.53	674.35
24	120	2.00	3.0	0.871	0.14	0.16	0.731	2.63	705.71
25	125	2.08	3.1	0.900	0.14	0.16	0.760	2.73	737.08
26	130	2.17	4.2	1.220	0.14	0.22	1.079	3.88	1082.07
27	135	2.25	5.0	1.452	0.14	0.26	1.311	4.72	1332.98
28	140	2.33	3.5	1.016	0.14	0.18	0.876	3.15	862.53
29	145	2.42	6.8	1.975	0.14	0.36	1.834	6.60	1897.52
30	150	2.50	7.3	2.120	0.14	0.38	1.979	7.13	2054.33
31	155	2.58	8.2	2.381	0.14	0.43	2.241	8.07	2336.60
32	160	2.67	5.9	1.713	0.14	0.31	1.573	5.66	1615.25
33	165	2.75	2.0	0.581	0.14	0.10	0.440	1.58	392.08
34	170	2.83	1.8	0.523	0.14	0.09	0.382	1.38	329.36
35	175	2.92	1.8	0.523	0.14	0.09	0.382	1.38	329.36
36	180	3.00	0.6	0.174	0.14	0.03	0.034	0.12	0.00
							23.978		22943.67

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.00
FLOOD VOLUME (acft)	0.60
FLOOD VOLUME (cuft)	26112.58
REQUIRED STORAGE (acft)	0.53
REQUIRED STORAGE (cuft)	22943.67
PEAK FLOW RATE (cfs)	8.07

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD
100 YEAR - 6 HOUR STORM EVENT

PROJECT: GREEN DAY VILLAGE
CONCENTRATION POINT: RETENTION BASIN E

BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60
UNIT TIME-MINUTES	5
LAG TIME - MINUTES	1.75
UNIT TIME-PERCENT OF LAG	286.1
TOTAL ADJUSTED STORM RAIN-INCHES	3.13
CONSTANT LOSS RATE-in/hr	0.141
LOW LOSS RATE - PERCENT	18%

TOTAL PERCOLATION RATE (cfs) 0.28 cfs

Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	5	0.08	0.5	0.188	0.14	0.03	0.05	0.17	0.00
2	10	0.17	0.6	0.225	0.14	0.04	0.08	0.31	8.21
3	15	0.25	0.6	0.225	0.14	0.04	0.08	0.31	8.21
4	20	0.33	0.6	0.225	0.14	0.04	0.08	0.31	8.21
5	25	0.42	0.6	0.225	0.14	0.04	0.08	0.31	8.21
6	30	0.50	0.7	0.263	0.14	0.05	0.12	0.44	48.77
7	35	0.58	0.7	0.263	0.14	0.05	0.12	0.44	48.77
8	40	0.67	0.7	0.263	0.14	0.05	0.12	0.44	48.77
9	45	0.75	0.7	0.263	0.14	0.05	0.12	0.44	48.77
10	50	0.83	0.7	0.263	0.14	0.05	0.12	0.44	48.77
11	55	0.92	0.7	0.263	0.14	0.05	0.12	0.44	48.77
12	60	1.00	0.8	0.300	0.14	0.05	0.16	0.58	89.34
13	65	1.08	0.8	0.300	0.14	0.05	0.16	0.58	89.34
14	70	1.17	0.8	0.300	0.14	0.05	0.16	0.58	89.34
15	75	1.25	0.8	0.300	0.14	0.05	0.16	0.58	89.34
16	80	1.33	0.8	0.300	0.14	0.05	0.16	0.58	89.34
17	85	1.42	0.8	0.300	0.14	0.05	0.16	0.58	89.34
18	90	1.50	0.8	0.300	0.14	0.05	0.16	0.58	89.34
19	95	1.58	0.8	0.300	0.14	0.05	0.16	0.58	89.34
20	100	1.67	0.8	0.300	0.14	0.05	0.16	0.58	89.34
21	105	1.75	0.8	0.300	0.14	0.05	0.16	0.58	89.34
22	110	1.83	0.8	0.300	0.14	0.05	0.16	0.58	89.34
23	115	1.92	0.8	0.300	0.14	0.05	0.16	0.58	89.34
24	120	2.00	0.9	0.338	0.14	0.06	0.20	0.71	129.90
25	125	2.08	0.8	0.300	0.14	0.05	0.16	0.58	89.34
26	130	2.17	0.9	0.338	0.14	0.06	0.20	0.71	129.90
27	135	2.25	0.9	0.338	0.14	0.06	0.20	0.71	129.90
28	140	2.33	0.9	0.338	0.14	0.06	0.20	0.71	129.90
29	145	2.42	0.9	0.338	0.14	0.06	0.20	0.71	129.90
30	150	2.50	0.9	0.338	0.14	0.06	0.20	0.71	129.90
31	155	2.58	0.9	0.338	0.14	0.06	0.20	0.71	129.90
32	160	2.67	0.9	0.338	0.14	0.06	0.20	0.71	129.90
33	165	2.75	1.0	0.376	0.14	0.07	0.24	0.85	170.47
34	170	2.83	1.0	0.376	0.14	0.07	0.24	0.85	170.47
35	175	2.92	1.0	0.376	0.14	0.07	0.24	0.85	170.47
36	180	3.00	1.0	0.376	0.14	0.07	0.24	0.85	170.47
37	185	3.08	1.0	0.376	0.14	0.07	0.24	0.85	170.47
38	190	3.17	1.1	0.413	0.14	0.07	0.27	0.98	211.03
39	195	3.25	1.1	0.413	0.14	0.07	0.27	0.98	211.03
40	200	3.33	1.1	0.413	0.14	0.07	0.27	0.98	211.03
41	205	3.42	1.2	0.451	0.14	0.08	0.31	1.12	251.60
42	210	3.50	1.3	0.488	0.14	0.09	0.35	1.25	292.16
43	215	3.58	1.4	0.526	0.14	0.09	0.39	1.39	332.73
44	220	3.67	1.4	0.526	0.14	0.09	0.39	1.39	332.73
45	225	3.75	1.5	0.563	0.14	0.10	0.42	1.52	373.29
46	230	3.83	1.5	0.563	0.14	0.10	0.42	1.52	373.29
47	235	3.92	1.6	0.601	0.14	0.11	0.46	1.66	413.86
48	240	4.00	1.6	0.601	0.14	0.11	0.46	1.66	413.86
49	245	4.08	1.7	0.639	0.14	0.11	0.50	1.79	454.42
50	250	4.17	1.8	0.676	0.14	0.12	0.54	1.93	494.99
51	255	4.25	1.9	0.714	0.14	0.13	0.57	2.06	535.55
52	260	4.33	2.0	0.751	0.14	0.14	0.61	2.20	576.11
53	265	4.42	2.1	0.789	0.14	0.14	0.65	2.33	616.68
54	270	4.50	2.1	0.789	0.14	0.14	0.65	2.33	616.68
55	275	4.58	2.2	0.826	0.14	0.15	0.69	2.47	657.24
56	280	4.67	2.3	0.864	0.14	0.16	0.72	2.60	697.81

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 6 HOUR STORM EVENT	PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN E BY: PK DATE: 7/4/2022

EFFECTIVE RAIN CALCULATION FORM

DRAINAGE AREA-ACRES	3.60		
UNIT TIME-MINUTES	5		
LAG TIME - MINUTES	1.75		
UNIT TIME-PERCENT OF LAG	286.1		
TOTAL ADJUSTED STORM RAIN-INCHES	3.13		
CONSTANT LOSS RATE-in/hr	0.141		
LOW LOSS RATE - PERCENT	18%	TOTAL PERCOLATION RATE (cfs)	0.28 cfs

Unit Time Period	Time		Pattern Percent	Storm Rain in/hr	Loss Rate in/hr		Effective Rain	Flood Hydrograph Flow	Required Storage
	Minutes	Hours	(Plate E-5.9)		Max	Low	in/hr	cfs	cf
57	285	4.75	2.4	0.901	0.14	0.16	0.76	2.74	738.37
58	290	4.83	2.4	0.901	0.14	0.16	0.76	2.74	738.37
59	295	4.92	2.5	0.939	0.14	0.17	0.80	2.87	778.94
60	300	5.00	2.6	0.977	0.14	0.18	0.84	3.01	819.50
61	305	5.08	3.1	1.164	0.14	0.21	1.02	3.69	1022.33
62	310	5.17	3.6	1.352	0.14	0.24	1.21	4.36	1225.15
63	315	5.25	3.9	1.465	0.14	0.26	1.32	4.77	1346.85
64	320	5.33	4.2	1.578	0.14	0.28	1.44	5.17	1468.54
65	325	5.42	4.7	1.765	0.14	0.32	1.62	5.85	1671.36
66	330	5.50	5.6	2.103	0.14	0.38	1.96	7.07	2036.45
67	335	5.58	1.9	0.714	0.14	0.13	0.57	2.06	535.55
68	340	5.67	0.9	0.338	0.14	0.06	0.20	0.71	129.90
69	345	5.75	0.6	0.225	0.14	0.04	0.08	0.31	8.21
70	350	5.83	0.5	0.188	0.14	0.03	0.05	0.17	0.00
71	355	5.92	0.3	0.113	0.14	0.02	0.09	0.33	16.46
72	360	6.00	0.2	0.075	0.14	0.01	0.06	0.22	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY

EFFECTIVE RAIN (in)	2.31
FLOOD VOLUME (acft)	0.69
FLOOD VOLUME (cuft)	30148.21
REQUIRED STORAGE (acft)	0.55
REQUIRED STORAGE (cuft)	23980.45
PEAK FLOW RATE (cfs)	7.07

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN E BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			3.600	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.1406		
LAG TIME - MINUTES			1.75	MINIMUM LOSS RATE (for var. loss) - in/hr			0.070		
UNIT TIME-PERCENT OF LAG			858.4	LOW LOSS RATE - DECIMAL			0.18		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00130		
				PERCOLATION RATE (cfs)			0.28		
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
1	15	0.25	0.2	0.040	0.248	0.007	0.033	0.12	0.00
2	30	0.50	0.3	0.061	0.245	0.011	0.050	0.18	0.00
3	45	0.75	0.3	0.061	0.243	0.011	0.050	0.18	0.00
4	60	1.00	0.4	0.081	0.240	0.015	0.066	0.24	0.00
5	75	1.25	0.3	0.061	0.237	0.011	0.050	0.18	0.00
6	90	1.50	0.3	0.061	0.234	0.011	0.050	0.18	0.00
7	105	1.75	0.3	0.061	0.231	0.011	0.050	0.18	0.00
8	120	2.00	0.4	0.081	0.228	0.015	0.066	0.24	0.00
9	135	2.25	0.4	0.081	0.226	0.015	0.066	0.24	0.00
10	150	2.50	0.4	0.081	0.223	0.015	0.066	0.24	0.00
11	165	2.75	0.5	0.101	0.220	0.018	0.083	0.30	18.87
12	180	3.00	0.5	0.101	0.218	0.018	0.083	0.30	18.87
13	195	3.25	0.5	0.101	0.215	0.018	0.083	0.30	18.87
14	210	3.50	0.5	0.101	0.212	0.018	0.083	0.30	18.87
15	225	3.75	0.5	0.101	0.210	0.018	0.083	0.30	18.87
16	240	4.00	0.6	0.121	0.207	0.022	0.100	0.36	72.64
17	255	4.25	0.6	0.121	0.204	0.022	0.100	0.36	72.64
18	270	4.50	0.7	0.142	0.202	0.026	0.116	0.42	126.42
19	285	4.75	0.7	0.142	0.199	0.026	0.116	0.42	126.42
20	300	5.00	0.8	0.162	0.196	0.029	0.133	0.48	180.19
21	315	5.25	0.6	0.121	0.194	0.022	0.100	0.36	72.64
22	330	5.50	0.7	0.142	0.191	0.026	0.116	0.42	126.42
23	345	5.75	0.8	0.162	0.189	0.029	0.133	0.48	180.19
24	360	6.00	0.8	0.162	0.186	0.029	0.133	0.48	180.19
25	375	6.25	0.9	0.182	0.184	0.033	0.149	0.54	233.96
26	390	6.50	0.9	0.182	0.181	0.033	0.001	0.00	0.00
27	405	6.75	1.0	0.202	0.179	0.036	0.023	0.08	0.00
28	420	7.00	1.0	0.202	0.177	0.036	0.026	0.09	0.00
29	435	7.25	1.0	0.202	0.174	0.036	0.028	0.10	0.00
30	450	7.50	1.1	0.223	0.172	0.040	0.051	0.18	0.00
31	465	7.75	1.2	0.243	0.170	0.044	0.073	0.26	0.00
32	480	8.00	1.3	0.263	0.167	0.047	0.096	0.35	60.88
33	495	8.25	1.5	0.304	0.165	0.055	0.139	0.50	199.55
34	510	8.50	1.5	0.304	0.163	0.055	0.141	0.51	206.99
35	525	8.75	1.6	0.324	0.160	0.058	0.164	0.59	279.95
36	540	9.00	1.7	0.344	0.158	0.062	0.186	0.67	352.84
37	555	9.25	1.9	0.385	0.156	0.069	0.229	0.82	491.24
38	570	9.50	2.0	0.405	0.154	0.073	0.251	0.90	564.00
39	585	9.75	2.1	0.425	0.151	0.077	0.274	0.99	636.69
40	600	10.00	2.2	0.445	0.149	0.080	0.296	1.07	709.32
41	615	10.25	1.5	0.304	0.147	0.055	0.157	0.56	257.25
42	630	10.50	1.5	0.304	0.145	0.055	0.159	0.57	264.16
43	645	10.75	2.0	0.405	0.143	0.073	0.262	0.94	598.89
44	660	11.00	2.0	0.405	0.141	0.073	0.264	0.95	605.66
45	675	11.25	1.9	0.385	0.139	0.069	0.246	0.89	546.78
46	690	11.50	1.9	0.385	0.137	0.069	0.248	0.89	553.41
47	705	11.75	1.7	0.344	0.135	0.062	0.210	0.75	428.81
48	720	12.00	1.8	0.364	0.133	0.066	0.232	0.83	500.87
49	735	12.25	2.5	0.506	0.131	0.091	0.375	1.35	966.33
50	750	12.50	2.6	0.526	0.129	0.095	0.398	1.43	1038.24
51	765	12.75	2.8	0.567	0.127	0.102	0.440	1.58	1175.66
52	780	13.00	2.9	0.587	0.125	0.106	0.462	1.66	1247.43
53	795	13.25	3.4	0.688	0.123	0.124	0.565	2.03	1581.43
54	810	13.50	3.4	0.688	0.121	0.124	0.567	2.04	1587.46
55	825	13.75	2.3	0.466	0.119	0.084	0.346	1.25	872.06
56	840	14.00	2.3	0.466	0.117	0.084	0.348	1.25	877.94
57	855	14.25	2.7	0.546	0.116	0.098	0.431	1.55	1146.05
58	870	14.50	2.6	0.526	0.114	0.095	0.412	1.48	1086.19
59	885	14.75	2.6	0.526	0.112	0.095	0.414	1.49	1091.83
60	900	15.00	2.5	0.506	0.110	0.091	0.396	1.42	1031.81

RCFCD SYNTHETIC UNIT HYDROGRAPH METHOD 100 YEAR - 24 HOUR STORM EVENT					PROJECT: GREEN DAY VILLAGE CONCENTRATION POINT: RETENTION BASIN E BY: PK DATE: 7/4/2022				
EFFECTIVE RAIN CALCULATION FORM									
DRAINAGE AREA-ACRES			3.600	CONSTANT LOSS RATE-in/hr			n/a		
UNIT TIME-MINUTES			15	VARIABLE LOSS RATE (AVG) in/hr			0.1406		
LAG TIME - MINUTES			1.75	MINIMUM LOSS RATE (for var. loss) - in/hr			0.070		
UNIT TIME-PERCENT OF LAG			858.4	LOW LOSS RATE - DECIMAL			0.18		
TOTAL ADJUSTED STORM RAIN-INCHES			5.06	C			0.00130		
				PERCOLATION RATE (cfs)			0.28		
Unit Time Period	Time Minutes	Time Hours	Pattern Percent (Plate E-5.9)	Storm Rain in/hr	Loss Rate in/hr Max	Loss Rate in/hr Low	Effective Rain in/hr	Flood Hydrograph Flow cfs	Required Storage cf
61	915	15.25	2.4	0.486	0.109	0.087	0.377	1.36	971.71
62	930	15.50	2.3	0.466	0.107	0.084	0.358	1.29	911.52
63	945	15.75	1.9	0.385	0.105	0.069	0.279	1.01	654.51
64	960	16.00	1.9	0.385	0.104	0.069	0.281	1.01	659.73
65	975	16.25	0.4	0.081	0.102	0.015	0.066	0.24	0.00
66	990	16.50	0.4	0.081	0.101	0.015	0.066	0.24	0.00
67	1005	16.75	0.3	0.061	0.099	0.011	0.050	0.18	0.00
68	1020	17.00	0.3	0.061	0.098	0.011	0.050	0.18	0.00
69	1035	17.25	0.5	0.101	0.096	0.018	0.005	0.02	0.00
70	1050	17.50	0.5	0.101	0.095	0.018	0.006	0.02	0.00
71	1065	17.75	0.5	0.101	0.093	0.018	0.008	0.03	0.00
72	1080	18.00	0.4	0.081	0.092	0.015	0.066	0.24	0.00
73	1095	18.25	0.4	0.081	0.091	0.015	0.066	0.24	0.00
74	1110	18.50	0.4	0.081	0.089	0.015	0.066	0.24	0.00
75	1125	18.75	0.3	0.061	0.088	0.011	0.050	0.18	0.00
76	1140	19.00	0.2	0.040	0.087	0.007	0.033	0.12	0.00
77	1155	19.25	0.3	0.061	0.085	0.011	0.050	0.18	0.00
78	1170	19.50	0.4	0.081	0.084	0.015	0.066	0.24	0.00
79	1185	19.75	0.3	0.061	0.083	0.011	0.050	0.18	0.00
80	1200	20.00	0.2	0.040	0.082	0.007	0.033	0.12	0.00
81	1215	20.25	0.3	0.061	0.081	0.011	0.050	0.18	0.00
82	1230	20.50	0.3	0.061	0.080	0.011	0.050	0.18	0.00
83	1245	20.75	0.3	0.061	0.079	0.011	0.050	0.18	0.00
84	1260	21.00	0.2	0.040	0.078	0.007	0.033	0.12	0.00
85	1275	21.25	0.3	0.061	0.077	0.011	0.050	0.18	0.00
86	1290	21.50	0.2	0.040	0.076	0.007	0.033	0.12	0.00
87	1305	21.75	0.3	0.061	0.075	0.011	0.050	0.18	0.00
88	1320	22.00	0.2	0.040	0.074	0.007	0.033	0.12	0.00
89	1335	22.25	0.3	0.061	0.074	0.011	0.050	0.18	0.00
90	1350	22.50	0.2	0.040	0.073	0.007	0.033	0.12	0.00
91	1365	22.75	0.2	0.040	0.072	0.007	0.033	0.12	0.00
92	1380	23.00	0.2	0.040	0.072	0.007	0.033	0.12	0.00
93	1395	23.25	0.2	0.040	0.071	0.007	0.033	0.12	0.00
94	1410	23.50	0.2	0.040	0.071	0.007	0.033	0.12	0.00
95	1425	23.75	0.2	0.040	0.071	0.007	0.033	0.12	0.00
96	1440	24.00	0.2	0.040	0.070	0.007	0.033	0.12	0.00

EFFECTIVE RAIN & FLOOD VOLUMES SUMMARY	
EFFECTIVE RAIN (in)	3.43
FLOOD VOLUME (acft)	1.03
FLOOD VOLUME (cuft)	44842.06
REQUIRED STORAGE (acft)	0.59
REQUIRED STORAGE (cuft)	25623.26
PEAK FLOW (cfs)	2.04

PROJECT: GREEN DAY VILLAGE
MBI JOB# 2022.09
RETENTION BASIN E

BASIN CHARACTERISTICS

CONTOUR	DEPTH		AREA		VOLUME		
	INCR (ft)	TOTAL (ft)	INCR (sf)	TOTAL (sf)	INCR (cuft)	TOTAL (cuft)	(acre-ft)
345	0	0		6000	0	0	0.00
346	1	1	0	6000	6000	6000	0.14
347	1	2	0	6000	6000	12000	0.28
348	1	3	0	6000	6000	18000	0.41
349	1	4	0	6000	6000	24000	0.55
350	1	5	0	6000	6000	30000	0.69

PERCOLATION CALCULATIONS

PERCOLATION RATE	2 in/hr	0.27778	cfs
MAXWELL IV DRYWELLS			
NUMBER USED	0		
RATE/DRYWELL	0.00000 cfs		
TOTAL DISSIPATED		0.00000	cfs
TOTAL PERCOLATION RATE		0.27778	cfs

DRAWDOWN TIME:

Total volume (A) to be draw-down	=	25623	cu ft (100-yr 24-hr volume, see page 2 of the results)
Total percolation rate (B) from above	=	0.27778	cfs
Drawdown Time (T)	=	(A)/(B*3600)	
	=	**26**	hrs < 36 hrs

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 3 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.85	256	256	83	173	345.03	173	0.00
2	10	0.85	256	428	83	345	345.06	345	0.01
3	15	0.64	193	538	83	455	345.08	455	0.01
4	20	1.06	319	773	83	690	345.12	690	0.02
5	25	1.06	319	1,009	83	925	345.15	925	0.02
6	30	1.38	413	1,338	83	1,255	345.21	1,255	0.03
7	35	1.06	319	1,573	83	1,490	345.25	1,490	0.03
8	40	1.38	413	1,903	83	1,819	345.30	1,819	0.04
9	45	1.38	413	2,232	83	2,149	345.36	2,149	0.05
10	50	1.06	319	2,467	83	2,384	345.40	2,384	0.05
11	55	1.17	350	2,734	83	2,651	345.44	2,651	0.06
12	60	1.38	413	3,063	83	2,980	345.50	2,980	0.07
13	65	1.79	538	3,518	83	3,435	345.57	3,435	0.08
14	70	1.79	538	3,973	83	3,890	345.65	3,890	0.09
15	75	1.79	538	4,428	83	4,344	345.72	4,344	0.10
16	80	1.58	475	4,820	83	4,737	345.79	4,737	0.11
17	85	2.21	664	5,400	83	5,317	345.89	5,317	0.12
18	90	2.32	695	6,012	83	5,928	345.99	5,928	0.14
19	95	2.00	601	6,529	83	6,446	346.07	6,446	0.15
20	100	2.32	695	7,141	83	7,058	346.18	7,058	0.16
21	105	2.94	883	7,941	83	7,857	346.31	7,857	0.18
22	110	2.73	820	8,678	83	8,594	346.43	8,594	0.20
23	115	2.53	758	9,352	83	9,269	346.54	9,269	0.21
24	120	2.63	789	10,058	83	9,975	346.66	9,975	0.23
25	125	2.73	820	10,795	83	10,712	346.79	10,712	0.25
26	130	3.88	1,165	11,877	83	11,794	346.97	11,794	0.27
27	135	4.72	1,416	13,210	83	13,127	347.19	13,127	0.30
28	140	3.15	946	14,073	83	13,989	347.33	13,989	0.32
29	145	6.60	1,981	15,970	83	15,887	347.65	15,887	0.36
30	150	7.13	2,138	18,024	83	17,941	347.99	17,941	0.41
31	155	8.07	2,420	20,361	83	20,278	348.38	20,278	0.47
32	160	5.66	1,699	21,976	83	21,893	348.65	21,893	0.50
33	165	1.58	475	22,368	83	22,285	348.71	22,285	0.51
34	170	1.38	413	22,698	83	22,614	348.77	22,614	0.52
35	175	1.38	413	23,027	83	22,944	348.82	22,944	0.53
36	180	0.12	36	22,980	83	22,897	348.82	22,897	0.53

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	5	0.17	51	51	83	-	345.00	-	0.00
2	10	0.31	92	92	83	8	345.00	8	0.00
3	15	0.31	92	100	83	16	345.00	16	0.00
4	20	0.31	92	108	83	25	345.00	25	0.00
5	25	0.31	92	116	83	33	345.01	33	0.00
6	30	0.44	132	165	83	82	345.01	82	0.00
7	35	0.44	132	214	83	130	345.02	130	0.00
8	40	0.44	132	262	83	179	345.03	179	0.00
9	45	0.44	132	311	83	228	345.04	228	0.01
10	50	0.44	132	360	83	277	345.05	277	0.01
11	55	0.44	132	409	83	325	345.05	325	0.01
12	60	0.58	173	498	83	415	345.07	415	0.01
13	65	0.58	173	587	83	504	345.08	504	0.01
14	70	0.58	173	677	83	593	345.10	593	0.01
15	75	0.58	173	766	83	683	345.11	683	0.02
16	80	0.58	173	855	83	772	345.13	772	0.02
17	85	0.58	173	945	83	861	345.14	861	0.02
18	90	0.58	173	1,034	83	951	345.16	951	0.02
19	95	0.58	173	1,123	83	1,040	345.17	1,040	0.02
20	100	0.58	173	1,213	83	1,129	345.19	1,129	0.03
21	105	0.58	173	1,302	83	1,219	345.20	1,219	0.03
22	110	0.58	173	1,392	83	1,308	345.22	1,308	0.03
23	115	0.58	173	1,481	83	1,398	345.23	1,398	0.03
24	120	0.71	213	1,611	83	1,527	345.25	1,527	0.04
25	125	0.58	173	1,700	83	1,617	345.27	1,617	0.04
26	130	0.71	213	1,830	83	1,747	345.29	1,747	0.04
27	135	0.71	213	1,960	83	1,877	345.31	1,877	0.04
28	140	0.71	213	2,090	83	2,006	345.33	2,006	0.05
29	145	0.71	213	2,220	83	2,136	345.36	2,136	0.05
30	150	0.71	213	2,350	83	2,266	345.38	2,266	0.05
31	155	0.71	213	2,479	83	2,396	345.40	2,396	0.06
32	160	0.71	213	2,609	83	2,526	345.42	2,526	0.06
33	165	0.85	254	2,780	83	2,697	345.45	2,697	0.06
34	170	0.85	254	2,950	83	2,867	345.48	2,867	0.07
35	175	0.85	254	3,121	83	3,037	345.51	3,037	0.07
36	180	0.85	254	3,291	83	3,208	345.53	3,208	0.07
37	185	0.85	254	3,462	83	3,378	345.56	3,378	0.08
38	190	0.98	294	3,673	83	3,589	345.60	3,589	0.08
39	195	0.98	294	3,884	83	3,800	345.63	3,800	0.09
40	200	0.98	294	4,095	83	4,011	345.67	4,011	0.09
41	205	1.12	335	4,346	83	4,263	345.71	4,263	0.10
42	210	1.25	375	4,639	83	4,555	345.76	4,555	0.10
43	215	1.39	416	4,971	83	4,888	345.81	4,888	0.11
44	220	1.39	416	5,304	83	5,221	345.87	5,221	0.12
45	225	1.52	457	5,677	83	5,594	345.93	5,594	0.13
46	230	1.52	457	6,051	83	5,967	345.99	5,967	0.14
47	235	1.66	497	6,464	83	6,381	346.06	6,381	0.15
48	240	1.66	497	6,878	83	6,795	346.13	6,795	0.16
49	245	1.79	538	7,333	83	7,249	346.21	7,249	0.17
50	250	1.93	578	7,828	83	7,744	346.29	7,744	0.18
51	255	2.06	619	8,363	83	8,280	346.38	8,280	0.19
52	260	2.20	659	8,939	83	8,856	346.48	8,856	0.20
53	265	2.33	700	9,556	83	9,473	346.58	9,473	0.22
54	270	2.33	700	10,173	83	10,089	346.68	10,089	0.23
55	275	2.47	741	10,830	83	10,747	346.79	10,747	0.25

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 6 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
56	280	2.60	781	11,528	83	11,444	346.91	11,444	0.26
57	285	2.74	822	12,266	83	12,183	347.03	12,183	0.28
58	290	2.74	822	13,005	83	12,921	347.15	12,921	0.30
59	295	2.87	862	13,783	83	13,700	347.28	13,700	0.31
60	300	3.01	903	14,603	83	14,520	347.42	14,520	0.33
61	305	3.69	1,106	15,625	83	15,542	347.59	15,542	0.36
62	310	4.36	1,308	16,850	83	16,767	347.79	16,767	0.38
63	315	4.77	1,430	18,197	83	18,114	348.02	18,114	0.42
64	320	5.17	1,552	19,666	83	19,583	348.26	19,583	0.45
65	325	5.85	1,755	21,337	83	21,254	348.54	21,254	0.49
66	330	7.07	2,120	23,374	83	23,290	348.88	23,290	0.53
67	335	2.06	619	23,909	83	23,826	348.97	23,826	0.55
68	340	0.71	213	24,039	83	23,956	348.99	23,956	0.55
69	345	0.31	92	24,047	83	23,964	348.99	23,964	0.55
70	350	0.17	51	24,015	83	23,932	348.99	23,932	0.55
71	355	0.33	100	24,031	83	23,948	348.99	23,948	0.55
72	360	0.22	67	24,015	83	23,931	348.99	23,931	0.55

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
1	15	0.12	108	108	250	-	345.00	-	0.00
2	30	0.18	161	161	250	-	345.00	-	0.00
3	45	0.18	161	161	250	-	345.00	-	0.00
4	60	0.24	215	215	250	-	345.00	-	0.00
5	75	0.18	161	161	250	-	345.00	-	0.00
6	90	0.18	161	161	250	-	345.00	-	0.00
7	105	0.18	161	161	250	-	345.00	-	0.00
8	120	0.24	215	215	250	-	345.00	-	0.00
9	135	0.24	215	215	250	-	345.00	-	0.00
10	150	0.24	215	215	250	-	345.00	-	0.00
11	165	0.30	269	269	250	19	345.00	19	0.00
12	180	0.30	269	288	250	38	345.01	38	0.00
13	195	0.30	269	307	250	57	345.01	57	0.00
14	210	0.30	269	325	250	75	345.01	75	0.00
15	225	0.30	269	344	250	94	345.02	94	0.00
16	240	0.36	323	417	250	167	345.03	167	0.00
17	255	0.36	323	490	250	240	345.04	240	0.01
18	270	0.42	376	616	250	366	345.06	366	0.01
19	285	0.42	376	742	250	492	345.08	492	0.01
20	300	0.48	430	923	250	673	345.11	673	0.02
21	315	0.36	323	995	250	745	345.12	745	0.02
22	330	0.42	376	1,122	250	872	345.15	872	0.02
23	345	0.48	430	1,302	250	1,052	345.18	1,052	0.02
24	360	0.48	430	1,482	250	1,232	345.21	1,232	0.03
25	375	0.54	484	1,716	250	1,466	345.24	1,466	0.03
26	390	0.00	2	1,468	250	1,218	345.20	1,218	0.03
27	405	0.08	76	1,294	250	1,044	345.17	1,044	0.02
28	420	0.09	83	1,127	250	877	345.15	877	0.02
29	435	0.10	91	969	250	719	345.12	719	0.02
30	450	0.18	165	883	250	633	345.11	633	0.01
31	465	0.26	238	871	250	621	345.10	621	0.01
32	480	0.35	311	932	250	682	345.11	682	0.02
33	495	0.50	450	1,131	250	881	345.15	881	0.02
34	510	0.51	457	1,338	250	1,088	345.18	1,088	0.02
35	525	0.59	530	1,618	250	1,368	345.23	1,368	0.03
36	540	0.67	603	1,971	250	1,721	345.29	1,721	0.04
37	555	0.82	741	2,462	250	2,212	345.37	2,212	0.05
38	570	0.90	814	3,026	250	2,776	345.46	2,776	0.06
39	585	0.99	887	3,663	250	3,413	345.57	3,413	0.08
40	600	1.07	959	4,372	250	4,122	345.69	4,122	0.09
41	615	0.56	507	4,630	250	4,380	345.73	4,380	0.10
42	630	0.57	514	4,894	250	4,644	345.77	4,644	0.11
43	645	0.94	849	5,493	250	5,243	345.87	5,243	0.12
44	660	0.95	856	6,098	250	5,848	345.97	5,848	0.13
45	675	0.89	797	6,645	250	6,395	346.07	6,395	0.15
46	690	0.89	803	7,198	250	6,948	346.16	6,948	0.16
47	705	0.75	679	7,627	250	7,377	346.23	7,377	0.17
48	720	0.83	751	8,128	250	7,878	346.31	7,878	0.18
49	735	1.35	1,216	9,094	250	8,844	346.47	8,844	0.20
50	750	1.43	1,288	10,133	250	9,883	346.65	9,883	0.23
51	765	1.58	1,426	11,308	250	11,058	346.84	11,058	0.25
52	780	1.66	1,497	12,556	250	12,306	347.05	12,306	0.28
53	795	2.03	1,831	14,137	250	13,887	347.31	13,887	0.32
54	810	2.04	1,837	15,725	250	15,475	347.58	15,475	0.36
55	825	1.25	1,122	16,597	250	16,347	347.72	16,347	0.38
56	840	1.25	1,128	17,475	250	17,225	347.87	17,225	0.40
57	855	1.55	1,396	18,621	250	18,371	348.06	18,371	0.42
58	870	1.48	1,336	19,707	250	19,457	348.24	19,457	0.45

RETENTION BASIN E
MBI JOB # 2022.09
100 YEAR - 24 HOUR STORM EVENT

TIME UNIT PERIOD	(min)	FLOW IN (cfs)	VOLUME IN (cuft)	TOTAL IN BASIN (cuft)	PERC OUT (cuft)	TOTAL IN BASIN (cuft)	BASIN DEPTH (ft)	BALANCE IN BASIN (cuft)	(acre-ft)
59	885	1.49	1,342	20,799	250	20,549	348.42	20,549	0.47
60	900	1.42	1,282	21,831	250	21,581	348.60	21,581	0.50
61	915	1.36	1,222	22,802	250	22,552	348.76	22,552	0.52
62	930	1.29	1,162	23,714	250	23,464	348.91	23,464	0.54
63	945	1.01	905	24,368	250	24,118	349.02	24,118	0.55
64	960	1.01	910	25,028	250	24,778	349.13	24,778	0.57
65	975	0.24	215	24,993	250	24,743	349.12	24,743	0.57
66	990	0.24	215	24,958	250	24,708	349.12	24,708	0.57
67	1005	0.18	161	24,870	250	24,620	349.10	24,620	0.57
68	1020	0.18	161	24,781	250	24,531	349.09	24,531	0.56
69	1035	0.02	16	24,547	250	24,297	349.05	24,297	0.56
70	1050	0.02	21	24,318	250	24,068	349.01	24,068	0.55
71	1065	0.03	26	24,094	250	23,844	348.97	23,844	0.55
72	1080	0.24	215	24,059	250	23,809	348.97	23,809	0.55
73	1095	0.24	215	24,024	250	23,774	348.96	23,774	0.55
74	1110	0.24	215	23,989	250	23,739	348.96	23,739	0.54
75	1125	0.18	161	23,901	250	23,651	348.94	23,651	0.54
76	1140	0.12	108	23,758	250	23,508	348.92	23,508	0.54
77	1155	0.18	161	23,669	250	23,419	348.90	23,419	0.54
78	1170	0.24	215	23,634	250	23,384	348.90	23,384	0.54
79	1185	0.18	161	23,546	250	23,296	348.88	23,296	0.53
80	1200	0.12	108	23,403	250	23,153	348.86	23,153	0.53
81	1215	0.18	161	23,315	250	23,065	348.84	23,065	0.53
82	1230	0.18	161	23,226	250	22,976	348.83	22,976	0.53
83	1245	0.18	161	23,137	250	22,887	348.81	22,887	0.53
84	1260	0.12	108	22,995	250	22,745	348.79	22,745	0.52
85	1275	0.18	161	22,906	250	22,656	348.78	22,656	0.52
86	1290	0.12	108	22,764	250	22,514	348.75	22,514	0.52
87	1305	0.18	161	22,675	250	22,425	348.74	22,425	0.51
88	1320	0.12	108	22,533	250	22,283	348.71	22,283	0.51
89	1335	0.18	161	22,444	250	22,194	348.70	22,194	0.51
90	1350	0.12	108	22,301	250	22,051	348.68	22,051	0.51
91	1365	0.12	108	22,159	250	21,909	348.65	21,909	0.50
92	1380	0.12	108	22,017	250	21,767	348.63	21,767	0.50
93	1395	0.12	108	21,874	250	21,624	348.60	21,624	0.50
94	1410	0.12	108	21,732	250	21,482	348.58	21,482	0.49
95	1425	0.12	108	21,589	250	21,339	348.56	21,339	0.49
96	1440	0.12	108	21,447	250	21,197	348.53	21,197	0.49

EXHIBIT “A”

PROPOSED CONDITION HYDROLOGY MAP

DRAINAGE BOUNDARY

X
3.85

DRNG AREA ID

AREA IN ACRES

CATCH BASIN

SD

STORM DRAIN

A
26.34

B
1.07

C
1.24

D
3.85

E
3.60

STORAGE CHAMBER

BASIN "A"
BOTTOM=57.5
(AREA=3051.34 SF.)

BASIN "B"
BOTTOM=44.0
(AREA=28167.66 SF.)

TRACT BOUNDARY

1' TO 3' MAX. RETAINING WALL

4' RETAINING WALL

HEADWALL OUTLET STRUCTURE

2:1 SLOPE

SWIMMING POOL

Drive

Palm

N

0 20' 40' 80'
SCALE: 1"=40'

UNIT HYDROGRAPH
HYDROLOGY EXHIBIT
GREEN DAY VILLAGE, DHS CA

APPENDIX A
Rainfall and Soil Data and E Plates

NOAA Atlas 14, Volume 6, Version 2
Location name: Desert Hot Springs, California, USA*
Latitude: 33.9134°, Longitude: -116.5046°
Elevation: 767.88 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Sarah Dietz, Sarah Heim, Lillian Hiner, Kazungu Maitaria, Deborah Martin, Sandra Pavlovic, Ishani Roy, Carl Trypaluk, Dale Unruh, Fenglin Yan, Michael Yekta, Tan Zhao, Geoffrey Bonnin, Daniel Brewer, Li-Chuan Chen, Tye Parzybok, John Yarchoan

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.079 (0.066-0.096)	0.115 (0.095-0.139)	0.168 (0.139-0.204)	0.215 (0.177-0.265)	0.288 (0.229-0.367)	0.351 (0.273-0.457)	0.422 (0.320-0.563)	0.503 (0.371-0.690)	0.627 (0.444-0.896)	0.737 (0.503-1.09)
10-min	0.113 (0.094-0.137)	0.164 (0.137-0.200)	0.240 (0.199-0.293)	0.309 (0.253-0.379)	0.413 (0.328-0.526)	0.504 (0.392-0.654)	0.606 (0.459-0.806)	0.722 (0.532-0.988)	0.899 (0.636-1.29)	1.06 (0.722-1.56)
15-min	0.137 (0.114-0.166)	0.199 (0.165-0.242)	0.290 (0.241-0.354)	0.373 (0.307-0.459)	0.500 (0.397-0.636)	0.609 (0.474-0.791)	0.732 (0.556-0.975)	0.873 (0.643-1.20)	1.09 (0.769-1.55)	1.28 (0.873-1.89)
30-min	0.212 (0.177-0.258)	0.309 (0.257-0.376)	0.451 (0.374-0.550)	0.580 (0.476-0.713)	0.777 (0.617-0.988)	0.947 (0.736-1.23)	1.14 (0.863-1.52)	1.36 (1.00-1.86)	1.69 (1.20-2.42)	1.99 (1.36-2.94)
60-min	0.308 (0.256-0.374)	0.448 (0.372-0.544)	0.654 (0.542-0.797)	0.840 (0.690-1.03)	1.13 (0.894-1.43)	1.37 (1.07-1.78)	1.65 (1.25-2.20)	1.97 (1.45-2.69)	2.45 (1.73-3.50)	2.88 (1.97-4.26)
2-hr	0.423 (0.352-0.513)	0.597 (0.496-0.726)	0.852 (0.706-1.04)	1.08 (0.889-1.33)	1.43 (1.14-1.82)	1.73 (1.34-2.25)	2.06 (1.56-2.74)	2.44 (1.80-3.34)	3.00 (2.12-4.29)	3.49 (2.38-5.16)
3-hr	0.512 (0.426-0.622)	0.718 (0.596-0.873)	1.02 (0.843-1.24)	1.29 (1.06-1.58)	1.69 (1.34-2.15)	2.04 (1.59-2.65)	2.42 (1.84-3.23)	2.86 (2.11-3.91)	3.51 (2.48-5.01)	4.06 (2.78-6.01)
6-hr	0.670 (0.558-0.814)	0.939 (0.780-1.14)	1.33 (1.10-1.62)	1.68 (1.38-2.06)	2.20 (1.75-2.79)	2.64 (2.05-3.43)	3.13 (2.37-4.17)	3.68 (2.71-5.04)	4.50 (3.18-6.43)	5.20 (3.55-7.70)
12-hr	0.817 (0.680-0.992)	1.17 (0.973-1.42)	1.68 (1.39-2.05)	2.13 (1.75-2.62)	2.81 (2.23-3.57)	3.38 (2.63-4.39)	4.01 (3.04-5.34)	4.71 (3.48-6.46)	5.77 (4.08-8.24)	6.67 (4.55-9.86)
24-hr	0.963 (0.853-1.11)	1.42 (1.26-1.64)	2.08 (1.84-2.41)	2.66 (2.33-3.11)	3.53 (2.99-4.25)	4.25 (3.53-5.23)	5.06 (4.10-6.36)	5.95 (4.70-7.70)	7.29 (5.53-9.82)	8.44 (6.19-11.8)
2-day	1.06 (0.935-1.22)	1.59 (1.41-1.84)	2.37 (2.09-2.74)	3.05 (2.66-3.55)	4.05 (3.43-4.88)	4.90 (4.07-6.02)	5.83 (4.73-7.34)	6.87 (5.42-8.89)	8.42 (6.38-11.3)	9.74 (7.14-13.6)
3-day	1.10 (0.972-1.26)	1.67 (1.48-1.93)	2.51 (2.21-2.90)	3.24 (2.83-3.78)	4.32 (3.66-5.20)	5.23 (4.34-6.43)	6.23 (5.05-7.84)	7.35 (5.80-9.50)	9.01 (6.83-12.1)	10.4 (7.64-14.5)
4-day	1.13 (1.00-1.31)	1.74 (1.54-2.01)	2.62 (2.31-3.04)	3.40 (2.97-3.96)	4.54 (3.85-5.47)	5.51 (4.57-6.77)	6.56 (5.32-8.26)	7.74 (6.11-10.0)	9.49 (7.19-12.8)	11.0 (8.04-15.3)
7-day	1.24 (1.10-1.43)	1.94 (1.72-2.24)	2.95 (2.60-3.41)	3.84 (3.36-4.48)	5.16 (4.37-6.21)	6.26 (5.19-7.69)	7.46 (6.05-9.38)	8.79 (6.93-11.4)	10.7 (8.15-14.5)	12.4 (9.09-17.3)
10-day	1.31 (1.16-1.50)	2.06 (1.82-2.37)	3.14 (2.77-3.64)	4.10 (3.59-4.79)	5.53 (4.68-6.66)	6.72 (5.58-8.25)	8.01 (6.49-10.1)	9.44 (7.45-12.2)	11.5 (8.75-15.5)	13.3 (9.75-18.5)
20-day	1.43 (1.27-1.65)	2.28 (2.02-2.63)	3.53 (3.11-4.08)	4.63 (4.05-5.40)	6.28 (5.32-7.56)	7.65 (6.35-9.40)	9.15 (7.42-11.5)	10.8 (8.52-14.0)	13.2 (10.00-17.8)	15.2 (11.1-21.2)
30-day	1.61 (1.42-1.85)	2.56 (2.27-2.96)	3.98 (3.51-4.60)	5.23 (4.58-6.10)	7.11 (6.03-8.57)	8.69 (7.21-10.7)	10.4 (8.43-13.1)	12.3 (9.68-15.9)	15.0 (11.4-20.2)	17.3 (12.7-24.0)
45-day	1.77 (1.57-2.04)	2.83 (2.50-3.26)	4.39 (3.88-5.08)	5.80 (5.07-6.76)	7.92 (6.71-9.53)	9.70 (8.05-11.9)	11.6 (9.43-14.6)	13.7 (10.8-17.8)	16.8 (12.7-22.6)	19.3 (14.2-26.9)
60-day	1.94 (1.72-2.24)	3.09 (2.73-3.56)	4.80 (4.23-5.55)	6.34 (5.55-7.39)	8.66 (7.34-10.4)	10.6 (8.82-13.1)	12.8 (10.4-16.1)	15.1 (11.9-19.5)	18.5 (14.0-24.9)	21.2 (15.6-29.6)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

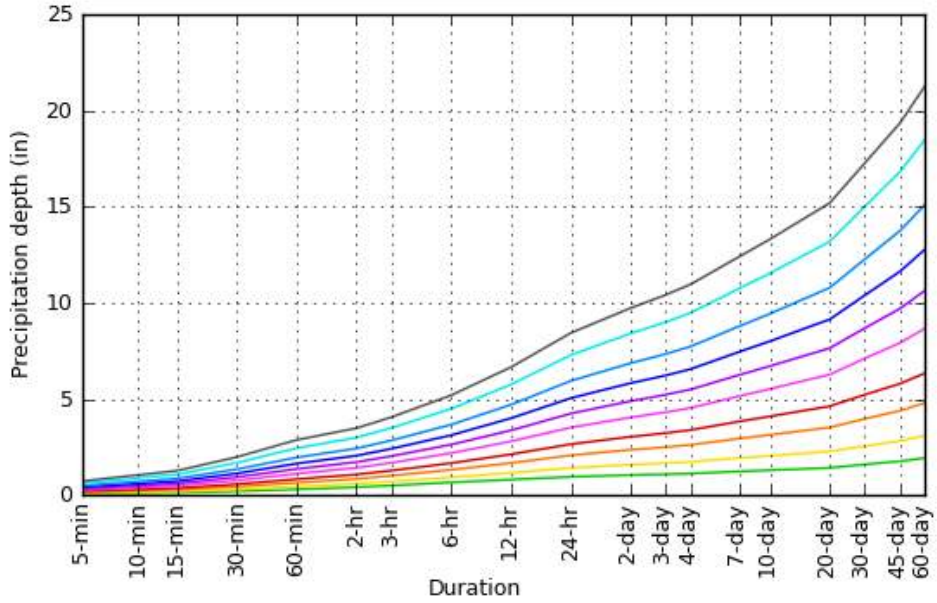
Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

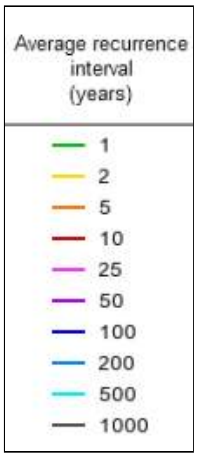
Please refer to NOAA Atlas 14 document for more information.

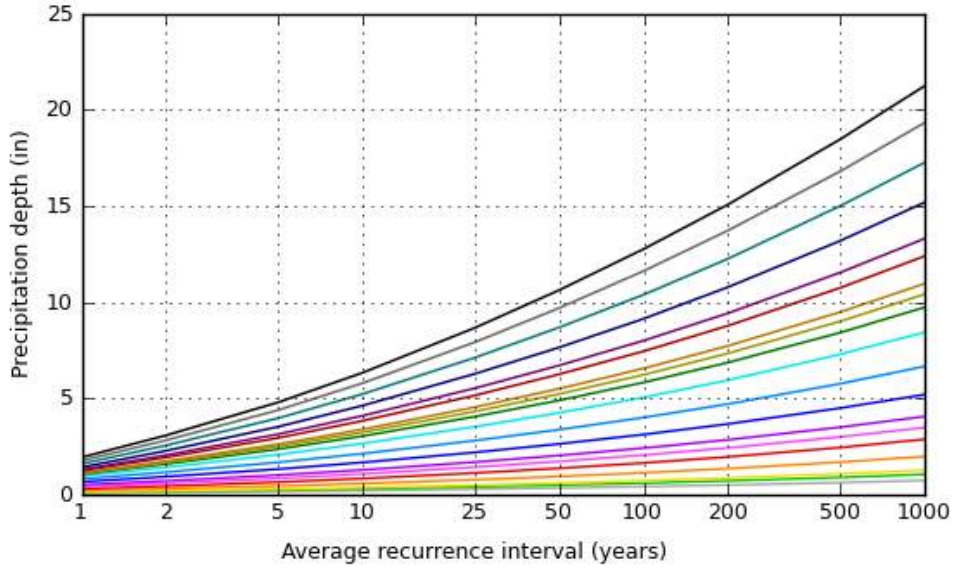
Back to Top

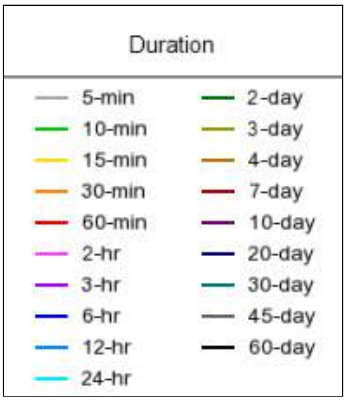
PF graphical

PDS-based depth-duration-frequency (DDF) curves
Latitude: 33.9134°, Longitude: -116.5046°









NOAA Atlas 14, Volume 6, Version 2

Created (GMT): Mon Jun 13 02:24:57 2022

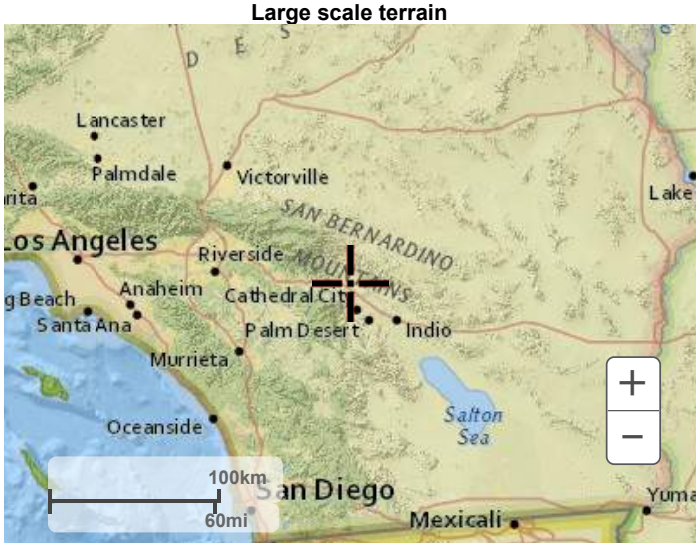
Back to Top

Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



Back to Top

US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

United States Department of Agriculture

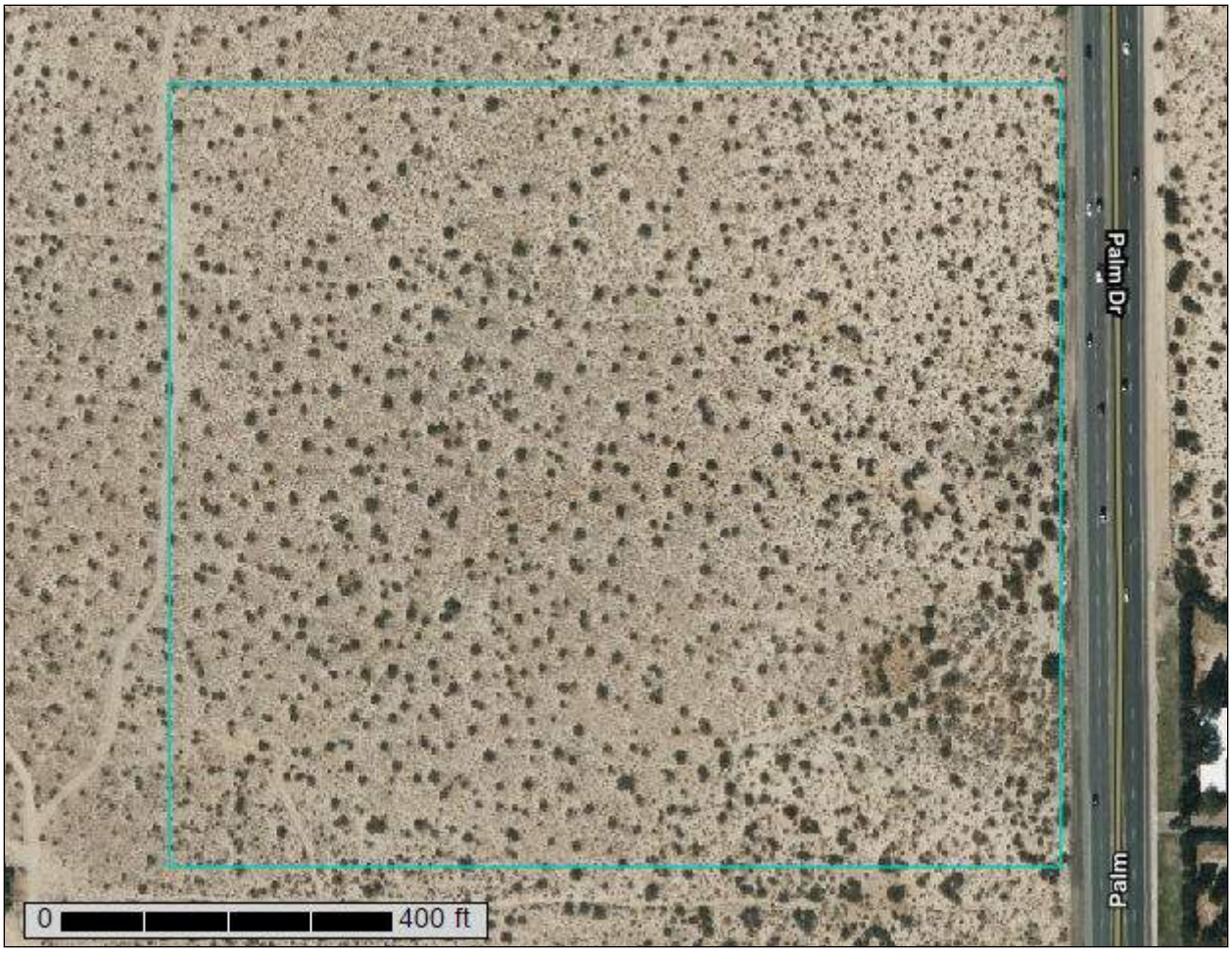
NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Riverside County, Coachella Valley Area, California

Green day Village



June 12, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require

alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

Preface.....2
How Soil Surveys Are Made.....5
Soil Map.....8
Soil Map.....9
Legend.....10
Map Unit Legend.....12
Map Unit Descriptions.....12
Riverside County, Coachella Valley Area, California.....14
MaB—Myoma fine sand, 0 to 5 percent slopes.....14
MaD—Myoma fine sand, 5 to 15 percent slopes.....15
References.....17

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil

scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:2,430 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 35 70 140 210

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 11N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Riverside County, Coachella Valley Area, California
Survey Area Data: Version 13, Sep 15, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Feb 3, 2021—May 27, 2021

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background

MAP LEGEND

MAP INFORMATION

imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
MaB	Myoma fine sand, 0 to 5 percent slopes	23.2	99.5%
MaD	Myoma fine sand, 5 to 15 percent slopes	0.1	0.5%
Totals for Area of Interest		**23.3**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however,

onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Riverside County, Coachella Valley Area, California

MaB—Myoma fine sand, 0 to 5 percent slopes

Map Unit Setting

National map unit symbol: hkw3
Elevation: -200 to 1,800 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 to 75 degrees F
Frost-free period: 270 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Myoma and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myoma

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind blown sandy alluvium

Typical profile

H1 - 0 to 18 inches: fine sand
H2 - 18 to 60 inches: sand

Properties and qualities

Slope: 0 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R031XY007CA - Lacustrine Basin and Large RIver Floodplain
Hydric soil rating: No

Minor Components

Coachella

Percent of map unit: 4 percent

Hydric soil rating: No

Carsitas

Percent of map unit: 4 percent
Hydric soil rating: No

Unnamed, noncalcareous soils

Percent of map unit: 4 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Channels
Hydric soil rating: Yes

MaD—Myoma fine sand, 5 to 15 percent slopes

Map Unit Setting

National map unit symbol: hkw4
Elevation: -200 to 1,800 feet
Mean annual precipitation: 2 to 4 inches
Mean annual air temperature: 72 to 75 degrees F
Frost-free period: 270 to 320 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Myoma and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Myoma

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Wind blown sandy alluvium

Typical profile

H1 - 0 to 18 inches: fine sand
H2 - 18 to 60 inches: sand

Properties and qualities

Slope: 5 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches

Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 4.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: A
Ecological site: R031XY007CA - Lacustrine Basin and Large RIver Floodplain
Hydric soil rating: No

Minor Components

Coachella

Percent of map unit: 5 percent
Hydric soil rating: No

Unnamed, calcareous soils

Percent of map unit: 5 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Channels
Hydric soil rating: Yes

Carsitas

Percent of map unit: 2 percent
Hydric soil rating: No

References

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep-water habitats of the United States. U.S. Fish and Wildlife Service FWS/OBS-79/31.

Federal Register. July 13, 1994. Changes in hydric soils of the United States.

Federal Register. September 18, 2002. Hydric soils of the United States.

Hurt, G.W., and L.M. Vasilas, editors. Version 6.0, 2006. Field indicators of hydric soils in the United States.

National Research Council. 1995. Wetlands: Characteristics and boundaries.

Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_054262

Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service, U.S. Department of Agriculture Handbook 436. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053577

Soil Survey Staff. 2010. Keys to soil taxonomy. 11th edition. U.S. Department of Agriculture, Natural Resources Conservation Service. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053580

Tiner, R.W., Jr. 1985. Wetlands of Delaware. U.S. Fish and Wildlife Service and Delaware Department of Natural Resources and Environmental Control, Wetlands Section.

United States Army Corps of Engineers, Environmental Laboratory. 1987. Corps of Engineers wetlands delineation manual. Waterways Experiment Station Technical Report Y-87-1.

United States Department of Agriculture, Natural Resources Conservation Service. National forestry manual. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/home/?cid=nrcs142p2_053374

United States Department of Agriculture, Natural Resources Conservation Service. National range and pasture handbook. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/landuse/rangepasture/?cid=stelprdb1043084

United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/scientists/?cid=nrcs142p2_054242

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296. http://www.nrcs.usda.gov/wps/portal/nrcs/detail/national/soils/?cid=nrcs142p2_053624

United States Department of Agriculture, Soil Conservation Service. 1961. Land capability classification. U.S. Department of Agriculture Handbook 210. http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_052290.pdf

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
NATURAL COVERS -					
Barren (Rockland, eroded and graded land)		78	86	91	93
Chaparrel, Broadleaf (Manzonita, ceanothus and scrub oak)	Poor	53	70	80	85
	Fair	40	63	75	81
	Good	31	57	71	78
Chaparrel, Narrowleaf (Chamise and redshank)	Poor	71	82	88	91
	Fair	55	72	81	86
Grass, Annual or Perennial	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Meadows or Cienegas (Areas with seasonally high water table, principal vegetation is sod forming grass)	Poor	63	77	85	88
	Fair	51	70	80	84
	Good	30	58	72	78
Open Brush (Soft wood shrubs - buckwheat, sage, etc.)	Poor	62	76	84	88
	Fair	46	66	77	83
	Good	41	63	75	81
Woodland (Coniferous or broadleaf trees predominate. Canopy density is at least 50 percent)	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	28	55	70	77
Woodland, Grass (Coniferous or broadleaf trees with canopy density from 20 to 50 percent)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
URBAN COVERS -					
Residential or Commercial Landscaping (Lawn, shrubs, etc.)	Good	32	56	69	75
Turf (Irrigated and mowed grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
AGRICULTURAL COVERS -					
Fallow (Land plowed but not tilled or seeded)		76	85	90	92

RCFC & WCD
HYDROLOGY MANUAL

RUNOFF INDEX NUMBERS FOR PERVIOUS AREAS

PLATE E-6.1 (1 of 2)

RUNOFF INDEX NUMBERS OF HYDROLOGIC SOIL-COVER COMPLEXES FOR PERVIOUS AREAS-AMC II

Cover Type (3)	Quality of Cover (2)	Soil Group A	B	C	D
AGRICULTURAL COVERS (cont.) -					
Legumes, Close Seeded (Alfalfa, sweetclover, timothy, etc.)	Poor	66	77	85	89
	Good	58	72	81	85
Orchards, Deciduous (Apples, apricots, pears, walnuts, etc.)		See Note 4			
Orchards, Evergreen (Citrus, avocados, etc.)	Poor	57	73	82	86
	Fair	44	65	77	82
	Good	33	58	72	79
Pasture, Dryland (Annual grasses)	Poor	67	78	86	89
	Fair	50	69	79	84
	Good	38	61	74	80
Pasture, Irrigated (Legumes and perennial grass)	Poor	58	74	83	87
	Fair	44	65	77	82
	Good	33	58	72	79
Row Crops (Field crops - tomatoes, sugar beets, etc.)	Poor	72	81	88	91
	Good	67	78	85	89
Small Grain (Wheat, oats, barley, etc.)	Poor	65	76	84	88
	Good	63	75	83	87
Vineyard		See Note 4			

Notes:

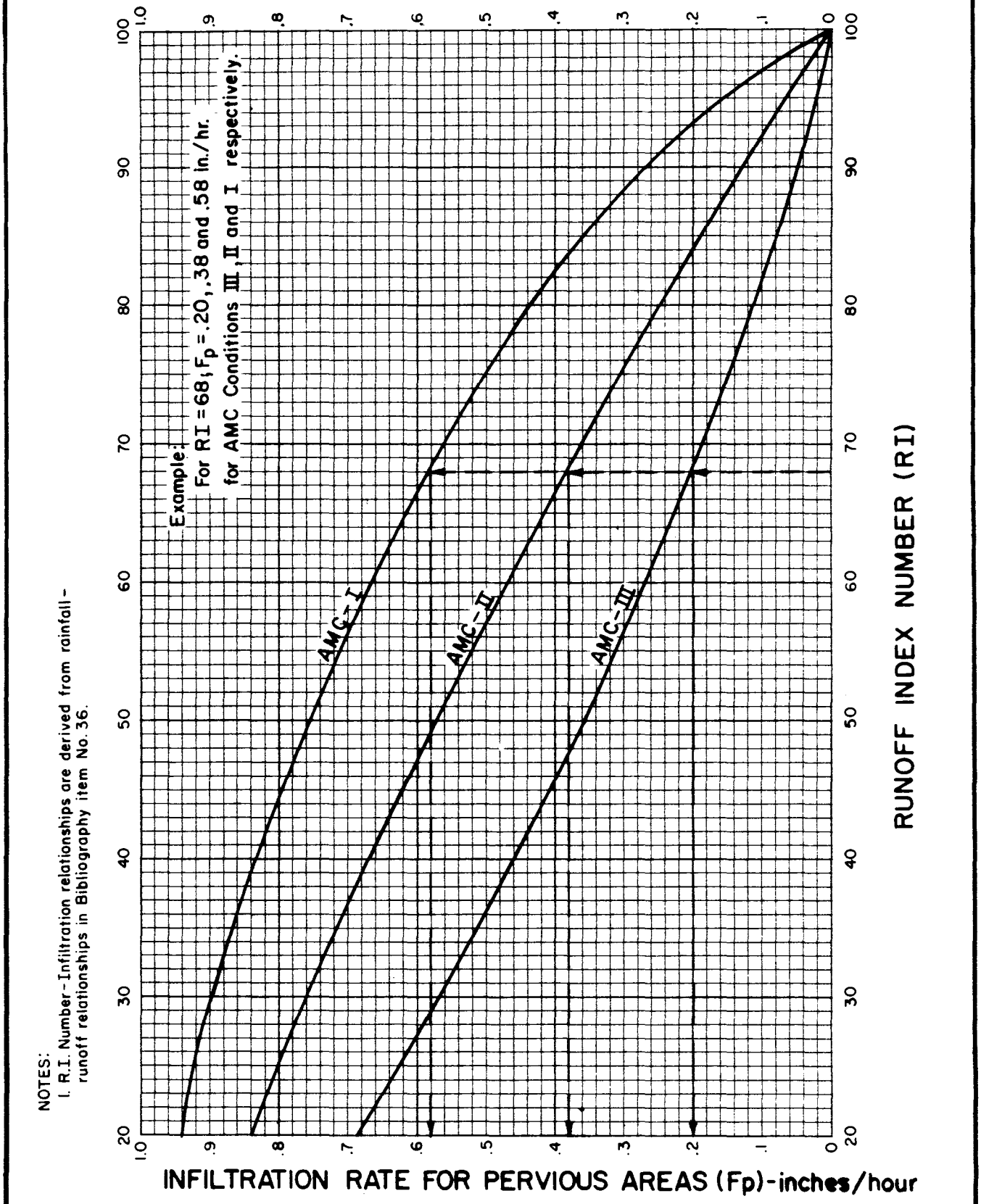
1. All runoff index (RI) numbers are for Antecedent Moisture Condition (AMC) II.

2. Quality of cover definitions:
   Poor-Heavily grazed or regularly burned areas. Less than 50 percent of the ground surface is protected by plant cover or brush and tree canopy.
   Fair-Moderate cover with 50 percent to 75 percent of the ground surface protected.
   Good-Heavy or dense cover with more than 75 percent of the ground surface protected.

3. See Plate C-2 for a detailed description of cover types.

4. Use runoff index numbers based on ground cover type. See discussion under "Cover Type Descriptions" on Plate C-2.

5. Reference Bibliography item 17.



NOTES:
1. R.I. Number-Infiltration relationships are derived from rainfall-runoff relationships in Bibliography item No. 36.

RCFC & WCD

HYDROLOGY MANUAL

INFILTRATION RATE FOR PERVIOUS AREAS VERSUS RUNOFF INDEX NUMBERS

PLATE E-6.2

ACTUAL IMPERVIOUS COVER

Land Use (1)	Range-Percent	Recommended Value For Average Conditions-Percent(2)
Natural or Agriculture	0 - 10	0
Single Family Residential: (3)		
40,000 S. F. (1 Acre) Lots	10 - 25	20
20,000 S. F. (½ Acre) Lots	30 - 45	40
7,200 - 10,000 S. F. Lots	45 - 55	50
Multiple Family Residential:		
Condominiums	45 - 70	65
Apartments	65 - 90	80
Mobile Home Park	60 - 85	75
Commercial, Downtown Business or Industrial	80 -100	90

Notes:

1. Land use should be based on ultimate development of the watershed. Long range master plans for the County and incorporated cities should be reviewed to insure reasonable land use assumptions.

2. Recommended values are based on average conditions which may not apply to a particular study area. The percentage impervious may vary greatly even on comparable sized lots due to differences in dwelling size, improvements, etc. Landscape practices should also be considered as it is common in some areas to use ornamental gravels underlain by impervious plastic materials in place of lawns and shrubs. A field investigation of a study area should always be made, and a review of aerial photos, where available may assist in estimating the percentage of impervious cover in developed areas.

3. For typical horse ranch subdivisions increase impervious area 5 percent over the values recommended in the table above.

RCFC & WCD
HYDROLOGY MANUAL

IMPERVIOUS COVER FOR DEVELOPED AREAS

PLATE E-6.3

APPENDIX G3

PERCOLATION TESTING REPORT

Sladden Engineering

45090 Golf Center Parkway, Suite F, Indio, CA. 92201 (760) 863-0713 Fax (760) 863-0847
6782 Stanton Avenue, Suite C, Buena Park, CA. 90621 (714) 523-0952 Fax (714) 523-1369
450 Egan Avenue, Beaumont, CA. 92223 (951) 845-7743 Fax (951) 845-8863
www.sladdenengineering.com

June 29, 2022

Project No. 544-21557
22-06-375

LA World Construction
2029 Century Park East, Suite 400
Century City, California 90067

Project: Proposed Green Day Village
APN 657-280-003
Palm Drive
Desert Hot Springs, California

Subject: Percolation/Infiltration Testing for On-Site Storm Water Management

In accordance with your request, we have performed percolation testing on the subject site to evaluate the infiltration potential of the near surface soil to assist in storm water management system design. It is our understanding that on-site storm water retention including infiltration is planned for the proposed mixed-use development.

Percolation testing was performed on June 15, 2022 within two (2) shallow test holes excavated on the site. Testing was performed at depths of approximately 5 and 10 feet below existing grade. The approximate locations of the test holes are presented on the attached Percolation Test Location Plan (Figure 3). Testing was performed by placing water within the test bores and recording the drop in the water surface with time. Testing was performed in general accordance with the *United States Bureau of Reclamation (BOR) Procedure 7300-89 (1999)*. Test results are summarized in the following table.

PERCOLATION TEST RESULTS

Test No.	Depth (Ft)	Percolation Rate (in/hr)	Infiltration Rate (in/hr)
P-1	10.00	120	20
P-2	5.00	120	20

The percolation rates determined represent the ultimate field rates that do not include a safety factor. The corresponding infiltration rates were calculated using the Porchet Method. An appropriate safety factor should be incorporated into design. The favorable infiltration rates are considered representative of the sandy soil throughout the site..

Groundwater was not encountered to the maximum explored depth of approximately 51.5 feet bgs during our geotechnical investigation. Based upon our field investigation it is our opinion that groundwater should not be factor in stormwater retention/infiltration system design.

If you have any questions regarding this memo, please contact the undersigned.

Respectfully submitted,
SLADDEN ENGINEERING

Matthew J. Cohrt
Principal Geologist

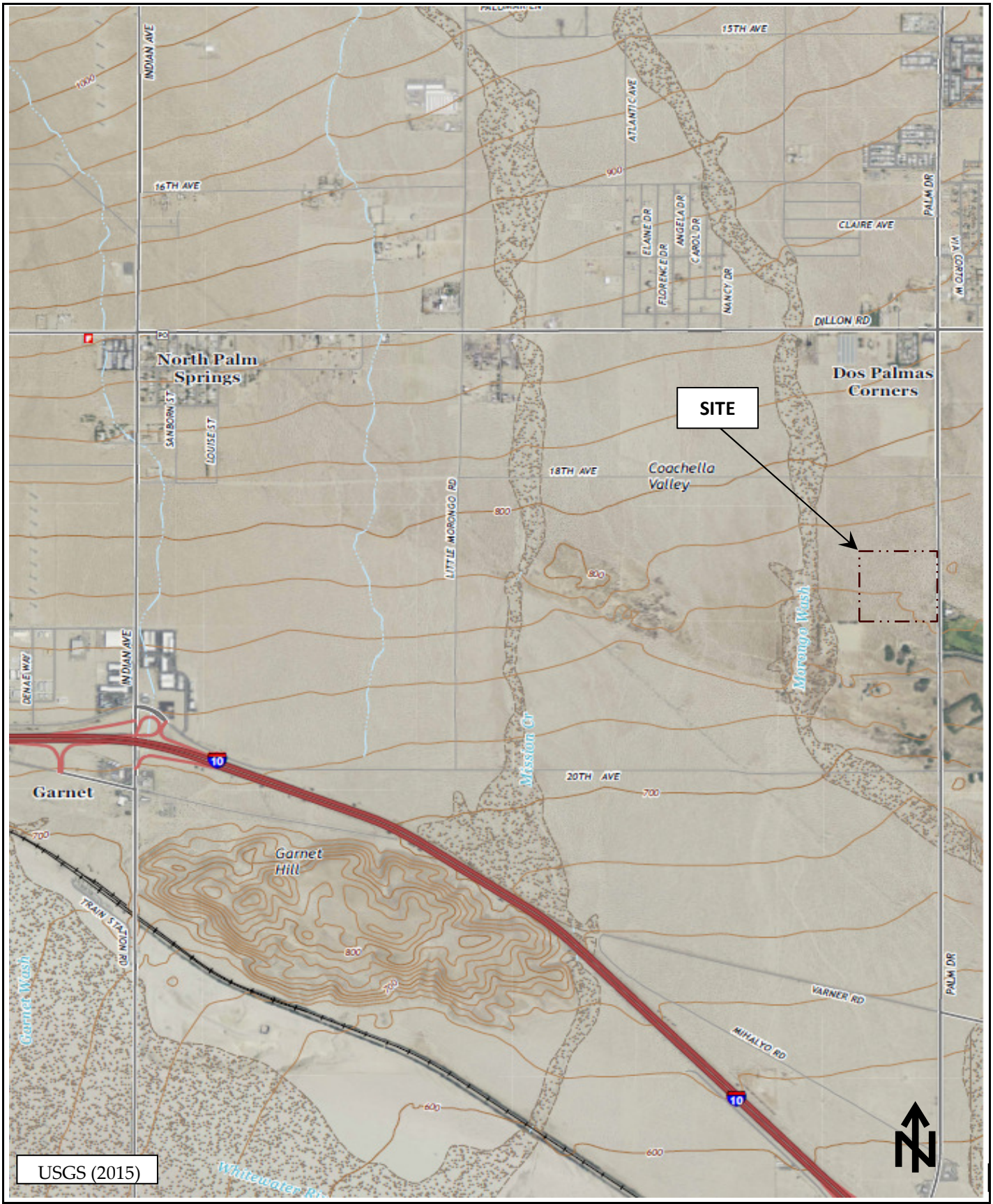
CERTIFIED ENGINEERING GEOLOGIST
MATTHEW J. COHRT
2634
STATE OF CALIFORNIA

Brett L. Anderson
Principal Engineer

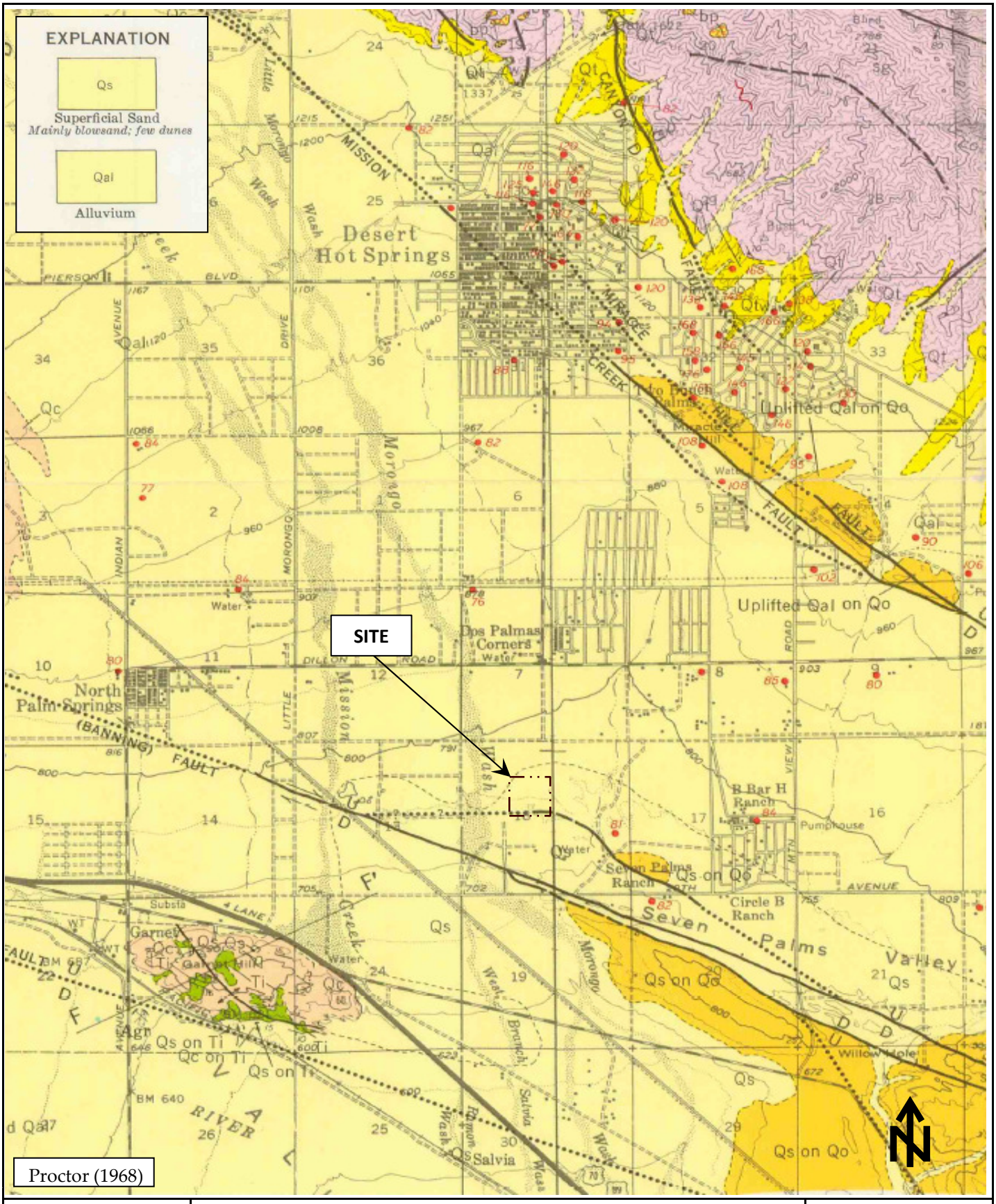
REGISTERED PROFESSIONAL ENGINEER
BRETT L. ANDERSON
No. C45389
CIVIL ENGINEERING
STATE OF CALIFORNIA

Copies: 4/Addressee

SITE LOCATION MAP
REGIONAL GEOLOGIC MAP
PERCOLATION TEST LOCATION PLAN



Sladden Engineering	SITE LOCATION MAP	FIGURE 1
	Project Number: 544-21557	
	Report Number: 22-06-375	
	Date: June 29, 2022	



Sladden Engineering	REGIONAL GEOLOGIC MAP	FIGURE 2
	Project Number: 544-21557	
	Report Number: 22-06-375	
	Date: June 29, 2022	



LEGEND

P-2 Percolation Test Location

Sladden Engineering	PERCOLATION TEST LOCATION PLAN	**FIGURE** 3
	Project Number: 544-21557	
	Report Number: 22-06-375	
	Date: June 29, 2022	

BORELOGS

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	5/17/2022
Elevation:	750 FT. MSL	Boring No:	BH6/P-1

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		
							4		
	3 3 5						6		Silty Sand to Sand (SM/SW); light yellowish brown, dry, fine- to coarse-grained
							8		
	8 14 18						10		
							12		
							14		Terminated at ~11.5 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED GREEN DAY VILLAGE
PALM DRIVE, DESERT HOT SPRINGS; APN 657-280-003

Project No:	544-21557	Page	1
Report No:	22-06-375		

Sladden Engineering

BORE LOG

Equipment:	CME-75	Date Drilled:	5/17/2022
Elevation:	750 FT. MSL	Boring No:	P-2

Sample	Blow Counts	Bulk Sample	Expansion Index	% Minus #200	% Moisture	Density, pcf	Depth (Feet)	Graphic Lithology	Description
							2		Silty Sand to Sand (SM/SW); light yellowish brown, dry, fine- to coarse-grained
							4		
							6		Terminated at ~5.0 Feet bgs. No Bedrock Encountered. No Groundwater or Seepage Encountered. Cased to Facilitate Percolation Testing.
							8		
							10		
							12		
							14		
							16		
							18		
							20		
							22		
							24		
							26		
							28		
							30		
							32		
							34		
							36		
							38		
							40		
							42		
							44		
							46		
							48		
							50		

Completion Notes:

PROPOSED GREEN DAY VILLAGE
PALM DRIVE, DESERT HOT SPRINGS; APN 657-280-003

Project No:	544-21557	Page	2
Report No:	22-06-375		

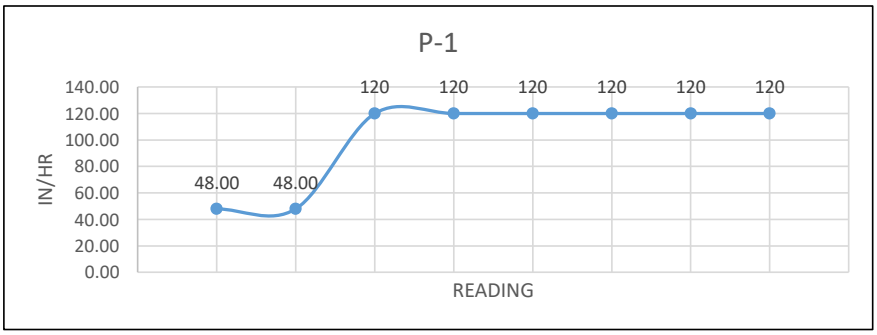
RIVERSIDE COUNTY STORMWATER TESTING DATA SHEETS

STORMWATER PERCOLATION SHEET (LESS THAN 10 FT)

Project:	APN 657-280-003	Depth (ft):	10.00
Job No. :	544-21557	USCS Soil Class:	SM
Date:	6/15/2022	Sandy Soil:	R.F.
Test Hole #:	P-1	Tested By:	R.F.

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
A	25.00	10.00	20	0	20	48.00
B	25.00	10.00	20	0	20	48.00

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
1	10.00	10.00	20	0	20	120
2	10.00	10.00	20	0	20	120
3	10.00	10.00	20	0	20	120
4	10.00	10.00	20	0	20	120
5	10.00	10.00	20	0	20	120
6	10.00	10.00	20	0	20	120



PERCOLATION RATE CONVERSION (PORCHET METHOD)

$$I_{t=} \quad \frac{\Delta H\ 60\ R}{\Delta t(r+2H_{avg})}$$

Δt =	10.00
D_f =	120.00
r =	4.00
D_0 =	100
D_t =	120.00
H_0 =	20
H_f =	0
ΔH =	20.00
H_{avg} =	10.00

Δt (minutes)
D_f (Final Depth to water)
r (hole radius in inches)
D_0 (Initial Depth to water)
D_t (Total Depth of test hole)
H_0 (initial height of water at selected time interval)

$$H_0 = D_t - D_0$$

H_f (final height of water at the selected time interval)

$$H_f = D_t - D_f$$

ΔH (change in head over the time interval)

$$\Delta H = H_0 - H_f$$

H_{avg} (average head height over the time interval)

$$H_{avg} = (H_0 + H_f)/2$$

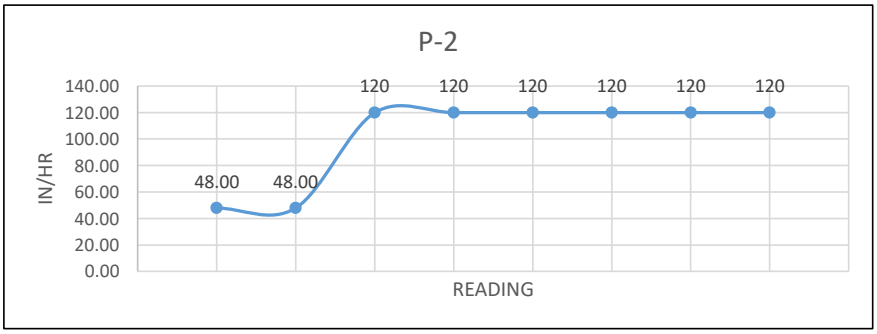
Field Rate:	120 in/hr
Infiltration Rate:	20.00 in/hr

STORMWATER PERCOLATION SHEET (LESS THAN 10 FT)

Project:	APN 657-280-003	Depth (ft):	5.00
Job No. :	544-21557	USCS Soil Class:	SM
Date:	6/15/2022	Sandy Soil:	R.F.
Test Hole #:	P-2	Tested By:	R.F.

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
A	25.00	5.00	20	0	20	48.00
B	25.00	5.00	20	0	20	48.00

READING	TIME (min)	DEPTH (ft)	INITIAL W (in)	FINAL W (in)	ΔW (in)	IN/HR
1	10.00	5.00	20	0	20	120
2	10.00	5.00	20	0	20	120
3	10.00	5.00	20	0	20	120
4	10.00	5.00	20	0	20	120
5	10.00	5.00	20	0	20	120
6	10.00	5.00	20	0	20	120



PERCOLATION RATE CONVERSION (PORCHET METHOD)

$$I_{t=} \quad \frac{\Delta H\ 60\ R}{\Delta t(r+2H_{avg})}$$

Δt =	10.00
D_f =	60.00
r =	4.00
D_0 =	40
D_t =	60.00
H_0 =	20
H_f =	0
ΔH =	20.00
H_{avg} =	10.00

Δt (minutes)
D_f (Final Depth to water)
r (hole radius in inches)
D_0 (Initial Depth to water)
D_t (Total Depth of test hole)
H_0 (initial height of water at selected time interval)

$$H_0 = D_t - D_0$$

H_f (final height of water at the selected time interval)

$$H_f = D_t - D_f$$

ΔH (change in head over the time interval)

$$\Delta H = H_0 - H_f$$

H_{avg} (average head height over the time interval)

$$H_{avg} = (H_0 + H_f)/2$$

Field Rate:	120 in/hr
Infiltration Rate:	20.00 in/hr

APPENDIX G4

WATER SUPPPLY ASSESSMENT AND VERIFICATION

Green Day Village Development
Water Supply Assessment and Verification

FINAL REPORT

May 2023

Prepared For:

Mission Springs Water District
66575 2nd Street
Desert Hot Springs, CA 92240

Prepared By:

TKE Engineering, Inc.
2305 Chicago Avenue
Riverside, CA 92507

TABLE OF CONTENTS

Section			Page
1.0	**INTRODUCTION**		
	1.1	Regulatory Requirements	1-1
	1.2	Water Supplier	1-2
	1.3	Purpose of Document	1-2
		1.3.1 Water Supply Verification	1-3
		1.3.2 Validity of the Document	1-3
	1.4	Existing Water Management Plans	1-3
		1.4.1 2020 Coachella Valley Regional Urban Water Management Plan	1-4
		1.4.2 2020 Alternative Plan Mission Creek Subbasin Update	1-6
2.0	**GREEN DAY VILLAGE DEVELOPMENT**		
	2.1	Project Description	2-1
	2.2	Project Land Use Summary	2-1
	2.3	Project Water Demands	2-5
	2.4	Water Conservation Measures	2-6
3.0	**WATER DEMANDS**		
	3.1	General Water System Information	3-1
		3.1.1 Service Area Description	3-1
		3.1.2 Facilities	3-1
		3.1.3 Climate	3-2
		3.1.4 Service Area Population	3-2
	3.2	Water Demands	3-3
		3.2.1 District Past and Current Water Use	3-3
		3.2.2 District Water Demand Projections	3-4
	3.3	Water Use Reduction Plan	3-5
4.0	**WATER SUPPLY ASSESSMENT (SB 610)**		
	4.1	General	4-1
	4.2	Identification of Water Sources	4-1
		4.2.1 Primary Water Sources	4-1
		4.2.2 Additional Water Sources	4-2
	4.3	Analysis of Water Supply	4-2
		4.3.1 Groundwater	4-2
		4.3.2 Imported Water	4-14
		4.3.3 Summary of Water Supply Sources	4-35

4.4 Analysis of Water Supply and Demand 4-36
4.5 Conclusions 4-39

5.0 WATER SUPPLY VERIFICATION (SB 221)
5.1 General 5-1
5.2 Water Source 5-1
5.3 Support Documentation 5-1
5.4 Factors of Reliability 5-1
5.4.1 General 5-1
5.4.2 Historical Availability of Supply 5-2
5.4.3 Water Shortage Contingency 5-2
5.4.4 Reduction of Water Supply 5-3
5.4.5 SWP and Colorado River Water 5-3
5.5 Impacts to Other Projects 5-4
5.6 Rights to Groundwater 5-4
5.7 Verification 5-4

6.0 REFERENCE 6-1

7.0 LIST OF ACRONYMS 7-1

LIST OF TABLES

2-1 Proposed Green Day Village Development Land Use Designation 2-1
2-2 Green Day Village Development Water Demands 2-5
2-3 Green Day Village Development Landscape Water Demands 2-6
3-1 Historical Distract Climate Characteristics 3-2
3-2 Current and Projected Population 3-3
3-3 Historical Water Service Connections 3-3
3-4 Demands for Potable Water Projected 3-4
3-5 Total Water Demands 3-4
3-6 Projected District Water Demands 3-8
4-1 Water Year 2020-2021 Water Balance in Mission Creek Subbasin 4-8
4-2 Deliveries for Direct Replenishment at the Mission Creek Groundwater Replenishment Facility 4-10
4-3 Groundwater Volume Pumped 4-13
4-4 Colorado River Water Entitlements 4-17
4-5 State Water Project Table A Amounts 4-23
4-6 Historical State Water Project Table A Allocations, CVWD and DWA (2002-2021) 4-27
4-7 Delta Conveyance Facility Supply Amounts 4-29
4-8 Lake Perris Seepage Recovery Amounts 4-30
4-9 Sites Reservoir Supply Amounts 4-30

4-10 Forecast Split of State Water Project Delivery to WWR-GRF and MC-GRF Based on Production 4-32
4-11 Forecast of State Water Project Table A Supplies to WWR-GRF and MC-GRF 4-33
4-12 Current and Projected Water Supplies 4-36
4-13 Normal Water Year Supply and Demand Comparison 4-37
4-14 Single-Dry Year Supply and Demand Comparison 4-38
4-15 Multiple-Dry Year Supply and Demand Comparison 4-38
5-1 Water Shortage Contingency Plan 5-3

LIST OF FIGURES

2-1 General Project Location 2-3
4-1 MSWD Groundwater Basins 4-5
4-2 Historical Annual in Groundwater Storage – Mission Creek Subbasin 1978 - 2022 4-11

This page is left intentionally blank

SECTION 1
INTRODUCTION

1.1 Regulatory Requirements

In 2002, California Water Code (CWC) Sections 10910 through 10915 were amended by the enactment of Senate Bill 610 (SB 610) to improve the link between information on water supply availability and certain land use decisions made by cities and counties. SB 610 provides that when a city or county determines that a "project" as defined in CWC Section 10912 is subject to review under the California Environmental Quality Act (CEQA), the city or county must identify the water supply agency that will provide retail water service to the project and request that water supplier to prepare a Water Supply Assessment (WSA).[1] The proposed Green Day Village Development (referred to herein as the "Project" or "Green Day Village") is a mixed use development which includes 355, 494 square feet of residential space, comprised of 612 dwelling units and 78,691 square feet of commercial use; and thus qualifies as a "project" under SB 610. Generally, a WSA must evaluate whether the total projected water supplies available to the water supplier during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the proposed project, in addition to the water supplier's existing and planned future uses, including agricultural and manufacturing uses.

This WSA has been prepared in accordance with the requirements of SB 610. Accordingly, the information, analyses and conclusions contained herein utilize and rely upon, in part, the information, analyses and conclusions set forth in other water supply planning documents that have been prepared and duly adopted by agencies such as the City of Desert Hot Springs (City), the Mission Springs Water District (MSWD or District), and the California Department of Water Resources (DWR). Those documents include, without limitation, the 2020 Coachella Valley Regional Urban Water Management Plan (RUWMP), the 2020 Mission Creek Subbasin Alternative Plan Update (2020 MC Alternative Plan), the 2018 Coachella Valley Integrated Regional

[1] For purposes of CWC Section 10912(a), a "project" includes any of the following: (1) a proposed residential development of more than 500 dwelling units; (2) a proposed shopping center or business establishment employing more than 1,000 persons or having more than 500,000 square feet of floor space; (3) a proposed commercial office building employing more than 1,000 persons or having more than 250,000 square feet of floor space; (4) a proposed hotel or motel, or both, having more than 500 rooms; (5) a proposed industrial, manufacturing, or processing plan, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, or having more than 650,000 square feet of floor area (provided; however, that until January 1, 2017, a photovoltaic or wind energy generation facility is not a "project" that requires a WSA if the facility would demand no more than 75 acre-feet of water annually); (6) a mixed-use project that includes one or more of the above-specified projects; or (7) a project that would demand an amount of water equivalent to, or greater than, the amount of water required by a 500 dwelling unit project.

Water Management and Stormwater Resource Plan (2018 IRWM/SWRP), and DWR's 2021 State Water Project Final Delivery Capability Report (DWR 2021 Report).

1.2 Water Supplier

Mission Springs Water District (MSWD or District) is the public water supplier for the area in which the Green Day Village Development is located. The District was established in 1953 and was formerly known as Desert Hot Springs County Water District. The District's water service area consists of 135 square miles including the City of Desert Hot Springs, a portion of the City of Palm Springs, and 10 smaller communities in Riverside County. The District's water supply source is 100 percent groundwater produced from District-owned and operated wells which provide water service to approximately 43,000 people in their water service area. The District also provides sewer service to approximately 26,000 people in Desert Hot Springs and surrounding communities.

MSWD currently receives 100 percent of its water supply from groundwater produced from subbasins within the Coachella Valley Groundwater Basin, which underlies the District's water service area. MSWD primarily produces groundwater from the Mission Creek Subbasin via eight (8) active wells. To a lesser extent, the District also produces groundwater from the Indio Subbasin via two (2) active wells, the Garnet Hill Subbasin via one (1) active well, and the San Gorgonio Pass Subbasin via two (2) active wells.

1.3 Purpose of Document

As mentioned above, this WSA is required under SB 610 if a development is proposed with over 500 dwelling units, and the Project has a proposed residential development of 612 dwelling units and 78,691 square feet of commercial use. Moreover, in accordance with SB 610 and applicable provisions of CEQA, the WSA will be included as part of the CEQA documentation being prepared for the Project. In the following sections, this WSA will evaluate whether the total projected water supplies available to the District during normal, single dry, and multiple dry water years during a 20-year projection will meet the projected water demand associated with the Green Day Village, in addition to the District's existing and planned future uses, including agricultural and manufacturing uses. Notably, the water demands associated with the Green Day Village Development have not been specifically accounted for but are a part of the projected growth analyzed by District in its recent 2020 Coachella Valley RUWMP.

1.3.1 Water Supply Verification

SB 221 was enacted in January 2002 and amends Section 11010 of the Business and Professional Code, and Sections 66455.3, 66473.7 and 65867.6 of the Government Code. SB 221 establishes the relationship between the WSA prepared for a residential project and its approval under the Subdivision Map Act. Pursuant to California Government Code Section 66473.7, the District, the public water supplier for the Project, a majority of which is proposed as residential, must provide a written verification of sufficient water supply prior to the approval of a new subdivision.

A WSV is required prior to the approval of a tentative subdivision map, or a parcel map for which a tentative map was not required, or a proposed industrial, manufacturing, or processing plant, or industrial park planned to house more than 1,000 persons, occupying more than 40 acres of land, having more than 650,000 square feet of floor area, or introducing more than 500 dwelling units. The purpose of the WSV is to provide the city or county or redevelopment agency with written verification from the public water purveyor that a sufficient water supply is available, or will be available, prior to completion of the project. The Project includes a proposal for more than 500 dwelling units and 78,691 square feet of commercial use, thus requiring a WSV as defined by the Government Code, once a tentative map, parcel map, or subdivision map is established.

1.3.2 Validity of the Document

This WSA/WSV must be reviewed every 5-years, or in the event that water planning assumptions have changed, or until the Project begins construction. The Project applicant shall notify MSWD in any of the above scenarios. Subsequent review will ensure that the information included in the WSA/WSV remains accurate and no significant changes to either the Project or MSWD's water supply have occurred. If neither the Project applicant nor the lead agency (City of Desert Hot Springs) contacts MSWD within 5-years of approval of this WSA/WSV, it will be assumed that the Project no longer exists, and the WSA/WSV provided by this document will become invalid.

1.4 Existing Water Management Plans

In accordance with Water Code Section 19010(c)(1), the District has reviewed whether the projected water demand associated with the Project was included as part of the District's most recently adopted 2020 Coachella Valley Regional Urban Water Management Plan (RUWMP). The 2020 RUWMP did not specifically reflect the demands associated with the Green Day Village Development. However, the demands associated with the Project have been accounted for as part of the 2020

Coachella Valley RUWMP, which specifically include population projections (and associated growth) within MSWD's service areas through the year 2045 in accordance with the Southern California Association of Government (SCAG).[2] In addition, the demands associated with the Project have also been accounted for in MSWD's, DWA's, and CVWD's regional water supply planning efforts, which specifically include population projections within MSWD's and CVWD's service areas in the Mission Creek and Garnet Hill subbasins through the year 2045 in accordance with the SCAG regional growth forecast contained in the 2020 Regional Transportation Plan and Sustainable Communities Strategy.[3] Therefore, and as set forth herein, the projected water demands of Green Day Village Development have already been considered in preparing and adopting both the 2020 Coachella Valley RUWMP and the 2020 MC Alternative Plan. These documents are described in more detail in the following sections.

1.4.1 2020 Coachella Valley Regional Urban Water Management Plan

As indicated above, the District has participated in the 2020 Coachella Valley RUWMP. Water Code Section 10910(c)(2) provides that if demand associated with a proposed project is accounted for in the most recently adopted RUWMP, the water supplier may incorporate information from the RUWMP in preparing certain elements of a WSA for the project.

Water conservation efforts are allowing water agencies to plan for growth in new and improved ways, where State law now requires water agencies to do more with less. SBx7-7 (sometimes referred to as the new "20 percent by 2020" law) is one of four policy bills enacted as part of the November 2009 Comprehensive Water Package (see California Water Code section 10608 et seq.). Among other things, SBx7-7 established the goal of achieving a 20 percent reduction in statewide urban per capita water use by the year 2020, and the interim goal of achieving a 10 percent reduction by 2015. In an effort to achieve those goals, SBx7-7 requires each urban retail water supplier to determine technical information, such as existing baseline water consumption, to establish future water use reduction targets (in gallons per capita per day (gpcd)), and to report that and other information in their UWMPs. SBx7-7 also requires each urban wholesale water supplier to include in its UWMP, an assessment of its present and proposed future measures, programs, and policies to help achieve the water use reductions required by SBx7-7.

The two primary calculations required by SBx7-7 are (1) the Base Daily Per Capita Water Use Calculation (average gpcd used in past years), and (2) Compliance Water

[2] See 2020 Coachella Valley RUWMP, pp. 8-6
[3] See 2020 Mission Creek Subbasin Alternative Plan Update, Section 2.3

Use Targets (targets for gpcd in 2015 and 2020). The Base Daily Per Capita Water Use Calculation is based on gross water use by an agency in each year and can be based on a 10-year average ending no earlier than 2004 and no later than 2010, or a 15-year average if 10 percent of 2008 demand was met by recycled water. The District does not currently produce or receive recycled water supply, and therefore, a 10-year baseline period is used as opposed to a 15-year baseline period. As indicated above, an urban retail water supplier must then set a 2020 water use target and a 2015 interim water use target in terms of gpcd. SBx7-7 establishes four alternative methods for water agencies to use in calculating their Compliance Water Use Targets, as follows: (1) 80 percent of Base Daily Per Capita Use; (2) adherence to specified performance standards; (3) 95 percent of the applicable state hydrologic region target as set forth in the State's 20x2020 Water Conservation Plan; or (4) the provisional target method and procedures developed by DWR pursuant to SBx7-7.

In accordance with SBx7-7, the District will strictly manage its per capita water use throughout the year 2020 and beyond. As set forth in Section 8.5 of the RUWMP, the District's actual baseline daily per capita water use was calculated as 189 gpcd. The 2020 target was established at 234.9 gpcd, which confirms that the District achieved its targeted reduction by the year 2020.

There are several water supply planning ideas, future projects and management activities detailed in the 2020 Coachella Valley RUWMP that will help maintain the 20 percent reduction in per capita water consumption under SBx7-7; see Section 8.9. For example, the District has begun construction of the Regional Water Reclamation Facility (RWRF), that will include tertiary treatment facilities in the future. The RWRF is scheduled to be in operation in late 2023. It is estimated that the future first phase of tertiary treatment will accommodate a recycled water demand of 1.0 mgd (1,210 AFY). The District plans to expand the recycled water system demand to 5,000 AFY by 2045 by expanding the plant. In order to help put the recycled water system into practice, the District prepared a Recycled Water Program Development Feasibility Study in March 2018 in which treatment and distribution alternatives and recycled water demands were identified. The study determined that the recycled water infrastructure could feasibly be implemented to supply existing and future irrigation demands and offset a portion of potable water demands. Recycled water can also be used for groundwater aquifer replenishment.

The District universally acknowledges and embraces the importance of water issues, and as such is managing several cost-effective demand management measures (DMMs). These DMMs include technologies and methodologies that have been sufficiently documented in multiple demonstration projects and result in more efficient water use and conservation (e.g., water use surveys/audits, rebates or giveaways of plumbing fixtures, rebate programs that include turf conversion, smart

timer rebates and high efficiency toilet rebates, leak detection and monitoring program, rebates for landscape irrigation efficiency, and public information and school education programs).

The District has adopted a landscape irrigation policy as part of the District's "Landscape Guidelines". The guidelines establish effective water efficient landscape requirements for newly installed and rehabilitated landscapes, as well as promote water conservation through climate appropriate plant material and efficient irrigation practices. In addition, the guidelines also require an irrigation design plan, which includes the installation of separate landscape water meters for all projects except for single-family homes or any project with a landscaped area of less than 2,500 square feet. Automatic control systems are required for each system and mechanical irrigation controllers are prohibited.

Furthermore, the District understands the need to investigate future water projects to meet demands associated with projected growth. As indicated above and as further discussed in this analysis, the District is evaluating and will continue to evaluate various source substitution projects to reduce overall demands on native groundwater.

1.4.2 2020 Mission Creek Subbasin Alternative Plan Update

The Coachella Valley Water District (CVWD), the Desert Water Agency (DWA), and the Mission Springs Water District (MSWD) (collectively the Agencies) form the Management Committee within the Mission Creek Subbasin (MCSB) and Garnet Hill Subarea (GHSA) of the Indio Subbasin (ISB) in the northern part of the Coachella Valley Groundwater Basin. The MCSB and GHSA are important to the local communities as groundwater resource areas, and the Agencies are committed to reliably meeting local demands and protecting water quality in a sustainable and cost-effective manner. The 2020 MC Alternative Plan Update was prepared to meet specific requirements of the Sustainable Groundwater Management Act (SGMA) as it applies to the MCSB. CVWD and DWA are the Groundwater Sustainability Agencies for the MCSB under SGMA. The 2020 MC Alternative Plan Update is also intended to support water management planning for both the MCSB and the GHSA. SGMA requirements for the GHSA, however, are addressed in the Water Management Plan Update for the Indio Subbasin.

The foundation for this Alternative Plan Update is the 2013 Mission Creek/Garnet Hill Water Management Plan (MWH, 2013 [2013 MC/GH WMP]) and Bridge Document (Stantec, 2016 [2016 Bridge Document]). Together, those documents met the requirements to be considered an alternative to a groundwater sustainability plan (GSP) (Alternative Plan) under the SGMA. In 2019, the California Department of

Water Resources (CDWR) approved the Alternative Plan, finding it functionally equivalent to a GSP. The MCSB is distinctive in that only nine subbasins throughout the State have an approved Alternative Plan.

The Agencies have prepared this Alternative Plan Update to:

- Ensure that the most current projections for population growth, land use, imported water supply, and other future conditions are incorporated into water management planning for the region.
- Update the groundwater model for the Planning Area for use as a tool in evaluating potential groundwater management actions.
- Review historical information along with current and projected future environmental and demographic conditions to define undesirable results and develop objectives and thresholds to maintain groundwater sustainability.
- Provide an analysis of future projected groundwater demand-based population growth and other factors and estimate future projected supplies for groundwater replenishment to use in forecasting future groundwater production and supplies.
- Develop scenarios for forecasting groundwater levels based on future demands and supplies assuming future hydrologic conditions are similar to historical long-term average conditions and assuming future hydrologic conditions are drier than the long-term historical average (climate change assumptions) and compare these forecasted water level conditions to groundwater sustainability criteria.
- Address specific actions recommended in the CDWR's 2019 SGMA Alternative Assessment Staff Report and Statement of Findings.[4]

Groundwater levels in the MCSB began to decline prior to the 1970s with increasing groundwater production. In the 1990s, the Agencies recognized that continued lowering of groundwater levels in the MCSB was not sustainable and, if continued, could have undesirable results ranging from increased energy costs for groundwater pumping to the need to deepen existing private and public wells. As a result, DWA and CVWD developed and implemented plans to recharge imported water into the MCSB. Groundwater levels in the MCSB began to increase after an imported water recharge program began in 2002 at the MC Groundwater Recharge Facility.[5]

The Alternative Plan Update incorporated SGMA Sustainable Management Criteria to guide water resources management in the main MCSB. Sustainable Management Criteria for the MCSB were developed based on available information developed for

[4] 2020 MC Alternative Plan, pp. ES-1 to ES-2
[5] 2020 MC Alternative Plan, p. ES-9

the Hydrogeologic Conceptual Model, the characterization of groundwater conditions, the groundwater balance, discussion with the Agencies, and feedback solicited from the public. Four Sustainability Indicators relevant to the MCSB based on historical or current conditions include: chronic lowering of groundwater levels, reduction of groundwater storage, degraded water quality, and land subsidence.[6]

Each of the Sustainability Indicators are evaluated based on its relevancy to the MCSB, significant and unreasonable conditions for the Sustainability Indicator, Minimum Thresholds developed for the Sustainability Indicator, Measurable Objectives established for the Sustainability Indicator, and the definition of Undesirable Results for the Sustainability Indicator. For example, for the chronic lowering of groundwater levels, the Minimum Threshold was set to one standard deviation of water levels in the wells between 2002 and 2019 below the known or estimated 2009 water level of the wells. This will be measured through nine Key Wells spatially distributed throughout the main MCSB with the Measurable Objective set to 2009 groundwater elevations. Undesirable results within MCSB are expected to occur if four Key Wells (~45%) each exceed their Minimum Threshold for 3 consecutive years.[7]

The 2020 MC Alternative Plan Update provides a review of the current groundwater conditions in the MCSB and confirms that the Agencies are already managing the subbasin in a sustainable manner. Based on predicted future water demands, the Alternative Plan Update identified that additional groundwater production will be needed through the planning period of 2045. The Agencies have identified options for obtaining additional imported water supplies and increasing water supply reliability through the planning period. The additional imported water supplies will address potential future conditions that are outside of the Agencies' control, including climate change and regulatory changes.

To evaluate future conditions, the groundwater model for the MCSB was updated and used to evaluate a range of water management and hydrologic scenarios. The results of these forecast scenarios were compared with the Sustainable Management Criteria for water levels. The water management forecast modeling shows that the Agencies can maintain sustainable groundwater levels in the MCSB under assumed drier climate change conditions through the planning period by continuing the ongoing Projects and Management Actions and implementing the planned Near-Term and Future Projects. In fact, the Near-Term Projects are the only projects required to maintain sustainability, but Future Projects may address additional demands past 2045. Because groundwater levels in the MCSB also drive sustainability criteria for

[6] 2020 MC Alternative Plan, p. ES-13
[7] 2020 MC Alternative Plan, Table ES-1, p. ES-14

change in groundwater storage and subsidence, these two Sustainability Indicators also indicate sustainability through the planning period and model forecast period.

Groundwater quality will be evaluated on an ongoing basis. The Agencies continue to support the efforts to update the Coachella Valley Salt and Nutrient Management Plan (CV-SNMP) by implementing the CV-SNMP Development Workplan which includes development of recommended numeric objectives for TDS concentration in groundwater that are both protective of beneficial uses while also providing maximum benefit of groundwater. The Alternative Plan Update also demonstrates that there is no substantial increase in inflow of elevated TDS groundwater from the Desert Hot Springs Subbasin (DHSSB) into the MCSB across the Mission Creek Fault due to lower groundwater levels in the MCSB.

As the Agencies continue to follow an adaptive management approach, MCSB conditions will be evaluated using the monitoring data and the sustainability objectives and thresholds, Sustainable Management Criteria, and through development and submittal of SGMA Annual Reports and 5-Year Updates to the Alternative Plan. Together, these actions will support water management to meet projected demands and maintain groundwater sustainability.[8]

[8] 2020 MC Alternative Plan, pp. ES-22 and ES-23

SECTION 2
GREEN DAY VILLAGE DEVELOPMENT

2.1 Project Description

The proposed Green Day Village Development will accommodate a residential-high and mixed-use corridor with a combination of residential buildings, with landscaping, hardscape, and community space as well as neighborhood commercial space, basins, landscaping, parking and roadways on approximately 38.43 acres. This includes 355,018 square feet for 612 residential dwelling units, 78,691 square feet of commercial spaces consisting of; 10,752 square feet restaurant/food service uses, 45,365 square feet retail uses, a two-story 21,854 square feet medical office building, and two recycling centers totaling 720 square feet, together with basins, community gathering spaces, landscaping, parking lots and onsite roadways for a total of 1,674,101 square feet or 38.5 acres. The District will serve as the public water system for this development. **Figure 2-1** shows the general project location within MSWD's service area and sphere of influence.

2.2 Project Land Use Summary

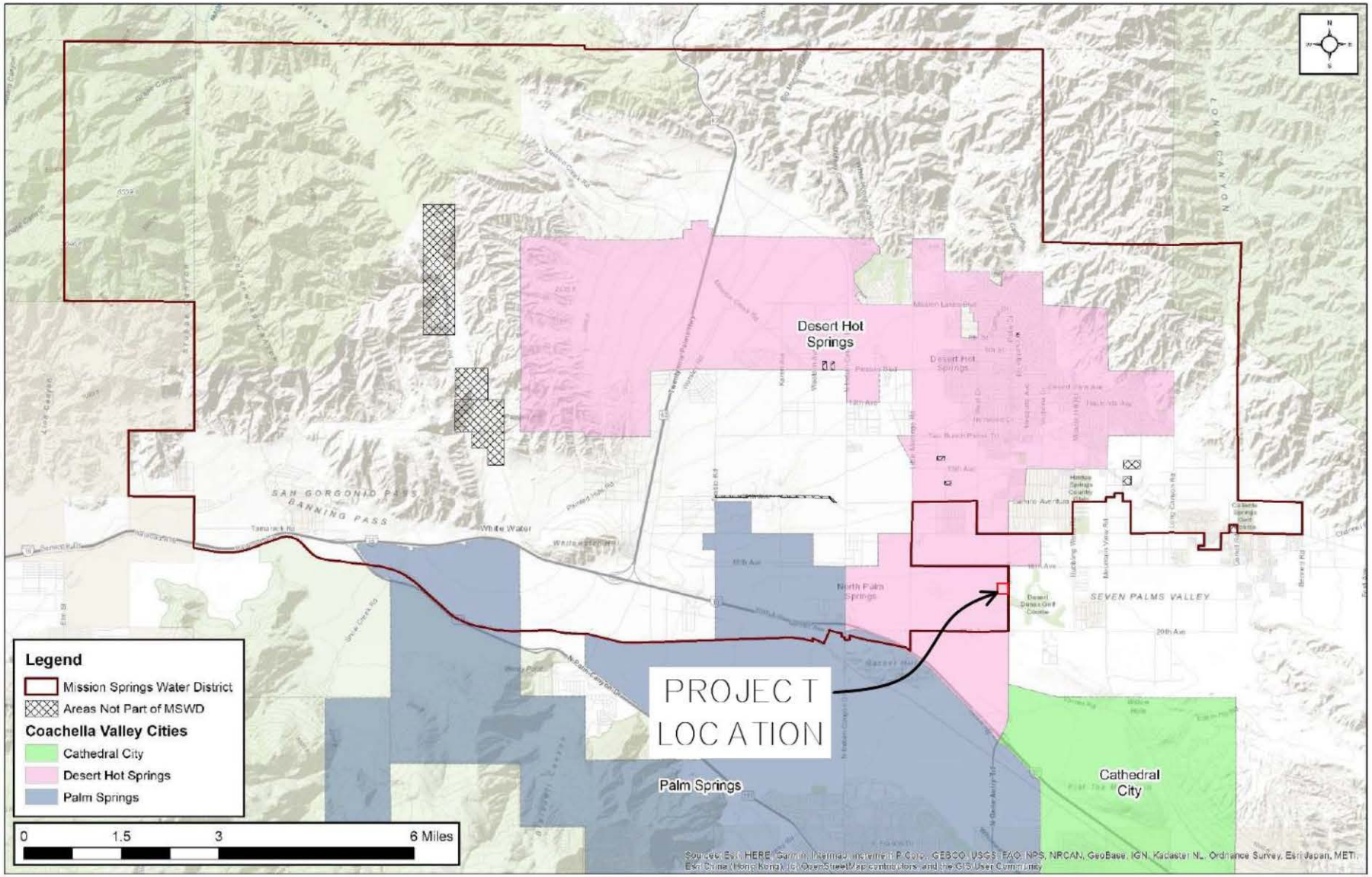
The Green Day Village Development is intended to be a mixed-use development that will accommodate a combination of residential dwelling units, retails, restaurant, fast-food drive-thru restaurant, convenience store, and office spaces within the City of Desert Hot Springs. The project land currently has a split land use designation of Mixed-Use Corridor (MU-C) and Residential-High (R-H) per the City of Desert Hot Springs General Plan Land Use and Zoning Designations. Based on the County of Riverside's 2019 General Plan Land Use Designations, **Table 2-1** details the proposed land use designations for the Green Day Village Development.

Table 2-1
Proposed Green Day Village Development Land Use Designation

Facilities	Land Use Designation	Area (square feet)	Area (acres)
Residential Dwelling Units	Residential-High (R-H)	355,494	8.2
Commercial	Light Industrial (LI)	78,691	1.8
Landscaping	-	505,700	11.6
Parking Lots / Onsite Roadways / Hardscape	-	734,216	16.9
	Total	**1,674,101**	**38.5**

This page is left intentionally blank

Figure 2-1
General Project Location



This page is left intentionally blank

2.3 Project Water Demand

As described, the Green Day Village Development is a combination of these water demand facilities: residential, retails, restaurant, fast-food drive-thru restaurant, convenience store, and office spaces, and landscaping. The water demands were separated and calculated into three separate categories: residential-high, commercial areas and landscaping areas.

The residential areas include 612 residences. Of which, 60 will be one bedroom loft apartments in a two-story structure and the remaining 552 residences will be distributed among 92 two-story residential buildings. Each of the residential buildings, to be constructed employing modular techniques, will comprise six residences, one of which will be an accessory dwelling unit (ADU).

The commercial areas include the retail, restaurant, fast-food drive-thru restaurant, convenience store, and office spaces.

Additionally, landscape consumption factors were developed using MSWD's Water Efficient Landscaping Guidelines. The guidelines set forth the Maximum Annual Applied Water Allowance (MAAWA) for landscaping. Using a combination of the total landscaped area, reference evapotranspiration in the area, and an evapotranspiration adjustment factor, the landscape consumption was determined. The following **Table 2-2** summarizes the light industrial area water demands and **Table 2-3** summarizes the landscape water demands for the Green Day Village Development, using the methods described above.

Table 2-2
Green Day Village Development Water Demands

Facilities	Land Use Designation	Units or Area		Demand Factor	Water Demand	
		Units or Square Feet	Acres	gal/day per du or Acre	gpd	AFY
Residential	Residential-High (R-H)	612	8.2	707.7	433.112	485.2
Mixed Use Corridor	Commercial (C)	78,691	1.8	2,000	3,581	4.0
Total		**--**	**10.0**	**--**	**436,694**	**489.2**

Table 2-3
Green Day Village Development Landscape Water Demands

Facility	Area (acres)	Eto (in/yr)	ET Adjustment Factor	Landscaped Area (sq ft)	Conversion Factor (to gallons per sq ft)	MAAWA (gal/yr)	MAAWA (AFY)
Landscape	11.6	75.7	0.5	505,700	0.62	11,857,781	**36.39**

The Green Day Village Development has an expected total water demand of approximately 525 AFY. In 2009 the Senate Bill x7-7 was enacted requiring all water suppliers to increase water use efficiency. MSWD has developed consumption factors based on the 2020 Coachella Valley RUWMP, after the enactment of SBx7-7. The demands included herein are consistent with MSWD and other Coachella Valley consumption factors that reflect the statewide goal to achieve and maintain a 20 percent reduction of per capita water use by the year 2020.

2.4 Water Conservation Measures

New developments are required to follow and implement the water conservation measures and efficient water use goals outlined in several of MSWD and County of Riverside planning documents.

In 2007, the County of Riverside adopted Ordinance 859.2, The Water Efficient Landscape Requirements. This Ordinance is an effort to implement, manage and maintain water efficient landscapes without a decline in landscape quality or quantity to all new and rehabilitated landscapes associated with residential uses. Furthermore, this Ordinance was adopted to implement the requirements of the California Water Conservation in Landscaping Act 2006 and the California Code of Regulations Title 23, Division 2, Chapter 2.7. The project is required to follow both County and local water conservation and planting measures. In addition, the following are some of the requirements applicable to the Green Day Village Development:

- All planting areas shall receive three inches (3”) of shredded bark mulch and one and a half inches (1-1/2”) on ground cover from flats.
- Turf areas shall be used in response to functional needs and in compliance with the water budget.
- Where available, recycled water shall be used as the source for irrigation and decorative water features.
- Stabilizing mulching products shall be used on slopes. Irrigation systems shall be designed, maintained and managed to meet or exceed an average irrigation efficiency of 0.71.

- All irrigation systems shall be designed to prevent runoff, overspray, low head drainage and other similar conditions where water flows off-site on to adjacent property, non-irrigated areas, walk, roadways, or structures.
- All irrigation systems shall be equipped with a small irrigation controller, a rain sensing device, anti-drain check valves, a manual shut off valve, a pressure regulator, backflow prevention device, and riser protection components.
- Water systems for common open space areas shall use non-potable water, if approved facilities are made available by the water purveyor.

According to the Green Day Village Specific Plan, the planning for the Project emphasizes sustainability, community, and conservation. The Project will implement the following water conservation and planting related measures:

- The inclusion of drought tolerant plant materials and retention basin designs facilitating groundwater recharge to promote water conservation;
- The inclusion of community farming areas within walking distance of most residents thus reducing vehicle trips and associated air emissions and assisting in fostering a sense of community;
- The incorporation of edible landscaping which reduces reliance on edibles produced elsewhere thus also reducing vehicle trips and associated air emissions;
- Establish design guidelines, development regulations, land use standards and procedures to control future project improvements;
- The irrigation design and equipment are designed to comply with City of Desert Hot Springs Municipal Code Section 17.56.130, Water Efficient Landscaping. The system utilizes water efficient practices to reduce runoff and irrigate landscape efficiently. The System will be designed with "smart" automatic controllers that maximize water efficiency with the capability of making real-time adjustments to the irrigation schedule corresponding with hourly weather updates. The irrigation system is designed and sized to accommodate planting material based on species, water use, density, sun exposure, and other microclimate factors.

SECTION 3
WATER DEMANDS

3.1 General Water System Information

3.1.1 Service Area Description

The District, established in 1953, consists of approximately 135 square miles, including the City of Desert Hot Springs, a portion of the City of Palm Springs, and 10 smaller communities in Riverside County. The District provides water service to approximately 43,000 people and sewer service to approximately 26,000 people in their service area. MSWD offices are located in Desert Hot Springs, California.[9]

The District has three different water supply and distributions systems, the Desert Hot Springs System, the Palm Springs Crest System, and the West Palm Springs Village System. The Desert Hot Springs System is the largest of the three and is where the proposed Green Day Village Development is located. The Palm Springs Crest System and the West Palm Springs Village Systems are located approximately five miles west of the Desert Hot Springs system and abutting the Morongo Indian Hill Reservation.[10]

MSWD currently receives 100 percent of its water supply from groundwater wells supplied by the several subbasins within the Coachella Valley Groundwater Basin. The District mainly produces water from the Mission Creek Subbasin (MCSB) and the Garnet Hill Subarea (GHSA) of the Indio Subbasin (ISB).

3.1.2 Facilities

The District, inclusive of all three distribution systems, has approximately 300 miles of pipelines of distribution pipeline ranging in sizes.

As previously mentioned, 100 percent of the water produced is supplied by the Coachella Valley Groundwater Basin. The Desert Hot Springs System has 13 active wells, Well Nos. 22, 24, 25, 25A, 26, 26A, 27, 29, 31, 32, 33, 34 and 37 and two inactive wells, Well Nos. 28 and 30. The 13 active wells and the two inactive wells produce water from the MCSB, GHSA, ISB, and San Gorgonio Pass Subbasin (SGPSB). The 13 active wells have a production capacity of 13,175 gpm. Well No. 34 has wellhead uranium treatment facilities.

[9] 2020 Coachella Valley RUWMP, p. 8-3.
[10] 2020 Coachella Valley RUWMP, p. 8-3.

3.1.3 Climate

The District's climate is a desert climate with a large range of high and low temperatures. The area has low rainfall and humidity and has an average of 3.8 inches of rainfall per year. The average high month temperature is 106 degrees Fahrenheit occurring in July and August and the average low month temperature of 39 degrees Fahrenheit occurring in December. **Table 3.1** shows the historic average monthly evapotranspiration (Eto), rainfall and temperatures for the District.

Table 3-1
Historical District Climate Characteristics

Month	Standard Average Eto (inches)	Average Rainfall (inches)	Daily Max Temperature (degrees F)	Daily Min Temperature (degrees F)
January	2.7	0.5	72	42
February	3.6	0.6	75	45
March	6.0	0.7	82	52
April	7.7	0.3	87	58
May	9.2	0.1	93	63
June	9.8	0.1	103	70
July	9.7	0.2	106	76
August	9.1	0.1	106	75
September	7.2	0.1	101	69
October	5.2	0.4	90	59
November	3.3	0.2	80	49
December	2.3	0.7	65	39
Annual (Total or Average):	**75.7**	**3.8**	**88**	**58**

3.1.4 Service Area Population

The majority of the District's service area population resides in the City of Desert Hot Springs. The City of Desert Hot Springs makes up approximately 17 percent of the District's water service area, 23 square miles. Population current and future estimates were gathered from the 2020 Coachella Valley RUWMP. The 2020 Coachella Valley RUWMP utilized the DWR Population Tool to estimate the 2020 population based on water service connections. A 2020 District water service area population of 38,962 was estimated. With an estimated City of Desert Hot Springs population of 32,510, the City makes up approximately 83.4 percent of MSWD's total water service area population. However, the 2025 population estimate is 49,081.

Future population growth was developed using the regional growth forecast prepared by the Southern California Association of Governments (SCAG). **Table 3-2** shows the current (2020) and projected water service area population for the City of Desert Hot Springs and population outside the City.

Table 3-2
Current and Projected Population

Service Area Population	2020	2025	2030	2035	2040	2045	Increase
MSWD	38,962	49,081	54,414	59,747	66,064	72,380	185.7%

3.2 Water Demands

3.2.1 District Past and Current Water Use

The District experienced steady service area population growth since 2005. As a result, the District as also had a steady growth in metered connections. As previously mentioned, the District's service area population will continue to increase over time, and it is expected that the number of metered accounts will also increase. It should be noted that water deliveries and the number of metered accounts does not directly reflect the District's service area population. The main factor in the growth of water deliveries and in the number of metered accounts are the types of developments that were built and will be built. **Table 3-3** details the historical water service connections by customer sector.

Table 3-3
Historical Water Service Connections

Customer Sector	2016	2017	2018	2019	2020
Single Family	3,803	3,977	4,071	3,430	4,496
Multi Family	1,148	1,189	1,148	959	1,248
Commercial	334	323	379	341	435
Industrial	150	237	192	163	282
Institutional/Governmental	197	205	161	125	170
Landscape	871	982	999	795	933
Other (i.e., Non-Revenue water, which includes losses)	720	899	925	1,879	705
Total:	**7,223**	**7,812**	**7,875**	**7,692**	**8,269**

3.2.2 District Water Demand Projections

MSWD currently does not have any recycled water use within its service area. However, according to the 2020 Coachella Valley RUWMP, there are plans to use recycled water for the irrigation of golf courses, parks, medians and greenbelts, and groundwater aquifer recharge in the future. In addition, the District is constructing the Regional Water Reclamation Facility and plans to have the plant running in late 2023. The proposed treatment plant has been designed to accommodate tertiary treatment in a subsequent phase. It is estimated that the future initial recycled water demand will be 1.0 mgd (1,210 AFY).

The demand for potable water is expected to increase as the service area population increase within time. **Table 3-4** and **Table 3-5** list the projected demands for potable, recycled and total water demands for the future years. Both recycled and potable projected demands were obtained from the 2020 Coachella Valley RUWM.

Table 3-4
Projected Demands for Potable Water

Use Type	2025	2030	2035	2040	2045
Single Family	4,743	5,143	5,543	6,066	6,588
Multi Family	1,316	1,427	1,538	1,683	1,828
Commercial	459	498	537	587	638
Industrial	298	323	348	381	413
Institutional/Governmental	179	194	209	229	249
Landscape	984	1,067	1,150	1,258	1,366
Other (i.e., Non-Revenue water, which includes losses)	1,1017	1,102	1,188	1,300	1,412
Total:	**8,996**	**9,754**	**10,513**	**11,504**	**12,494**

Table 3-5
Total Water Demands

Type	2020	2025	2030	2035	2040	2045
Potable Water Demand	8,269	8,996	9,754	10,513	11,504	12,495
Recycled Water Demand	0	0	1,210	2,200	3,600	5,000
Total:	**8,269**	**8,996**	**10,874**	**12,713**	**15,104**	**17,495**

Of note, total per-capita water use is estimated to decrease from 189 gpcd in 2020 to 154 gpcd in 2045 due to on-going conservation efforts.

3.3 Water Use Reduction Plan

The District has made the State-mandated DMMs a key element in the overall water resource management strategy. The District is dedicated to implementing water conservation measures as demonstrated in adopting a Water Conservation Master Plan in 2004 (2004 WCMP). A series of sensible water conservation activities that complement the unique water resource characteristics of the District's service area are outlines in the 2004 WCMP. The Plan represents a qualitative effort at identifying and screening potential conservation initiatives appropriate for implementation in the District's service area. The data will assist the District in determining which initiatives should be continued to meet long-term conservation objectives.[11]

As part of the 2004 WCMP, the District identified factors affecting water conservation within the District. Significant factors are impacting water use within the District and include the following:

- Limited availability of water as a resource in Coachella Valley;
- the District's 100 percent dependency on groundwater as a water source;
- lack of other potable water sources and limited emergency interconnections;
- assessments to DWA for future imported water supply; lack of sufficient reservoir storage for water shortages and emergencies;
- continued new residential development in the City of Desert Hot Springs;
- risk of future degradation of groundwater supplies from septic systems, and commercial and industrial development; and
- the need to implement costly new sources of water (reclamation/ conjunctive use, etc.).[12]

The water conservation principles identified in the District's Water Conservation Master Plan were outlined and include detailed tasks. Overall, the District aims to employ the following principles:

- Clarify and summarize the District's conservation programs, reflecting conservation commitments made through the UWMP and other programs.
- Ensure that the conservation measures adopted by the District treat all customers fairly and equitably.
- Do not create undue pressure on revenue stability resulting in water costs exceeding local socio-economic conditions.
- Identify and establish measurable conservation targets to be accomplished by the District within a reasonable period of time.

[11] 2020 Coachella Valley RUWMP, p. 8-28.
[12] 2020 Coachella Valley RUWMP, p. 8-28.

- Develop sensible approaches for practical, cost-effective and efficient conservation programs which anticipate and serve the long-term needs of District customers.
- Facilitate the District's ability to provide a dependable, reliable supply of water.[13]

The District also developed a conceptual framework for the proposed conservation planning process throughout the service area. Four phases are envisioned as part of the process, including the formulation of conservation principles, program refinement, program implementation and program evaluation. The Plan's Conservation Action Plan seeks to implement the conceptual framework in a "dual approach," whereby regulatory and management practices are jointly utilized. In the Conservation Action Plan, the process for establishing measurable conservation targets is discussed. Three distinct components for the process are identified as the following:

- establishment of measurable targets,
- identifying worthwhile conservation measures, and
- evaluating the effects of conservation activities and attainment of goals[14]

For additional information on the District's implementation of the demand management and water conservation measures, see the 2020 Coachella Valley RUWMP, Chapter 8, Sub-Chapter 9.

[13] 2020 Coachella Valley RUWMP, p. 8-28.
[14] 2020 Coachella Valley RUWMP, pp. 8-28 to 8-29.

SECTION 4
WATER SUPPLY ASSESSMENT

4.1 General

The Coachella Valley relies on a combination of local groundwater, Colorado River (CR) water, State Water Project (SWP) water, surface water, and recycled water to meet demand. MSWD produces all of its water supplies from the Upper Coachella Valley Groundwater Basin; more specifically, the Mission Creek, Indio (including the Garnet Hill Subarea), and, and San Gorgonio Pass Subbasins. According to the 2020 Coachella Valley RUWMP, CVWD and DWA are remediating the overdraft condition of the groundwater basin by artificial replenishment with imported Colorado River and State Water Project (SWP) Exchange Water in the Mission Creek Subbasin (MCSB) and Indio Subbasin (ISB).

The following section identifies and describes the water supply sources that will serve the Green Day Village Development Project. Additionally, in accordance with State Water Code Section 10910(d), this section will identify existing water supply amounts, water rights, or water service contracts relevant to the identified water supply for the proposed Project. As previously described, the 2020 Coachella Valley RUWMP and the 2020 MC Alternative Plan apply to the Green Day Village Development Project. According to the 2020 Coachella Valley RUWMP, the groundwater supply is reliable for a five-year dry period as the volume in storage can be drawn down during a dry period.[15]

4.2 Identification of Water Sources

4.2.1 Primary Water Sources

As described above, MSWD currently receives 100 percent of its municipal water supply from groundwater produced from subbasins within the Coachella Valley Groundwater Basin, which underlies the District's water service area. The Coachella Valley Groundwater Basin is not adjudicated. As such, there are no legal agreements that limit MSWD from producing groundwater from any of the subbasins. However, both the MCSB and ISB have been designated as "medium-priority" based on the State of California Department of Water Resources (CDWR), and are therefore subject to the requirements of the Sustainable Groundwater Management Act (SGMA).[16] As indicated herein, substantial regional efforts are ongoing, led by CVWD and DWA, supported by MSWD, to manage and recharge the MCSB and ISB with imported water

[15] 2020 Coachella Valley RUWMP, pp. 8-25
[16] 2020 MC Alternative Plan, pp. 1-1

and other supplies to ensure adequate water supplies are sustained and protected in the future. Those efforts are made possible in large part because CVWD and DWA are Metropolitan Water District of Southern California (MWD) State Water Project (SWP) contractors. Therefore, the Green Day Village Development will rely on groundwater as its primary water supply source, more specifically the MCSB.

4.2.2 Additional Water Sources

While groundwater from the MCSB will be the primary source of water for the project, additional water sources related to the project include the Garnet Hill Subarea (GHSA) of the ISB, surface water that naturally replenished the groundwater basin, return flows from applied water that returns to the water cycle as recharge to groundwater after it has been used for its intended purpose (i.e., municipal, agricultural, industrial, and golf course), and imported water to recharge groundwater supplies.

4.3 Analysis of Water Supply

4.3.1 Groundwater

As described above, MSWD currently receives 100 percent of its water supply from groundwater produced from subbasins within the Coachella Valley Groundwater Basin, which underlies the District's water service area. MSWD primarily produces groundwater from the MCSB through eight (8) active groundwater wells. In addition, MSWD also produces groundwater from the ISB via two (2) active wells, the GHSA of the ISB through one (1) active well, and the San Gorgonio Pass Subbasin (SGPSB) through two (2) active wells.

The Coachella Valley Groundwater Basin is bounded on the north and east by non-water bearing crystalline rocks of the San Bernardino and Little San Bernardino Mountains and on the south and west by the crystalline rocks of the Santa Rosa and San Jacinto Mountains. At the west end of the San Gorgonio Pass, between Beaumont and Banning, the basin boundary is defined by a surface drainage divide separating the Coachella Valley Groundwater Basin from the Beaumont Groundwater Basin of the Upper Santa Ana drainage area.[17]

While groundwater flows throughout the groundwater basin, several features (i.e., fault lines, constrictions in the basin profile, and changed soil conditions) limit and control its movement. As such, several subareas and subbasins have been identified

[17] 2020 Coachella Valley RUWMP, p. 3-1

and defined by CDWR in 1964 and the United States Geological Survey (USGS) in 1971.[18]

The Coachella Valley subbasins are the: Mission Creek, Desert Hot Springs, San Gorgonio Pass, and Indio (including the GHSA) subbasins. The ISB is sometimes referred to as the Whitewater subbasin. The subbasins all have varying water quality and quantity and serve as groundwater storage reservoirs. Municipal and Private wells are used to produce water from the natural reservoirs. MSWD's water service area and underlying subbasins are shown in **Figure 4-1**. MSWD produces groundwater from the MCSB, GHSA of the ISB, ISB, and SGPSB; described in greater detail in the following sections.

Of note, the Coachella Valley Groundwater Basin is not adjudicated and there are no legal agreements that limit MSWD from producing groundwater from any of the subbasins. CVWD and DWA continually recharge the MCSB and ISB with imported water and other supplies. Both agencies are SWP contractors.

Starting in 1973, the ISB has been replenished using SWP Exchange Water for groundwater recharge. CVWD and DWA have an agreement with MWD to exchange (on an acre-foot-for-acre-foot basis) a percentage of their SWP Table A water rights for an equal amount of MWD's Colorado River water for the purpose of recharging the Coachella Valley Groundwater Basin. A replenishment program using SWP Exchange Water was also established for the MCSB with recharge commencing in 2003.[19]

4.3.1.1 Mission Creek Subbasin

MSWD primarily produces groundwater from the MCSB through eight (8) active groundwater wells. The MCSB is located in the Upper Coachella Valley in the north central portion of Riverside County, California. The Mission Creek Fault and the Banning Fault bound the northeastern and southern edges of the subbasin, respectively, and are the major groundwater controls. Both act to limit groundwater movement as these faults have folded sedimentary deposits, displaced water-bearing deposits, and caused once permeable sediments to become impermeable (DWR, 1964).[20]

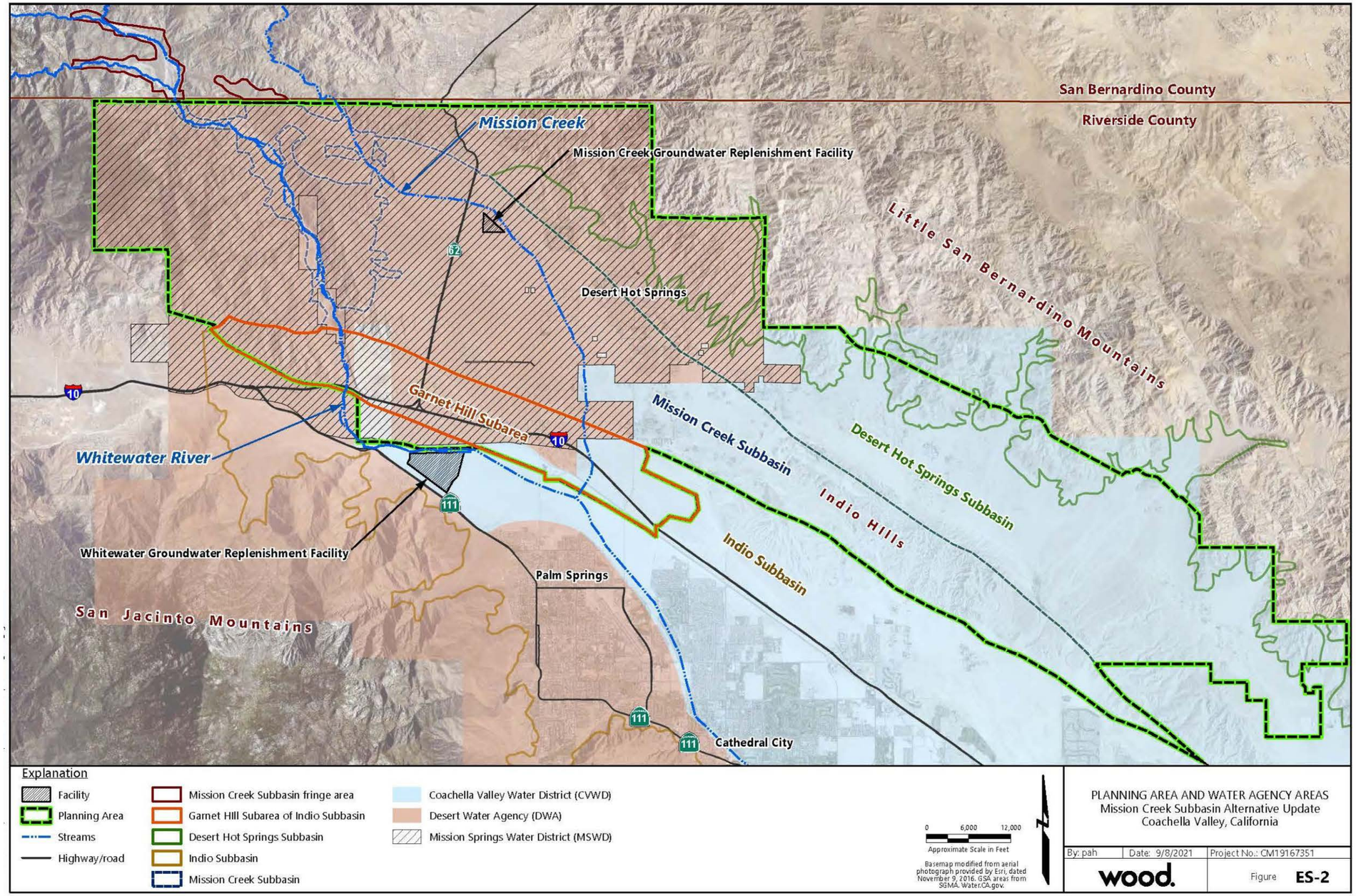
To the west, the subbasin is bounded by the San Bernardino Mountains and to the east by the Indio Hills and the Mission Creek Fault. Artesian conditions have historically been present near a narrow strip along the northwest portion of the Seven

[18] 2020 Coachella Valley RUWMP, p. 3-2
[19] 2020 Coachella Valley RUWMP, pp. 3-4 to 3-5
[20] 2020 Coachella Valley RUWMP, p. 3-5

Palms Ridge (DWR, 1964), allowing for the development of a unique Willow-Mesquite biological community that includes phreatophytes. Depth to groundwater in other parts of the Subbasin averages 300 feet below ground surface. Major surface water features in the area are the Whitewater River, Mission Creek, San Gorgonio River, Little and Big Morongo Washes, and Long Canyon.[21]

[21] 2020 Coachella Valley RUWMP, p. 3-5

Figure 4-1
Groundwater Basins[22]



[22] 2020 MC Alternative Plan Update, Figure ES-2

This page is left intentionally blank

The MCSB is filled with Holocene and late Pleistocene unconsolidated sediments eroded from the San Bernardino and Little San Bernardino Mountains. There are three significant water-bearing sedimentary deposits recognized in the subbasin: Pleistocene Cabazon Fanglomerate and Pleistocene to Holocene Older alluvium and alluvial deposits. These deposits are generally coarse sand and gravel, poorly sorted alluvial fan and pediment deposits that coalesce with one another.[23]

The MCSB is considered an unconfined aquifer with a saturated thickness of 1,200 feet or more and an estimated total storage capacity on the order of 2.6 million acre-feet (MAF). The subbasin is naturally recharged by surface and subsurface flow from the Mission Creek, Dry, and Big Morongo Washes, the Painted Hills, and surrounding mountain drainages. Irrigation return flow and discharges from municipal and individual subsurface wastewater disposal systems also contribute to recharge.[24]

Natural inflow has been supplemented with artificial recharge of imported water since 2003. In Water Year (WY) 2021-2022 total inflow to the MCSB is estimated at 11,590 (afy) and includes 5,700 AFY from infiltration or natural runoff, 1,150 of subsurface inflows from adjacent basins and 0 AF of artificial recharge.[25] Additionally, non-consumptive return flow (1,585 AF of infiltration of applied irrigation water, 2,306 AFY of wastewater percolation, 849 AF of septic tank percolation) is estimated at 4,740 AF or approximately 41 percent of the total inflow budget.[26]

The primary outflow from the MCSB is through groundwater production for domestic, agricultural and commercial use. Total groundwater production by MSWD, CVWD, and other privately-owned wells together averaged approximately 2,000 AFY in the 1970s; increased to over 17,000 AFY in 2006; and has since decreased to 14,234 AFY in WY 2021-2022.[27] Additionally, natural outflow includes underflow to the Garnet Hill Subbasin and to semi-water-bearing rocks in southeastern portion of basin of 2,350 AF, evapotranspiration of 950 AF, and evaporative losses of 69 AF for a total of 3,369 AF.

The WY 2021-2022 water balance in MCSB is shown in **Table 4-1**. The annual water balance is the total inflow less the total outflow, which is estimated at a decrease of 6,013 AF of water storage (approximately 0.23 percent of storage capacity) in the subbasin in WY 2021-2022.

[23] 2020 Coachella Valley RUWMP, p. 3-5
[24] 2020 Coachella Valley RUWMP, p. 3-5
[25] MCSB Annual Report for Water Year 2021-2022, p. 7-6, Table 7-3.
[26] MCSB Annual Report for Water Year 2021-2022, p. 7-3.
[27] MCSB Annual Report for Water Year 2021-2022, p. 7-6, Table 7-3.

Table 4-1
WY 2021-2022 Water Balance in Mission Creek Subbasin

Basin Inflow and Outflow Component	Flow (AFY)
Inflow	
Subsurface Inflows From Adjacent Basins	1,150
Non-Consumptive Return	4,740
Infiltration of Natural Runoff	5,700
Artificial Recharge	0
Total Inflow	**11,590**
Outflow	
2019 Groundwater Pumping	14,234
Natural Outflow	3,369
Total Outflow	**17,603**
Annual Balance	**-6,013**

Through SGMA planning efforts, the basins are being managed for long-term sustainability. Based on the annual reports prepared for Water Year 2021-2022, the basin is not in a state of overdraft.[28]

Due to continuing overdraft conditions in the MCSB, CVWD and DWA began constructing facilities to replenish the MCSB in October 2001. Facilities were completed in June 2002 and in December 2002, DWA and CVWD began recharge activities in the MCSB. The current replenishment program is effectively increasing water levels throughout most of the subbasin.[29]

As of the beginning of 2022, the SGMA Portal Monitoring Network Module (MNM) replaced the California Statewide Groundwater Elevation Monitoring (CASGEM) program as the database for SGMA groundwater well data and water level data. Data upload to CASGEM is no longer required for subbasins reporting to the SGMA Portal MNM.[30]

MSWD, DWA, and CVWD now jointly manage the MCSB under the terms of the Mission Creek Settlement Agreement (December 2004). This agreement and the 2014 Mission Creek Groundwater Replenishment Agreement between CVWD and DWA specify that the available SWP water will be allocated between the MCSB and ISB in proportion to the amount of water produced or diverted from each Subbasin during the preceding year. In 2021, production from the MCSB was about 8.9 percent of the combined production from these two Subbasins.[31]

[28] MCSB Annual Report for Water Year 2021-2022, p. 9-20
[29] 2020 Coachella Valley RUWMP, p. 3-5
[30] MCSB Annual Report for Water Year 2021-2022, p. 3-1
[31] CVWD Engineer's Report on Water Supply and Replenishment Assessment 2022-2023, Tables 3-1 and 4-1

Since there is no physical connection to SWP facilities in the Coachella Valley, in the 1970s, CVWD and DWA signed a water Exchange Agreement with the MWD to deliver an equivalent amount of Colorado River water from MWD's Colorado River Aqueduct (CRA) in exchange for CVWD's and DWA's SWP water; referred to herein as SWP Exchange Water.

Deliveries of SWP Exchange Water from the CRA to the Mission Creek Groundwater Replenishment Facility began in 2003. Final SWP allocations between 2002 and 2021 have ranged from a high of 100% in 2006, to a low of 5% in 2014 and 2021. The reliability of SWP deliveries has declined since 2007 when Judge Wanger overturned the Biological Opinion about Delta export pumping operations (2007 Wanger Decision). This decision significantly impacted CDWR's ability to convey SWP supplies across the Delta for export. Since the 2007 Wanger decision, SWP final allocations have averaged 45% annually. This period has also been marked by six critically dry years.[32] A portion of the recharge represents advanced delivery of SWP Exchange Water, further discussed in **Section 4.3.2.2**. **Table 4-2** summarizes the total volume of water delivered for artificial recharge in the MCSB.

The historical annual change in storage for the MCSB is presented on **Figure 4-2**. It is observed that groundwater storage declined from 1936 until imported water recharge activities were started in the MCSB in 2003. Increasing values are reflective of additions to total groundwater storage (due to higher recharge than pumping), and declining values are reflective of decreases in total groundwater storage (pumping greater than recharge). The effect of imported water recharge is clearly seen for the MCSB since 2003. During periods of relatively high recharge (2005-2006 and 2010-2011), groundwater storage increased whereas in periods of lower recharge (2003-2004 and 2007-2009), groundwater storage declined. The MCSB is currently more than 6,000 AF above groundwater storage levels in 2009 due to groundwater replenishment efforts.[33]

[32] 2020 MC Alternative Plan Update, p. 4-12
[33] 2020 MC Alternative Plan Update, p. 7-9

Table 4-2
Deliveries for Direct Replenishment
at the
Mission Creek Groundwater Replenishment Facility

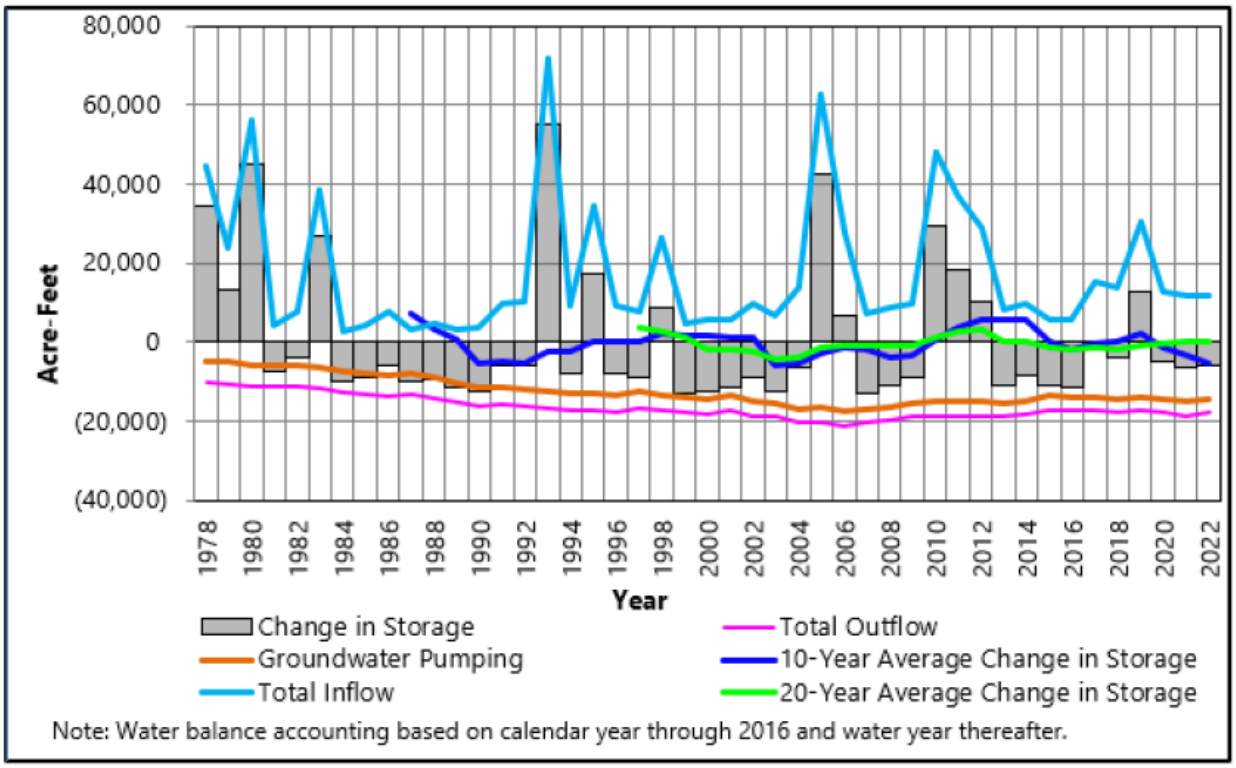
Year	Delivered to Mission Creek Groundwater Replenishment Facility (AFY)
2002	4,733
2003	59
2004	5,564
2005	24,723
2006	19,901
2007	1,011
2008[a]	503
2009[a]	4,090
2010[a]	33,210
2011[a]	26,238
2012	23,406
2013	2,379
2014	4,325
2015	171
2016	0
2017	9,248
2018	2,027
2019[b]	3,688
2020	1,768
2021	0
TOTAL:	**167,044**

(a) Includes deliveries of DWA's non-SWP supplemental water purchased from entities in Kern County for the CPV Sentinel Energy Power Plant.

(b) The volume of water recharged to the Mission Creek GRF in CY 2019 reported in the 2020-2021 Engineer's Report was provisional. The provisional value of 3,498 AF was updated herein to 3,688 AF.

Source: CVWD Engineer's Report on Water Supply and Replenishment Assessment 2022-2023, Tables 3-2

Figure 4-2
Historical Annual in Groundwater Storage – Mission Creek Subbasin
1978 - 2022[34]



4.3.1.2 Garnet Hill Subarea

MSWD produces groundwater from the Garnet Hill Subarea (GHSA) of the Indio Subbasin through one (1) active well. While the Project will, in part, rely on the GHSA to meet demand, as the MCSB and GHSA of the ISB are intertied, as described herein.

The Garnet Hill Subbasin which lies immediately south of the MCSB, underlies approximately 20 square miles and is subordinate to the ISB (DWR, 2003). The basin is bounded on the north by the Banning fault, on the south by the Garnet Hill fault, and on the east and west by non-water to semi-water bearing rocks.[35]

The area between the Garnet Hill fault and the Banning fault, named the Garnet Hill Subarea by DWR (2003), was considered a distinct Subbasin by the USGS because of the effectiveness of the Banning and Garnet Hill faults as barriers to groundwater movement.[36]

[34] MCSB Annual Report for Water Year 2021-2022
[35] 2020 Coachella Valley RUWMP, p. 3-5
[36] 2020 Coachella Valley RUWMP, p. 3-5.

The GHSA is considered an unconfined aquifer with a saturated thickness of 1,000 feet or more and an estimated total storage capacity on the order of 1.0 million AF (DWR, 1964). The GHSA is naturally recharged by subsurface flow from the MCSB and runoff from the Whitewater River watershed on the west. Irrigation return flow and discharges from municipal and individual subsurface wastewater disposal systems also contribute to recharge but are considered minimal.[37]

4.3.1.3 Desert Hot Springs Subbasin

The Desert Hot Springs subbasin is bounded on the north by the Little San Bernardino Mountains and to the south by the Mission Creek and San Andreas faults. The San Andreas fault separates the Desert Hot Springs Subbasin from the ISB and serves as an effective barrier to groundwater flow. Due to poor quality and low groundwater yields, all potable water demand overlying the subbasin is supplied by wells in the MCSB. However, wells in the Miracle Hill area produce geothermally heated groundwater that supplies spa resorts in Desert Hot Springs. Private wells in the Fargo Canyon Subarea have historically been used for agricultural irrigation.[38]

4.3.1.4 Indio Subbasin

The ISB, part of what was once referred to as the Whitewater Subbasin, comprises the major portion of the floor of the Coachella Valley and encompasses approximately 400 square miles. Beginning approximately one mile west of the junction of State Highway 111 and Interstate 10, the ISB extends southeast approximately 70 miles to the Salton Sea.[39]

MSWD currently produces groundwater from the ISB, as defined herein, through two (2) active wells; however, the Project will not rely on the ISB to meet demand. Of note, DWR considers the GHSA as part of the ISB; however, they are considered separate basins at the regional/local level and herein.

4.3.1.5 Cabazon Storage Unit of the San Gorgonio Pass Subbasin

MSWD produces groundwater from the San Gorgonio Pass Subbasin (SGPSB) through two (2) active wells. However, the Project will not rely on the SGPSB to meet demand.

[37] 2020 MC Alternative Plan Update, p. 2-5
[38] 2020 Coachella valley RUWMP, p. 3-5
[39] 2020 Coachella Valley RUWMP, p. 3-4

The main water bearing deposits in the SGPSB are Holocene and Pleistocene age alluvium and Pliocene to Pleistocene age San Timoteo Formation. Holocene alluvium is mostly gravel and sand and, where saturated, would yield water readily to wells. Within the Subbasin, these deposits lie largely above the water table and contribute little water to wells. Holocene alluvium is found in the tributaries of the Subbasin and allows runoff to infiltrate and recharge the Subbasin. Older, Pleistocene-age alluvium contains sand and gravel, but also large amounts of clay and silt. These deposits yield moderate amounts of water to wells.[40]

The SGPSB is subdivided into a series of storage units that include: the Banning Bench, Banning, Beaumont, and Cabazon storage units. The Cabazon storage unit within the San Gorgonio Basin is recharged naturally with runoff from the adjacent San Jacinto and San Bernardino Mountains.[41]

The Cabazon storage unit encompasses approximately 11 square miles. The Cabazon storage unit is located near the western boundary of the MSWD boundary. MSWD operates two (2) wells in the Cabazon storage unit. Other groundwater users in the Cabazon storage unit include Desert Hills Premium Outlets, Morongo Band of Mission Indians, and Cabazon Water District.[42]

4.3.1.6 District Groundwater Production

A summary of groundwater pumped by the District by subbasin from 2016 through 2020 is shown in **Table 4-3**.

Table 4-3
Groundwater Volume Pumped (AFY)[43]

Groundwater Type	Basin Name	2016	2017	2018	2019	2020
Alluvial Basin	MCSB	6,792	7,207	7,568	7,273	7,833
Alluvial Basin	GHSA	285	449	154	266	270
Alluvial Basin	ISB / SGPSB	145	156	153	153	165
	Total:	**7,222**	**7,812**	**7,875**	**7,692**	**8,268**

[40] 2020 Coachella Valley RUWMP, pp. 3-5 to 3-6
[41] 2020 Coachella Valley RUWMP, p. 3-6
[42] 2020 Coachella Valley RUWMP, p. 3-6
[43] 2020 Coachella Valley RUWMP, Table 8-12

4.3.2 Imported Water

Both CVWD and DWA are State Water Contractors. However, there is no conveyance system in place to deliver State Water Project (SWP) water to the Coachella Valley. Conversely, imported water from the Colorado River is delivered to Southern California agencies through the Colorado River Aqueduct (CRA) that traverses through the Coachella Valley. As such, both DWA and CVWD have entered into separate agreements with MWD to receive Colorado River water in exchange for State Water Project (SWP) water on an acre-foot-for-acre-foot basis (SWP Exchange Water).

In 1997, DWA worked with MWD to get a 48-inch turnout constructed along the CRA system just south of Indian Avenue and west of Worsley Road. In addition, DWA acquired property, approximately 190 acres, near the turnout to construct spreading basins (the Mission Creek Groundwater Recharge Facility or MCGRF) to hold the Colorado River water as it percolates downward into the MCSB. In 2002, DWA completed construction of the MCGRF with a series of 13 recharge basins and a combined surface area of 57 acres. Replenishments efforts began in 2003 and, to date, a cumulative total of approximately 167,044 AF of supplemental water has been recharged into the MCSB.[44]

The ISB has been replenished using SWP Exchange Water since 1973. Administered by CVWD, Colorado River water is recharged in two separate Whitewater River Groundwater Replenishment Facility. To date, approximately 3,825,000 AF of supplemental water has been recharged into the ISB.[45]

The spreading of MWD's SWP in the MCSB benefits the City of Desert Hot Springs and MSWD. MSWD pays DWA's replenish assessment for every AF of supplemental water extracted from the MCSB.

4.3.2.1 Colorado River Water

Colorado River water has been a significant water supply source for the Indio Subbasin since the Coachella Canal was completed in 1949. CVWD is the only agency in the Indio Subbasin that receives Colorado River water allocations.

The Colorado River is managed and operated in accordance with the *Law of the River*, a collection of interstate compacts, federal and state legislation, various agreements and contracts, an international treaty, a U.S. Supreme Court decree, and federal

[44] CVWD Engineer's Report on Water Supply and Replenishment Assessment 2022-2023, Tables 3-2
[45] CVWD Engineer's Report on Water Supply and Replenishment Assessment 2022-2023, Table 4-2.

administrative actions that govern the rights to use Colorado River water within the seven Colorado River Basin states. The *1922 Colorado River Compact* apportioned the waters of the Colorado River Basin between the Upper Colorado River Basin (i.e., Colorado, Wyoming, Utah, and New Mexico) and the Lower Basin (i.e., Nevada, Arizona, and California) (USBR, 1922). The *1922 Colorado River Compact* allocates 15 million AFY of Colorado River water as follows: 7.5 million AFY to the Upper Basin and 7.5 million AFY to the Lower Basin, plus up to 1 million AFY of surplus supplies. The Lower Basin's water was further apportioned among the three Lower Basin states by the *1928 Boulder Canyon Project Act* (USBR, 1928) and the *1931 Boulder Canyon Project Agreement* (USBR, 1931), typically called the *1931 Seven Party Agreement*, which allocates California's apportionment of Colorado River water among Palo Verde Irrigation District (PVID), Imperial Irrigation District (IID), Coachella Valley Water District (CVWD), Metropolitan Water District of Southern California (MWD), City of Los Angeles, City of San Diego, and County of San Diego. The 1964 U.S. Supreme Court decree in *Arizona v. California* established Arizona's basic annual apportionment at 2.8 million AFY, California's at 4.4 million AFY, and Nevada's at 0.3 million AFY. Mexico is entitled to 1.5 million AFY of the Colorado River under the *1944 United States-Mexico Treaty for Utilization of Waters of the Colorado and Tijuana Rivers and of the Rio Grande* (U.S. Government Printing Office, 1946). However, this treaty did not specify a required quality for water entering Mexico. In 1973, the United States and Mexico signed *Minute No. 242* of the International Boundary and Water Commission (IBWC) requiring certain water quality standards for water entering Mexico (IBWC, 1973).[46]

California's Colorado River supply is protected by the *1968 Colorado River Basin Project Act* (USBR, 1968), which provides that in years of insufficient supply on the main stem of the Colorado River, supplies to the Central Arizona Project shall be reduced to zero before California will be reduced below 4.4 million AF in any year. This assures full supplies to the Coachella Valley, except in periods of extreme drought.[47]

The Coachella Canal is a branch of the All-American Canal that brings Colorado River water into the Imperial and Coachella Valleys. Under the *1931 Seven Party Agreement* (USBR, 1931), CVWD receives 330,000 AFY of Priority 3A Colorado River water diverted from the All-American Canal at the Imperial Dam. The Coachella Canal originates at Drop 1 on the All-American Canal and extends approximately 123 miles, terminating in CVWD's Lake Cahuilla. The service area for Colorado River water delivery under CVWD's contract with the U.S. Department of the Interior Bureau of Reclamation (USBR) is defined as Improvement District No. 1 (ID-1), which

[46] 2022 ISB Water Management Plan Update, p. 6-7
[47] 2022 ISB Water Management Plan Update, p. 6-8

encompasses 136,400 acres covering most of the East Valley and a portion of the West Valley north of Interstate 10. Under the *1931 Seven Party Agreement*, CVWD has water rights to Colorado River water as part of the first 3.85 million AFY allocated to California. CVWD is in the third priority position along with IID.[48]

2003 Quantification Settlement Agreement

In 2003, CVWD, IID, and MWD successfully negotiated the *2003 Quantification Settlement Agreement* (*2003 QSA*) (CVWD, 2003), which quantifies Colorado River allocations through 2077 and supports the transfer of water between agencies. Under the *2003 QSA*, CVWD has a base entitlement of 330,000 AFY. CVWD negotiated water transfer agreements with MWD and IID that increased CVWD supplies by an additional 123,000 AFY. CVWD's net QSA supply will increase to 424,000 AFY by 2026 and remain at that level until 2047, decreasing to 421,000 AFY until 2077, when the agreement terminates (Secretary of the Interior, 2003). CVWD's available Colorado River diversions through 2045, the ISB Alternative Plan Update horizon, are shown on **Table 4-4**.[49]

As of 2020, CVWD's available Colorado River water diversions at Imperial Dam under the QSA were 394,000 AFY. This includes the base entitlement of 330,000 AFY, the MWD/IID Transfer of 20,000 AFY, IID/CVWD First Transfer of 50,000 AFY, and IID/CVWD Second Transfer of 23,000 AFY. CVWD's QSA diversions also deducts the -26,000 AFY transferred to San Diego County Water Authority (SDCWA) as part of the Coachella Canal Lining Project and the -3,000 AFY transfer to Indian Present Perfected Rights.[50]

Additionally, under the 2003 QSA, MWD transferred 35,000 AFY of its SWP Table A Amount to CVWD. This SWP water is exchanged for Colorado River water and can be delivered at Imperial Dam for delivery via the Coachella Canal to the eastern portion of the Indio Subbasin or at Lake Havasu for delivery via the Colorado River Aqueduct to the western portion of the Indio Subbasin at the Whitewater River Groundwater Recharge Facility (WWR-GRF). The 2019 Second Amendment (CVWD, 2019b) guaranteed delivery of 35,000 AFY from 2019 to 2026, for a total of 280,000 AFY of water to the WWR-GRF during that timeframe. MWD can deliver the water through CVWD's Whitewater Service Connections (for recharge at WWR-GRF) or via the Advance Delivery account.[51]

[48] 2022 ISB Water Management Plan Update, p. 6-8
[49] 2022 ISB Water Management Plan Update, p. 6-8
[50] 2022 ISB Water Management Plan Update, p. 6-8
[51] 2022 ISB Water Management Plan Update, p. 6-9

The MWD/IID Transfer originated in a 1989 agreement with MWD to receive 20,000 AF of its Colorado River supply. The *2019 Amended and Restated Agreement for Exchange and Advance Delivery of Water* (CVWD, 2019a) defined the exchange and delivery terms between MWD, CVWD, and DWA. The *2019 Second Amendment to Delivery and Exchange Agreement* (CVWD, 2019b) reduced CVWD's annual delivery of the MWD/IID Transfer to 15,000 AFY, for a total of 105,000 AF, if taken at the Whitewater Service Connections (for recharge at WWR-GRF) between 2020 and 2026. For those seven years, MWD keeps the remaining 5,000 AFY, after which CVWD's allocation increases back up to 20,000 AFY. In the ISB Alternative Plan Update, both the 15,000 AFY MWD/IID Transfer and the 35,000 AF QSA MWD SWP Transfer are assumed to be delivered to WWR-GRF through 2026. CVWD's total allocations under the QSA, including MWD's transfer of 35,000 AFY and the MWD/IID Transfer, will increase from 424,000 AFY in 2020 to 459,000 AFY by 2026 and remain at that level for the remainder of the 75-year term of the QSA.[52]

Table 4-4
Colorado River Water Entitlements (AFY)[53]

Diversion	2020	2025	2030	2035	2040	2045
Base Entitlement	330,000	330,000	330,000	330,000	330,000	330,000
1988 MWD/IID Approval Agreement	20,000	20,000	20,000	20,000	20,000	20,000
IID/CVWD First Transfer	50,000	50,000	50,000	50,000	50,000	50,000
IID/CVWD Second Transfer	23,000	48,000	53,000	53,000	53,000	53,000
Coachella Canal Lining	-26,000	-26,000	-26,000	-26,000	-26,000	-26,000
Indian Present Perfected Rights Transfer	-3,000	-3,000	-3,000	-3,000	-3,000	-3,000
QSA Diversions	**394,000**	**419,000**	**424,000**	**424,000**	**424,000**	**424,000**
MWD SWP Transfer	35,000	35,000	35,000	35,000	35,000	35,000
Total Diversions	**429,000**	**454,000**	**459,000**	**459,000**	**459,000**	**464,000**
Assumed Conveyance Losses (5%)	-21,200	-22,700	-22,950	-22,950	-22,950	-22,950
MWD/IID Approval Agreement Transfer[1]	-5,000	-5,000	0	0	0	0
Total Available Deliveries	**402,800**	**426,300**	**436,050**	**436,050**	**436,050**	**436,050**

[1] Accounts for -5,000 AFY reduction in MWD/IID Approval Agreement deliveries from 2020–2026 per the 2019 Amendments with MWD.

Source: *Colorado River Water Delivery Agreement (https://www.usbr.gov/lc/region/g4000/crwda/crwda.pdf, Exhibit B)*

[52] 2022 ISB Water Management Plan Update, p. 6-9
[53] 2022 ISB Water Management Plan Update, Table 6-3

Colorado River Water Consumptive Use

Each year, CVWD submits its water order to USBR for its total QSA entitlement. USBR provides an annual Colorado River Accounting and Water Use Report that provides diversions, return flows, and consumptive use of water diverted from the mainstream of the Colorado River below Lee's Ferry (USBR, 2020). For the eight years between 2013 and 2020, CVWD consumed less than its QSA allotment by an average of 25,574 AFY. CVWD can transfer up to 20,000 AF of the *1989 Approval Agreement* water to MWD, to help mitigate the lower consumption. Despite minor annual variability, CVWD anticipates full consumptive use of its QSA entitlement by 2030. Payback for the over consumption that occurred in years 2001 and 2002 has been completed; no additional payback is assumed during the planning horizon.[54]

Assumptions regarding Colorado River (Canal water) supplies available for use are based on CVWD's delivery schedule from the QSA, minus estimated Canal conveyance losses (see discussion below). Table 6-3 and Figure 6-2 provides CVWD's contracted Colorado River water entitlement through 2045. Note that due to the IID/CVWD Second Transfer, CVWD's Colorado River supplies continue to increase by 5,000 AFY per year through 2027 before reaching a total volume of 424,000 AFY. **Table 4-5** lists total Colorado River entitlements under existing agreements. However, the ISB Alternative Plan Update does not assume full QSA ramp up volumes will be available due to ongoing drought and forecasted climate change on the Colorado River system.[55]

Colorado River Supply Reliability

Colorado River supplies face several challenges to long-term reliability including the extended Colorado River Basin drought and shortage sharing agreements, endangered species and habitat protection, and climate change. Due to both California's and CVWD's high-priority position regarding Colorado River allocations, CVWD's Colorado River supply is expected to be reliable.

QSA Litigation

The *2010 CV Water Management Plan Update* cautioned against the reliability of CVWD's Colorado River supplies because of ongoing QSA litigation at the time. However, the QSA has held up to scrutiny under several unsuccessful legal challenges in state and federal court. Immediately following passage of the QSA, in November 2003, IID filed a complaint in Imperial County Superior Court to confirm the validity

[54] 2022 ISB Water Management Plan Update, p. 6-9
[55] 2022 ISB Water Management Plan Update, p. 6-9

of the QSA and 12 of the 34 QSA-related agreements. The case was coordinated for trial with other lawsuits challenging QSA environmental and regulatory approvals in the Sacramento County Superior Court. CVWD, IID, MWD, SDCWA, and the State defended these suits, which sought validation of the contracts. In February 2010, a California Superior Court judge ruled that the QSA and 11 related agreements were invalid because the QSA-JPA Agreement created an unconditional obligation for the State to pay for excess environmental mitigation costs, in violation of California's constitution. The court declined, for jurisdictional reasons, to validate the thirteenth agreement, the IID-CVWD Salton Sea Flooding Settlement Agreement.[56]

The QSA parties appealed this decision. In March 2011, the California Court of Appeal, Third Appellate District issued a temporary stay of the trial court judgment. In December 2011, the California Court of Appeal reversed the lower court ruling and remanded the case back to trial court for decision on the environmental challenges to the QSA Program EIR. In July 2013, a Sacramento Superior Court entered a final judgment validating the QSA and rejecting all of the remaining legal challenges. In May 2015, the California Court of Appeal issued a ruling that dismissed all remaining appeals.[57]

Colorado River Interim Guidelines

Since 2000, drought conditions in the Colorado River basin have led to significant fluctuations and decreases in water elevations at key Colorado River reservoirs. Each year, the Secretary of the Interior is required to declare the Colorado River water supply availability conditions for the Lower Basin States in terms of normal, surplus, or shortage. In 2007, USBR adopted *Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead* (*2007 Interim Guidelines*).[58]

These *2007 Interim Guidelines* will remain in effect for determinations to be made through December 2025 regarding water supply and reservoir operating decisions through 2026 and provide guidance for development of the Annual Operating Plan (AOP) for Colorado River reservoirs (USBR, 2007).

The purposes of the *2007 Interim Guidelines* are to:

- Improve USBR's management of the Colorado River by considering trade-offs between the frequency and magnitude of reductions of water deliveries and considering the effects on water storage in Lake Powell and Lake Mead. USBR

[56] 2022 ISB Water Management Plan Update, p. 6-12
[57] 2022 ISB Water Management Plan Update, p. 6-12
[58] 2022 ISB Water Management Plan Update, p. 6-12

will also consider the effects on water supply, power production, recreation, and other environmental resources;

- Provide mainstream U.S. users of Colorado River water, particularly those in the Lower Basin states, a greater degree of predictability with respect to the amount of annual water deliveries in future years, particularly under drought and low reservoir conditions; and
- Provide additional mechanisms for the storage and delivery of water supplies in Lake Mead to increase the flexibility of meeting water use needs from Lake Mead, particularly under drought and low reservoir conditions (USBR 2007).

In October 2020, USBR released a *Review of the Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead* (*7D Review*; USBR 2020a). The *7D Review* acknowledged the operational stability provided by the *2007 Interim Guidelines* and the cooperation of participating agencies in providing information to inform the post-2026 operations of Lake Powell and Lake Mead. Negotiations began in 2021 for the *2027 Interim Guidelines* that may affect available supplies of Colorado River water.[59]

Lower Basin Drought Contingency Plan

In May 2019, CVWD entered into the *Lower Basin Drought Contingency Plan Agreement* (USBR, 2019) to provide an additional mechanism to prevent Lake Mead from reaching critically low elevations by establishing that certain Colorado River users in the Lower Basin make Drought Contingency Plan (DCP) contributions if Lake Mead reaches certain elevations. The *Implementation Agreement* (CVWD 2019c) explains that the *Lower Basin Drought Contingency Plan (Lower Basin DCP*) provides that USBR's annual 24-month study's projection of Lake Mead's January 1 elevation will determine the amount of California DCP contributions for the subsequent year, if any. CVWD's portion of California DCP contributions under the *Lower Basin DCP* is seven percent (which is approximately 14,000 to 24,500 AFY). CVWD will implement its portion of the *Lower Basin DCP* contributions by storing water in MWD's Lake Mead DCP Intentionally Created Surplus (ICS) account and/or by CVWD reducing its call for the 35,000 AFY MWD SWP Transfer (refer to description above). MWD will then reduce its USBR water order by an equivalent amount in that year to cover CVWD's contribution. The *Lower Basin DCP* is a short-term plan that will end when the 2027 Interim Guidelines are implemented.[60]

[59] 2022 ISB Water Management Plan Update, pp. 6-12 to 6-13
[60] 2022 ISB Water Management Plan Update, p. 6-13

Use of Colorado River Water

The 2020 ISB Alternative Plan Update considers the QSA ramp up to ensure that all available supply is used. This requires balancing direct uses and replenishment deliveries against the available Colorado River supply (less conveyance and regulatory water losses). This *Alternative Plan Update* considers two Colorado River delivery scenarios:

1. **Historical hydrology conditions** – Full ramp up of the *2003 QSA* entitlement, along with transfers where there are agreements in place. These assumptions are used only in the baseline scenario in Chapter 7, *Numerical Model and Plan Scenarios*.
2. **Climate change conditions** – Full ramp up of the *2003 QSA* entitlement and transfers, minus CVWD's portion of California's *Lower Basin DCP* contribution increasing from 14,500 AFY to 24,500 AFY. These assumptions are used in all future project scenarios in Chapter 7, *Numerical Model and Plan Scenarios*.

To fully utilize the Colorado River water entitlement, the GSAs propose several source substitutions (replacing existing groundwater pumping with Canal water deliveries) and replenishment projects that can be found in Chapter 11 of the 2020 ISB Alternative Plan Update.[61]

4.3.2.2 State Water Project Exchange Water

The SWP is managed by the California Department of Water Resources (DWR) and includes 705 miles of aqueduct and conveyance facilities extending from Lake Oroville in Northern California to Lake Perris in Southern California. The SWP has contracts to deliver 4.172 million AFY to the State Water Contractors. The State Water Contractors consist of 29 public entities with long-term contracts with DWR for all, or a portion of, their water supply needs. In 1962 and 1963, DWA and CVWD, respectively, entered contracts with the State of California for a total of 61,200 AFY of SWP water.[62]

SWP water has been an important component of the region's water supply mix since CVWD and DWA began receiving and recharging SWP exchange water at the WWR-GRF. Starting in 1973, CVWD and DWA began exchanging their SWP water with MWD for Colorado River water delivered via MWD's Colorado River Aqueduct. Because CVWD and DWA do not have a physical connection to SWP conveyance facilities, MWD takes delivery of CVWD's and DWA's SWP water, and in exchange, delivers an equal amount of Colorado River water to the Whitewater Service Connections (for recharge

[61] 2022 ISB Water Management Plan Update, p. 6-13
[62] 2022 ISB Water Management Plan Update, p. 6-13

at WWR-GRF and MC-GRF). The exchange agreement was most recently re-established in the 2019 *Amended and Restated Agreement for Exchange and Advance Delivery of Water* (CVWD, 2019a).[63]

SWP Table A Amounts

Each SWP contract contains a "Table A" exhibit that defines the maximum annual amount of water each contractor can receive excluding certain interruptible deliveries. DWR uses Table A amounts to allocate available SWP supplies and some SWP project costs among the contractors. Each year, DWR determines the amount of water available for delivery to SWP contractors based on hydrology, reservoir storage, the requirements of water rights licenses and permits, water quality, and environmental requirements for protected species in the Sacramento-San Joaquin River Delta (Delta). The available supply is then allocated according to each SWP contractor's Table A amount.[64]

CVWD's and DWA's collective increments of Table A water are listed in **Table 4-5**. Original Table A SWP water allocations for CVWD and DWA were 23,100 AFY and 38,100 AFY, respectively, for a combined amount of 61,200 AFY. CVWD and DWA obtained a combined 100,000 AFY transfer from MWD under the 2003 Exchange Agreement. In 2004, CVWD purchased an additional 9,900 AFY of SWP Table A water from the Tulare Lake Basin Water Storage District (Tulare Lake Basin) in Kings County (DWR, 2004). In 2007, CVWD and DWA made a second purchase of Table A SWP water from Tulare Lake Basin totaling 7,000 AFY (DWR, 2007a and 2007b). In 2007, CVWD and DWA also completed the transfer of 16,000 AFY of Table A Amounts from the Berrenda Mesa Water District in Kern County (DWR, 2007c and 2007d). These latter two transfers became effective in January 2010. With these additional transfers, the total SWP Table A Amount for CVWD and DWA is 194,100 AFY.[65]

Previously, the 100,000 AFY MWD Transfer obtained under the *2003 Exchange Agreement* included a "Call Back" component that allowed MWD to call-back the 100,000 AFY and assume the entire cost of delivery if it needed the water. In 2019, the *Amended and Restated Agreement for Exchange and Advance Delivery of Water* (CVWD, 2019a) ended MWD's right to call back that 100,000 AFY of Table A water.[66]

[63] 2022 ISB Water Management Plan Update, p. 6-14
[64] 2022 ISB Water Management Plan Update, p. 6-14
[65] 2022 ISB Water Management Plan Update, p. 6-14
[66] 2022 ISB Water Management Plan Update, p. 6-14

Table 4-5
State Water Project Table A Amounts (AFY)[67]

	Original SWP Table A	MWD Transfer	Tulare Lake Basin Transfer #1	Tulare Lake Basin Transfer #2	Berrenda Transfer	Total
CVWD	23,100	88,100	9,900	5,250	12,000	138,350
DWA	38,100	11,900	-	1,750	4,000	55,750
Total:	**61,200**	**100,000**	**9,900**	**7,000**	**16,000**	**194,100**

In some years, DWA and CVWD carry over SWP water to the following year by storing it in San Luis Reservoir. This carryover water is SWP water that is allocated to a State Water Contractor and approved for delivery in a given year but was not able to be delivered to the Contractor by the end of that year. This water is exported from the Delta, but instead of being delivered to the Contractor, it is stored in the SWP's share of San Luis Reservoir south of the Delta, when space is available, for the Contractor to use in the following year. This variability is reflected in the historical delivery values but does not affect supply projections.[68]

Other SWP Water Types

There are other types of SWP water that can be purchased, such as individual water purchase opportunities and transfers/exchanges. These may be conveyed to CVWD and DWA as available, but no commitments exist.[69]

Yuba Accord

In 2008, CVWD and DWA entered into separate agreements with DWR for the purchase and conveyance of supplemental SWP water under the Yuba River Accord Dry Year Water Purchase Program (Yuba Accord). This program provides dry year supplies through a water purchase agreement between DWR and Yuba County Water Agency, which settled long-standing operational and environmental issues over instream flow requirements for the lower Yuba River. The amount of water available for purchase varies annually and is allocated among participating SWP contractors based on their Table A amounts. CVWD and DWA may purchase up to 1.72 percent and 0.69 percent, respectively, of available Yuba Accord water, in years it is made available.[70]

[67] 2022 ISB Water Management Plan Update, Table 6-4
[68] 2022 ISB Water Management Plan Update, p. 6-15
[69] 2022 ISB Water Management Plan Update, p. 6-15
[70] 2022 ISB Water Management Plan Update, p. 6-15

Yuba Accord deliveries have varied from zero in multiple years to a total of 2,664 AFY to CVWD and DWA in 2013. Over the 10-year period from 2010-2019, the average annual amount of Yuba Accord water purchased by the GSAs was 651 AFY. This *Alternative Plan Update* assumes the same 10-year average of Yuba Accord deliveries annually through 2045.[71]

Article 21

Article 21 water (described in Article 21 of the SWP water contracts), "Interruptible Water", is water that State Water Contractors may receive on a short-term basis in addition to their Table A water if they request it in years when it is available. Article 21 water is used by many Contractors to help meet demands in low allocation years. Article 21 water is not available every year, amounts vary when it is available, and is proportionately allocated among participating Contractors. The availability and delivery of Article 21 water cannot interfere with normal SWP operations and cannot be carried over for delivery in a subsequent year.[72]

The State Water Contractors believe that as reliability increases over time with the operation of the Delta Conveyance Facility (see description below), that Article 21 water will become more available to Contractors for purchase. The 2020 ISB Alternative Plan Update assumes that once the Delta Conveyance Facility is constructed, approximately 10,600 AFY in Article 21 will be made available to DWA and CVWD annually.[73]

<u>Advance Deliveries</u>

The 1984 *Advance Delivery* A*greement* (amended in 2019 by the *Amended and Restated Agreement for Exchange and Advance Delivery of Water* [CVWD 2019a]) allows MWD to deliver up to 800,000 AFY of Colorado River water to be credited against its future SWP exchange water obligations. Advance deliveries of exchange water are highly variable and concentrated in wet years, with the ISB providing the majority of storage. The Advance Delivery Account balance for 2003 – 2019 ranged from 44,601 acre-feet (AF) in 2009 to 391,155 AF in 2019. As of January 2020, there was 353,946 AF stored in MWD's Advance Delivery account in the Indio Subbasin.[74]

[71] 2022 ISB Water Management Plan Update, p. 6-15
[72] 2022 ISB Water Management Plan Update, p. 6-15
[73] 2022 ISB Water Management Plan Update, p. 6-16
[74] 2022 ISB Water Management Plan Update, p. 6-16

Supply Reliability

SWP supplies vary annually due to weather and runoff variations in Northern California and regulatory limitations on exports from the Delta.

Delta Exports

The SWP's and Central Valley Project's (CVP; managed by USBR) exports from the Delta have decreased since 2005 due to several key environmental decisions. While the SWP primarily serves the State's population and economic growth, the CVP serves the State's agricultural industry. In 2005, the U.S. Fish and Wildlife Service (USFWS) released a Biological Opinion that Delta export (combined SWP and CVP) pumping operations would not jeopardize the continued existence of the Delta smelt, a small, endangered fish endemic to the Delta. Environmental groups challenged the action and in May 2007, federal Judge Oliver Wanger ruled that the Biological Opinion was faulty in its assumptions and needed to be performed again. In 2008, the USFWS and National Marine Fisheries Service (NMFS) released a new Biological Opinion that addressed Delta fisheries, restricting operations of the SWP and CVP diversion pumps. In 2009, Wanger struck down the USBR acceptance of the new Biological Opinion, saying USBR failed to comply with the National Environmental Policy Act (NEPA) related to cutbacks in water exports for Central Valley farmers.[75]

In 2009, the Sacramento-San Joaquin Delta Reform Act of 2009 (Delta Reform Act) established the Delta Stewardship Council to create a comprehensive, long-term, legally enforceable plan to guide management of the Delta's water and environmental resources. The Delta Plan (Delta Stewardship Council, 2013) includes policies and recommendations to achieve the "coequal goals," which means the two goals of providing more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem. In 2016, USBR and DWR developed the California WaterFix, a twin-tunnels alternative for conveying flows across the natural channels of the Delta, focused on conveyance and ecosystem improvements to significantly reduce reverse flows and fish species impacts associated with the existing south Delta intakes. In 2019, USFWS and NMFS issued revised Biological Opinions (USFWS, 2020) to address California WaterFix. Concurrently, USBR issued the 2018 Addendum (USBR, 2018) to the 1986 Coordinated Operations Agreement (USBR, 1986) with accompanying SWP and CVP operations changes which reduced SWP exports and increased CVP exports, along with more conservative operation of Lake Oroville. Most recently, in 2019, Governor Newsom directed state agencies to proceed with

[75] 2022 ISB Water Management Plan Update, p. 6-17

modernizing Delta conveyance with a single tunnel project (see DCF description below).[76]

SWP Reliability

State Water Contractors are required to submit annual delivery schedules to the DWR for a suite of potential water allocations; for example, 15 percent, 30 percent, 50 percent, 60 percent, and 100 percent were provided for calendar year 2021. DWR makes an initial SWP Table A allocation for planning purposes, typically in December, prior to the start of each calendar year. Throughout the year, as additional information regarding water availability becomes available and DWR performs hydrologic analyses, the SWP allocation and delivery estimates are updated. Typically, the final SWP allocation for the year is derived by June, and although not typical, can still be updated into the Fall. **Table 4-6** presents the historical draft and final Table A allocations over the past 20 years (i.e., 2002 to 2021). Note that CVWD's and DWA's contracted Table A amounts increased substantially in 2005 and again in 2010.[77]

Final SWP allocations between 2002 and 2021 have ranged from a high of 100 percent in 2006 to a low of five percent in 2014 and again in 2021. The reliability of SWP deliveries has declined since 2007 when Judge Wanger overturned the Biological Opinion regarding Delta export pumping operations. This decision significantly impacted DWR's ability to convey SWP supplies across the Delta for export. Since the 2007 Wanger decision, SWP final allocations have averaged 45 percent annually. This period has also been marked by six critically dry years.[78]

DWR's *Final SWP Delivery Capability Report 2019* (DWR, 2020a) was released in August 2020. The delivery reliability of water from the SWP system is an important component for the SWP Contractors' water supply planning. SWP delivery amounts were modeled for the *2019 SWP Delivery Capability Report* using the CalSim II simulation model that incorporates the historical range of hydrologic conditions from Water Years 1922 through 2003. DWR's analysis determined that long-term average SWP deliveries across all water years through 2015 was 2,414,000 AF, or 58 percent of the maximum of the 4,133,000 AFY available for export from the Delta.[79] By using this 82-year historical flow record, the delivery estimates modeled for existing

[76] 2022 ISB Water Management Plan Update, p. 6-17
[77] 2022 ISB Water Management Plan Update, p. 6-17
[78] 2022 ISB Water Management Plan Update, pp. 6-17 to 6-18
[79] While 4,173,000 AFY is the current combined maximum Table A mount, 4,133,000 AFY is the SWP's maximum Table A water available for export from the Delta excluding Butte County and Yuba City (DWR, 2020a).

conditions reflect a reasonable range of potential hydrologic conditions from wet years to critically dry years.[80]

Table 4-6
Historical SWP Table A Allocations, CVWD and DWA (2002-2021)

Year	100% Table A Volume Max Contract (AFY)[1]	Water Year Type	SWP Initial Allocation (%)	SWP Final Allocation (%)
2002	61,200	Dry	20%	70%
2003	61,200	Above Normal	20%	90%
2004	71,100	Below Normal	35%	65%
2005	171,100	Above Normal	40%	90%
2006	171,100	Wet	55%	100%
2007	171,100	Dry	60%	60%
2008	171,100	Critically Dry	25%	35%
2009	171,100	Dry	15%	40%
2010	194,100	Below Normal	5%	50%
2011	194,100	Wet	25%	80%
2012	194,100	Above Normal	60%	65%
2013	194,100	Critically Dry	30%	35%
2014	194,100	Critically Dry	5%	5%
2015	194,100	Critically Dry	10%	20%
2016	194,100	Above Normal	10%	60%
2017	194,100	Above Normal	20%	85%
2018	194,100	Critically Dry	15%	35%
2019	194,100	Above Normal	10%	75%
2020	194,100	Below Normal	10%	20%
2021	194,100	Critically Dry	5%	5%
20-Year Average:			**24%**	**54%**
14-Year Average Since Wanger:			**20%**	**45%**

[1] Source: DWR 2018, Bulletin 132-18, Appendix B Table B-4
[2] Source: DWR 2018, Bulletin 132-18, Appendix B Table B-5B

DWR's analysis further showed a decreasing trend seen in the future long-term average. The *Technical Addendum to the 2019 SWP Delivery Capability Report* (DWR, 2020b) provides a "Future Conditions with Climate Change and 45 cm Sea Level Rise Scenario" which projects a further decrease in SWP delivery over time. Although the *2019 SWP Delivery Capability Report* estimates delivery reliability of 58 percent based on the long-term average, this *Alternative Plan Update* recognizes the

[80] 2022 ISB Water Management Plan Update, pp. 6-19

significant reduction in reliability associated with climate change and Delta export litigation and instead assumes 45 percent reliability through the planning horizon.[81]

Delta Conveyance Facility

The Delta Conveyance Facility (DCF) is a DWR project that would improve SWP reliability and result in increased deliveries in the future. The existing SWP water conveyance facilities in the Delta, which include Clifton Court Forebay and the Banks Pumping Plant, enable DWR to divert water to the California Aqueduct. The DCF project includes the construction and operation of new conveyance facilities in the Delta, primarily a new tunnel to bypass existing natural channels used for conveyance. New intake facilities would be located in the north Delta along the Sacramento River between Freeport, California, and the confluence with Sutter Slough. A new tunnel would convey water from the new intakes to the existing Banks Pumping Plant and potentially the federal Jones Pumping Plant, both in Byron, California, in the south Delta. The new facilities would provide an alternate location for diversion of water from the Delta and would be operated in coordination with the existing south Delta pumping facilities.[82]

Construction of the DCF will improve water supply reliability for State Water Contractors by addressing in-Delta conveyance, with its myriad of constraints. Because the SWP currently relies on the Delta's natural channels to convey water, it is vulnerable to earthquakes, climate change, and pumping restrictions established to protect in-stream species and habitats. Certain pumping restrictions in the south Delta can prevent the SWP from reliably capturing water when it is available, especially in wet weather. The DCF would add new diversions in the north Delta to promote a more resilient and flexible SWP in the face of unstable future conditions. Combined with the current through-Delta method, the addition of DCF is referred to as the "dual conveyance" system.[83]

CVWD and DWA have approved a 2-year agreement to advance their share of funding for DCF planning and design costs. The *Agreement in Principle for the Delta Conveyance Facility* was approved in November 2020, as outlined in **Table 4-7** below. A preliminary estimate of the DCF benefits is 500,000 AFY. DWA and CVWD approved their participation levels of 1.52 percent and 3.78 percent, respectively. This restores 26,500 AFY in SWP deliveries to CVWD and DWA over and above current conditions, allocated between 60 percent to Table A and 40 percent to Article 21.

[81] 2022 ISB Water Management Plan Update, p. 6-20
[82] 2022 ISB Water Management Plan Update, p. 6-20
[83] 2022 ISB Water Management Plan Update, p. 6-21

With DCF construction, SWP reliability is anticipated to increase to 59 percent as an annual average. DCF deliveries are assumed to begin in year 2040.[84]

Table 4-7
DCF Supply Amounts[85]

Description	CVWD	DWA	Total
DCF Additional Supply (%)	3.78%	1.52%	5.30%
Annual Estimate (AFY)	**18,900**	**7,600**	**26,500**
Table A Supply (AFY)	11,340	4,560	15,900
Article 21 Supply (AFY)	7,560	3,040	10,600

Lake Perris Dam Seepage Recovery Project

In 2017, MWD and DWR began preliminary planning for recovery of seepage below the Lake Perris Dam and delivery of the recovered water to MWD in addition to its current allocated Table A water. The project is composed of installing a series of five pumps placed down-gradient from the face of the Lake Perris Dam that will pump water that has seeped from the lake into the groundwater. The recovered water will be pumped into a collection pipeline that discharges directly into MWD's Colorado River Aqueduct south of Lake Perris.[86]

CVWD and DWA were invited to partner in the project with MWD, and the parties signed an agreement with DWR in 2021 for funding of environmental analysis, planning, and preliminary design. An additional agreement (or amendment to the existing *Exchange Agreement*) will be needed to exchange a proportional share of the recovered seepage water, as outlined in **Table 4-8** below, for Colorado River water delivered by MWD to WWR-GRF and MC-GRF (MWD, 2020) through MWD's Colorado River Aqueduct. The project is estimated to recover approximately 7,500 AFY, with 2,752 AFY for delivery to CVWD and DWA, and is anticipated to begin delivery in 2023.[87]

[84] 2022 ISB Water Management Plan Update, pp. 6-21 to 6-22
[85] 2022 ISB Water Management Plan Update, Table 6-7
[86] 2022 ISB Water Management Plan Update, p. 6-22
[87] 2022 ISB Water Management Plan Update, p. 6-22

Table 4-8
Lake Perris Seepage Recovery Amounts[88]

Description	MWD	CVWD	DWA	Total
Percent of Lake Perris Dam Seepage Recovery (%)	63.30%	32.3%	4.4%	100%
Annual Estimate (AFY)	4,747	2,425	328	7,500

Sites Reservoir Project

The Sites Reservoir Project would capture, and store stormwater flows from the Sacramento River for release in dry years. Sites Reservoir would be situated on the west side of the Sacramento Valley, approximately 10 miles west of Maxwell, CA. When operated in coordination with other Northern California reservoirs such as Shasta, Oroville, and Folsom, which function as the backbone to both the SWP and the Central Valley Project, Sites Reservoir would increase flexibility and reliability of statewide water supplies in drier periods.[89]

In 2019, CVWD and DWA both entered into an agreement with the Sites Project Authority for the next phase of planning for the Sites Reservoir (Sites Project Authority, 2019; 2020). The Sites Project Authority's goals are to make water supply and storage capacity available to water purveyors within the Sacramento River watershed, and in other areas of California, who are willing to purchase water supply from the Sites Reservoir Project. CVWD and DWA are participating members at 10,000 AFY and 6,500 AFY levels, respectively, as shown in **Table 4-9**. The 2020 ISB Alternative Plan Update assumes approximately 30 percent conveyance losses, for total delivery of 11,550 AFY to CVWD and DWA beginning in 2035.[90]

Table 4-9
Sites Reservoir Supply Amounts[91]

Description	CVWD	DWA	Total
Percent of Sites Reservoir Supply (%)	5.2%	3.4%	8.6%
Annual Estimate (AFY)	10,000	6,500	16,500

[88] 2022 ISB Water Management Plan Update, Table 6-8
[89] 2022 ISB Water Management Plan Update, p. 6-22
[90] 2022 ISB Water Management Plan Update, pp. 6-22 to 6-23
[91] 2022 ISB Water Management Plan Update, Table 6-9

SWP Delivery to Subbasins

All SWP Exchange water delivered to DWA and CVWD is recharged at WWR-GRF in the ISB and at MC-GRF in the MCSB. According to the *2014 Mission Creek Water Management Agreement* (CVWD and DWA, 2014), this includes any water that is paid for or planned to be paid for by the SWP tax or split between the RAC paid by groundwater producers in the West Whitewater River Subbasin Management Area (which includes CVWD's West Whitewater River Subbasin Area of Benefit [AOB] and DWA's West Whitewater River Subbasin AOB) and the Mission Creek Subbasin Management Area (which includes CVWD's Mission Creek Subbasin AOB and DWA's Mission Creek Subbasin AOB). As such, this includes Table A, Article 21, and Yuba Accord water, in addition to any future increase in Table A reliability (i.e., DCF), Lake Perris Seepage, and Sites Reservoir. Available SWP Exchange water allocated to MC-GRF and WWR-GRF is based on proportional assessable production between the Mission Creek Subbasin Management Area and the West Whitewater River Subbasin Management Area, to be balanced over a 20-year period beginning December 2004. In 2020, total assessable production in the Mission Creek Subbasin Management Area (inclusive of CVWD's Mission Creek AOB and DWA's Mission Creek AOB) was 14,244 AF, while total assessable production in the West Whitewater River Subbasin Management Area (again inclusive of CVWD's West AOB and DWA's West AOB) was 153,979 AF (CVWD 2020). Based on a cumulative total of 168,223 AF in assessable production between the two management areas, this resulted in an 8 percent/92 percent split between the Mission Creek and West Whitewater River management areas in 2020. As shown in **Table 4-10**, the projected allotment of SWP exchange water to the two management areas was calculated as 8 to 10 percent to MC-GRF and 90 to 92 percent to WWR-GRF. Urban growth and associated water demand in the Mission Creek Subbasin will result in slightly more SWP Exchange water being delivered to that Subbasin over time. The 2020 ISB Alternative Plan Update is coordinated with the 2020 MC Alternative Plan Update to establish production estimates and associated SWP delivery estimates for the two management areas through 2045 planning horizon.[92]

[92] 2022 ISB Water Management Plan Update, p. 6-23

Table 4-10
Forecast Split of SWP Delivery to WWR-GRF and MC-GRF
Based on Production[93]

Assessable Production	2020	2025	2030	2035	2040	2045
West WWR Management Area (AFY)	150,336	155,338	160,640	165,955	170,754	175,202
% West WWR Management Area	92%	92%	91%	91%	91%	90%
Mission Creek Management Area (AFY)	13,281	14,369	15,455	16,543	17,717	18,892
% Mission Creek Management Area	8%	8%	9%	9%	9%	10%
Total West WWR + Mission Creek (AFY)	**163,617**	**169,707**	**176,095**	**182,498**	**188,471**	**194,093**

Use of SWP Exchange Water

The 2020 ISB Alternative Plan Update accounts for all anticipated SWP Exchange water to be recharged at WWR-GRF and MC-GRF (as described above) to ensure that all available supply is used. In order to fully use available SWP exchange supplies, the GSAs will continue to replenish groundwater at maximum delivery levels and pursue additional SWP supplies as they become available. The 2020 ISB Alternative Plan Update considers two SWP Exchange delivery scenarios:

1) **Historical hydrology conditions** – Table A deliveries at 45 percent through 2045 based on average SWP reliability since the 2007 Wanger decision and uncertainty about the future of Delta exports. These assumptions are used only in the baseline scenario in Chapter 7, *Numerical Model and Plan Scenarios*.
2) **Climate change conditions** – Table A deliveries at 45 percent in 2020 based on the 2007 Wanger decision, then reduced by -1.5 percent through straight line projection from 2020 to 2045 due to forecast climate changes. These assumptions are used in all future project scenarios in Chapter 7, *Numerical Model and Plan Scenarios*.

Scenario modeling described in Chapter 7 of the 2020 ISB Alternative Plan Update assumes annual variability of Table A deliveries associated with different projected climate years. However, Yuba Accord, Lake Perris Seepage, Sites Reservoir, and DCF supplies are assumed at their full anticipated amounts each year. The projected estimates for all potential SWP Exchange supplies are shown in **Table 4-11**.

[93] 2022 ISB Water Management Plan Update, Table 6-10

Table 4-11
Forecast of SWP Table A Supplies to WWR-GRF and MC-GRF[94]

Existing SWP Supplies	2020	2025	2030	2035	2040	2045
Table A Amount	194,100	194,100	194,100	194,100	194,100	194,100
Assumed SWP Reliability	45%	45%	45%	45%	45%	45%
Average Table A Deliveries w/ Assumed SWP Reliability	**87,345**	**87,345**	**87,345**	**87,345**	**87,345**	**87,345**
Yuba Accord	651	651	651	651	651	651
Sum of Existing SWP Supplies	**87,996**	**87,996**	**87,996**	**87,996**	**87,996**	**87,996**
Estimated Replenishment (AFY)a						
WWR-GRF Replenishment	80,853	80,546	80,273	80,019	79,724	79,431
MC-GRF Replenishment	7,143	7,450	7,723	7,977	8,272	8,565
Future SWP Supplies						
Lake Perris Seepage	0	2,752	2,752	2,752	2,752	2,752
Sites Reservoir	0	0	0	11,550	11,550	11,550
Delta Conveyance Facility (Additional SWP Table A / Article 21)	0	0	0	0	0	26,500
Sum of Existing + Future SWP Supplies	**88,647**	**91,399**	**91,399**	**102,949**	**102,949**	**129,449**
Estimated Replenishment (AFY)a						
WWR-GRF Replenishment	81,451	83,660	83,377	93,617	93,272	116,849
MC-GRF Replenishment	7,196	7,739	8,022	9,332	9,677	12,600

Additional 35,000 AFY MWD/SWP Transfer under the QSA is accounted for under Colorado River water above (see Table 6-3) and though replenished at WWR-GRF, that supply is not accounted for in replenishment volumes in this table.

4.3.2.3 Surface Water

Surface water in the MCSB, GHSA, and DHSSB includes streamflow in addition to runoff from several drainage areas. The precipitation that occurs within the tributary watersheds of the Planning Area either evaporates, is consumed by native vegetation, percolates directly into underlying alluvium and fractured rock, or becomes runoff. A portion of the flow percolating into the soil and bedrock of the mountain watersheds surrounding the MCSB, GHSA, and DHSSB eventually becomes subsurface inflow to these groundwater bodies.[95]

[94] 2022 ISB Water Management Plan Update, Table 6-11
[95] 2020 MC Alternative Plan Update, p. 4-2

Natural recharge in the MCSB, GHSA, and DHSSB occurs as infiltrated surface water flows and subsurface inflows. Due to the relatively high evapotranspiration rates compared to precipitation, recharge from direct precipitation on the valley floor and in the low-lying hills at the northwest part of the MCSB (east of Whitewater River) is considered to be negligible. Surface water flow in the MCSB, GHSA, and DHSSB consists of temporary or intermittent streams that originate in the San Bernardino and Little San Bernardino mountains.[96] The District does not use, or plan to use, self-supplied surface water as part of its water supply.

4.3.2.4 Recycled Water

MSWD operates two wastewater treatment plants. The Horton Wastewater Treatment Plant (Horton WWTP) with a capacity of 2.3 million gallons per day (MGD) and the average daily flow metered to the plant in 2020 was 2.0 MGD. The Horton WWTP uses an extended aeration process for treatment and disposes of secondary wastewater, which is not disinfected, in adjacent percolation/evaporation ponds. The Desert Crest Wastewater Treatment Plant with a capacity of 0.18 MGD and the average daily flow to the plant in 2020 was metered at 0.05 MGD. The facility operates similarly to the Horton WWTP using an aeration basin for treatment and disposes of the secondary wastewater, which is not disinfected, by way of percolation/evaporation ponds.[97]

The District prepared a Recycled Water Program Development Feasibility Study in 2018 in which treatment and distribution alternatives and recycled water demands were identified. It was determined that recycled water infrastructure could feasibly be implemented for groundwater recharge, and, subsequently, to supply existing and future irrigation demands and offset a portion of potable water demands. Recycled water can be used for groundwater basin replenishment and favorably impacts water balance calculations.[98]

Due to the success of its septic to sewer program, the District is constructing the MSWD Regional Water Reclamation Facility (RWRF) to meet increasing wastewater demands. In its initial phase, the RWRF will use a sequence batch reactor process for treatment and disposal of the secondary wastewater, which is not disinfected, in adjacent percolation/evaporation ponds located within the plant over the GHSA. The District plans to produce recycled water meeting Title 22 standards with tertiary treatment facilities in the subsequent phase. The primary recycled water demands are foreseen to be replenishment of the MCSB and public green areas, golf courses

[96] 2020 MC Alternative Plan Update, p. 4-5
[97] 2020 Coachella Valley RUWMP, p. 8-15
[98] 2020 Coachella Valley RUWMP, p. 8-17

and playing fields that were identified as part of the 2018 study. Consistent with recycled water demands that have been identified and estimated system wastewater flows, it is envisioned that the recycled water system including the RWRF will be expanded to accommodate a system recycled water system demand of 5,000 AFY by 2045.[99]

4.3.2.5 Desalinated Water

Desalination has been identified as a potential solution for increasing water supplies and reducing groundwater overdraft for the Coachella Valley region. However, desalination requires complicated technologies and is a high energy consuming technology. Desalination offers many potential benefits including increases water supply and reliability during drought periods, reduced dependency on imported supplies by developing a local supply source, protection of public health, and facilitates more recycling and reuse, given the lower salinity of the source. MSWD does not anticipate the future use of desalinated water within its service area, as the backbone facilities and infrastructure needed for desalination are not economically feasible.[100]

4.3.2.6 Water Exchanges and Transfers

The District has not entered into any agreements for the transfer or exchange of water. However, the District cooperates with DWA and MWD for the Desert Water Agency/Coachella Valley Water District (DWCV) SWP Table A Transfer and the DWCV Advance Delivery Program.[101]

4.3.3 Summary of Water Supply Sources

MSWD currently receives 100 percent of its water supply from groundwater production and does not purchase imported water from a water wholesaler. However, CVWD and DWA are remediating the overdraft condition of the groundwater in the Upper Coachella Valley by replenishment with Colorado River and SWP Exchange Water from MWD. District groundwater meets all Federal and State primary and secondary water quality standards without treatment (other than chlorination for disinfection), with the exceptions that groundwater from Well Nos. 26A and 34 is treated at each well site to meet the primary water quality standard for uranium. Construction of the RWRF is in progress and expected to be operational in late 2023, with tertiary treatment facilities for recycled water to be included in a subsequent

[99] 2020 Coachella Valley RUWMP, p. 8-17
[100] 2020 Coachella Valley RUWMP, p. 8-19
[101] 2020 Coachella Valley RUWMP, p. 8-19

phase and anticipated to accommodate a recycled water demand of 1,210 AFY. Projected District water supplies through 2045 are shown in **Table 4-12**.[102]

Table 4-12
Current and Projected Water Supplies

Water Supply Source	Additional Detail	Projected Water Supply				
		2025	2030	2035	2040	2045
Groundwater (not desalinated)	All Subbasins	8,996	9,754	10,513	11,504	12,495
Recycled Water		0	1,210	2,200	3,600	5,000
Total:		**8,996**	**10,964**	**12,713**	**15,104**	**17,495**

4.4 Analysis of Water Supply and Demand

As noted herein, the supply and demand analyses for the Green Day Village Development are based in large part on the 2020 Coachella Valley RUWMP and the 2020 MC Alternative Plan Update. The 2020 Coachella Valley RUWMP was prepared in accordance with the Urban Water Management Planning Act, as most recently amended by SBx7-7. Among other analyses, the 2020 Coachella Valley RUWMP and the 2020 MC Alternative Plan Update identified total projected water demands and demonstrate that total projected water supplies will be sufficient to meet those demands through 2045 and beyond. Also discussed above, the 2020 MC Alternative Plan Update found that by continuing the ongoing projects and management actions (PMAs) and implementing the planned Near-term and Future PMAs the MCSB can maintain sustainable groundwater levels through the planning period (2045). In fact, the Near-term Projects are the only PMAs required to maintain sustainability, but Future Projects may address additional demands past 2045.[103]

As outlined in the Sections above, water conservation is a major component of future water management in the Coachella Valley. As presented above, MSWD is committed to reducing their per capita urban water demand in accordance with SBx7-7. In addition, MSWD's 2009 Water Efficient Landscape Guidelines establish effective water efficient landscape requirements for newly installed and rehabilitated landscapes and reduce demands.

All water delivered to end users is obtained from the groundwater basin, which is continuously recharged with both natural and supplemental imported supplies as

[102] 2020 Coachella Valley RUWMP, p. 8-21
[103] 2020 MC Alternative Plan Update, p. 8-24

discussed above. As provided throughout this WSA, and in the 2020 MC Alternative Plan Update, the managed basin is capable of ensuring a sufficient and sustainable water supply to meet existing water demands and the demands associated with projected growth throughout the region (specifically including MSWD's service area and the proposed Green Day Village Development) during normal, single-dry and multiple-dry periods throughout the 20-year projection and beyond. In addition, CVWD, DWA and MSWD developed many PMAs to maximize the water resources available to them including recharge of its Colorado River and SWP supplies, recycled water, and various conservation measures, such as tiered water rates, a landscaping ordinance, outreach and education. The 2020 MC Alternative Plan Update and DWA/CVWD replenishment assessment programs, in which MSWD fully participates, establish a comprehensive and managed effort to eliminate the overuse of local groundwater supplies.

The analysis herein evaluates whether the total projected water supplies available to MSWD, by virtue of its membership and participation in the regional efforts as outlined in the 2020 MC Alternative Plan Update, are sufficient to meet the water demands of the Green Day Village Development in addition to other existing and planned future uses within MSWD's service area. The supply and demand assessment includes three scenarios over the 20-year projection as required by SB 610: normal water years, single-dry years, and multiple-dry years. As presented in **Section 3**, MSWD's water demands are projected to grow from 8,269 AFY in 2020 to 17,495 AFY in 2045. As shown in **Section 2**, the estimated Project demands are 525 AFY, representing approximately 5.7 percent of MSWD's projected growth. **Tables 4-13, 4-14, and 4-15** outline the water supply and demand scenarios for normal, single-dry and multiple-dry years respectively. As described in the 2020 Coachella Valley RUWMP, it is expected that conservation programs will prevent an increase in demands during single dry-year and multiple dry-year supply scenarios.

Table 4-13

Normal Water Year Supply and Demand Comparison (AFY)

	2025	2030	2035	2040	2045
Supply Totals	8,996	10,874	12,713	15,104	17,495
Demand Totals	8,996	10,874	12,713	15,104	17,495
Difference	0	0	0	0	0

Table 4-14
Single-Dry Year Supply and Demand Comparison (AFY)

	2025	2030	2035	2040	2045
Supply Totals	8,996	10,874	12,713	15,104	17,495
Demand Totals	8,996	10,874	12,713	15,104	17,495
Difference	0	0	0	0	0

Table 4-15
Multiple-Dry Year Supply and Demand Comparison (AFY)

		2025	2030	2035	2040	2045
Multiple-Dry Year First Year Supply	**Supply totals**	8,996	10,874	12,713	15,104	17,495
	Demand totals	8,996	10,874	12,713	15,104	17,495
	Difference	0	0	0	0	0
Multiple-Dry Year Second Year Supply	**Supply totals**	8,996	10,874	12,713	15,104	17,495
	Demand totals	8,996	10,874	12,713	15,104	17,495
	Difference	0	0	0	0	0
Multiple-Dry Year Third Year Supply	**Supply totals**	8,996	10,874	12,713	15,104	17,495
	Demand totals	8,996	10,874	12,713	15,104	17,495
	Difference	0	0	0	0	0
Multiple-Dry Year Fourth Year Supply	**Supply totals**	8,996	10,874	12,713	15,104	17,495
	Demand totals	8,996	10,874	12,713	15,104	17,495
	Difference	0	0	0	0	0
Multiple-Dry Year Fifth Year Supply[5]	**Supply totals**	8,996	10,874	12,713	15,104	17,495
	Demand totals	8,996	10,874	12,713	15,104	17,495
	Difference	0	0	0	0	0

Note: Recycled water used for groundwater recharge is presented as a supply and a demand for consistency with DWR reporting framework.

Note: The 2020 Coachella Valley RUWMP participating agencies collaborate on groundwater management plans for long-term sustainability. During a normal year, single-dry year, or five-dry year period, the agencies could produce additional groundwater if demands exceeded the estimates shown here.

4.5 Conclusions

The water supply for the proposed Green Day Village Development Project will be the MCSB and GHSA in the Coachella Valley with supplemental water supplies that are recharged to the Basin on an ongoing basis. Groundwater storage will be used in dry years to support potential differences between demands and supply. The groundwater basin has a capacity of approximately 2.6 million acre-feet and is estimated to contain about 1.4 million acre-feet, simulating the benefits of a very large conjunctive use reservoir. It is capable of meeting the water demands of the surrounding communities for extended periods during normal, single-dry and multiple-dry year conditions.

As discussed in the 2020 MC Alternative Plan Update, the 2020 Coachella Valley RUWMP, and this WSA; CVWD, DWA and MSWD have many programs to maximize the water resources available, including but not limited to recharge of the basin using Colorado River and SWP supplies, direct use and recharge of recycled water, and comprehensive water conservation practices such as tiered water rates, landscaping ordinances, outreach and education. The DWA/CVWD groundwater replenishment programs establish a comprehensive and managed effort to reduce and eliminate overuse of local groundwater resources. These programs allow MSWD, CVWD, and DWA to maintain the groundwater basin as its primary water supply and to recharge the groundwater basin as its other supplies are available and needed to meet existing and projected demands within its overall service areas.

Based on the information, analysis, and conclusions documented in this WSA, substantial evidence exists to support a determination that the total projected water supplies available to MSWD during normal, single dry, and multiple dry water years during a 20-year projection are sufficient to meet the projected water demand associated with the proposed Green Day Village Development Project, in addition to MSWD's existing and planned future uses, including commercial and industrial uses. This conclusion is based on the volume of water available in the regional aquifer, MSWD's current and planned local water management programs and projects, and DWA and CVWD's current and planned local and regional management programs and water supply projects to supplement and sustain regional groundwater supplies. Additionally, MSWD, CVWD, and DWA have committed sufficient resources to further implement the primary elements of the 2020 Coachella Valley RUWMP and the 2020 MC Alternative Plan Update, including source substitution, water conservation, and purchases of additional water supplies. Furthermore, as set forth in this WSA and the Green Day Village Development plans, the Project will incorporate various water conservation elements adopted by MSWD in accordance with SBx7-7. These include conservation elements for indoor and outdoor uses throughout the Project. These efforts may further reduce the ultimate water demands of the Project.

As provided by Water Code section 10914, nothing in this WSA is intended to create a right or entitlement to water service or any specific level of water service, and nothing herein is intended to impose, expand or limit any duty concerning MSWD's obligation to provide certain levels of service to existing or future potential customers.[104] MSWD retains the right, in its sole discretion, to evaluate from time to time, whether the projected demands associated with the Project continue to fall within MSWD's forecasted demand or planned future uses.

[104] Water Code § 10914(a)-(b).

SECTION 5
WATER SUPPLY VERIFICATION

5.1 General

The Green Day Village Development is proposing more than 500 dwelling units along with 78,691 square feet of commercial development and is therefore pursuant to the Subdivision Map Act as the requirements of Senate Bill 221. Further discussion can be found in **Section 1.1**.

5.2 Water Source

The Project's residential and commercial water demands are proposed to be provided by groundwater. The Water Supply Verification (WSV) addresses: (1) information included in the 2020 Coachella Valley RUWMP; (2) issues related to groundwater recharge of non-groundwater sources, namely Colorado River water and SWP Exchange Water; and (3) consideration of the litigation regarding the Quantification Settlement Agreement.

5.3 Supporting Documentation

The WSV relies on the 2020 Coachella valley RUWMP, as permitted by Government Code 66473.7(c).

5.4 Factors of Reliability

5.4.1 General

Government Code 66473.7(a) requires that when determining "sufficient water supply", the following factors be considered:

- The availability of water supply over a historical record of at least 20 years
- The applicability of MSWD's Water Shortage Contingency Analysis which includes actions to be undertaken by the public water system in response to water supply shortages.
- The reduction of water supply to a specific user by ordinance or resolution.
- The reasonable amount of groundwater supply that can be relied upon, considering its natural sources as well as the supporting recharge sources within agreements for Colorado River water and SWP Exchange Water.

5.4.2 Historical Availability of Supply

MSWD currently receives 100 percent of its water supply from the subbasins within the Coachella Valley Groundwater Basin, which underlies the District's water service area. While none of the groundwater basins in the Coachella Valley are adjudicated, both the Mission Creek Subbasin (MCSB) and Indio Subbasin (ISB) have been identified under the and the Sustainable Groundwater Management Act (SGMA) as medium-priority basins. Nevertheless, there are no legal agreements limiting MSWD's pumping from any of the subbasins. The District has been dependent upon groundwater as its only source of domestic water supply for several decades. The 2020 Coachella Valley RUWMP reviewed the historical use of water in the District. In 2020, MSWD total groundwater production was 8,268 acre-feet and current (2022) groundwater production is at approximately 7,969 acre-feet annually. Deliveries of Colorado River water and MWD SWP Exchange Water help offset the groundwater use. As of 2020, CVWD receives 402,800 AFY of Colorado River water deliveries under the QSA.[105] In addition, SWP deliveries were 39,471 AFY to the Coachella Valley in 2020.

5.4.3 Water Shortage Contingency

The MSWD has developed a Water Shortage Contingency Plan and is discussed in its 2020 Coachella Valley RUWMP. As detailed in the 2020 Coachella Valley RUWMP, during water shortages, the District has the ability to meet its demands by applying Water Conservation Stages. MSWD, and the other RUWMP participating agencies, have elected to use the six standard shortage levels included in guidance documents prepared by DWR. The six standard water shortage levels correspond to progressively increasing estimated shortage conditions (up to 10-, 20-, 30-, 40-, 50-percent, and greater than 50-percent shortage compared to the normal reliability condition). The Water Conservation Stages and action is summarized in **Table 5-1**.

[105] 2020 Coachella Valley RUWMP, p. 3-11

Table 5-1
Water Shortage Contingency Plan

Stage	Percent Supply Reduction	Description	Shortage Response Actions
1	Up to 10%	Normal water supplies	Mandatory prohibitions defined by the state, ongoing rebate programs
2	Up to 20%	Slightly limited water supplies	Outdoor water use restrictions on time of day, increased water waste patrols
3	Up to 30%	Moderately limited water supplies	Outdoor water use restrictions on days per week, restrictions on filling swimming pools
4	Up to 40%	Limited water supplies	Limits on new landscaping, expanded public information campaign
5	Up to 50%	Significantly limited water Supplies	Limits on watering of parks or school grounds
6	Greater than 50%	Severe shortage or catastrophic incident	No potable water use for outdoor purposes

The General Manager of the District shall monitor supply and demand for water on a daily basis and determine the level of the Water Conservation Stage needed. The Manager shall notify the Board of Directors of the implementation as well as the termination of the stages.

5.4.4 Reduction of Water Supply

There are no expected reductions in the water supply. This is based on, among other things, the volume of water available in the regional aquifer, MSWD's current and planned local water management programs and projects, and DWA and CVWD's current and planned local and regional management programs and water supply projects to supplement and sustain regional groundwater supplies. Additionally, MSWD, CVWD, and DWA have committed sufficient resources to further implement the primary elements of the 2020 Coachella Valley RUWMP and the 2020 MC Alternative Plan Update, including source substitution, water conservation, and purchases of additional water supplies.

5.4.5 SWP and Colorado River Water

The Coachella Valley Groundwater Basin has the capacity to meet the Project's needs and future demands presented in the 2020 Coachella Valley RUWMP and the 2020 MC Alternative Plan Update. If additional conservation and/or supply limitations are necessary, the Project would adhere to any and all limitations associated with this potential reduction in supply.

5.5 Impacts to Other Projects

The Green Day Village Development is within the projected water demands of the 2020 Coachella Valley RUWMP and should not have a significant impact on other potable and non-potable water user. In addition, the Project will not affect the water supply for future housing projects.

The Project will comply with MSWD's Water Efficient Landscaping Guidelines. Based on the findings of the WSV, it is expected that the impacts to the groundwater basin are fully mitigated.

5.6 Rights to Groundwater

While none of the groundwater basins in the Coachella Valley are adjudicated, both the MCSB and ISB have been identified under the Sustainable Groundwater Management Act (SGMA) as medium-priority basins. Nevertheless, there are no legal agreements limiting MSWD's pumping from any of the subbasins. The District has been dependent upon groundwater as its only source of domestic water supply for several decades and can continue to do so for needed supply of the Project.

5.7 Verification

This WSV provides verification that adequate water supply for the Project is available, as required by California Government Code Section 66473.7.

SECTION 6
REFERENCES

California Department of Water Resources (DWR). 1964. Coachella Valley Investigation, California Department of Water Resources, Bulletin 109.

CVWD. 2003. *2003 Quantification Settlement Agreement*. October 2003.

CVWD. 2019a. *Amended and Restated Agreement Between the Metropolitan Water District of Southern California, Coachella Valley Water District, and Desert Water Agency for the Exchange and Advance Delivery of Water*.

CVWD. 2019b. *Second Amendment to Delivery and Exchange Agreement Between Metropolitan and Coachella for 35,000 Acre-Feet*.

CVWD. 2019c. *Drought Contingency Plan Implementation Agreement between Metropolitan Water District of Southern California and Coachella Valley Water District*.

CVWD and DWA. 2014. *Mission Creek Water Management Agreement*. Dated as of July 15, 2014.

DWR, 2003. California's Groundwater, Bulletin 118

DWR. 2004. *Amendment No. 19 to Water Supply Contract between the State of California Department of Water Resources and Coachella Valley Water District* (Tulare Lake Basin Water Storage District transfer) dated February 23, 2004.

DWR. 2007a. *Amendment No. 20 to Water Supply Contract between the State of California Department of Water Resources and Coachella Valley Water District* (Tulare Lake Basin Water Storage District transfer) dated May 9, 2007.

DWR. 2007b. *Amendment No. 19 to Water Supply Contract between the State of California Department of Water Resources and Desert Water Agency* (Tulare Lake Basin Water Storage District transfer) dated May 9, 2007.

DWR. 2007c. *Amendment No. 21 to Water Supply Contract between the State of California Department of Water Resources and Coachella Valley Water* District (Berrenda Mesa Water District transfer) dated September 26, 2007.

DWR. 2007d. *Amendment No. 20 to Water Supply Contract between the State of California Department of Water Resources and Desert Water Agency* (Berrenda Mesa Water District transfer) dated September 26, 2007.

DWR. 2020a. *Final State Water Project Delivery Capability Report 2019*. August 26, 2020.

DWR. 2020b. *Technical Addendum to Final State Water Project Delivery Capability Report 2019*. August 26, 2020.

International Boundary and Water Commission (IBWC). 1973. Minute No. 242.

Metropolitan Water District (MWD). 2020. Summary of Lake Perris Seepage Recovery Project Sharing Agreement Terms, DRAFT – As of November 26, 2019.

Secretary of the Interior. 2003. Colorado River Water Delivery Agreement: Federal Quantification Settlement Agreement for the Purposed of Section 5(B) of Interim Surplus Guidelines. October 10, 2003.

Sites Project Authority. 2019. 2019 Reservoir Project Agreement, Dated as of April 1, 2019.

Sites Project Authority. 2020. First Amendment to 2019 Reservoir Project Agreement, Dated as of January 1, 2020.

State of California Natural Resources Agency Department of Water Resources. 2022. The State Water Project Final Delivery Capability Report 2021.

Todd Groundwater and Woodard & Curran. 2021. 2022 Indio Subbasin Water Management Plan Update. Prepared for CVWD, Et al.

Todd Groundwater and Woodard & Curran. April 2022. 2022-2023 Engineer's Report on Water Supply and Replenishment Assessment.

U.S. Department of the Interior Bureau of Reclamation (USBR). 1922. *Colorado River Compact, 1922*.

USBR. 1928. *Boulder Canyon Project Act*.

USBR. 1931. 1931 *Boulder Canyon Project Agreement*.

USBR. 1968. *1968 Colorado River Basin Project Act*.

USBR. 1986. *1986 Agreement Between the United States of America and the State of California for Coordinated Operation of the Central Valley Project and the State Water Project*.

USBR. 2007. *Record of Decision for the Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead. December 2007*.

USBR. 2018. *2018 Addendum to the Coordinated Operation Agreement, Central Valley Project/State Water Project*.

USBR. 2019. *Lower Basin Drought Contingency Plan Agreement*.

USBR. 2020a. *Draft Report – Review of the Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead*. October.

USBR. 2020 (website). Boulder Canyon Operations Office – Programs and Activities, Lower Colorado River Water Accounting Reports.

U.S. Fish and Wildlife Service. 2020 (website). Water Project Biological Opinions.

Wood Env. and Kennedy/Jenkins Cons. 2021. Mission Creek Subbasin Alternative Plan Update. Prepared for CVWD, DWA, and MSWD.

WSC, Inc. 2021. 2020 Coachella Valley Regional Urban Water Management Plan. Prepared for CVWD, Et al.

WSP USA Environment & Infrastructure Inc. 2023. Mission Creek Subbasin Annual Report for Water Year 2021-2022. Prepared for CVWD, DWA, and MSWD.

SECTION 7
ACRONYMS AND ABBREVIATIONS

AB	Assembly Bill
AF	Acre Feet
AFY	Acre Feet per Year
APA	Administrative Procedure Act
BDCP	Bay Delta Conservation Plan
BIOps	Biological Opinions
BOR	Bureau of Reclamation
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CIP	Capital Improvement Plan
CR	Colorado River
CRA	Colorado River Aqueduct
CUWCC	California Urban Water Conservation Council
CVAG	Coachella Valley Association of Governments
CVP	Central Valley Project
CVRWMG	Coachella Valley Regional Water Management Group
CVSC	Coachella Valley Stormwater Channel
CVWD	Coachella Valley Water District
CVWMP	Coachella Valley Water Management Plan
CWA	Coachella Water Authority
CWC	California Water Code
DFW	Department of Fish and Wildlife
DHS	Desert Hot Springs
DHSSB	Desert Hot Springs Subbasin
DMM	Demand Management Measures
DWR	California Department of Water Resources
EIS	Environmental Impact Statement
ESA	Endangered Species Act
FWS	Fish and Wildlife Service
GHSA	Garnet Hill Subarea
GPCD	Gallons per Capita per Day
GPD	Gallons per Day
GPM	Gallons per Minute
HDR	High Density Residential
ID	Improvement District
IID	Imperial Irrigation District
IRWMP	Integrated Regional Water Management Plan
ISB	Indio Subbasin
IWA	Indio Water Authority

LAFCO	Local Agency Formation Commission
LDR	Low Density Residential
MCL	Maximum Contaminant Limit
MCSB	Mission Creek Subbasin
MDR	Medium Density Residential
MG	Million Gallons
MGD	Million Gallons per Day
MOU	Memorandum of Understanding
MU	Mixed Use
MVP	Mid-Valley Pipeline
MWD	Metropolitan Water District of Southern California
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
PEIR	Programmatic Environmental Impact Report
PPR	Present Perfected Rights
PVID	Palo Verde Irrigation District
PWS	Public Water System
QSA	Quantification Settlement Agreement
RAC	Replenishment Assessment Charge
RCTLMA	Riverside County Transportation and Land Management Agency
RO	Reverse Osmosis
RPA	Reasonable and Prudent Alternative
RUWMP	Regional Urban Water Management Plan
RV	Recreational Vehicle
SB	Senate Bill
SCADA	Supervisory Control and Data Acquisition
SCAG	Southern California Association of Governments
SCH	State Clearinghouse
SDCWA	San Diego County Water Authority
SGPSB	San Gorgonio Pass Subbasin
SOI	Sphere of Influence
SPEIR	Subsequent Programmatic Environment Impact Report
SWP	State Water Project
SWRCB	State Water Resources Control Board
UWMP	Urban Water Management Plan
VLDR	Very Low Density Residential
VSD	Valley Sanitary District
WRP	Water Reclamation Plant
WSA	Water Supply Assessment
YCWA	Yuba County Water Agency

APPENDIX G5

FLOOD PROTECTION MEMO

PACE
Advanced Water Engineering

Technical Memorandum

REGISTERED PROFESSIONAL ENGINEER
ANDREW RONNAU
No. 72851
CIVIL
STATE OF CALIFORNIA

Date: June 12, 2023

To: Avraham Farzan - LA World Construction

From: Andrew Ronnau, PhD, PE

Re: Green Day Village Regional Flood Protection # C010

1 Introduction

Green Day Village is planned low-income housing community on 40 acres in Desert Hot Springs, California. A vicinity map is shown on Figure 1. This technical memo describes the regional flood protection analysis at a concept design level.

2 Design Authority and Floodplain Management Authority

The City of Desert Hot Springs is the review agency for project design. The project design must meet sound engineering standards. The project is planning to have one foot of freeboard, and appropriate regional flood protection measures. Certain design conditions may be established during review.

The City of Desert Hot Springs is the floodplain manager for the FEMA floodplain mapping and the NFIP. The project design must meet sound engineering standards, and must follow FEMA procedure for design and construction in a floodplain. The project is to obtain a Conditional Letter of Map Revision (CLOMR) prior to construction, and obtain a Letter of Map Revision (LOMR) after the mass grading and essential regional flood protection components have been constructed.

3 Floodplain Setting and Hydrology

The project property is located on Flood Insurance Rate Map (FIRM) Panel 06065C0895G, effective 08-28-2008. The effective FEMA mapping for the property and the surrounding area is Zone A03. The FEMA floodplain boundaries are shown on Figure 2.

The project area is subject to overland flooding from the alluvial fans approximately 5 miles to the north. Multiple documents are available containing hydrology data relevant to the project.

The FEMA mapping shows watersheds and flowlines that suggest Mission Creek, Big Morongo Wash, and Desert Hot Springs Channel as possible watersheds tributary to the project, and 100-Year flowrates are listed for those watersheds in the Riverside County Flood Insurance Study (FIS), dated 03-22-2022.

More recent studies by Northwest Hydraulics, on behalf of the Coachella Valley Water District, analyzed the overall hydrology of the valley for use in master plan drainage plan facilities design. That hydrology has been accepted by FEMA for a recently approved CLOMR. The tributary watersheds, from the NHC study, are shown with the project property on Figure 3.

4 Regional Flood Protection Design Concept

The project property is subject to broad overland flow, with possible variations caused by upstream alluvial flow migration. As such the project design concept uses elevated pads with regional flow corridors as shown on Figure 4.

FEMA does not require any freeboard for elevated pads. The City of Desert Hot springs will require one foot, or more of freeboard. The design conditions required by the City of Desert Hot Springs may be changed or revised during detailed design.

The dimensions of the design concept were adjusted, in an iterative approach, using modeling results to establish a concept design that has one foot or more of freeboard, and to check the offsite impacts to flow depth. Contours for the resultant mass grading concept are shown on Figure 4.

5 Hydraulic Analysis

Hydraulic analysis of the overland flow conditions through the project area was prepared for existing conditions and for proposed conditions. Hydraulic models were created using HEC-RAS 2D. The model domain, inflow location, existing contours and project property relative to the existing terrain are shown on Figure 5.

5.1 Topographic Data

The hydraulic analysis used 1M regional data from Intermap. The data is in State Plane, Zone 6, NAD 88 vertical datum. The data was used to create a DTM surface for the HEC-RAS model.

5.2 Model Flowrate Data

Flow data from the NHC models was used for the present hydraulic analysis. Note that accepted convention for alluvial floodplain studies is to utilize flowrates established at the alluvial apices and ignore infiltration and contribution from on the piedmont between the subject area and the alluvial apices.

The flow from the NHC hydrology includes all of the upstream watersheds that may be tributary, with a peak flowrate of 28,301 cfs. To account for possible flow migration, the inflow location from the NHC hydrology was placed approximately 4,800 feet upstream of the project property, and centered in the apparent low flow thalweg as shown on Figure 5.

5.3 Floodplain Roughness

The model roughness for existing conditions and for proposed conditions was set to 0.05 everywhere except on roads within the project boundary where it was set to 0.02.

5.4 Run Time Parameters

Inflow data from the NHC study consists of 12-hour hydrographs. The HEC-RAS 2D models were run for 14 hours using a time step of 2 seconds.

6 Results

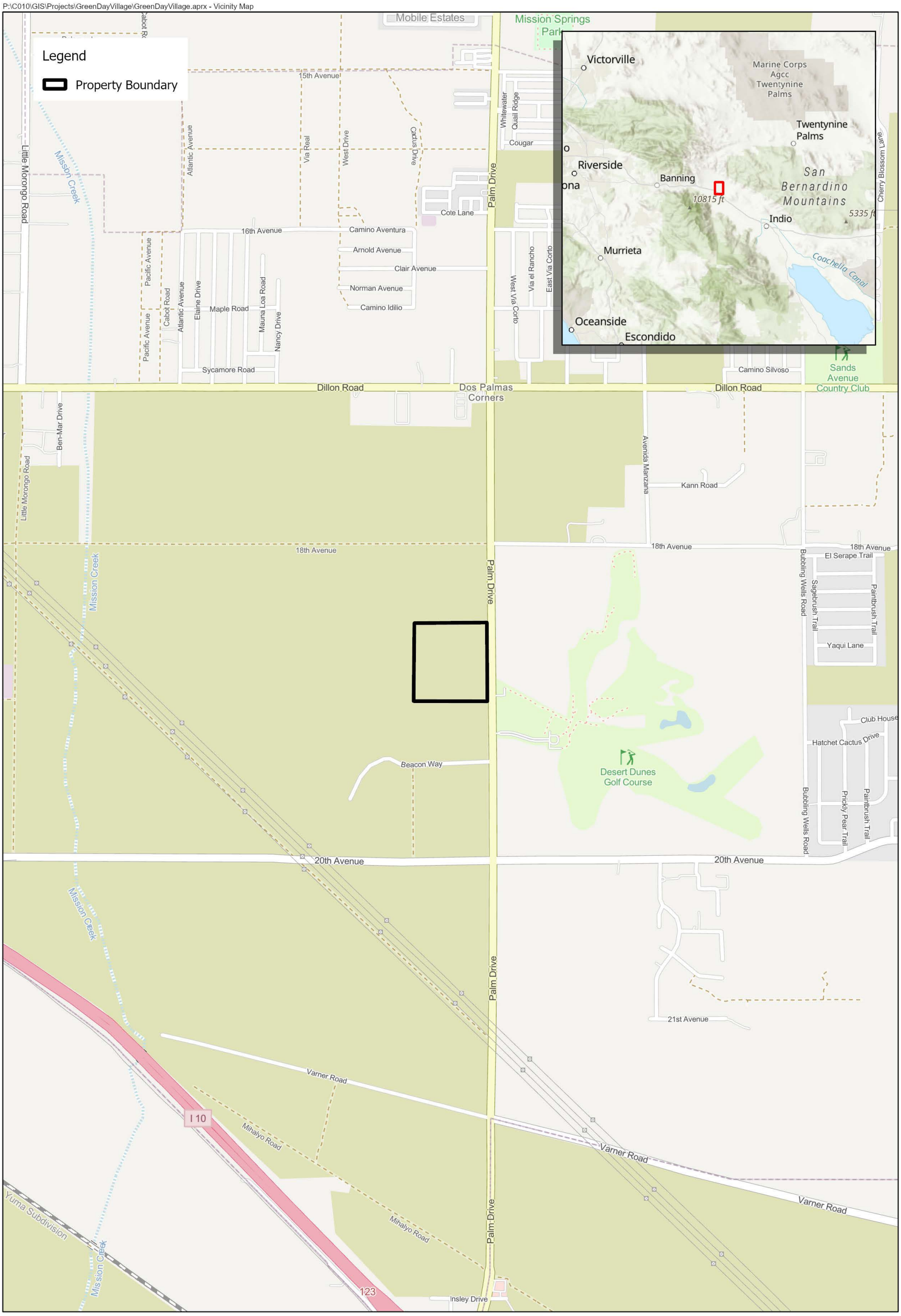
The existing conditions flow depths are shown on Figure 6 to allow a comparison with proposed conditions. Note that the part of the property near the road is higher than the rest of the property so existing flow tends to be on the west half of the property, with natural areas of weak channelization. In proposed conditions, the project grading confines the flow to the conveyance corridors, as shown on Figure 7. The depths about the proposed pads is in the range of 1-3 feet. The depth differential, Figure 8, shows that the proposed project depth impacts are all less than 1 foot, with most areas showing changes less than plus or minus 0.5 feet.

The existing and proposed flow velocity fields are shown on Figure 9 and Figure 10. In proposed conditions, the flow velocities through the conveyance corridors are moderately high, in the range of 8-10 ft/s, with some areas of velocity greater than 10 ft/s. This indicates that the project design will need to include embankment protection on the pad perimeters. The velocity differential, Figure 11, shows that velocity field impacts are mostly less than 1 ft/s, with some localized areas of greater velocity

change. If necessary, the planned grading can be refined during final design to reduce the localized areas of moderately high change.

The analysis shows that the design concept is sound and can provide regional flood protection with modestly elevated development pads. The project streets and sidewalks can be at adjusted grade to provide conveyance corridors to allow regional flow to pass through without undue impacts to neighbor properties. Note that flow conditions used in deign may change, as conditioned by the city of Desert Hot Springs, or FEMA, but the present analysis demonstrates that the concept works and can be refined to a suitable final design.

P:\C010\GIS\Projects\GreenDayVillage\GreenDayVillage.aprx - Vicinity Map



GREEN DAY VILLAGE

VICINITY MAP

PACE Advanced Water Engineering

0 750 1,500 3,000 Feet

Date: 5/9/2023

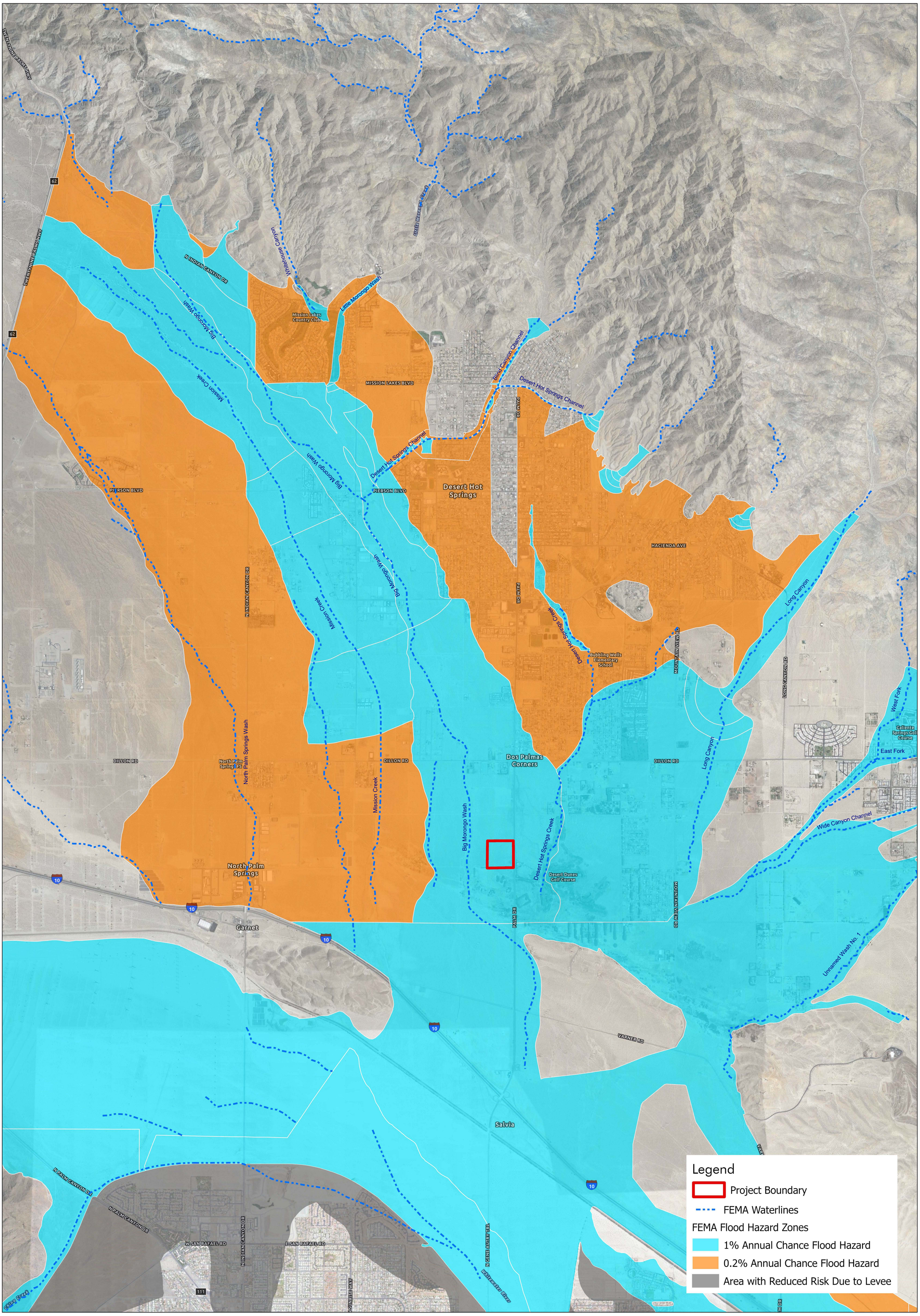
Job Number: C010

Figure 1

GREEN DAY VILLAGE

FEMA EFFECTIVE FLOOD HAZARD ZONES

Figure XX



PACE Advanced Water Engineering

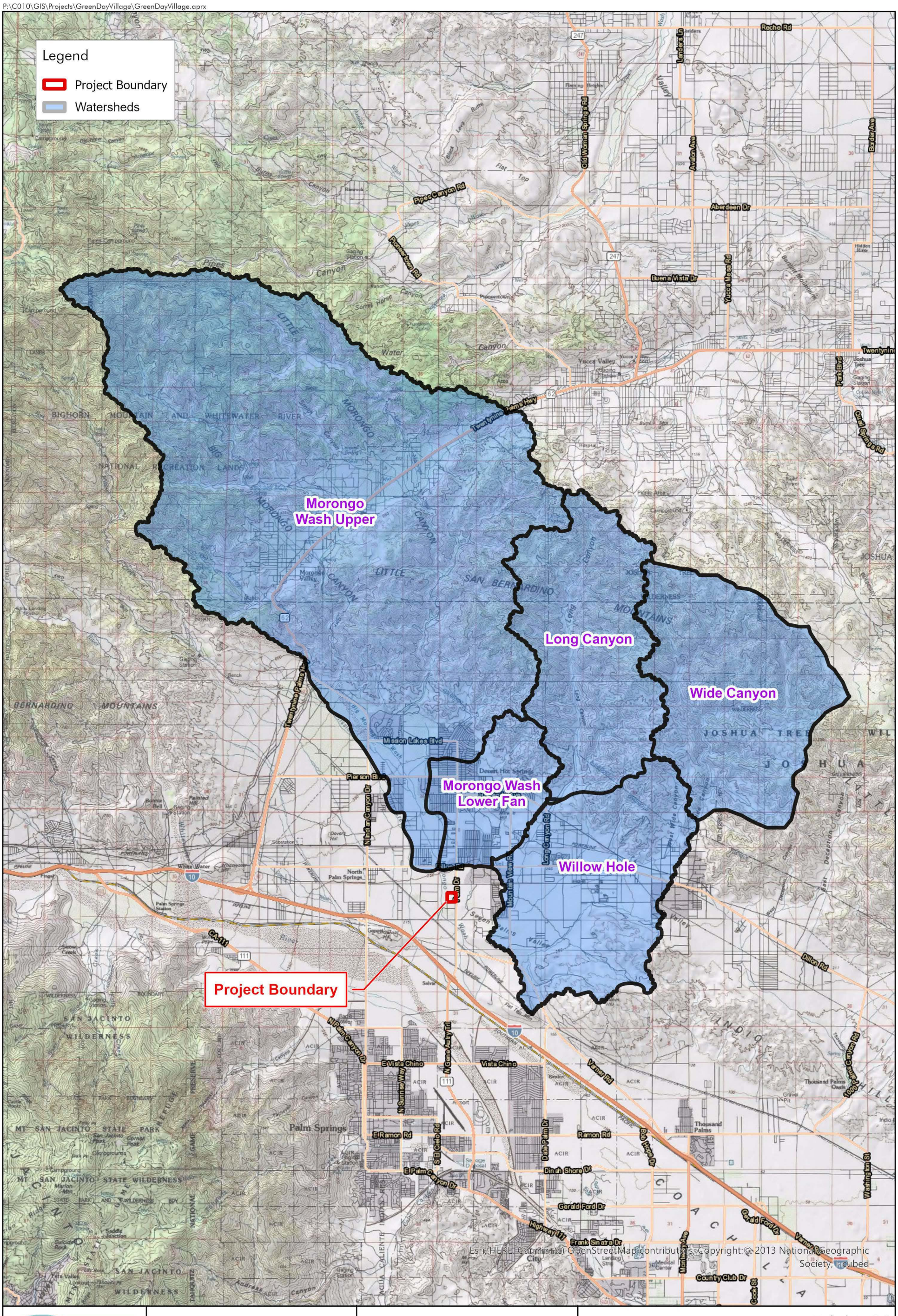
0 2,000 4,000 8,000 Feet

Date: 10/24/2022

Job Number: C010

P:\C010\GIS\Projects\GreenDayVillage\GreenDayVillage.aprx - FEMA Effective Floodplain

P:\C010\GIS\Projects\GreenDayVillage\GreenDayVillage.aprx



PACE
Advanced Water Engineering

0 1.25 2.5 5
Miles

Date: 10/24/2022

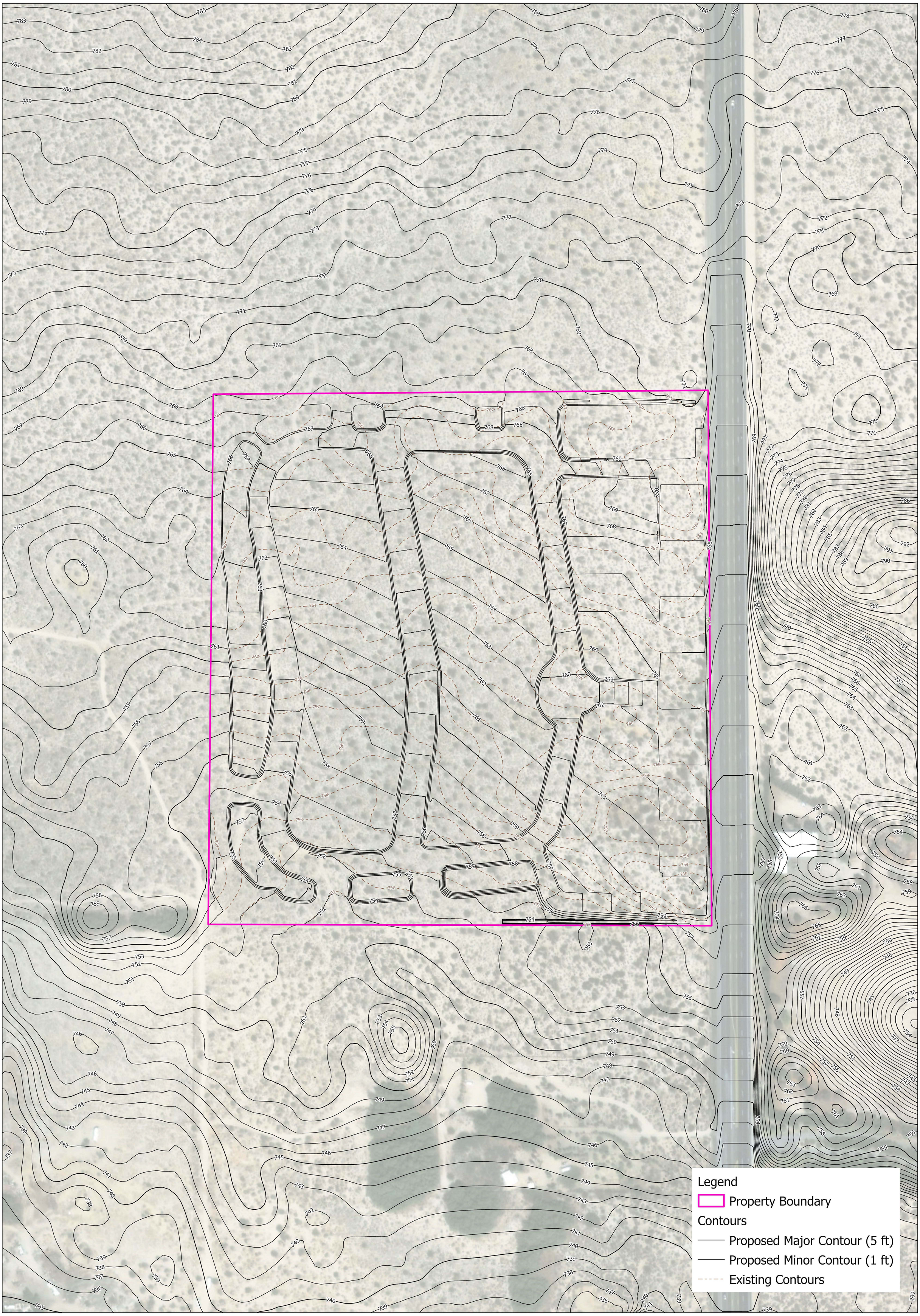
GREEN DAY VILLAGE

RIVERSIDE CO. CA

Exhibit 20

REGIONAL/RIVERINE WATERSHEDS

Job Number	Drawn By
B695	sfifield



P:\C010\GIS\Projects\GreenDayVillage\GreenDayVillage.aprx - Proposed Topographic Contours

GREEN DAY VILLAGE

PROPOSED TOPOGRAPHIC CONTOURS

PACE Advanced Water Engineering

0 100 200 400 Feet

Date: 5/9/2023

Job Number: C010

Figure XX

Legend

Inflow Location

Property Boundary

Model Domain

Topography

Major (10 ft)

Minor (2 ft)

GREEN DAY VILLAGE

MODEL WORKMAP

PACE Advanced Water Engineering

0 600 1,200 2,400 Feet

Date: 5/9/2023

Job Number: C010

Figure 5

P:\C010\GIS\Projects\GreenDayVillage\GreenDayVillage.aprx - Model Workmap

San Bernardino County, Maxar, Esri Community Maps Contributors, Loma Linda University, UC Riverside, County of Riverside, California State Parks, © OpenStreetMap, Microsoft, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, Bureau of Land Management, EPA, NPS, US Census Bureau, USDA

GREEN DAY VILLAGE

EXISTING FLOOD DEPTHS

Legend

- Property Boundary

Contours

- Major (5 ft)
- Minor (1 ft)

Existing Flood Depths (ft)

- 0 to 1
- 1 to 2
- 2 to 3
- 3 to 4
- 4 to 5
- > 5

PACE Advanced Water Engineering

0 100 200 400 Feet

Date: 6/12/2023

Job Number: C010

Figure 6

P:\C010\GIS\Projects\GreenDayVillage\GreenDayVillage.aprx - Existing Depths

GREEN DAY VILLAGE

PROPOSED FLOOD DEPTHS

Legend

- Property Boundary

Proposed Contours

- Major (5 ft)
- Minor (1 ft)

Proposed Flood Depths (ft)

- 0 to 1
- 1 to 2
- 2 to 3
- 3 to 4
- 4 to 5
- > 5

0 100 200 400 Feet

Date: 5/9/2023

Job Number: C010

Figure 7

P:\C010\GIS\Projects\GreenDayVillage\GreenDayVillage.aprx - Proposed Flood Depths

GREEN DAY VILLAGE

DEPTH DIFFERENTIAL

Figure 8

Legend

- Property Boundary

Depth Differential (ft)

Proposed - Existing

- < -2.0
- -2.0 to -1.5
- -1.5 to -1.0
- -1.0 to -0.5
- -0.5 to 0.0
- 0.0 to 0.5
- 0.5 to 1.0
- 1.0 to 1.5
- 1.5 to 2.0
- > 2.0

Contours

- Major Contour (5 ft)
- Minor Contour (1 ft)

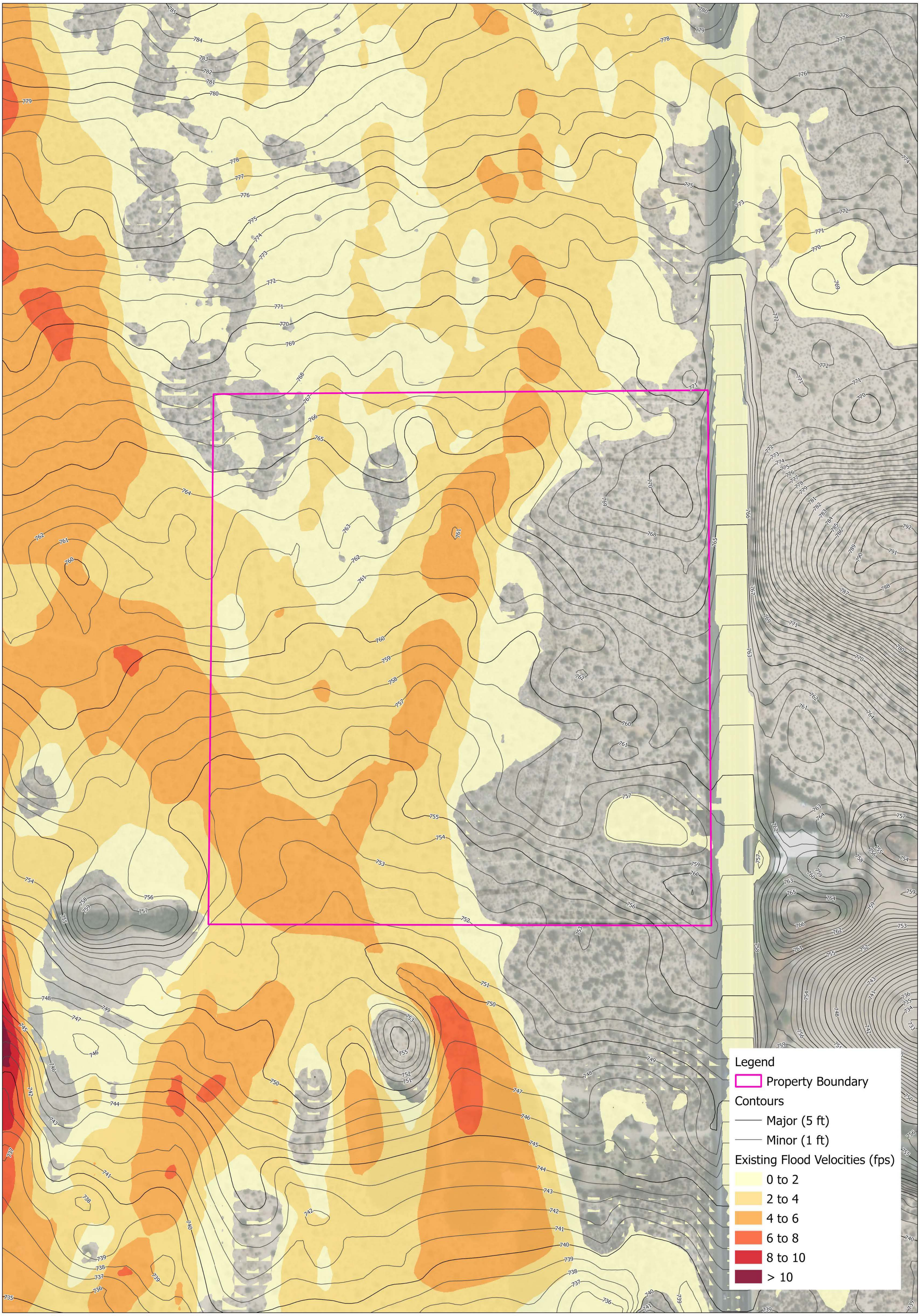
0 100 200 400 Feet

Date: 6/12/2023

Job Number: C010

PACE Advanced Water Engineering

P:\C010\GIS\Projects\GreenDayVillage\GreenDayVillage.aprx - Depth Differential



P:\C010\GIS\Projects\GreenDayVillage\GreenDayVillage.aprx - Existing Velocity

GREEN DAY VILLAGE

EXISTING VELOCITIES

PACE Advanced Water Engineering

0 100 200 400 Feet

Date: 6/12/2023

Job Number: C010

Figure 9

GREEN DAY VILLAGE

PROPOSED FLOOD VELOCITIES

Legend

- Property Boundary

Proposed Contours

- Major (5 ft)
- Minor (1 ft)

Proposed Flood Velocities (fps)

- 0 to 2
- 2 to 4
- 4 to 6
- 6 to 8
- 8 to 10
- > 10

0 100 200 400 Feet

Date: 5/9/2023

Job Number: C010

Figure 10

P:\C010\GIS\Projects\GreenDayVillage\GreenDayVillage.aprx - Proposed Velocity

Legend

Property Boundary

Velocity Differential (ft)

Proposed - Existing

< -2.0

-2.0 to -1.5

-1.5 to -1.0

-1.0 to -0.5

-0.5 to 0.0

0.0 to 0.5

0.5 to 1.0

1.0 to 1.5

1.5 to 2.0

> 2.0

Contours

Major Contour (5 ft)

Minor Contour (1 ft)

P:\C010\GIS\Projects\GreenDayVillage\GreenDayVillage.aprx - Velocity Differential

GREEN DAY VILLAGE

VELOCITY DIFFERENTIAL

PACE Advanced Water Engineering

0 100 200 400 Feet

Date: 6/12/2023

Job Number: C010

Figure 11

APPENDIX H

NOISE ANALYSIS REVISED MAY 2023

NOISE TECHNICAL REPORT
GREEN DAY VILLAGE OASIS DEVELOPMENT
DESERT HOT SPRINGS, CALIFORNIA

Prepared for:

CITY OF DESERT HOT SPRINGS

City of Desert Hot Springs
Patricia Villagomez, Associate Planner
11999 Palm Drive
Desert Hot Springs
T: 760/329-6411 x243

Prepared by:

UltraSystems Environmental Inc.
16431 Scientific Way
Irvine, CA 92618
(949) 788-4900

May 2023

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 NOISE AND VIBRATION CHARACTERISTICS 1
2.1 Characteristics of Sound 1
2.2 Noise Measurement Scales 2
2.3 Noise Attenuation 3
2.4 Vibration 3

3.0 PROJECT DESCRIPTION 4
3.1 Project Overview 4
3.2 Construction 8
3.3 Operations 9

4.0 EXISTING CONDITIONS 9
4.1 Noise Sources in the Project Area 9
4.2 Vibration Sources in the Project Area 13

5.0 REGULATORY FRAMEWORK 13
5.1 Federal 13
5.2 State of California 13
5.3 City of Desert Hot Springs 15
5.4 Vibration 17

6.0 PROJECT IMPACTS 17
6.1 Methodology 17
6.2 Thresholds of Significance for this Analysis 20
6.3 Analysis of Project Impacts 21

7.0 MITIGATION 27

LIST OF TABLES

Table 2.1-1 - Typical Sound Levels 2
Table 3.2-1 - Estimated Construction Schedule 8
Table 4.1-1 - Sensitive Receivers in Project Area 9
Table 5.2-1 - Land Use Compatibility for Community Noise Sources 14
Table 6.1-1 - Construction Equipment Noise Characteristics 18
Table 6.3-1 – Maximum Estimated Unmitigated Construction Noise Exposures at Nearest Sensitive Receivers for Phases 0-2 23
Table 6.3-2 - Traffic Increase Due to Project Operations 26
Table 6.3-3 - Vibration Levels of Typical Construction Equipment 26

LIST OF FIGURES

Figure 3.1-1 - Regional Location 5
Figure 3.1-2 - Project Site and Surroundings 6
Figure 3.1-3 - Proposed Site Plan 7
Figure 4.1-1 - Sensitive Receivers Near Project Site 11

Figure 6.3-1 - Sensitive Receiver Locations for Construction Noise Analysis.....22

ATTACHMENTS

Attachment 1 Ambient Noise Measurement Data
Attachment 2 CalEEMod Output File

1.0 INTRODUCTION

This noise technical report was prepared by UltraSystems Environmental Inc. (UltraSystems) for the Green Day Village Specific Plan, which would permit a mixed-use residential and commercial development on a 38.34-acre site on the west side of Palm Drive between 18th Avenue and 20th Avenue, in the city of Desert Hot Springs, California. The project applicant (LA World Construction of Los Angeles, California) proposes to construct and operate approximately 612 residential units. Most units would be in 92 two-story six-unit buildings, with 60 loft apartments in one two-story building. The total floor area of the residential units would be 355,218 square feet. The project proposes 77,971 square feet of commercial uses in the eastern part of the project site. It would also include five pool houses of 1,200 square feet each, a two-story community center with 8,886 square feet in floor area, and a 1,620-square-foot farm equipment building.

Construction is projected to start in January 2023, and full operation is anticipated to begin in October 2025.

One objective of this report is to assess the impacts of noise from project construction on neighboring residents and businesses. In addition, this technical report will estimate noise exposures to the surrounding community after project build-out. The following analysis provides a discussion of the fundamentals of sound; an examination of federal, state and local noise guidelines and policies; a review of existing conditions; an evaluation of potential noise and vibration impacts associated with the proposed project; and mitigation for identified significant or potentially significant impacts.

2.0 NOISE AND VIBRATION CHARACTERISTICS

2.1 Characteristics of Sound

Sound is a pressure wave transmitted through the air. It is described in terms of loudness or amplitude (measured in decibels), frequency or pitch (measured in hertz [Hz] or cycles per second), and duration (measured in seconds or minutes). The decibel (dB) scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound. The pitch of the sound is related to the frequency of the pressure vibration. Because the human ear is not equally sensitive to all frequencies, a special frequency-dependent rating scale is used to relate noise to human sensitivity. The A-weighted decibel scale (dBA) provides this compensation by discriminating against upper and lower frequencies in a manner approximating the sensitivity of the human ear. The scale is based on a reference pressure level of 20 micropascals (zero dBA). The scale ranges from zero (for the average least perceptible sound) to about 130 (for the average human pain level).

The normal range of conversation is between 34 and 66 dBA. Between 70 and 90 dBA, sound is distracting and presents an obstacle to conversation, thinking, or learning. Above 90 dBA, sound can cause permanent hearing loss. Examples of various sound levels in different environments are shown in **Table 2.1-1** (Typical Sound Levels).

Table 2.1-1
TYPICAL SOUND LEVELS

Common Sounds	A-Weighted Sound Level in Decibels	Subjective Impression
Oxygen Torch	120	Pain Threshold
Rock Band	110	
Pile Driver at 50 feet	100	Very Loud
Ambulance Siren at 100 feet	90	
Garbage disposal	80	
Vacuum Cleaner at 10 feet	70	Moderately Loud
Air Conditioner at 100 feet	60	
Quiet Urban Daytime	50	
Quiet Urban Nighttime	40	Quiet
Bedroom at Night	30	
Recording Studio	20	Just Audible
	10	Threshold of Hearing
	0	

Sources: Aviation Planning Associates. 1978. Calculations of Maximum A-weighted Sound Levels (dBA) Resulting from Civil Aircraft Operations.

A noise environment consists of a base of steady "background" noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, traffic on a major highway.

To the human ear, a sound 10 dBA higher than another, is judged to be twice as loud; 20 dBA higher is four times as loud; and so forth. According to the U.S. Environmental Protection Agency,[1] a difference of more than 3 dBA is a perceptible change in environmental noise, while a 5-dBA difference typically causes a change in community reaction, and an increase of 10 dBA is perceived by people as doubling of loudness.

2.2 Noise Measurement Scales

Several rating scales have been developed to analyze adverse effects of community noise on people. Since environmental noise fluctuates over time, these scales consider that the effect of noise on people depends largely upon the total acoustical energy content of the noise, as well as the time of day when the noise occurs. Those that are applicable to this analysis are as follows:

- L_{eq}, the equivalent noise level, is an average of sound level over a defined time period (such as 1 minute, 15 minutes, 1 hour or 24 hours). Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure.

1 Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. U.S. Environmental Protection Agency, Office of Noise Abatement and Control. March. Internet: https://nepis.epa.gov/Exe/ZyPDF.cgi/2000L3LN.PDF?Dockey=2000L3LN.PDF. Accessed October 8, 2019.

- L_{90} is a noise level that is exceeded 90 percent of the time at a given location; it is often used as a measure of "background" noise.

- L_{max} is the root mean square (RMS) maximum noise level during the measurement interval. This measurement is calculated by taking the RMS of all peak noise levels within the sampling interval. L_{max} is distinct from the peak noise level, which only includes the single highest measurement within a measurement interval.

- CNEL, the Community Noise Equivalent Level, is a 24-hour average L_{eq} with a 4.77-dBA "penalty" added to noise during the hours of 7:00 p.m. to 10:00 p.m., and a 10-dBA penalty added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime.[2] The logarithmic effect of these additions is that a 60-dBA 24-hour L_{eq} would result in a calculation of 66.7 dBA CNEL.

- L_{dn}, the day-night average noise, is a 24-hour average L_{eq} with an additional 10-dBA "penalty" added to noise that occurs between 10 p.m. and 7 a.m. The L_{dn} metric yields values within 1 dBA of the CNEL metric. As a matter of practice, L_{dn} and CNEL values are considered to be equivalent and are treated as such in this assessment.

2.3 Noise Attenuation

The noise level from a particular source generally declines as the distance to the receiver increases. Other factors such as the weather and reflecting or shielding also intensify or reduce the noise level at any given location. Typically, a single row of buildings between the receiver and the noise source reduces the noise level by about 5 dBA. The U.S. Department of Housing and Urban Development (HUD) has stated that exterior noise levels can normally be reduced by 15 dBA inside buildings constructed with no special noise insulation.[3] The USEPA estimates that residences in "warm" climates provide at least 12 dBA of exterior-to-interior noise attenuation with windows open and 24 dBA with windows closed.[4]

Noise from traffic on roads depends on the volume and speed of traffic and the distance from the traffic. A commonly used rule of thumb for traffic noise is that for every doubling of distance from the road, atmospheric spreading over "hard" or "soft" sites reduces the noise level by about 3 or 4.5 dBA, respectively. For a stationary source, the noise is reduced by at least 6 dBA for each doubling of distance. Further, because of the logarithmic nature of the decibel scale, a doubling of traffic on any given roadway or doubling a stationary source would cause a noise increase of approximately 3 dBA.

2.4 Vibration

Vibration is sound radiated through the ground. Ground-borne noise is the rumbling sound caused by the vibration of building interior surfaces. The ground motion caused by vibration is measured as

2 Technical Noise Supplement to the Traffic Noise Analysis Protocol. California Department of Transportation, Division of Environmental Analysis. September 2013, p. 2-48. Internet: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf.

3 Noise Guidebook. A Reference Document for Implementing the Department of Housing and Urban Development's Noise Policy. U.S, Department of Housing and Urban Development. 1985. Internet: https://babel.hathitrust.org/cgi/pt?id=umn.31951p00994853x&view=1up&seq=5. 1985.

4 Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. U.S. Environmental Protection Agency, Office of Noise Abatement and Control. March. Internet: https://nepis.epa.gov/Exe/ZyPDF.cgi/2000L3LN.PDF?Dockey=2000L3LN.PDF. Accessed October 8, 2019.

peak particle velocity (PPV) in inches per second. It is also measured as root-mean-square velocity, referenced as vibration decibels (VdB). Typical outdoor sources of perceptible ground-borne vibration are construction equipment and traffic on rough roads.

2.4.1 Construction Vibration

It is expected that ground-borne vibration from most project construction activities would cause only intermittent, localized intrusion. The project's construction activities most likely to cause vibration impacts are:

- **Heavy Construction Equipment:** Although all heavy, mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to buildings, the vibration is usually short-term and is not of sufficient magnitude to cause building damage. It is not expected that heavy equipment such as large bulldozers would operate closely enough to any sensitive receivers to cause vibration impact.

- **Trucks:** Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes almost always eliminates the problem.

2.4.2 Operational Vibration

The types of land uses proposed for this project do not involve sources that cause substantial ground-borne vibration. **Therefore, the project would not result in long-term significant impacts due to ground-borne vibration or noise levels. No mitigation is necessary for operational vibration impacts.**

3.0 PROJECT DESCRIPTION

3.1 Project Overview

The City of Desert Hot Springs (City) is processing an application for the Green Day Village Specific Plan, which would permit a mixed-use residential and commercial development on a 38.34-acre site on the west side of Palm Drive between 18th Avenue and 20th Avenue (APN 657280003). The City is the Lead Agency for the purposes of the California Environmental Quality Act (CEQA).

The project site is currently vacant and vegetated mostly with creosote bush – white bursage scrub. The project site is near the Desert Dunes Golf Club, which is across Palm Drive to the east; and surrounded by vacant land to the north, west and south. The City's zoning and General Plan land use designations for approximately the east half of the site are both Mixed Use Corridor (MU-C), which permits integrated residential and commercial uses including residential density of 20 to 30 units per acre. The zoning and General Plan designations for the west half of the site are both Residential High (R-H), permitting development of multifamily residential uses with densities of 20 to 30 units per acre. **Figure 3.1-1** shows the regional location of the project, and **Figure 3.1-2** shows the site area. A plot plan is provided in **Figure 3.1-3**.

Figure 3.1-1
REGIONAL LOCATION

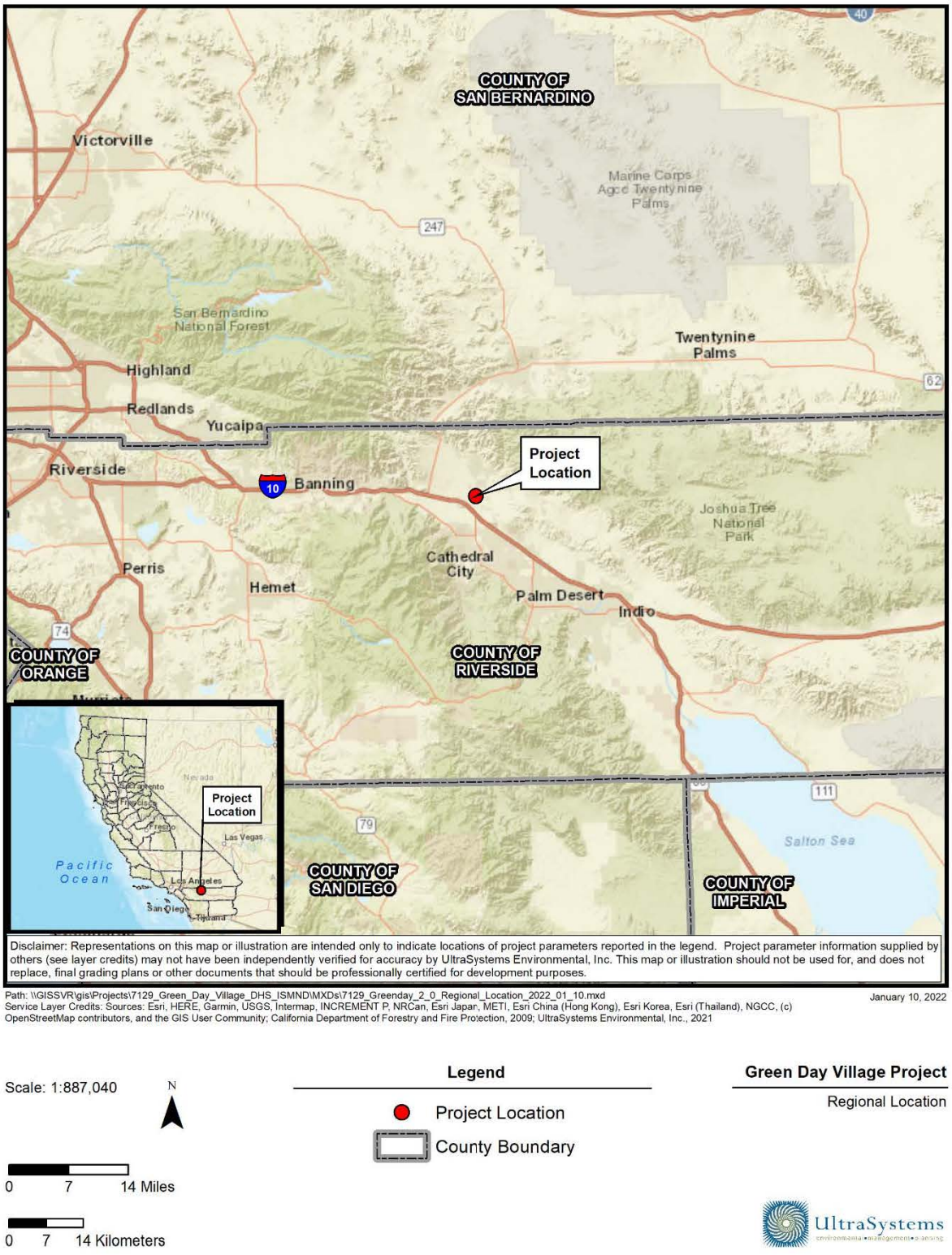


Figure 3.1-2
PROJECT SITE AND SURROUNDINGS

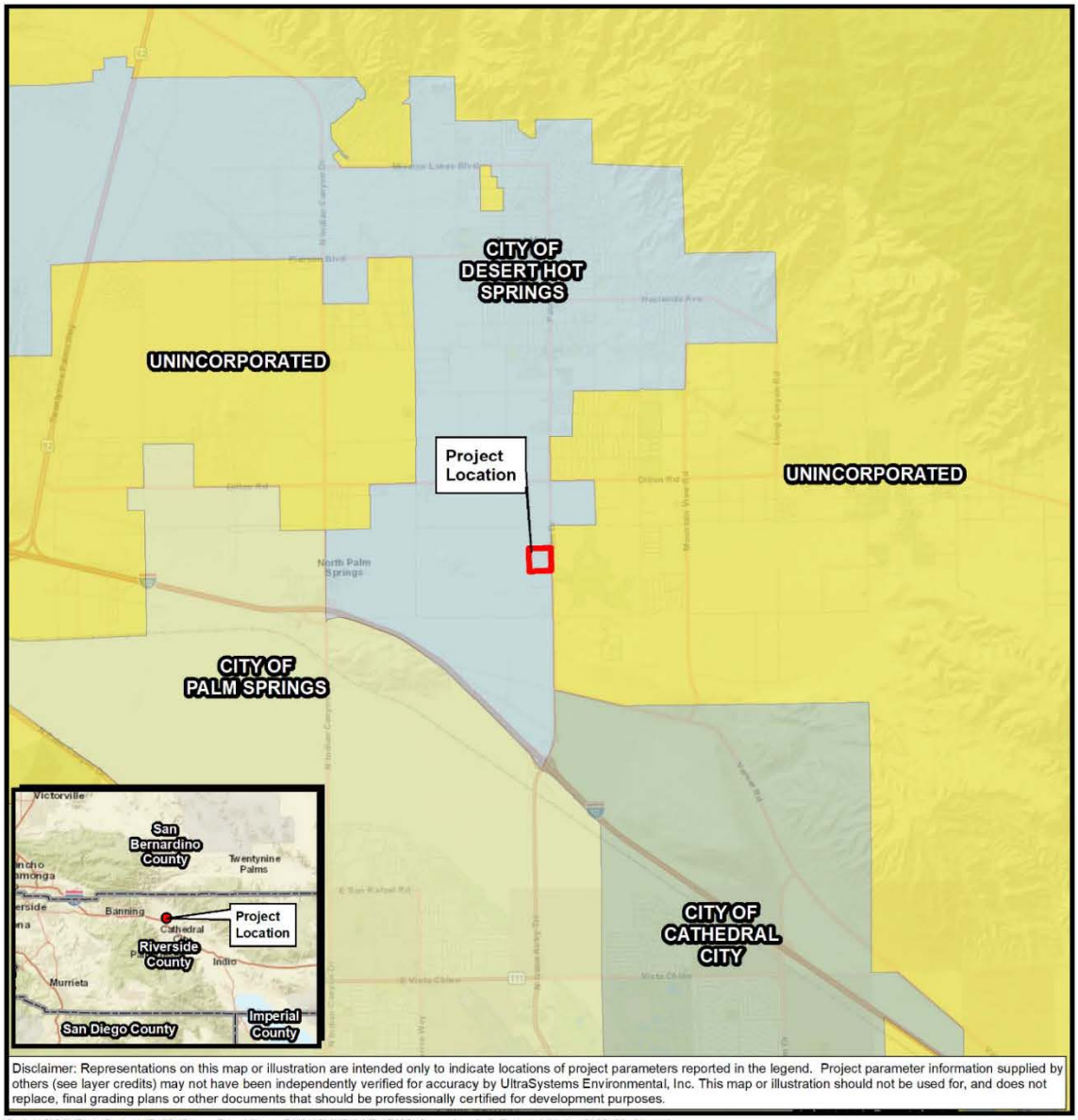
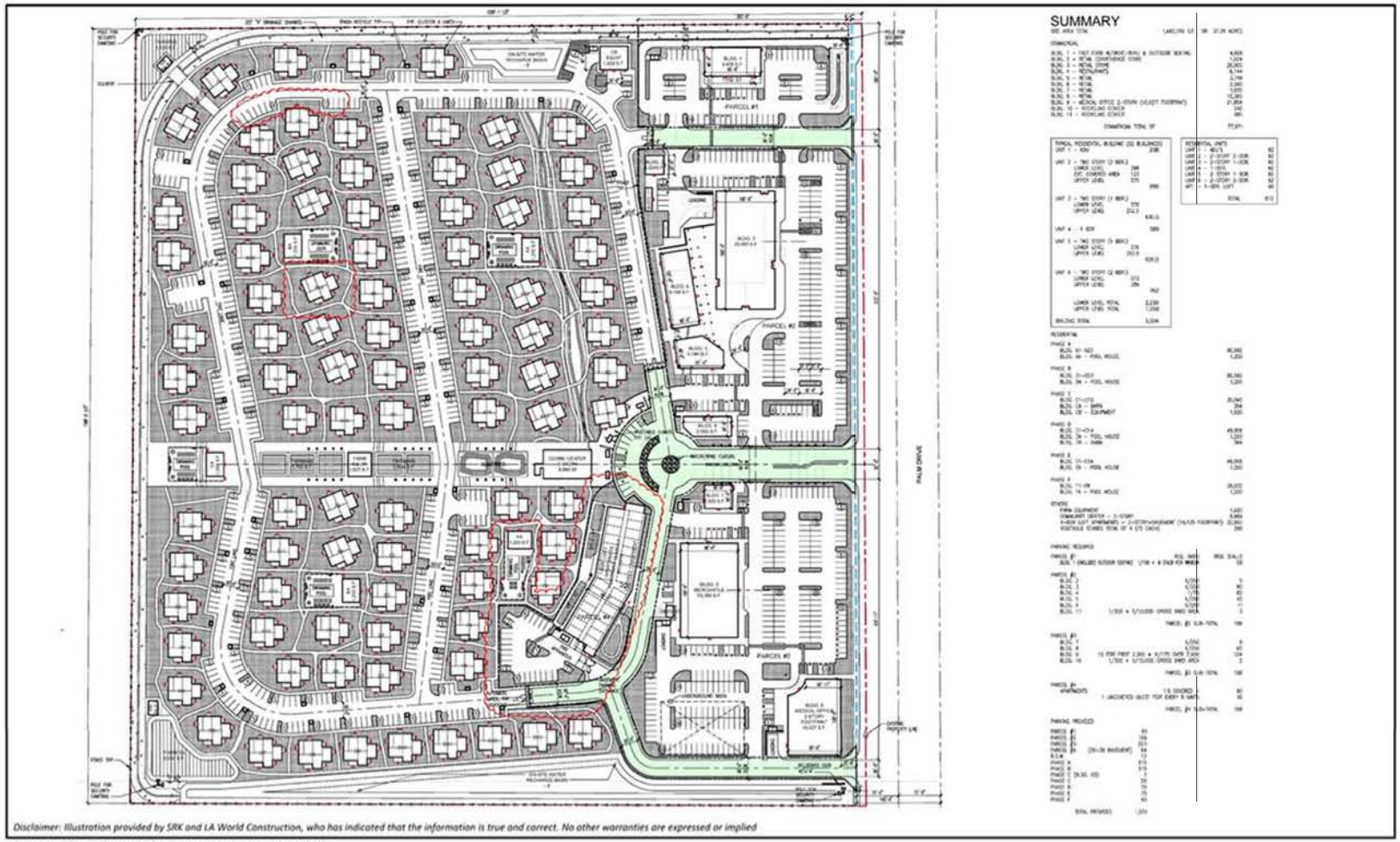


Figure 3.1-3
PROPOSED SITE PLAN



3.2 Construction

It is estimated that construction will be done in three phases for the proposed project would begin in January 2023 and end in late October 2025. The proposed project would be built in three major non-overlapping phases:

- Phase 0: Site preparation, grading, and trenching for utilities
- Phase 1: Construction of the residential portion of the project, including buildings, architectural coating, and landscaping.
- Phase 2: Construction of the commercial portion of the project, including buildings, architectural coating, and landscaping.

Table 3.2-1 shows the estimated construction schedule and equipment deployment.

Table 3.2-1
ESTIMATED CONSTRUCTION SCHEDULE

Phase	Construction Phase	Equipment Type	No. of Pieces	HP	Load Factor
Phase 0: January 2023-June 2023	Site Preparation	Rubber-Tired Dozers	3	247	0.40
		Tractors/Loaders/Backhoes	4	97	0.37
	Rough Grading	Excavators	2	158	0.38
		Graders	1	187	0.41
		Rubber Tired Dozers	1	247	0.40
		Scrapers	2	367	0.48
		Tractors/Loaders/Backhoes	2	97	0.37
	Trenching	Tractors/Loaders/Backhoes	3	97	0.37
		Trenchers	3	46	0.45
Phase 1: July 2023 – December 2024	Fine Grading	Graders	1	187	0.41
		Rubber Tired Dozers	1	247	0.40
		Tractors/Loaders/Backhoes	2	97	0.37
	Building Construction	Cranes	1	231	0.29
		Forklifts	3	89	0.20
		Generator Sets	1	84	0.74
		Tractors/Loaders/Backhoes	3	97	0.37
		Welders	1	46	0.45
	Paving	Pavers	2	130	0.42
		Paving Equipment	2	132	0.36
		Rollers	2	80	0.38
	Architectural Coating	Air Compressors	1	78	0.48
Phase 2: January 2025 – October 2025	Fine Grading	Graders	1	187	0.41
		Rubber Tired Dozers	1	247	0.40
		Tractors/Loaders/Backhoes	2	97	0.37
	Building Construction	Cranes	1	231	0.29
		Forklifts	1	89	0.20
		Generator Sets	1	84	0.74
		Tractors/Loaders/Backhoes	1	97	0.37
		Welders	3	46	0.45

Phase	Construction Phase	Equipment Type	No. of Pieces	HP	Load Factor
	Paving	Cement and Mortar Mixers	1	9	0.56
		Pavers	1	130	0.42
		Paving Equipment	1	132	0.36
		Rollers	1	80	0.38
		Tractors/Loaders/Backhoes	1	97	0.37
	Architectural Coating	Air Compressors	1	78	0.48

3.3 Operations

The project will have 612 residential units. Most units would be in 92 two-story six-unit buildings, with 60 loft apartments in one two-story building. The project proposes commercial use in the eastern part of the project site. It would also include five pool houses, a two-story community center, and a farm equipment building.

4.0 EXISTING CONDITIONS

4.1 Noise Sources in the Project Area

The project site is in a predominantly undeveloped rural residential area. The main source of ambient noise is traffic on local roadways, including Palm Drive and Dillon Road.

4.1.1 Sensitive Land Uses

Noise-sensitive receptors are buildings or areas where unwanted sound or increases in sound may have an adverse effect on people or land uses. Residential areas, motels and hotels, hospitals and health care facilities, school facilities, and parks are examples of noise receptors that could be sensitive to changes in existing environmental noise levels.

The principal existing sensitive receptors near the project are a recreational facility (golf course), a mobile home park and single-family homes. **Table 4.1-1** identifies sensitive receivers in the project vicinity. **Figure 4.1-1** shows the locations of representative sensitive receivers.

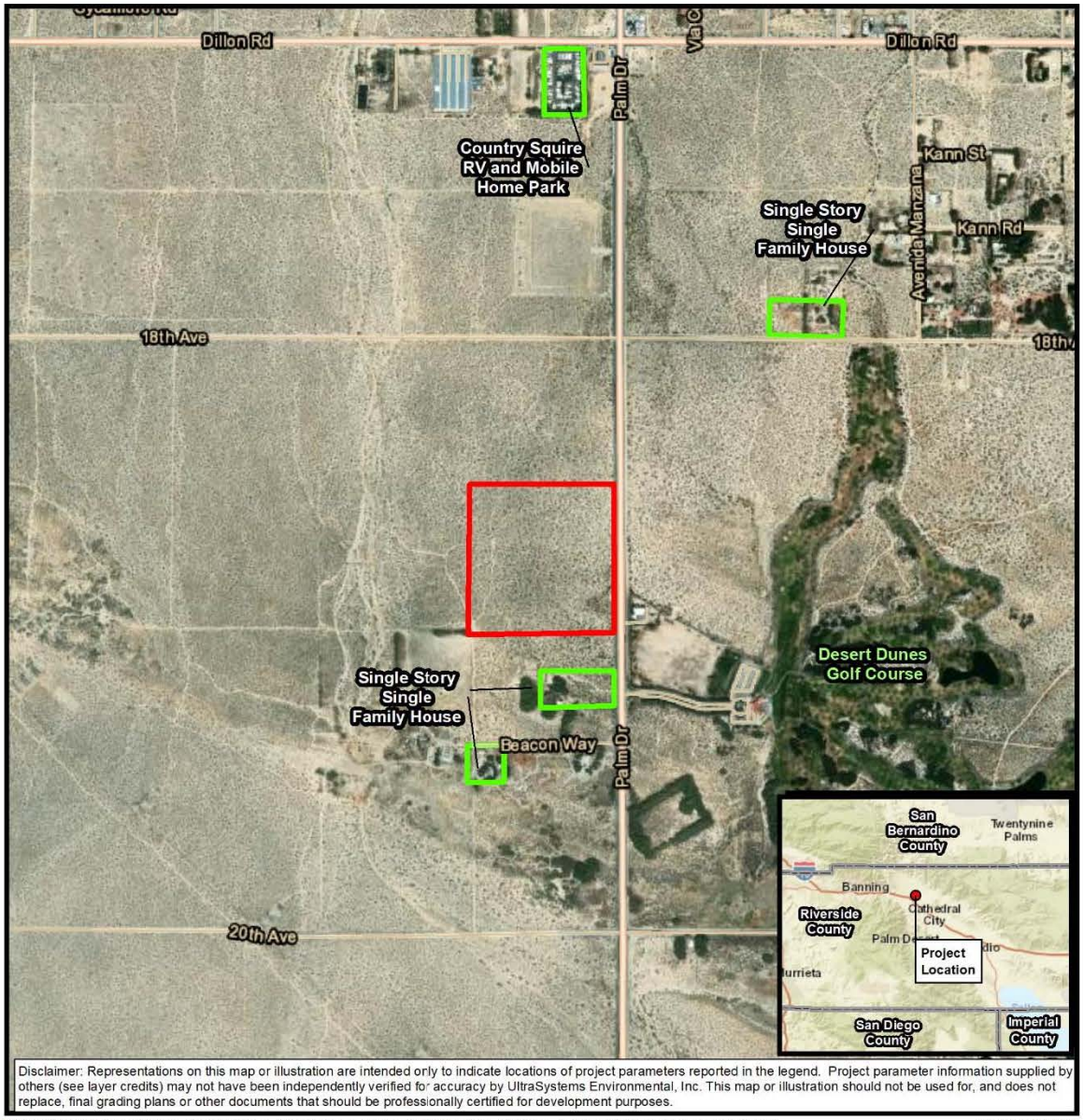
Table 4.1-1
SENSITIVE RECEIVERS IN PROJECT AREA

ID	Name	Type	Address	Feet From Site[a]
1	Desert Dunes Golf Club	Recreational	19300 Palm Drive, Desert Hot Springs, CA 92240	1,291
2	Mobile Home Park	Residential	17025 Palm Drive, Desert Hot Springs, CA 92240	3,356
3	Single-family Residence	Residential	19501 Beacon Way, Desert Hot Springs, CA 92240	1,034
4	Single-family Residence	Residential	67210 18th Avenue, Desert Hot Springs, CA 92240	2,350

ID	Name	Type	Address	Feet From Site[a]
5	Single-family Residence	Residential	19255 Palm Drive, Desert Hot Spring, CA 92240	334

[a]These distances are from the sensitive receptor to the nearest point on the project boundary. They are not the values used for the noise and vibration exposure calculations.

Figure 4.1-1
SENSITIVE RECEIVERS NEAR PROJECT SITE



Path: \\GISSVR\gis\Projects\7129a_GreenDayVillage_DHS_Technical_Studies_only\MXDs\7129a_Greenday_4_3_SensitiveAirReceptor_2022_11_08.mxd November 09, 2022
Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, Esri, HERE, Garmin, (c) OpenStreetMap contributors, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community; UltraSystems Environmental, Inc., 2022

Scale: 1:14,400

N

0 600 1,200 Feet

0 150 300 Meters

Legend

Project Boundary

Sensitive Air Receptor

Green Day Village Project

Sensitive Air Receptors

UltraSystems environmental • management • planning

4.1.2 Ambient Noise Levels

On September 1, 2022, UltraSystems conducted ambient noise sampling near sensitive noise receivers around the project area. The highest recorded L_{eq} value was measured at point 2 and the lowest was recorded at sampling point 4. **Table 4.1-2** summarizes the results of the study.

Table 4.1-2
MEASURED AMBIENT NOISE LEVELS AT SENSITIVE RECEIVERS ANALYZED

No.	Sample ID	Time	Description	Sound Level (dBA)			Notes
				L_{eq}	L_{max}	L_{90}	
4	S275	11:37 a.m. - 11:52 a.m.	In front of single-family home facing Palm Drive	45.4	61.4	39.1	Residential
2	S276	12:05 p.m. - 12:20 p.m.	Outside mobile home park near southeast boundary facing Palm Drive	56.7	66.5	49.3	Residential
1	S277	12:28 p.m. - 1243 p.m.	At entrance of Desert Dunes Golf Club facing driveway leading to Palm Drive	54.5	68.9	53.5	Recreational
3	S278	12:57 p.m. - 01:12 p.m.	19501 Beacon Way on northwest property line of single-family house	49.3	55.9	48.8	Residential

Source: UltraSystems, 2022.

4.2 Vibration Sources in the Project Area

The only vibration source in the project area is local traffic. No industrial land uses with intense vibratory processes are close enough to the project site to have an adverse impact.

5.0 REGULATORY FRAMEWORK

To limit population exposure to noise levels that are physically and/or psychologically damaging or intrusive, the federal government, the State of California, various county governments, and most municipalities in the state have established noise policies, standards and ordinances.

5.1 Federal

The U.S. Department of Housing and Urban Development has set a goal of 45 dBA $L_{dn,}$ as a desirable maximum interior standard for residential units developed under HUD funding.[5] While HUD does not specify acceptable exterior noise levels, standard construction of residential dwellings constructed under Title 24 of the California Code of Regulations typically provides 20 dBA of acoustical attenuation with the windows closed and 10 dBA with the windows open. Based on this assumption, the exterior L_{dn} or CNEL should not exceed 65 dBA under normal conditions.

5.2 State of California

The California Department of Health Services (DHS) Office of Noise Control studied the correlation of noise levels with effects on various land uses. (The Office of Noise Control no longer exists.) The most current guidelines prepared by the state noise officer are contained in the "General Plan Guidelines" issued by the Governor's Office of Planning and Research in 2017 (OPR 2017). These guidelines establish four categories for judging the severity of noise intrusion on specified land uses:

- **Normally Acceptable**: Is generally acceptable, with no mitigation necessary.
- **Conditionally Acceptable**: May require some mitigation, as established through a noise study.
- **Normally Unacceptable**: Requires substantial mitigation.
- **Clearly unacceptable**: Probably cannot be mitigated to a less-than-significant level.

The types of land uses addressed by the state standards, and the acceptable noise categories for each are presented in **Table 5.2-1** (Land Use Compatibility for Community Noise Sources). There is some overlap between categories, which indicates that some judgment is required in determining the applicability of the numbers in every situation.

5 U.S. Department of Housing and Urban Development. The Noise Guidebook. Office of Community Planning and Development. 1985. Accessible (read only) online at https://babel.hathitrust.org/cgi/pt?id=umn.31951p00994853x&view=1up&seq=8.

Table 5.2-1
LAND USE COMPATIBILITY FOR COMMUNITY NOISE SOURCES

Land Use Category	*Noise Exposure (dBA, CNEL)*						
	55	*60*	*65*	*70*	*75*	*80*	
Residential – Low-Density Single-Family, Duplex, Mobile Homes							
Residential – Multiple Family							
Transient Lodging – Motel, Hotels							
Schools, Libraries, Churches, Hospitals, Nursing Homes							
Auditoriums, Concert Halls, Amphitheaters							
Sports Arena, Outdoor Spectator Sports							
Playgrounds, Neighborhood Parks							
Golf Courses, Riding Stables, Water Recreation, Cemeteries							

Land Use Category	*Noise Exposure (dBA, CNEL)*						
	55	*60*	*65*	*70*	*75*	*80*	
Office Buildings, Business Commercial and Professional							
Industrial, Manufacturing, Utilities, Agriculture							

	Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
	Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply system or air conditioning will normally suffice.
	Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
	Clearly Unacceptable: New construction or development should generally not be undertaken.

Source: Office of Planning and Research.[6]

5.3 City of Desert Hot Springs

5.3.1 City of Desert Hot Springs General Plan Safety and Noise Element

The City's General Plan contains the following goals and policies relevant to noise (City of Desert Hot Springs 2020).

Goal SN-8: A noise environment that provides peace and quiet that complements the City's spa resort character.

Policy SN-8.1: Sensitive Land Uses. Protect noise-sensitive land uses from high noise levels from both existing and future noise sources. Sensitive uses include residences, resorts and community open space, schools, libraries, churches, hospitals, and convalescent homes.

Policy SN-8.2: Noise Impacts. Assess proposed development and associated traffic for the potential to generate adverse and incompatible noise impacts. Require mitigation for identified impacts.

6 General Plan Guidelines: State of California, Governor's Office of Planning and Research, Sacramento, California. Internet: http://opr.ca.gov/docs/OPR_COMPLETE_7.31.17.pdf. Accessed July 7, 2022.

Policy SN-8.3: Noise Mitigation. Require the installation of sound walls, earthen berms, wall, window noise insulation, and other mitigation measures for new development in areas that may exceed the City's noise limit standards.

Policy SN-8.4: Circulation Pattern. Encourage a Citywide circulation pattern that places primary traffic loads on major arterials and preserves local neighborhood noise environments by controlling traffic speeds to the greatest extent practical.

Policy SN-8.5: Compatible Land Uses. Designate land uses that are compatible with higher noise levels adjacent to major arterial roads and highways, the Interstate 10 corridor, or designated industrial lands.

Policy SN-8.6: Truck Routes. Designate primary truck routes and clearly mark these routes through the City. Other than vehicles providing local service, construction traffic, and delivery trucks, through traffic shall be limited to those as detailed in the Circulation chapter.

Policy SN-8.7: Wind Farm Noise Impacts. Strive to minimize noise impacts from existing and future wind farm development.

Policy SN-8.8: Interior Noise Standards. Enforce quantitative exterior and interior noise standards for various types of sensitive land uses.

Policy SN-8.9: Exterior Noise Standards. Allow for an exceedance of exterior noise standards for all land use types so long as adequate mitigation is provided for interior noise reduction.

Policy SN-8.10: Noise-Generating Uses. Require specific design for noise-generating uses such as restaurants, bars, and industrial business located near sensitive uses such as residential.

Policy SN-8.11: Noise Level Compliance. Require new development to monitor and document compliance with all applicable noise level limits in areas subject to potentially significant noise impacts.

Policy SN-8.12: Delivery or Service Noise Generation. Regulates delivery or service hours for businesses with potential noise-generating features such as trash bins, docks, loading areas that are located near sensitive uses such as residences, schools, and hospitals.

Policy SN-8.13. Noise-Reducing Pavement. Encourages the use of noise-reducing paving materials such as rubberized asphalt for road surfacing projects near sensitive land uses.

5.3.2 City of Desert Hot Springs Municipal Code

The City of Desert Hot Springs Municipal Code sections applicable to the evaluation of the proposed project in this analysis include the following:

Section 8.12.030. Prohibits unlawful noise disturbances within City limits or within 200 feet of City. Per Section 8.12.020, a noise disturbance is any sound that:

- Endangers the safety or health of any person;
- Disturbs a reasonable person of normal sensitivities; or

- Endangers personal or real property.

Section 8.12.090. Prohibits operational noise disturbances across residential property boundaries outside specified hours: Monday through Friday, 7:00 a.m. through 6:00 p.m.; Saturday, 8:00 a.m. through 6:00 p.m. and Sunday, 9:00 a.m. through 5:00 p.m.

Section 9.04.030. Prohibits construction activities between the hours of 5:00 p.m. of each day and 7:00 a.m. of the next day, except when daylight savings time is in effect. During such time as daylight savings time is in effect in the City, no such activities shall be permitted between the hours of 6:00 p.m. of each day and 6:00 a.m. of the next day. No such activities shall be permitted on Sundays.

Section 17.40.300. Prohibits discernible vibration beyond the boundary line of the property.

5.4 Vibration

There are no California or local governmental standards for exposure to vibration. The American National Standards Institute[7] indicates that vibration levels in critical care areas, such as hospital surgical rooms and laboratories, should not exceed 0.2 inch per second of PPV. The FTA also uses a PPV of 0.2 inch per second as a vibration damage threshold for fragile buildings and a PPV of 0.12 inch per second for extremely fragile historic buildings.[8] The FTA criteria for "infrequent" ground-borne vibration events (fewer than 30 events per day) that may cause annoyance are 80 VdB for residences and buildings where people normally sleep, and 83 VdB for institutional land uses with primarily daytime use; for "frequent" events (more than 70 per day from the same source), the annoyance levels are 72 and 75 VdB for the two aforementioned receiver categories, respectively.[9]

6.0 PROJECT IMPACTS

6.1 Methodology

Noise impacts associated with new facility developments include short-term and long-term impacts. Construction activities, especially heavy equipment operation, would create noise effects on and adjacent to the construction site. Long-term noise impacts include project-generated onsite and offsite operational noise sources. Onsite (stationary) noise sources from the proposed mixed-use project would include automobiles and delivery trucks coming in and out of the project site, air conditioners, landscaping and building maintenance. Offsite noise would be attributable to project-induced traffic, which would cause an incremental increase in noise levels within and near the project vicinity.

This section also evaluates potential ground-borne vibration that would be generated from the construction or operation of the proposed project.

7 Guide to the Evaluation of Human Exposure to Vibration in Buildings: American National Standards Institute, ANSI S.329-1983. 1983.

8 Transit Noise and Vibration Impact Assessment Manual. Federal Transit Administration, Office of Planning and Environment, Washington, DC, FTA Report No. 0123. September 2018, p. 186.

9 Ibid., p. 126.

6.1.1 Noise Exposure Estimation

6.1.1.1 Short-Term Noise Impacts

The construction of the proposed project may generate temporary increases in ambient noise levels that exceed the thresholds of significance for this analysis. Noise impacts from construction activities are a function of the noise generated by the operation of construction equipment and on-road delivery and worker commuter vehicles, the location of equipment, and the timing and duration of the noise-generating activities.

The types and numbers of pieces of equipment anticipated in each phase of construction and development were estimated using the California Emissions Estimator Model (CalEEMod), Version 2020.4.0[10] and UltraSystems' experience with similar projects. A CalEEMod output that includes the equipment data is in **Attachment 2**.

Table 6.1-1 lists the equipment expected to be used. For each equipment type, the table shows an average noise emission level (in dB at 50 feet, unless otherwise specified) and a "usage factor," which is an estimated percentage of operating time that the equipment would be producing noise at the stated level.[11] Equipment use was matched to phases of the construction schedule. The last column of the table shows the composite noise at 50 feet for each phase; i.e., the total noise if all of each phase's equipment were to operate simultaneously.

Using calculation methods published by the Federal Transit Administration,[12] UltraSystems estimated the average hourly exposures at four representative locations around the project site. To account for the fact that at any given time the various pieces of construction equipment are at different places, the distances used for the calculation were those from the center of construction activity during each construction phase to each receiver.[13]

Table 6.1-1
CONSTRUCTION EQUIPMENT NOISE CHARACTERISTICS

Phase	Construction Phase	Equipment Type	No. of Pieces	Maximum Sound Level (dBA @ 50 feet)	Usage Factor	Composite Noise (dBA @50 feet)
Phase 0	Site Preparation	Rubber-Tired Dozers	3	79	0.40	87.51
		Tractors/Loaders/Backhoes	4	85	0.37	

10 California Emissions Estimator Model. User's Guide, Version 2020.4.0 Prepared by BREEZE Software for the California Air Pollution Control Officers Association, in collaboration with South Coast Air Quality Management District. May 2021. Internet: http://www.aqmd.gov/docs/default-source/caleemod/user-guide-2021/01_user-39-s-guide2020-4-0.pdf?sfvrsn=6.

11 Equipment noise emissions and usage factors are from Knauer, H. et al., 2006. FHWA Highway Construction Noise Handbook. U.S. Department of Transportation, Research and Innovative Technology, Administration, Cambridge, Massachusetts, FHWA-HEP-06-015 (August 2006), except where otherwise noted.

12 Transit Noise and Vibration Impact Assessment Manual. Federal Transit Administration, Office of Planning and Environment, Washington, DC, FTA Report No. 0123. September 2018. Internet: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf.

13 The source receptor distances are therefore greater than shown in **Table 4.1-1**, which are from the project boundary to the sensitive receiver.

Phase	Construction Phase	Equipment Type	No. of Pieces	Maximum Sound Level (dBA @ 50 feet)	Usage Factor	Composite Noise (dBA @50 feet)
	Rough Grading	Excavators	2	80	0.40	88.14
		Graders	1	85	0.41	
		Rubber Tired Dozers	1	79	0.40	
		Scrapers	2	88	0.14	
		Tractors/Loaders/Backhoes	2	85	0.37	
	Trenching	Tractors/Loaders/Backhoes	3	83	0.37	87.25
		Trenchers	3	85	0.3	
Phase 1	Fine Grading	Graders	1	85	0.41	85.97
		Rubber Tired Dozers	1	79	0.40	
		Tractors/Loaders/Backhoes	2	85	0.37	
	Building Construction	Cranes	1	83	0.08	85.94
		Forklifts	3	67	0.30	
		Generator Sets	1	73	0.50	
		Tractors/Loaders/Backhoes	3	85	0.37	
		Welders	1	74	0.45	
	Paving	Pavers	2	77	0.50	86.35
		Paving Equipment	2	85	0.50	
		Rollers	2	74	0.10	
	Architectural Coating	Air Compressors	1	81	0.48	
Phase 2	Fine Grading	Graders	1	85	0.41	85.97
		Rubber Tired Dozers	1	79	0.40	
		Tractors/Loaders/Backhoes	2	85	0.37	
	Building Construction	Cranes	1	83	0.08	82.51
		Forklifts	1	67	0.30	
		Generator Sets	1	73	0.50	
		Tractors/Loaders/Backhoes	1	85	0.37	
		Welders	3	74	0.45	
	Paving	Cement and Mortar Mixers	1	85	0.41	86.93
		Pavers	1	77	0.50	
		Paving Equipment	1	85	0.50	
		Rollers	1	74	0.10	
		Tractors/Loaders/Backhoes	1	85	0.37	
	Architectural Coating	Air Compressors	1	81	0.48	

6.1.1.2 Long-Term Noise Impacts

Noise from Onsite Sources

Onsite Operational

Onsite noise sources associated with the proposed project will include rooftop equipment, such as air conditioners; trash collection; and cars entering and exiting the parking areas. The impacts of these types of sources are discussed in **Section 6.3.1.**

Traffic Noise

The principal noise source in the project area is traffic on local streets. The project may contribute to a permanent increase in ambient noise levels in the project vicinity due to project-generated vehicle traffic on neighborhood roadways and at intersections. A noise impact would occur if the project contributes to a permanent increase in ambient noise levels affecting sensitive receivers along roadways that would carry project-generated traffic. Traffic generated by the project was estimated as part of the traffic access analysis.[14]

6.1.2 Vibration Exposure Estimation

The project would not include any blasting, drilling, or pile driving. Construction equipment such as loaded trucks and small bulldozers may temporarily increase groundborne vibration or noise at the project site.

The construction vibration analysis used formulas published by the Federal Transit Administration.[15] For a standard reference distance of 25 feet, peak particle velocity is found from:

$$PPV = PPV_{ref} \times (25/D)^{1.5}$$

where

PPV_{ref} = Reference source vibration at 25 feet

D = Distance from source to receiver

The vibration level (VdB) for a standard reference distance of 25 feet is found from:

$$VdB = L_{vref} - 30 \log(D/25)$$

where

L_{vref} = Reference source vibration level at 25 feet

D = Distance from source to receiver

6.2 Thresholds of Significance for this Analysis

6.2.1 Noise

Two criteria were used for judging noise impacts. First, noise levels generated by the proposed project must comply with all relevant federal, state, and local standards and regulations. Noise impacts on the surrounding community are limited by local noise ordinances, which are implemented through investigations in response to nuisance complaints. It is assumed that all existing regulations for the construction and operation of the proposed project will be enforced. In

14 Green Day Village Access Analysis. Memorandum from Mike Arizabal, IBI Group, Irvine CA, to Michael Milroy, UltraSystems Environmental Inc, Irvine, CA. October 6, 2022.

15 Ibid., p. 185.

addition, the proposed project should not produce noise levels that are incompatible with adjacent noise sensitive land uses.

The second measure of impact used in this analysis is a significant increase in noise levels above existing ambient noise levels resulting from the introduction of a new noise source. An increase in noise level due to a new noise source has a potential to adversely impact people. The proposed project would have a significant noise impact if it would do any of the following:

- Expose persons to or generate long-term noise levels (as CNEL) in excess of standards recommended in the state's land use compatibility table.
- Include construction activities outside of the allowed construction times.
- Increase short-term noise exposures at sensitive receivers during construction by 5 dBA L_{eq} or more for prolonged periods.
- Contribute, with other local construction projects, to a significant cumulative noise impact.
- Increase operational exposures at sensitive receivers by 5 dBA CNEL or more.

6.2.2 Vibration

Given the information presented in **Section 5.4**, we have set the following significance thresholds for this project:

- PPV of 0.2 inch per second as a vibration damage threshold for fragile buildings.
- 80 VdB for residences and buildings where people normally sleep,

6.3 Analysis of Project Impacts

6.3.1 Would The Proposed Project Result in the Generation of a Substantial Temporary or Permanent Increase in Ambient Noise Levels in the Vicinity of the Project in Excess of Standards Established in the Local General Plan or Noise Ordinance, or Applicable Standards of Other Agencies?

Construction

Sensitive receivers for which noise exposures were estimated are shown in **Figure 6.3-1**.

Figure 6.3-1

SENSITIVE RECEIVER LOCATIONS FOR CONSTRUCTION NOISE ANALYSIS

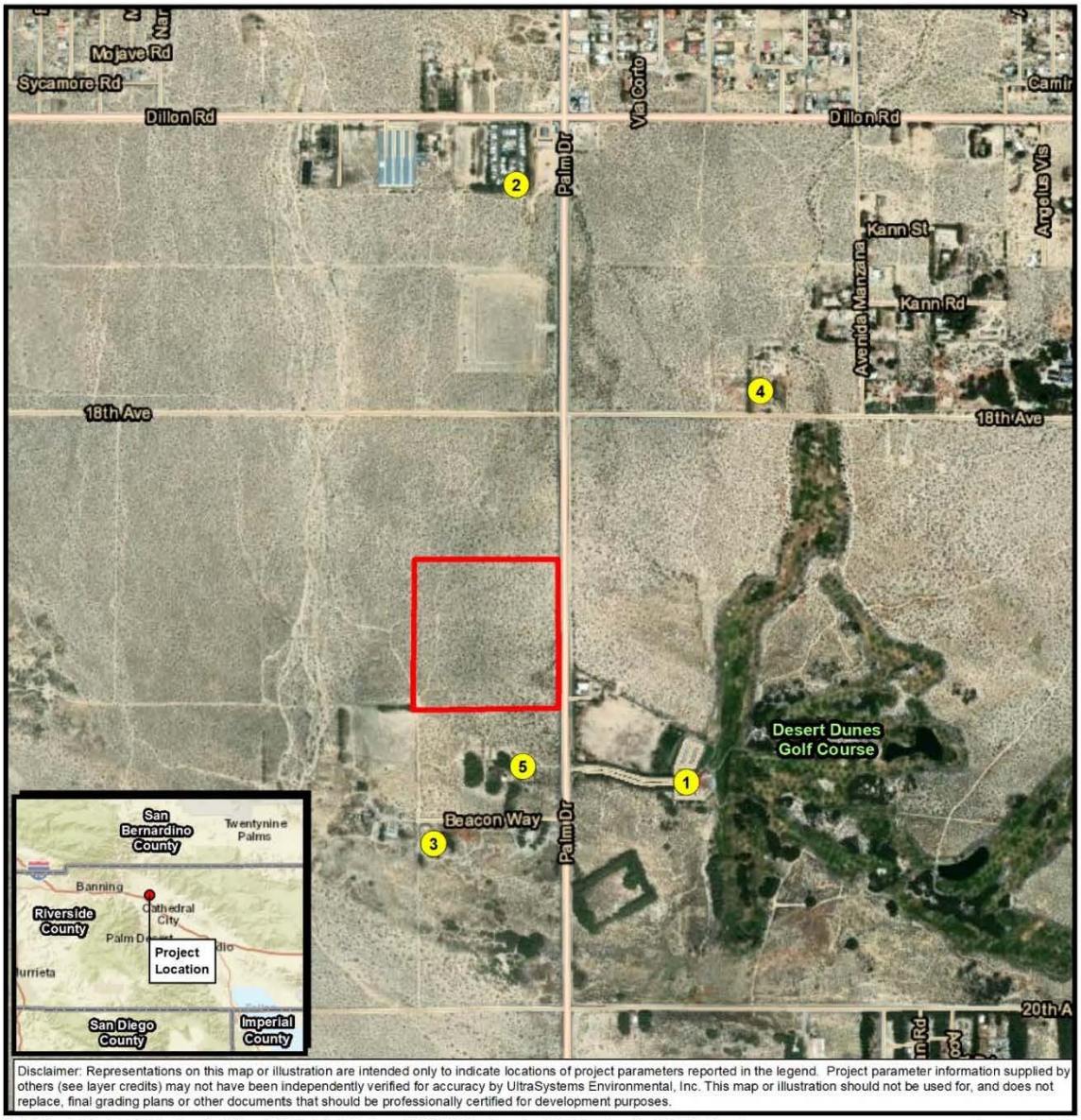


Table **6.3-1** summarizes the results of the unmitigated construction noise analysis for various sensitive receivers in the project area. Per Federal Transit Administration (FTA) guidance,[16] the distances in the table are from the center of the project site to the nearest exterior of each sensitive receiver. The increase in short-term noise exposures at sensitive receivers during construction would not exceed 5-dBA increase criterion for any sensitive receiver, except for the single-family house nearest the project. In Phase 0, the increase in short-term exposure during rough grading would be 5.3 dBA L_e. The maximum exposures during construction would be between 46.8 and 56.8 dBA, which are typical of quiet residential neighborhoods. The 5-dBA L_{eq} increase criterion is exceeded by only 0.3 dBA (about 7%). Furthermore, this increase would occur during hours when many local residents will be absent from their homes. In our considered judgment, the onsite construction impacts would be less than significant.

Table 6.3-1
MAXIMUM ESTIMATED CONSTRUCTION NOISE EXPOSURES AT NEAREST SENSITIVE RECEIVERS FOR PHASES 0-2

Sensitive Receivers for Phase 0	Distance (feet)	15-minute L_{eq} (dBA)		
		Existing	Projected[a]	Change
1 – Desert Dunes Golf Course	2,225	54.5	55.2	0.7
2 – Mobile Home Park	3,950	56.7	56.8	0.1
3 – Single-Story Single-Family House	1,925	49.3	51.9	2.6
4 – Single-Story Single-Family House	3,226	45.4	47.3	1.9
5 – Single-Story Single-Family House	1,251	49.3	54.6	**5.3**

[a]Existing plus construction-related.

Sensitive Receivers for Phase 1	Distance (feet)	15-minute L_{eq} (dBA)		
		Existing	Projected[a]	Change
1 – Desert Dunes Golf Course	2,225	54.5	55.0	0.5
2 – Mobile Home Park	3,950	56.7	56.8	0.1
3 – Single-Story Single-Family House	1,925	49.3	51.2	1.9
4 – Single-Story Single-Family House	3,226	45.4	46.8	1.4
5 – Single-Story Single-Family House	1,251	49.3	53.4	4.1

[a]Existing plus construction-related; adjusted for intervening structures between source and receiver.

16 Transit Noise and Vibration Impact Assessment Manual. Federal Transit Administration, Office of Planning and Environment, Washington, DC, FTA Report No. 0123. September 2018, p. 177. Internet: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf. Given the great distances from the project site to the centers of individual construction phases, using the center of the site for all construction phases does not introduce appreciable error.

Sensitive Receivers for Phase 2	Distance (feet)	15-minute L_{eq} (dBA)		
		Existing	Projected[a]	Change
1 – Desert Dunes Golf Course	2,225	54.5	55.0	0.5
2 – Mobile Home Park	3,950	56.7	56.8	0.1
3 – Single-Story Single-Family House	1,925	49.3	51.4	2.1
4 – Single-Story Single-Family House	3,226	45.4	46.9	0.6
5 – Single-Story Single-Family House	1,251	49.3	53.8	4.5

[a]Existing plus construction-related; adjusted for intervening structures between source and receiver.

The aforementioned CalEEMod run estimated that a maximum of 676 worker commuting and vendor truck trips per day would be necessary during Phase 1. Using a method described by the Federal Transit Administration,[17] and assuming that noise generation was similar to that of diesel buses, and that (as a worst case), trucks would travel on local streets for eight hours per day, it was estimated that the exposure from motor vehicles to residences in the area would be about 44.3 dBA L_{eq}. This is lower than existing ambient noise levels on that street, and the change in total exposure (ambient plus trucks) would be about 0.4 dBA at Sensitive Receiver 4, the nearest one to a roadway. These increases would not be noticeable to the human ear.

Onsite Operational

Onsite noise sources associated with the proposed project will include rooftop equipment, such as air conditioners; trash collection; and cars entering and exiting the parking areas. Rooftop equipment usually emits about 50 to 55 dB at 50 feet, and would not be heard above normal traffic. Trash pickup may be loud but it is for only a few minutes or so, and does not contribute to the hourly L_{eq}. Therefore, onsite noise sources would not cause a change in exposure to the community and the impact would be less than significant.

Finally, we consider noise from motor vehicles entering and leaving the facility. The project traffic access analysis[18] estimates onsite travel of 9,083 vehicles per day, or an average of 378.5 per hour, assuming a 24-hour day.

The average hourly noise exposure for a given number of individual arrivals is:[19]

$$L_{eq} = SEL + 10 \log(V) + 40 \log(S/50) - 10 \log(S/50) - 35.6$$

where

SEL = sound exposure level of one vehicle[20]

V = number of vehicles per hour

17 Ibid., pp. 78-80.

18 Green Day Village Access Analysis. Memorandum from Mike Arizabal, IBI Group, Irvine CA, to Michael Milroy, UltraSystems Environmental Inc, Irvine, CA. October 6, 2022. Rates determined by this analysis are shown in **Attachment 3.**

19 Transit Noise and Vibration Impact Assessment Manual. Federal Transit Administration, Office of Planning and Environment, Washington, DC, FTA Report No. 0123. September 2018. Internet: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf.

20 The sound exposure level (SEL) is equivalent to the total sound energy experienced during a measurement period, as if it had all occurred in one second.

S = average vehicle speed, miles per hour

The Federal Transit Administration recommends using a SEL of 74 dBA for automobiles. Therefore, for 390.8 vehicles per hour, and an assumed onsite travel speed of five miles per hour, L_{eq} would be 34.2 dBA L_{eq} at 50 feet. Not only would much of this noise be blocked by onsite structures, but, given the attenuation with distance, the highest exposure at the nearest sensitive receiver would be only about 13.6 dBA L_{eq}. This would not be noticed by the average person.

Roadway Noise

The principal noise source in the project area is traffic on local streets. The project may contribute to a permanent increase in ambient noise levels in the project vicinity due to project-generated vehicle traffic on neighborhood roadways and at intersections. A noise impact would occur if the project contributes to a permanent increase in ambient noise levels affecting sensitive receivers along roadways that would carry project-generated traffic.

The Project is forecast to generate a maximum of 9,083 daily vehicle trips (actual vehicles).[21] The estimated distribution of this traffic on local streets is:[22]

- 90% on Palm Drive between Dillon Road and 20th Avenue
- 5% on Dillon Road West of Palm Drive
- 5% on Dillon Road East of Palm Drive

Table 6.3-2 shows the increase in traffic on Palm Drive and Dillon Road during project operations. Existing ADT values were obtained from the Draft EIR for the General Plan Update and Zoning Amendment.[23] Given the logarithmic nature of the decibel, traffic volume needs to be doubled in order for the noise level to increase by 3 dBA,[24] the minimum level perceived by the average human ear. A doubling is equivalent to a 100% increase. Because the maximum increase in traffic at any intersection is far below 100%, the increase in roadway noise experienced at sensitive receivers would not be perceptible to the human ear. Therefore, roadway noise associated with project operation would not expose a land use to noise levels that are considered incompatible with or in excess of adopted standards, and impacts would be less than significant.

21 Green Day Village Access Analysis. Memorandum from Mike Arizabal, IBI Group, Irvine CA, to Michael Milroy, UltraSystems Environmental Inc, Irvine, CA. October 6, 2022. Rates determined by this analysis are shown in **Attachment 3**.

22 Email from Mike Arizabal, IBI Group Inc., to Michael Rogozen, UltraSystems Environmental Incorporated, July 11, 2022.

23 City of Desert Hot Springs. 2020. Draft Environmental Impact Report. Desert Hot Springs General Plan Update and Zoning Amendment. SCH #2019080101, February 14. P. 4.17-19. Internet: https://files.ceqanet.opr.ca.gov/254367-3/attachment/gM8XZ9g_0pU_iw3pCMKBrFGmbbtJh5r-QPQ8ONYqHCSbuBhljGihA5x7MdYefPBbcwJdrVjonfk0GCfj0. Accessed July 12, 2022.

24 Technical Noise Supplement. Prepared by ICF Jones & Stokes, Sacramento, California for California Department of Transportation, Division of Environmental Analysis, Sacramento, California. November 2009, p. 2-12. Internet: https://dot.ca.gov/-/media/dot-media/programs/environmental-analysis/documents/env/tens-sep2013-a11y.pdf.

Table 6.3-2
TRAFFIC INCREASES DUE TO PROJECT OPERATIONS

Location	Existing ADT	Trip Distribution	Percent Increase
Dillon Road West of Palm Drive	10,081	454	4.5
Dillon Road East of Palm Drive	10,539	454	4.3
Palm Drive Between Dillon Road and 20th Avenue	35,024	8,175	23.3

6.3.2 Would the Proposed Project Result in Generation of Excessive Groundborne Vibration or Groundborne Noise Levels?

Construction Vibration

The FTA has published standard vibration levels for construction equipment operations, at a distance of 25 feet.[25] The average distance from the center of construction activity to the middle of the nearest residential receiver would be approximately 1,275 feet. The calculated vibration levels expressed in VdB and PPV for selected types of construction equipment at distances of 25 and 1,275 feet are listed in **Table 6.3-3**.

Table 6.3-3
VIBRATION LEVELS OF TYPICAL CONSTRUCTION EQUIPMENT

Equipment	PPV at 25 feet (in/sec)	Vibration Decibels at 25 feet (VdB)	PPV at 1,275 feet (in/sec)	Vibration Decibels at 1,275 feet (VdB)
Loaded trucks	0.076	86	0.0010	35
Small bulldozer	0.003	58	0.000040	7
Large bulldozer	0.089	87	0.0012	36

As shown in **Table 6.3-3**, the vibration level of construction equipment at the nearest sensitive receiver (1,275 feet) is at most 0.0012 inch per second, which is less than the FTA damage threshold of 0.12 inch per second PPV for fragile historic buildings, and 36 VdB, which is below the FTA threshold for human annoyance of 80 VdB. Construction vibration impacts would therefore be less than significant.

Operational Vibration

Operation of the proposed project would not involve significant sources of ground-borne vibration or ground-borne noise. Thus, operation of the proposed project would result in a less than significant impact.

6.3.3 For a Project Located Within the Vicinity of a Private Airstrip or an Airport Land Use Plan or Where Such a Plan Has Not Been Adopted, Within Two Miles of a Public

25 Ibid., p. 184.

Airport or Public Use Airport, Would the Project Expose People Residing or Working in the Project Area to Excessive Noise Levels?

The nearest active public airport is Palm Springs International Airport, located approximately 5.6 miles to the southwest of the project. Due to the project's distance from the nearest active airport, it is not located within the boundary of an Airport Influence Area (AIA), or within two miles of a public airport or public-use airport. As a consequence, the project would not expose people to safety hazards due to proximity to a public airport, and no impacts would occur.

7.0 MITIGATION

All noise impacts will be less than significant. Therefore, no mitigation is needed.

ATTACHMENTS

ATTACHMENT 1
Ambient Noise Measurement Data

ATTACHMENT 2
CalEEMod Output File

APPENDIX I1

VEHICLE MILES TRAVELED MEMORANDUM

IBI GROUP
18401 Von Karman Avenue – Suite 300
Irvine CA 92612 USA
tel 949 833 5588 fax 949 833 5511
ibigroup.com

Memorandum

To/Attention	Michael Milroy, UltraSystems	**Date**	July 8, 2022
From	Mike Arizabal, IBI Group	**Project No**	139220
cc			
Subject	Green Day Village VMT Analysis		

IBI Group has been retained to prepare a VMT Analysis for the proposed Green Day Village Mixed-Use Project in the City of Desert Hot Springs, CA. The City of Desert Hot Springs defers to the County of Riverside's *Transportation Analysis Guidelines for Level of Service (LOS) and Vehicle Miles Traveled (VMT) (December 2020)*. As such, the VMT analysis was prepared to be consistent with the County's approach to VMT analysis. This technical memorandum includes a description of the project, as well a four-step analytical process: Evaluate Land Use Type, Screen for Non-Significant Transportation Impact, Identify Significance Measure and Threshold, and VMT Analysis for Non-Screened Development

PROJECT DESCRIPTION

Green Day Village is generally bounded by Palm Drive in the east, Beacon Way to the south, 18th Avenue in the north, and Power Line Road to the west. The current site is vacant with the only surround use being the Desert Dunes Golf Club to the east.

The applicant proposes a mixed-use development (commercial and residential) encompassing 1,642,186 square feet, or 37.29 acres. The project includes the following land uses:

- Residential – 612 dwelling units
- Fast Food with Drive Through Window – 4.608 thousand square feet (TSF)
- Retail Convenience Store – 1.024 TSF
- Retail Store – 20 TSF
- General Retail – 23.621 TSF
- Restaurants – 6.144 TSF
- Medical Office – 21.854 TSF

BACKGROUND

The updated California Environmental Quality Act (CEQA) Guidelines, which were adopted in December 2018, went into effect on July 1, 2020. These updated guidelines require all lead agencies to adopt VMT as the new measure for identifying transportation impacts for land use projects. VMT has been adopted as the new measure, in place of the previous metric of automobile delay-based level of service (LOS). Further information on the updated guidelines is available in the *Technical Advisory on Evaluating Transportation Impacts in CEQA* (December 2018), released by the Governor's Office of Planning and Research (OPR). Riverside County also developed their *Transportation Analysis Guidelines for Level of Service (LOS) and Vehicle Miles Traveled (VMT) in December 2020*. The City of Desert Hot Springs utilizes the County's guidelines for VMT analysis.

LAND USE TYPE EVALUATION

The first analytical step in the VMT process is determining land use types. Per the County Guidelines, if there are multiple distinct land uses within the project (residential, office, retail, etc.), they will be required to be analyzed separately unless they are determined to be insignificant to the total VMT. Mixed use projects are permitted to account for internal capture, which depending on the methodology may require a distinct approach not covered in this documentation.

As such, the VMT analysis will look at each use separately – residential, retail, and office.

PROJECT SCREENING

For the purposes of SB 743 compliance, a VMT analysis should be conducted for land use projects, as deemed necessary by the Transportation Department and would apply to projects that have the potential to increase the average VMT per capita (residential), per employee (office), net increase in total VMT compared to County-Wide averages. The County SB 743 Guidelines provides details on appropriate “screening criteria” that can be used to identify when a proposed land use development project is anticipated to result in a less-than significant impact without conducting a more detailed analysis.

Screening thresholds are broken into the following categories:

- Small Projects:
- Projects Neat High-Quality Transit
- Local-Serving Retail
- Affordable Housing
- Local Essential Service
- Map-Based Screening

A land use component need only meet one of the above screening thresholds to result in a less-than-significant impact.

Small Projects

The County Guidelines identify that the following may be presumed to have a less than significant impact absent substantial evidence to the contrary:

- Single Family Housing projects less than or equal to 110 Dwelling Units; or
- Multi Family (low rise) Housing projects less than or equal to 147 Dwelling Units; or
- Multi Family (mid-rise) Housing projects less than or equal to194 Dwelling Units; or
- General Office Building with area less than or equal to 165,000 SF; or
- Retail buildings with area less than or equal to 60,000 SF; or
- Warehouse (unrefrigerated) buildings with area less than or equal to 208,000 SF; or
- General Light Industrial buildings with area less than or equal to 179,000 SF

- Project GHG emissions less than 3,000 Metric Tons of Carbon Dioxide Equivalent (MTCO2e) as determined by a methodology acceptable to the Transportation Department; or
- Unless specified above, project trip generation is less than 110 trips per day per the ITE Manual or other acceptable source determined by Riverside County.

The Small Project screening criterion is met for all components of the project, with the exception of the residential component (612 dwelling units).

Projects Near Transit Screening

Consistent with the County's Guidelines, projects located within a half mile area of an existing "major transit stop"[1] and maintains a service interval frequency of 15 minutes or less during the morning and afternoon peak commute periods may be presumed to have a less than significant impact absent substantial evidence to the contrary.

Based on the Screening Tool, the Project site is not located within ½ mile of an existing major transit stop and does not have transit service with a 15 minute or less frequency during morning and afternoon peak times.

The TPA screening criterion are not met.

Local-Serving Retail

As noted in the County Guidelines, "Local-serving retail is presumed to have a less than significant impact if no store on-site exceeds 50,000 SF and the project itself is locally serving as determined by the Transportation Department." Local-serving retail is defined as goods and services located in or around residential development, where residents are expected to be the primary patrons.

The Local-Serving Retail screening criterion is not met.

Affordable Housing Screening

Projects that provide a "high percentage of affordable housing" as determined by the Riverside County Planning and Transportation Departments are presumed to have a less than significant impact. The project does not propose a high percentage of affordable housing units.

The Affordable Housing screening criterion is not met.

Local Essential Service

The following projects are presumed to have a less than significant impact:

- Project is local-serving as determined by the Transportation
- Department; and
- Local-serving and Day care center; or

---

[1] Pub. Resources Code, § 21064.3 - 'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.

- Police or Fire facility; or
- Medical/Dental office building under 50,000 square feet; or
- Government offices (in-person services such as post office, library, and utilities); or
- Local or Community Parks

The Local Essential Service screening criterion is met for the retail and medical office components of the project.

Map-Based Screening

This method eliminates the need for complex analyses, by allowing existing VMT data to serve as a basis for the screening smaller developments. Note that screening is limited to residential and office projects. Area of development is under threshold as shown on screening map as allowed by the Transportation Department.

The Map-Based screening criterion does not apply for the project.

Redevelopment Projects

The project does not replace an existing VMT-generating land use.

The Redevelopment Project screening criterion does not apply for the project.

SIGNIFICANCE MEASURE AND THRESHOLD

The purpose of this step is to determine the VMT measure and threshold of significance for application to a land use project. Significance thresholds for the residential component of the project (not screened out per the previous section) is on a VMT/capita basis. The other components of the project (retail, medical office, and restaurants) screen out from further VMT analysis.

The County adopted the county-wide average VMT per capita as the threshold of significance for residential land uses. This approach was adopted consistent with several jurisdictions within the County as well to address the significant housing needs as identified in the SCAG regional housing needs assessment.

A project would result in a significant project-generated VMT impact if its VMT exceeds the VMT threshold of 15.2 VMT/capita.

VMT ANALYSIS FOR NON-SCREENED DEVELOPMENT

The total daily trips associated with the 608 dwelling units of the residential component of the project are anticipated to generate 4,098 trips per the trip rates for Low-Rise Multifamily Housing (Land Use 220) of Institute of Transportation Engineers (ITE 11th Edition, 2021), which equates to a resident population of 1,681. Factoring internal capture, alternative modes of travel (transit and carpool), the net daily trips of the residential component is 3,361. The average one-way trip length (in miles) for the City of Desert Hot Springs is 11.4 miles using the Riverside County Planning Sketch Tool (22.8 miles roundtrip).

Therefore, the VMT calculation is as follows:

VMT = total number of trips x trip length

VMT = (3,361 daily trips/ 2) x 22.8 miles

VMT = 38,315

VMT per Capita = VMT / Population

VMT per Capita = 38,315 / 1,681

VMT per Capita = 22.79

The VMT per capita of the proposed residential component of the project would be greater than the 15.2 VMT/capita threshold set forth by the County.

MITIGATION MEASURES

As the project VMT is anticipated to exceed the threshold of significance, mitigation measures in the form of transportation demand management measures (TDM) would need to be implemented. The TDM measures implemented would need to reduce the VMT/capita by 34 percent to be below the County's threshold of significance. VMT mitigations will require the preparation of a TDM program. A TDM program is a combination of strategies to reduce VMT. The program will be created by the applicant for the land use project based on a list of strategies agreed to with Riverside County.

Riverside County has developed a list of potential TDM strategies and the magnitude of VMT reduction that could be achieved. The selection process was guided by the California Air Pollution Control Officers Association (CAPCOA) recommendations found in the 2010 publication Quantifying Greenhouse Gas Mitigation Measures. The area context of Riverside County also influenced the type of TDM strategies that were selected. CAPCOA has found strategies with the largest VMT reduction in rural areas include vanpools, telecommute or alternative work schedules, and master planned communities with design and land-use diversity to encourage intra-community travel.

The following Riverside County TDM Measures should be implemented to achieve the 34 percent reduction in project VMT:

- Transit Subsidies - Involves the subsidization of transit fare for residents and employees of the project site. Existing bus stops are located along Palm Drive in the vicinity of the project site and the applicant is proposing a bus stop on Palm Drive immediately adjacent to the project site. ***Max VMT Reduction = 3%***

- Vanpool/Carpool – Incentivize residents with similar work commutes and times to carpool and vanpool through provision of resident-sponsored van or vehicle. ***Max VMT Reduction = 4%***
- Alternative Work Schedule or Telework (Telecommuting, Distance-Learning, etc.) – Flextime, Compressed Work Week (CWW), staggered shifts, and use of telecommunications as a substitute for physical travel. ***Max VMT Reduction = 10%***
- School Carpool Program – The project implements a school carpool program to encourage ridesharing for students living in the residential units. ***Max VMT Reduction = 15%***
- On-Site Affordable Housing – Provision of on-site affordable housing. ***Max VMT Reduction = 4%***

Implementation of this TDM program would reduce the VMT per capita to less than the County average.

CONCLUSIONS

As a mixed-use development, County Guidelines require each component be analyzed separately for potential VMT impacts. The retail, restaurant, and medical office components of the project all meet at least one of the seven (7) listed criterion in the guidelines and therefore screen out of any required VMT analysis. The residential component, however, did not screen out and a VMT analysis was required.

Using the county-wide average VMT per capita of 15.2 as the threshold, the residential component was calculated to be 22.94, which is higher than the county-wide threshold. Therefore, mitigation measures are required to reduce the VMT from the County average. Implementation of transit subsidies, a vanpool/carpool program, continuing alternative work schedule/work from home, a school carpool program, and provision of affordable housing units for the residents would reduce the VMT per capita to less than the 15.2 County threshold. As such, no impacts would remain.

If you have any questions or comments, please do not hesitate to email me at mike.arizabal@ibigroup.com.

Thank you,



Mike Arizabal
Senior Transportation Planner
IBI Group

IBI GROUP
18401 Von Karman Avenue – Suite 300
Irvine CA 92612 USA
tel 949 833 5588 fax 949 833 5511
ibigroup.com

REFERENCES

1. **Office of Planning and Research.** *Technical Advisory on Evaluating Transportation Impacts in CEQA.* State of California: s.n., December 2018.

IBI GROUP
18401 Von Karman Avenue – Suite 300
Irvine CA 92612 USA
tel 949 833 5588 fax 949 833 5511
ibigroup.com

Attachment A

IBI GROUP
18401 Von Karman Avenue – Suite 300
Irvine CA 92612 USA
tel 949 833 5588 fax 949 833 5511
ibigroup.com

Trip Rates[1] (Land Use Code)	**Unit**	**ADT**
Low-Rise Multifamily Housing (220)	TSF	6.74
Project Trip Generation	**Size**	**ADT**
Green Day Village Residential Component	608 DU	4,098
Total Project Trip Generation		***4,098***
Net Project Trip Generation (Internal Capture)		***3,361***

Notes: TSF - thousand square feet, DU – dwelling units

[1]Trip rates referenced from the Institute of Transportation Engineers (ITE) Trip Generation, 11th Edition

APPENDIX I2

PROJECT ACCESS ANALYSIS

IBI GROUP
18401 Von Karman Avenue – Suite 300
Irvine CA 92612 USA
tel 949 833 5588 fax 949 833 5511
ibigroup.com

Memorandum

To/Attention	Michael Milroy, UltraSystems	**Date**	October 6, 2022
From	Mike Arizabal, IBI Group	**Project No**	139220
cc			
Subject	Green Day Village Access Analysis		

IBI Group has been retained to prepare a focused access analysis for the proposed Green Day Village Mixed-Use Project in the City of Desert Hot Springs, CA. The City of Desert Hot Springs defers to the County of Riverside's *Transportation Analysis Guidelines for Level of Service (LOS) and Vehicle Miles Traveled (VMT) (December 2020)*. As such, the LOS analysis for the proposed access locations was prepared to be consistent with the County's approach to traffic analysis. This technical memorandum includes a description of the project, the project trip generation, distribution, and assignment at all proposed driveways, signal warrant analysis, and geometric recommendations based on operational and safety considerations. A VMT analysis for the project was completed by IBI Group in July 2022.

PROJECT DESCRIPTION

Green Day Village is generally bounded by Palm Drive in the east, Beacon Way to the south, 18th Avenue in the north, and Power Line Road to the west. The current site is vacant with the only surround use being the Desert Dunes Golf Club to the east.

The applicant proposes a mixed-use development (commercial and residential) encompassing 1,642,186 square feet, or 38.34 acres. The project includes the following land uses:

- Residential – 612 dwelling units
- Fast Food with Drive Through Window – 4.608 thousand square feet (TSF)
- Retail Convenience Store – 1.024 TSF
- Retail Store – 20 TSF
- General Retail – 23.621 TSF
- Restaurants – 6.144 TSF
- Medical Office – 21.854 TSF
- Recycling Center – 0.720 TSF
- Farm Equipment Building – 1.620 TSF

PROJECT TRIP GENERATION

Daily, AM peak hour, and PM peak hour trips for the proposed project were generated using the latest edition of the Institute of Transportation Engineers' (ITE) Trip Generation Manual (11th Edition, 2021). The trip rates were based on the following Land Use Codes contained in the manual:

- Shopping Plaza (Land Use Code 821)
- Fast-Food with Drive Through Window (Land Use Code 934)

- Retail Convenience Store (Land Use Code 851)
- Fast Casual Restaurants (Land Use Code 930)
- Medical Office Building (Land Use Code 720)
- Low-Rise Multifamily Housing (Land Use Code 220)
- Beverage Container Recycling Center (Land Use Code 895)

As shown in Table 1, the project would generate approximately 9,794 daily trips, with 650 trips occurring during the AM peak hour and 804 trips occurring during the PM peak hour. However, since the proposed project is a mix of uses, there are synergies between certain land use types. This synergy is expressed in terms of an internal capture percentage, which is calculated through the ITE Handbook (3rd Edition). An internal capture of approximately 20 percent is anticipated to occur between the residential uses, retail, and restaurant uses. It should be noted that the Farm Equipment Building is not anticipated to generate any trips.

The resulting net trip generation of the proposed project would be 8,031 daily trips, 533 AM peak hour trips, and 659 PM peak hour trips. The trip generation is summarized in Table 1.

Table 1: Green Day Village Trip Generation Summary

	Unit	ADT	A.M. Peak Hour			P.M. Peak Hour		
			In	Out	Total	In	Out	Total
Trip Rates[1] (Land Use Code)								
Shopping Plaza (821)	TSF	94.49	2.19	1.34	3.53	4.33	4.70	9.03
Fast Food w/Drive Thru (934)	TSF	467.48	22.75	21.86	44.61	17.18	15.85	33.03
Retail Convenience Store (851)	TSF	762.28	31.27	31.27	62.54	25.05	24.06	49.11
Fast Casual Restaurants (930)	TSF	97.14	0.72	0.72	1.43	6.90	5.65	12.55
Beverage Container Recycling Depot (895)	TSF	92.23	4.89	4.89	9.78	5.25	4.85	10.10
Low-Rise Multifamily Housing (220)	DU	6.74	0.10	0.30	0.40	0.32	0.19	0.51
Medical Office Building (720)	DU	5.44	0.09	0.27	0.36	0.27	0.17	0.44
Project Trip Generation	**Size**							
Shopping Plaza (821)	45.3	3,512	108	66	174	145	157	303
Fast Food w/Drive Thru (934)	4.60	2,154	105	101	206	79	73	152
Retail Convenience Store (851)	1.024	781	32	32	64	26	25	50
Fast Casual Restaurants (930)	6.144	597	4	4	9	42	35	77
Medical Office Building (720)	21.854	119	2	6	8	6	4	10
Beverage Container Recycling Depot (895	0.720	66	4	4	7	4	3	7
Low-Rise M amily Housing (220)	612	4,125	59	186	245	197	115	312
Gross Project Trip Generation		**11,354**	**314**	**399**	**713**	**499**	**413**	**911**
Internal Capture Reduction[2]		***-2,271***	***-63***	***-80***	***-143***	***-100***	***-83***	***-182***
Net Project Trip Generation		***9,083***	***251***	***319***	***570***	***399***	***330***	***729***

Notes: TSF - thousand square feet; DU - dwelling unit; ADT - average daily traffic

[1]Trip rates referenced from the Institute of Transportation Engineers (ITE) Trip Generation, 11th Edition (2021).
[2] Internal Trip Capture is the average percentage of trips captured by residential units to commercial uses using the ITE Handbook (3rd Edition)

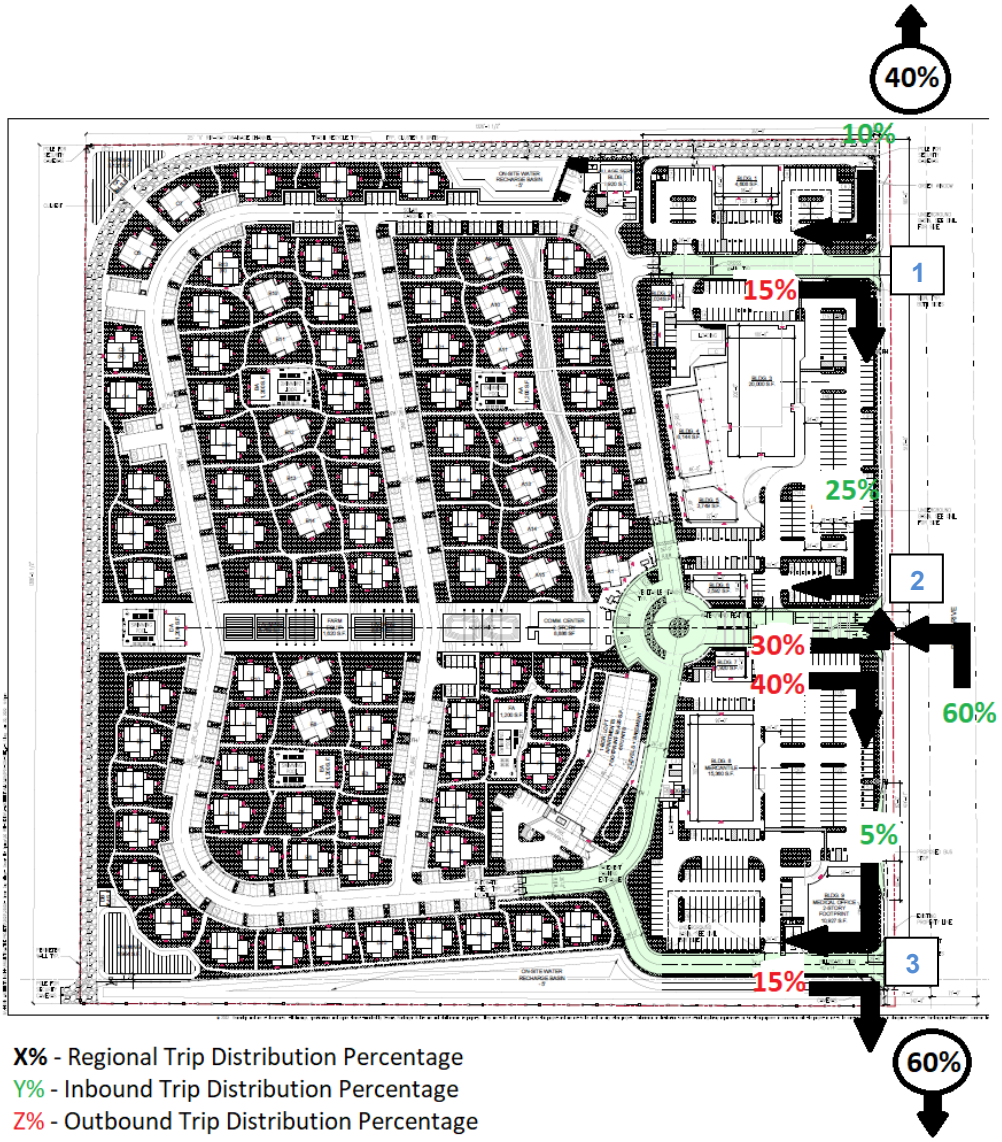
Michael Milroy – October 6, 2022

PROJECT TRIP DISTRIBUTION AND ASSIGNMENT

The project's trip distribution was be based on expected origin-destination patterns related to the project's land uses. Trip distribution accounted for the type of proposed development, the location and intensity of the development, the conditions and availability of the surrounding roadway network (and freeway network), and other land uses in the vicinity of the development.

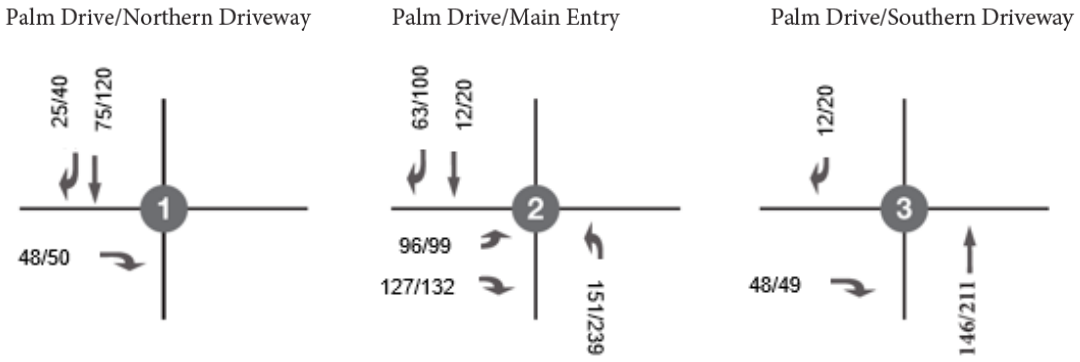
Access is proposed along Palm Drive via three driveways – the main driveway and the northern and southern driveways. For purposes of the base traffic analysis, the main driveway was assumed to be a full-access driveway (meaning left-turn and right-turn movements are available into and out of the driveway. The northern and southern driveways were assumed to be right-turn in/out only driveways. Figure 1 illustrates the trip distribution into and out of the project driveways.

Figure 1: Project Trip Distribution



The project trip assignment is the result of the project trip generation multiplied by the project trip distribution. Figure 2 shows the resultant trip assignment at each of the project driveways.

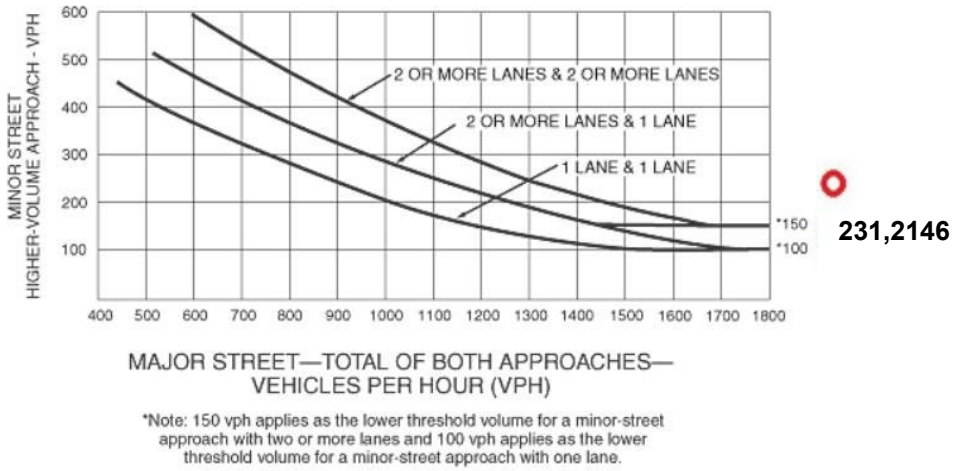
Figure 2: Project Trip Assignment



SIGNAL WARRANT ANALYSIS

A traffic signal warrant analysis was performed for the proposed main entry driveway at Palm Drive. Background traffic volumes (i.e., through volumes on Palm Drive) were obtained from the Coachella Valley ArcGIS interactive website and other traffic studies within the City of Desert Hot Springs. The signal warrant analysis was prepared consistent with Warrant 3, Peak Hour from the California Manual on Uniform Traffic Control Devices (MUTCD, 11th Edition 2020). Figure 3 shows the results of the signal warrant for the main entry (traffic signal warrant met).

Figure 3: Signal Warrant Analysis



Warrant Met

GEOMETRIC RECOMMENDATIONS

Geometric recommendations (i.e., lane configuration recommendations) were made based on the level of service, queuing, and safety analysis. The LOS analysis was based on the PM peak hour, which represents the higher of the two peak hours.

ID	Intersection	Traffic Control	Existing with Project PM	
			Delay	LOS
1	Palm Drive & Northern Driveway	TWSC	13.2	B
2	Palm Drive & Main Entrance	TWSC	64.1	F
	With Mitigation	*SIGNAL*	*10.9*	*B*
3	Palm Drive & Southern Driveway	TWSC	13.3	B

The intersection of Palm Drive and the Main Entrance would operate at an unacceptable LOS (LOS E) with the worst-approach delay being the eastbound left-turn out of the site (LOS F, 129.8 seconds of delay). Based on the LOS, queuing (excessive left and right-turn outbound queues), and safety (minimal gaps for left-turns out of the site), it is recommended that a signal be installed at the intersection of Palm Drive and the Main Entrance with the following geometry:

- One northbound left-turn lane (minimum 150-foot striped pocket length, but two-way left-turn lane can be used for additional storage as needed)
- Two northbound through lanes
- One southbound shared through/right-turn lane
- One southbound through lane
- One eastbound left-turn lane (minimum 100 feet of storage before first drive aisle)
- One eastbound right-turn lane (minimum 100 feet of storage before first drive aisle)

The northern and southern driveways at Palm Drive can be remain unsignalized as right-turn in/out only driveways (eastbound movement stop-controlled):

- Two northbound through lanes
- One southbound shared through/right-turn lane
- One southbound through lane
- One eastbound right-turn lane (minimum 50 feet of storage before first drive aisle)

CONCLUSIONS

Based on the project trip generation, distribution and assignment, queuing, and safety analysis at the proposed project ingress and egress locations, installation of a traffic signal is recommended for the intersection of Palm Drive and the Main Entrance. The northern and southern driveways at Palm Drive should be right-turn in/out only driveways (no left-turns into or out of the project site). The proposed traffic signal will alleviate any egress issues from the main entry as there are limited gaps in traffic on the uncontrolled Palm Drive (making it difficult for vehicles to find ample gaps to comfortably exit the site). A traffic signal is warranted based on the criteria set forth in the MUTCD.

Egress lanes at the main entrance should be at least 100 feet long to accommodate potential queues and to minimize any conflicts with vehicles turning into or out of the internal drive aisles. The egress lanes at the northern and southern driveways should be at least 50 feet long for the same reasons.

If you have any questions or comments, please do not hesitate to email me at mike.arizabal@ibigroup.com.

Thank you,



Mike Arizabal
Senior Transportation Planner
IBI Group

IBI GROUP
18401 Von Karman Avenue – Suite 300
Irvine CA 92612 USA
tel 949 833 5588 fax 949 833 5511
ibigroup.com

Attachment A – LOS Worksheets

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mike Arizabal*
Agency/Co.	*IBI Group*
Date Performed	*2022-10-06*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Palm Drive/North Entry*
Jurisdiction	*Desert Hot Springs*
Analysis Year	*2022*

Project Description *Green Day Village*

East/West Street: *North Entry* | North/South Street: *Palm Drive*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)		*1029*			*1210*	*40*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*1029*	*0*	*0*	*1210*	*40*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*0*	*2*	*0*	*0*	*2*	*0*
Configuration		*T*			*T*	*TR*
Upstream Signal		*0*			*0*	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)			*50*			
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*0*	*0*	*50*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*1*	*0*	*0*	*0*
Configuration			*R*			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration								*R*
v (veh/h)								*50*
C (m) (veh/h)								*488*
v/c								*0.10*
95% queue length								*0.34*
Control Delay (s/veh)								*13.2*
LOS								*B*
Approach Delay (s/veh)	--	--				*13.2*		
Approach LOS	--	--				*B*		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6

Generated: 2022-10-06 11:02 AM

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	*Mike Arizabal*
Agency/Co.	*IBI Group*
Date Performed	*2022-10-06*
Analysis Time Period	*PM Peak Hour*

Site Information

Intersection	*Palm Drive/Main Entry*
Jurisdiction	*Desert Hot Springs*
Analysis Year	*2022*

Project Description *Green Day Village*

East/West Street: *Main Entry* | North/South Street: *Palm Drive*

Intersection Orientation: *North-South* | Study Period (hrs): *0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	*239*	*1029*			*1122*	*100*
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*239*	*1029*	*0*	*0*	*1122*	*100*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Two Way Left Turn Lane*					
RT Channelized			*0*			*0*
Lanes	*1*	*2*	*0*	*0*	*2*	*0*
Configuration	*L*	*T*			*T*	*TR*
Upstream Signal		*0*			*0*	

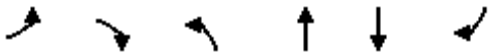
Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	*99*		*132*			
Peak-Hour Factor, PHF	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*	*1.00*
Hourly Flow Rate, HFR (veh/h)	*99*	*0*	*132*	*0*	*0*	*0*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)		*0*			*0*	
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*1*	*0*	*1*	*0*	*0*	*0*
Configuration	*L*		*R*			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*					*L*		*R*
v (veh/h)	*239*					*99*		*132*
C (m) (veh/h)	*578*					*111*		*497*
v/c	*0.41*					*0.89*		*0.27*
95% queue length	*2.02*					*5.39*		*1.06*
Control Delay (s/veh)	*15.5*					*129.8*		*14.8*
LOS	*C*					*F*		*B*
Approach Delay (s/veh)	--	--				*64.1*		
Approach LOS	--	--				*F*		

Copyright © 2010 University of Florida, All Rights Reserved

HCS+™ Version 5.6 Generated: 2022-10-06 11:13 AM



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	99	132	239	1029	1120	100
Future Volume (vph)	99	132	239	1029	1120	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	4.5	4.5	4.5	4.5	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	3539	3496	
Flt Permitted	0.95	1.00	0.19	1.00	1.00	
Satd. Flow (perm)	1770	1583	349	3539	3496	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	108	143	260	1118	1217	109
RTOR Reduction (vph)	0	123	0	0	5	0
Lane Group Flow (vph)	108	20	260	1118	1321	0
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	12.4	12.4	95.3	95.3	95.3	
Effective Green, g (s)	12.4	12.4	95.3	95.3	95.3	
Actuated g/C Ratio	0.11	0.11	0.82	0.82	0.82	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	188	168	285	2890	2854	
v/s Ratio Prot	c0.06			0.32	0.38	
v/s Ratio Perm		0.01	c0.75			
v/c Ratio	0.57	0.12	0.91	0.39	0.46	
Uniform Delay, d1	49.6	47.2	7.7	2.9	3.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	4.2	0.3	34.9	0.4	0.5	
Delay (s)	53.8	47.5	42.6	3.3	3.7	
Level of Service	D	D	D	A	A	
Approach Delay (s)	50.2			10.7	3.7	
Approach LOS	D			B	A	

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	116.7	Sum of lost time (s)	9.0
Intersection Capacity Utilization	64.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

APPENDIX J

PUBLIC SERVICES LETTERS RESPONSES

UltraSystems
environmental•management•planning

June 22, 2022
Project No.: 7129

Steven Fox, Fire Safety Specialist
Desert Hot Springs - Community Development Staff
11999 Palm Drive
Desert Hot Springs, CA 92240

via email at sfox@cityofdhs.org

RE: Information Request Letter for the Green Day Village Project

Dear Mr. Fox,

UltraSystems Environmental Inc. has been retained by LA World Construction to prepare an initial study and mitigated negative declaration (IS/MND) for the Green Day Village Project in the city of Desert Hot Springs in Riverside County. As part of preparation of the IS/MND, we are assessing existing public services serving the project site and environs and what impacts project development may have on those services. We are asking for your assistance in providing information regarding fire facilities and services in the project area and potential project impacts on those services.

Project Location and Existing Conditions

The project site is approximately 38.34 acres of vacant land, west of the Desert Dunes Golf Club on Palm Drive. The Local Vicinity Map is shown on **Figure 1**.

Project Description

The project would involve development of 612 dwelling units comprised of ranging from two-bedroom units to accessory dwelling units. The residential uses would be on the western and central two-thirds of the project site. The eastern third of the project site would be developed with 77,971 square feet of commercial uses comprising 12 buildings: two of which would be restaurants, six retail, one medical office building, and two recycling centers. The medical office building would be two stories and the remainder one story. **Figure 2** shows the project site plan.

The project Land Uses is shown on the table below.

Table 1
PROPOSED LAND USES

Land Use	Residential Units	Square Feet	
		Per unit	Total
Residential			
Two-bedroom, two-story units	184	762 to 886	151,616
One-bedroom, two-story units	184	631	116,104

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

Land Use	Residential Units	Square Feet	
		Per unit	Total
One-bedroom, one-story units	92	389	35,788
Accessory Dwelling Units (ADUs)	92	208	19,136
Loft apartments (one bedroom)	60	548	32,850
Total	**612**	Not applicable	**355,494**
Commercial			
Restaurant/food service (2 buildings)	Not applicable	Not applicable	10,752
Retail (7 spaces)	Not applicable	Not applicable	45,365
Medical Office	Not applicable	Not applicable	21,854
Recycling Centers (2)	Not applicable	Not applicable	720
Total	Not applicable	Not applicable	**77,971**
Community Uses			
Community Center (1)	Not Applicable	Not applicable	8,886
Pool Houses (5)	Not Applicable	1,200	6,000
Farm Equipment (1)	Not Applicable	Not applicable	1,620
Equipment (1)	Not applicable	Not applicable	1,920
Barns (2)	Not Applicable	384	768
Total	Not Applicable	Not Applicable	**19,194**
Total			
Total	Not Applicable	Not Applicable	**452,659**

Source: SKR Architects 2022

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

Existing RCFD Resources Serving Project Site

We understand based on the RCFD website that the Riverside County Fire Department (RCFD) provides fire protection and emergency medical services to the city of Desert Hot Springs. The two stations serving Desert Hot Springs are Station 36 (Skyborne) and Station 37 (Desert Hot Springs). Station 36 is at 11535 Karen Avenue, approximately five miles northwest of the project site, and is equipped with one Type I fire engine; daily staffing is three firefighters. Station 37 is at 65958 Pierson Boulevard, approximately 3.6 miles north of the project site, and is equipped with one Type I engine (staffed) and one Type I reserve engine (unstaffed); daily staffing is three firefighters.

We would be very grateful for your answering the questions below via email no later than June 24, 2022. I will follow up by phone on Thursday June 23.

1. Would proposed project development require RCFD to build any new or expanded fire stations?
   The proposed project would cumulatively impact the fire department's ability to provide timely service to the development. The project location is outside of Station 36 and Station 37's response time goals. The project itself would not necessarily require the immediate need of new facilities, however, the cumulative development of the area will at some point as determined by the fire department.

2. Does RCFD currently plan to build any stations that would serve the project site?
   No, but we continuously assess areas for the need to develop new and/or expanded facilities, additional apparatus, etc.
   a. If so, where?

3. Would project development require RCFD to acquire additional staff or apparatus?
   See response above
   a. If so:
      i. How many staff?
      ii. What apparatus (numbers and types)?

4. Would project development adversely impact RCFD performance measures such as response times?
   See response in question 1 concerning response times

a. If so, would you recommend any measures to minimize or avoid such adverse impacts?
The project will be required to pay Development Impact Fees to contribute to the future needs of new/ expanded facilities and/ or apparatus. The project will also be required to establish a community funding district to assist in the sustainment of current and future staffing needs to provide appropriate levels of service to the development.

Name Adria Reinertson Title Deputy Fire Marshal

Signature _____ Date July 1, 2022

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

Figure 1
LOCAL VICINITY MAP

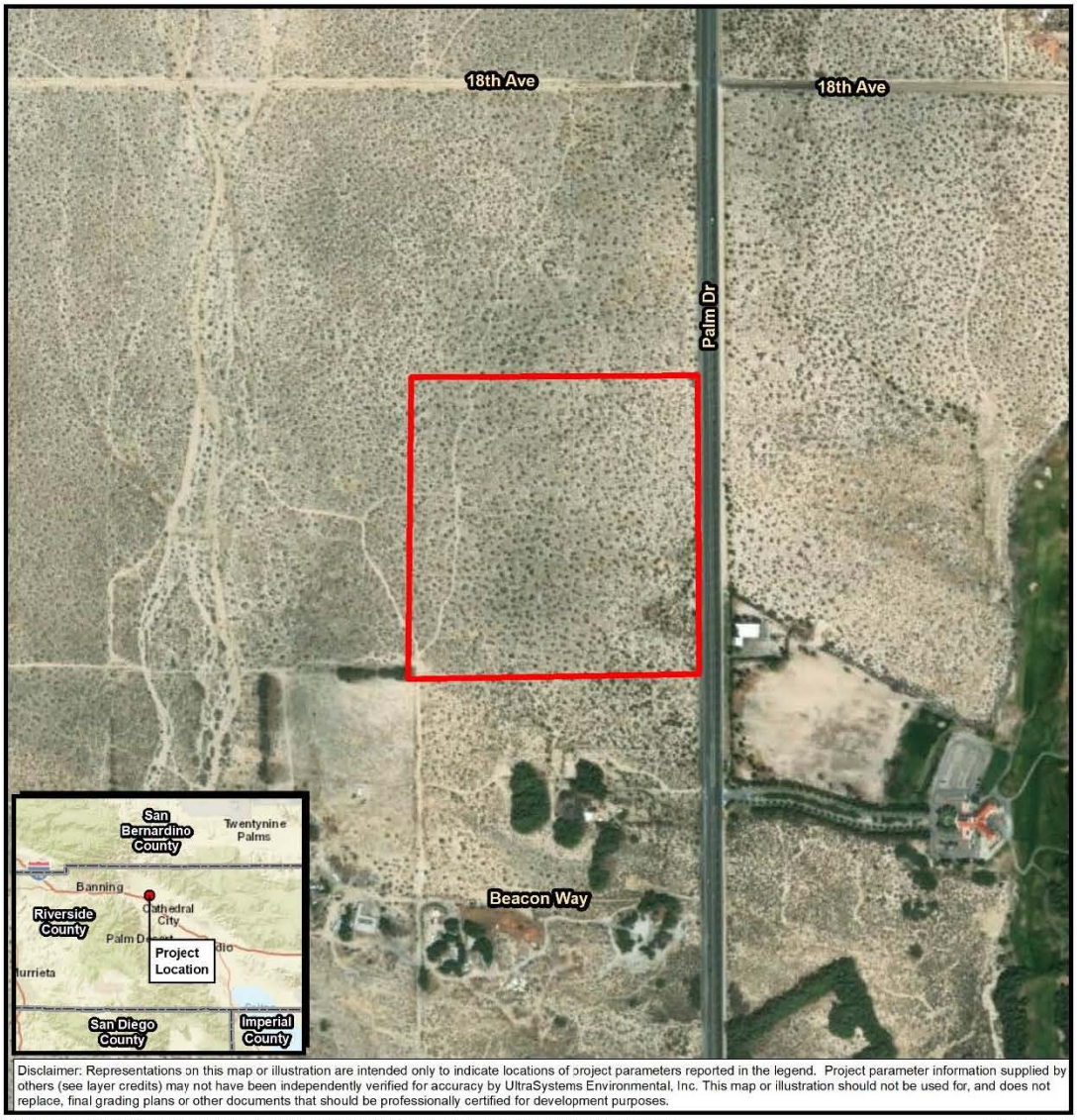
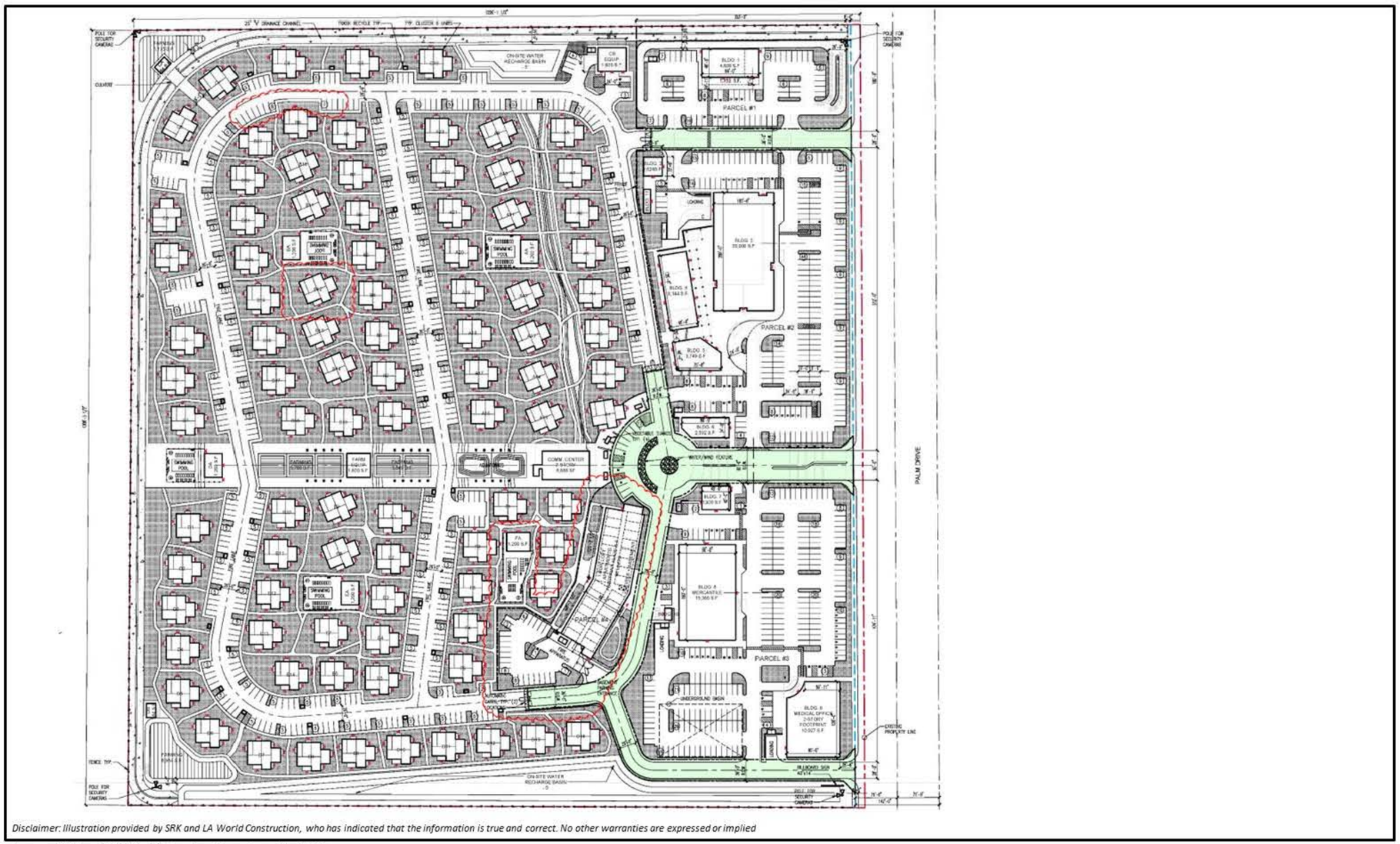


Figure 2
SITE PLAN



Disclaimer: Illustration provided by SRK and LA World Construction, who has indicated that the information is true and correct. No other warranties are expressed or implied

Source: SRK and LA World Construction, June 14, 2022.

Green Day Village
Proposed Site Plan

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

June 22, 2022
Project No.: 7129

Sue Duran
Manager, Riverside County Library
14380 Palm Drive
Desert Hot Springs, CA 92240

via email at sue.duran@rivlib.net

RE: Information Request Letter for the Green Day Village Project

Dear Ms. Duran,

UltraSystems Environmental Inc. has been retained by the LA World Construction to prepare an initial study and mitigated negative declaration (IS/MND) for the Green Day Village Project in the city of Desert Hot Springs in Riverside County. As part of preparation of the IS/MND, we are assessing existing public services serving the project site and environs and what impacts project development may have on those services. We are asking for your assistance in providing information regarding library facilities and services in the project area and potential project impacts on those services.

Project Location and Existing Conditions

The project site is approximately 38.34 acres of vacant land, west of the Desert Dunes Golf Club on Palm Drive. The Local Vicinity Map is shown on **Figure 1**.

Project Description

The project would involve development of 612 dwelling units comprised of ranging from two-bedroom units to accessory dwelling units. The residential uses would be on the western and central two-thirds of the project site. The eastern third of the project site would be developed with 77,971 square feet of commercial uses comprising 12 buildings: two of which would be restaurants, six retail, one medical office building, and two recycling centers. The medical office building would be two stories and the remainder one story. **Figure 2** shows the project site plan.

The project Land Uses is shown on the table below.

Table 1
PROPOSED LAND USES

Land Use	Residential Units	Square Feet	
		Per unit	Total
Residential			
Two-bedroom, two-story units	184	762 to 886	151,616

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

Land Use	Residential Units	Square Feet	
		Per unit	Total
One-bedroom, two-story units	184	631	116,104
One-bedroom, one-story units	92	389	35,788
Accessory Dwelling Units (ADUs)	92	208	19,136
Loft apartments (one bedroom)	60	548	32,850
Total	**612**	Not applicable	**355,494**
Commercial			
Restaurant/food service (2 buildings)	Not applicable	Not applicable	10,752
Retail (7 spaces)	Not applicable	Not applicable	45,365
Medical Office	Not applicable	Not applicable	21,854
Recycling Centers (2)	Not applicable	Not applicable	720
Total	Not applicable	Not applicable	**77,971**
Community Uses			
Community Center (1)	Not Applicable	Not applicable	8,886
Pool Houses (5)	Not Applicable	1,200	6,000
Farm Equipment (1)	Not Applicable	Not applicable	1,620
Equipment (1)	Not applicable	Not applicable	1,920
Barns (2)	Not Applicable	384	768
Total	Not Applicable	Not Applicable	**19,194**
Total			
Total	Not Applicable	Not Applicable	**452,659**

Source: SKR Architects 2022

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

Existing Library Serving Project Site

We understand based on the Riverside County Library's website that the Desert Hot Springs Library is approximately 15,500 square feet in area with total collection of approximately 31,000 items including books, videos, CDs, CDROM software, audiocassettes, books on tape, and pamphlets; and that Riverside County's standard for library space per resident is 0.5 square foot.

We would be very grateful for your answering the questions below via email no later than June 27, 2022. I will follow up by phone on Thursday June 23.

1. Does Riverside County have a service standard for library collection size per resident?

2. Would project development require RCLS to build a new or expanded library facility?

    a. If so:

        i. what additional square footage would be needed?

        ii. What additional collection size, of any, would be needed?

Name _____ Title _____

Signature _____ Date _____

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

Figure 1
LOCAL VICINITY MAP

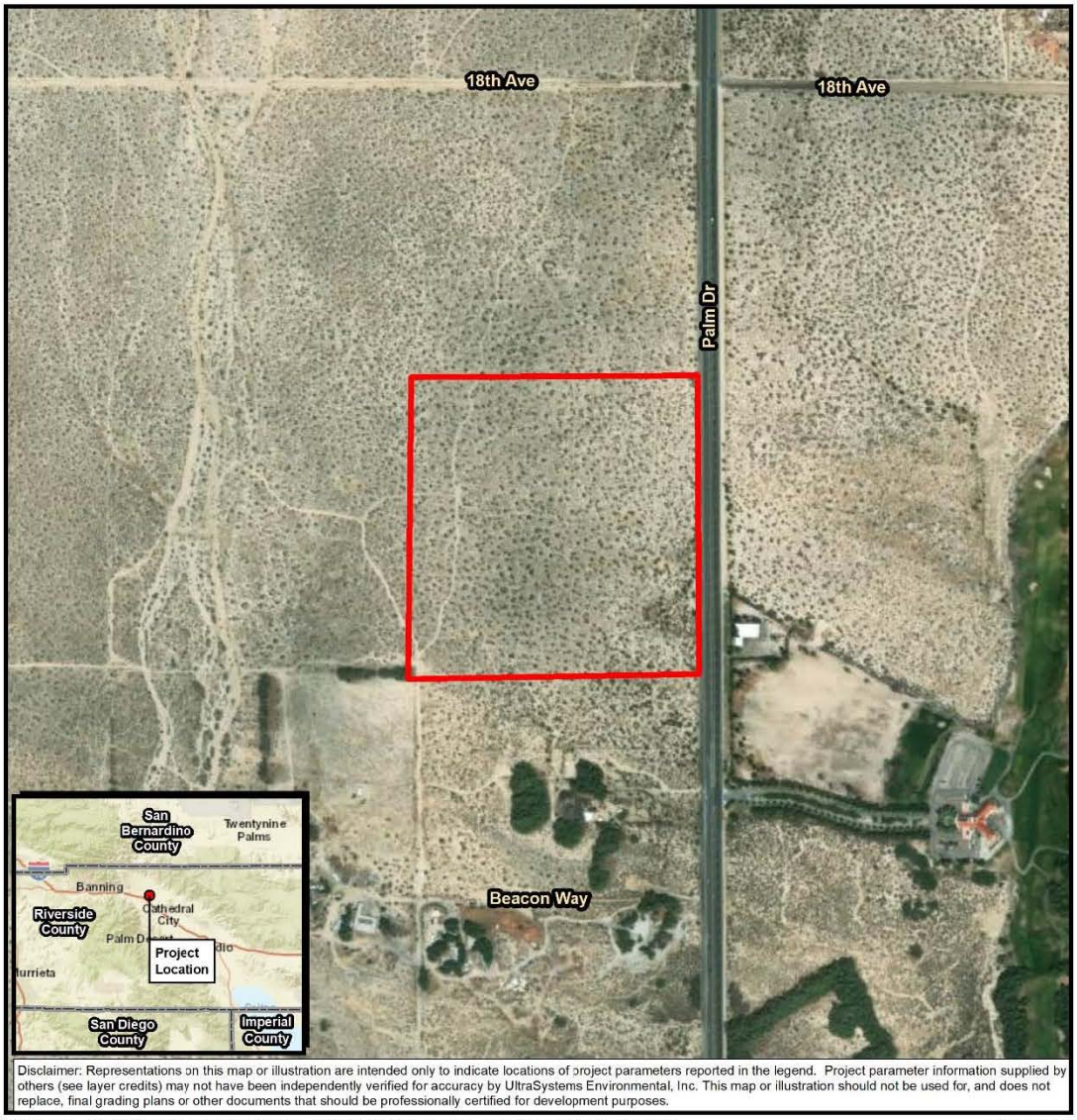
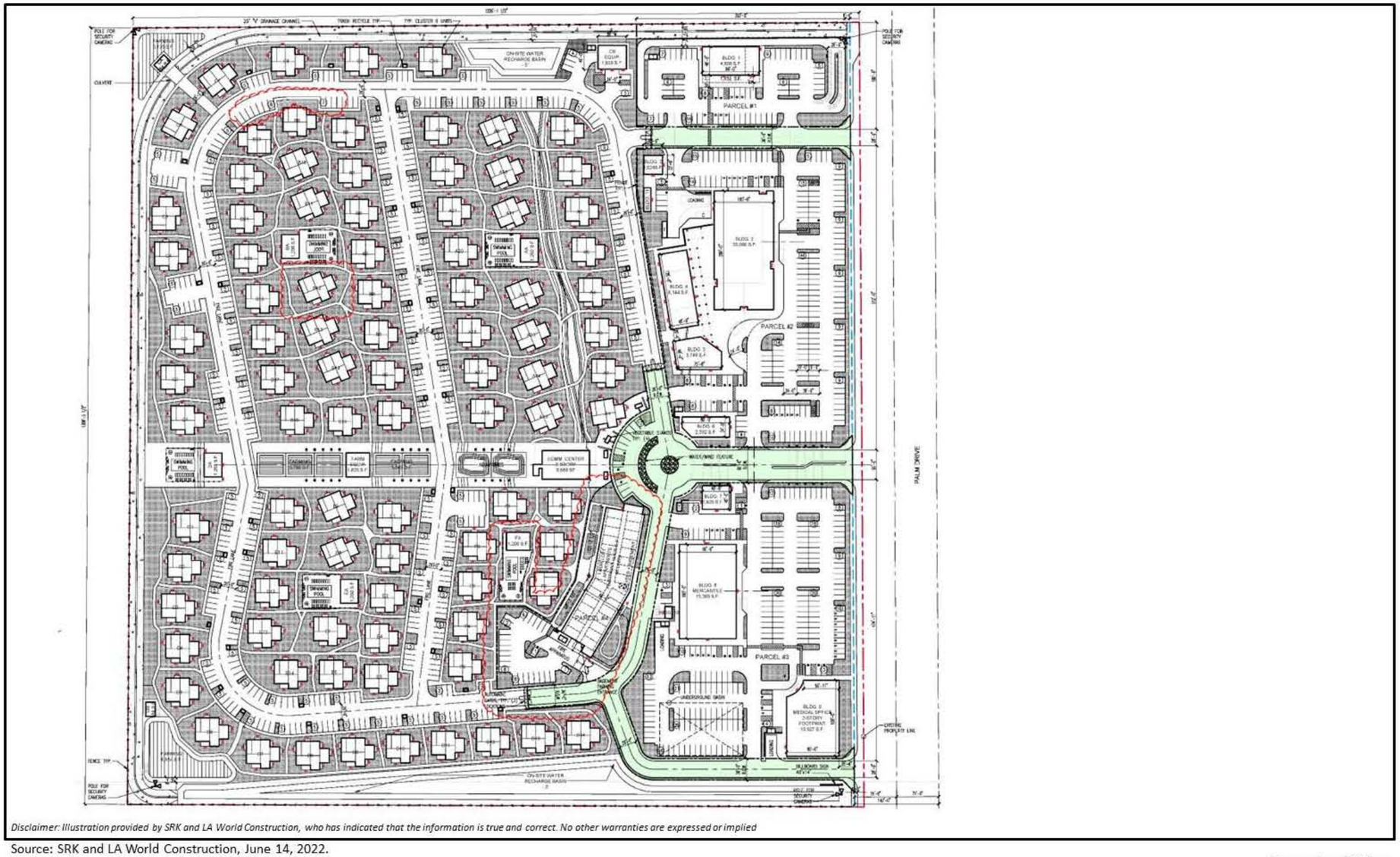


Figure 2
CONCEPTUAL MASTER PLAN



Disclaimer: Illustration provided by SRK and LA World Construction, who has indicated that the information is true and correct. No other warranties are expressed or implied

Source: SRK and LA World Construction, June 14, 2022.

Green Day Village
Proposed Site Plan

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

June 22, 2022
Project No.: 7129

Erick Becerril
Desert Hot Springs Community Development
Community Development Director
11999 Palm Dr.
Desert Hot Springs, CA 92240

via email at ebecerril@cityofdhs.org

RE: Information Request Letter for the Green Day Village Project

Dear Mr. Becerril,

UltraSystems Environmental Inc. has been retained by LA World Construction to prepare an initial study and mitigated negative declaration (IS/MND) for the Green Day Village Project in the city of Desert Hot Springs in Riverside County. As part of preparation of the IS/MND, we are assessing existing public services serving the project site and environs and what impacts project development may have on those services. We are asking for your assistance in providing information regarding park facilities and services in the project area and potential project impacts on those services.

Project Location and Existing Conditions

The project site is approximately 38.34 acres of vacant land, west of the Desert Dunes Golf Club on Palm Drive. The Local Vicinity Map is shown on **Figure 1**.

Project Description

The project would involve development of 612 dwelling units comprised of ranging from two-bedroom units to accessory dwelling units. The residential uses would be on the western and central two-thirds of the project site. The eastern third of the project site would be developed with 77,971 square feet of commercial uses comprising 12 buildings: two of which would be restaurants, six retail, one medical office building, and two recycling centers. The medical office building would be two stories and the remainder one story. **Figure 2** shows the project site plan.

The project Land Uses is shown on the table below.

Table 1
PROPOSED LAND USES

Land Use	Residential Units	Square Feet	
		Per unit	Total
Residential			
Two-bedroom, two-story units	184	762 to 886	151,616
One-bedroom, two-story units	184	631	116,104

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

Land Use	Residential Units	Square Feet	
		Per unit	Total
One-bedroom, one-story units	92	389	35,788
Accessory Dwelling Units (ADUs)	92	208	19,136
Loft apartments (one bedroom)	60	548	32,850
Total	**612**	Not applicable	**355,494**
Commercial			
Restaurant/food service (2 buildings)	Not applicable	Not applicable	10,752
Retail (7 spaces)	Not applicable	Not applicable	45,365
Medical Office	Not applicable	Not applicable	21,854
Recycling Centers (2)	Not applicable	Not applicable	720
Total	Not applicable	Not applicable	**77,971**
Community Uses			
Community Center (1)	Not Applicable	Not applicable	8,886
Pool Houses (5)	Not Applicable	1,200	6,000
Farm Equipment (1)	Not Applicable	Not applicable	1,620
Equipment (1)	Not applicable	Not applicable	1,920
Barns (2)	Not Applicable	384	768
Total	Not Applicable	Not Applicable	**19,194**
Total			
Total	Not Applicable	Not Applicable	**452,659**

Source: SKR Architects 2022

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

Existing Desert Hot Springs Parks Near Project Site

We understand that three Desert Hot Springs parks near the project site are Mission Springs Park at 14510 Palm Drive; Constitution Park at 11-777 West Dr; and Wardman Park 66190 8th St.

We would be very grateful for your answering the questions below via email no later than June 27, 2022. I will follow up by phone Thursday June 23.

1. Is Desert Hot Springs currently meeting its standard—set forth in its General Plan—of three acres of parkland per 1,000 residents?

2. Does the city of Desert Hot Springs currently plan to build any new or expanded park?

3. Would project development require the city of Desert Hot Springs to build a new or expanded park to adhere to the parkland standard identified in Question 1?

    a. If so, what additional acreage would be needed?

Name _____ Title _____

Signature _____ Date _____

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

Figure 1
LOCAL VICINITY MAP

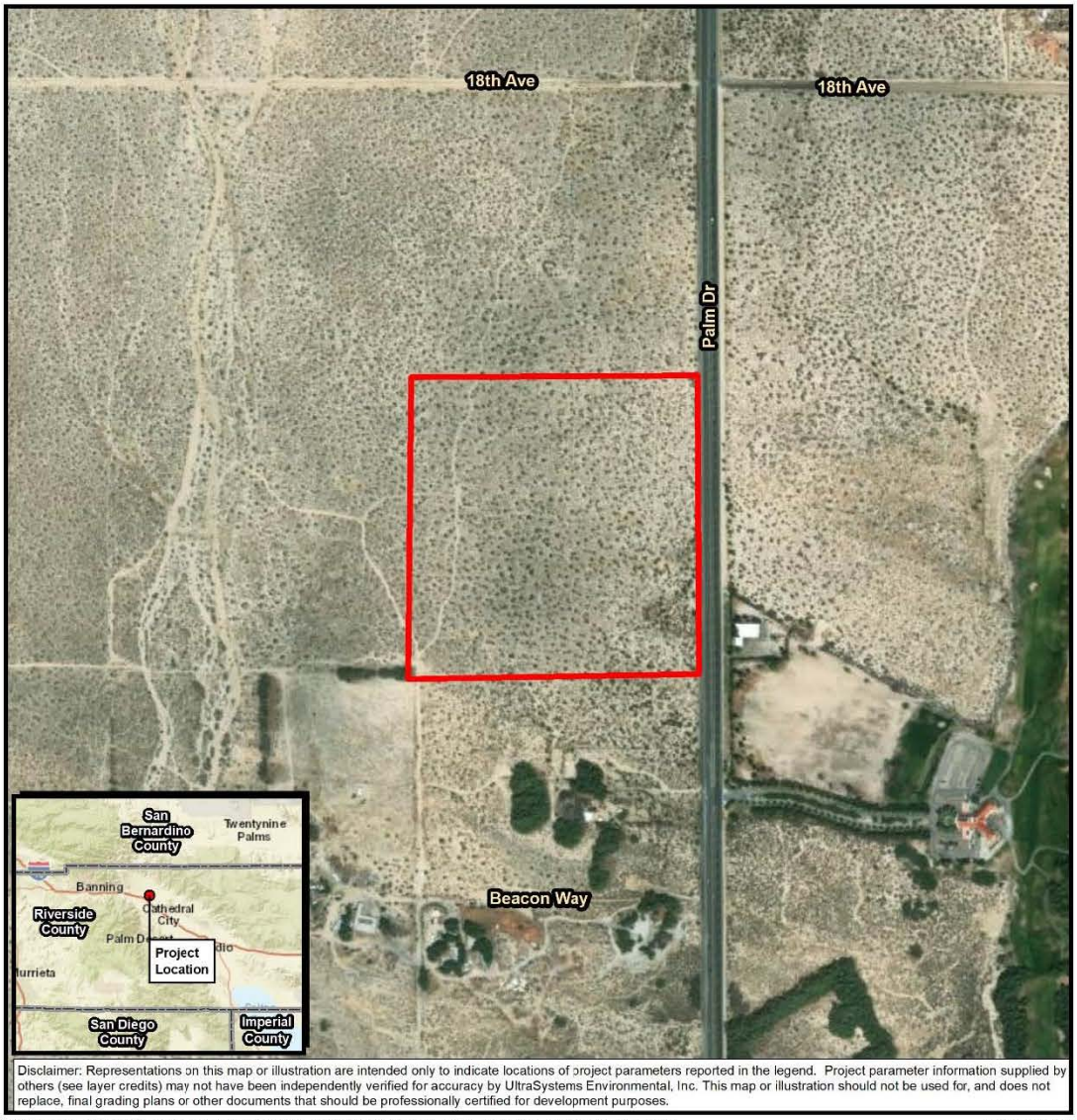
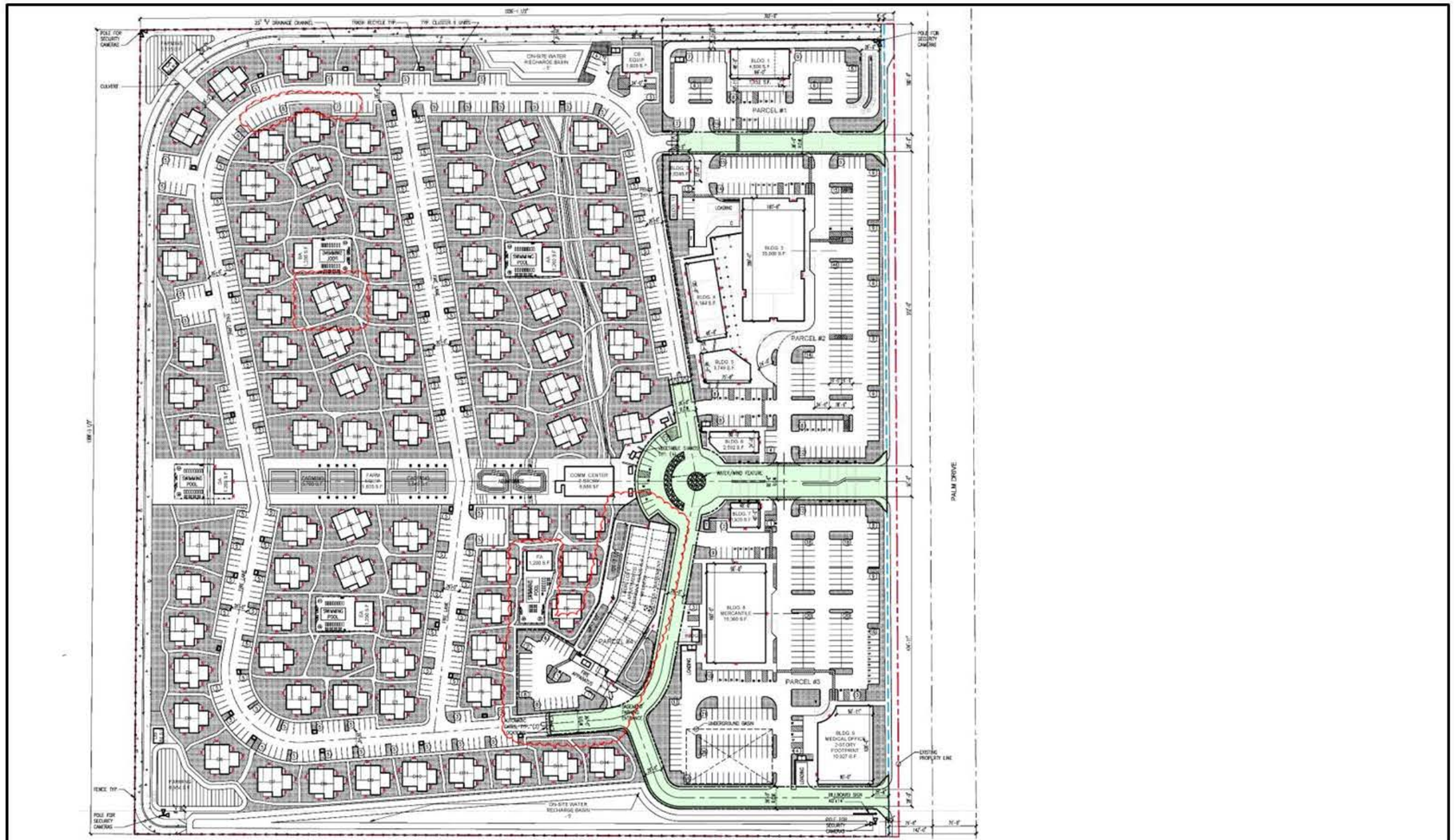


Figure 2
CONCEPTUAL MASTER PLAN



Disclaimer: Illustration provided by SRK and LA World Construction, who has indicated that the information is true and correct. No other warranties are expressed or implied

Source: SRK and LA World Construction, June 14, 2022.

Green Day Village
Proposed Site Plan

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

Michael Milroy

From: Jilleen Ferris <jferris@cityofdhs.org> on behalf of Jilleen Ferris
Sent: Wednesday, June 29, 2022 4:30 PM
To: Erick Becerril; Nicholas Haecker
Cc: mmilroy@ultrasystems.com; Patricia Villagomez; Daniel Porras; Doria Wilms
Subject: RE: inquiry, impacts on park facilities, Green Day Village project

Erick,

As for item #1, that would probably be determined by an outside consultant.

As for item #2, we only have one new park currently in design, but we do not have funding for construction.

Item #3 would be determined by the environmental consultant.

Best regards,

Jilleen Ferris, P.E. | ***City Engineer***

Office: (760) 329-6411 ext. 220 Fax: (760) 288-0639
City of Desert Hot Springs
11999 Palm Drive, Desert Hot Springs, CA 92240
www.cityofdhs.org

From: Erick Becerril <ebecerril@cityofdhs.org>
Sent: Tuesday, June 28, 2022 8:10 AM
To: Nicholas Haecker <nhaecker@cityofdhs.org>; Jilleen Ferris <jferris@cityofdhs.org>
Cc: mmilroy@ultrasystems.com; Patricia Villagomez <pvillagomez@cityofdhs.org>; Daniel Porras <dporras@cityofdhs.org>; Doria Wilms <dwilms@cityofdhs.org>
Subject: RE: inquiry, impacts on park facilities, Green Day Village project

Hi Nick and Jilleen,

I just got off the phone with the environmental consultant, Ultrasystems, that is handling the Greenday Village project. He has the following questions regarding parks. Any help gathering these answers would be greatly appreciated.

1. Is Desert Hot Springs currently meeting its standard—set forth in its General Plan—of three acres of parkland per 1,000 residents?

2. Does the city of Desert Hot Springs currently plan to build any new or expanded park?

3. Would project development require the city of Desert Hot Springs to build a new or expanded park to adhere to the parkland standard identified in Question 1?

    a. If so, what additional acreage would be needed?

Erick Becerril | *Community Development Director*

Office: (760) 329-6411 ext. 240 Fax: (760) 288-0639
City of Desert Hot Springs
11999 Palm Drive, Desert Hot Springs, CA 92240
www.cityofdhs.org

From: mmilroy@ultrasystems.com <mmilroy@ultrasystems.com>
Sent: Wednesday, June 22, 2022 5:43 PM
To: Erick Becerril <ebecerril@cityofdhs.org>
Subject: inquiry, impacts on park facilities, Green Day Village project

CAUTION: This email originated from outside of our organization. Do not click on links or open attachments unless you recognize the sender and know that the content is safe. Thank you.

Dear Mr. Becerril,

UltraSystems Environmental Inc. has been retained by LA World Construction to prepare an initial study and mitigated negative declaration (IS/MND) for the Green Day Village Project in the city of Desert Hot Springs in Riverside County. As part of preparation of the IS/MND, we are assessing existing public services serving the project site and environs and what impacts project development may have on those services. We are asking for your assistance in providing information regarding park facilities and services in the project area and potential project impacts on those services.

We have attached a service letter, including a few questions, in pdf and Word formats.

I will follow up by phone tomorrow.

We thank you much for your help.

Michael Milroy | Assistant Project Manager

June 22, 2022
Project No.: 7129

Julie Arthur via email at jarthur@psusd.us
Executive Director
Palm Springs Unified School District, Facilities Planning and Development
150 District Center Drive
Palm Springs, CA 92264

RE: Information Request Letter for the Green Day Village Project

Dear Ms. Arthur,

UltraSystems Environmental Inc. has been retained by the LA World Construction to prepare an initial study and mitigated negative declaration (IS/MND) for the Green Day Village Project in the city of Desert Hot Springs in Riverside County. As part of preparation of the IS/MND, we are assessing existing public services serving the project site and environs and what impacts project development may have on those services. We are asking for your assistance in providing information regarding library facilities and services in the project area and potential project impacts on those services.

Project Location and Existing Conditions

The project site is approximately 38.34 acres of vacant land, west of the Desert Dunes Golf Club on Palm Drive. The Local Vicinity Map is shown on **Figure 1**.

Project Description

The project would involve development of 612 dwelling units comprised of ranging from two-bedroom units to accessory dwelling units. The residential uses would be on the western and central two-thirds of the project site. The eastern third of the project site would be developed with 77,971 square feet of commercial uses comprising 12 buildings: two of which would be restaurants, six retail, one medical office building, and two recycling centers. The medical office building would be two stories and the remainder one story. **Figure 2** shows the project site plan.

The project Land Uses is shown on the table below.

Table 1
PROPOSED LAND USES

Land Use	Residential Units	Square Feet	
		Per unit	Total
Residential			
Two-bedroom, two-story units	184	762 to 886	151,616
One-bedroom, two-story units	184	631	116,104
One-bedroom, one-story units	92	389	35,788
Accessory Dwelling Units (ADUs)	92	208	19,136
Loft apartments (one bedroom)	60	548	32,850
Total	**612**	Not applicable	**355,494**
Commercial			
Restaurant/food service (2 buildings)	Not applicable	Not applicable	10,752
Retail (7 spaces)	Not applicable	Not applicable	45,365
Medical Office	Not applicable	Not applicable	21,854
Recycling Centers (2)	Not applicable	Not applicable	720
Total	Not applicable	Not applicable	**77,971**
Community Uses			
Community Center (1)	Not Applicable	Not applicable	8,886
Pool Houses (5)	Not Applicable	1,200	6,000
Farm Equipment (1)	Not Applicable	Not applicable	1,620
Equipment (1)	Not applicable	Not applicable	1,920
Barns (2)	Not Applicable	384	768
Total	Not Applicable	Not Applicable	**19,194**
Total			

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

Land Use	Residential Units	Square Feet	
		Per unit	Total
Total	Not Applicable	Not Applicable	**452,659**

Existing PSUSD Schools Serving Project Site

We understand based on PSUSD's *School Locator* that the three following schools serve the project site:

Table 2
LOCAL SCHOOL ENROLLMENT CAPACITY

School	Grade Levels	Address	Enrollment	Capacity
Two Bunch Palms Elementary	K-5	14250 West Drive	710	1200
Painted Hills Middle School	6-8	9250 Sonora Drive	788	1300
Desert Hot Springs High School	9-12	65850 Pierson Boulevard	1892	2600

We would be very grateful for your answering the questions below via email no later than June 27, 2022. I will follow up by phone on Thursday June 23.

UltraSystems
environmental•management•planning

1. Please fill in enrollment (from May 2022) and capacities for the three schools in the table above.

2. Would project development require PSUSD to add capacity at any of its schools? *Capacity is currently available at the schools slated to serve this development.*

    a. If so, what:

        i. Capacity _____ school _____

        ii. Capacity _____ school _____

        iii. Capacity _____ school _____

Name Julie Arthur Title Executive Director of Facilities Planning

Signature Julie Arthur Date June 29, 2022

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

Figure 1
LOCAL VICINITY MAP

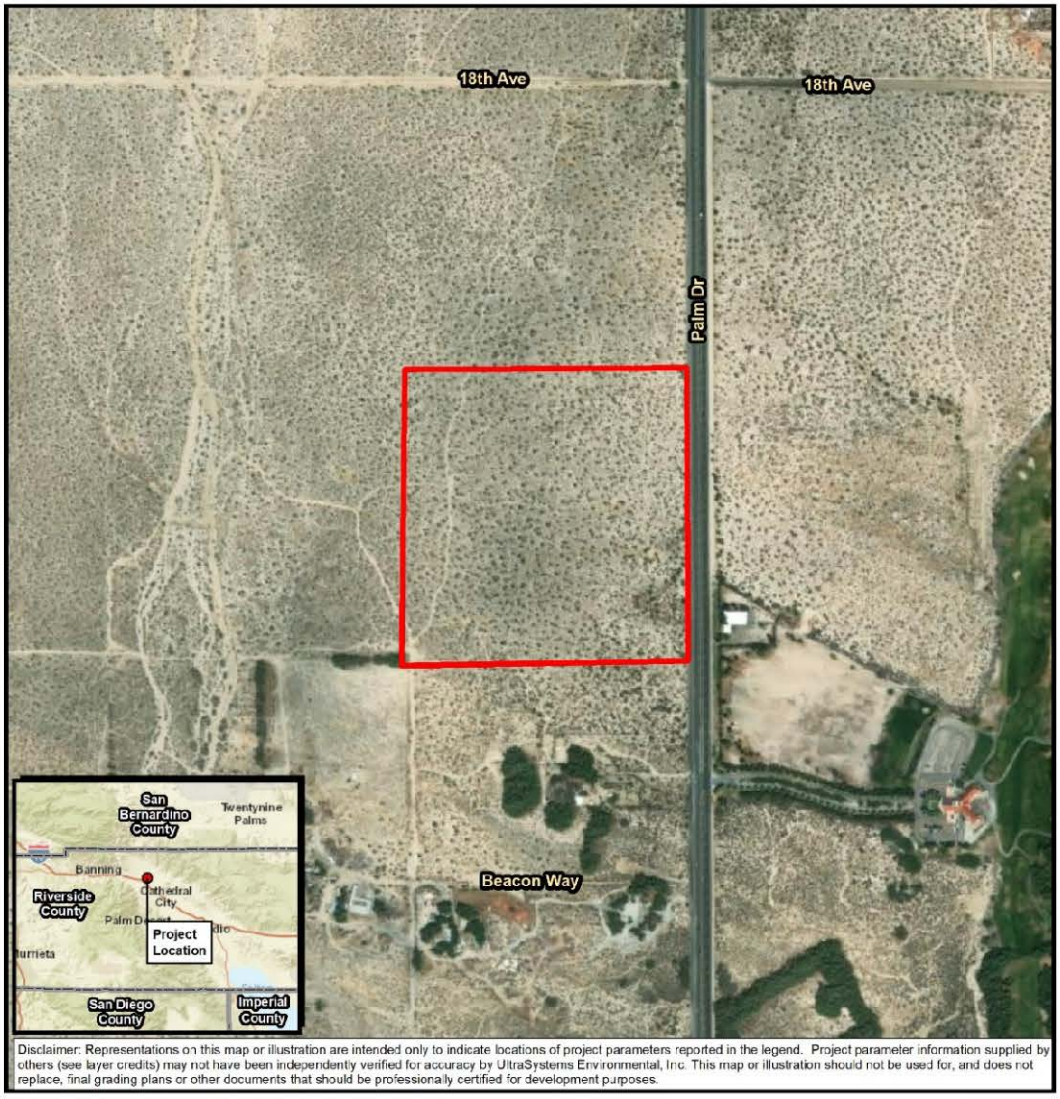
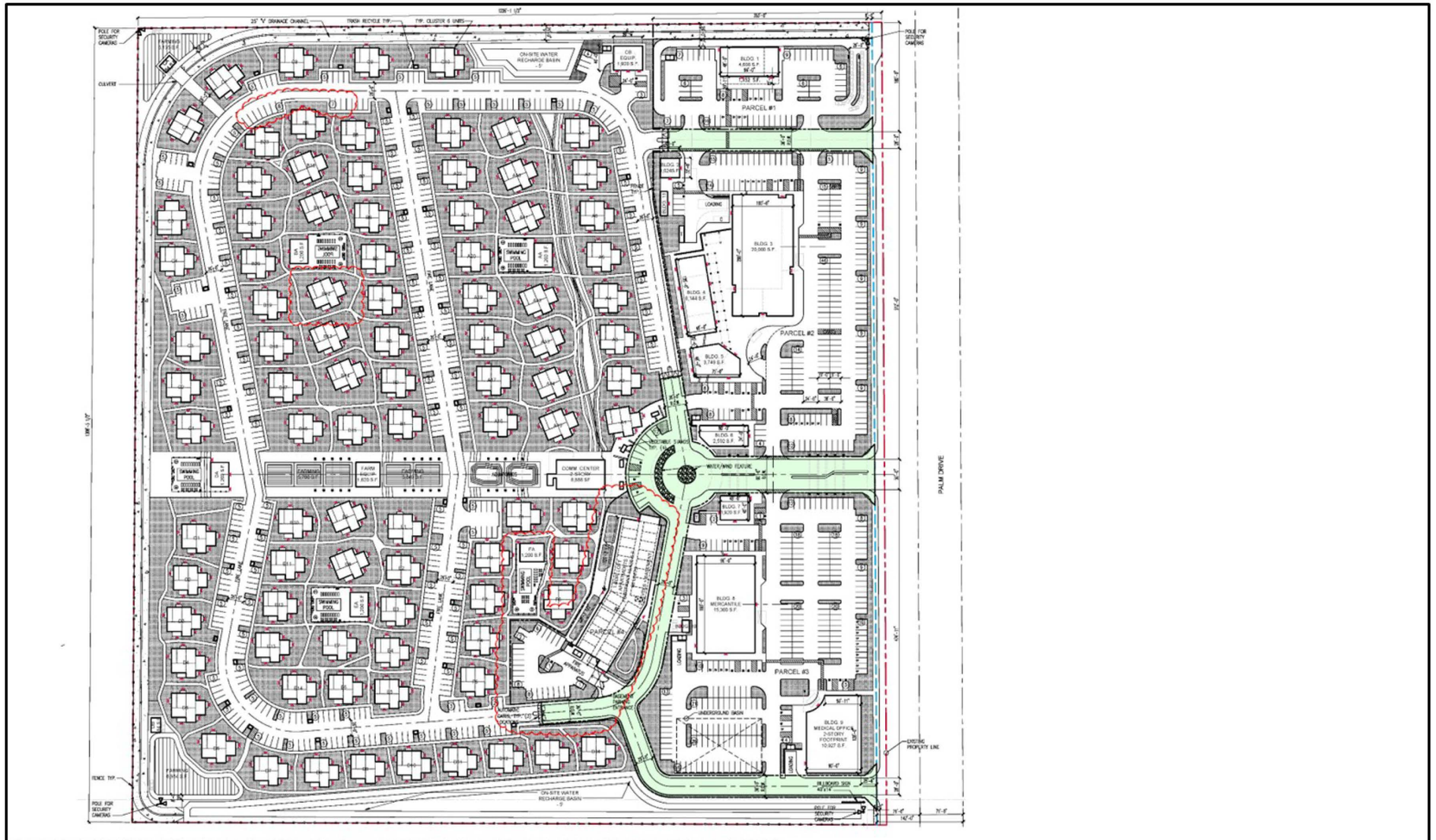


Figure 2
SITE PLAN



Disclaimer: Illustration provided by SRK and LA World Construction, who has indicated that the information is true and correct. No other warranties are expressed or implied

Source: SRK and LA World Construction, June 14, 2022.

Green Day Village
Proposed Site Plan

PSUSD
PALM SPRINGS
UNIFIED
SCHOOL DISTRICT

150 District Center Drive | Palm Springs, CA 92264
Phone 760-883-2710, ext. 4806142 | www.PSUSD.us

Julie Arthur, *Executive Director*

Facilities
Planning &
Development

June 29, 2022

Ultra Systems
Corporate Office - Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Re: Green Day Project

To Whom It May Concern:

The following elementary, middle, and high schools serve your development:

Two Bunch Palms Elementary School
14250 West Drive
Desert Hot Springs, CA 92240
(760) 251-7220

Painted Hills Middle School
9250 Sonora Drive
Desert Hot Springs, CA 92240
(760) 251-1551

Desert Hot Springs High School
65850 Pierson Boulevard
Desert Hot Springs, CA 92240
(760) 288-7000

Bussing is available to Painted Hills Middle School. Bussing is not available to Two Bunch Palms Elementary School or Desert Hot Springs High School.

School developer fees are calculated at $4.79 per square foot for residential construction and $.78 per square foot for Commercial/Industrial construction and Greenhouse/Agricultural buildings.

If you have any questions regarding hours of collection and/or receipting of school fees, call Fiscal Services at (760) 883-2710, ext. 6076. Thank you.

Sincerely,

Yolonda M. Mann
Facilities Planning Assistant

Attachment

cc: Julie Arthur, Executive Director

UltraSystems
environmental•management•planning

June 22, 2022
Project No.: 7129

Corinn Lindsey
Desert Hot Springs Police Department, Police Commander
65950 Pierson Boulevard
Desert Hot Springs, CA 92240

via email at clindsey@dhspd.com

RE: Information Request Letter for the Green Day Village Project

Dear Ms. Lindsey,

UltraSystems Environmental Inc. has been retained by the LA World Construction to prepare an initial study and mitigated negative declaration (IS/MND) for the Green Day Village Project in the city of Desert Hot Springs in Riverside County. As part of preparation of the IS/MND, we are assessing existing public services serving the project site and environs and what impacts project development may have on those services. We are asking for your assistance in providing information regarding library facilities and services in the project area and potential project impacts on those services.

Project Location and Existing Conditions

The project site is approximately 38.34 acres of vacant land, west of the Desert Dunes Golf Club on Palm Drive. The Local Vicinity Map is shown on **Figure 1**.

Project Description

The project would involve development of 624 dwelling units comprised of one-bedroom and studdi units; accessory dwelling units (ADUs); and a 72-unit assisted living facility. The residential uses would be on the western and central two-thirds of the project site. The eastern third of the project site would be developed with 71,806 square feet of commercial uses comprising nine buildings: two of which would be restaurants, six retail, and one medical office building. The medical office building would be two stories and the remainder one story. **Figure 2** shows the project site plan.

The project Land Uses is shown on the table below.

Table 1
PROPOSED LAND USES

Land Use	Units	Square feet	
		Per unit	total
Residential			
One bedroom	368	628.5 to 886	267,444
studio	92	389	35,788
ADU	92	208	19,136

UltraSystems
environmental•management•planning

Land Use	Units	Square feet	
		Per unit	total
Assisted Living	72	426.7 average per unit	30,724
Total	624	Not applicable	**353,092**
Commercial			
Retail	6	Not applicable	39,200
Restaurants	2	Not applicable	10,752
Medical office building	1	Not applicable	21,854
Total	9	Not applicable	**71,806**
Community			
Barns	2	Not applicable	1,694
Farm Equipment	1	Not applicable	1,629
Community Center	1	Not applicable	3,472
Pool Houses	5	1,200	6,000
Total	9	Not applicable	**12,795**
Grand Total	Not applicable	Not applicable	**437,693**

Existing Police Department Resources Serving Project Site
We understand based on the Desert Hot Springs Police Department (DHSPD)'s website that the nearest police station to the project site is at 65-950 Pierson Boulevard; a satellite office is at 66140 West Arroyo in Tedesco Park. The DHSPD staff numbers 41 including 30 sworn officers.**We would be very grateful for your answering the questions below via email no later than June 27, 2022.** I will follow up by phone on Thursday June 23.

1. Would proposed project development require DHSPD to build any new or expanded police stations? NO
    a. If so, where?

2. Would project development require DHSPD to acquire additional staff or vehicles? No
    a. If so, how many:
        i. Staff?
        ii. vehicles

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

3. Would project development adversely impact DHSPD performance measures such as response times? No

   a. If so, would you recommend any measures to minimize or avoid such adverse impacts?

Name Steven Shaw Title Deputy Chief

Signature SF8 Date 10/6/22

Corporate Office – Orange County
16431 Scientific Way
Irvine, CA 92618-4355

Telephone: 949.788.4900
Facsimile: 949.788.4901
Website: www.ultrasystems.com

UltraSystems
environmental•management•planning

Figure 1
LOCAL VICINITY MAP

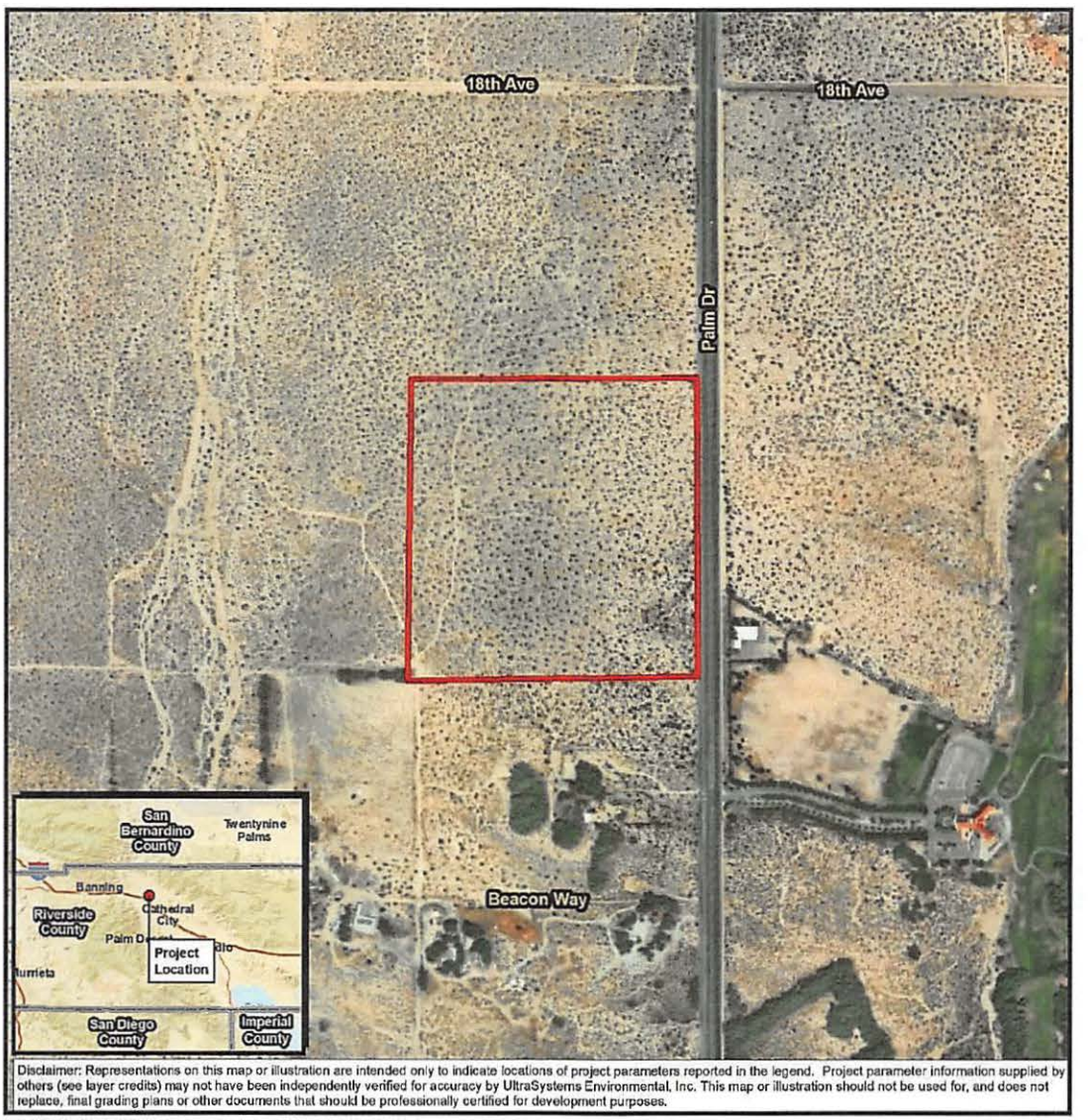


Figure 2
SITE PLAN

