PRELIMINARY DRAINAGE STUDY AND STORMWATER QUALITY STUDY FOR SQX WATT

LEVEL 3 DRAINAGE STUDY

PLNP2022-00353

Watershed: Hagginwood Creek
Vertical Datum: NAVD-88

Job Number: 19682

Revised September 13, 2023
Revised August 16, 2023
April 12, 2023

RICK ENGINEERING COMPANY

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ENGINEERING COMPANY
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PRELIMINARY DRAINAGE STUDY AND

STORMWATER QUALITY STUDY

FOR SQX WATT

Job Number 19682

09/13/2023

M. Scott Lillibridge

R.C.E. #52504, Exp. 12/24

Region Manager

Prepared For:

William Warren Group
201 Wilshire Boulevard
Santa Monica, CA 90401

Prepared By:

Rick Engineering Company
2525 East Bidwell Street
Folsom, CA 95630
(916) 638-8200
www.rickengineering.com

Revised September 13, 2023
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List of Attachments

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Revised September 13, 2023

SUBJECT: Preliminary Drainage Study and Stormwater Quality Study for SQX Watt
(RICK Job Number: 19682)

1.0 Introduction

This memorandum presents the results of the preliminary drainage and stormwater quality analysis prepared for the proposed SQX Watt project in Sacramento County, California. The proposed project site is located at 3438 Watt Ave and is shown on the vicinity map in Figure 1, below. The project site consists of one parcel of approximately 1.6 acres and is currently fully developed with an existing vacant building and parking lot. The proposed project is a multi-story self storage building with associated improvements.

The project site is shown on the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) number 06067C0069H, effective August 16, 2012. The project site is shown within FEMA Zone X (un-shaded), areas of minimal flood hazard, no FEMA submittals are anticipated for the project. An annotated FIRMette is included in Attachment 1.

Figure 1: Vicinity Map

2.0 Hydrology

2.1. On-Site Hydrology

The Nolte flows for the proposed site were determined using SacCalc. A workmap for the hydrologic basins is included in Attachment 4. Output from the SacCalc Nolte model and backup information used to develop the model are included in Attachment 2.

Proposed condition HEC-1 hydrology for the 100-year, 24-hour storm has been calculated utilizing the SacCalc software. Output from the SacCalc models and backup information used to develop the SacCalc model are included in Attachment 2. Executable copies of the SacCalc models are included with the electronic files in Attachment 7. A copy of the projects grading plan is included in Attachment 6.

2.2. Peak Flow Attenuation

The existing project site is completely impervious. The proposed project includes roughly 10% of the site areas as pervious areas. Therefore, it is anticipated that the project will result in reduced peak flows in the proposed condition. Additionally, the project proposes to utilize an underground infiltration basin as part of compliance with water quality requirements for the site. The infiltration basin will provide incidental storage and peak flow attenuation with its inclusion on the site. No detention storage is anticipated to be required for the site.

3.0 Hydraulics

3.1 Inlets

The proposed onsite inlets will be designed using the Hydraflow Storm Sewers Extension for AutoCAD Civil3D (v.12), which utilizes FHWA HEC-22 inlet calculation methodology, to intercept the Nolte flow determined from the SacCalc model described in Section 2. Grate inlets will be designed assuming 50% clogging to account for the grate and debris build up.

3.2 Storm Drain System

The proposed storm drain system will be designed using the Hydraflow Storm Sewers Extension for AutoCAD Civil3D (v.12). The on-site storm drain system will be designed to maintain a minimum of 0.5 foot freeboard to the inlets using the Nolte flow determined from the SacCalc model described in Section 2. The proposed storm drain system will discharge to the existing inlet in Watt Avenue at the southwest corner of the site. As discussed in Section 2.2, the proposed project will result in reduced peak flows from the site so no negative impacts to the existing storm drain system in Watt Avenue or the existing system along the southern property line are anticipated.

3.3 Overland Release

The project has been designed to provide a continuous slope from the northeast corner, to the south and then west, to the southwest corner of the site where it will flow into Watt Avenue. The overland release path is shown on the workmap in Attachment 3. A calculation for the conveyance of the 100-year storm event through the drive aisle is included in Attachment 3 which assumes no flow is intercepted in the proposed storm drain system.

4.0 Water Quality

The proposed project is a commercial/industrial development which creates more than 1 acre of impervious area. Pursuant to Table 3-2 of the Stormwater Quality Design Manual for the Sacramento Region (SQDM), dated July 2018; the proposed project is required to provide source control, hydromodification control, low impact development control (LID), treatment control measures, and full trash capture control.

4.1 Source Control

Per Table 3-3 of the SQDM, the project is anticipated to provide the following source control measures:

- Efficient Irrigation
- Landscaping
- Storm Drain Markings and Signs
- Waste Management Areas

4.2 Hydromodification Control

Per Figure 5-2 of the SQDM, the project is located in an area where hydromodification control is exempt. An annotated copy of Figure 5-2 is included in Attachment 5.

4.3 LID, Treatment, and Full Trash Capture Control

The proposed LID measure for the project site is an underground infiltration basin which has been sized to provide a minimum of 100 LID points for the project's DMA. The project site consists of soils with very low infiltration rates. The proposed project LID and treatment strategy was discussed with Archie Wright at Sacramento County on July 20, 2023. Pursuant to the conversation, the proposed underground infiltration basin is acceptable to the county because the project is also proposing to utilize Treatment Control measures in addition to the infiltration basin.

Treatment control and full trash capture for the project is proposed to be provided by utilizing a Contech Stormfilter proprietary device prior to discharging to the municipal drainage system. Calculations for the required LID credits and treatment flow rates are included in Attachment 5. The post-construction stormwater quality plan for the project is included in Attachment 4. A copy of the LID credits worksheet is included with the electronic files in Attachment 7.

4.4 Operation and Maintenance

Operation, maintenance, and long-term performance of the proposed LID, Treatment, and Full Trash Capture Control will be the property owner's responsibility. The property owner will enter into a maintenance agreement, covenant, or permit with Sacramento County as required.

5.0 Attachments

Attachment 1: FEMA FIRMette
Attachment 2: Hydrologic Calculations
Attachment 3: Hydraulic Calculations
Attachment 4: Stormwater Quality Conceptual Plan
Attachment 5: Water Quality Calculations
Attachment 6: Proposed Grading Plan
Attachment 7: Electronic Files

Sincerely,

RICK ENGINEERING COMPANY

M. Scott Lillibridge
R.C.E. #52504, Exp. 12/24
Region Manager

Attachment 1

FEMA FIRMette

Attachment 2

Hydrologic Calculations

Attachment 3

Hydraulic Calculations

Attachment 4

Stormwater Quality Conceptual Plan

Attachment 5

Water Quality Calculations

Attachment 6

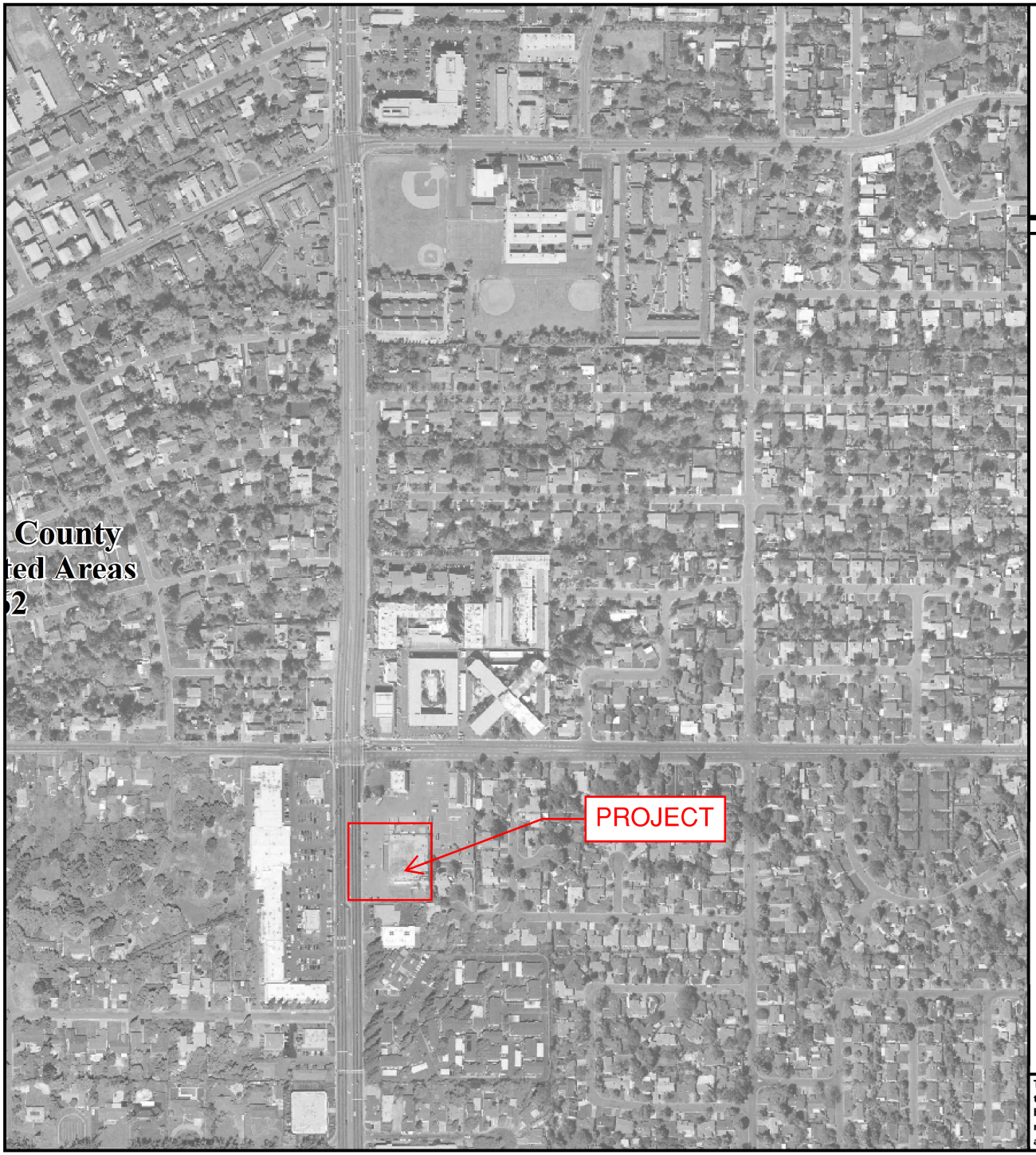
Proposed Grading Plan

Attachment 7

Electronic Files

Attachment 1

FEMA FIRMette



MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0069H

FIRM

FLOOD INSURANCE RATE MAP

SACRAMENTO COUNTY, CALIFORNIA

AND INCORPORATED AREAS

PANEL 69 OF 705

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
SACRAMENTO, CITY OF	060266	0069	H
SACRAMENTO COUNTY	060262	0069	H

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
06067C0069H

EFFECTIVE DATE
AUGUST 16, 2012

Federal Emergency Management Agency

Attachment 2

Hydrologic Calculations

Nolte method results
(Project: 19682 SQX Watt)
(Hydrologic zone 3)

ID	Drainage area (acres)	Impervious area (%)	Design Q (cfs)
DMA1	1.33	90.00	0.69

Sacramento Hydrologic Calculator Report

April 11, 2023 15:32

Project Title: 19682 SQX Watt
Comments:
Prepared by:

Method: Nolte method
Date: 4/11/2023

Watershed Hydrologic Summary Data

Watershed	Area (acres)	Area Percent											
		Given as	90	85	80	75	70	60	50	40	30	25	20
DMA1	1.33	fraction	100										

Refer to the Drainage manual for Land Use Impervious Area Percent

View HEC-1 output

Sacramento method results
(Project: 19682 Proposed)
(100-year, 1-day rainfall)

ID	Peak flow (cfs)	Time of peak (hours)	Basin area (sq. mi)	Peak stage (feet)	Peak storage (ac-ft)	Diversion volume (ac-ft)
DMA1	4.7	12:02	.00			

Sacramento Hydrologic Calculator Report

April 11, 2023 15:34

Project Title: 19682 Proposed
Comments:
Prepared by:

Method: Sacramento County HEC-1 method
Date: 4/11/2023

Watershed Hydrologic Summary Data

Watershed	Area (acres)	Mean Elevation (ft)	Lag Times		Basin "n"		Loss Rates		Percent Impervious	
			Method	Lag Time (min)	Method	Basin "n"	Method	Loss Rate (in/hr)	Method	Impervious Area (%)
DMA1	1.33	75	Basin "n"	-	Computed	-	Computed	-	Computed	-

Basin “n” Method Data for Lag Time Computation

Watershed	Channel Length (ft)	Centroid Length (ft)	Slope (ft/ft)	Channelization	Land Use Impervious Area Percent (% or acres)																
					95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	2	1	1*
DMA1	200	100	.005	Undeveloped		0																
				Developed		100																

Refer to the Drainage manual for Land Use Impervious Area Percent

*Dense Oaks, Shrubs, Vines

Infiltration Loss Rate Data

Watershed	Soil Cover Group	Land Use Impervious Area Percent (% or acres)																	
		95	90	85	80	75	70	60	50	40	30	25	20	15	10	5	2	1	1*
DMA1	B																		
	C		100																
	D																		

Refer to the help file for Land Use Impervious Area Percent

*Dense Oaks, Shrubs, Vines

Sacramento County, California

220—San Joaquin-Urban land complex, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: hhq2
Elevation: 20 to 500 feet
Mean annual precipitation: 10 to 22 inches
Mean annual air temperature: 61 to 63 degrees F
Frost-free period: 250 to 300 days
Farmland classification: Not prime farmland

Map Unit Composition

San joaquin and similar soils: 65 percent
Urban land: 25 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of San Joaquin

Setting

Landform: Terraces
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from granite

Typical profile

H1 - 0 to 13 inches: fine sandy loam
H2 - 13 to 30 inches: sandy clay loam
H3 - 30 to 35 inches: clay loam
H4 - 35 to 60 inches: indurated
H5 - 60 to 67 inches: stratified sandy loam to loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches; 35 to 60 inches to duripan
Drainage class: Moderately well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: C
Ecological site: R017XY902CA - Duripan Vernal Pools
Hydric soil rating: No

Description of Urban Land

Typical profile
H1 - 0 to 6 inches: variable

Interpretive groups
Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Dierssen
Percent of map unit: 4 percent
Hydric soil rating: No

Bruella
Percent of map unit: 3 percent
Hydric soil rating: No

Xerarents
Percent of map unit: 1 percent
Hydric soil rating: No

Durixeralfs
Percent of map unit: 1 percent
Hydric soil rating: No

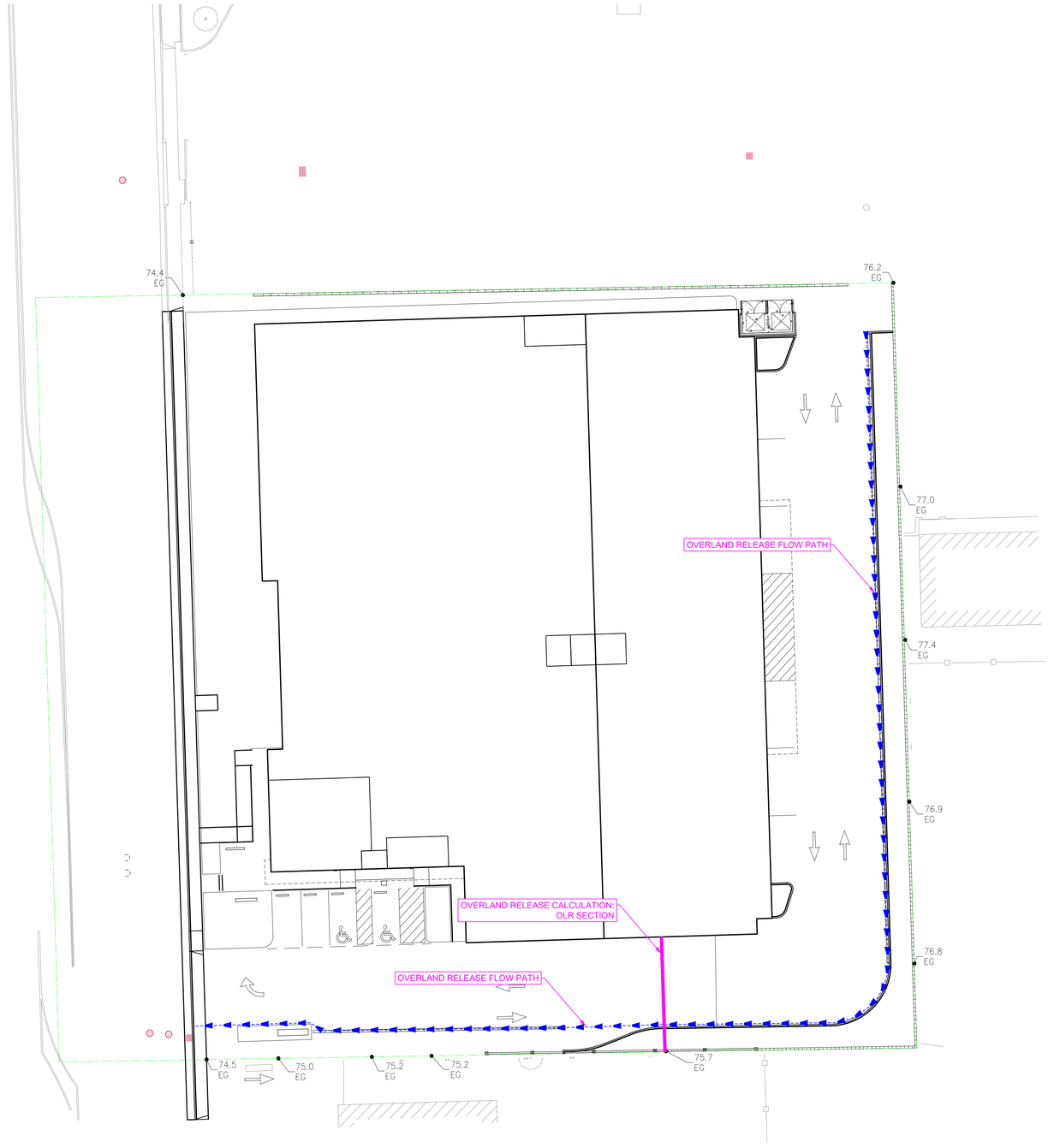
Unnamed, clayey subsoil
Percent of map unit: 1 percent
Hydric soil rating: No

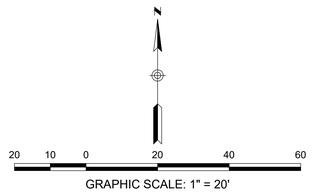
Data Source Information

Soil Survey Area: Sacramento County, California
Survey Area Data: Version 22, Sep 1, 2022

Attachment 3

Hydraulic Calculations





GRAPHIC SCALE: 1" = 20'

RICK ENGINEERING COMPANY
Sacramento
2525 EAST BIDWELL STREET
FOLSOM, CA 95630
916.638.8200
(FAX)916.934.5144
rickengineering.com
San Diego - Orange - Riverside - San Luis Obispo - Phoenix - Tucson - Denver - Las Vegas

OVERLAND RELEASE PLAN FOR STORQUEST WATT

SHEET 1 OF 1

J-19682
DATE: AUGUST 16, 2023

Hydraulic Analysis Report

Project Data

Project Title:

Designer:

Project Date: Wednesday, August 16, 2023

Project Units: U.S. Customary Units

Notes:

Channel Analysis: OLR Section

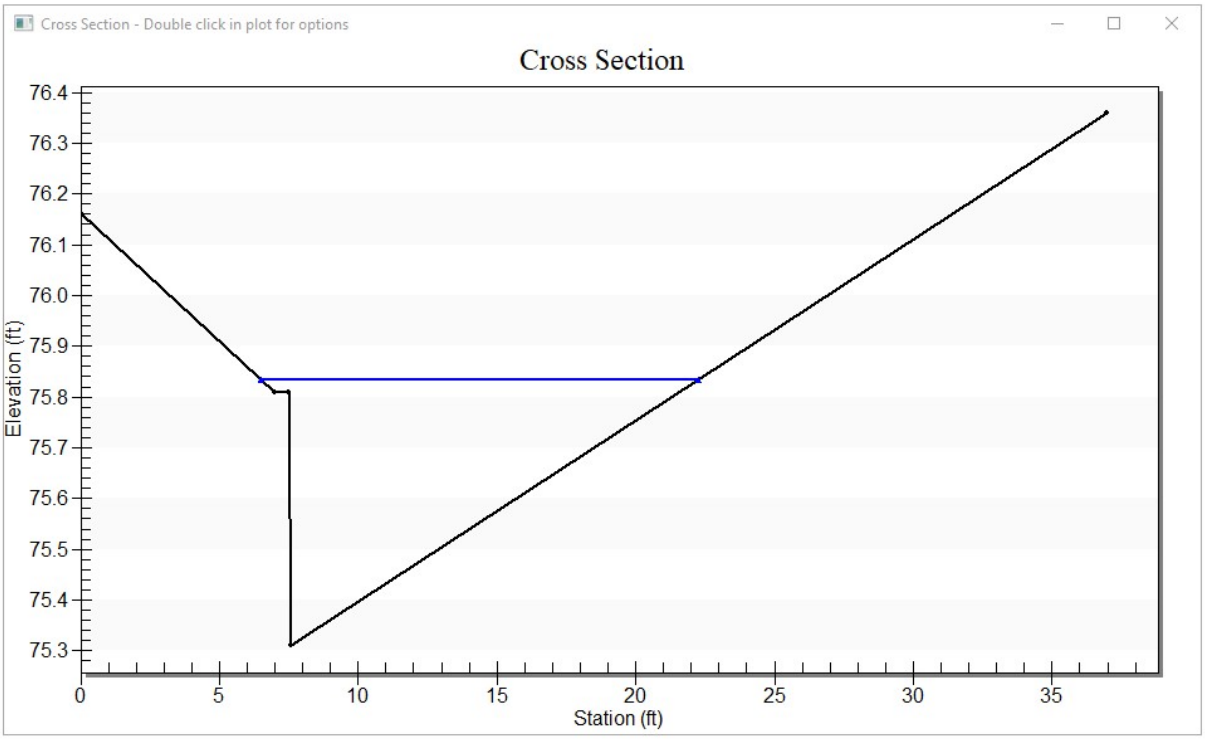
Notes:

Input Parameters

Channel Type: Custom Cross Section

Cross Section Data

Elevation (ft)	Elevation (ft)	Manning's n
0.00	76.16	0.0150
7.00	75.81	0.0150
7.50	75.81	0.0150
7.58	75.31	0.0150
36.96	76.36	-----



Longitudinal Slope: 0.0010 ft/ft

Flow: 4.7000 cfs

Result Parameters

Depth: 0.5241 ft

Area of Flow: 3.8824 ft^2

Wetted Perimeter: 16.1623 ft

Hydraulic Radius: 0.2402 ft

Average Velocity: 1.2106 ft/s

Top Width: 15.7260 ft

Froude Number: 0.4294

Critical Depth: 0.3700 ft

Critical Velocity: 2.4406 ft/s

Critical Slope: 0.0060 ft/ft

Critical Top Width: 10.41 ft

Calculated Max Shear Stress: 0.0327 lb/ft^2

Calculated Avg Shear Stress: 0.0150 lb/ft^2

Composite Manning's n Equation: Lotter method

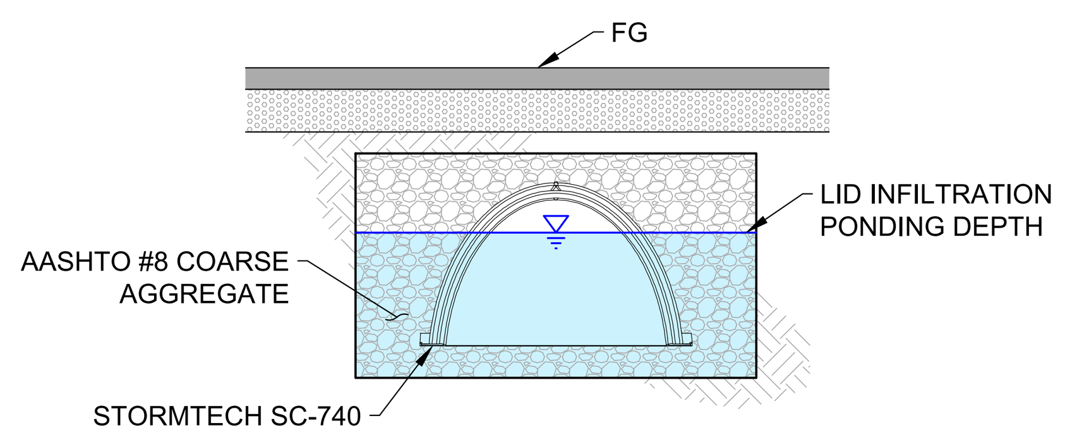
Manning's n: 0.0150

Attachment 4

Stormwater Quality Conceptual Plan

LEGEND

- DMA BOUNDARY
- 1000 DMA NUMBER
- LID UNDERGROUND INFILTRATION
- PERVIOUS AREAS
- XX SOURCE/TREATMENT CONTROL MEASURES
- PROPERTY LINE

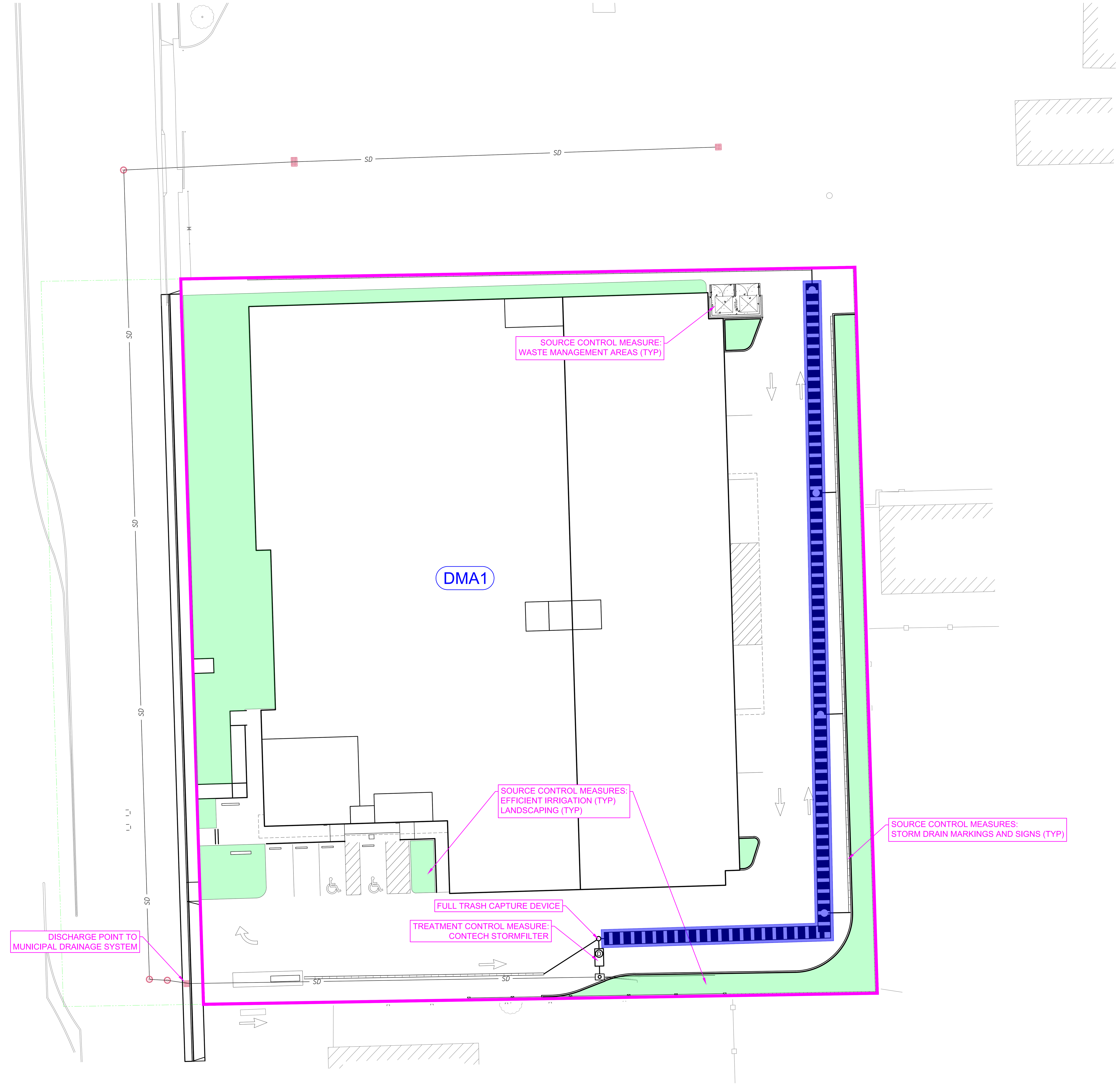


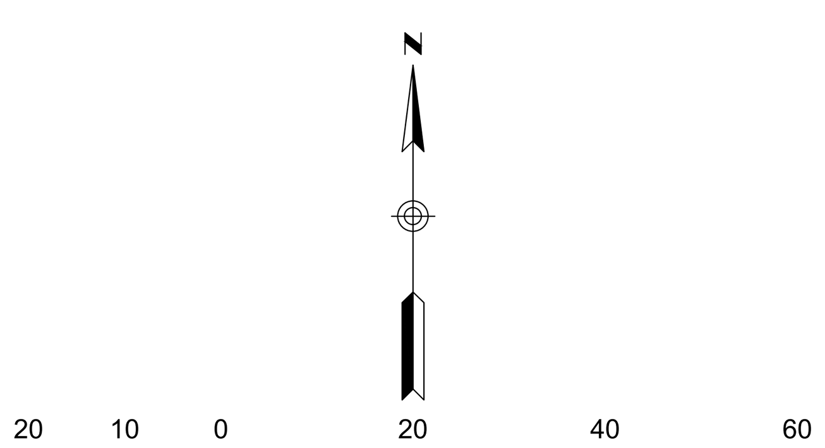
TYPICAL INFILTRATION SECTION
NOT TO SCALE

POST CONSTRUCTION MEASURES

DMA	EXISTING (ACRES)		PROPOSED (ACRES)		TOTAL AREA (ACRES)	LID MEASURES			TREATMENT MEASURES	
	PERVIOUS	IMPERVIOUS	PERVIOUS	IMPERVIOUS		VOLUME PROVIDED (ACFT)	TYPE	LID CREDITS PROVIDED	TYPE	WQF (CFS)
1	0.00	1.33	0.15	1.18	1.33	0.04	INFILTRATION BASIN	100.0	CONTECH STORMFILTER	0.11

POST CONSTRUCTION CONTROL MEASURE COMPLIANCE
I HEREBY CERTIFY THAT THE POST CONSTRUCTION CONTROL MEASURES WERE CONSTRUCTED AS SHOWN ON THE PLANS APPROVED BY THE COUNTY OF SACRAMENTO.
PROJECT MANAGER:
DATE:





GRAPHIC SCALE: 1" = 20'

POST-CONSTRUCTION STORMWATER QUALITY PLAN FOR STORQUEST WATT

J-19682
DATE: AUGUST 16, 2023

SHEET 1 OF 1

RICK ENGINEERING COMPANY
Sacramento
2525 EAST BIDWELL STREET
FOLSOM, CA 95630
916.638.8200
(FAX)916.934.5144
rickengineering.com
San Diego - Orange - Riverside - San Luis Obispo - Phoenix - Tucson - Denver - Las Vegas

Attachment 5

Water Quality Calculations

Appendix D-2: Commercial Sites: Low Impact Development (LID) Credits and Treatment BMP Sizing Calculations

Name of Drainage Shed: DMA1
Location of project: Sacramento

Fill in Blue Highlighted boxes

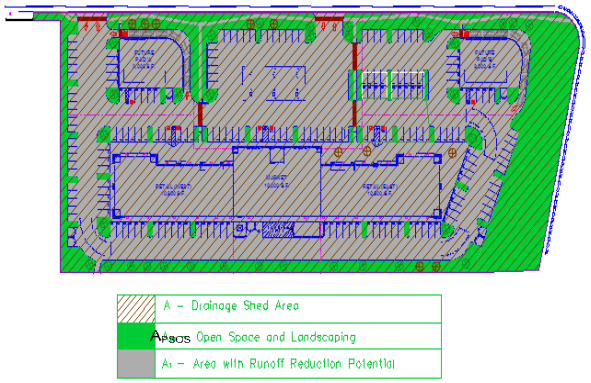
Step 1 - Open Space and Pervious Area Credits

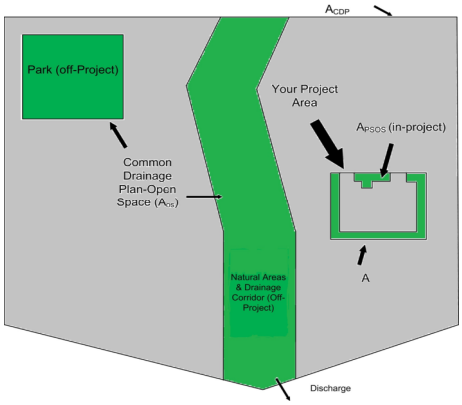
Is your project within the drainage area of a common drainage plan that includes open space? If not, skip to 1 b.

1 a. Common Drainage Plan Area	0	acres	A_{CDP}	
Common Drainage Plan Open Space (Off-project)	0	acres	A_{OS}	**see area example below**
a. Natural storage reservoirs and drainage corridors	0	acres		
b. Buffer zones for natural water bodies	0	acres		
c. Natural areas including existing trees, other vegetation, and soil	0	acres		
d. Common landscape area/park	0	acres		
e. Regional Flood Control/Drainage basins	0	acres		
1 b. Project Drainage Shed Area (Total)	1.33	acres	A	
Project-Specific Open Space (In-project, communal)**	0.15	acres	A_{PSOS}	
a. Natural storage reservoirs and drainage corridors	0.00	acres		
b. Buffer zones for natural water bodies	0.00	acres		
c. Natural areas including existing trees, other vegetation, and soil	0.00	acres		**see area example below**
d. Landscape area/park	0.15	acres		
e. Flood Control/Drainage basins	0.00	acres		

** Doesn't include impervious areas within individual lots and surrounding individual units. That is accounted for below using Form D-1a in Step 2.

Area with Runoff Reduction Potential	$A - A_{PSOS}$ =	1.18	acres	A_T
Assumed Initial Impervious Fraction	A_T / A =	0.89		I
Open Space & Pervious Area LID Credit (Step 1)	$(A_{OS}/A_{CDP}+A_{PSOS}/A)x100$ =	11	pts	





Step 2 - Runoff Reduction Credits

Runoff Reduction Treatments	Impervious Area Managed			Efficiency Factor		Effective Area Managed (A_C)	
Porous Pavement:							
Option 1: Porous Pavement (see Fact Sheet, excludes porous pavement used in Option 2)	0	acres	x		=	0.000	acres
Option 2: Disconnected Pavement (see Fact Sheet, excludes porous pavement used in Option 1)	use Form D-2a for credits →					0.00	acres
Landscaping used to Disconnect Pavement (see Fact Sheet)	0.0000	acres			=	0.00	acres
Disconnected Roof Drains (see Fact Sheet and/or Table D-2b for summary of requirements)	0	acres			=	0.00	acres
Ecoroof (see Fact Sheet)	0	acres			=	0.00	acres
Interceptor Trees (see Fact Sheet)	use Form D-2b for credits →					0.00	acres
Total Effective Area Managed by Runoff Reduction Measures				A_C		0.00	acres
Runoff Reduction Credit (Step 2)				$(A_C / A_T)*100$ =		0	pts

Table D-2a

Porous Pavement Type	Efficiency Multiplier
Cobblestone Block Pavement	0.40
Pervious Concrete/Asphalt	0.60
Modular Block Pavement &	0.75
Reinforced Grass Pavement	1.00

Table D-2b

Maximum roof size	Minimum travel distance
≤ 3,500 sq ft	21 ft
≤ 5,000 sq ft	24 ft
≤ 7,500 sq ft	28 ft
≤ 10,000 sq ft	32 ft

Form D-2a: Disconnected Pavement Worksheet

See Fact Sheet for more information regarding Disconnected Pavement credit guidelines

Effective Area Managed (A_C)

Pavement Draining to Porous Pavement

2. Enter area draining onto Porous Pavement	0.00	acres	Box K1
3. Enter area of Receiving Porous Pavement (excludes area entered in Step 2 under Porous Pavement)	0.00	acres	Box K2
4. Ratio of Areas (Box K1 / Box K2)	0.00		Box K3

5. Select multiplier using ratio from Box K3 and enter into Box K4

Ratio (Box D)	Multiplier
Ratio is ≤ 0.5	1.00
Ratio is > 0.5 and < 1.0	0.83
Ratio is > 1.0 and < 1.5	0.71
Ratio is > 1.5 and < 2.0	0.55

Box K4: 1

6. Enter Efficiency of Porous Pavement (see table below) — Box K5

Porous Pavement Type	Efficiency Multiplier
Cobblestone Block Pavement	0.40
Pervious Concrete Asphalt Pavement	0.60
Modular Block Pavement Porous Gravel Pavement	0.75
Reinforced Grass Pavement	1.00

7. Multiply Box K2 by Box K5 and enter into Box K6	0.00	acres	Box K6
8. Multiply Boxes K1,K4, and K5 and enter the result in Box K7	0.00	acres	Box K7

9. Add Box K6 to Box K7 and multiply by 60%, and enter the Result in Box K8 — 0.00 acres
This is the amount of area credit to enter into the "Disconnected Pavement" Box of Form D-2

Form D-2b: Interceptor Tree Worksheet

See Fact Sheet for more information regarding Interceptor Tree credit guidelines

New Evergreen Trees

1. Enter number of new evergreen trees that qualify as Interceptor Trees in Box L1.		trees	Box L1
2. Multiply Box L1 by 200 and enter result in Box L2	0	sq. ft.	Box L2

New Deciduous Trees

3. Enter number of new deciduous trees that qualify as Interceptor Trees in Box L3.		trees	Box L3
4. Multiply Box L3 by 100 and enter result in Box L4	0	sq. ft.	Box L4

Existing Tree Canopy

5. Enter square footage of existing tree canopy that qualifies as Existing Tree canopy in Box L5.	0	sq. ft.	Box L5
6. Multiply Box L5 by 0.5 and enter the result in Box L6	0	sq. ft.	Box L6

Total Interceptor Tree EAM Credits

Add Boxes L2, L4, and L6 and enter it into Box L7	0	sq. ft.	Box L7
Divide Box L7 by 43,560 and multiply by 20% to get effective area managed and enter result in Box L8 This is the amount of area credit to enter into the "Interceptor Trees" Box of Form D-2	0.00	acres	Box L8

Step 3 - Runoff Management Credits

Capture and Use Credits

Impervious Area Managed by Rain barrels, Cisterns, and automatically-emptied systems

(see Fact Sheet) | - | enter gallons, for simple rain barrels | 0.00 | acres

Automated-Control Capture and Use System

(see Fact Sheet, then enter impervious area managed by the system) | 0.00 | acres

Bioretention/Infiltration Credits

Impervious Area Managed by Bioretention BMPs

(see Fact Sheet)

Bioretention Area | sq ft
Subdrain Elevation | inches
Ponding Depth, inches | inches | 0.00 | acres

Impervious Area Managed by Infiltration BMPs

(see Fact Sheet)

Drawdown Time, hrs | drawdown_hrs_inf
Soil Infiltration Rate, in/hr | soil_inf_rate

Sizing Option 1: Capture Volume, acre-ft | 0.04 | capture_vol_inf | 0.52 | acres

Sizing Option 2: Infiltration BMP surface area, sq ft | 0 | soil_surface_area | 0.00 | acres

Basin or trench? | approximate BMP depth | 0.00 | ft

Impervious Area Managed by Amended Soil or Mulch Beds

(see Fact Sheet) | Mulched Infiltration Area, sq ft | mulch_area | 0.00 | acres

Total Effective Area Managed by Capture-and-Use/Bioretention/Infiltration BMPs | 0.52 | A_{LIDc}

Runoff Management Credit (Step 3) | A_{LIDC}/A_T*200 = | 88.8 | pts

Total LID Credits (Step 1+2+3) LID compliant, check for treatment sizing in Step 4 100.0

Does project require hydromodification management? If yes, proceed to using SacHM.

Adjusted Area for Flow-Based, Non-LID Treatment | $A_T - A_C - A_{LIDC}$ = 0.66 | A_{AT}

Adjusted Impervious Fraction of A for Volume-Based, Non-LID Treatment | A_{AT} / A = 0.49 | I_A

Further treatment is required, see choose flow-based or volume-based sizing in Step 4

Step 4a Treatment - Flow-Based (Rational Method)

Calculate treatment flow (cfs): Flow = Runoff Coefficient x Rainfall Intensity x Area

Look up value for i in Table D-2c (Rainfall Intensity) | 0.18 | i

Obtain A_{AT} from Step 3 | 0.66 | A_{AT}

Use C = 0.95 | 0.95 | C

Flow = 0.95 * i * A_{AT} | 0.11 | cfs

Table D-2c

Rainfall Intensity			
Roseville	i =	0.20	in/hr
Sacramento	i =	0.18	in/hr
Folsom	i =	0.20	in/hr

Step 4b Treatment - Volume-Based (ASCE-WEF)

Calculate water quality volume (Acre-Feet): WQV = Area x Maximized Detention Volume (P_0)

Obtain A from Step 1 | 1.33 | A | hrs | Specified Draw Down time

Obtain P_0: Maximized Detention Volume from figures E-1 to E-4 in Appendix E of this manual using I_A from Step 2. | 0.36 | P_0

Calculate treatment volume (acre-ft):

Treatment volume = A x (P_0 / 12) | 0.04 | Acre-Feet

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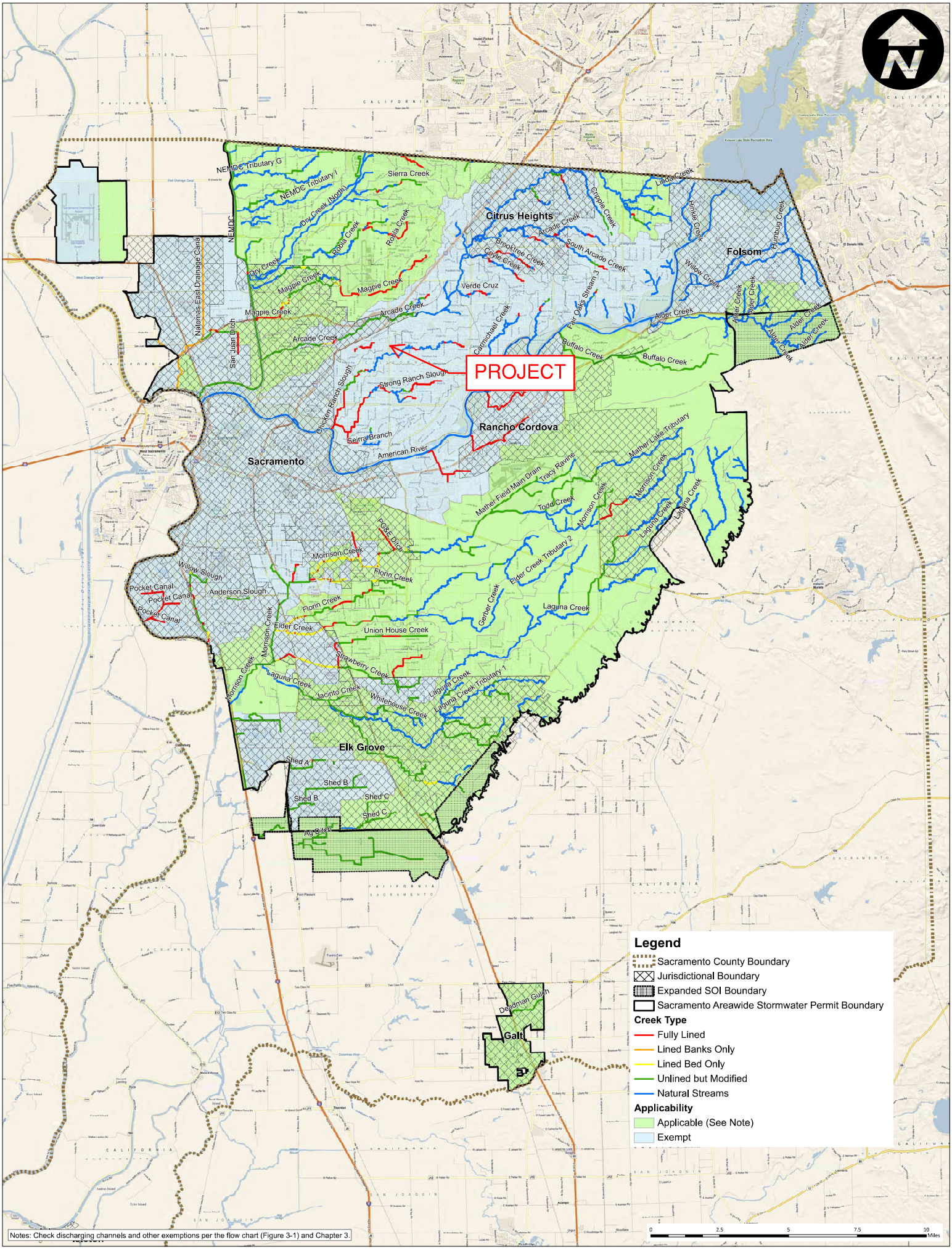
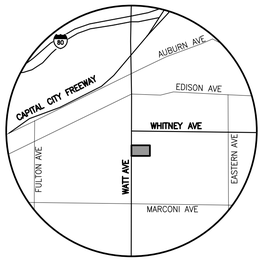

PROJECT
Citrus Heights
Folsom
Rancho Cordova
Sacramento
Elk Grove
Galt
NEMDC Tributary G
NEMDC Tributary I
Sierra Creek
Dry Creek (North)
Robla Creek
Dry Creek
Magpie Creek
Arcade Creek
Linda Creek
Cripple Creek
Hinkle Creek
Brooktree Creek
Cavitt Creek
South Arcade Creek
Willow Creek
Rumsey Creek
Verde Cruz
Fair Oaks Stream 3
Carmichael Creek
Alder Creek
Buffalo Creek
Natomas East Drainage Canal
NEMDC
San Juan Ditch
Chicken Ranch Slough
Strong Ranch Slough
Sierra Branch
American River
Mather Lake Tributary
Tracy Ravine
Mather Field Main Drain
Todd Creek
Morrison Creek
Laguna Creek
Lagunitas Creek
Elder Creek Tributary 2
Gerber Creek
PG&E Ditch
Florin Creek
Willow Slough
Pocket Canal
Anderson Slough
Elder Creek
Union House Creek
Strawberry Creek
Jacinto Creek
Whitehouse Creek
Laguna Creek Tributary 1
Shed A
Shed B
Shed C
Ag Ditch
Deadman Gulch
Legend
Sacramento County Boundary
Jurisdictional Boundary
Expanded SOI Boundary
Sacramento Areawide Stormwater Permit Boundary
Creek Type
Fully Lined
Lined Banks Only
Lined Bed Only
Unlined but Modified
Natural Streams
Applicability
Applicable (See Note)
Exempt
Notes: Check discharging channels and other exemptions per the flow chart (Figure 3-1) and Chapter 3.
0
2.5
5
7.5
10
Miles

Attachment 6

Proposed Grading Plan



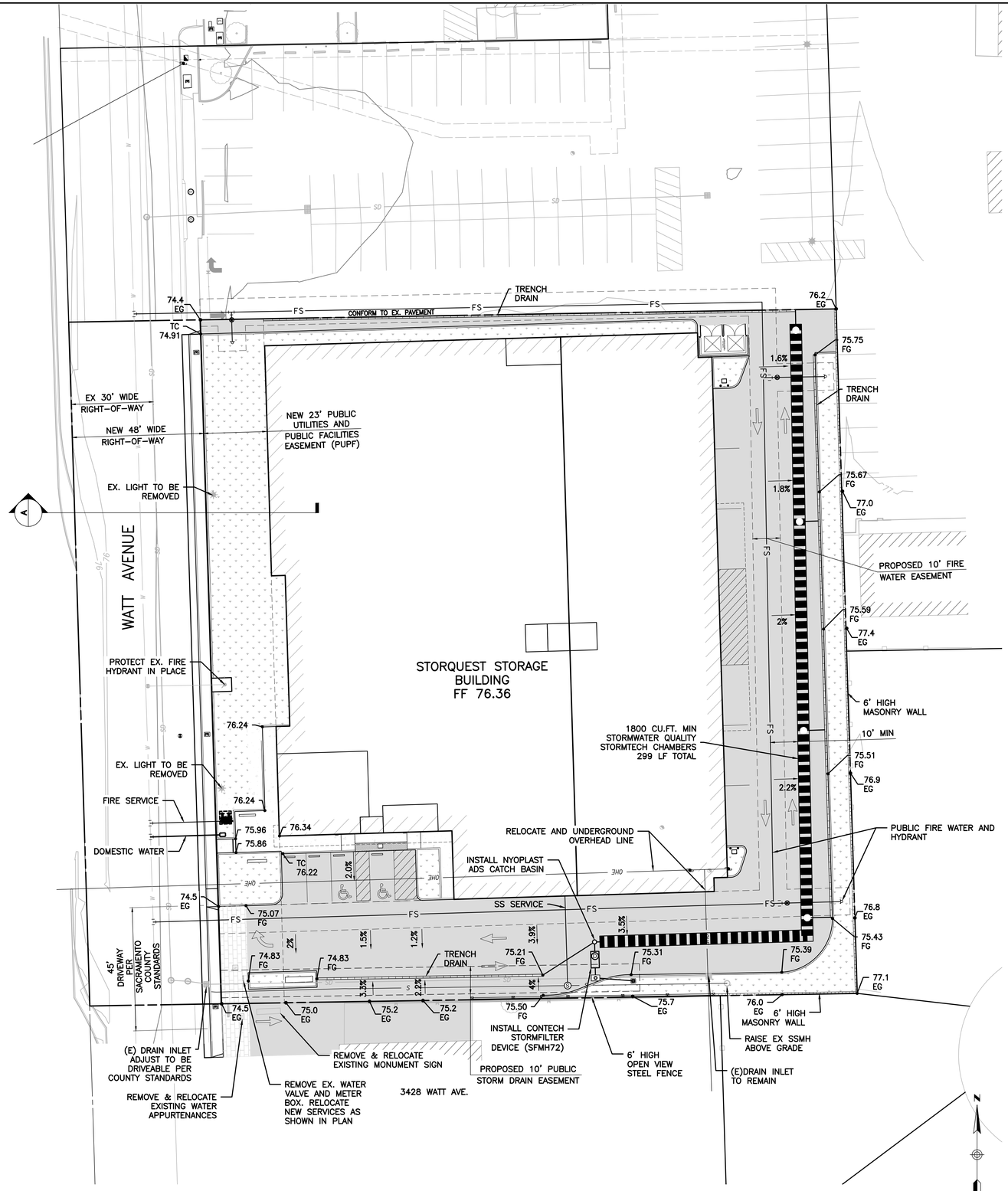
VICINITY MAP
SCALE: NTS

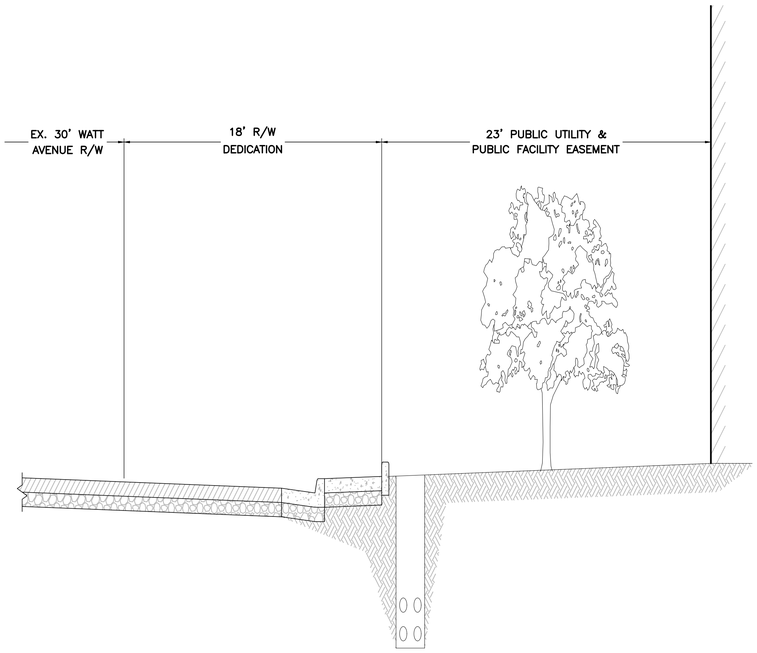
SYMBOL LEGEND

- PROPERTY BOUNDARY
- EASEMENT
- UTILITY EASEMENT
- INFILTRATION TRENCH
- SWALE
- STORMTECH CHAMBER
- TOP OF BANK/SLOPE
- SLOPE
- STORM DRAIN INLET
- STORM DRAIN MANHOLE
- STORM DRAIN PIPE
- PERFORATED PIPE UNDERDRAIN
- TRENCH DRAIN
- SEWER MANHOLE
- SEWER PIPE
- SEWER CLEAN OUT
- WATER PIPE
- WATER FITTING
- WATER REDUCER
- WATER BLOW OFF
- FIRE HYDRANT
- UNDERDRAIN
- AC PAVEMENT
- CONCRETE PAVEMENT
- CONCRETE SIDEWALK/HARDSCAPE

ABBREVIATIONS

BS	BOTTOM OF STEP
BOP	BOTTOM OF POND
C	CONCRETE
EG	EXISTING GROUND
EP	EDGE OF PAVEMENT
FF	FINISHED FLOOR
FL	FLOW LINE
FS	FINISHED SURFACE
HP	HIGH POINT
IE	INVERT ELEVATION
LP	LOW POINT
TC	TOP OF CURB
TS	TOP OF STEP
TOP	TOP OF POND





SECTION A
SCALE – H: 1" = 5' V: NTS

GRAPHIC SCALE: 1"=20'

THE WILLIAM WARREN GROUP
SELF STORAGE MANAGEMENT. ACQUISITIONS. DEVELOPMENT.

StorQuest SELF STORAGE

RICK ENGINEERING COMPANY
2525 EAST BIDWELL ST
FOLSOM, CA 95630
916.638.8200
rickengineering.com

STORQUEST WATT AVENUE

PRELIMINARY GRADING AND UTILITY PLAN

PROJECT NO:	19682	SCALE:	1"=20'
DRAWN BY:	MM	DATE:	8/14/2023

Attachment 7

Electronic Files