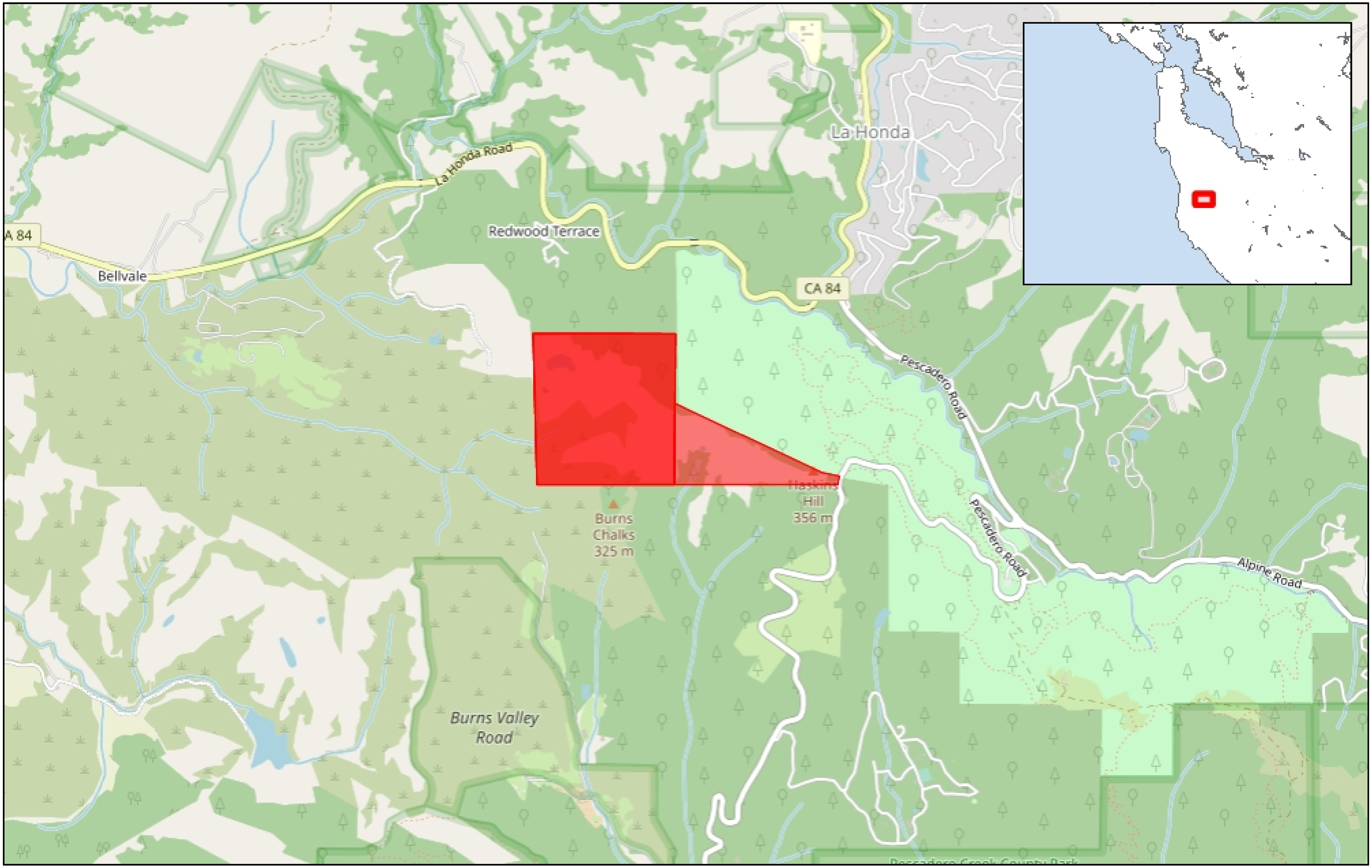
COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

ATTACHMENT A

San Mateo County

Vicinity Map, APN 082-050-020, 082-050-011



1.14 0 0.57 1.14 Miles

WGS_1984_Web_Mercator_Auxiliary_Sphere
© Latitude Geographics Group Ltd.

1: 36,112

COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

ATTACHMENT B

ANIMAL SANCTUARY

PENINSULA HUMANE SOCIETY & SPCA

KSH ARCHITECTS
KORTH SUNSERI HAGEY

COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2
08.01.2022

Peninsula Humane Society & SPCA

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PENINSULA HUMANE SOCIETY

ANIMAL SANCTUARY

Peninsula Humane Society & SPCA

KSH

ARCHITECTS
KORTH SUNSERI HAGEY

ISSUES AND REVISIONS

	No. Date	Description
	07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
△1	01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1
△2	08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

PROJECT NUMBER
18042.00

SHEET TITLE
SHEET INDEX

SCALE

SHEET NUMBER

A0.00

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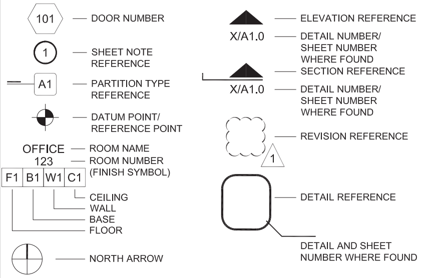
SYMBOL LEGEND



GENERAL NOTES

1. ALL WORK SHALL CONFORM TO THE CONTRACT DOCUMENTS WHICH INCLUDE THE OWNER/CONTRACTOR AGREEMENT, THE DRAWINGS AND ALL ADDENDA AND MODIFICATIONS ISSUED BY THE ARCHITECT.
2. THE CONTRACTOR SHALL REVIEW ALL DOCUMENTS AND VERIFY ALL DIMENSIONS AND FIELD CONDITIONS AND CONFIRM THAT WORK IS BUILDABLE AS SHOWN. ANY CONFLICTS OR OMISSIONS ETC., SHALL BE IMMEDIATELY REPORTED TO THE ARCHITECT FOR CLARIFICATION PRIOR TO THE PERFORMANCE OF ANY WORK IN QUESTION.
3. INCASE OF CONFLICT BETWEEN ARCHITECT'S AND ENGINEER'S DRAWINGS IN LOCATING MATERIALS AND/OR EQUIPMENT, THE ARCHITECTURAL DRAWINGS SHALL GOVERN.
4. "ALIGN" SHALL MEAN TO ACCURATELY LOCATE FINISH FACES IN THE SAME PLANE
5. "TYPICAL" OR "TYP." SHALL MEAN THAT THE CONDITION IS REPRESENTATIVE FOR SIMILAR CONDITIONS THROUGHOUT. DETAILS ARE USUALLY KEYED AND NOTED "TYP." ONLY ONCE, WHEN THEY FIRST OCCUR.
6. "SIMILAR" OR "SIM." MEANS COMPARABLE CHARACTERISTICS FOR THE CONDITIONS NOTED. VERIFY DIMENSIONS AND ORIENTATION ON PLANS AND ELEVATIONS.
7. WORK AREAS ARE TO REMAIN SECURE AND LOCKABLE DURING CONSTRUCTION. CONTRACTOR SHALL COORDINATE WITH TENANT AND LANDLORD TO ENSURE SECURITY.
8. THE CONTRACTOR SHALL OBTAIN ALL PERMITS AND INSPECTIONS AND COMPLY WITH ALL CODES, LAWS, ORDINANCES, RULES AND REGULATIONS OF ALL PUBLIC AUTHORITIES (FEDERAL, STATE OR LOCAL) GOVERNING THE WORK. THE MOST STRINGENT SHALL APPLY.
9. ALL WORK NOTED "BY OTHERS" OR "N.I.C." SHALL BE PROVIDED BY THE OWNER OR TENANT UNDER SEPARATE CONTRACT. INCLUDE SCHEDULE REQUIREMENTS FOR THIS "OTHER" WORK IN THE CONSTRUCTION PROGRESS SCHEDULE AND COORDINATE AS REQUIRED TO ASSURE ORDERLY SEQUENCE OF INSTALLATION.
10. DO NOT SCALE THE DRAWINGS.
11. CONTRACTOR SHALL REPAIR OR REPLACE ALL LANDSCAPE PLANTING AND IRRIGATION DAMAGED THROUGH THE COURSE OF CONSTRUCTION, REPLACE CONTAMINATED OR COMPACTED SOILS, PROTECT ALL TREES TO REMAIN WITH RIGID METAL FENCING, AND REPAIR ALL DAMAGED PAVING SURFACES IN KIND. CONTRACTOR IS RESPONSIBLE FOR THE HEALTH AND PROTECTION OF ALL PLANTS WITHIN THE PROJECT FENCE LINE.
12. ALL DIMENSIONS SHALL BE TO THE FACE OF FINISH UNLESS OTHERWISE NOTED.
13. DESIGN OF AUTOMATED SPRINKLER SYSTEM, SMOKE DETECTION SYSTEM, SMOKE CONTROL SYSTEM AND FIRE ALARM & COMMUNICATION SYSTEM SHALL BE PER CODE 403.2. SEE MECHANICAL, ELECTRICAL, PLUMBING AND FIRE PROTECTION DOCUMENTS & DRAWINGS.
14. THE BUILDING FIRE SPRINKLER SYSTEM SHALL BE MAINTAINED OPERATIONAL AT ALL TIMES DURING CONSTRUCTION ONCE COMPLETED. WHEN RENOVATION REQUIRES MODIFICATION OF A PORTION OF A FIRE PROTECTION SYSTEM, THE REMAINDER OF THE SYSTEM SHALL BE KEPT IN SERVICE. WHEN IT IS NECESSARY TO SHUT DOWN THE ENTIRE SYSTEM, A FIRE WATCH SHALL BE KEPT ON SITE UNTIL THE SYSTEM IS RETURNED TO SERVICE IN COMPLIANCE WITH CFC SECTION 3304.5 & NFPA 241 SECTION 10.8
15. EXIT SIGNS, EMERGENCY LIGHTING, ADDRESS POSTING, FIRE LANE MARKING, FIRE EXTINGUISHERS AND KNOX BOX LOCATION(S) TO BE FIELD VERIFIED BY FIRE INSPECTOR.

VICINITY MAP

PROJECT SITE:
12429 PESCADERO CREEK ROAD

NORTH

PROJECT INFO

1. **APN:** 082-050-020
2. **ZONING:** RM ZONING DISTRICT
3. **LOT AREA:** 216 ACRES
4. **CONSTRUCTION TYPE (CBC CH. 6):** VB
5. **USE AND OCCUPANCY** (CBC CH. 3): A-3, B,R-3, S-2, & U
6. **RATING REQUIREMENTS** (CBC TABLE 601):
   PRIMARY STRUCTURAL FRAME: 0 HOURS
   EXTERIOR BEARING WALLS: 0 HOURS
   INTERIOR BEING WALLS: 0 HOURS
   EXTERIOR NONBEARING WALLS: 0 HOURS
   INTERIOR NONBEARING WALLS: 0 HOURS
   FLOOR CONSTRUCTION: 0 HOURS
   ROOF CONSTRUCTION: 0 HOURS

7. **SITE BUILDINGS:**

QUANTITY	BUILDING	BUILDING AREA (S.F.)	FENCED AREA (S.F.)	OCCUPANCY	CONSTRUCTION TYPE	FIRE SPRINKLERS
1	(E) BARN	3,000	-	S-2	VB	NO
1	(N) ADMIN / VET	6,500	-	B, A-3, S-2	VB	YES
1	(N) MAINTENANCE BUILDING	660	-	S-2	VB	NO
1	(N) CARETAKER RESIDENCE	995	-	R-3	VB	YES
1	(N) FARMED ANIMAL BARN	2,000	-	U	VB	YES
1	(N) DOG ARENA	3,000	-	U	VB	YES
10	CAT COTTAGES	320 EA.	26,400 TOTAL	U	VB	NO
4	SENIOR CAT COTTAGES	320 EA.	900 EA.	U	VB	NO
4	LARGE DOG COTTAGES	320 EA.	900 EA.	U	VB	NO
66	DOG COTTAGES	192 EA.	450 EA.	U	VB	NO

DEFERRED SUBMITTALS

DEFERRED ELEMENTS OF THE BUILDING SCOPE WHICH WILL BE SUBMITTED SEPERATELY INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
1. FIRE SPRINKLERS
2. FIRE ALARM SYSTEM

NOTE: DEFERRED SUBMITTALS SHALL FIRST BE SUBMITTED TO THE ARCHITECT AND/OR ENGINEER OF RECORD FOR REVIEW AND COORDINATION. FOLLOWING THE COMPLETION OF REVIEW BY THE ARCHITECT / ENGINEER OF RECORD, A SUBMITTAL TO THE COUNTY SHALL BE MADE (FOR REVIEW AND APPROVAL), WHICH SHALL INCLUDE A LETTER STATING THIS REVIEW AND COORDINATION HAS BEEN PERFORMED AND COMPLETED, AND PLANS AND CALCULATIONS FOR THE DEFERRED ITEMS ARE FOUND TO BE ACCEPTABLE WITH NO EXCEPTIONS.

APPLICABLE CODES

THE GENERAL CONTRACTOR IS RESPONSIBLE FOR COMPLETING THE CONSTRUCTION OF THIS PROJECT IN ACCORDANCE WITH THE FOLLOWING FEDERAL, STATE, AND LOCAL CODES, INCLUDING THEIR MOST RECENT AMENDMENTS AND REVISIONS.

THE COUNTY OF SAN MATEO ADOPTS THE FOLLOWING CODES, ORDINANCES, RULES AND REGULATIONS (INCLUDING ERRATA AND SUPPLEMENTS OF THE BELOW CODES):
2019 CALIFORNIA BUILDING CODE
2019 CALIFORNIA FIRE CODE
2019 CALIFORNIA GREEN BUILDING CODE
2019 CALIFORNIA MECHANICAL CODE
2019 CALIFORNIA ELECTRICAL CODE
2019 CALIFORNIA PLUMBING CODE
ALL OTHER STATE AND LOCAL ORDINANCES AND REGULATIONS (INCLUDING SAN MATEO COUNTY MUNICIPAL CODE)

ABBREVIATIONS

A.C.	ASPHALTIC CONCRETE
ACCD'G.	ACCORDING
ACOUS.	ACOUSTICAL
AD.	AREA DRAIN
ADD'L.	ADDITIONAL
ADJ.	ADJUSTABLE OR ADJACENT
A.F.F.	ABOVE FLOOR FINISH
ALUM.	ALUMINUM
ANOD.	ANODIZED
ASS'Y.	ASSEMBLY
BD.	BOARD
BLDG.	BUILDING
BLK'G.	BLOCKING
B.O.	BOTTOM OF
B.P.	BUILDING PAPER
B.U.	BUILT UP
B.U.R.	BUILT UP ROOF
CAB.	CABINET
CEM.	CEMENT
CER.	CERAMIC
CJ.	CONTROL JOINT
CLG.	CEILING
C.L.	CENTERLINE
CLR.	CLEAR
C.M.U.	CONCRETE MASONRY UNIT
C.O.	CLEANOUT
COL.	COLUMN
CONC.	CONCRETE
COND.	CONDITION
CONTR.	CONTRACTOR
CPT.	CARPET
C.T.	CERAMIC TILE
C.W.	CURTAIN WALL
DET.	DETAIL
D.F.	DRINKING FOUNTAIN
D.F.	DOUGLAS FIR
DIA.	DIAMETER
DIM.	DIMENSION
D.S.	DOWNSPOUTS
DWG.	DRAWING
EA.	EACH
E.J.	EXPANSION JOINT
ELEC.	ELECTRIC OR ELECTRICAL
ELEV.	ELEVATOR
E.O.S.	EDGE OF SLAB
ENCL.	ENCLOSURE
EQ.	EQUAL
(E)	EXISTING
EXH.	EXHAUST
EXT.	EXTERIOR
F.A.	FIRE ALARM PULL STATION
FDN.	FOUNDATION
FIN.	FINISH
F.E.C.	FIRE EXTINGUISHER CABINET
F.D.	FLOOR DRAIN
FLUOR.	FLUORESCENT
F.O.	FACE OF
F.O.W.	FACE OF WALL
F.R.	FIRE RATED
FRMG.	FRAMING
FSTNRS.	FASTENERS
FTG.	FOOTING
GA.	GAUGE
GALV.	GALVANIZED
GDN.	GARDEN
GFRC	GLASS FIBER REINFORCED CONCRETE
GL.	GLASS
GL.	GRIDLINE
G.S.M.	GALVANIZED SHEET METAL
GYP. BD.	GYPSUM BOARD
H.C.	HANDICAP
HDR.	HEADER
HDWR.	HARDWARE
HDWD.	HARDWOOD
H.M.	HOLLOW METAL
HT.	HEIGHT
H.W.	HOT WATER
INSUL.	INSULATION
JT.	JOINT
LAM.	LAMINATE
L.O.	LINE OF
LT. FIXT.	LIGHT FIXTURE
MAT.	MATERIAL
MAX.	MAXIMUM
MECH.	MECHANICAL
MEMB.	MEMBRANE
MET.	METAL
MFR.	MANUFACTURER
MFY.	MODIFY
MIN.	MINIMUM
MTD.	MOUNTED
MTL.	METAL
N.I.C.	NOT IN CONTRACT
NL	NOSING LINE
N.T.S.	NOT TO SCALE
(N)	NEW
O.C.	ON CENTER
O.D.	OVERFLOW DRAIN
OPN'G	OPENING
OPP.	OPPOSITE
P.G.	PAINT GRADE
PLAS.	PLASTIC
P-LAM.	PLASTIC LAMINATE
PLY.	PLYWOOD
POL.	POLISHED
P.T.	PRESSURE TREATED
PTD.	PAINTED
PTN.	PARTITION
R.	RADIUS
R.D.	ROOF DRAIN
REINF.	REINFORCED
RESIL.	RESILIENT
REQ'D.	REQUIRED
R.O.	ROUGH OPENING
RM.	ROOM
RWL.	RAIN WATER LEADER
S.A.R.F	SELF ADHESIVE RUBBERIZED FLASHING (FLEXIBLE FLASHING)
S.E.D.	SEE ELECTRICAL DRAWINGS
S.L.D.	SEE LANDSCAPE DRAWINGS
S.M.D.	SEE MECHANICAL DRAWINGS
S.P.D.	SEE PLUMBING DRAWINGS
S.S.D.	SEE STRUCTURAL DRAWINGS
SCHED.	SCHEDULE
S.G.	STAIN GRADE
S.S.	STAINLESS STEEL
SIM.	SIMILAR
SPEC.	SPECIFICATIONS
STL.	STEEL
STRUCT.	STRUCTURAL
TEMP.	TEMPERED OR TEMPORARY
T&G	TONGUE AND GROOVE
THK.	THICK
T'HOLD	THRESHOLD
TRANS.	TRANSPARENT
T.O.	TOP OF
T.O.P.	TOP OF PLATE
T.S.	TUBE STEEL
T.W.	TOP OF WALL
TYP.	TYPICAL
U.O.N.	UNLESS OTHERWISE NOTED
V.I.F.	VERIFY IN FIELD
WD.	WOOD
W.P.	WORK POINT

PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY

Peninsula Humane Society & SPCA

KSH
ARCHITECTS
KORTH SUNSERI HAGEY

ISSUES AND REVISIONS

No.	Date	Description
	07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
1	01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1
	08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

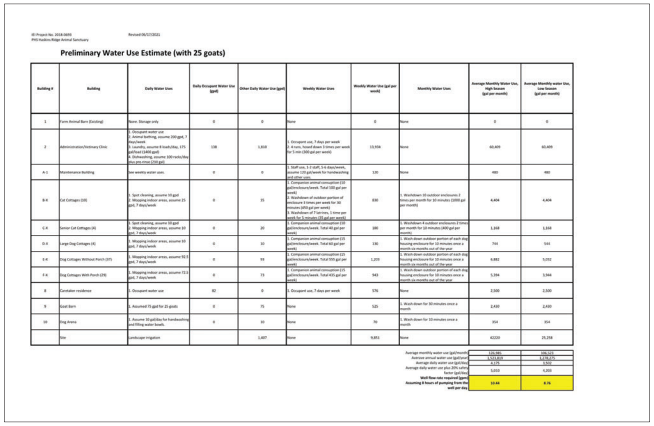
PROJECT NUMBER
18042.00

SHEET TITLE
PROJECT INFORMATION

SCALE

SHEET NUMBER
A0.01

PRELIMINARY WATER USE ESTIMATE



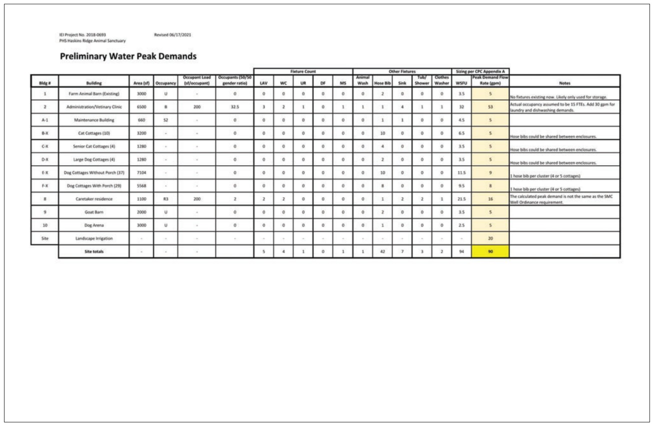
IEI Project No. 2018-0693 Revised 06/17/2021
PHS Haskins Ridge Animal Sanctuary

Preliminary Water Use Estimate (with 25 goats)

Building #	Building	Daily Water Uses	Daily Occupant Water Use (gpd)	Other Daily Water Use (gpd)	Weekly Water Uses	Weekly Water Use (gal per week)	Monthly Water Uses	Average Monthly Water Use, High Season (gal per month)	Average Monthly water Use, Low Season (gal per month)
1	Farm Animal Barn (Existing)	None. Storage only	0	0	None	0	None	0	0
2	Administration/Vetinary Clinic	1. Occupant water use 2. Animal bathing, assume 200 gpd, 7 days/week 3. Laundry, assume 8 loads/day, 175 gal/load (1400 gpd) 4. Dishwashing, assume 100 racks/day plus pre-rinse (210 gal)	138	1,810	1. Occupant use, 7 days per week 2. 4 runs, hosed down 3 times per week for 5 min (300 gal per week)	13,934	None	60,409	60,409
A-1	Maintenance Building	See weekly water uses.	0	0	1. Staff use, 1-2 staff, 5-6 days/week, assume 120 gal/week for handwashing and other uses	120	None	480	480
B-X	Cat Cottages (10)	1. Spot cleaning, assume 10 gpd 2. Mopping indoor areas, assume 25 gpd, 7 days/week	0	35	1. Companion animal consuption (10 gal/enclosure/week. Total 100 gal per week) 2. Washdown of outdoor portion of enclosure 3 times per week for 30 minutes (450 gal per week) 3. Washdown of 7 latrines, 1 time per week for 5 minutes (35 gal per week)	830	1. Washdown 10 outdoor enclosures 2 times per month for 10 minutes (1000 gal per month)	4,404	4,404
C-X	Senior Cat Cottages (4)	1. Spot cleaning, assume 10 gpd 2. Mopping indoor areas, assume 10 gpd, 7 days/week	0	20	1. Companion animal consuption (10 gal/enclosure/week. Total 40 gal per week)	180	1. Washdown 4 outdoor enclosures 2 times per month for 10 minutes (400 gal per month)	1,168	1,168
D-X	Large Dog Cottages (4)	1. Mopping indoor areas, assume 10 gpd, 7 days/week	0	10	1. Companion animal consuption (15 gal/enclosure/week. Total 60 gal per week)	130	1. Wash down outdoor portion of each dog housing enclosure for 10 minutes once a month six months out of the year	744	544
E-X	Dog Cottages Without Porch (37)	1. Mopping indoor areas, assume 92.5 gpd, 7 days/week	0	93	1. Companion animal consuption (15 gal/enclosure/week. Total 555 gal per week)	1,203	1. Wash down outdoor portion of each dog housing enclosure for 10 minutes once a month six months out of the year	6,882	5,032
F-X	Dog Cottages With Porch (29)	1. Mopping indoor areas, assume 72.5 gpd, 7 days/week	0	73	1. Companion animal consuption (15 gal/enclosure/week. Total 435 gal per week)	943	1. Wash down outdoor portion of each dog housing enclosure for 10 minutes once a month six months out of the year	5,394	3,944
8	Caretaker residence	1. Occupant water use	82	0	1. Occupant use, 7 days per week	576	None	2,500	2,500
9	Goat Barn	1. Assumed 75 gpd for 25 goats	0	75	None	525	1. Wash down for 30 minutes once a month	2,430	2,430
10	Dog Arena	1. Assume 10 gal/day for handwashing and filling water bowls.	0	10	None	70	1. Wash down for 10 minutes once a month	354	354
	Site	Landscape irrigation		1,407	None	9,851	None	42220	25,258

Average monthly water use (gal/month)	126,985	106,523
Avevave annual water use (gal/year)	1,523,819	1,278,275
Average daily water use (gal/day)	4,175	3,502
Average daily water use plus 20% safety factor (gal/day)	5,010	4,203
Well flow rate required (gpm) Assuming 8 hours of pumping from the well per day	**10.44**	**8.76**

PRELIMINARY WATER PEAK DEMANDS



IEI Project No. 2018-0693 Revised 06/17/2021
PHS Haskins Ridge Animal Sanctuary

Preliminary Water Peak Demands

						Fixture Count					Other Fixtures					Sizing per CPC Appendix A		
Bldg #	**Building**	**Area (sf)**	**Occupancy**	**Occupant Load (sf/occupant)**	**Occupants (50/50 gender ratio)**	**LAV**	**WC**	**UR**	**DF**	**MS**	**Animal Wash**	**Hose Bib**	**Sink**	**Tub/ Shower**	**Clothes Washer**	**WSFU**	**Peak Demand Flow Rate (gpm)**	**Notes**
1	Farm Animal Barn (Existing)	3000	U	-	0	0	0	0	0	0	0	2	0	0	0	3.5	5	No fixtures existing now. Likely only used for storage.
2	Administration/Vetinary Clinic	6500	B	200	32.5	3	2	1	0	1	1	1	4	1	1	32	53	Actual occupancy assumed to be 15 FTEs. Add 30 gpm for laundry and dishwashing demands.
A-1	Maintenance Building	660	S2	-	0	0	0	0	0	0	0	1	1	0	0	4.5	5	
B-X	Cat Cottages (10)	3200	-	-	0	0	0	0	0	0	0	10	0	0	0	6.5	5	Hose bibs could be shared between enclosures.
C-X	Senior Cat Cottages (4)	1280	-	-	0	0	0	0	0	0	0	4	0	0	0	3.5	5	Hose bibs could be shared between enclosures.
D-X	Large Dog Cottages (4)	1280	-	-	0	0	0	0	0	0	0	2	0	0	0	3.5	5	Hose bibs could be shared between enclosures.
E-X	Dog Cottages Without Porch (37)	7104	-	-	0	0	0	0	0	0	0	10	0	0	0	11.5	9	1 hose bib per cluster (4 or 5 cottages)
F-X	Dog Cottages With Porch (29)	5568	-	-	0	0	0	0	0	0	0	8	0	0	0	9.5	8	1 hose bib per cluster (4 or 5 cottages)
8	Caretaker residence	1100	R3	200	2	2	2	0	0	0	0	1	2	2	1	21.5	16	The calculated peak demand is not the same as the SMC Well Ordinance requirement.
9	Goat Barn	2000	U	-	0	0	0	0	0	0	0	2	0	0	0	3.5	5	
10	Dog Arena	3000	U	-	0	0	0	0	0	0	0	1	0	0	0	2.5	5	
Site	Landscape Irrigation	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	20	
	Site totals	-	-	-		5	4	1	0	1	1	42	7	3	2	94	90	

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No. Date	Description
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01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1
08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

PROJECT NUMBER
18042.00

SHEET TITLE
WATER USE & PEAK DEMANDS

SCALE

SHEET NUMBER
A0.02

MATERIAL BOARD

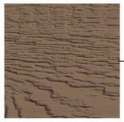

GREY ASPHALT
SHINGLE ROOF


CEMENT BOARD SIDING
REDWOOD RED


TRIM & PROCH COLOR
DESERT STONE


CEMENT BOARD SIDING
TIMBERLAND SUEDE


DOG YARD FENCING


CEMENT BOARD SIDING
CANYON BROWN

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PROJECT NUMBER
18042.00

SHEET TITLE
MATERIAL BOARD

SCALE

SHEET NUMBER

A0.03

FIRE DEPARTMENT - PROJECT NOTES

1. ADDRESS NUMBERS: BUILDING IDENTIFICATION SHALL BE CONSPICUOUSLY POSTED AND VISIBLE FROM THE STREET. (TEMPORARY ADDRESS NUMBERS SHALL BE POSTED PRIOR TO COMBUSTIBLES BEING PLACED ON SITE). THE LETTERS/NUMERALS FOR PERMANENT ADDRESS NUMBERS SHALL BE OF 6-INCH HEIGHT WITH A MINIMUM 1/2-INCH STROKE AND OF A COLOR, WHICH IS CONTRASTING WITH THE BACKGROUND. SUCH LETTER/NUMERALS SHALL BE ILLUMINATED AND FACING THE DIRECTION OF ACCESS.

DISTANCE FROM ROAD	ADDRESS NO. SIZE
0-50 FEET	6-INCH
50-100 FEET	8-INCH
100-150 FEET	10-INCH
150 + FEET	12-INCH

   WITH A CORRESPONDING INCREASE IN STROKE WIDTH.

2. ADDRESS NUMBERS AND DIRECTIONAL SIGNS MAY BE REQUIRED AT THE ENTRANCE TO THE DRIVEWAY/ACCESS ROAD, ROAD FORKS, AND INTERSECTIONS. WHEN LOCATED ON THE STREET THE NUMBERS SHALL BE VISIBLE FROM EACH DIRECTION OF TRAVEL. THIS REMOTE SIGNAGE SHALL CONSIST OF A 6 INCH BY 18-INCH GREEN REFLECTIVE METAL SIGN WITH 3 INCH REFLECTIVE NUMBERS/ LETTERS SIMILAR TO HY-KO 911 OR EQUIVALENT.

3. AUTOMATIC FIRE SPRINKLER SYSTEM: PROJECT TO BE EQUIPPED WITH AN APPROVED NFPA 13 FIRE SPRINKLER SYSTEM THROUGHOUT WHERE APPLICABLE. FIRE SPRINKLER DESIGN SHALL BE BASED ON AN AT LEAST LIGHT HAZARD OR HIGHER CLASSIFICATION BASED ON STORED COMMODITY. COMMODITY INFORMATION TO BE PROVIDED FOR REVIEW.

4. ALL NON-RESIDENTIAL STRUCTURES GREATER THAN 1,000 SQUARE FEET REQUIRE FIRE SPRINKLERS, EXCLUDING AGRICULTURE STRUCTURES WITH LESS THAN 10% OF THE STRUCTURE BEING USED FOR STORAGE OR OFFICE USE.

5. THE PROPOSED PROJECT MUST BE EQUIPPED WITH AN APPROVED NFPA 13 FIRE SPRINKLER THROUGHOUT.

6. UNOBSTRUCTED FIRE SPRINKLER COVERAGE: SHALL EXTEND TO ALL AREAS IN THE OCCUPANCY. ANY AREAS CREATING COMPARTMENTALIZATION DUE TO NEW WALLS SHALL HAVE ADDITIONAL SPRINKLER HEADS INSTALLED TO PROVIDE UNOBSTRUCTED COVERAGE. ANY HEAT PRODUCING APPLIANCES THAT ARE HOOKED UP TO AN ELECTRICAL POWER SOURCE, NATURAL OR PROPANE GAS, AND ARE OPERATIONAL SHALL NOT HAVE SPRINKLER HEADS LOCATED WITHIN THEIR RESPECTIVE HEAT ZONES.

7. LIGHTING LAYOUT SHALL NOT CONFLICT WITH FIRE SPRINKLER LAYOUT.

8. FIRE SERVICE LINE TO BE IDENTIFIED ON PLANS AND MEET MINIMUM SIZE FOR FIRE SPRINKLER HYDRAULIC CALCULATIONS.

9. GENERAL INFORMATION SIGN TO BE PLACED AT THE RISER ON PLAN PER NFPA 13 SECTION 28.6.1.

10. FIRE SPRINKLER HARDWARE: THIS PROJECT IS REQUIRED TO INSTALL ALL RELATED FIRE SPRINKLER HARDWARE (POST INDICATOR VALVE, FIRE DEPARTMENT CONNECTION AND EXTERIOR BELL).

11. AN AUTOMATIC FIRE SPRINKLER SYSTEM WILL BE REQUIRED AND MUST HAVE AN NFPA 13 CLASSIFIC. SECTION 903.2.8 OF THE 2019 CFC.

12. FIRE ACCESS ROADS: THE APPLICANT MUST HAVE A MAINTAINED ASPHALT SURFACE ROAD FOR INGRESS AND EGRESS OF FIRE APPARATUS. THE SAN MATEO COUNTY DEPARTMENT OF PUBLIC WORKS AND THE CALIFORNIA FIRE CODE SHALL SET ROAD STANDARDS. AS PER THE 2016 CFC, DEAD-END ROADS EXCEEDING 150 FEET SHALL BE PROVIDED WITH A TURNAROUND IN ACCORDANCE WITH SAN MATEO COUNTY FIRE DEPARTMENT SPECIFICATIONS. AS PER THE 2019 CFC, SECTION APPENDIX D, ROAD WIDTH SHALL NOT BE LESS THAN 20 FEET. FIRE ACCESS ROADS SHALL BE INSTALLED AND MADE SERVICEABLE PRIOR TO COMBUSTIBLES BEING PLACED ON THE PROJECT SITE AND MAINTAINED DURING CONSTRUCTION. APPROVED SIGNS AND PAINTED CURBS OR LINES SHALL BE PROVIDED AND MAINTAINED TO IDENTIFY FIRE ACCESS ROADS AND STATE THE PROHIBITION OF THEIR OBSTRUCTION. IF THE ROAD WIDTH DOES NOT ALLOW PARKING ON THE STREET (20-FOOT ROAD) AND ON-STREET PARKING IS DESIRED, AN ADDITIONAL IMPROVED AREA SHALL BE DEVELOPED FOR THAT USE.

13. THE BUILDINGS ARE IN A VERY HIGH FIRE HAZARD SEVERITY ZONE AND WILL REQUIRE A CLASS A ROOF.

14. VEGETATION MANAGEMENT (SRA) THE 2019 CALIFORNIA FIRE CODE CHAPTER 49 AND PUBLIC RESOURCES CODE 4291. A FUEL BREAK OF DEFENSIBLE SPACE IS REQUIRED AROUND THE PERIMETER OF ALL STRUCTURES TO A DISTANCE OF NOT LESS THAN 30 FEET AND MAY BE REQUIRED TO A DISTANCE OF 100 FEET OR TO THE PROPERTY LINE. THIS IS NEITHER A REQUIREMENT NOR AN AUTHORIZATION FOR THE REMOVAL OF LIVING TREES. TREES LOCATED WITHIN THE DEFENSIBLE SPACE SHALL BE PRUNED TO REMOVE DEAD AND DYING PORTIONS, AND LIMBED UP 6 FEET ABOVE THE GROUND. NEW TREES PLANTED IN THE DEFENSIBLE SPACE SHALL BE LOCATED NO CLOSER THAN 10' TO ADJACENT TREES WHEN FULLY GROWN OR AT MATURITY. REMOVE THAT PORTION OF ANY EXISTING TREES, WHICH EXTENDS WITHIN 10 FEET OF THE OUTLET OF A CHIMNEY OR STOVEPIPE OR IS WITHIN 5' OF ANY STRUCTURE. MAINTAIN ANY TREE ADJACENT TO OR OVERHANGING A BUILDING FREE OF DEAD OR DYING WOOD.

15. GATES SHALL BE A MINIMUM OF 2 FEET WIDER THAN THE ACCESS ROAD/DRIVEWAY THEY SERVE. OVERHEAD GATE STRUCTURES SHALL HAVE A MINIMUM OF 15 FEET OF VERTICAL CLEARANCE. LOCKED GATES SHALL BE PROVIDED WITH A KNOX BOX OR KNOX PADLOCK. ELECTRIC GATES SHALL HAVE A KNOX KEY SWITCH. ELECTRIC GATES SHALL AUTOMATICALLY OPEN DURING POWER FAILURES. CFC 503.6, 506.

FIRE DEPARTMENT - PROJECT NOTES

16. EMERGENCY BUILDING ACCESS: THE PROPOSED PROJECT WILL REQUIRE THE INSTALLATION OF “KNOX BOXES” THESE EMERGENCY KEY BOXES ARE REQUIRED WHEN ACCESS TO OR WITHIN A STRUCTURE OR AN AREA IS UNDULY DIFFICULT BECAUSE OF SECURED OPENINGS OR WHERE IMMEDIATE ACCESS IS NECESSARY FOR LIFE SAVING OR FIRE-FIGHTING PURPOSES. THE CHIEF WILL DETERMINE THE LOCATION FOR THE KEY BOX AND PROVIDE AN AUTHORIZED ORDER FORM. ALL SECURITY GATE SYSTEMS CONTROLLING VEHICULAR ACCESS SHALL BE EQUIPPED WITH A “KNOX”; KEY OPERATED EMERGENCY ENTRY DEVICE.

17. FIRE ALARM SYSTEM: THIS PROJECT IS REQUIRED TO HAVE INSTALLED AN APPROVED NFPA 72 FIRE ALARM SYSTEM THROUGHOUT. THE SYSTEM IS TO MONITOR ANY FLOW THROUGH THE REQUIRED AUTOMATIC FIRE SPRINKLER SYSTEM, ANY FIRE SPRINKLER VALVE TAMPER AND ALL HEAT AND SMOKE DETECTORS. THE SYSTEM WILL ALSO INCLUDE AN EXTERIOR BELL AND INTERIOR HORN/STROBES, WHICH ARE REQUIRED TO BE WIRED TO THE ALARM SYSTEM AND THE FLOW SWITCH FOR THE FIRE SPRINKLER SYSTEM. THE FACP SHALL BE PROTECTED WITH A SMOKE DETECTOR AS PER NFPA 72, SECTION 1-5.6 AND A MANUAL PULL STATION. A WIRING INSPECTION IS REQUIRED TO BE CONDUCTED BY THE FIRE DEPARTMENT PRIOR TO COVERING WALLS AND CEILING AREAS. ALL SYSTEMS AND COMPONENTS MUST BE TESTED PER MANUFACTURES SPECIFICATIONS AND NFPA 72. BATTERY BACKUP SHALL MEET OR EXCEED REQUIREMENTS FOR AMP-HOUR RATING AND MUST BE TESTED AS PER MANUFACTURES SPECIFICATION AND NFPA 72.

18. SOLAR PHOTOVOLTAIC SYSTEMS: THESE SYSTEMS SHALL MEET THE REQUIREMENTS OF THE 2019 CFC SECTION 605.11

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PROJECT NUMBER
18042.00

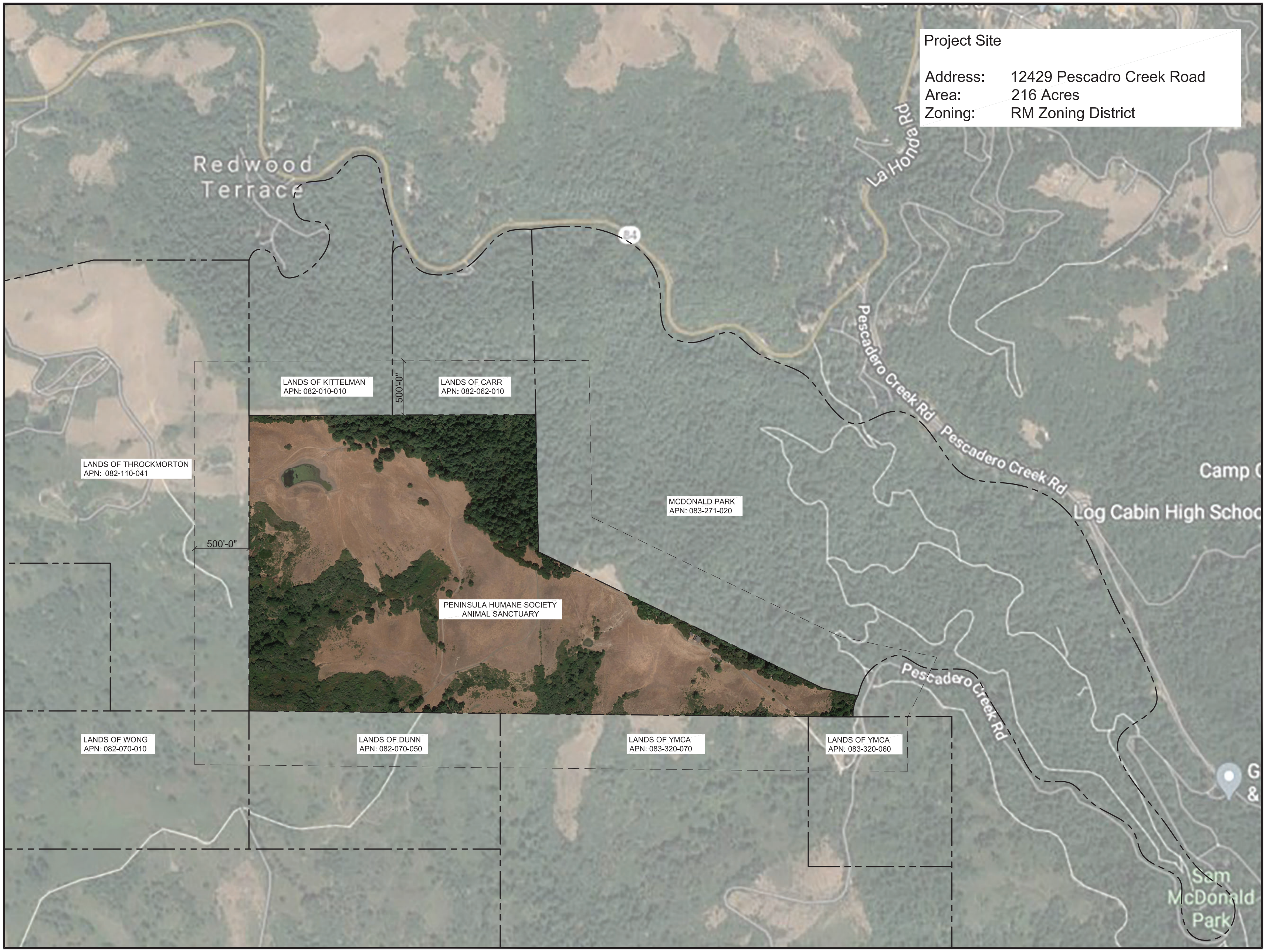
SHEET TITLE
PROJECT NOTES

SCALE

SHEET NUMBER

1

A0.04



Project Site

Address:	12429 Pescadro Creek Road
Area:	216 Acres
Zoning:	RM Zoning District

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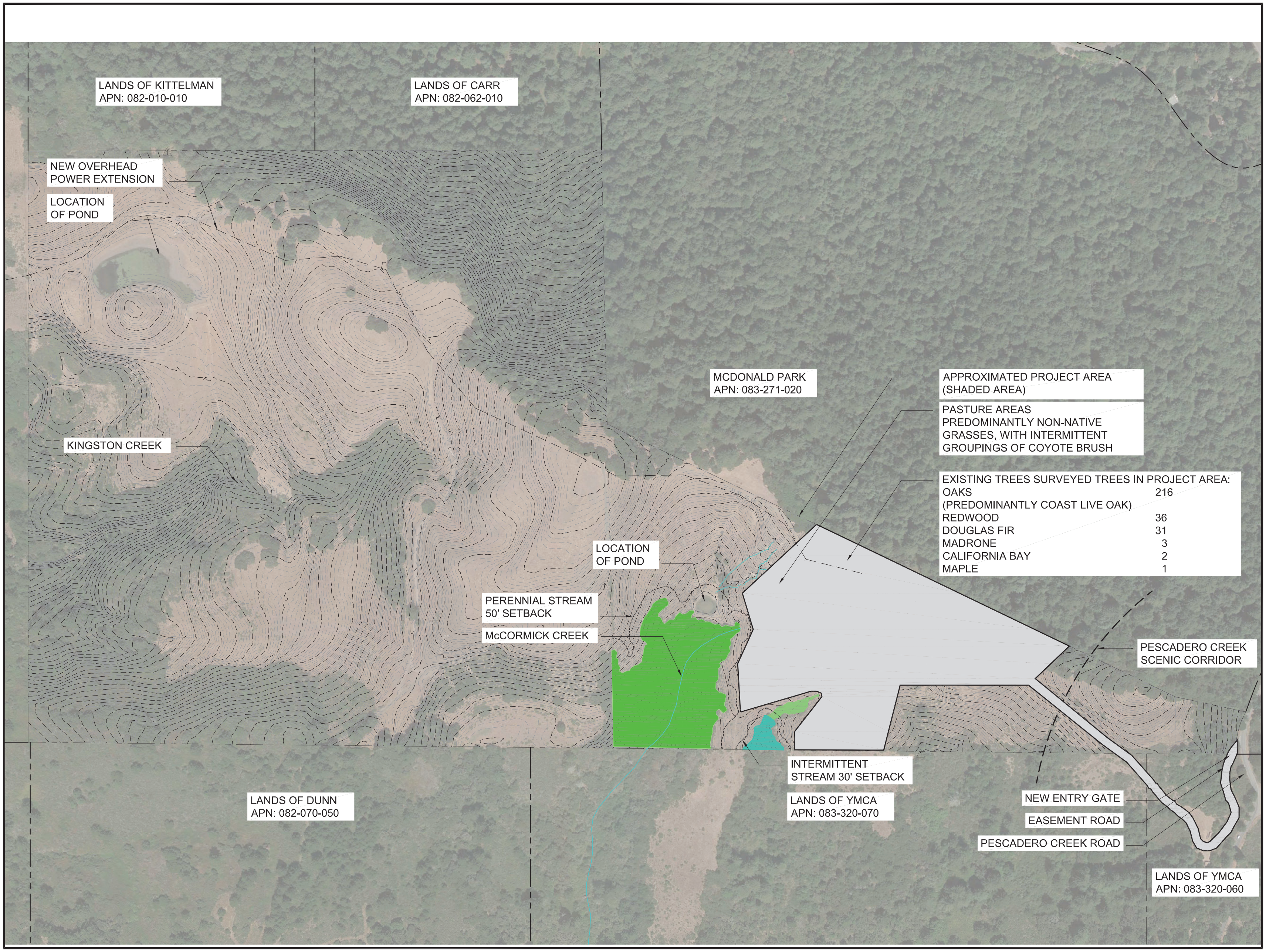
PROJECT NUMBER
18042.00

SHEET TITLE
VICINITY MAP

SCALE
1"=400'-0"

SHEET NUMBER

A1.00



EXISTING TREES SURVEYED TREES IN PROJECT AREA:

OAKS (PREDOMINANTLY COAST LIVE OAK)	216
REDWOOD	36
DOUGLAS FIR	31
MADRONE	3
CALIFORNIA BAY	2
MAPLE	1

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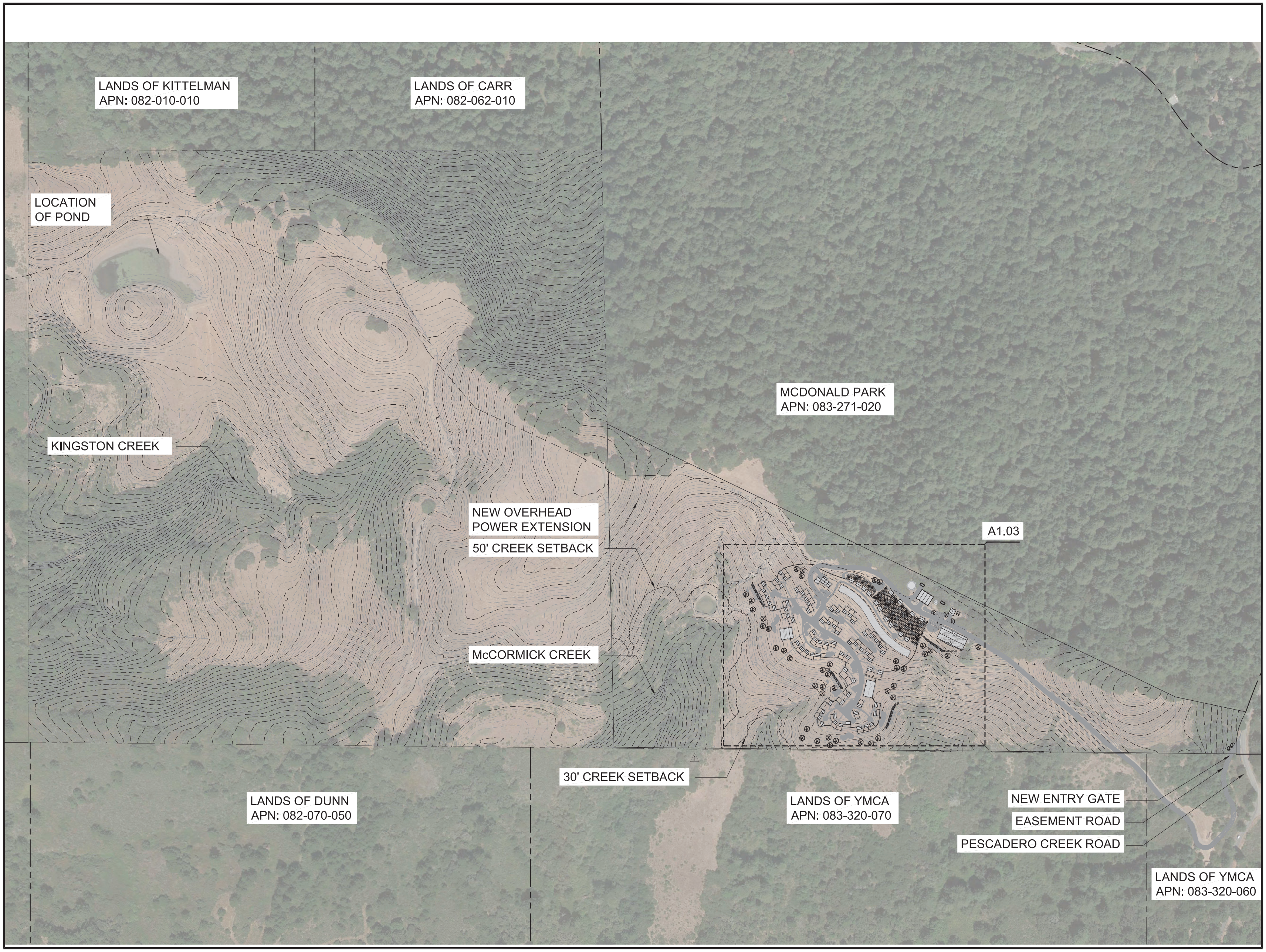
PROJECT NUMBER
18042.00

SHEET TITLE
NATURAL SETTING MAP

SCALE
1"=200'-0"

SHEET NUMBER

A1.01



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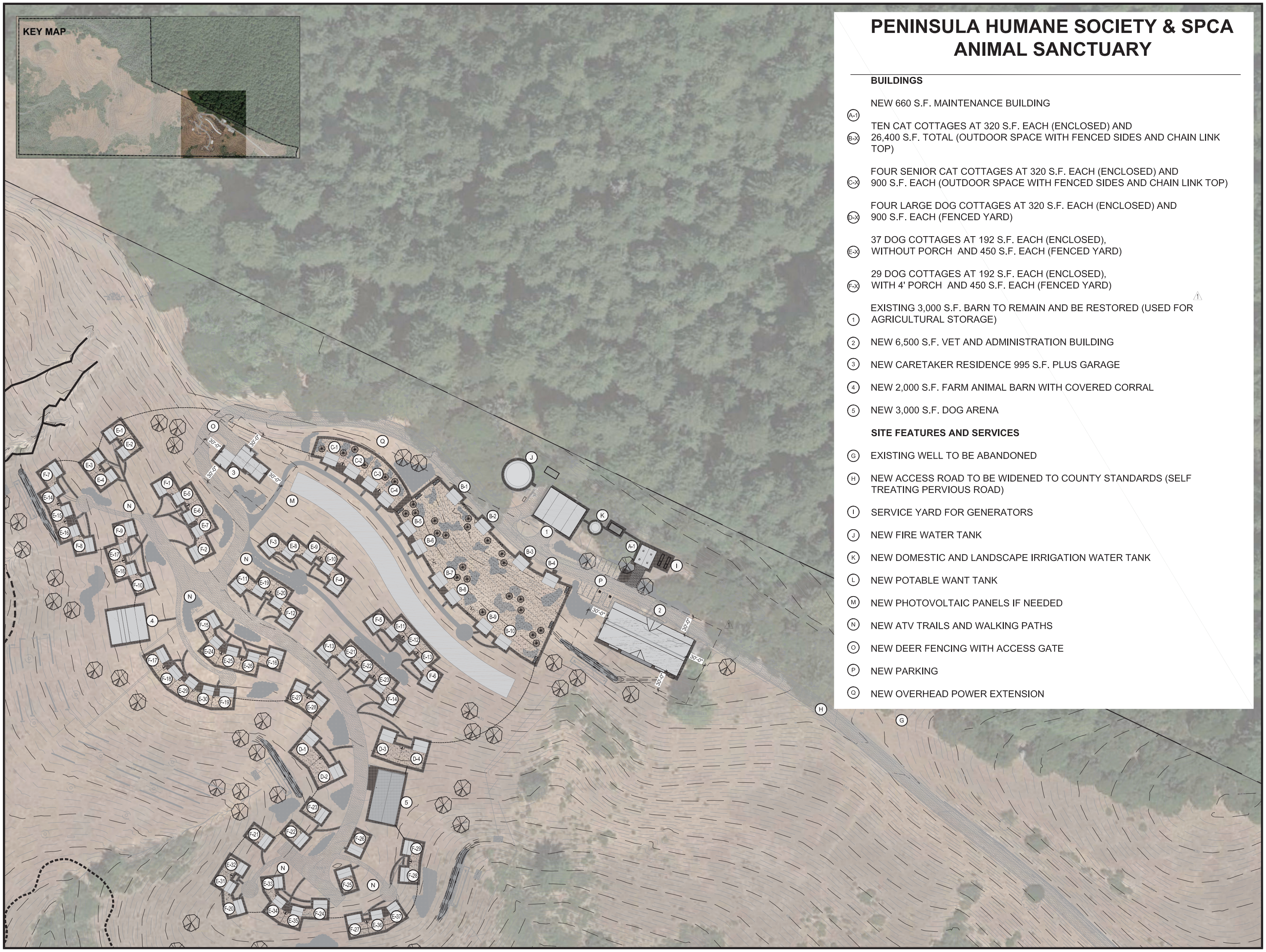
PROJECT NUMBER
18042.00

SHEET TITLE
OVERALL SITE PLAN

SCALE
1"=200'-0"

SHEET NUMBER
A1.02



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BUILDINGS

A-1	NEW 660 S.F. MAINTENANCE BUILDING
B-X	TEN CAT COTTAGES AT 320 S.F. EACH (ENCLOSED) AND 26,400 S.F. TOTAL (OUTDOOR SPACE WITH FENCED SIDES AND CHAIN LINK TOP)
C-X	FOUR SENIOR CAT COTTAGES AT 320 S.F. EACH (ENCLOSED) AND 900 S.F. EACH (OUTDOOR SPACE WITH FENCED SIDES AND CHAIN LINK TOP)
D-X	FOUR LARGE DOG COTTAGES AT 320 S.F. EACH (ENCLOSED) AND 900 S.F. EACH (FENCED YARD)
E-X	37 DOG COTTAGES AT 192 S.F. EACH (ENCLOSED), WITHOUT PORCH AND 450 S.F. EACH (FENCED YARD)
F-X	29 DOG COTTAGES AT 192 S.F. EACH (ENCLOSED), WITH 4' PORCH AND 450 S.F. EACH (FENCED YARD)
1	⚠1 EXISTING 3,000 S.F. BARN TO REMAIN AND BE RESTORED (USED FOR AGRICULTURAL STORAGE)
2	NEW 6,500 S.F. VET AND ADMINISTRATION BUILDING
3	NEW CARETAKER RESIDENCE 995 S.F. PLUS GARAGE
4	NEW 2,000 S.F. FARM ANIMAL BARN WITH COVERED CORRAL
5	NEW 3,000 S.F. DOG ARENA

SITE FEATURES AND SERVICES

G	EXISTING WELL TO BE ABANDONED
H	NEW ACCESS ROAD TO BE WIDENED TO COUNTY STANDARDS (SELF TREATING PERVIOUS ROAD)
I	SERVICE YARD FOR GENERATORS
J	NEW FIRE WATER TANK
K	NEW DOMESTIC AND LANDSCAPE IRRIGATION WATER TANK
L	NEW POTABLE WANT TANK
M	NEW PHOTOVOLTAIC PANELS IF NEEDED
N	NEW ATV TRAILS AND WALKING PATHS
O	NEW DEER FENCING WITH ACCESS GATE
P	NEW PARKING
Q	NEW OVERHEAD POWER EXTENSION

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PROJECT NUMBER
18042.00

SHEET TITLE
ENLARGED SITE PLAN

SCALE
1/64" = 1'-0"

SHEET NUMBER

A1.03

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No.	Date	Description
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2	08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

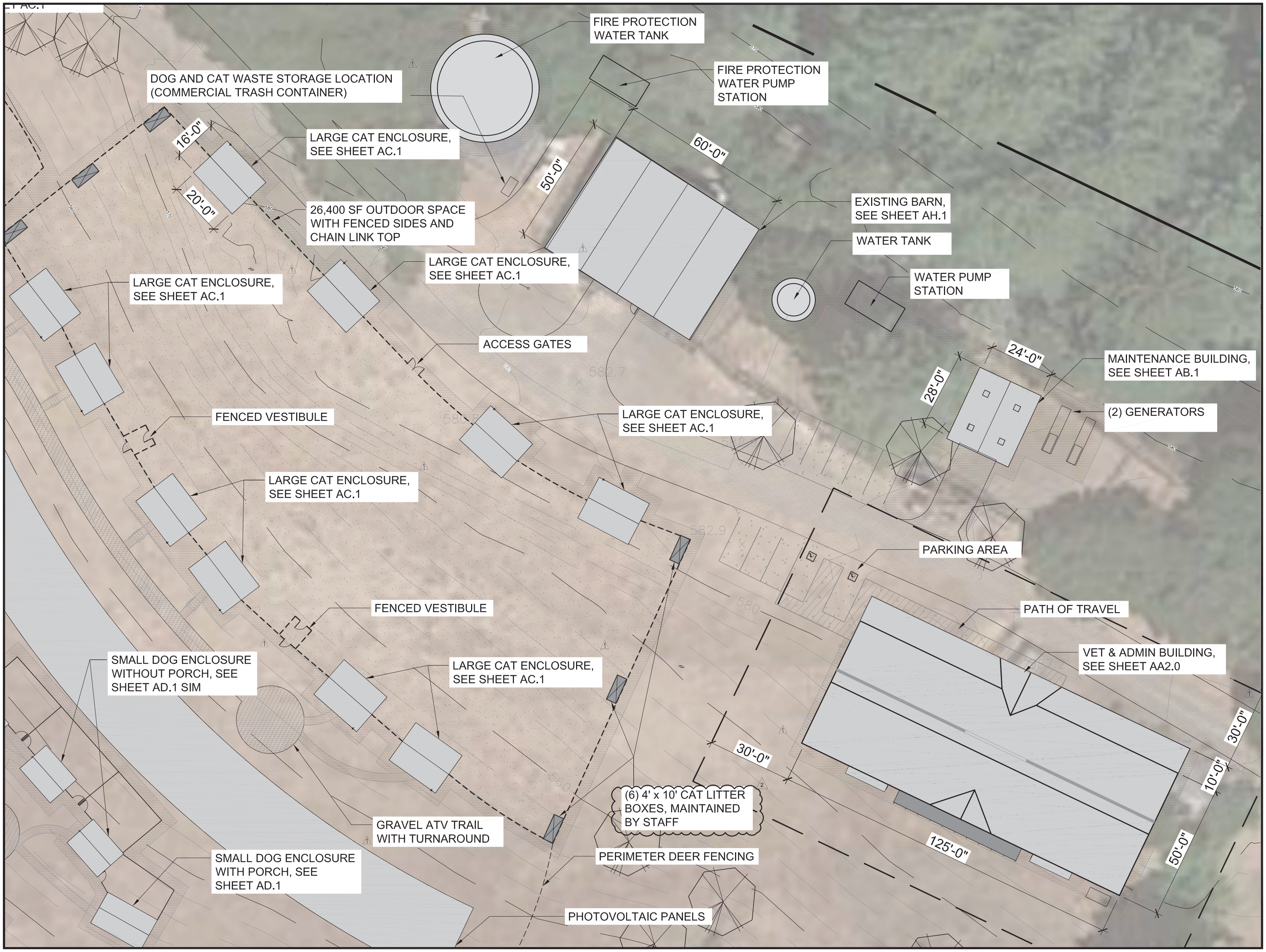
PROJECT NUMBER
18042.00

SHEET TITLE
ANIMAL WASTE MANAGEMET PLAN

SCALE
1/64" = 1'-0"

SHEET NUMBER
1

A1.04



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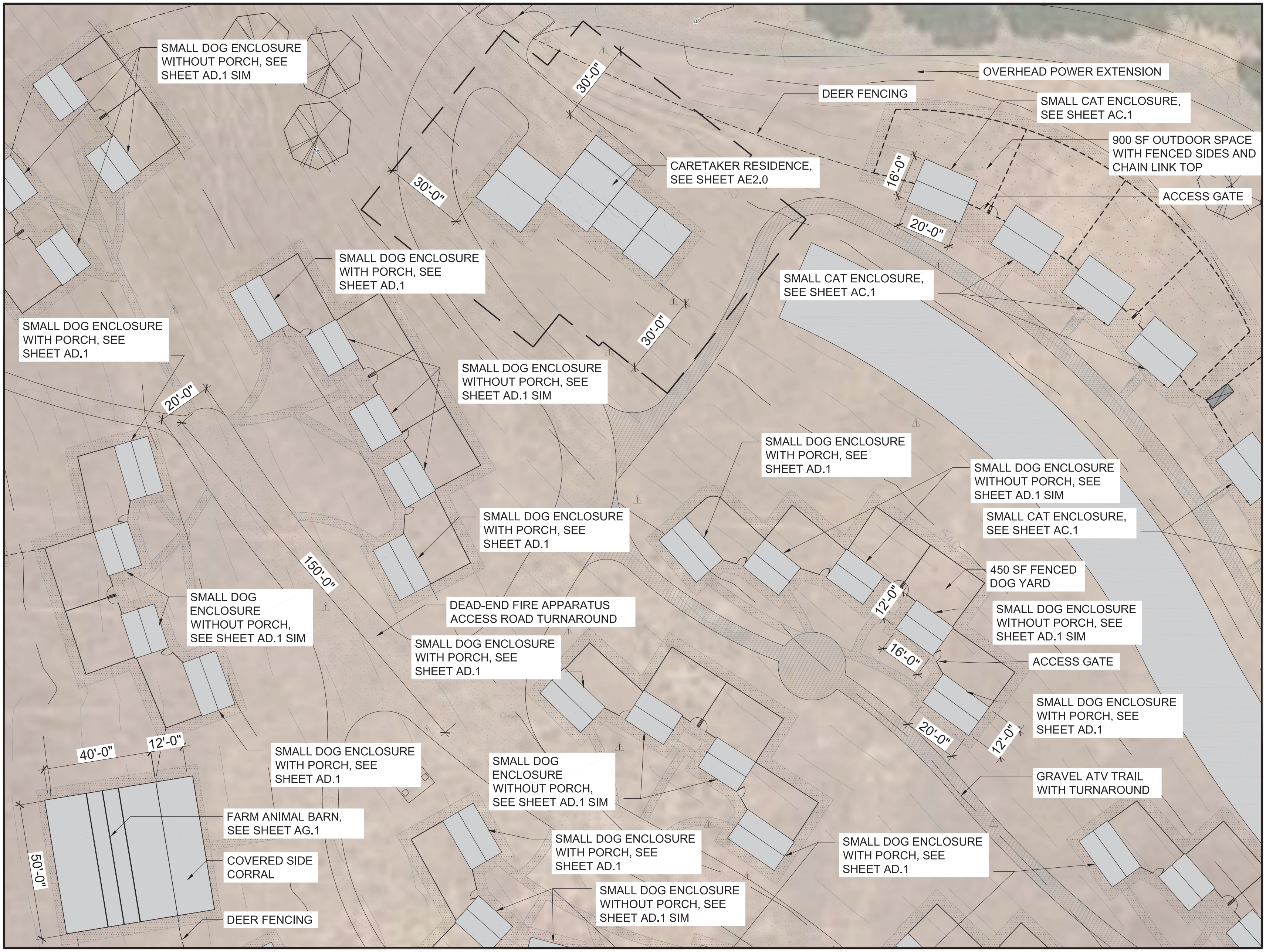
PROJECT NUMBER
18042.00

SHEET TITLE
ADMIN/VET BUILDING
& LARGE CAT ENCLOSURE

SCALE
1/16" = 1'-0"

SHEET NUMBER

A1.2



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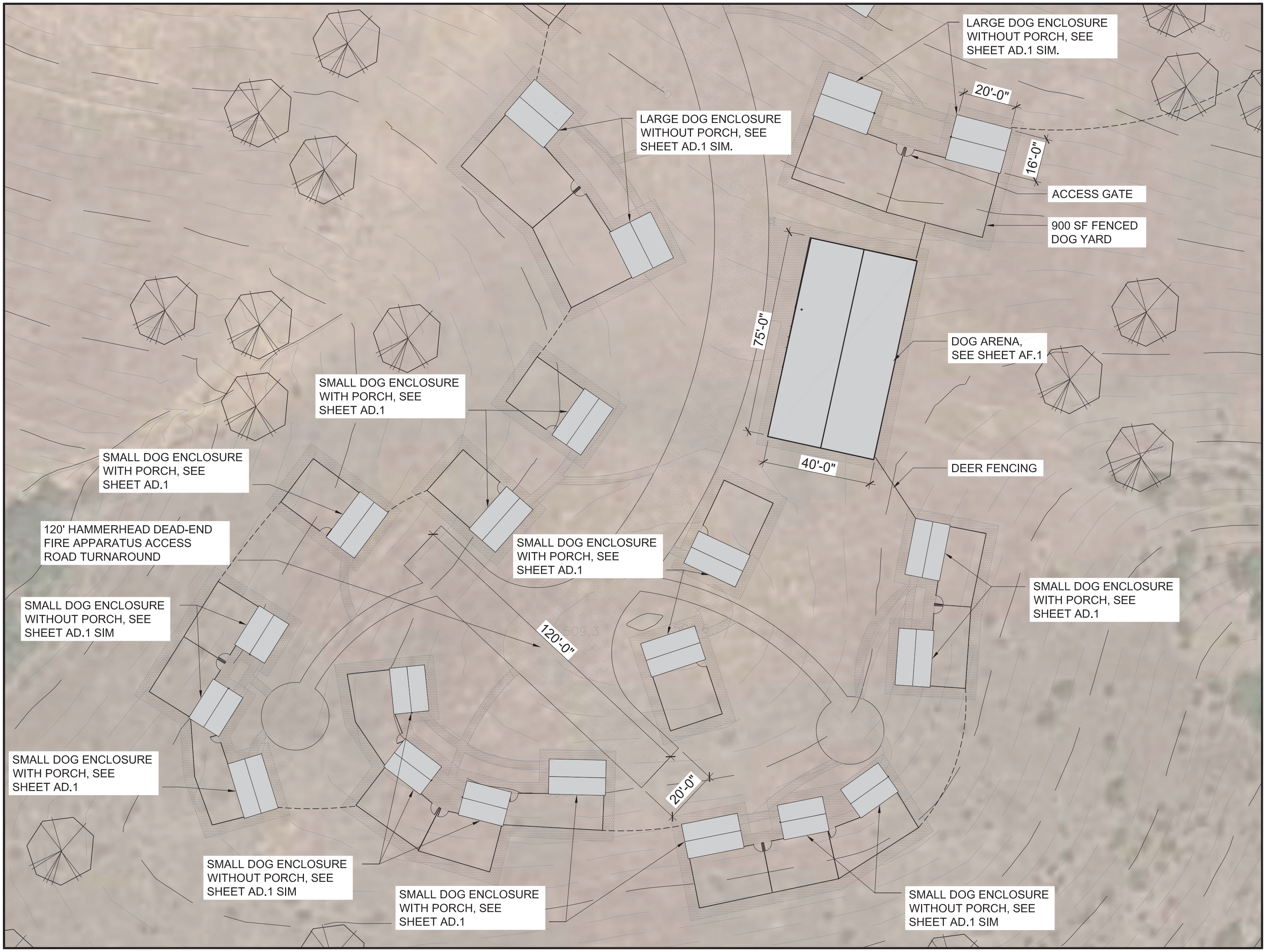
PROJECT NUMBER
18042.00

SHEET TITLE
SMALL CAT & DOG ENCLOSURES

SCALE
1/16" = 1'-0"

SHEET NUMBER
A1.3



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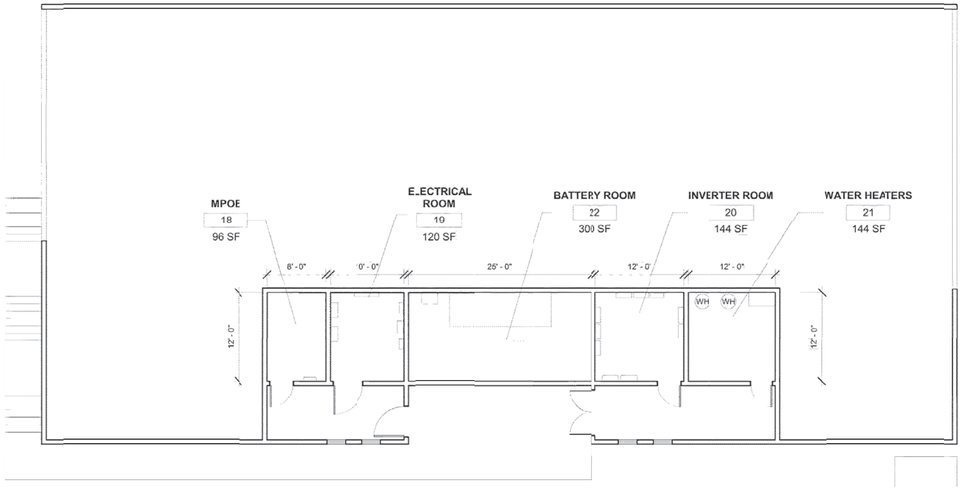
PROJECT NUMBER
18042.00

SHEET TITLE
DOG ENCLSOURES & DOG ARENA

SCALE
1/16" = 1'-0"

SHEET NUMBER
A1.4

① LEVEL 1 FLOOR PLAN
1/8" = 1'-0"



② BASEMENT FLOOR PLAN
1/8" = 1'-0"

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STEPHEN SUNSERI
C-19143
11-30-23

ISSUES AND REVISIONS

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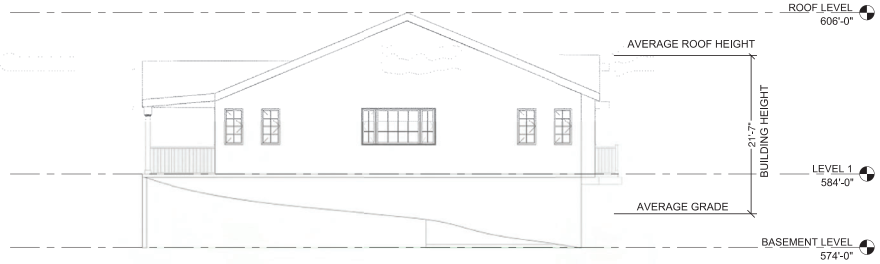
PROJECT NUMBER
18042.00

SHEET TITLE
VET & ADMIN FLOOR PLANS

SCALE
1/8" = 1'-0"

SHEET NUMBER
AA2.0

① EAST ELEVATION
1/8" = 1'-0"



④ WEST ELEVATION
1/8" = 1'-0"

② NORTH ELEVATION
1/8" = 1'-0"

③ SOUTH ELEVATION
1/8" = 1'-0"

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STEPHEN SUNSERI
19143
11-30-23
RENEWAL DATE

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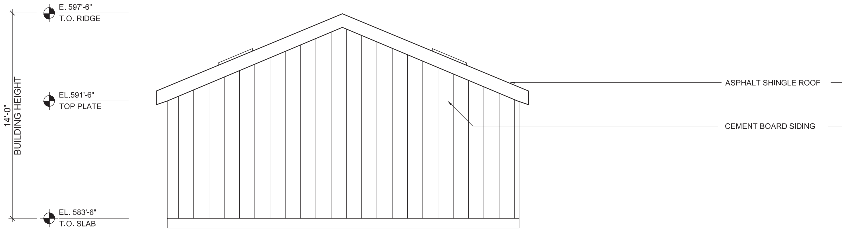
PROJECT NUMBER
18042.00

SHEET TITLE
ELEVATIONS

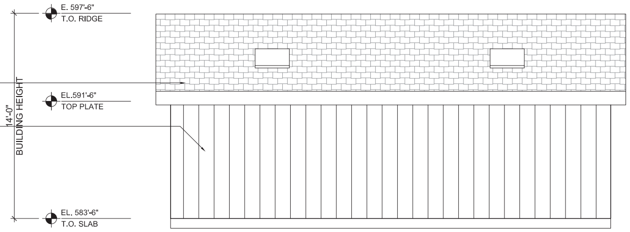
SCALE
1/8" = 1'-0"

SHEET NUMBER

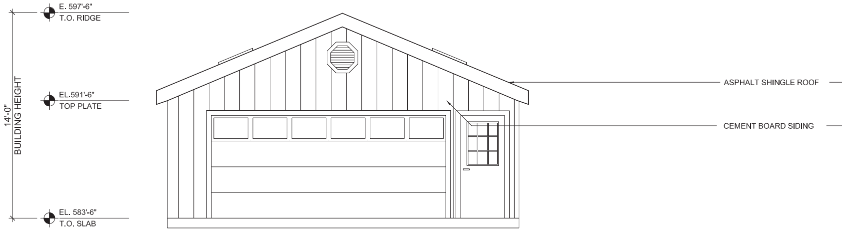
AA3.0



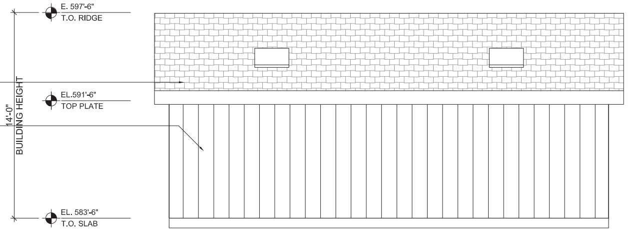
8 **EAST ELEVATION**
1/4"=1'-0"



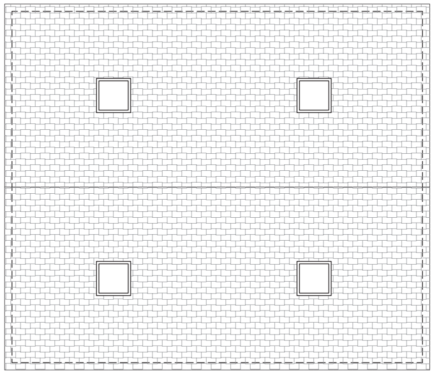
4 **NORTH ELEVATION**
1/4"=1'-0"



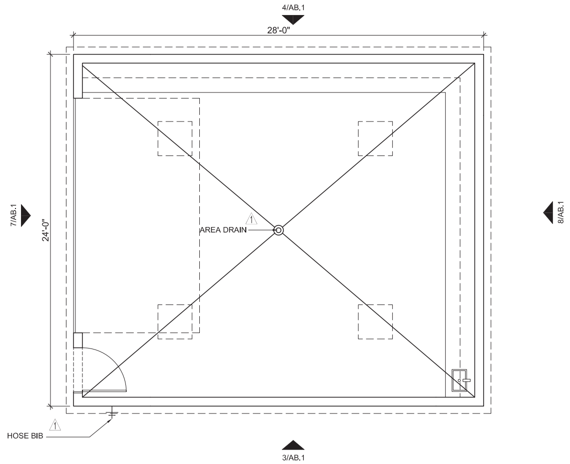
7 **WEST ELEVATION**
1/4"=1'-0"



3 **SOUTH ELEVATION**
1/4"=1'-0"



5 **MAINTENANCE BLDG ROOF PLAN**
1/4"=1'-0"



1 **MAINTENANCE BLDG FLOOR PLAN**
1/4"=1'-0"

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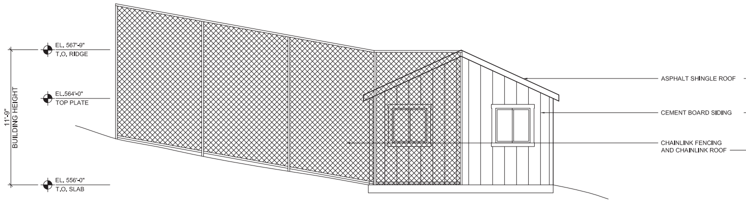
PROJECT NUMBER
18042.00

SHEET TITLE
MAINTENANCE BUILDING

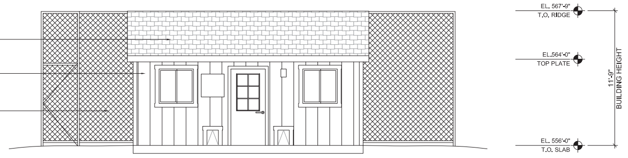
SCALE
AS NOTED

SHEET NUMBER

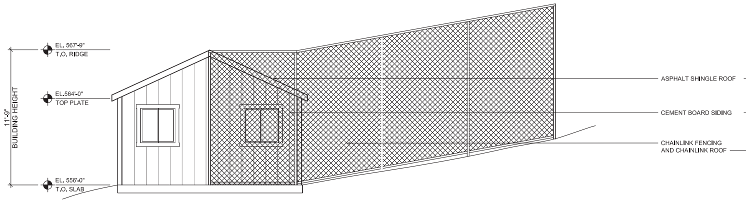
AB.1



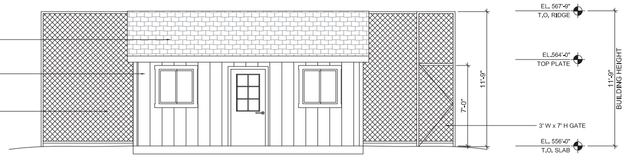
8 | **WEST ELEVATION**
1/4"=1'-0"



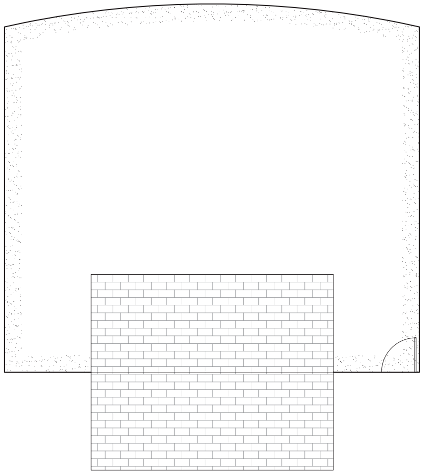
4 | **NORTH ELEVATION**
1/4"=1'-0"



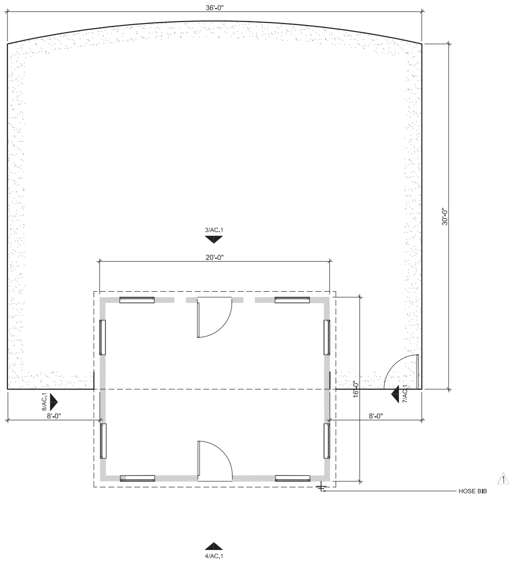
7 | **EAST ELEVATION**
1/4"=1'-0"



3 | **SOUTH ELEVATION**
1/4"=1'-0"



5 | **CAT COTTAGE ROOF PLAN**
1/4"=1'-0"



1 | **CAT COTTAGE FLOOR PLAN**
1/4"=1'-0"

PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY

Peninsula Humane Society & SPCA

KSH
ARCHITECTS
KORTH SUNSERI HAGEY

ISSUES AND REVISIONS

No.	Date	Description
	07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
1	01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1
	08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

PROJECT NUMBER
18042.00

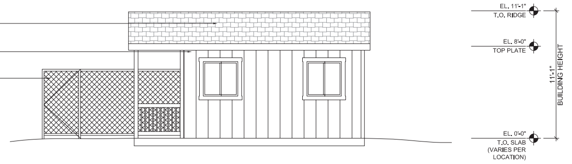
SHEET TITLE
SMALL CAT ENCLOSURE

SCALE
AS NOTED

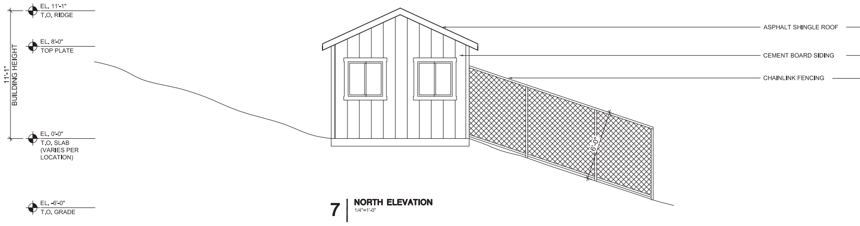
SHEET NUMBER

AC.1

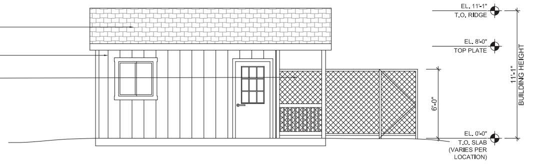
8 **SOUTH ELEVATION**
1/4"=1'-0"



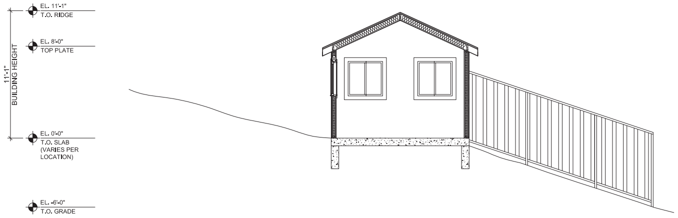
4 **EAST ELEVATION**
1/4"=1'-0"



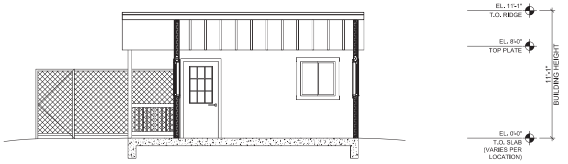
7 **NORTH ELEVATION**
1/4"=1'-0"



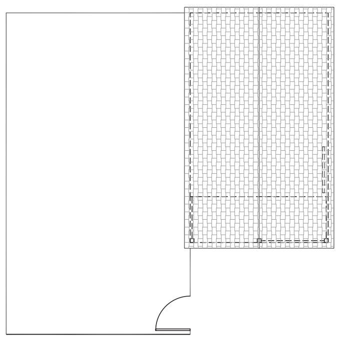
3 **WEST ELEVATION**
1/4"=1'-0"



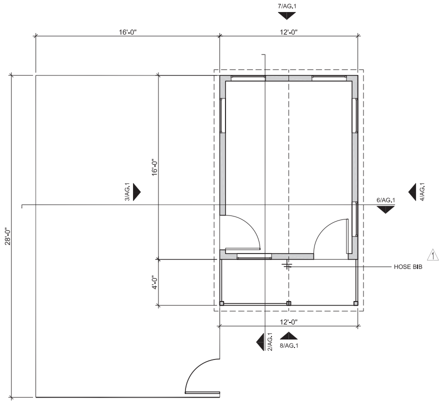
6 **DOG COTTAGE SECTION**
1/4"=1'-0"



2 **DOG COTTAGE SECTION**
1/4"=1'-0"



5 **DOG COTTAGE ROOF PLAN**
1/4"=1'-0"



1 **DOG COTTAGE FLOOR PLAN**
1/4"=1'-0"

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No.	Date	Description
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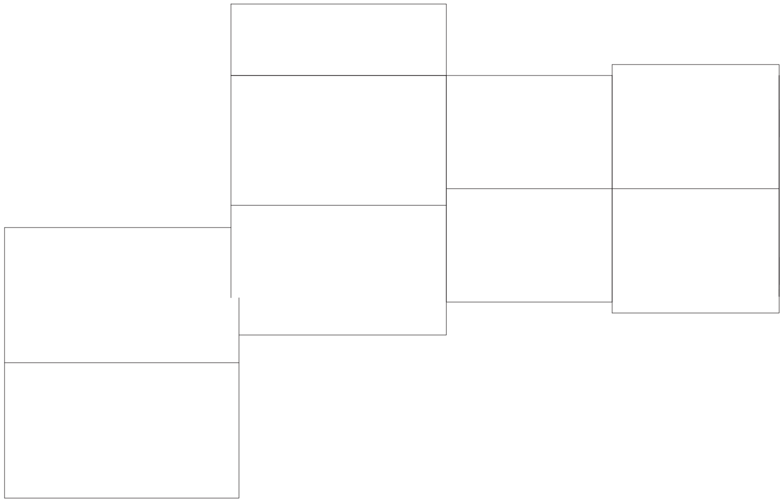
PROJECT NUMBER
18042.00

SHEET TITLE
DOG COTAGE

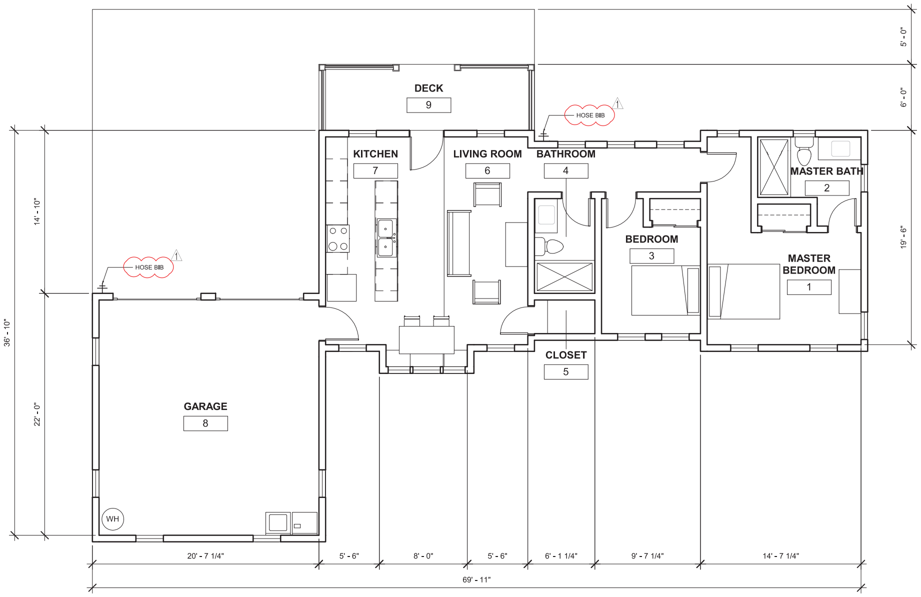
SCALE
AS NOTED

SHEET NUMBER

AD.1



② ROOF PLAN
3/16" = 1'-0"



① LEVEL 1 FLOOR PLAN
3/16" = 1'-0"

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KORTH SUNSERI HAGEY

JAMES STEPHEN SUNSERI
19143
11-30-23
RENEWAL DATE

ISSUES AND REVISIONS

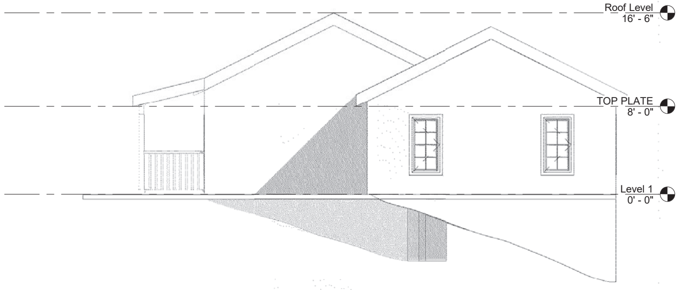
No.	Date	Description
	07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
1	01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1

PROJECT NUMBER
18042.00

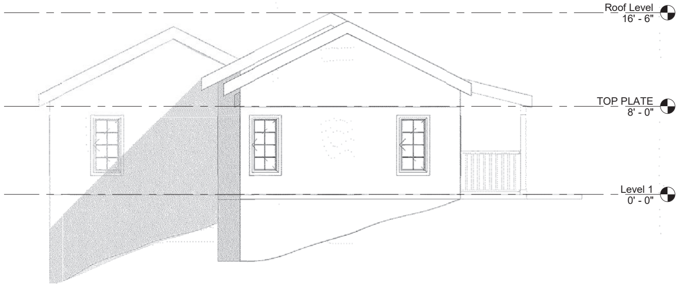
SHEET TITLE
CARETAKER RESIDENCE FLOOR PLANS

SCALE
As indicated

SHEET NUMBER
AE2.0

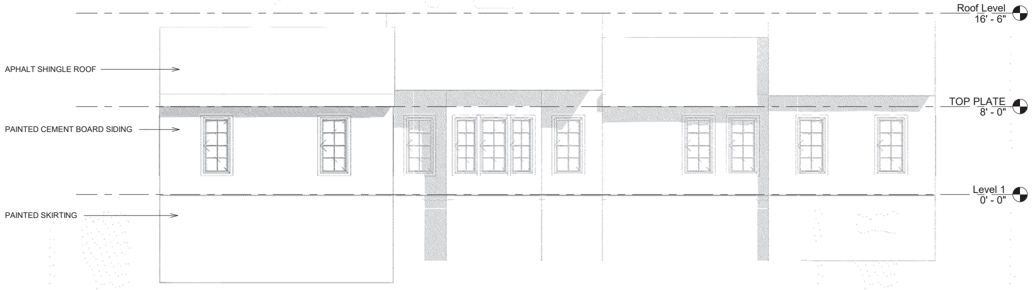


4 West
3/16" = 1'-0"



3 East
3/16" = 1'-0"

1 North
3/16" = 1'-0"



2 South
3/16" = 1'-0"

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ARCHITECTS
KORTH SUNSERI HAGEY

STEPHEN SUNSERI
19143
11-30-23

ISSUES AND REVISIONS

No. Date	Description
07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1

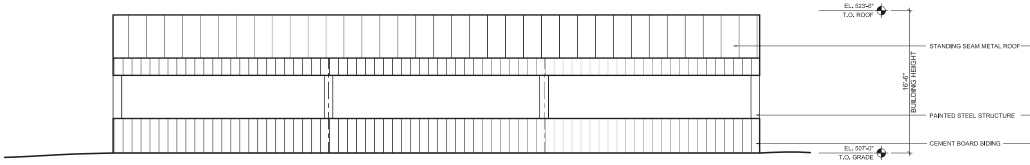
PROJECT NUMBER
18042.00

SHEET TITLE
CARETAKER RESIDENCE ELEVATIONS

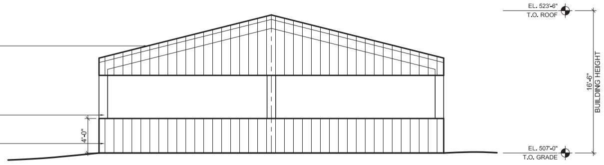
SCALE
3/16" = 1'-0"

SHEET NUMBER

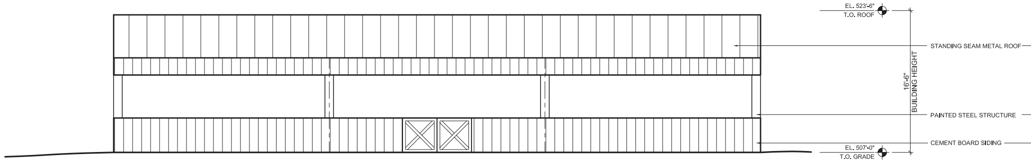
AE3.0



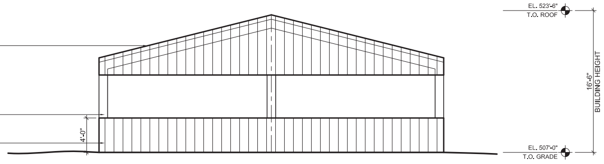
6 | **EAST ELEVATION**
3/16"=1'-0"



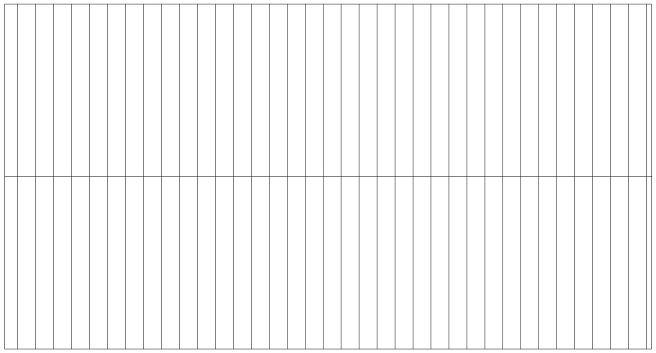
3 | **NORTH ELEVATION**
3/16"=1'-0"



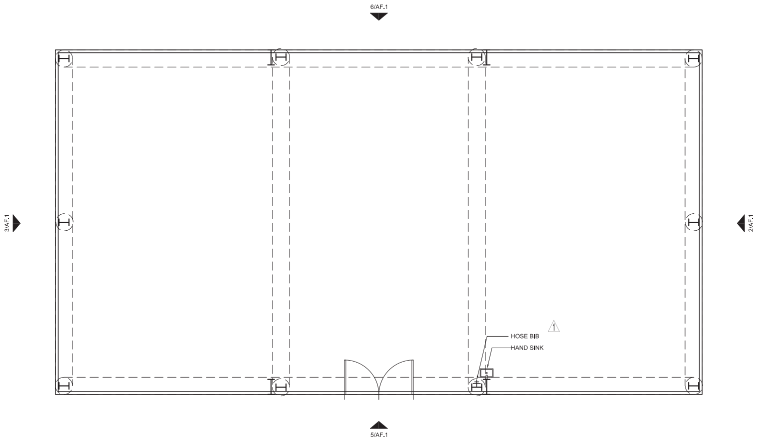
5 | **WEST ELEVATION**
3/16"=1'-0"



2 | **SOUTH ELEVATION**
3/16"=1'-0"



4 | **ROOF PLAN**
3/16"=1'-0"



1 | **FLOOR PLAN**
3/16"=1'-0"

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Peninsula Humane Society & SPCA

KSH

ARCHITECTS
KORTH SUNSERI HAGEY

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	08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

PROJECT NUMBER
18042.00

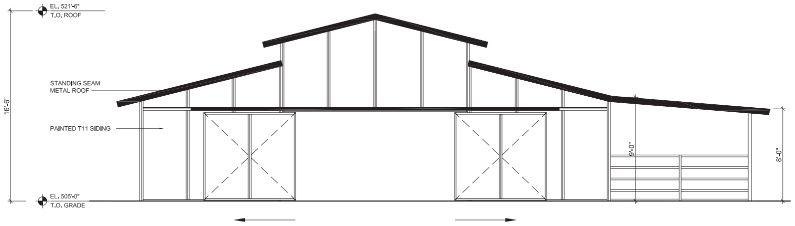
SHEET TITLE
DOG ARENA

SCALE
3/16 = 1'-0"

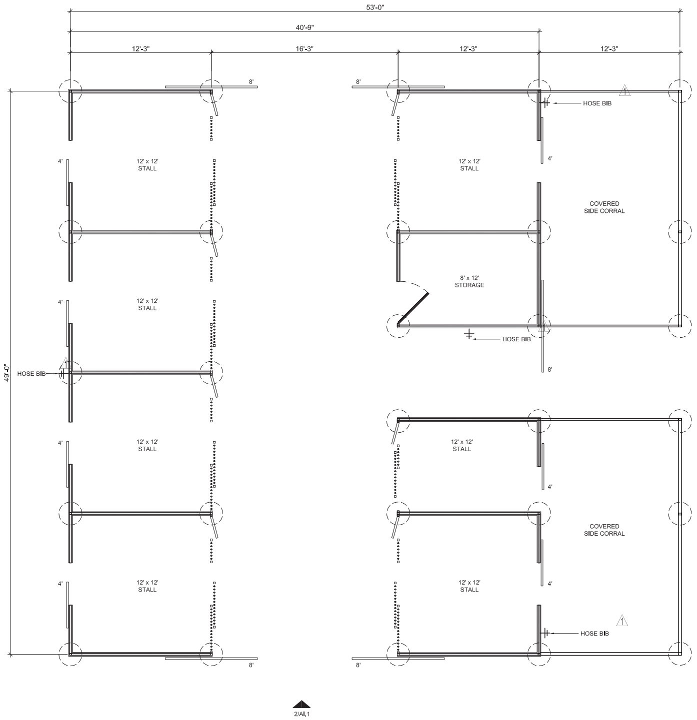
SHEET NUMBER

AF.1

3 | **BARN RENDERING**
NTS



2 | **BARN ELEVATION**
1/4"=1'-0"



1 | **BARN FLOOR PLAN**
1/4"=1'-0"

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PROJECT NUMBER
18042.00

SHEET TITLE
ANIMAL BARN

SCALE
AS NOTED

SHEET NUMBER
AG.1

INTERIOR TO REMAIN UNPAINTED

NEW 8' LIGHTS SUSPENDED FROM EXISTING TRUSSES

PAINT EXISTING TRIM

PAINT EXISTING SIDING

PAINT EXISTING DOOR

REPAIR AND PAINT EXISTING ROLL UP DOOR

REMOVE EXISTING CORRAL

REMOVE AND CLEAN SITE OF EXISTING DEBRIS

PENINSULA HUMANE SOCIETY

ANIMAL SANCTUARY

Peninsula Humane Society & SPCA

KSH

ARCHITECTS
KORTH SUNSERI HAGEY

ISSUES AND REVISIONS

No. Date	Description
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PROJECT NUMBER
18042.00

SHEET TITLE
EXISTING BARN

SCALE
N.T.S.

SHEET NUMBER

AH.1

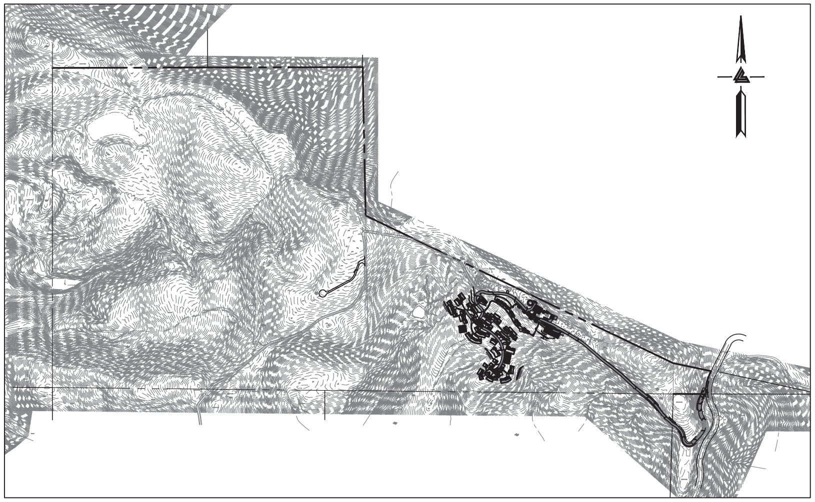
PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY
12429 PESCADERO CREEK ROAD
LOMA MAR, CALIFORNIA

LEGEND

EXISTING	PROPOSED	DESCRIPTION
		BOUNDARY
		PROPERTY LINE
		RETAINING WALL
		LANDSCAPE RETAINING WALL
	RW RW	RAINWATER TIGHTLINE
	SUB	SUBDRAIN LINE
	TL	TIGHTLINE
SD	SD	STORM DRAIN LINE
SS	SS	SANITARY SEWER LINE
W	W	WATER LINE
G	G	GAS LINE
P	P	PRESSURE LINE
JT	JT	JOINT TRENCH
		SET BACK LINE
		CONCRETE VALLEY GUTTER
		EARTHEN SWALE
CB	CB	CATCH BASIN
JB	JB	JUNCTION BOX
AD	AD	AREA DRAIN
		CURB INLET
SDMH	SDMH	STORM DRAIN MANHOLE
		FIRE HYDRANT
SSMH	SSMH	SANITARY SEWER MANHOLE
		STREET SIGN
222.57 INV	222.57 INV	SPOT ELEVATION
←	←	FLOW DIRECTION
	D	DEMOLISH/REMOVE
		BENCHMARK
200	200	CONTOURS
	XX" TREE	TREE TO BE REMOVED

ABBREVIATIONS

AB	AGGREGATE BASE
AC	ASPHALT CONCRETE
ACC	ACCESSIBLE
AD	AREA DRAIN
BC	BEGINNING OF CURVE
B & D	BEARING & DISTANCE
BM	BENCHMARK
BUB	BUBBLER BOX
BW/FG	BOTTOM OF WALL/FINISH GRADE
CB	CATCH BASIN
C & G	CURB AND GUTTER
℄	CENTER LINE
CPP	CORRUGATED PLASTIC PIPE (SMOOTH INTERIOR)
CO	CLEANOUT
COTG	CLEANOUT TO GRADE
CONC	CONCRETE
CONST	CONSTRUCT or -TION
CONC COR	CONCRETE CORNER
CY	CUBIC YARD
D	DIAMETER
DI	DROP INLET
DIP	DUCTILE IRON PIPE
EA	EACH
EC	END OF CURVE
EG	EXISTING GRADE
EL	ELEVATIONS
EP	EDGE OF PAVEMENT
EQ	EQUIPMENT
EW	EACH WAY
(E)	EXISTING
FC	FACE OF CURB
FF	FINISHED FLOOR
FG	FINISHED GRADE
FH	FIRE HYDRANT
FL	FLOW LINE
FS	FINISHED SURFACE
G	GAS
GA	GAGE OR GAUGE
GB	GRADE BREAK
HDPE	HIGH DENSITY CORRUGATED POLYETHYLENE PIPE
HORIZ	HORIZONTAL
HI PT	HIGH POINT
H&T	HUB & TACK
ID	INSIDE DIAMETER
INV	INVERT ELEVATION
JB	JUNCTION BOX
JT	JOINT TRENCH
JP	JOINT UTILITY POLE
L	LENGTH
LNDG	LANDING
LF	LINEAR FEET
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MON.	MONUMENT
MRO	METERED RELEASE OUTLET
(N)	NEW
NO.	NUMBER
NTS	NOT TO SCALE
O.C.	ON CENTER
O/	OVER
(PA)	PLANTING AREA
PED	PEDESTRIAN
PIV	POST INDICATOR VALVE
PSS	PUBLIC SERVICES EASEMENT
⅊	PROPERTY LINE
PP	POWER POLE
PUE	PUBLIC UTILITY EASEMENT
PVC	POLYVINYL CHLORIDE
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
RIM	RIM ELEVATION
RW	RAINWATER
R/W	RIGHT OF WAY
S	SLOPE
S.A.D.	SEE ARCHITECTURAL DRAWINGS
SAN	SANITARY
SD	STORM DRAIN
SDMH	STORM DRAIN MANHOLE
SHT	SHEET
S.L.D.	SEE LANDSCAPE DRAWINGS
SPEC	SPECIFICATION
SS	SANITARY SEWER
SSCO	SANITARY SEWER CLEANOUT
SSMH	SANITARY SEWER MANHOLE
ST.	STREET
STA	STATION
STD	STANDARD
STRUCT	STRUCTURAL
T	TELEPHONE
TC	TOP OF CURB
TOW	TOP OF WALL
TEMP	TEMPORARY
TP	TOP OF PAVEMENT
TW/FG	TOP OF WALL/FINISH GRADE
TYP	TYPICAL
VC	VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
W/	WITH
W, WL	WATER LINE
WM	WATER METER
WWF	WELDED WIRE FABRIC



KEY MAP
1" = 500'

ESTIMATED EARTHWORK QUANTITIES

CUBIC YARDS	WITHIN BUILDING FOOTPRINT	OUTSIDE BUILDING FOOTPRINT	ROADWAY THICKNESS	TOTAL CUBIC YARDS
CUT	270	1,560	4,400	6,230
FILL	850	5,010	0	5,860
EXPORT	(SPREAD ON SITE)			370

NOTE:
GRADING QUANTITIES REPRESENT BANK YARDAGE. IT DOES NOT INCLUDE ANY SWELLING OR SHRINKAGE FACTORS AND IS INTENDED TO REPRESENT IN-SITU CONDITIONS. QUANTITIES DO NOT INCLUDE OVER-EXCAVATION, TRENCHING, STRUCTURAL FOUNDATIONS OR PIERS, OR POOL EXCAVATION (IF ANY). NOTE ADDITIONAL EARTHWORKS, SUCH AS KEYWAYS OR BENCHING MAY BE REQUIRED BY THE GEOTECHNICAL ENGINEER IN THE FIELD AT TIME OF CONSTRUCTION. CONTRACTOR TO VERIFY QUANTITIES.

PROJECT TEAM INTENDS TO HAVE A NET BALANCED SITE WITH NO IMPORT OR EXPORT OF SOIL, ASIDE FROM REQUIRED ENGINEERED MATERIAL, FOUNDATION SUBGRADE, AND STABILIZED SURFACE MATERIALS SUCH AS DECOMPOSED GRANITE. DURING PERMITTING PHASE WHEN FOUNDATION TYPES, OVER-EXCAVATION, AND TRENCHING SPOILS CAN BE DETERMINED, THE PROJECT TEAM WILL ADJUST ON-SITE EARTHWORK CALCULATIONS TO MATCH INTENDED CONDITIONS.

EASEMENT NOTE

EASEMENTS ARE SHOWN PER TITLE REPORT PREPARED BY LAWYERS TITLE COMPANY, TITLE NO. FLNP-0061800758-DW, DATED SEPTEMBER 28, 2018 AND DOCUMENT 2019-050286.

BOUNDARY NOTE

BOUNDARY LINES LABELED WITH BEARINGS AND DISTANCES ON THIS SURVEY ARE RESOLVED LINES. LIGHTER BOUNDARY LINES SHOWN WITHOUT BEARINGS AND DISTANCES AND LABELED AS "APPROXIMATE BOUNDARY LINE" ARE NOT RESOLVED AND ARE SUBJECT TO CHANGE.

NOTES

ALL DISTANCES AND DIMENSIONS ARE IN FEET AND DECIMALS.

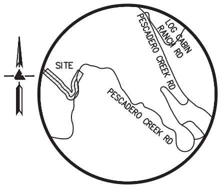
UNDERGROUND UTILITY LOCATION IS BASED ON SURFACE EVIDENCE.

BUILDING FOOTPRINTS ARE SHOWN TO FINISHED MATERIAL (STUCCO/SIDING) AT GROUND LEVEL.

FINISH FLOOR ELEVATIONS ARE TAKEN AT DOOR THRESHOLD (EXTERIOR).

⊕ SITE BENCHMARK

SURVEY CONTROL POINT
MAG AND SHINER SET IN ASPHALT
ELEVATION = 509.12'
(ASSUMED)



VICINITY MAP
NO SCALE

OWNER'S INFORMATION

OWNER:
PENINSULA HUMANE SOCIETY & SPCA
1450 ROLLINS ROAD
BURLINGAME, CA 94010

APN: 082-050-020

REFERENCES

THIS IMPROVEMENT PLAN IS SUPPLEMENTAL TO:

1. TOPOGRAPHIC SURVEY BY LEA & BRAZE ENGINEERING INC., ENTITLED:
   "TOPOGRAPHIC SURVEY"
   LOMA MAR, CA
   DATED: 01-11-19
   JOB#: 2181427
2. ARCHITECTURAL PLANS BY KORTH SUNSERI HAGEY ARCHITECTS ENTITLED:
   "PENINSULA HUMANE SOCIETY ANIMAL SANCTUARY"
   12429 PESCADERO CREEK ROAD
   LOMA MAR, CA
3. LANDSCAPE PLANS BY THE GUZZARDO PARTNERSHIP, INC.
   "PENINSULA HUMANE SOCIETY ANIMAL SANCTUARY"
   12429 PESCADERO CREEK ROAD
   LOMA MAR, CA
4. GEOTECHNICAL REPORT BY CORNERSTONE EARTH GROUP ENTITLED:
   "PENINSULA HUMANE SOCIETY ANIMAL SANCTUARY"
   12429 PESCADERO ROAD
   LOMA MAR, CA
   DATED: 07-23-2021
5. WATER SYSTEM DESIGN BY SCHAAF & WHEELER CONSULTING CIVIL ENGINEERS ENTITLED:
   "PENINSULA HUMANE SOCIETY ANIMAL SANCTUARY"
   12429 PESCADERO CREEK ROAD
   LOMA MAR, CA

THE CONTRACTOR SHALL REFER TO THE ABOVE NOTED SURVEY AND PLAN, AND SHALL VERIFY BOTH EXISTING AND PROPOSED ITEMS ACCORDING TO THEM.

NOTE:
FOR CONSTRUCTION STAKING SCHEDULING OR QUOTATIONS PLEASE CONTACT ALEX ABAYA AT LEA & BRAZE ENGINEERING (510)887-4086 EXT 116.
aabaya@leabraze.com

*** BUILDING PAD NOTE:**
ADJUST PAD LEVEL AS REQUIRED. REFER TO STRUCTURAL PLANS FOR SLAB SECTION OR CRAWL SPACE DEPTH TO ESTABLISH PAD LEVEL.

1-800-227-2600
CALL BEFORE YOU DIG
USA
UNDERGROUND SERVICE ALERT

SHEET INDEX

C-1.0	TITLE SHEET
C-1.1	OVERALL SITE PLAN
C-2.0	TREE REMOVAL PLAN
C-3.0 TO C-3.14	GRADING & DRAINAGE PLAN
C-4.0 TO C-4.14	UTILITY PLAN
C-4.15 TO C-4.18	STORMWATER CONTROL PLAN
C-4.19 TO C-4.20	FIRE SUPPRESSION PLAN
C-5.0 TO C-5.12	PLAN & PROFILE
ER-1 TO ER-2	EROSION CONTROL PLAN

REGISTERED PROFESSIONAL ENGINEER
PETER CARLINO
No. C79555
CIVIL
STATE OF CALIFORNIA
ORIGINAL SIGNATURES IN BLUE INK

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS • LAND SURVEYORS
MAIN OFFICE:
2495 INDUSTRIAL PKWY WEST
HAYWARD, CALIFORNIA 94545
(510) 887-4086
REGIONAL OFFICES:
ROSEVILLE
DUBLIN
SAN JOSE (COMING SOON)
WWW.LEABRAZE.COM

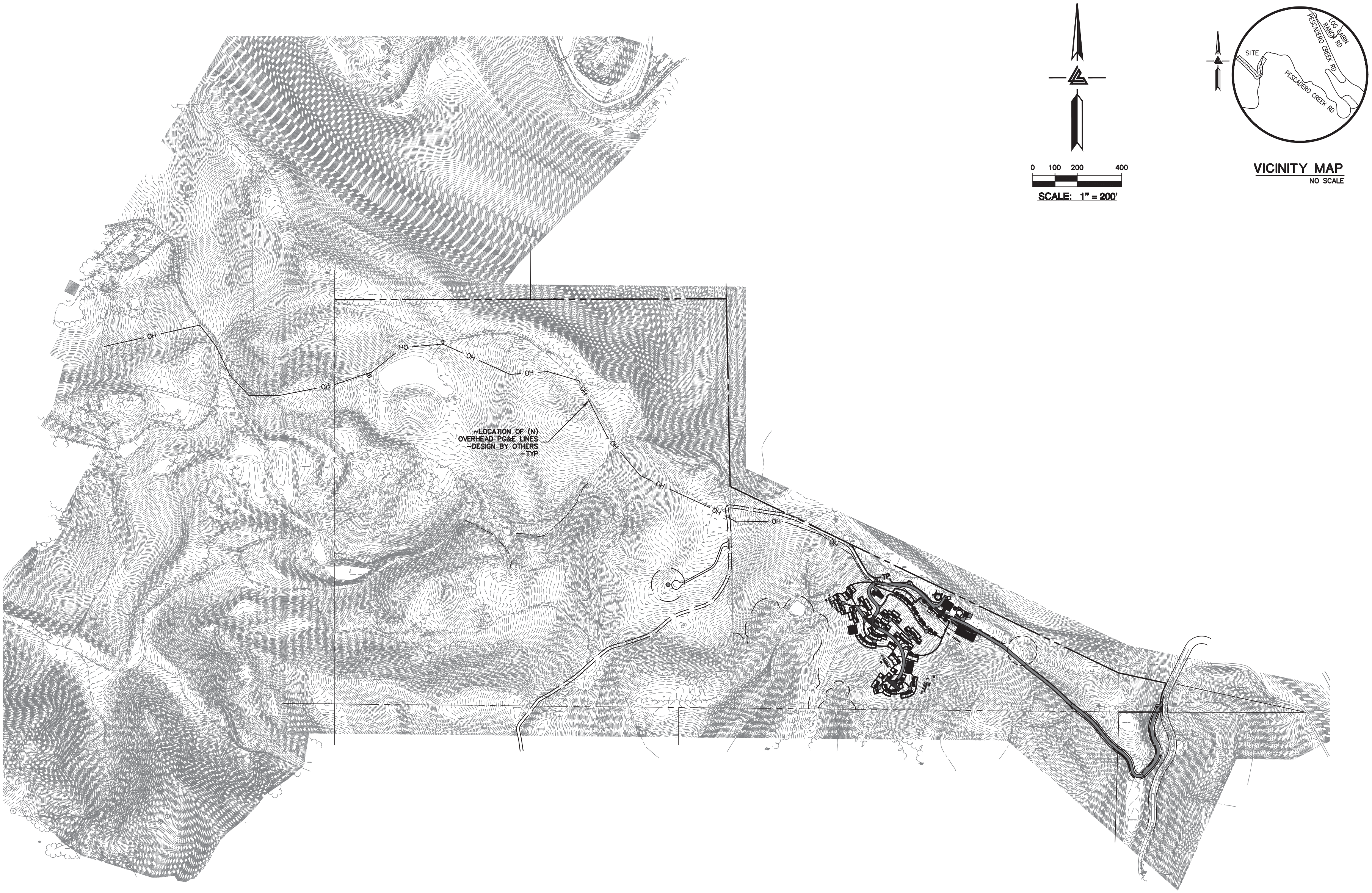
PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA
SAN MATEO COUNTY
APN: 082-050-010
082-050-020

TITLE SHEET

REVISIONS	BY
-	-
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 500'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-1.0
1 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL



SCALE: 1" = 200'

VICINITY MAP
NO SCALE

PETER CARLINO
No. C79555
CIVIL
ORIGINAL SIGNATURES IN BLUE INK

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS • LAND SURVEYORS

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HAYWARD, CALIFORNIA 94545
(510) 887-4086

REGIONAL OFFICES:
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LOMA MAR, CALIFORNIA

APN: 082-050-010
082-050-020

SAN MATEO COUNTY

GRADNING & DRAINAGE PLAN (OVERALL SITE)

REVISIONS	BY
-	-
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 200'
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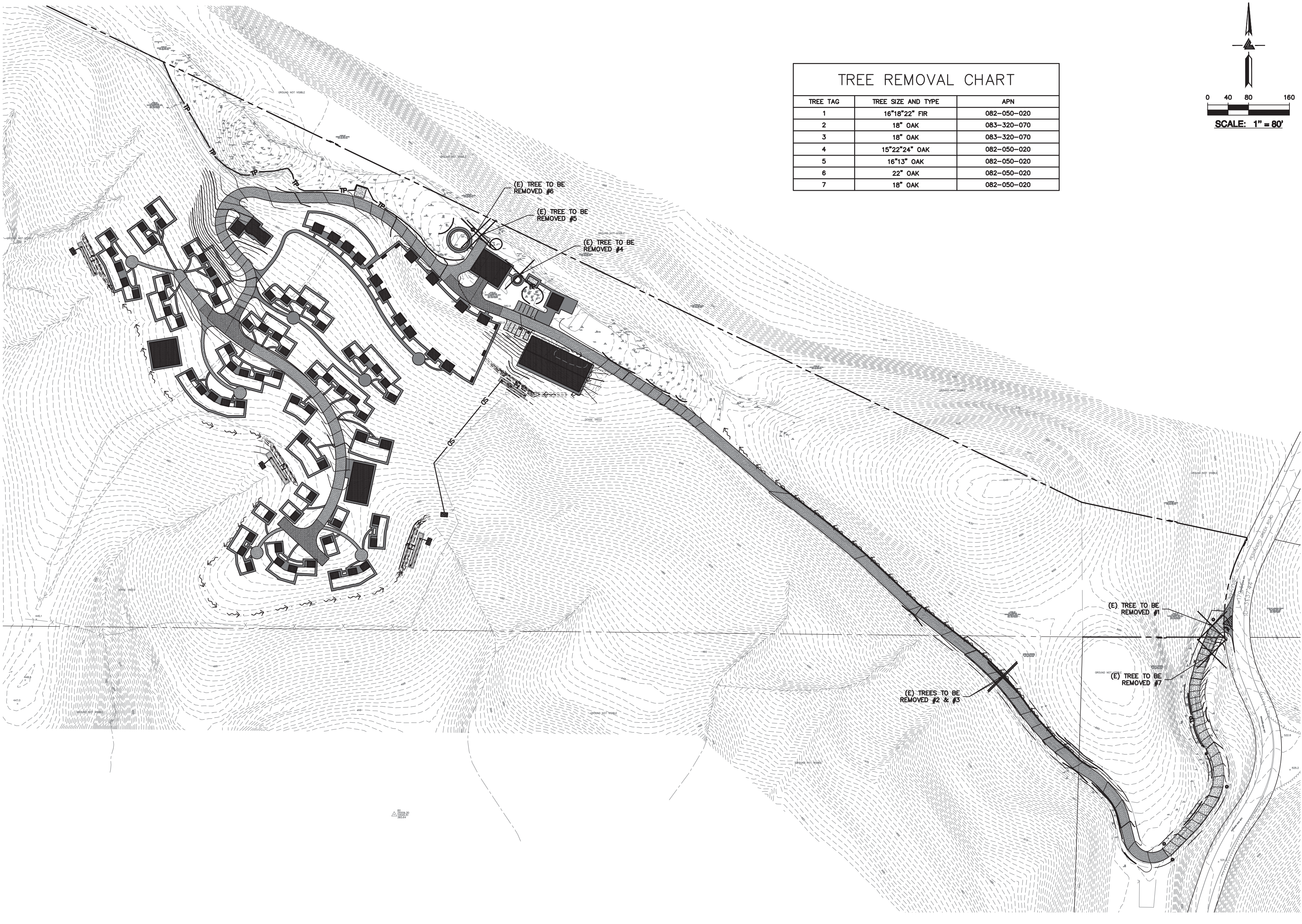
C-1.1
02 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL



TREE REMOVAL CHART

TREE TAG	TREE SIZE AND TYPE	APN
1	16"18"22" FIR	082–050–020
2	18" OAK	083–320–070
3	18" OAK	083–320–070
4	15"22"24" OAK	082–050–020
5	16"13" OAK	082–050–020
6	22" OAK	082–050–020
7	18" OAK	082–050–020

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SAN MATEO COUNTY

TREE REMOVAL PLAN

–	–
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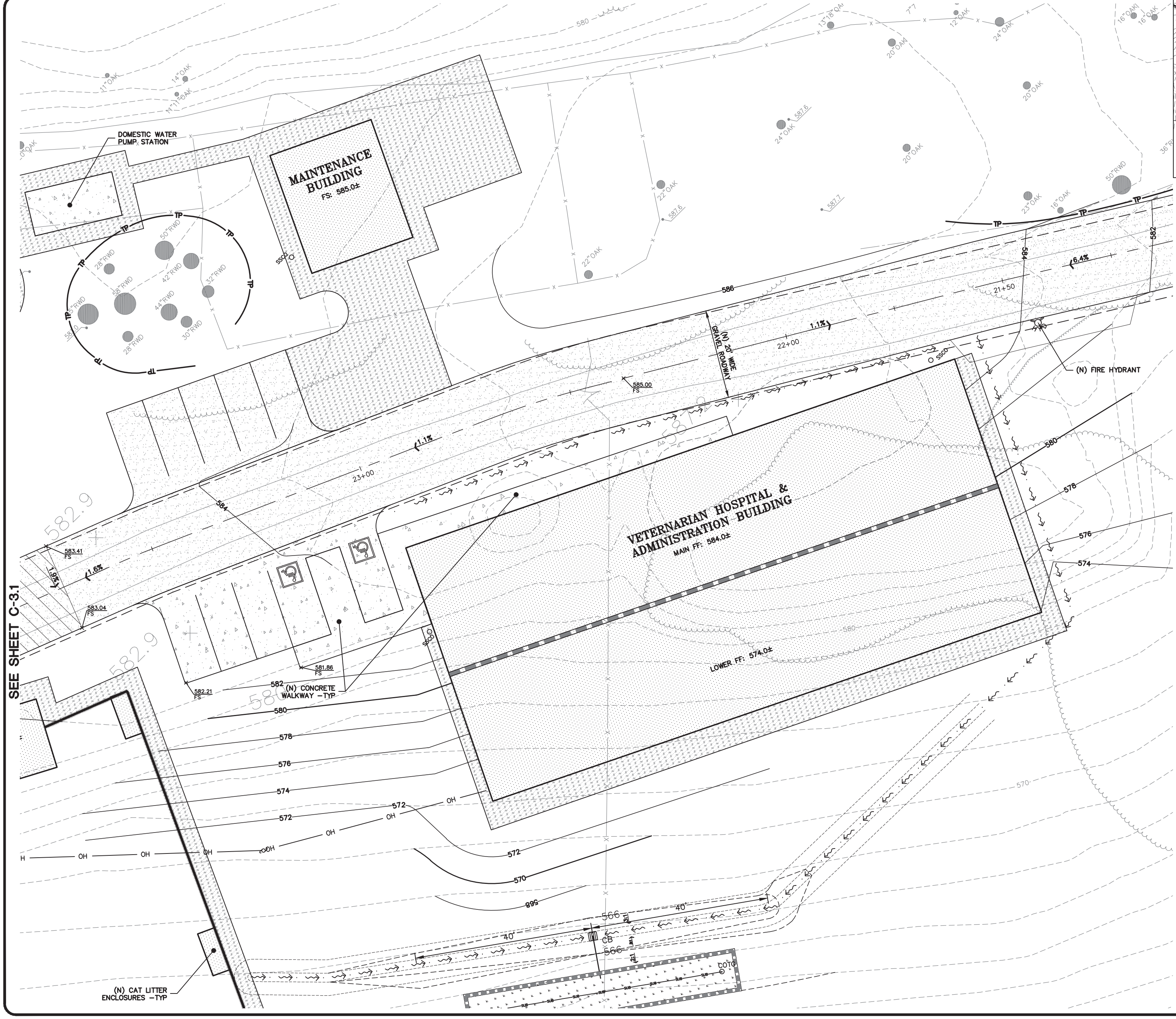
REVISIONS	BY

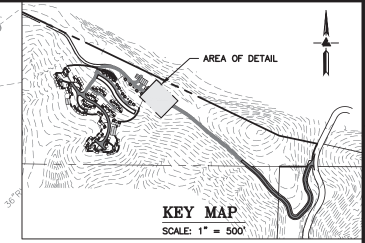
JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 80'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:

C-2.0

03 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





KEY MAP
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0 5 10 20
SCALE: 1" = 10'

FLATWORK

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GRADING & DRAINAGE PLAN

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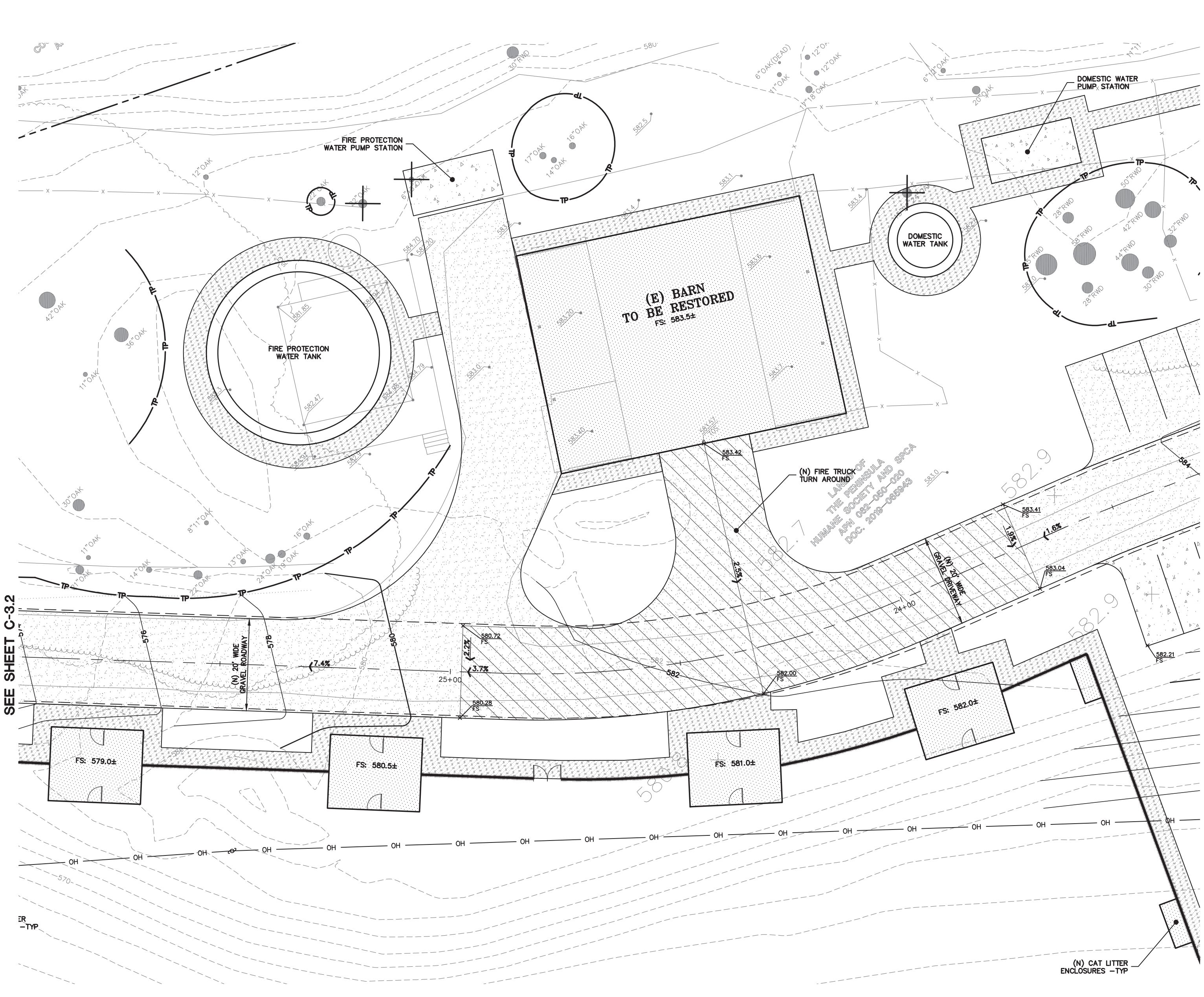
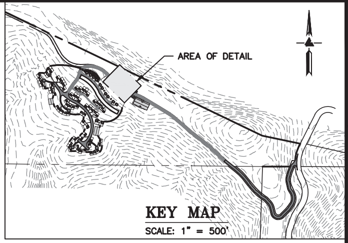
04 OF 54 SHEETS





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GRADING & DRAINAGE PLAN

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1	USE PERMIT RESUBMITTAL 01/12/22	TB
	REVISIONS	BY

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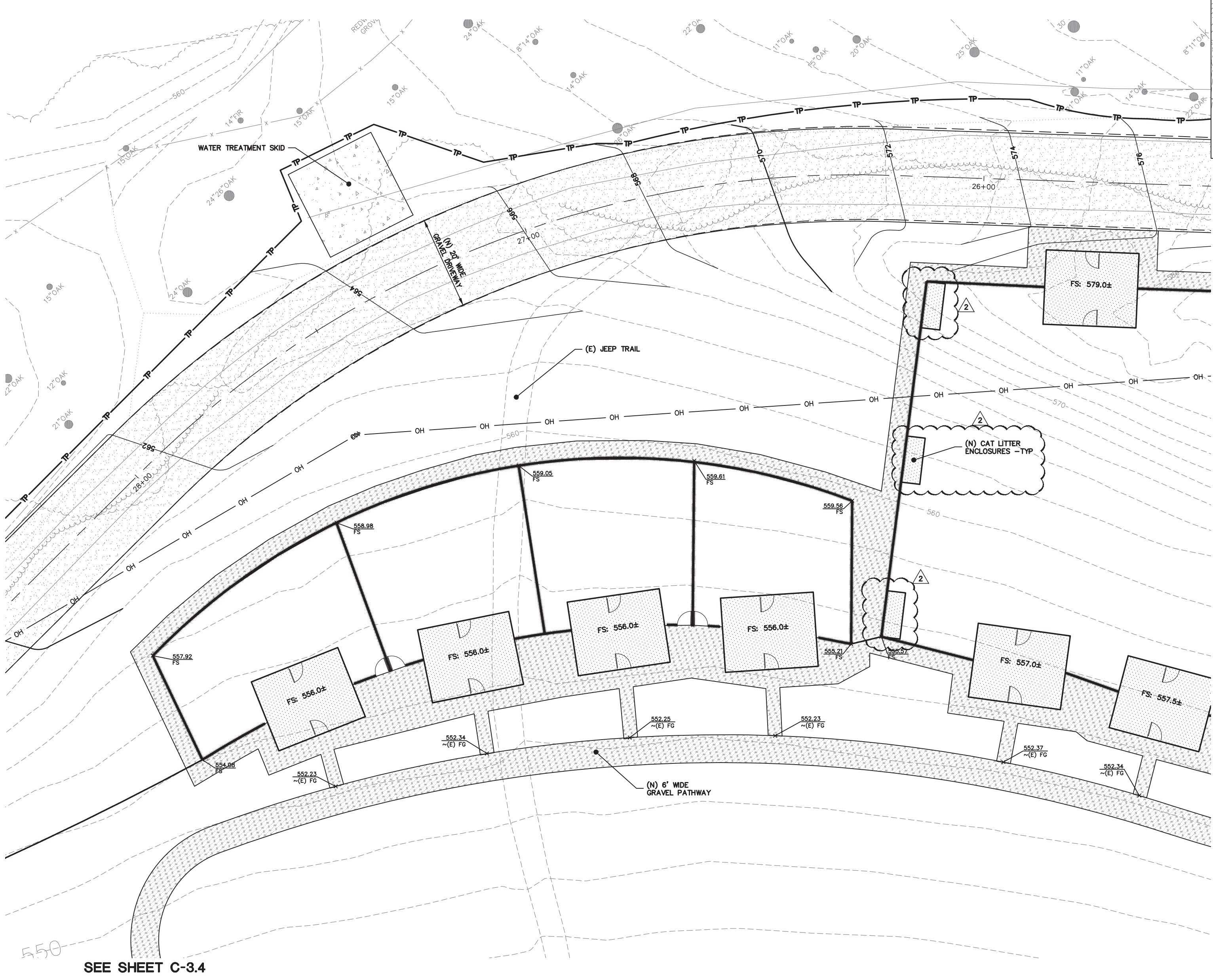
05 OF 54 SHEETS

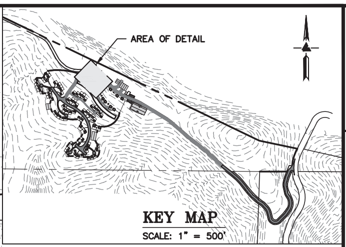
COUNTY OF SAN MATEO USE PERMIT SUBMITTAL



SEE SHEET C-3.1

SEE SHEET C-3.3

SEE SHEET C-3.4



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GRADING & DRAINAGE PLAN

–	–
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB
REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
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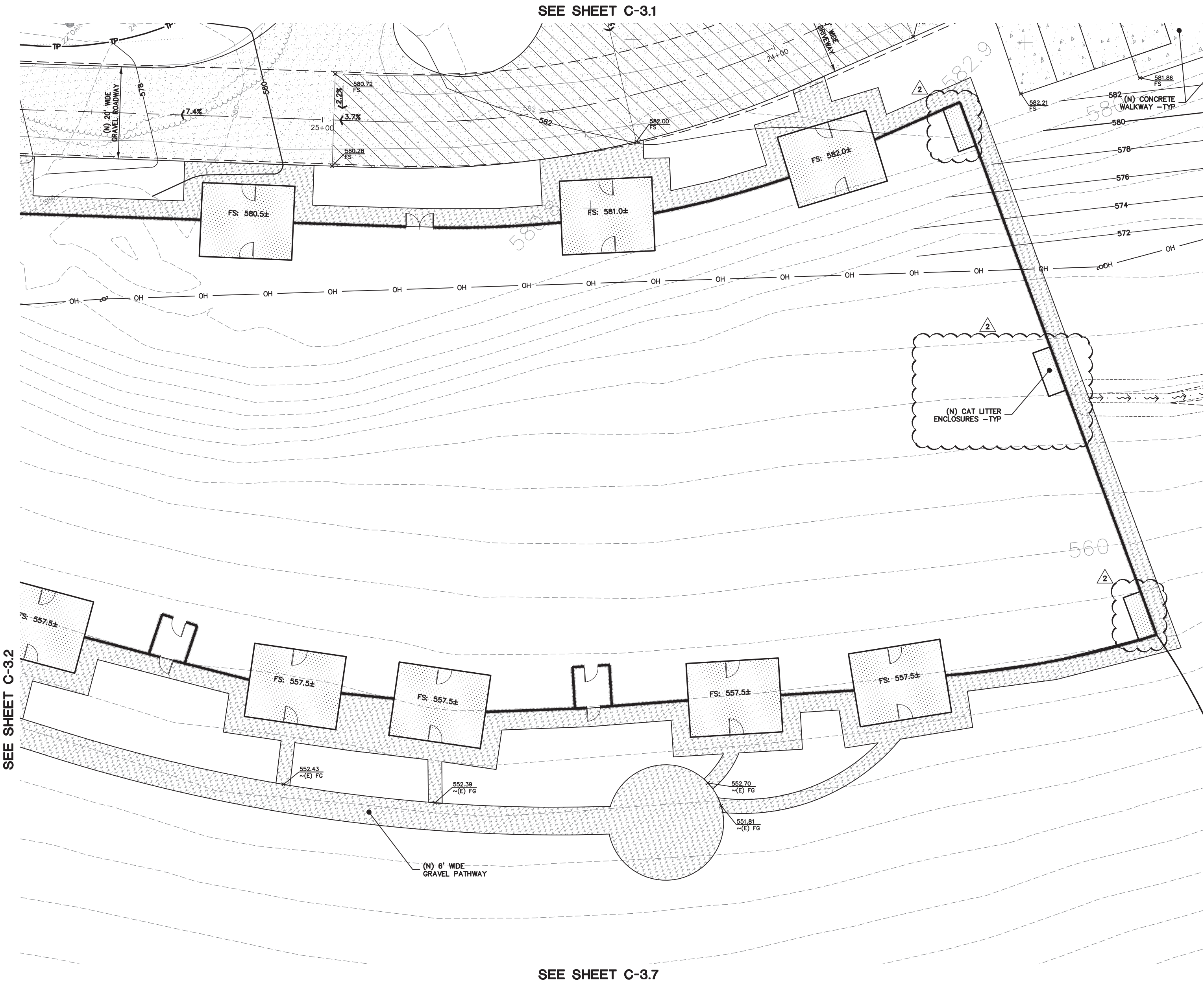
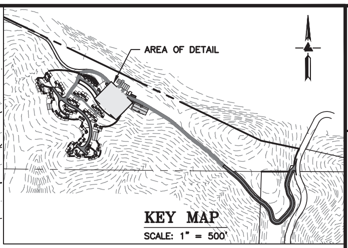
SHEET NO:

C-3.2

06 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





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APN: 082-050-010
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GRADING & DRAINAGE PLAN

-	-
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB
REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
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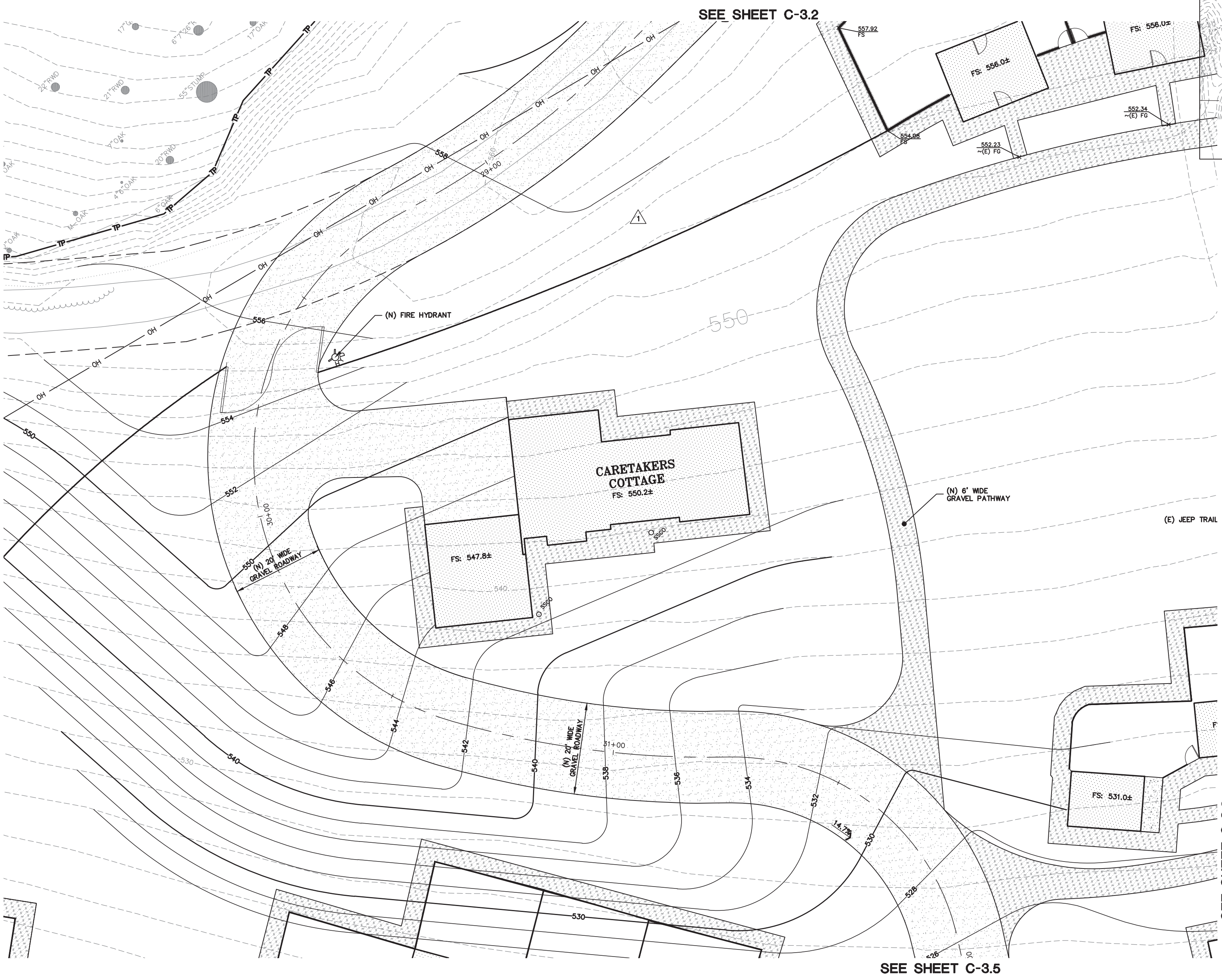
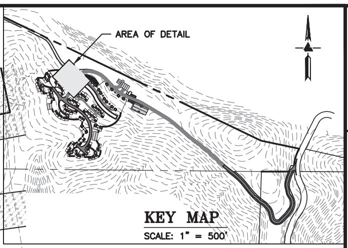
SHEET NO:
C-3.3
07 OF 54 SHEETS





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REGISTERED PROFESSIONAL ENGINEER
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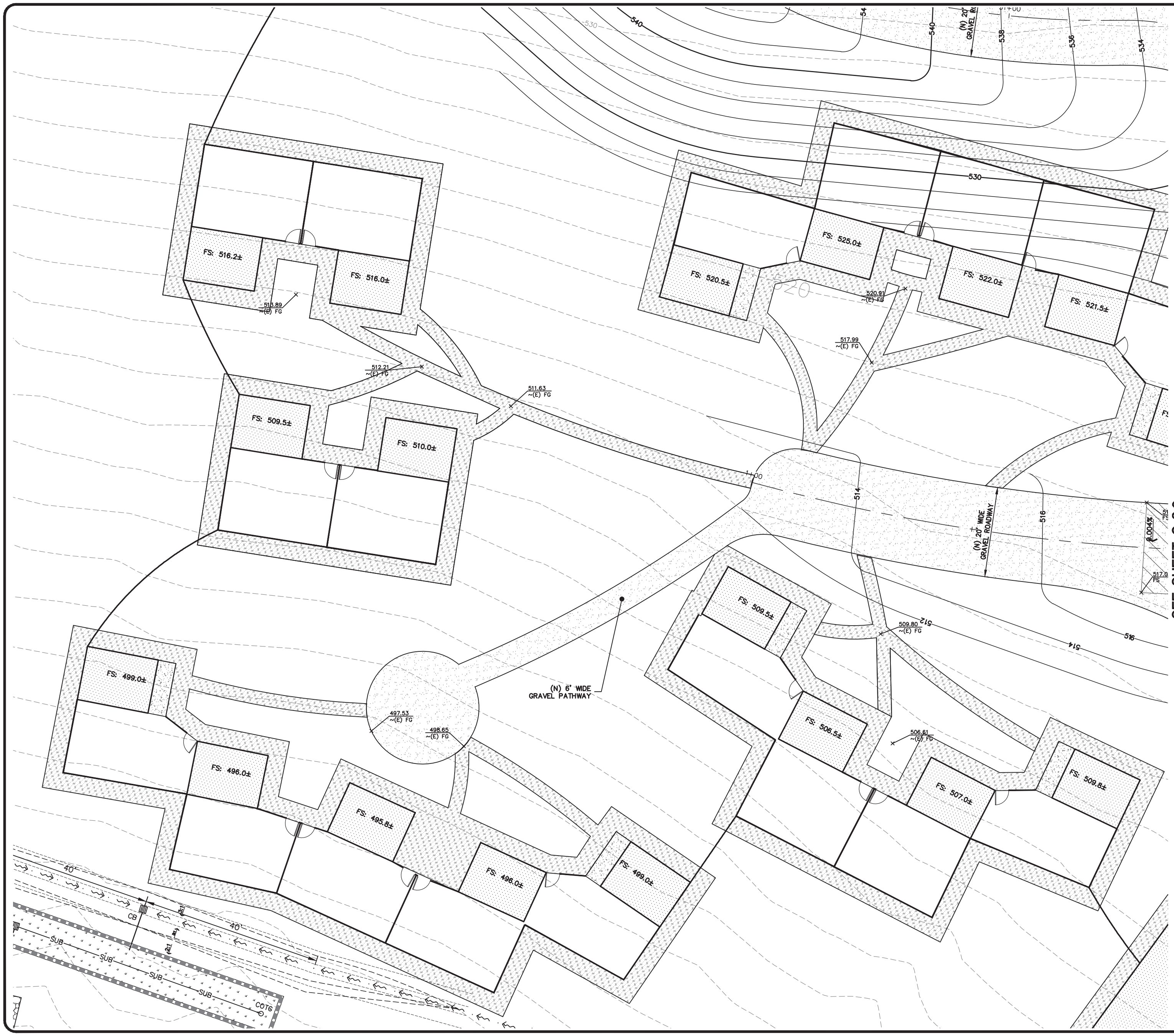
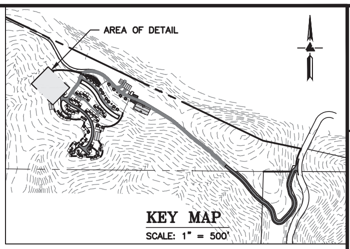
COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





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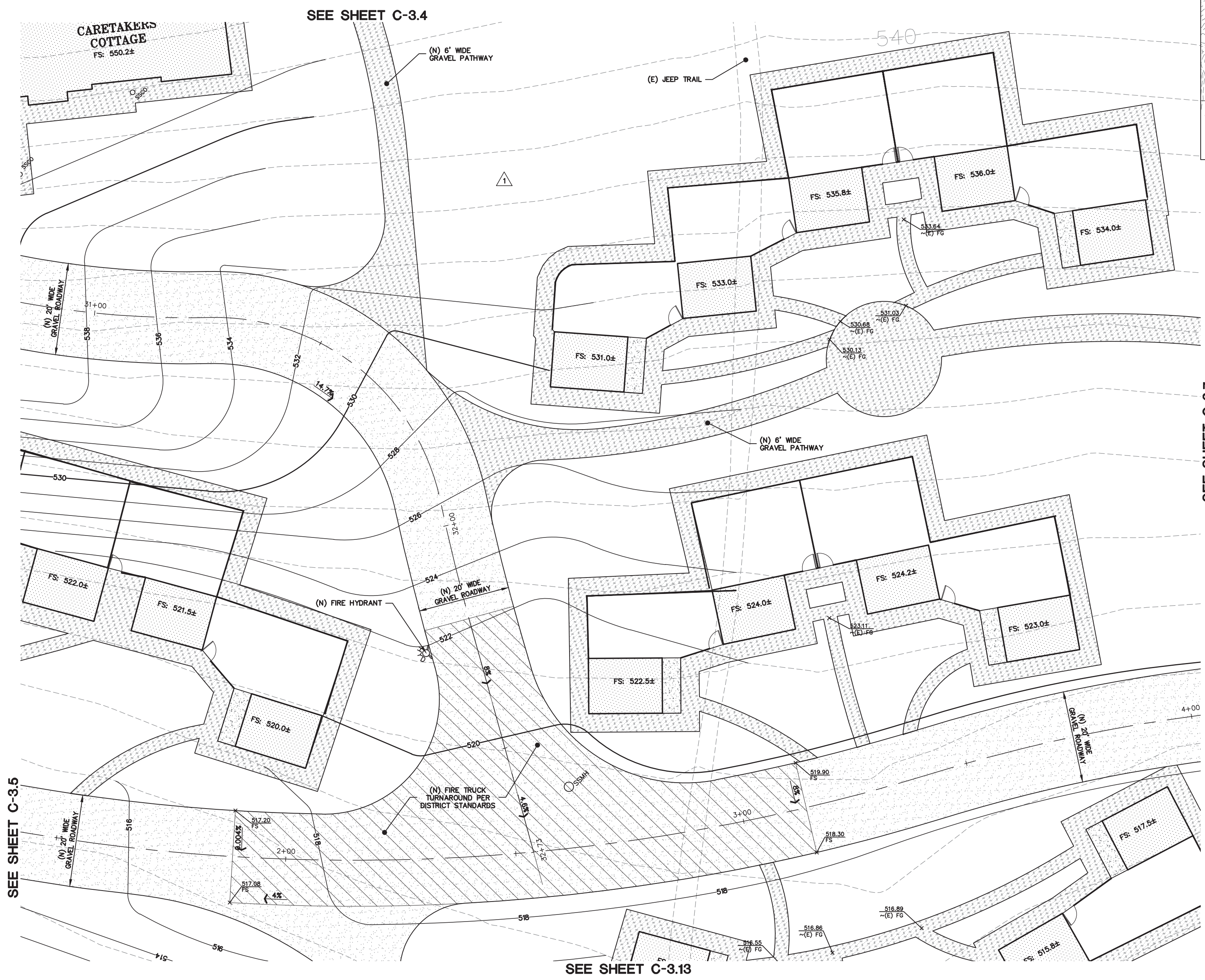

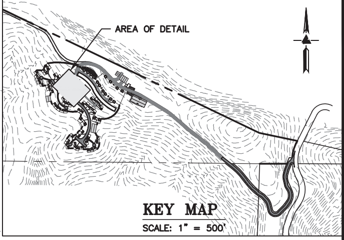

KEY MAP
SCALE: 1" = 500'

0 5 10 20
SCALE: 1" = 10'

FLATWORK

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PETER CARLINO
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CIVIL

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LOMA MAR, CALIFORNIA
SAN MATEO COUNTY
APN: 082-050-010
082-050-020

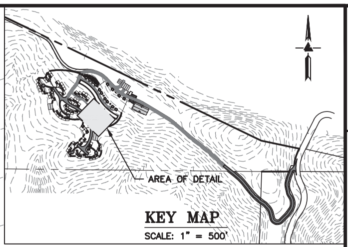
GRADING
&
DRAINAGE PLAN

REVISIONS	BY
–	–
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB

JOB NO:	2201144
DATE:	07/12/21
SCALE:	1" = 10'
DESIGN BY:	TB
CHECKED BY:	CA

SHEET NO:
C-3.6
10 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL



KEY MAP

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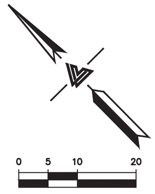

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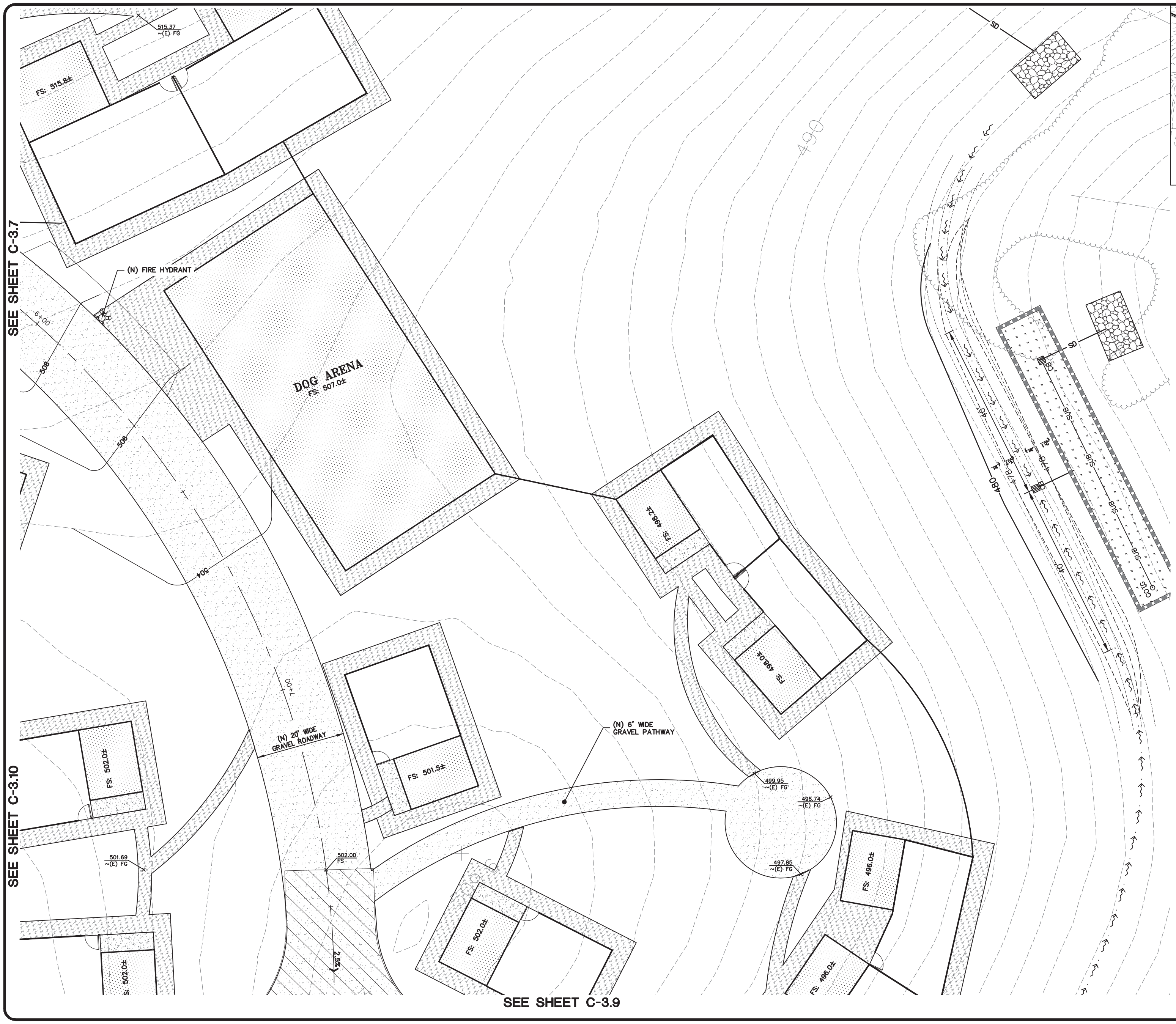
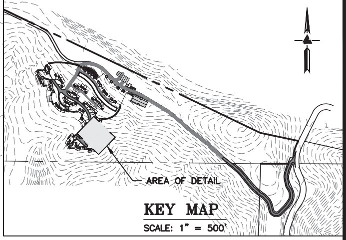
GRADING & DRAINAGE PLAN

REVISIONS	BY
–	–
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-3.7
11 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





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GRADING
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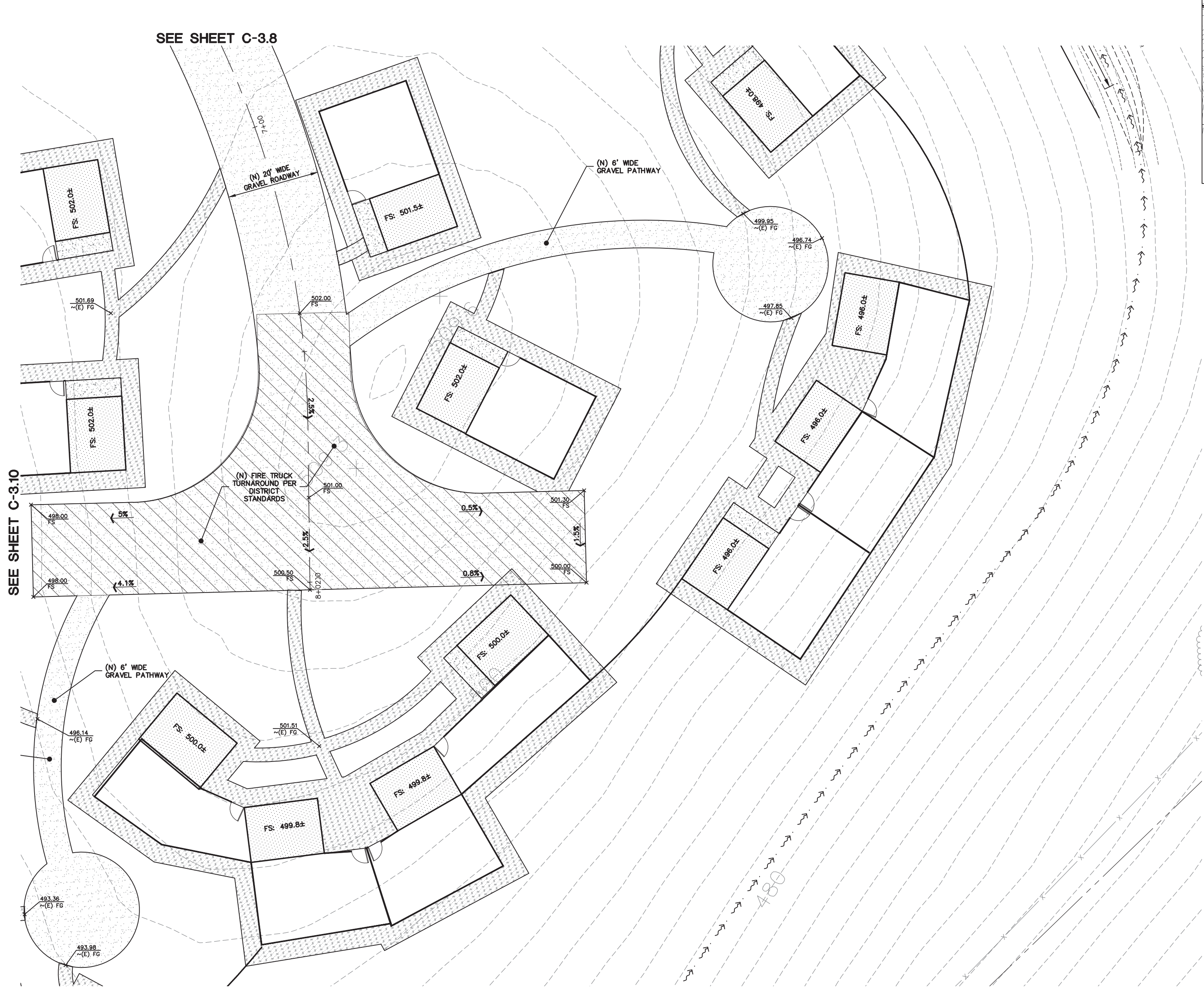
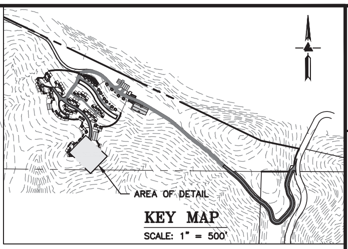
JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-3.8
12 OF 54 SHEETS





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GRADING & DRAINAGE PLAN

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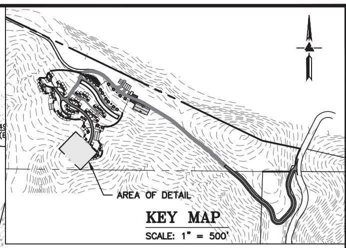
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-3.9
13 OF 54 SHEETS



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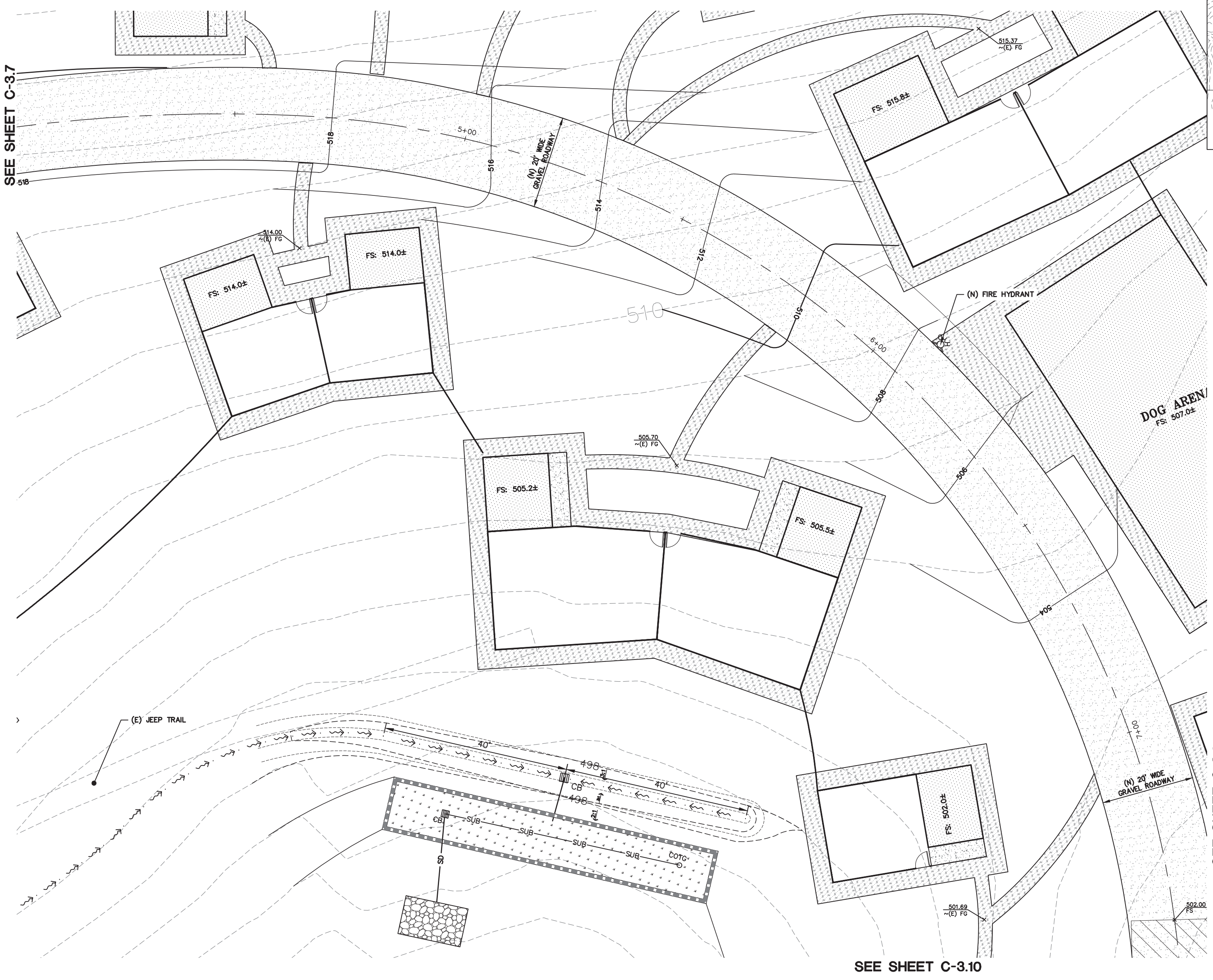
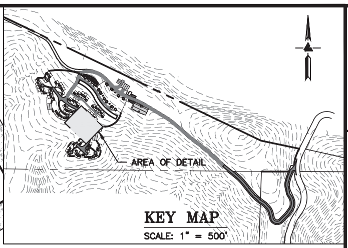
GRADING & DRAINAGE PLAN

REVISIONS	BY
–	–
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-3.10
14 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





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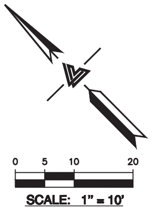

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DESIGN BY: TB
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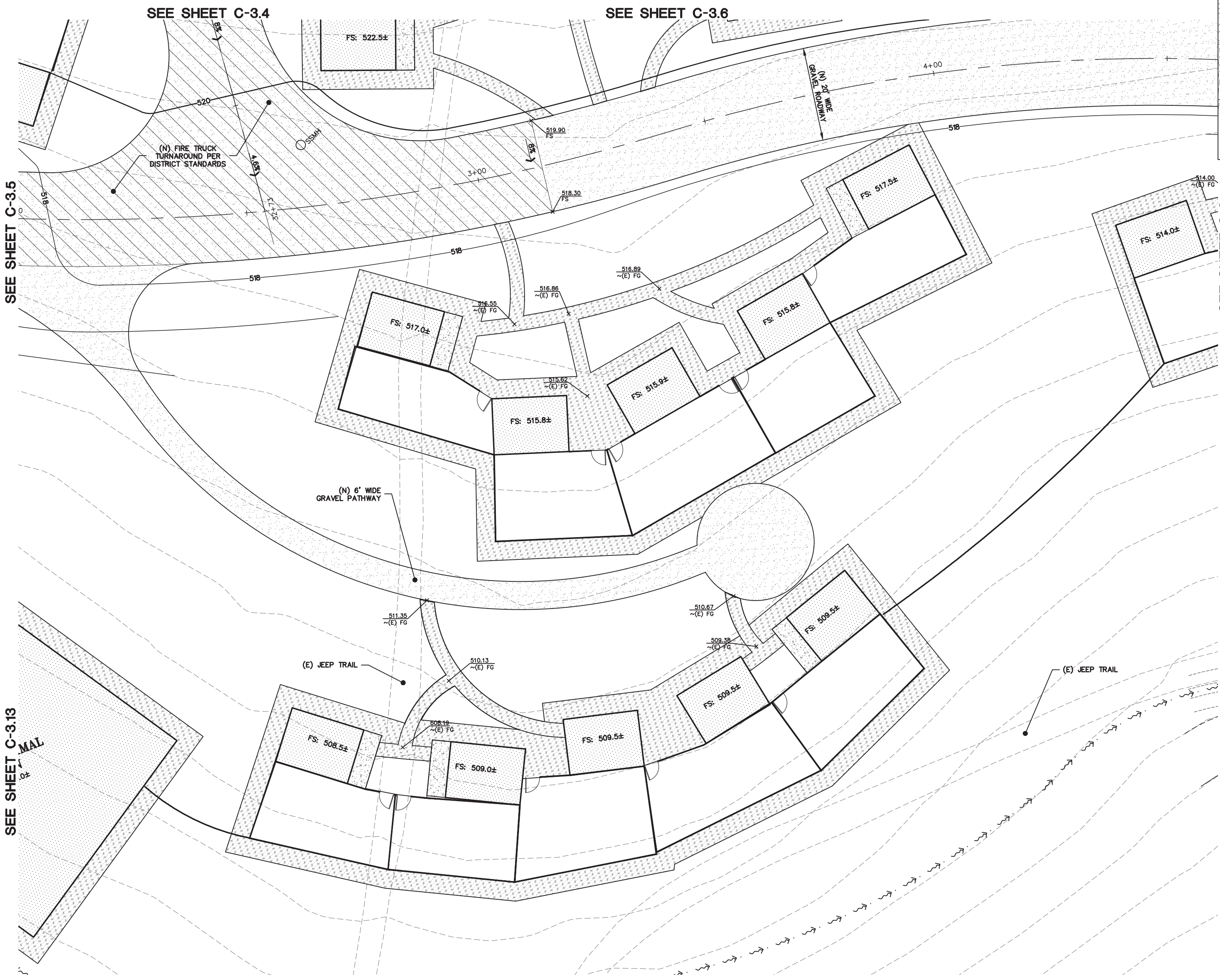
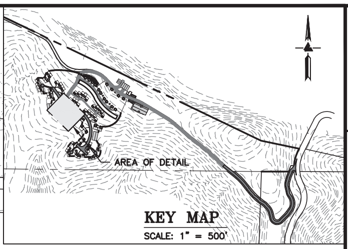
SHEET NO:
C-3.11
15 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





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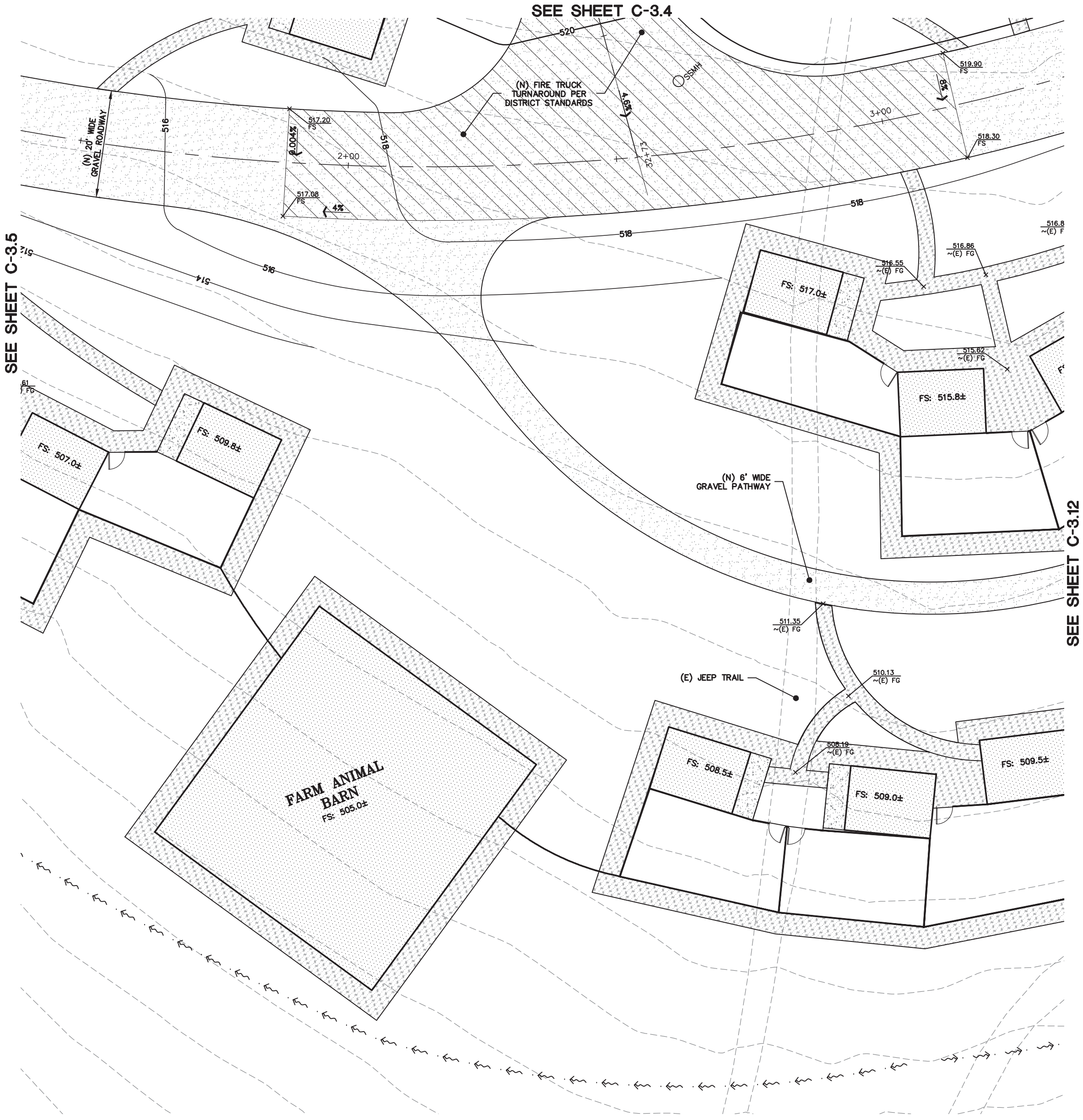
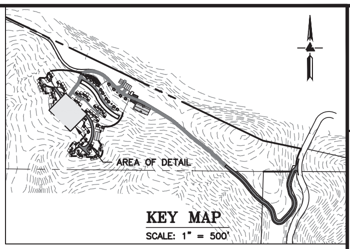
16 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





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PROVIDE 2% (1% MIN.) SLOPE ACROSS FLAT WORK AND/OR PAVING PER CBC 1804.4. SLOPE TOWARDS POSITIVE DRAINAGE AS SHOWN ON PLAN.

(N) AC ACCESS ROAD/DRIVEWAY.

(N) GRAVEL PAVING.

(N) HARDSCAPE, PATIOS, AND WALKWAYS.

(N) DECOMPOSED GRANITE WALKWAY.

DEMOLITION

DEMOLISH (E) IMPROVEMENTS AS NECESSARY TO ACCOMMODATE (N) CONSTRUCTION. NO DEMOLITION SHALL COMMENCE WITHOUT REQUIRED DEMOLITION PERMITS.

REMOVE (E) TREE. CONTRACTOR SHALL OBTAIN THE PROPER TREE REMOVAL PERMITS AS REQUIRED.

PROVIDE TREE PROTECTION AROUND TREES TO REMAIN.

NOTE:
FOR CONSTRUCTION STAKING SCHEDULING OR QUOTATIONS PLEASE CONTACT ALEX ABAYA AT LEA & BRAZE ENGINEERING (510)887-4086 EXT 116.
aabaya@leabraze.com

* BUILDING PAD NOTE:
ADJUST PAD LEVEL AS REQUIRED. REFER TO STRUCTURAL PLANS FOR SLAB SECTION OR CRAWL SPACE DEPTH TO ESTABLISH PAD LEVEL.

PETER CARLINO
No. C79555
CIVIL

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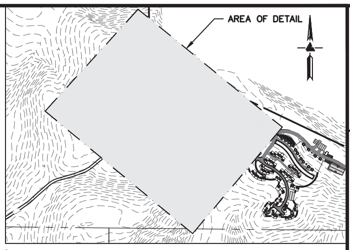
PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA
SAN MATEO COUNTY
APN: 082-050-010
082-050-020

GRADING & DRAINAGE PLAN

-	-
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB
REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-3.13
17 OF 54 SHEETS



0 5 10 20

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GRADING & DRAINAGE PLAN

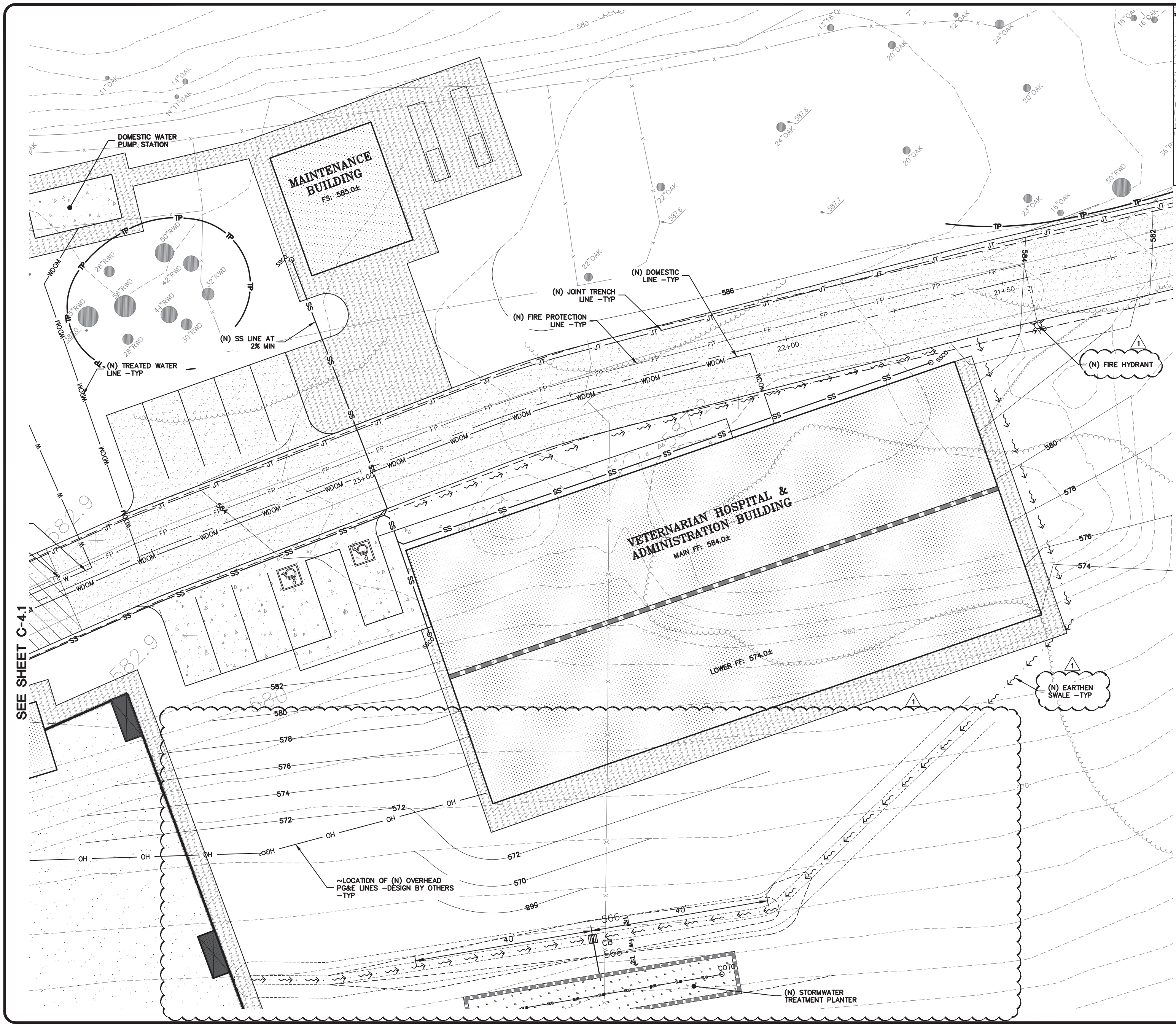
	-	-
2	USE PERMIT RESUBMITTAL 08/01/22	TB
1	USE PERMIT RESUBMITTAL 01/12/22	TB
	REVISIONS	BY

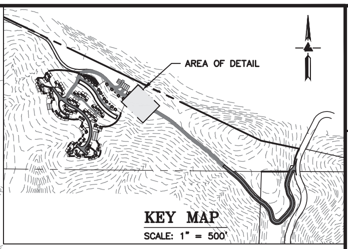
JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:

C-3.14

18 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





KEY MAP

SCALE: 1" = 500'

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0 5 10 20
SCALE: 1" = 10'

STORM DRAIN

(N) ACCESS ROAD/DRIVEWAY EDGE DRAIN.

(N) ON-SITE STORM WATER BIO-RETENTION AREA (BTA).

INSTALL (N) RIP-RAP ENERGY DISSIPATER. (N) ROCKED LINE SWALE.

(N) EARTHEN SWALE.

UTILITIES

(N) SEPTIC TANK. REFER TO THE SEPTIC PLANS BY LEA & BRAZE ENGINEERING FOR FINAL TANK SIZE AND LOCATION.

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(N) SITE WELL. RUN SUPPLY LINE FROM THE WELL TO THE ON-SITE WATER STORAGE TANKS (DOMESTIC / FIRE PROTECTION).

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(N) ON-SITE WATER TANK DEDICATED FOR DOMESTIC SERVICE. REFER TO MECHANICAL PLANS FOR DETAILS ON TANK CONFIGURATION AND PIPE DETAILS.

(N) FIRE PROTECTION WATER LINE.

(N) ON-SITE FIRE HYDRANT.

(N) DOMESTIC WATER LINE.

(N) RAW WATER LINE.

(N) TREATED WATER LINE.

(N) PAD MOUNTED TRANSFORMER. FINAL LOCATION TO BE COORDINATED WITH PG&E. REFER TO MECHANICAL PLANS FOR DETAILS

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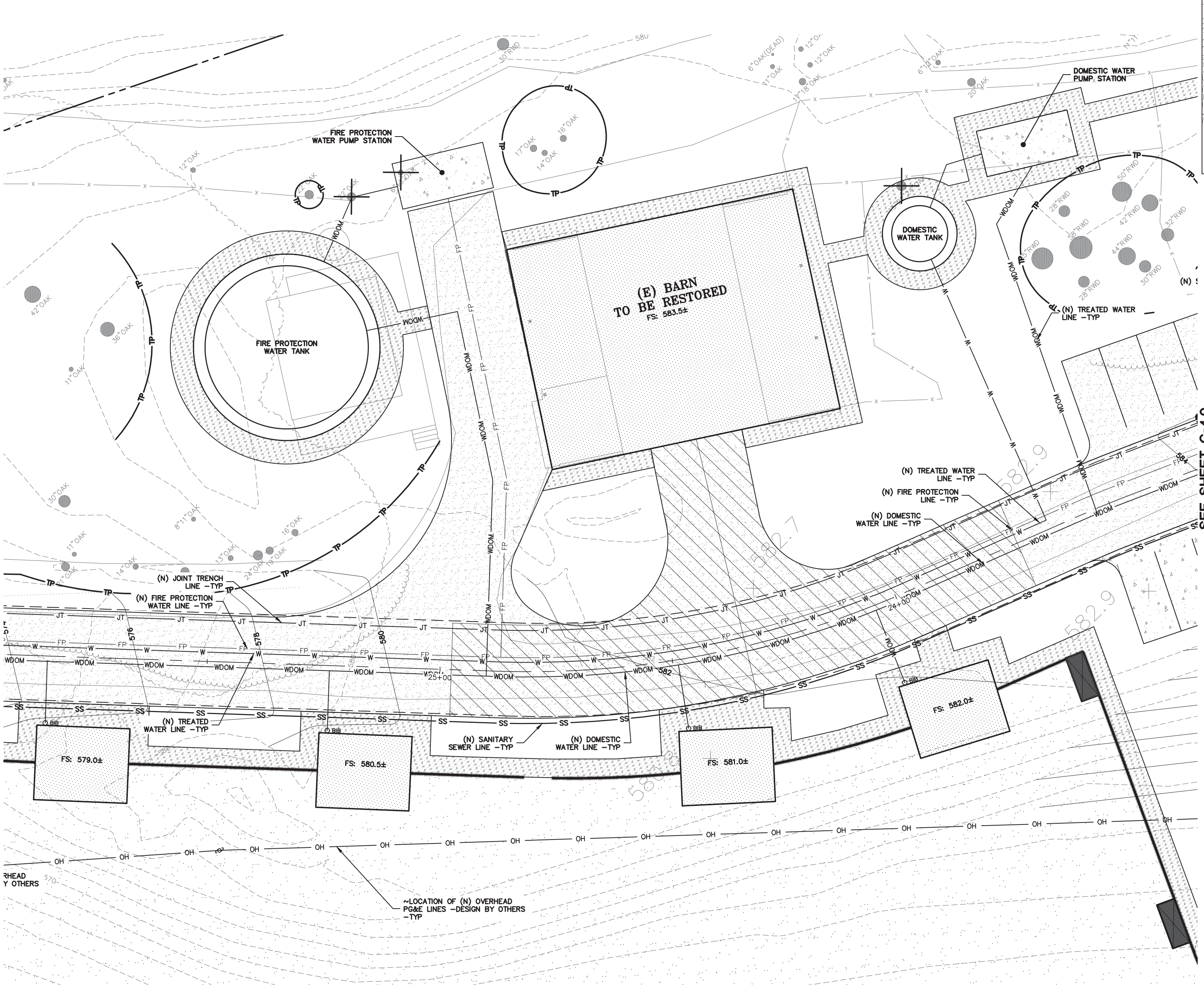
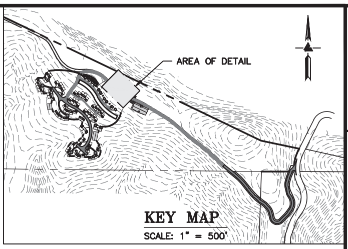
UTILITY PLAN

	-	-
2	USE PERMIT RESUBMITTAL 08/01/22	TB
1	USE PERMIT RESUBMITTAL 01/12/22	TB
	REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-4.0
19 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





KEY MAP

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0 5 10 20

SCALE: 1" = 10'

STORM DRAIN

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(N) ON–SITE STORM WATER BIO–RETENTION AREA (BTA).

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(N) EARTHEN SWALE.

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UTILITY PLAN

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	REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
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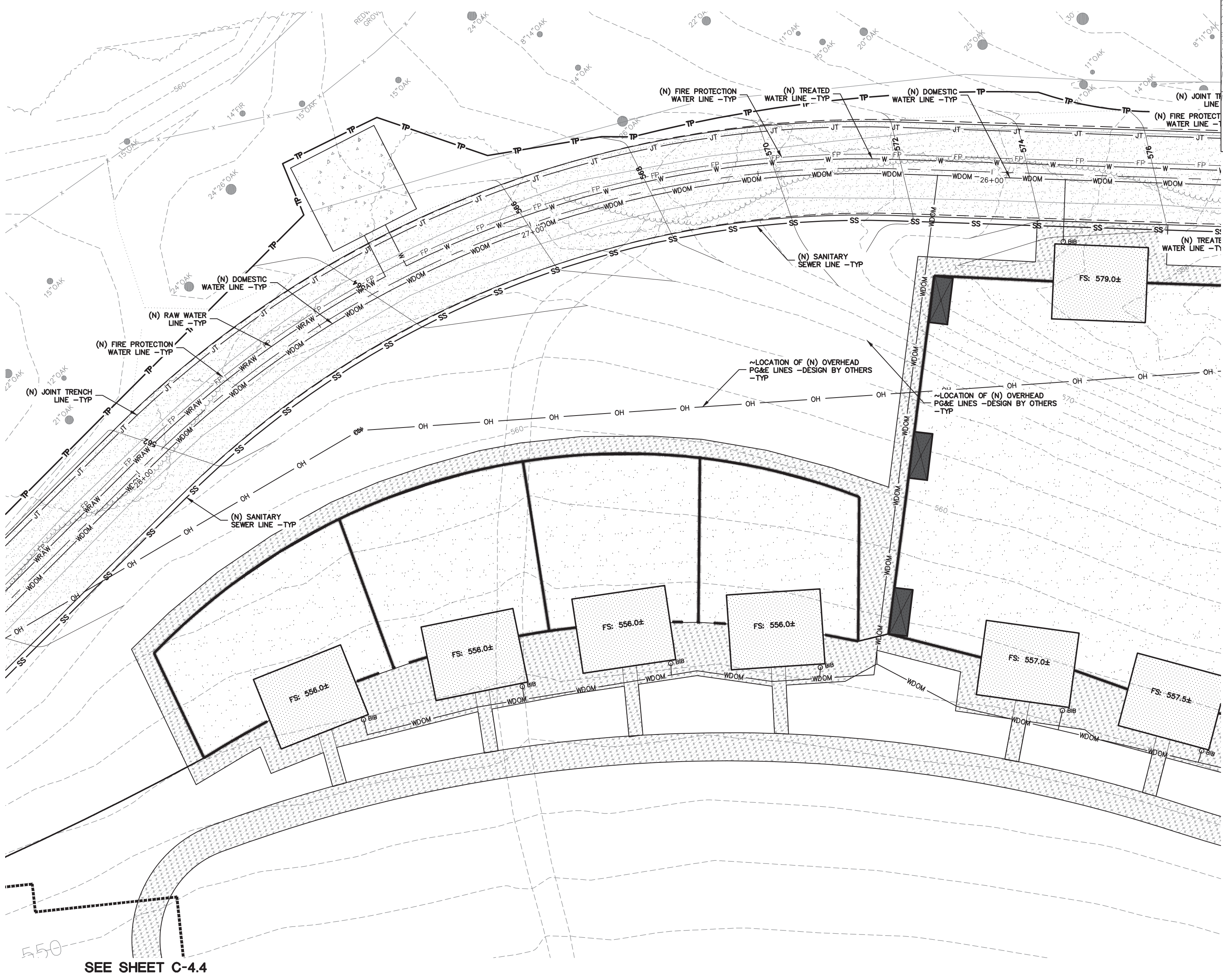
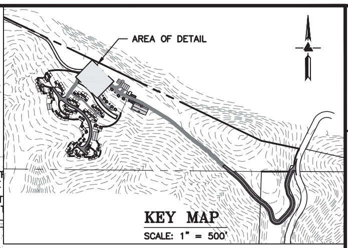
SHEET NO:

C-4.1

20 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





KEY MAP
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0 5 10 20
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UTILITY PLAN

–	–	–
2	USE PERMIT RESUBMITTAL 08/01/22	TB
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	REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
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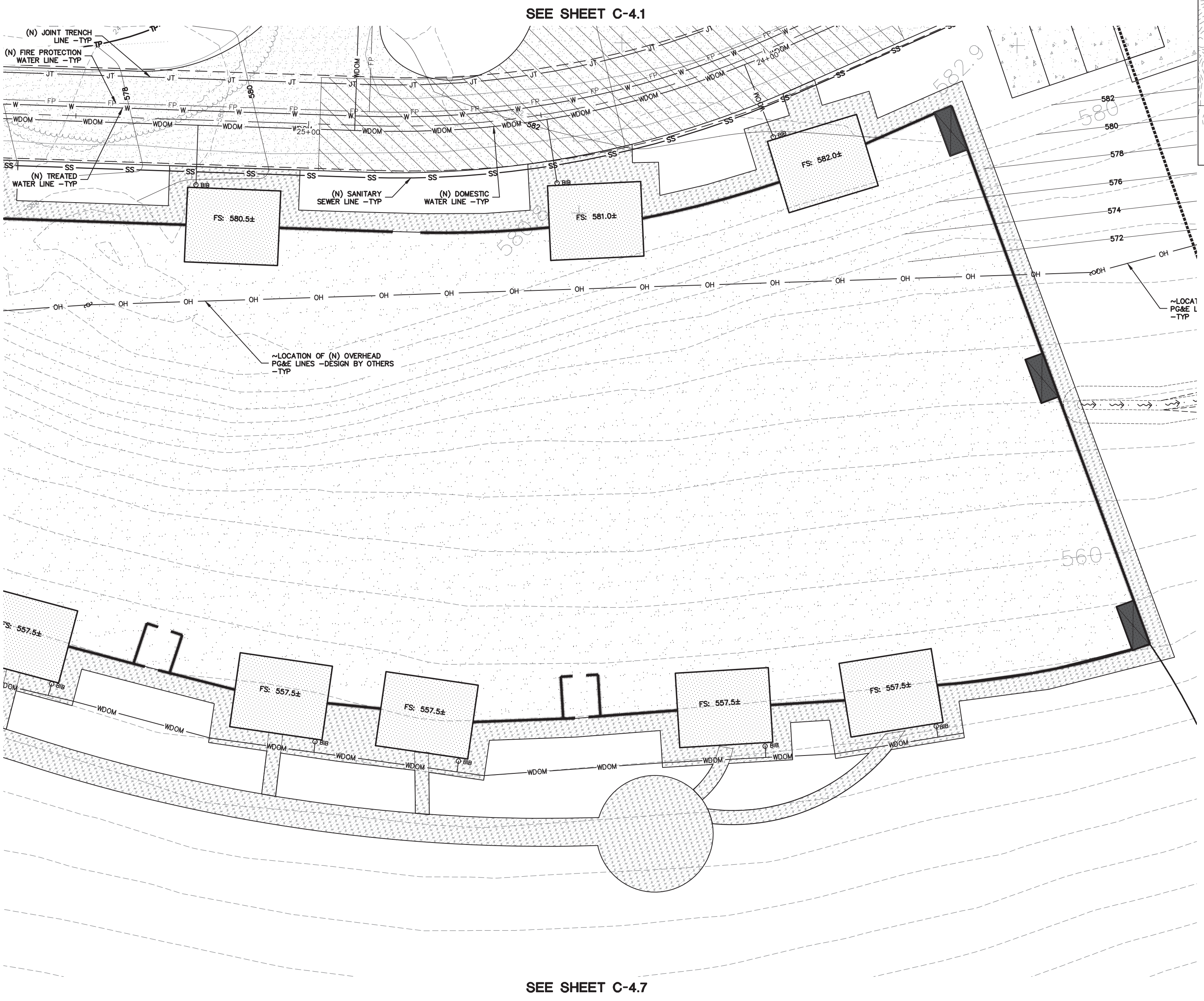
SHEET NO:
C-4.2
21 OF 54 SHEETS

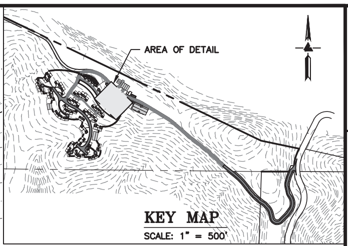
COUNTY OF SAN MATEO USE PERMIT SUBMITTAL

SEE SHEET C-4.1



SEE SHEET C-4.2

SEE SHEET C-4.7



KEY MAP
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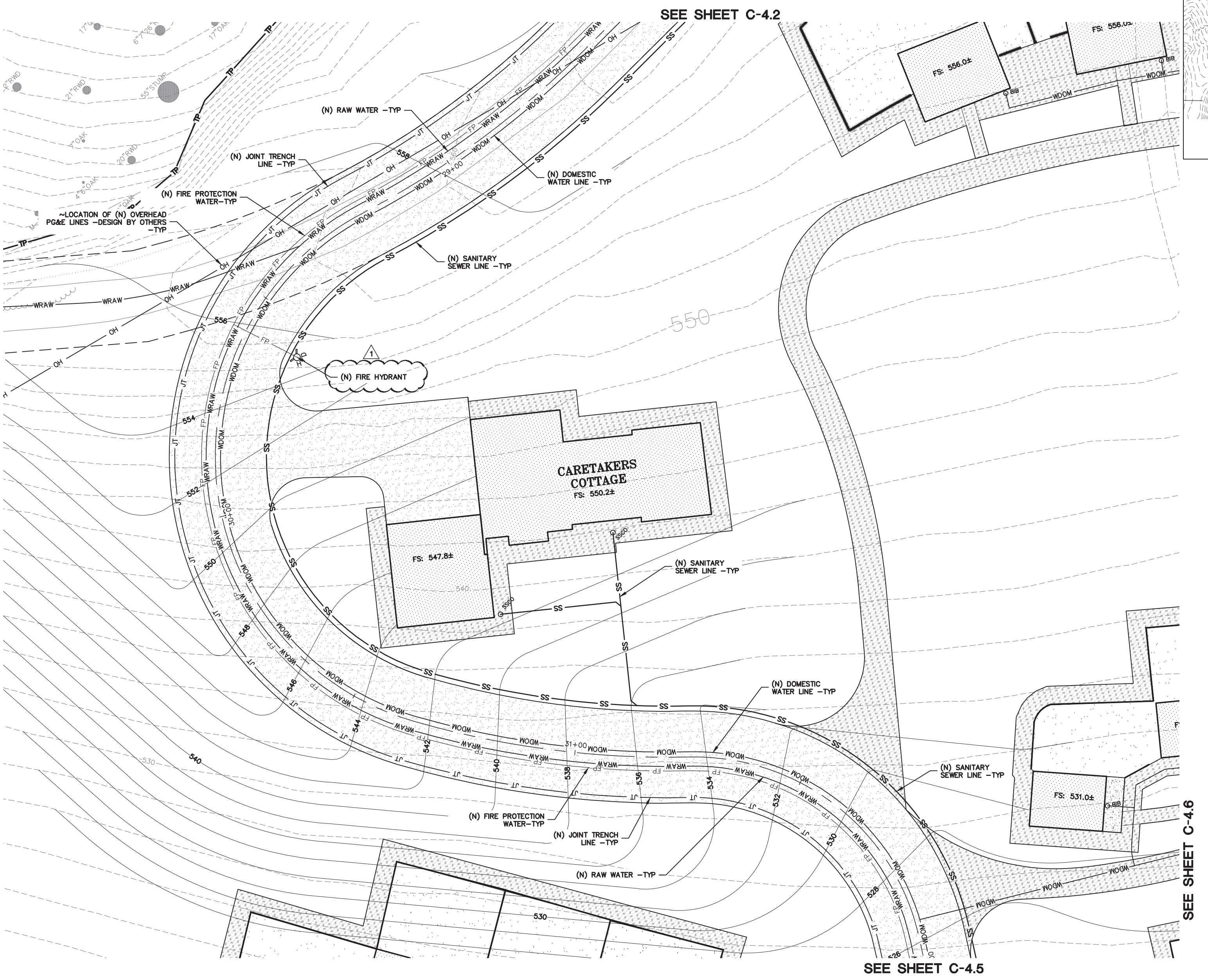
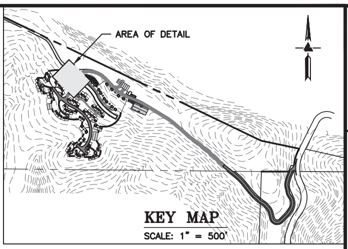
22 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





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(N) PAD MOUNTED TRANSFORMER. FINAL LOCATION TO BE COORDINATED WITH PG&E. REFER TO MECHANICAL PLANS FOR DETAILS

PETER CARLINO
No. C79555
CIVIL
ORIGINAL SIGNATURES IN BLUE INK

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS • LAND SURVEYORS

MAIN OFFICE:
2495 INDUSTRIAL PKWY WEST
HAYWARD, CALIFORNIA 94545
(510) 887-4086

REGIONAL OFFICES:
ROSEVILLE
DUBLIN
SAN JOSE (COMING SOON)

WWW.LEABRAZE.COM

PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA

SAN MATEO COUNTY

APN: 082-050-010
082-050-020

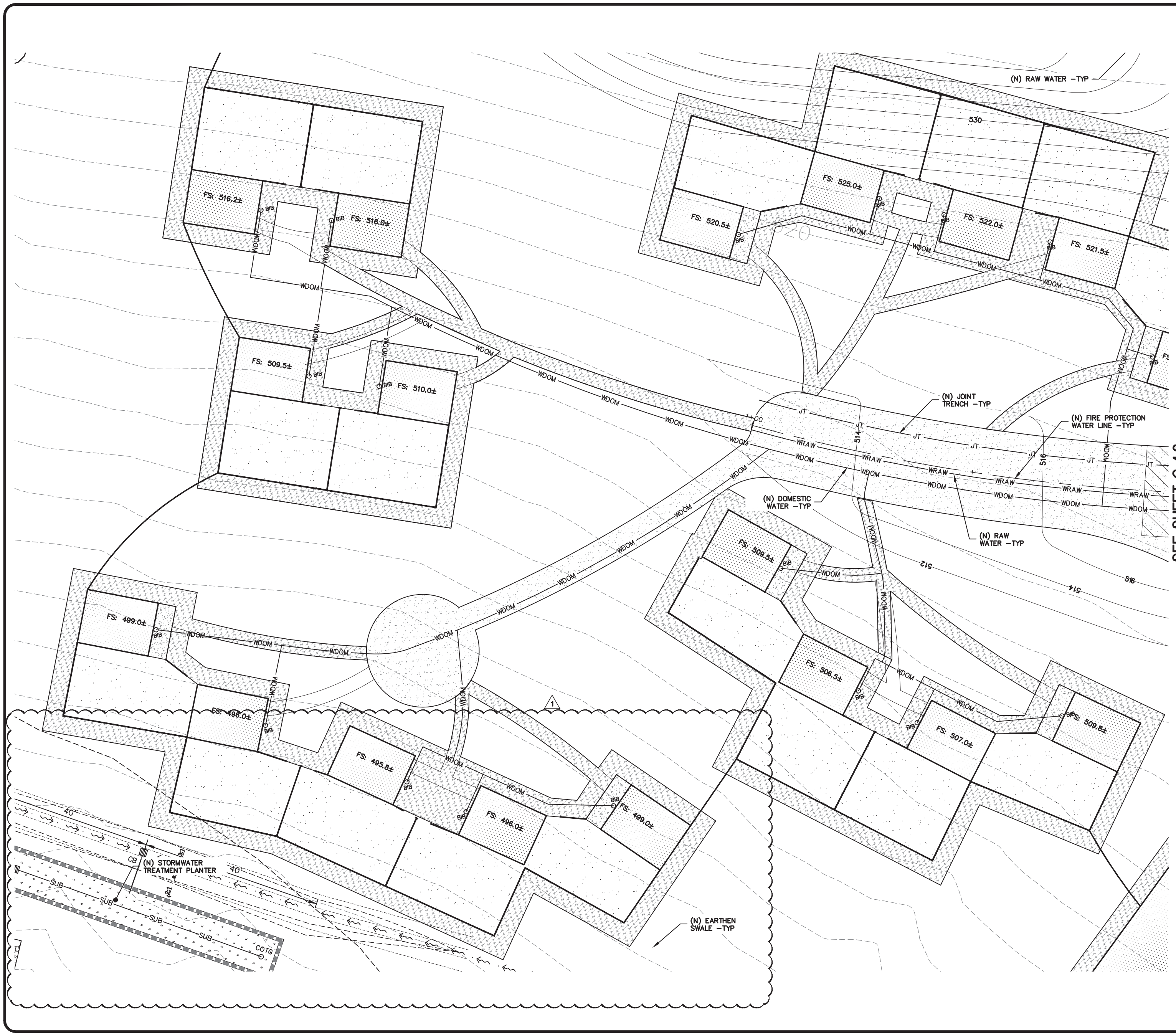
UTILITY PLAN

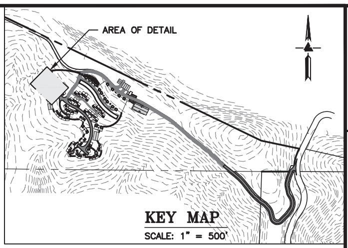
REVISIONS	BY
–	–
△2 USE PERMIT RESUBMITTAL 08/01/22	TB
△1 USE PERMIT RESUBMITTAL 01/12/22	TB

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA

SHEET NO:
C-4.4
23 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





KEY MAP

SCALE: 1" = 500'

NOTE:
FOR CONSTRUCTION STAKING SCHEDULING OR QUOTATIONS PLEASE CONTACT ALEX ABAYA AT LEA & BRAZE ENGINEERING (510)887-4086 EXT 116. aabaya@leabraze.com

0 5 10 20

SCALE: 1" = 10'

STORM DRAIN

(N) ACCESS ROAD/DRIVEWAY EDGE DRAIN.

(N) ON-SITE STORM WATER BIO-RETENTION AREA (BTA).

INSTALL (N) RIP-RAP ENERGY DISSIPATER. (N) ROCKED LINE SWALE.

(N) EARTHEN SWALE.

UTILITIES

(N) SEPTIC TANK. REFER TO THE SEPTIC PLANS BY LEA & BRAZE ENGINEERING FOR FINAL TANK SIZE AND LOCATION.

(N) LEACH FIELD. REFER TO THE SEPTIC PLANS BY LEA & BRAZE ENGINEERING FOR FINAL FIELD LAYOUT AND LOCATION.

(N) HOLDING TANK WITH LIFT PUMP. REFER TO THE SEPTIC PLANS BY LEA & BRAZE ENGINEERING FOR FINAL TANK SIZE AND LOCATION.

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(N) ON-SITE FIRE HYDRANT.

(N) DOMESTIC WATER LINE.

(N) RAW WATER LINE.

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1 USE PERMIT RESUBMITTAL 01/12/22	TB
REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
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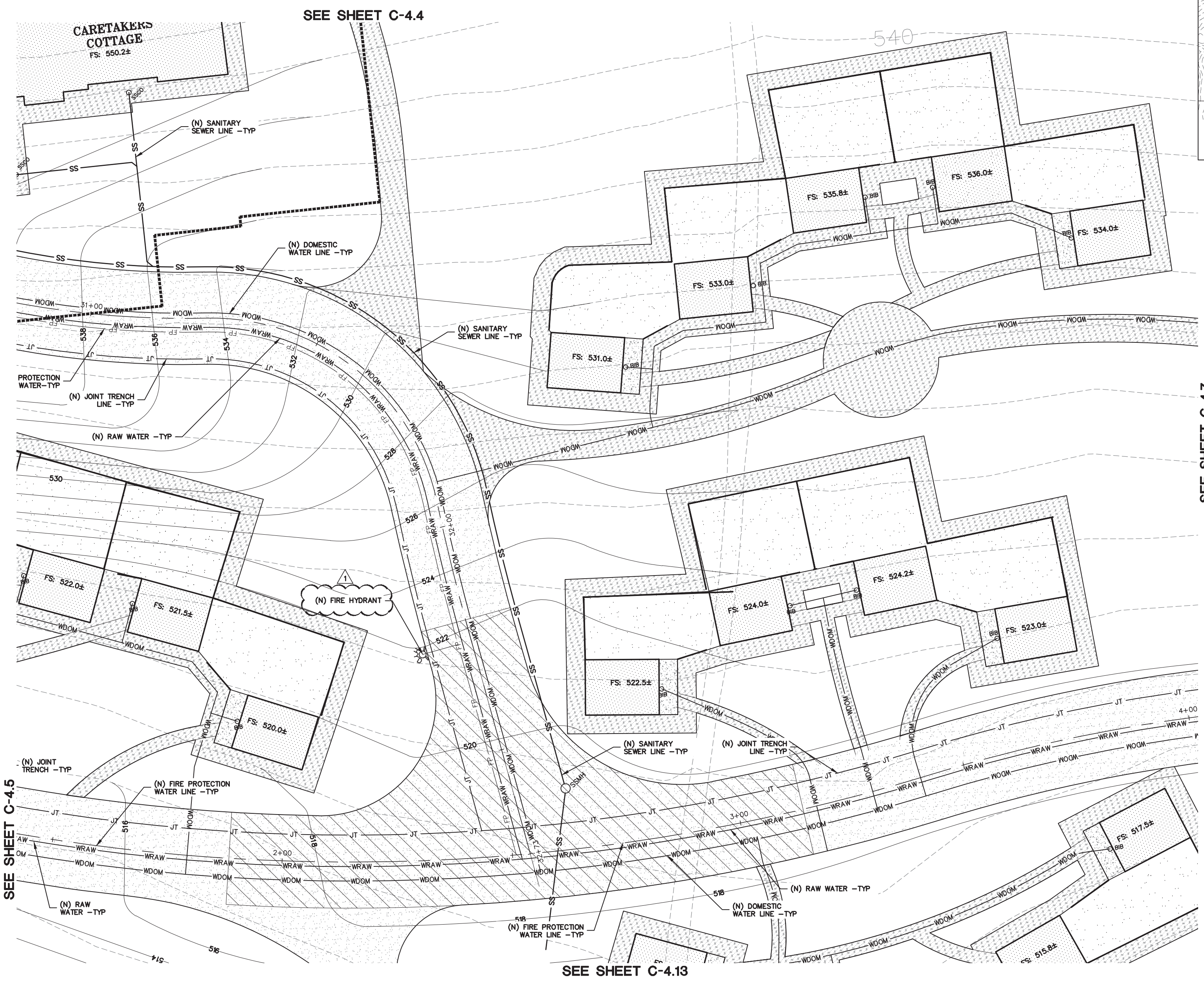
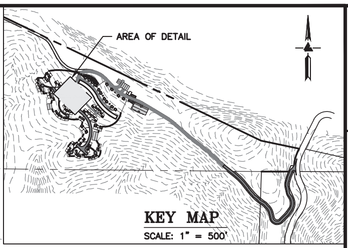
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:

C-4.5

24 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





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0 5 10 20
SCALE: 1" = 10'

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REVISIONS	BY

JOB NO:	2201144
DATE:	07/12/21
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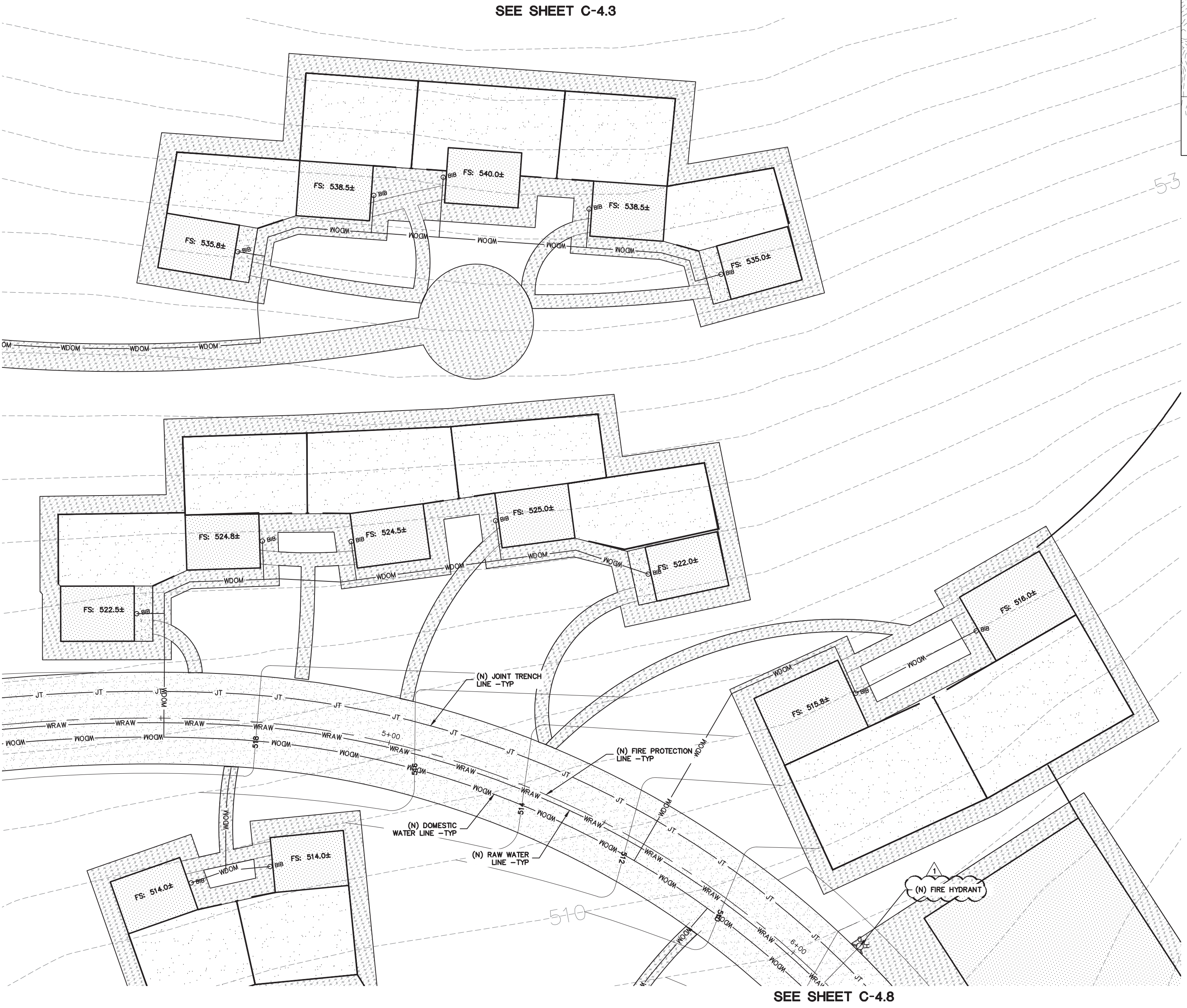
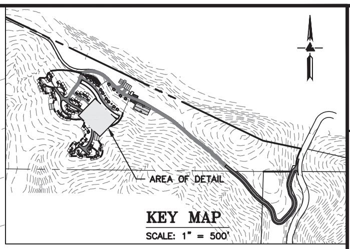
DESIGN BY:	TB
CHECKED BY:	CA

SHEET NO:
C-4.6
25 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





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UTILITY PLAN

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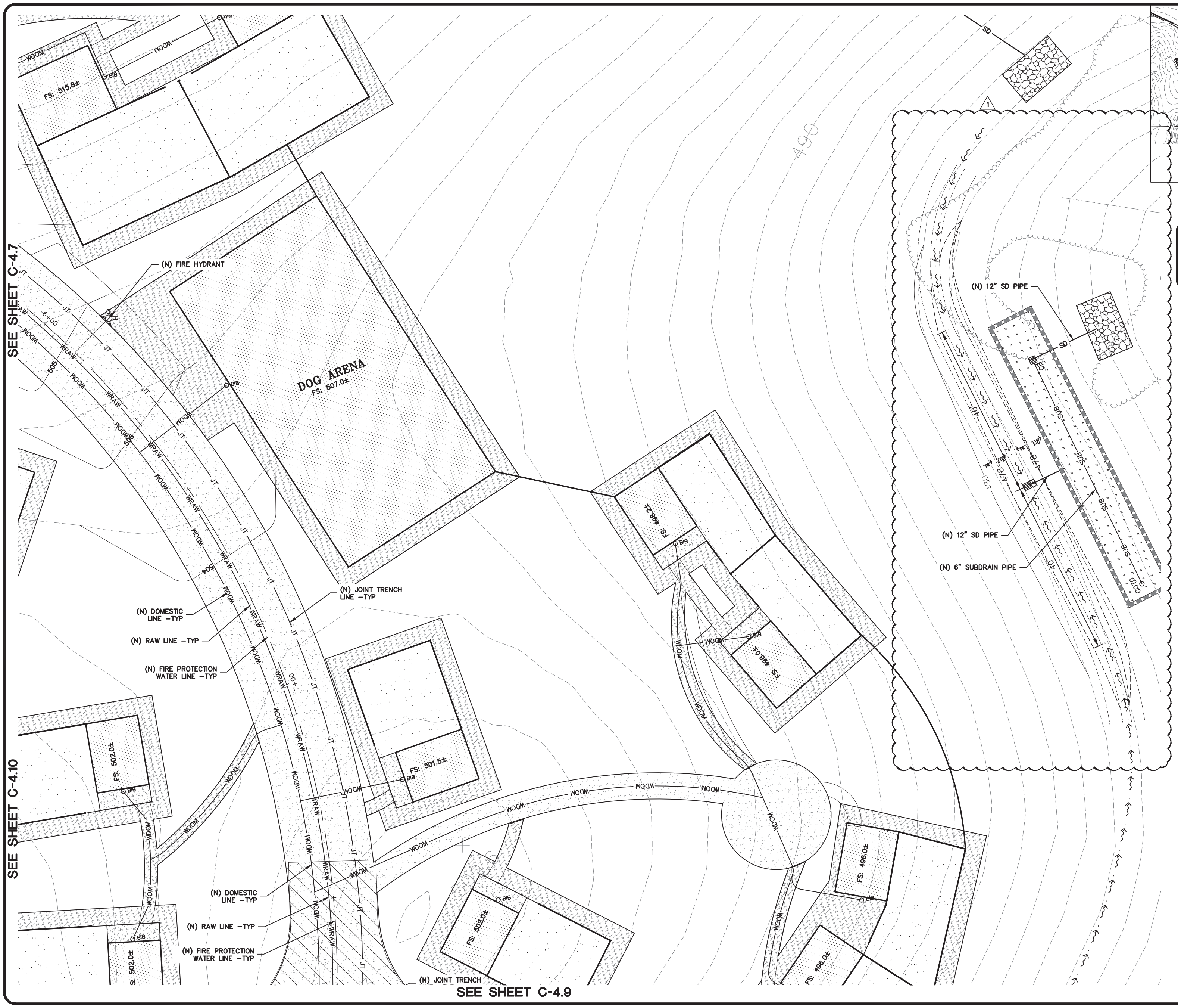
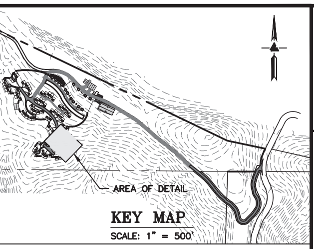
REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-4.7
26 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





KEY MAP

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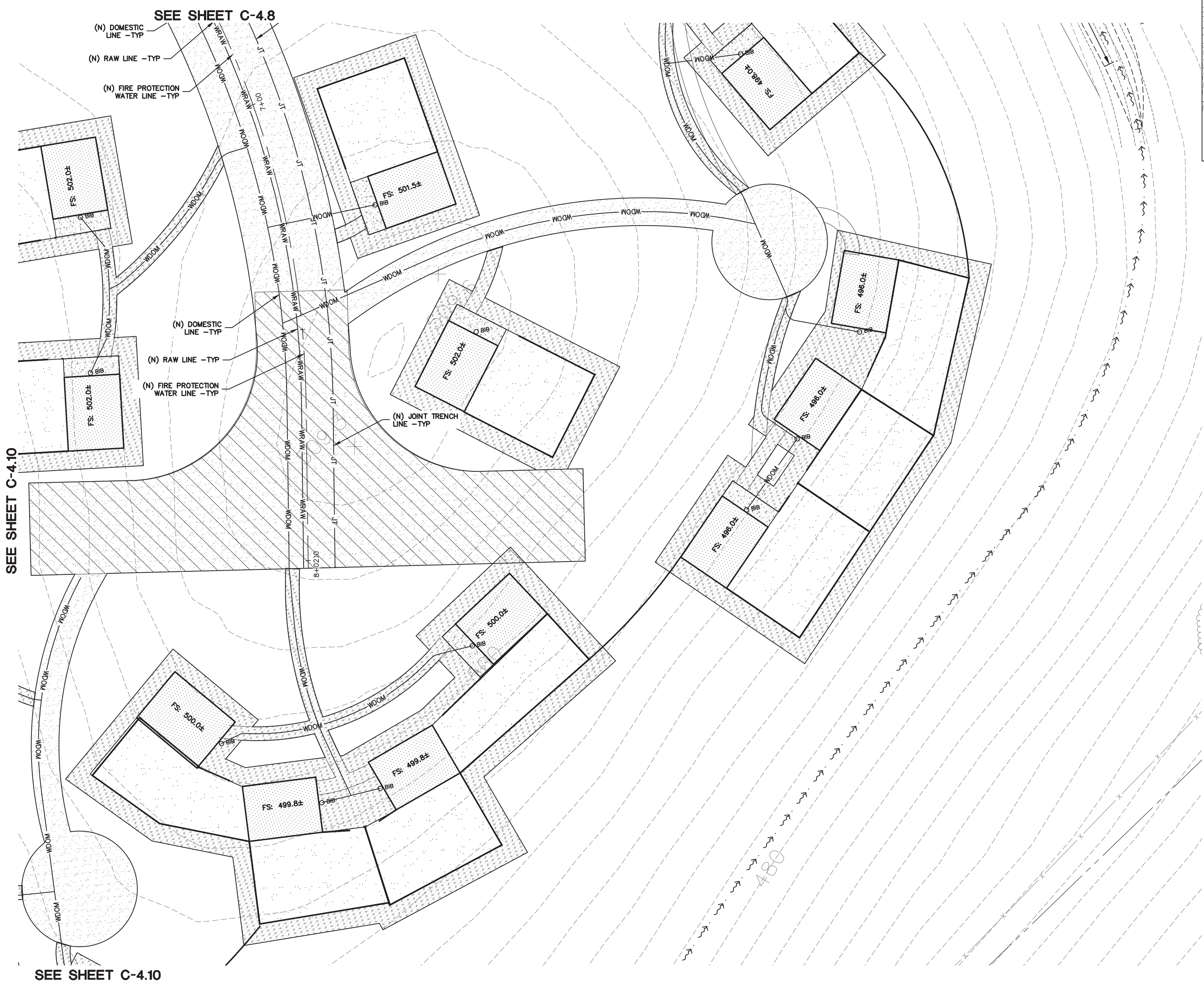
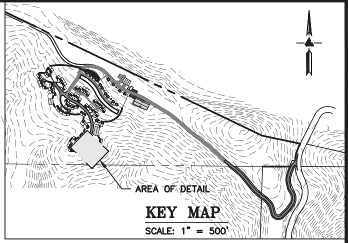
27 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





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REGISTERED PROFESSIONAL ENGINEER
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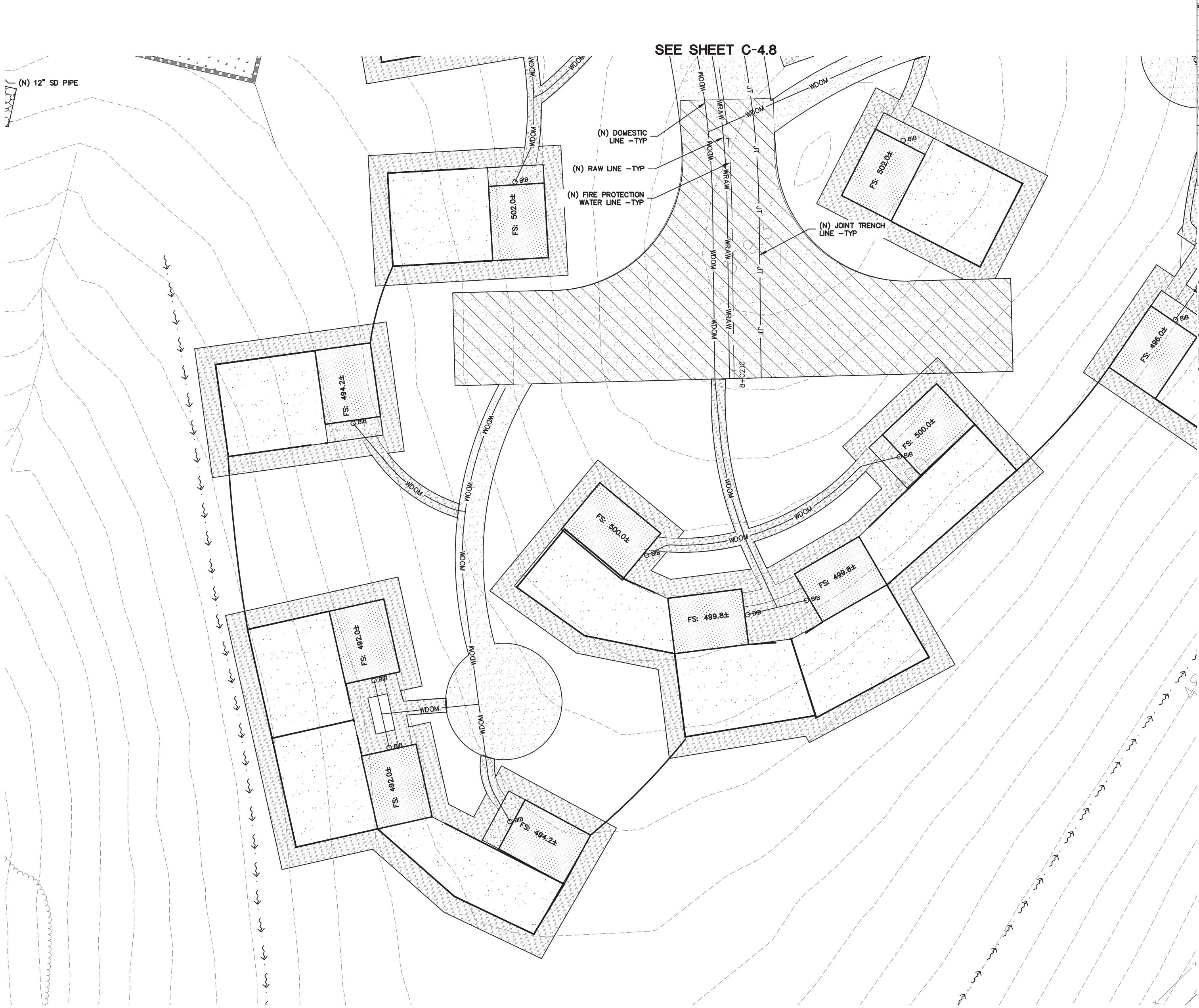

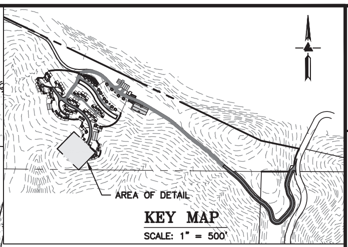

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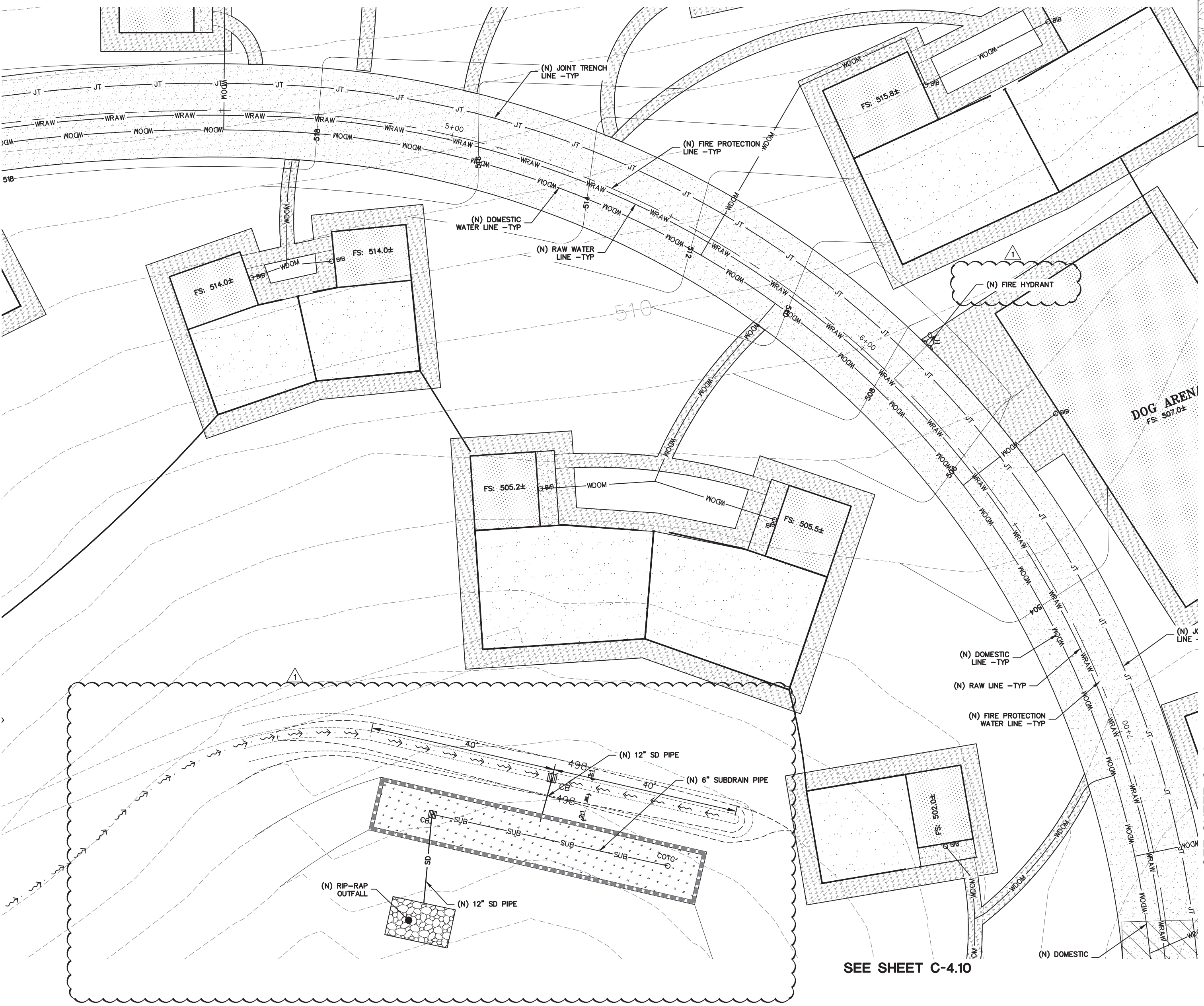
PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA
SAN MATEO COUNTY
APN: 082-050-010
082-050-020

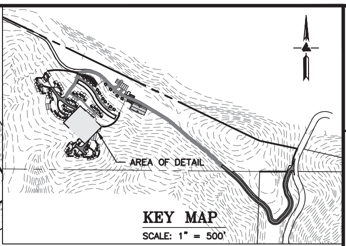
UTILITY PLAN

–		–
2	USE PERMIT RESUBMITTAL 08/01/22	TB
1	USE PERMIT RESUBMITTAL 01/12/22	TB
	REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-4.10
29 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





KEY MAP

SCALE: 1" = 500'

NOTE:
FOR CONSTRUCTION STAKING SCHEDULING OR QUOTATIONS PLEASE CONTACT ALEX ABAYA AT LEA & BRAZE ENGINEERING (510)887-4086 EXT 116.
aabaya@leabraze.com

0 5 10 20

SCALE: 1" = 10'

STORM DRAIN

(N) ACCESS ROAD/DRIVEWAY EDGE DRAIN.

(N) ON-SITE STORM WATER BIO-RETENTION AREA (BTA).

INSTALL (N) RIP-RAP ENERGY DISSIPATER. (N) ROCKED LINE SWALE.

(N) EARTHEN SWALE.

UTILITIES

(N) SEPTIC TANK. REFER TO THE SEPTIC PLANS BY LEA & BRAZE ENGINEERING FOR FINAL TANK SIZE AND LOCATION.

(N) LEACH FIELD. REFER TO THE SEPTIC PLANS BY LEA & BRAZE ENGINEERING FOR FINAL FIELD LAYOUT AND LOCATION.

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(N) DEDICATED NEUTRALIZING TANK. REFER TO MECHANICAL PLANS FOR SIZING CRITERIA AND MODEL SELECTION.

(N) SITE WELL. RUN SUPPLY LINE FROM THE WELL TO THE ON-SITE WATER STORAGE TANKS (DOMESTIC / FIRE PROTECTION).

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(N) FIRE PROTECTION WATER LINE.

(N) ON-SITE FIRE HYDRANT.

(N) DOMESTIC WATER LINE.

(N) RAW WATER LINE.

(N) TREATED WATER LINE.

(N) PAD MOUNTED TRANSFORMER. FINAL LOCATION TO BE COORDINATED WITH PG&E. REFER TO MECHANICAL PLANS FOR DETAILS

PETER CAMINO
No. C79555
CIVIL

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MAIN OFFICE:
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UTILITY PLAN

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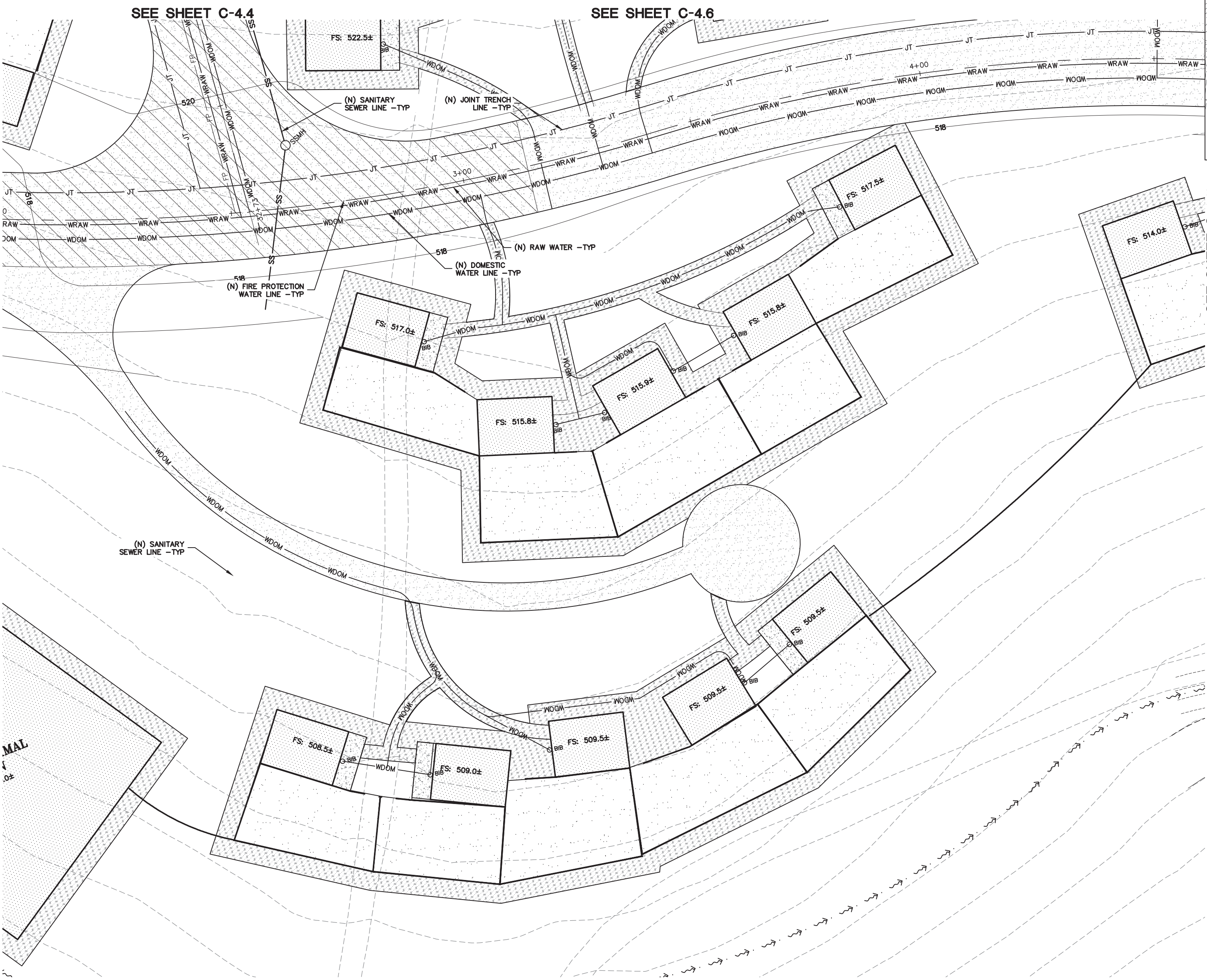
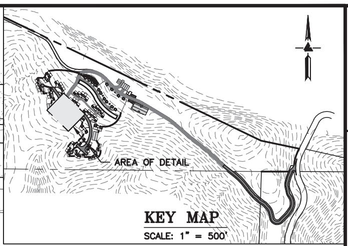
30 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





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PETER CARLINO
No. C79555
CIVIL
STATE OF CALIFORNIA
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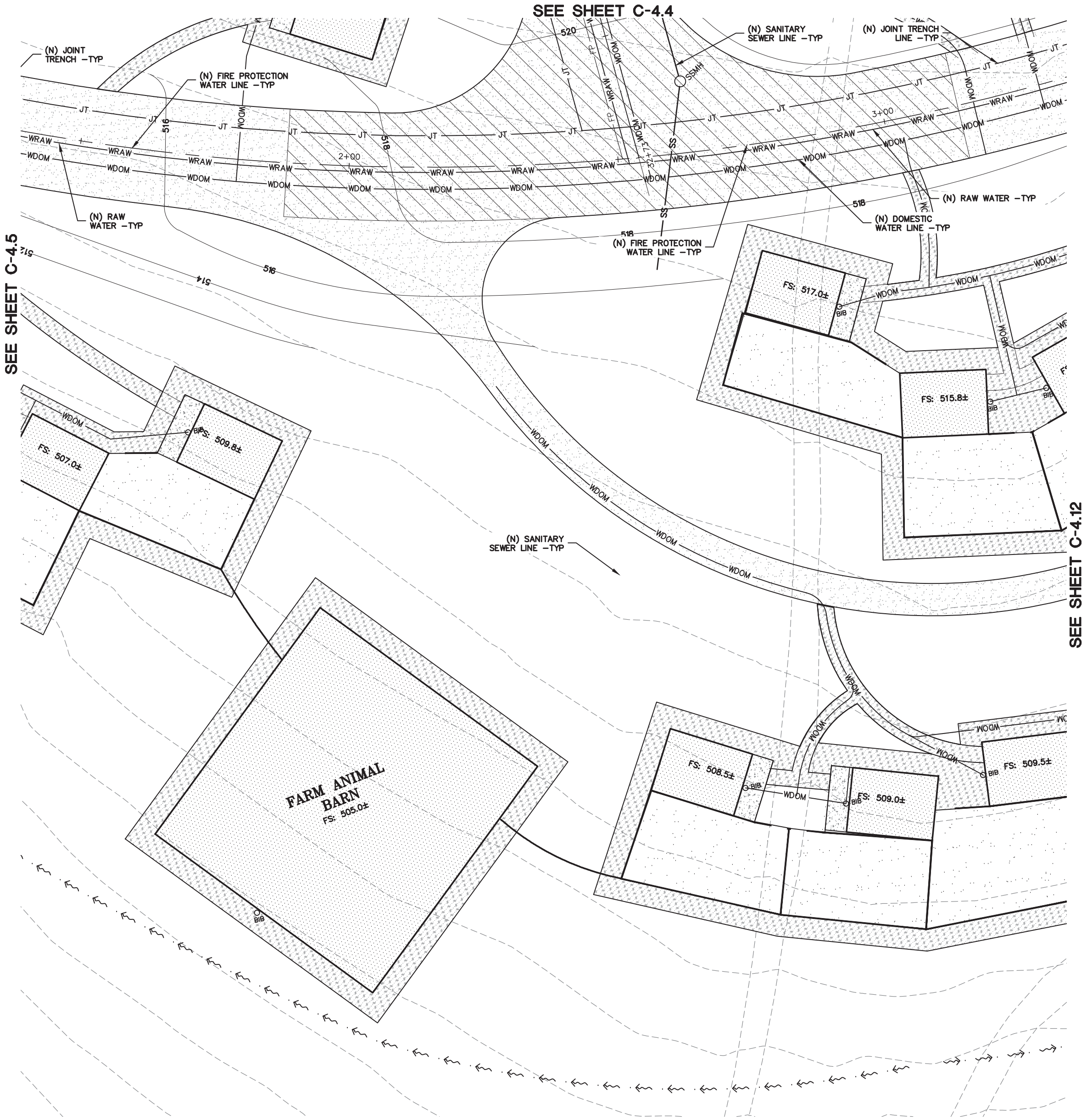
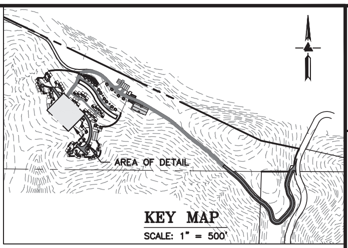
SHEET NO:

C-4.12

31 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





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1 USE PERMIT RESUBMITTAL 01/12/22	TB
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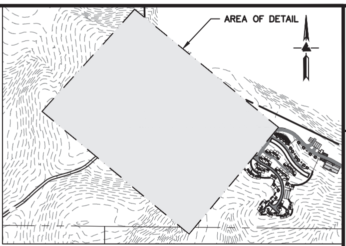
32 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL



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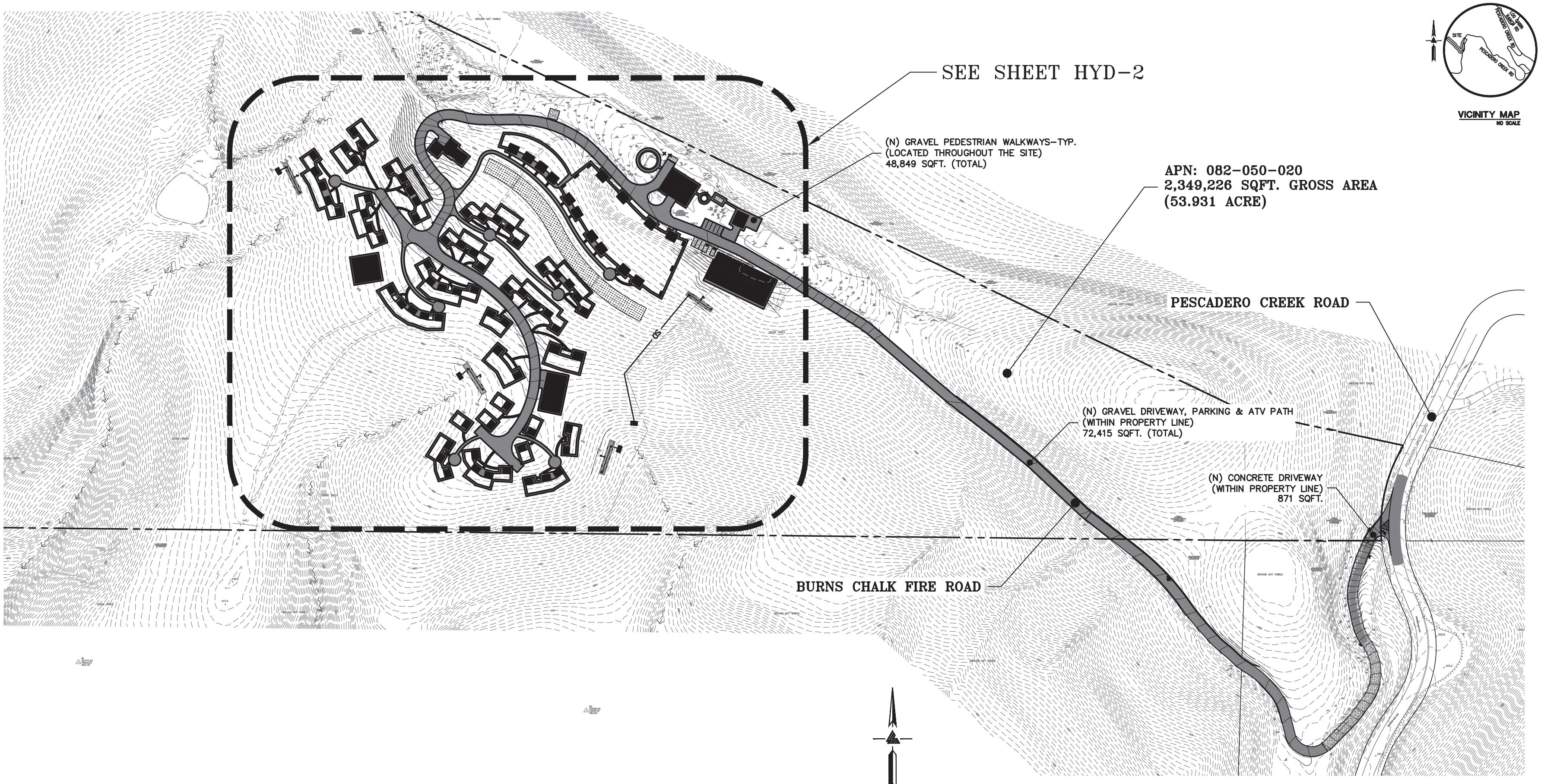
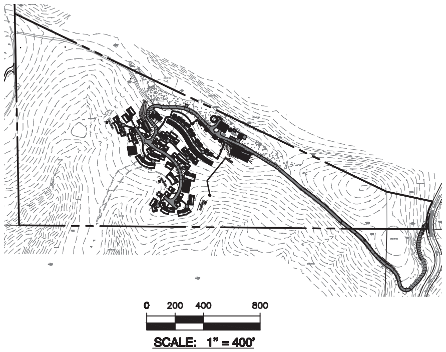
33 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





DEVELOPMENT AREA INFORMATION

TOTAL SITE AREA	**2,349,226 SQUARE FEET (53.931 ACRE)**			
TOTAL DISTURBED AREA	**500,000 SQUARE FEET (11.478 ACRE)**			
IMPERVIOUS AREAS	**EXISTING TOTAL S.F.**	**REMOVED TOTAL S.F.**	**NEW TOTAL S.F.**	**PROPOSED TOTAL S.F.**
BARN	3,000	3,000	3,000	3,000
VET & ADMIN BUILDING*	0	0	7,800	7,800
CARETAKER RESIDENCE	0	0	1,585	1,585
FARM ANIMAL BARN	0	0	2,600	2,600
COVERED DOG ARENA	0	0	3,000	3,000
MAINTENANCE BUILDING	635	635	660	660
LITTER BOX ENCLOSURE	0	0	240	240
ANIMAL COTTAGES*	0	0	18,432	18,432
WALKWAYS & PADS**	497	497	3,946	3,946
SOLAR PANELS	0	0	13,530	13,530
WATER TANKS	0	0	1,458	1,458
A.C. / CONCRETE DRIVEWAY	591	591	871	871
TOTAL IMPERVIOUS AREA	**4,723**	**4,723**	**57,122**	**57,122**
NET CHANGE IN IMPERVIOUS AREA	+ 52,399 SQFT (NET INCREASE)			
PERVIOUS PAVING				
GRAVEL DRIVEWAY, PARKING & ATV PATHS	0	0	72,415	72,415
GRAVEL PEDESTRIAN PATHS	0	0	48,849	48,849
TOTAL PERVIOUS PAVING AREA	0	0	121,264	121,264
NET CHANGE IN PERVIOUS PAVING AREA	+ 121,264 SQFT (NET INCREASE)			
TOTAL DEVELOPED AREA	4,723	4,723	178,386	178,386
NET CHANGE IN DEVELOPED AREA	+ 173,663 SQFT (NET INCREASE)			

*INCLUDES BUILDINGS ONLY (EXCLUDES PORCHES & WALKWAYS)
**INCLUDES A.D.A. PARKING, VET BUILDING WALKWAY, EQUIPMENT PADS, & ANIMAL COTTAGE PORCHES

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IMPERVIOUS SURFACE EXHIBIT (OVERALL SITE)

	–	–
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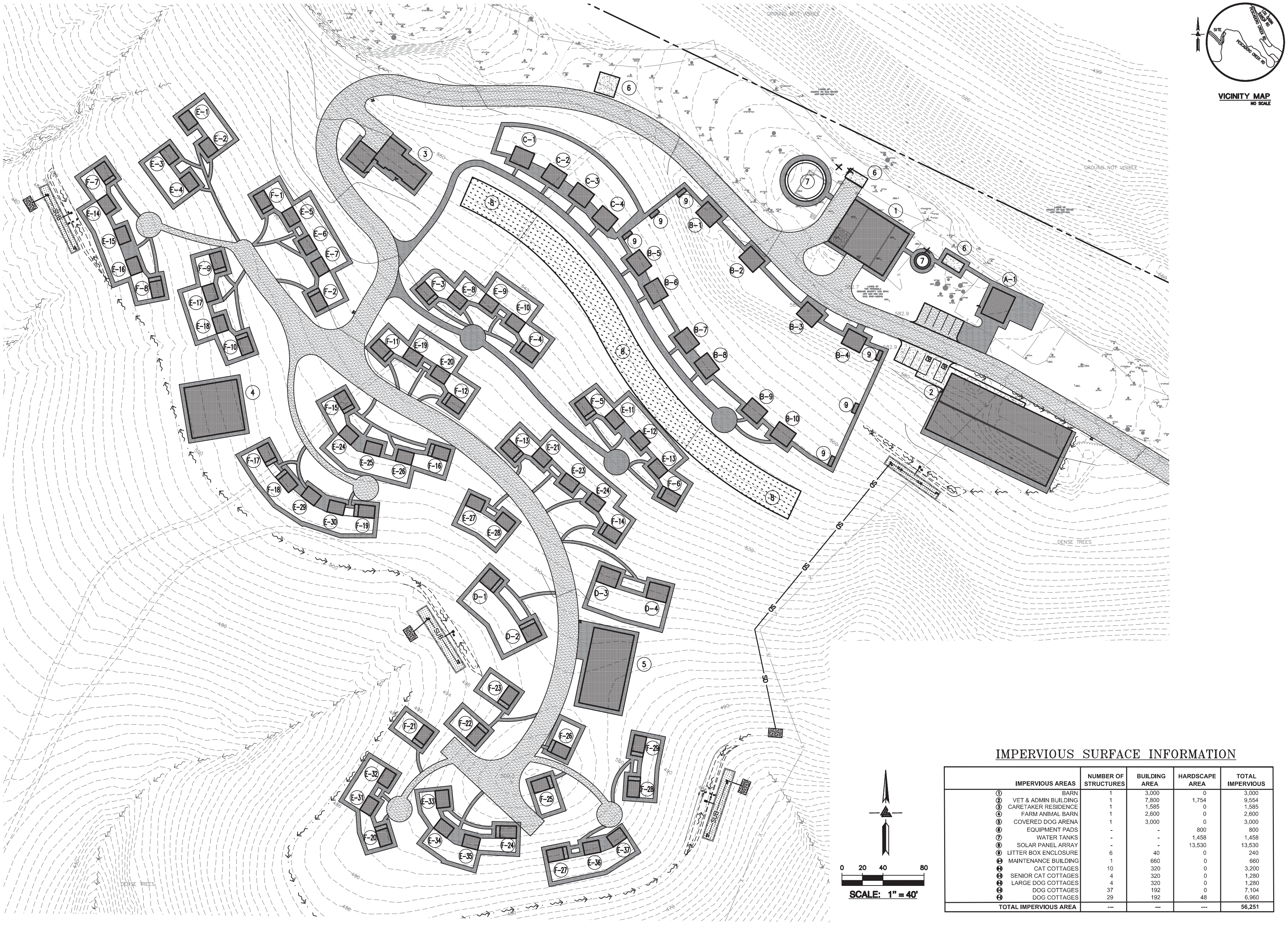

IMPERVIOUS SURFACE INFORMATION

IMPERVIOUS AREAS	NUMBER OF STRUCTURES	BUILDING AREA	HARDSCAPE AREA	TOTAL IMPERVIOUS
① BARN	1	3,000	0	3,000
② VET & ADMIN BUILDING	1	7,800	1,754	9,554
③ CARETAKER RESIDENCE	1	1,585	0	1,585
④ FARM ANIMAL BARN	1	2,600	0	2,600
⑤ COVERED DOG ARENA	1	3,000	0	3,000
⑥ EQUIPMENT PADS	-	-	800	800
⑦ WATER TANKS	-	-	1,458	1,458
⑧ SOLAR PANEL ARRAY	-	-	13,530	13,530
⑨ LITTER BOX ENCLOSURE	6	40	0	240
⑩ MAINTENANCE BUILDING	1	660	0	660
⑪ CAT COTTAGES	10	320	0	3,200
⑫ SENIOR CAT COTTAGES	4	320	0	1,280
⑬ LARGE DOG COTTAGES	4	320	0	1,280
⑭ DOG COTTAGES	37	192	0	7,104
⑮ DOG COTTAGES	29	192	48	6,960
TOTAL IMPERVIOUS AREA	---	—	---	56,251

REGISTERED PROFESSIONAL ENGINEER
PETER CARLINO
No. C79555
CIVIL
STATE OF CALIFORNIA
ORIGINAL SIGNATURES IN BLUE INK

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IMPERVIOUS SURFACE EXHIBIT (AREA OF DETAIL)

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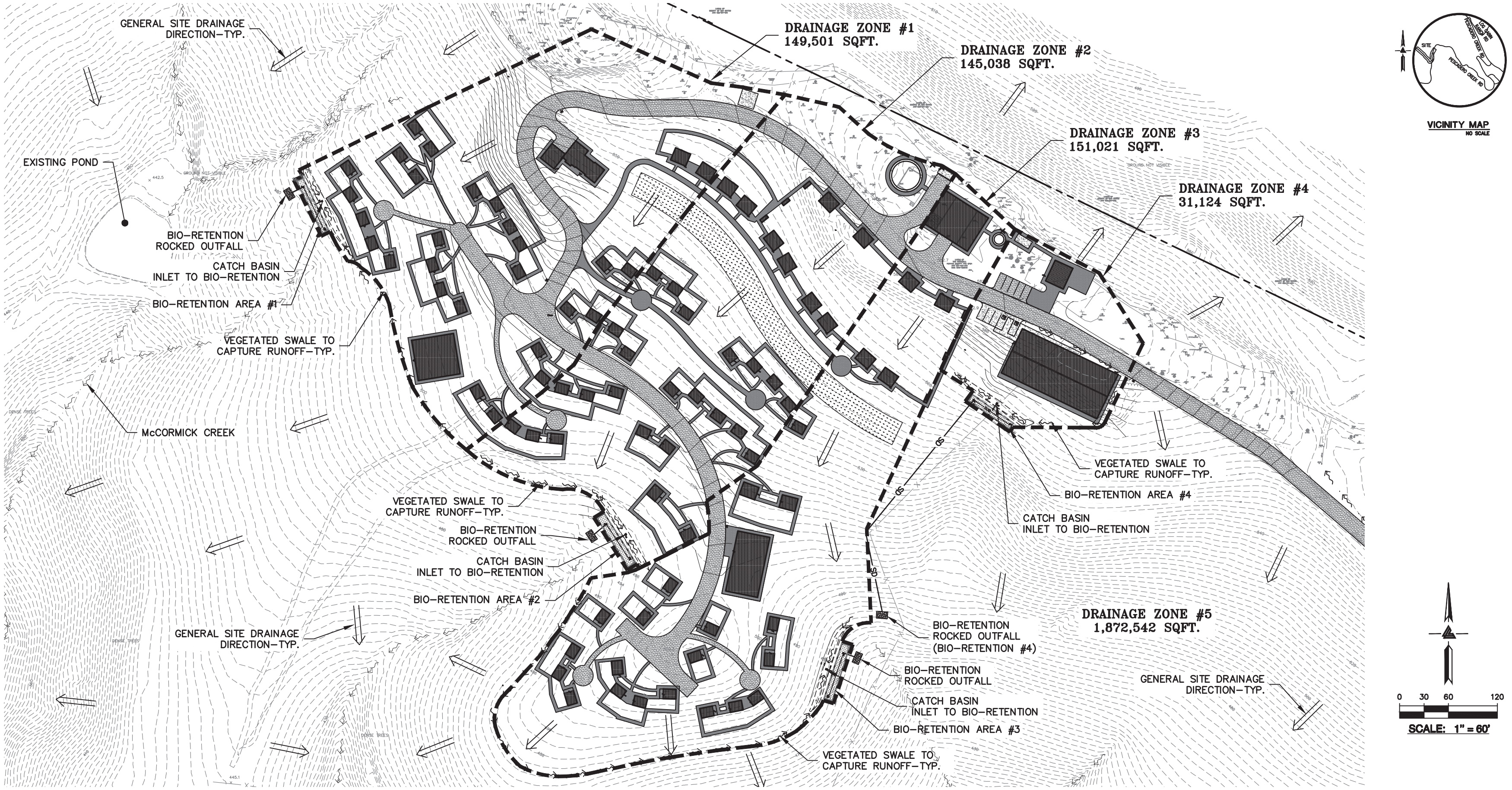

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COVERED DOG ARENA	0	0	3,000	3,000
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PERVIOUS PAVING				
GRAVEL DRIVEWAY, PARKING & ATV PATHS	0	0	72,415	72,415
GRAVEL PEDESTRIAN PATHS	0	0	48,849	48,849
TOTAL PERVIOUS PAVING AREA	0	0	121,264	121,264
NET CHANGE IN PERVIOUS PAVING AREA	+ 121,264 SQFT (NET INCREASE)			
TOTAL DEVELOPED AREA	4,723	4,723	178,386	178,386
NET CHANGE IN DEVELOPED AREA	+ 173,663 SQFT (NET INCREASE)			

*INCLUDES BUILDINGS ONLY (EXCLUDES PORCHES & WALKWAYS)
**INCLUDES A.D.A. PARKING, VET BUILDING WALKWAY, EQUIPMENT PADS, & ANIMAL COTTAGE PORCHES

DRAINAGE ZONE INFORMATION

TOTAL SITE AREA	**2,349,226 SQUARE FEET (53.931 ACRE)**					
IMPERVIOUS AREAS	**PROPOSED TOTAL**	**DRAINAGE ZONE #1**	**DRAINAGE ZONE #2**	**DRAINAGE ZONE #3**	**DRAINAGE ZONE #4**	**DRAINAGE ZONE #5**
BARN	3,000	0	0	3,000	0	0
VET & ADMIN BUILDING*	7,800	0	0	0	7,800	0
CARETAKER RESIDENCE	1,585	1,585	0	0	0	0
FARM ANIMAL BARN	2,600	2,600	0	0	0	0
COVERED DOG ARENA	3,000	0	0	3,000	0	0
MAINTENANCE BUILDING	660	0	0	0	660	0
LITTER BOX ENCLOSURE	240	0	120	120	0	0
ANIMAL COTTAGES*	18,432	5,632	7,424	5,376	0	0
WALKWAYS & PADS**	3,946	928	336	528	2,154	0
SOLAR PANELS	13,530	2,108	7,838	3,584	0	0
WATER TANKS	1,458	0	1,257	201	0	0
A.C. DRIVEWAY	871	0	0	0	0	871
TOTAL IMPERVIOUS AREA	**57,122**	**12,853**	**16,975**	**15,809**	**10,614**	**871**
PERVIOUS AREAS						
GRAVEL DRIVEWAY, PARKING & ATV PATHS	72,415	21,181	15,954	12,219	5,537	17,524
GRAVEL PEDESTRIAN PATHS	48,849	15,751	13,256	16,683	3,159	0
LANDSCAPE / TREATMENT PLANTERS	2,170,840	99,716	98,853	106,310	11,814	1,854,147
TOTAL PERVIOUS AREA	2,292,104	136,648	128,063	135,212	20,510	1,871,671

*INCLUDES BUILDINGS ONLY (EXCLUDES PORCHES & WALKWAYS)
**INCLUDES A.D.A. PARKING, VET BUILDING WALKWAY, EQUIPMENT PADS, & ANIMAL COTTAGE PORCHES

STORMWATER TREATMENT CALCULATIONS

DRAINAGE MANAGEMENT AREA	IMPERVIOUS SURFACE	PERVIOUS PAVING	LANDSCAPE	TREATMENT MEASURE	TREATMENT AREA REQUIRED*	TREATMENT AREA PROVIDED
DRAINAGE AREA #1	12,853	---	—	BIO-RETENTION PLANTER	515	560
	---	36,932	—	SELF-TREATING	---	---
	---	---	99,716	SELF-TREATING	---	---
DRAINAGE AREA #2	16,975	---	—	BIO-RETENTION PLANTER	679	700
	---	29,210	—	SELF-TREATING	---	---
	---	---	98,853	SELF-TREATING	---	---
DRAINAGE AREA #3	15,809	---	—	BIO-RETENTION PLANTER	633	665
	---	28,902	—	SELF-TREATING	---	---
	---	---	106,310	SELF-TREATING	---	---
DRAINAGE AREA #4	10,614	---	—	BIO-RETENTION PLANTER	425	480
	---	8,696	—	SELF-TREATING	---	---
	---	---	11,814	SELF-TREATING	---	---
DRAINAGE AREA #5	0	---	—	---	---	---
	---	17,524	—	SELF-TREATING	---	---
	---	---	1,854,147	SELF-TREATING	---	---
TOTAL	56,251	---	—	BIO-RETENTION PLANTER	2,252	2,405
	---	121,264	—	SELF-TREATING	---	---
	---	---	2,170,840	SELF-TREATING	---	---

FLOW-THROUGH PLANTER TREATMENT AREAS ARE CALCULATED USING THE UNIFORM INTENSITY METHOD (IMPERVIOUS SURFACE X 0.04)

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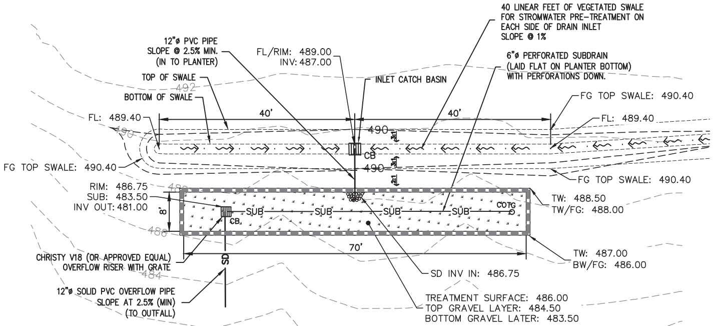
SAN MATEO COUNTY
APN: 082-050-010
082-050-020

STORMWATER CONTROL PLAN

–	–
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB
REVISIONS	BY

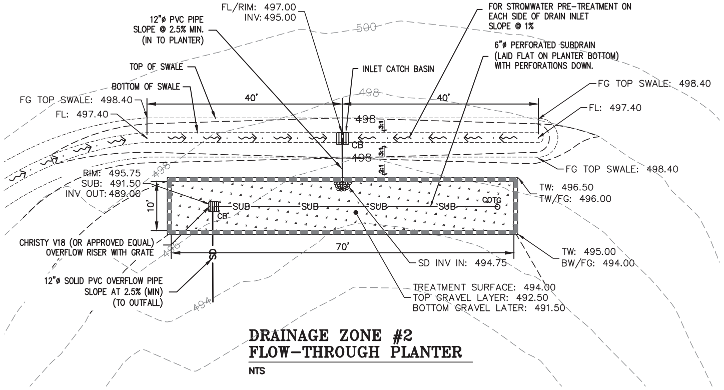
JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 60'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-4.17
36 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL



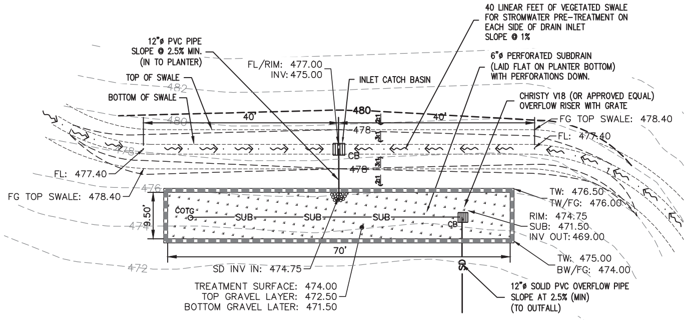
DRAINAGE ZONE #1
FLOW–THROUGH PLANTER

NTS



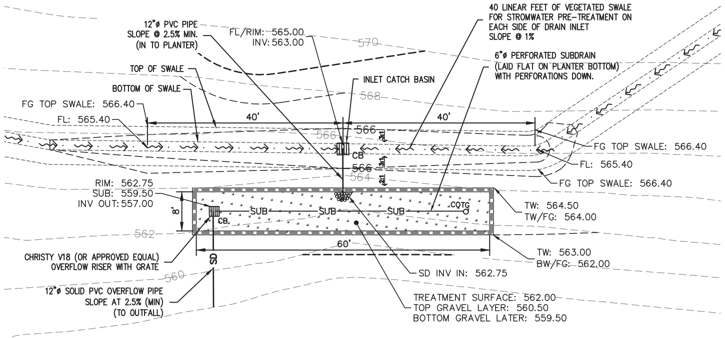
DRAINAGE ZONE #2
FLOW–THROUGH PLANTER

NTS



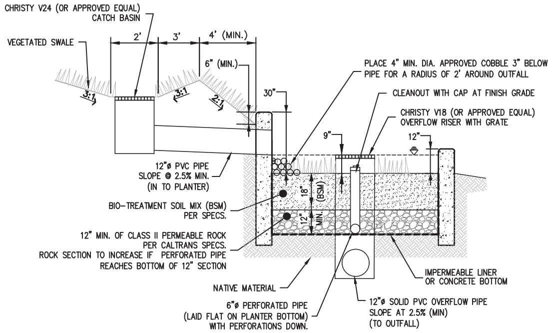
DRAINAGE ZONE #3
FLOW–THROUGH PLANTER

NTS



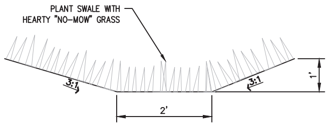
DRAINAGE ZONE #4
FLOW–THROUGH PLANTER

NTS



FLOW–THROUGH PLANTER DETAIL

NTS



VEGETATED PRE–TREATMENT SWALE

NTS

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STORMWATER TREATMENT DETAILS

–	–
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1 USE PERMIT RESUBMITTAL 01/12/22	TB
REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: N.T.S.
DESIGN BY: TB
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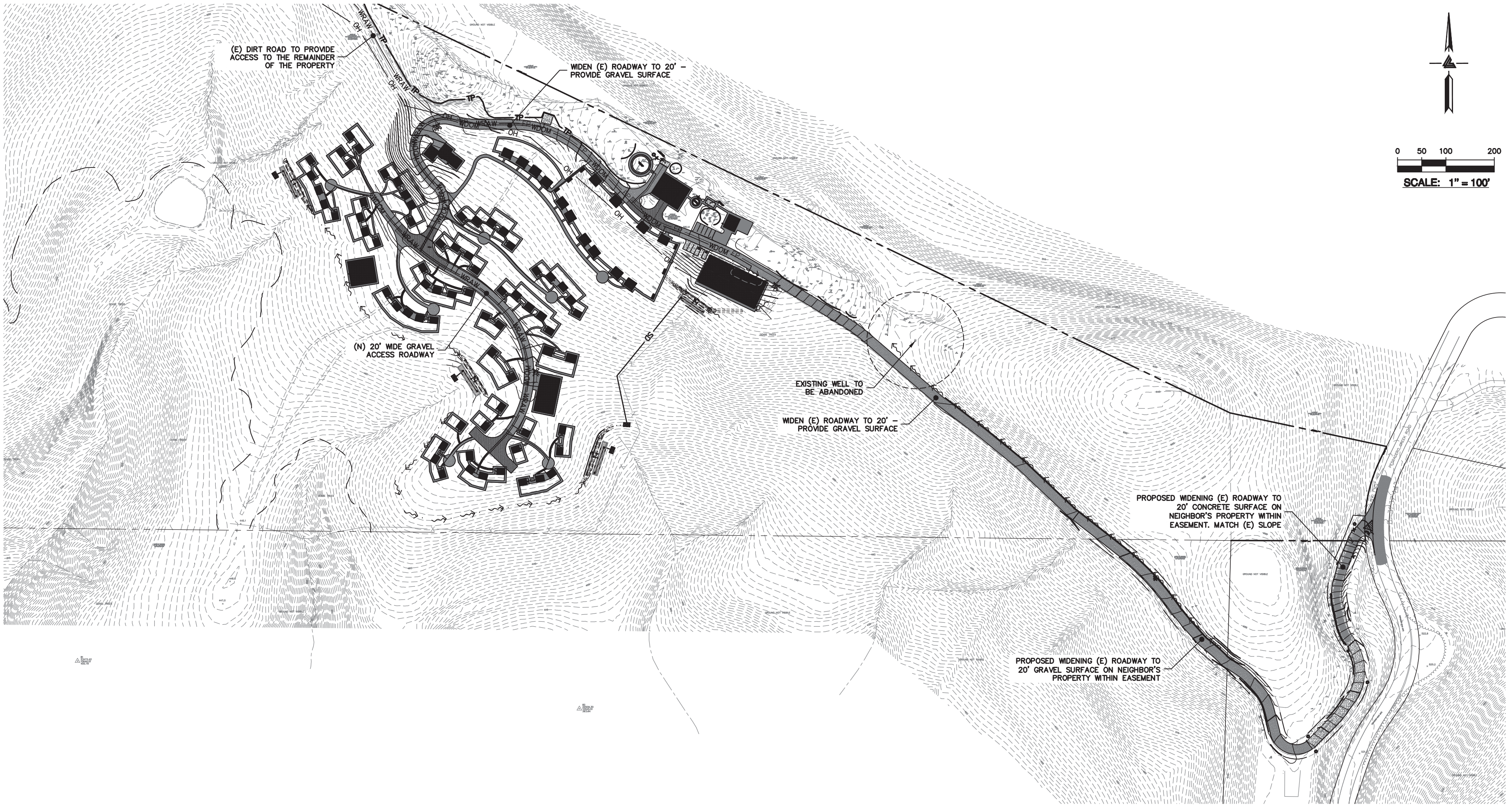
SHEET NO:
C-4.18
37 OF 54 SHEETS



REGISTERED PROFESSIONAL ENGINEER
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SITE FIRE EXHIBIT

REVISIONS	BY
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DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-4.19
38 OF 54 SHEETS

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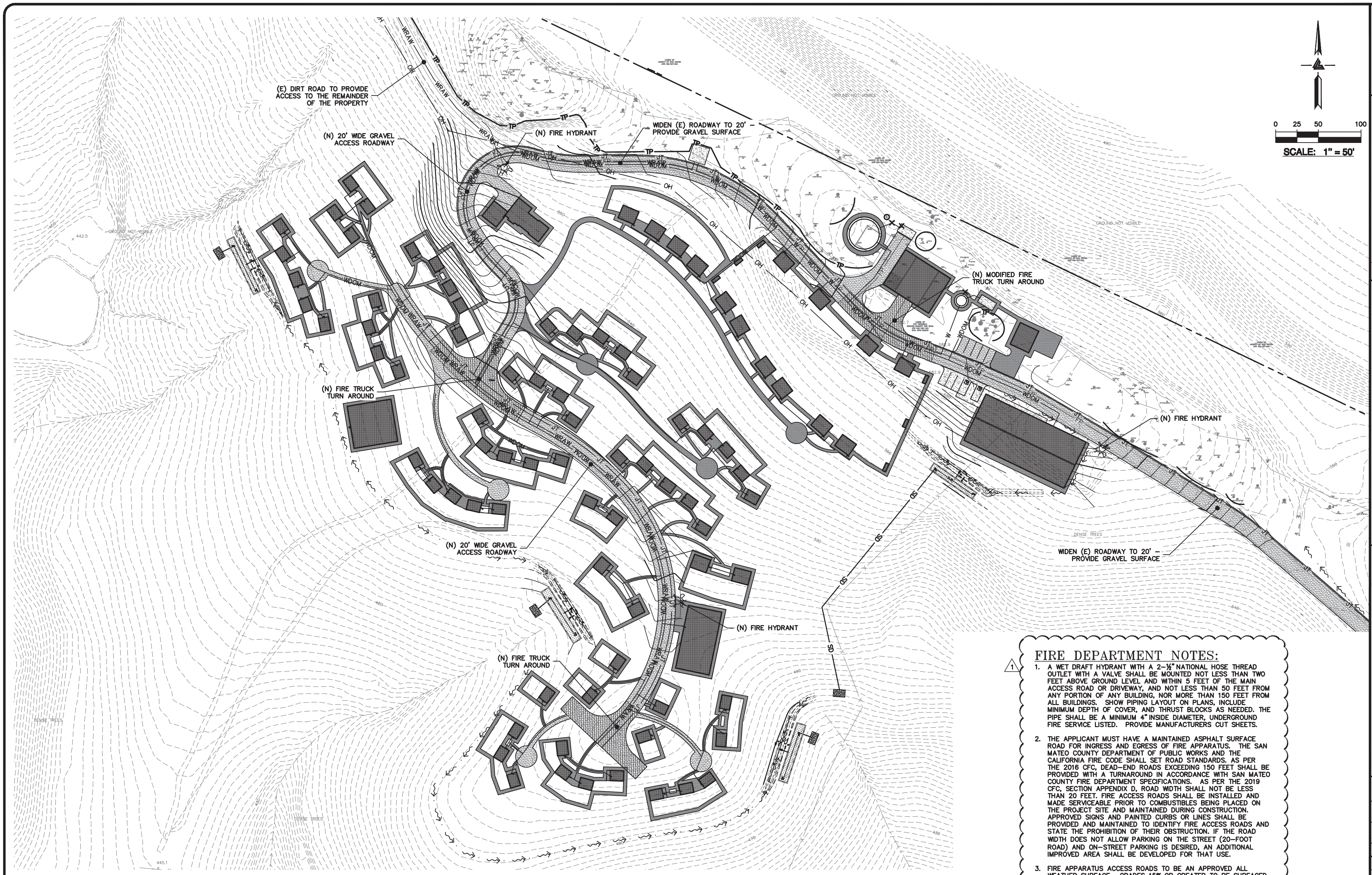

FIRE DEPARTMENT NOTES:

△1

1. A WET DRAFT HYDRANT WITH A 2–½" NATIONAL HOSE THREAD OUTLET WITH A VALVE SHALL BE MOUNTED NOT LESS THAN TWO FEET ABOVE GROUND LEVEL AND WITHIN 5 FEET OF THE MAIN ACCESS ROAD OR DRIVEWAY, AND NOT LESS THAN 50 FEET FROM ANY PORTION OF ANY BUILDING, NOR MORE THAN 150 FEET FROM ALL BUILDINGS. SHOW PIPING LAYOUT ON PLANS, INCLUDE MINIMUM DEPTH OF COVER, AND THRUST BLOCKS AS NEEDED. THE PIPE SHALL BE A MINIMUM 4" INSIDE DIAMETER, UNDERGROUND FIRE SERVICE LISTED. PROVIDE MANUFACTURERS CUT SHEETS.
2. THE APPLICANT MUST HAVE A MAINTAINED ASPHALT SURFACE ROAD FOR INGRESS AND EGRESS OF FIRE APPARATUS. THE SAN MATEO COUNTY DEPARTMENT OF PUBLIC WORKS AND THE CALIFORNIA FIRE CODE SHALL SET ROAD STANDARDS. AS PER THE 2016 CFC, DEAD–END ROADS EXCEEDING 150 FEET SHALL BE PROVIDED WITH A TURNAROUND IN ACCORDANCE WITH SAN MATEO COUNTY FIRE DEPARTMENT SPECIFICATIONS. AS PER THE 2019 CFC, SECTION APPENDIX D, ROAD WIDTH SHALL NOT BE LESS THAN 20 FEET. FIRE ACCESS ROADS SHALL BE INSTALLED AND MADE SERVICEABLE PRIOR TO COMBUSTIBLES BEING PLACED ON THE PROJECT SITE AND MAINTAINED DURING CONSTRUCTION. APPROVED SIGNS AND PAINTED CURBS OR LINES SHALL BE PROVIDED AND MAINTAINED TO IDENTIFY FIRE ACCESS ROADS AND STATE THE PROHIBITION OF THEIR OBSTRUCTION. IF THE ROAD WIDTH DOES NOT ALLOW PARKING ON THE STREET (20–FOOT ROAD) AND ON–STREET PARKING IS DESIRED, AN ADDITIONAL IMPROVED AREA SHALL BE DEVELOPED FOR THAT USE.
3. FIRE APPARATUS ACCESS ROADS TO BE AN APPROVED ALL WEATHER SURFACE. GRADES 15% OR GREATER TO BE SURFACED W/ ASPHALT, OR BRUSHED CONCRETE. GRADES 15 % OR GREATER SHALL BE LIMITED TO 150 FT. IN LENGTH WITH A MINIMUM OF 500 FT. BETWEEN THE NEXT SECTION. FOR ROADS APPROVED LESS THAN 20 FT., 20 FT. WIDE TURNOUTS SHALL BE ON EACH SIDE OF 15% OR GREATER SECTION. NO GRADES OVER 20%. (PLAN AND PROFILE REQUIRED) CFC 503.
4. "NO PARKING – FIRE LANE" SIGNS SHALL BE PROVIDED ON BOTH SIDES OF ROADS 20 TO 26 FT. WIDE AND ON ONE SIDE OF ROADS 26 TO 32 FT. WIDE. CFC D103.6

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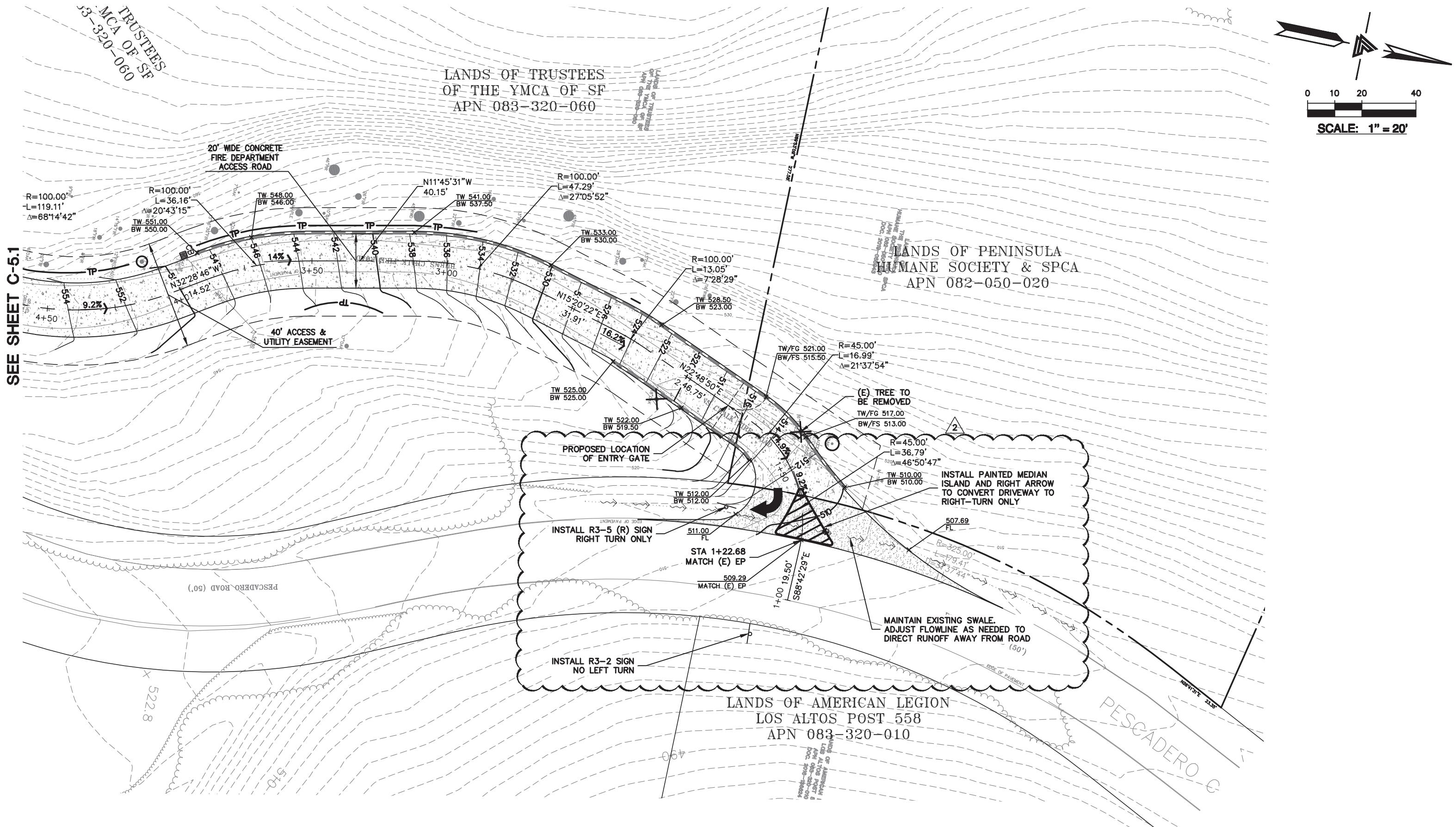
FIRE SITE PLAN
(AREA OF DETAIL)

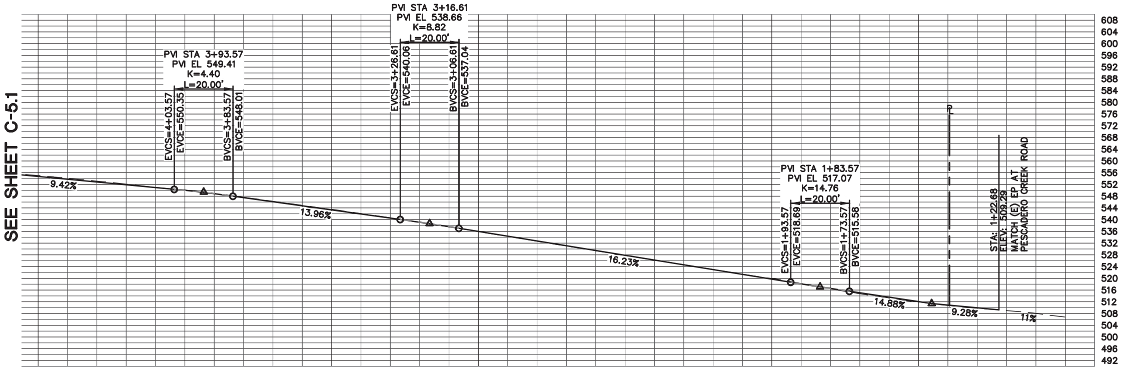
	–	–
△2	USE PERMIT RESUBMITTAL 08/01/22	TB
△1	USE PERMIT RESUBMITTAL 01/12/22	TB
	REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 50'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:

C-4.20

39 OF 54 SHEETS





MAIN ROADWAY

SCALE: 1" = 20' HORIZ & VERT

NOTE:
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PLAN & PROFILE
STA: 1+00 TO 4+50

-	-
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB
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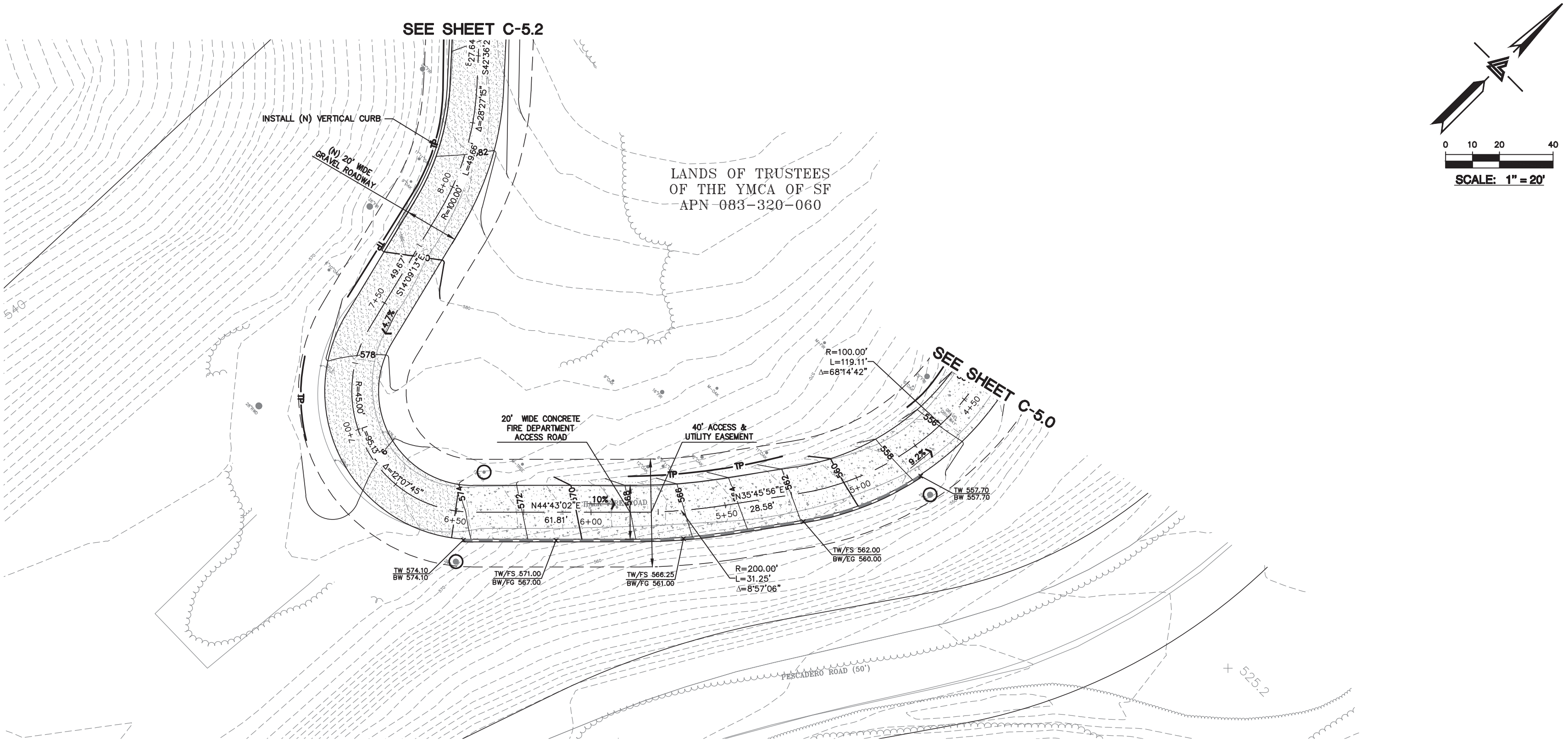
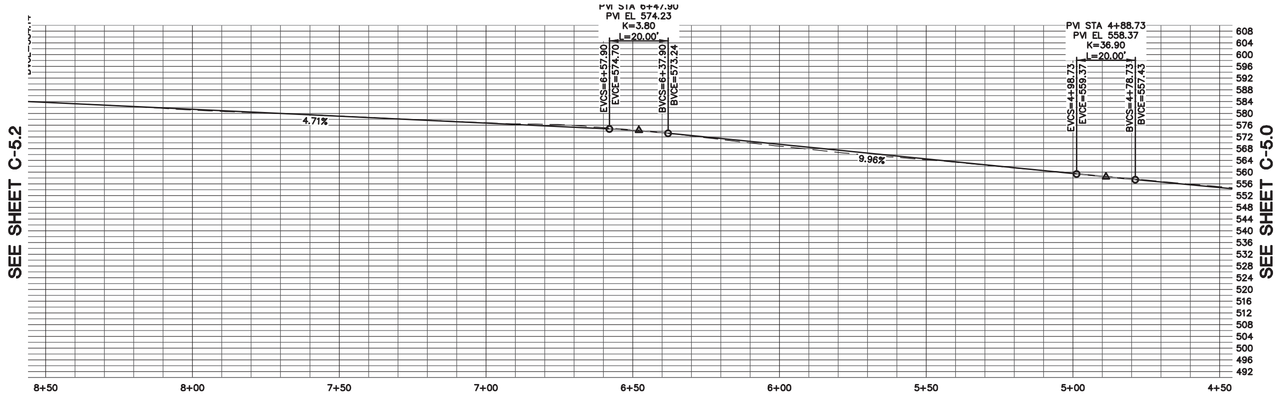
JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 20'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:

C-5.0

40 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





MAIN ROADWAY

SCALE: 1" = 20' HORIZ & VERT

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PLAN & PROFILE
STA: 4+50 TO 8+50

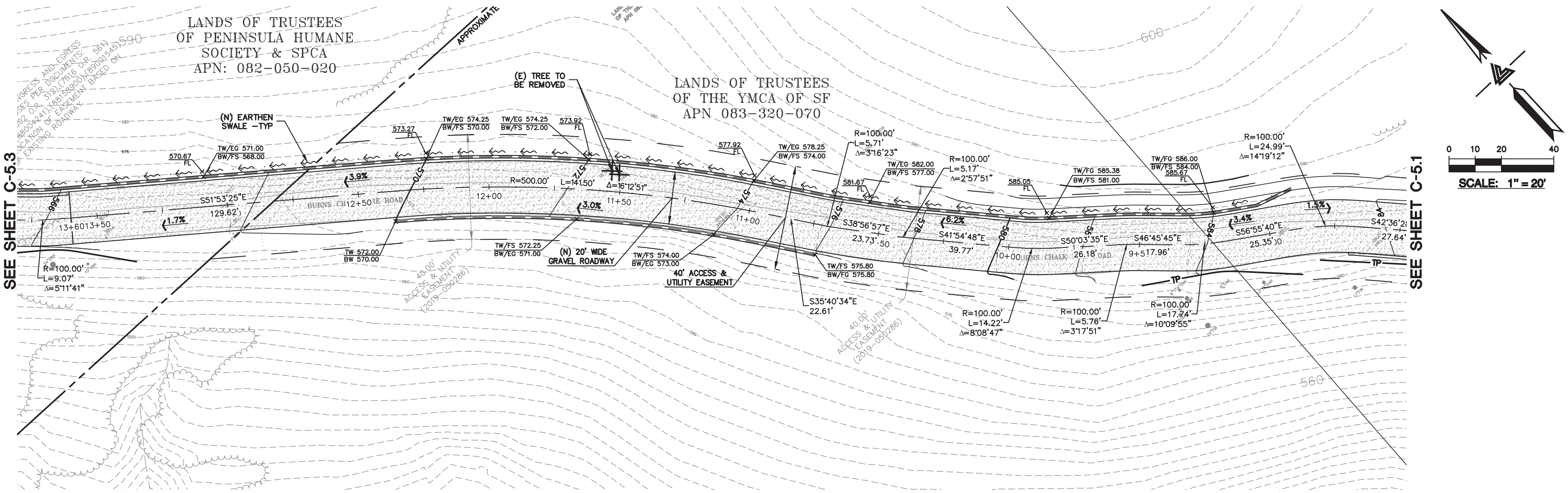
-		-
2	USE PERMIT RESUBMITTAL 08/01/22	TB
1	USE PERMIT RESUBMITTAL 01/12/22	TB
	REVISIONS	BY

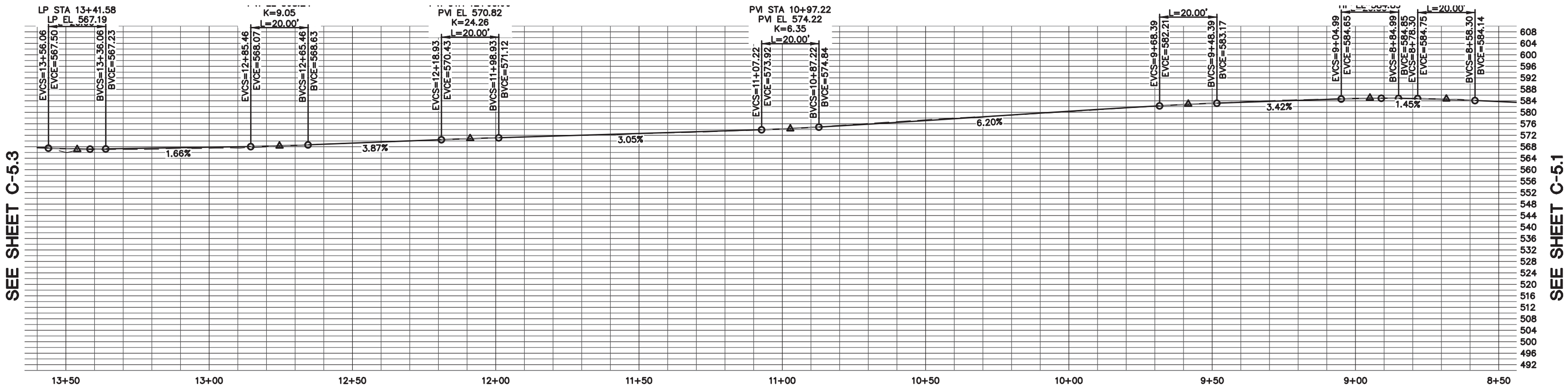
JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 20'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:

C-5.1

41 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





MAIN ROADWAY

SCALE: 1" = 20' HORIZ & VERT

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PLAN & PROFILE
STA: 8+50 TO 13+50

-		-
2	USE PERMIT RESUBMITTAL 08/01/22	TB
1	USE PERMIT RESUBMITTAL 01/12/22	TB
	REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 20'
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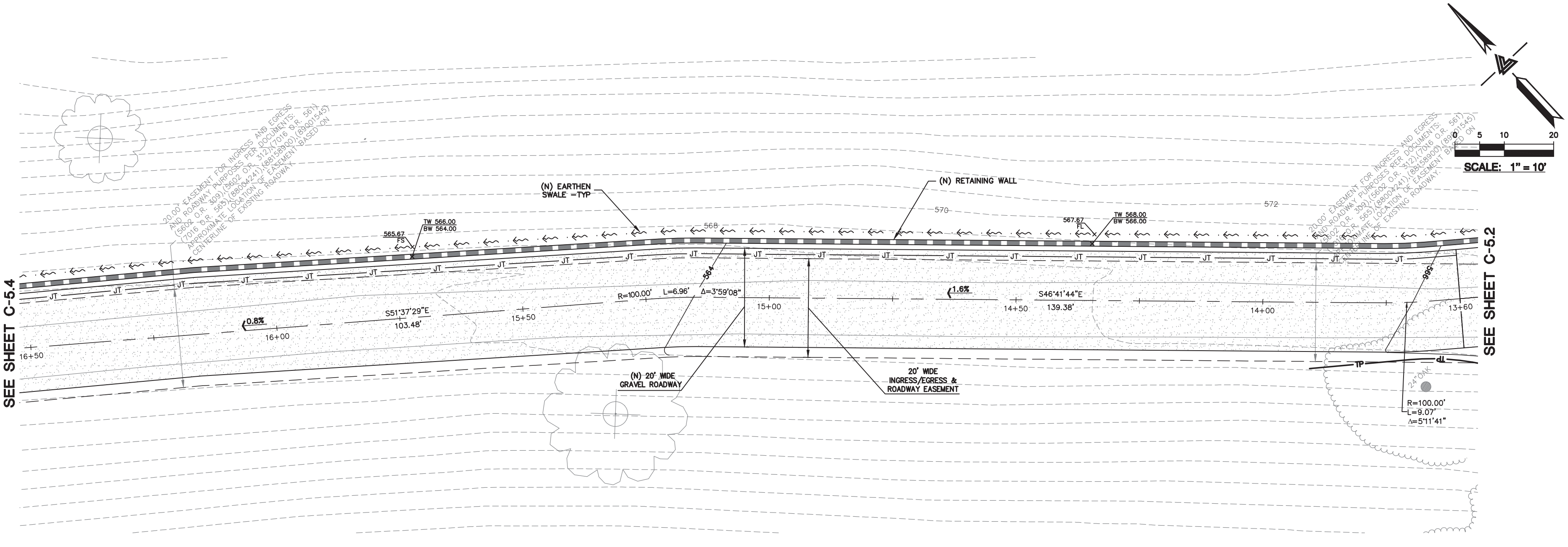
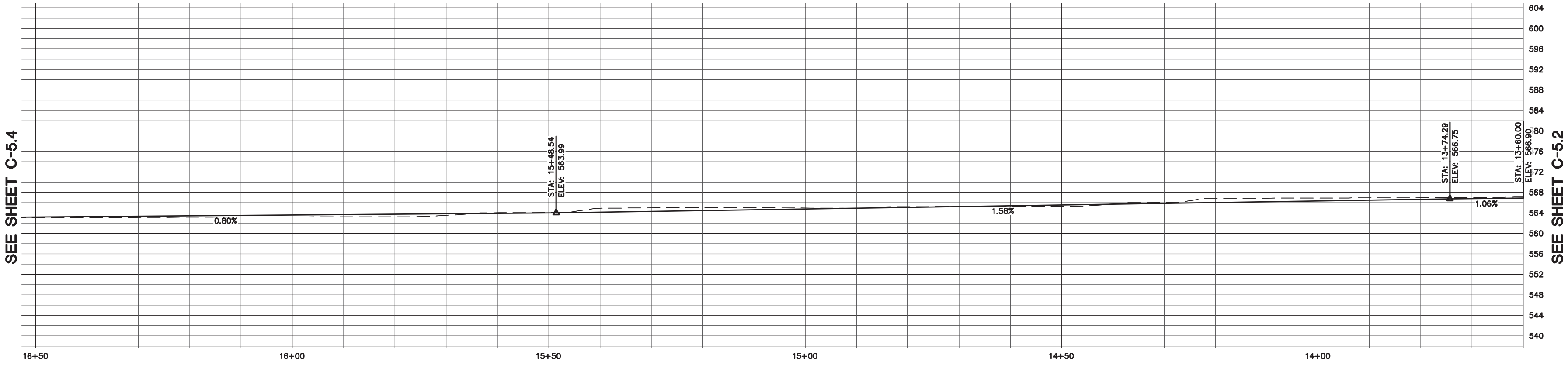
CHECKED BY: CA
SHEET NO:
C-5.2
42 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





MAIN ROADWAY

SCALE: 1" = 10' HORIZ & VERT

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* BUILDING PAD NOTE:
ADJUST PAD LEVEL AS REQUIRED. REFER TO STRUCTURAL PLANS FOR SLAB SECTION OR CRAWL SPACE DEPTH TO ESTABLISH PAD LEVEL.

REGISTERED PROFESSIONAL ENGINEER
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STATE OF CALIFORNIA
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PLAN & PROFILE
STA: 13+60 TO 16+50

REVISIONS	BY
-	-
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
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CHECKED BY: CA
SHEET NO:
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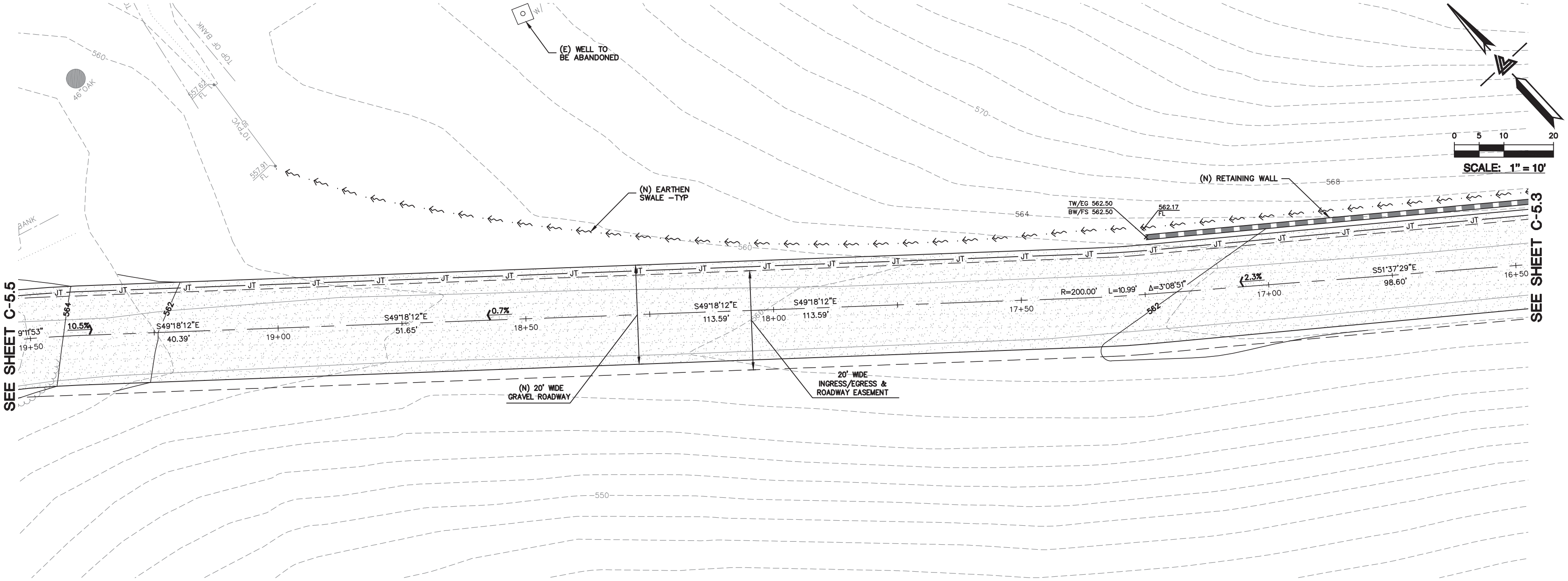
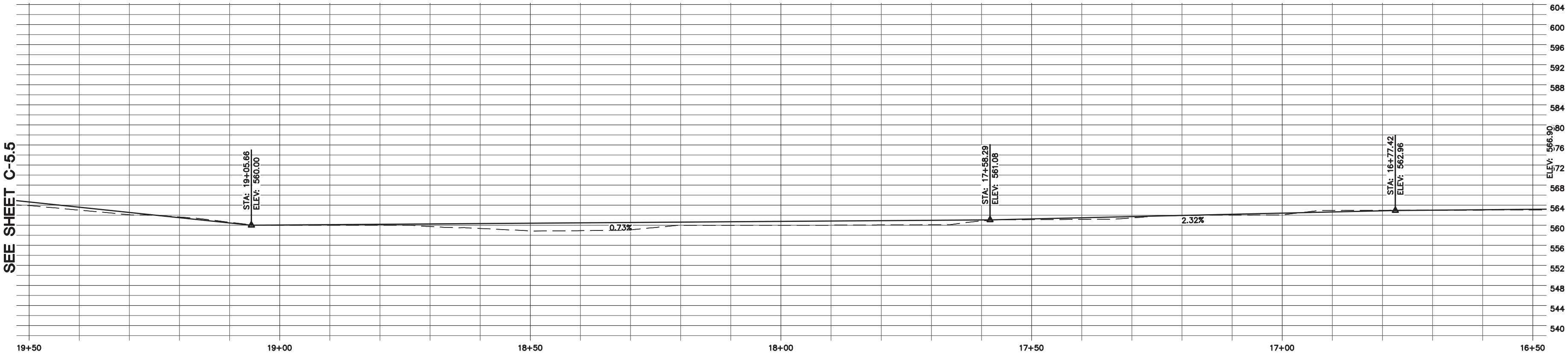
43 OF 54 SHEETS





MAIN ROADWAY

SCALE: 1" = 10' HORIZ & VERT

NOTE:
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*** BUILDING PAD NOTE:**
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PLAN & PROFILE
STA: 16+50 TO 19+50

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2	USE PERMIT RESUBMITTAL 08/01/22	TB
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JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
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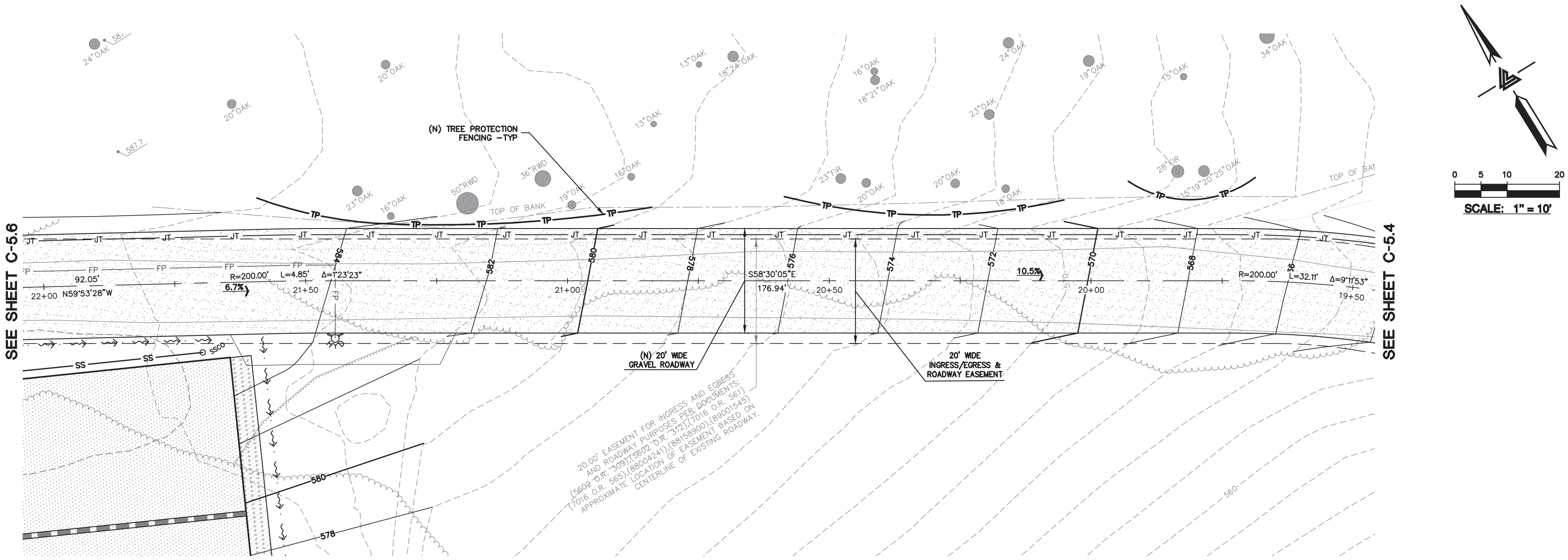
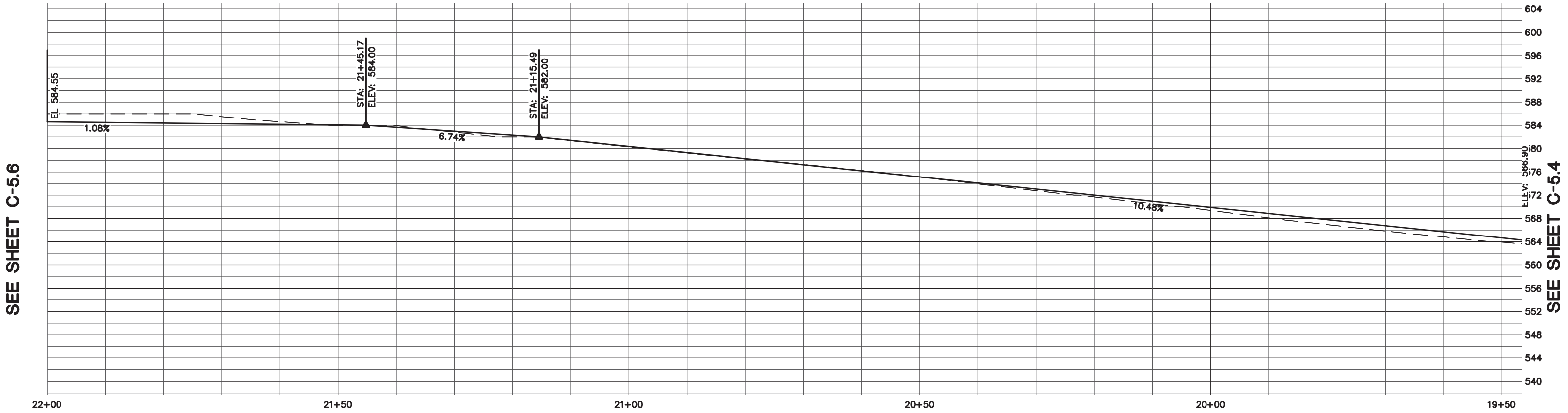
44 OF 54 SHEETS





MAIN ROADWAY

SCALE: 1" = 10' HORIZ & VERT

NOTE:
FOR CONSTRUCTION STAKING SCHEDULING OR QUOTATIONS PLEASE CONTACT ALEX ABAYA AT LEA & BRAZE ENGINEERING (510)887-4086 EXT 116.
aabaya@leabraze.com

REGISTERED PROFESSIONAL ENGINEER
PETER CARLINO
No. C79555
CIVIL
STATE OF CALIFORNIA
ORIGINAL SIGNATURES IN BLUE INK

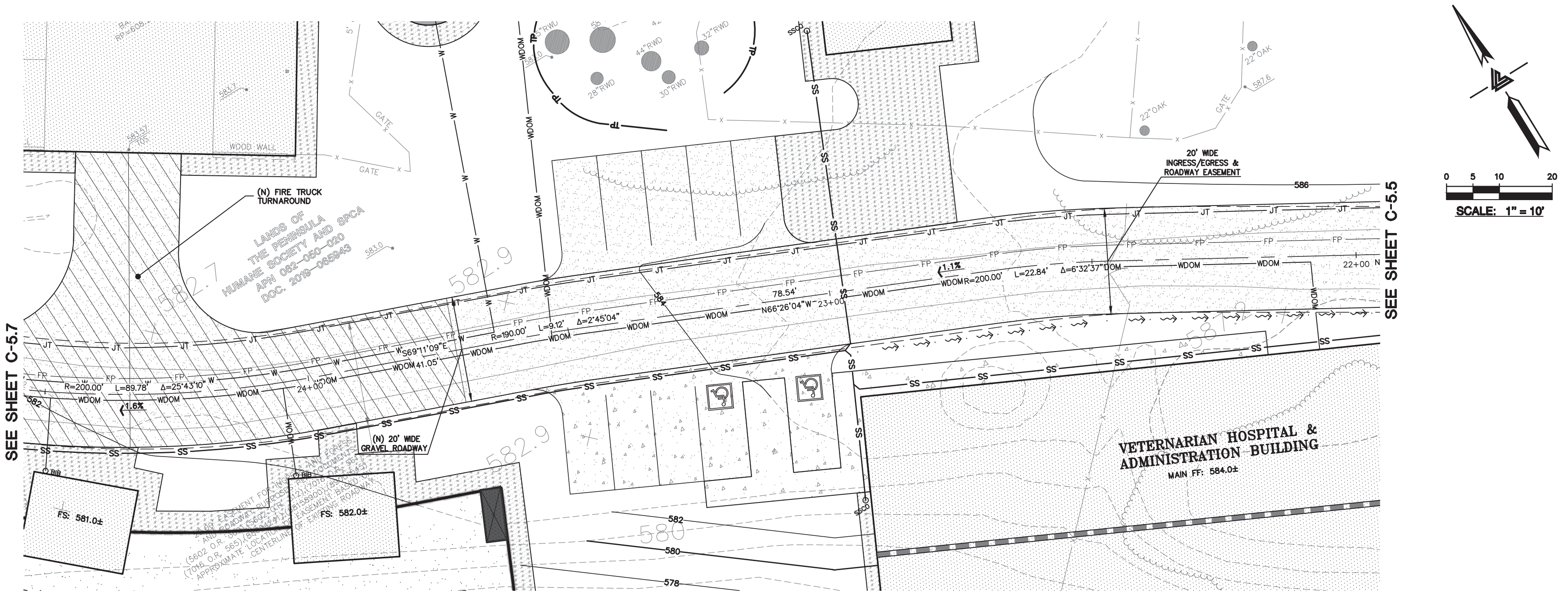
LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS • LAND SURVEYORS
MAIN OFFICE:
2495 INDUSTRIAL PKWY WEST
HAYWARD, CALIFORNIA 94545
(510) 887-4086
REGIONAL OFFICES:
ROSEVILLE
DUBLIN
SAN JOSE (COMING SOON)
WWW.LEABRAZE.COM

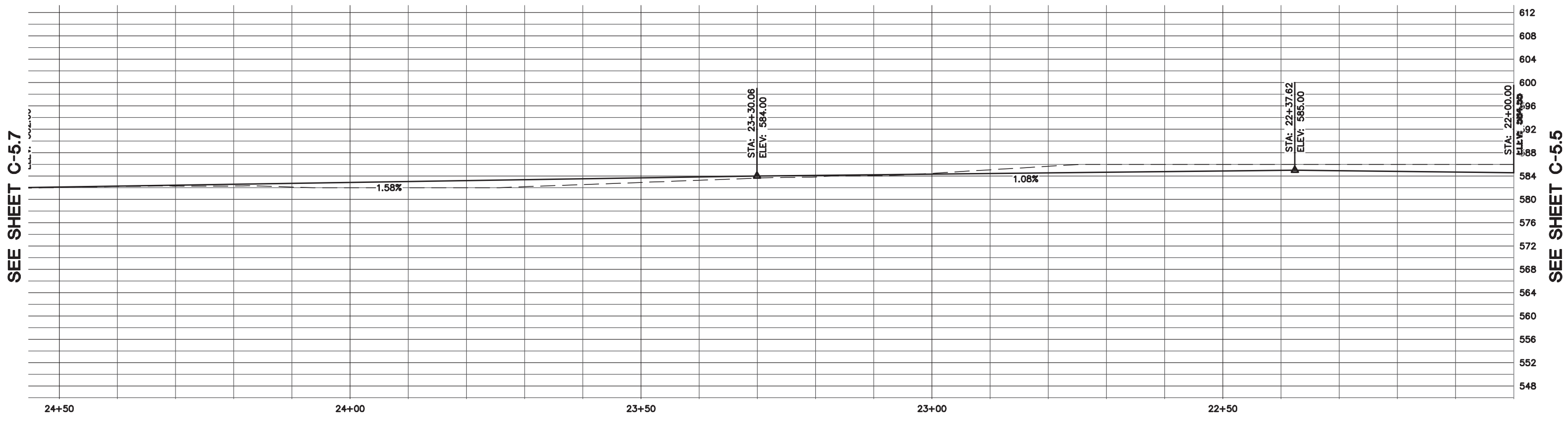
PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA
SAN MATEO COUNTY
APN: 082-050-010
082-050-020

PLAN & PROFILE
STA: 19+50 TO 22+00

REVISIONS	BY
–	–
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-5.5
45 OF 54 SHEETS





MAIN ROADWAY

SCALE: 1" = 10' HORIZ & VERT

NOTE:
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aabaya@leabraze.com

PETER CARLINO
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CIVIL
STATE OF CALIFORNIA
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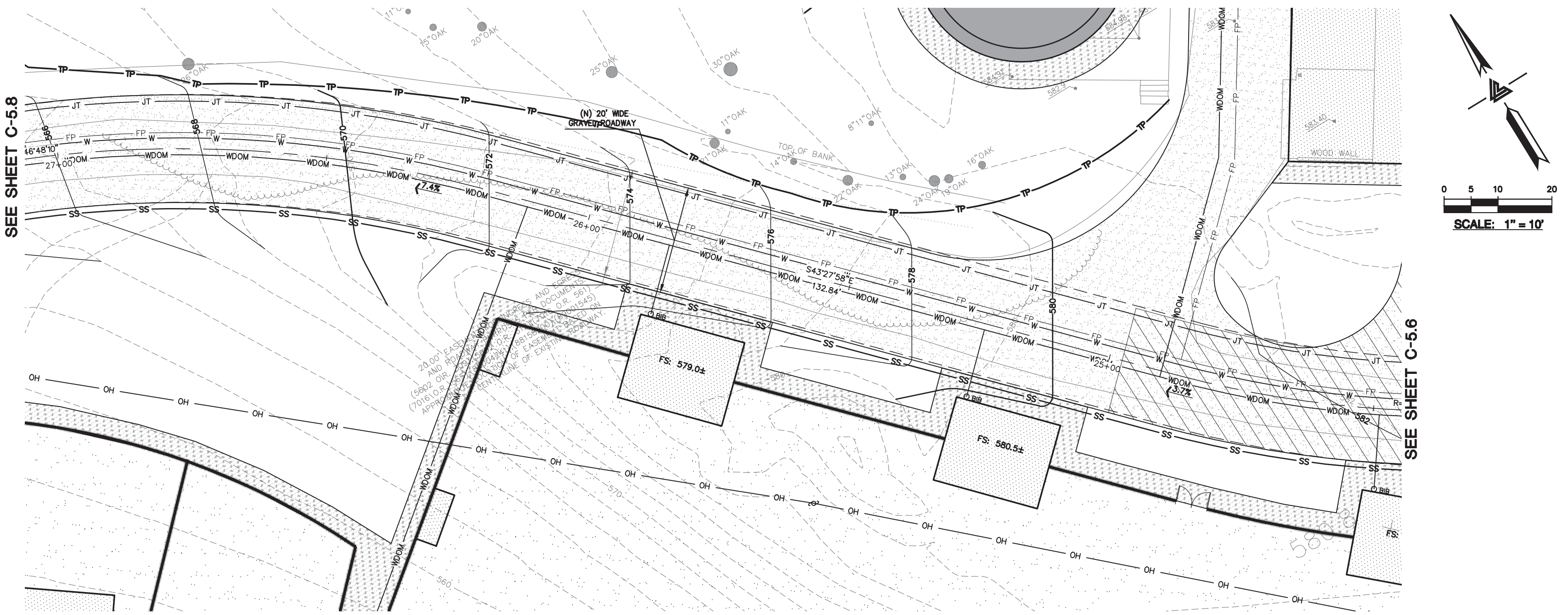
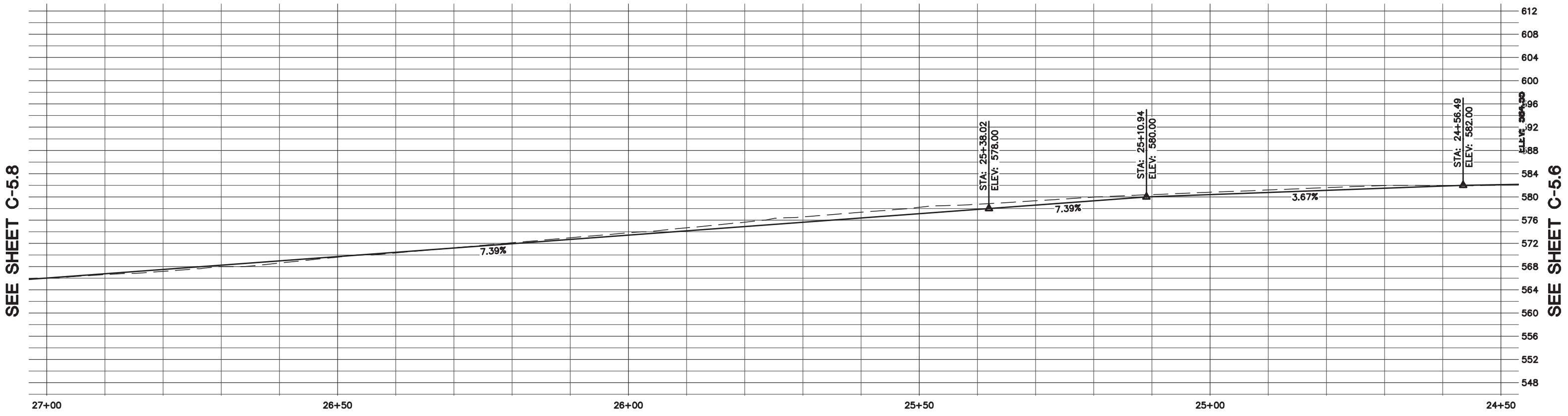
LOMA MAR, CALIFORNIA
SAN MATEO COUNTY
APN: 082-050-010
082-050-020

PLAN & PROFILE
STA: 22+00 TO 24+50

–	–
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB
REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-5.6
46 OF 54 SHEETS





MAIN ROADWAY

SCALE: 1" = 10' HORIZ & VERT

NOTE:
FOR CONSTRUCTION STAKING SCHEDULING OR QUOTATIONS PLEASE CONTACT ALEX ABAYA AT LEA & BRAZE ENGINEERING (510)887-4086 EXT 116.
aabaya@leabraze.com

PETER CABALINO
No. C79555
CIVIL
STATE OF CALIFORNIA
ORIGINAL SIGNATURES IN BLUE INK

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS • LAND SURVEYORS
MAIN OFFICE:
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(510) 887-4086
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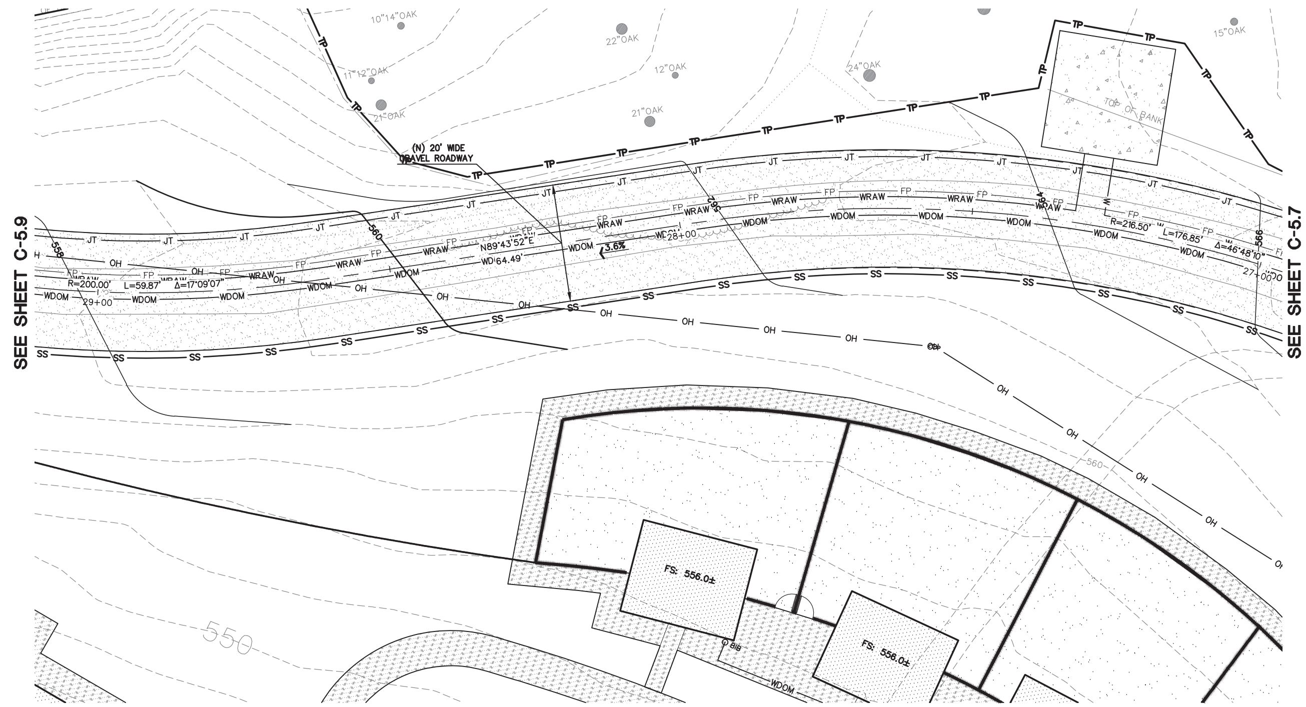
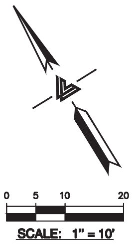
PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA
SAN MATEO COUNTY
APN: 082-050-010
082-050-020

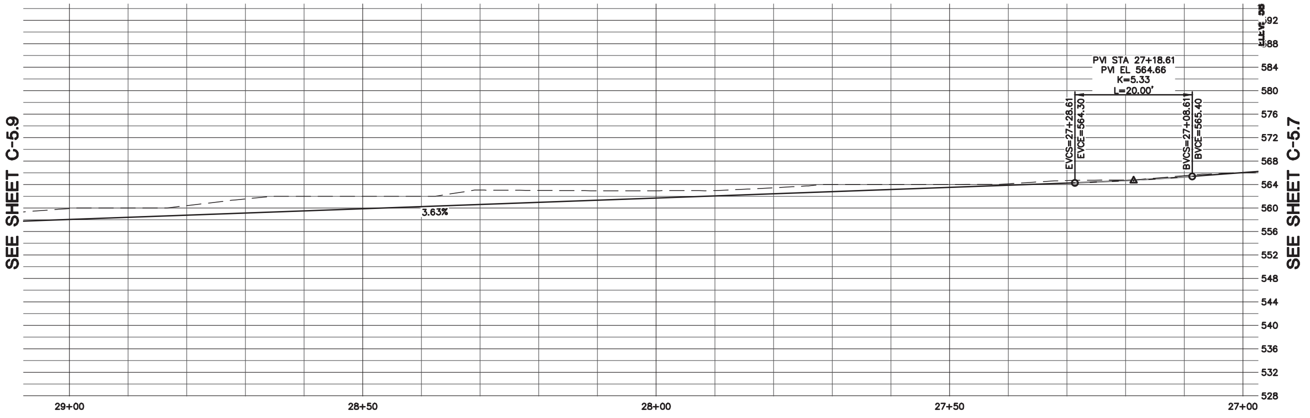
PLAN & PROFILE
STA: 24+50 TO 27+00

–	–
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB
REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-5.7
47 OF 54 SHEETS







MAIN ROADWAY

SCALE: 1" = 10' HORIZ & VERT

NOTE:
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PETER CARLINO
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CIVIL
ORIGINAL SIGNATURES IN BLUE INK

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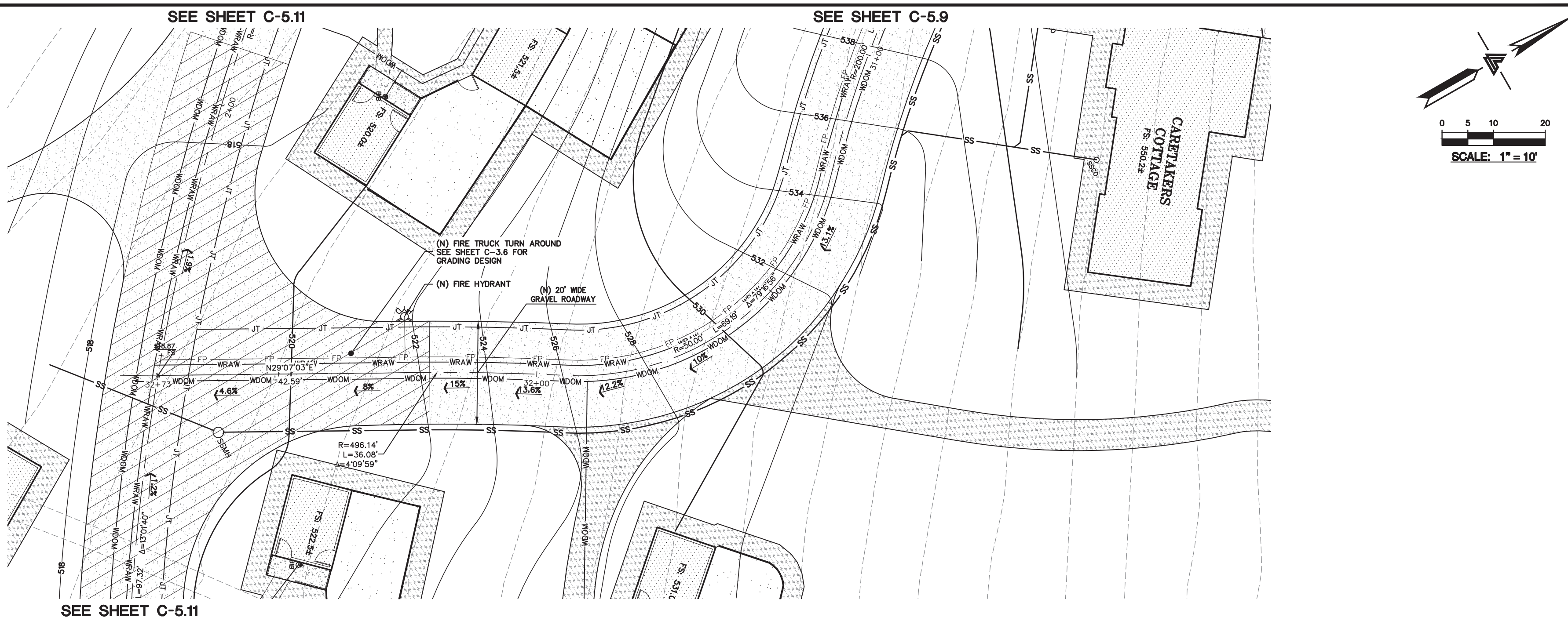
LOMA MAR, CALIFORNIA
SAN MATEO COUNTY
APN: 082-050-010
082-050-020

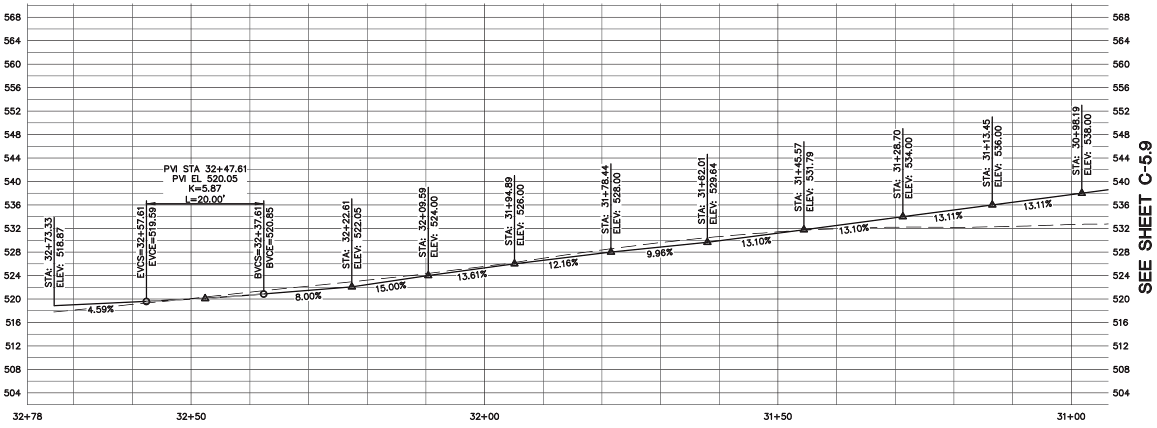
PLAN & PROFILE
STA: 27+00 TO 29+00

-	-
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB
REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-5.8
48 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





MAIN ROADWAY
SCALE: 1" = 10' HORIZ & VERT

NOTE:
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REGISTERED PROFESSIONAL ENGINEER
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CIVIL
STATE OF CALIFORNIA
ORIGINAL SIGNATURES IN BLUE INK

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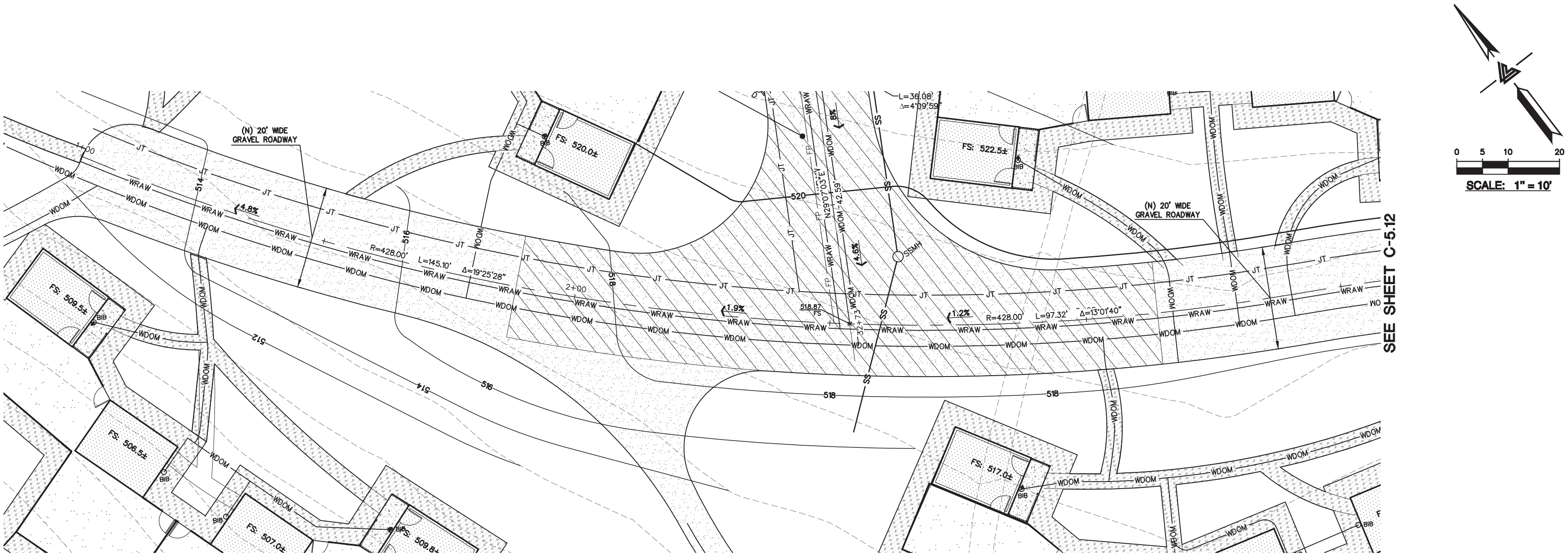
LOMA MAR, CALIFORNIA
SAN MATEO COUNTY
APN: 082-050-010
082-050-020

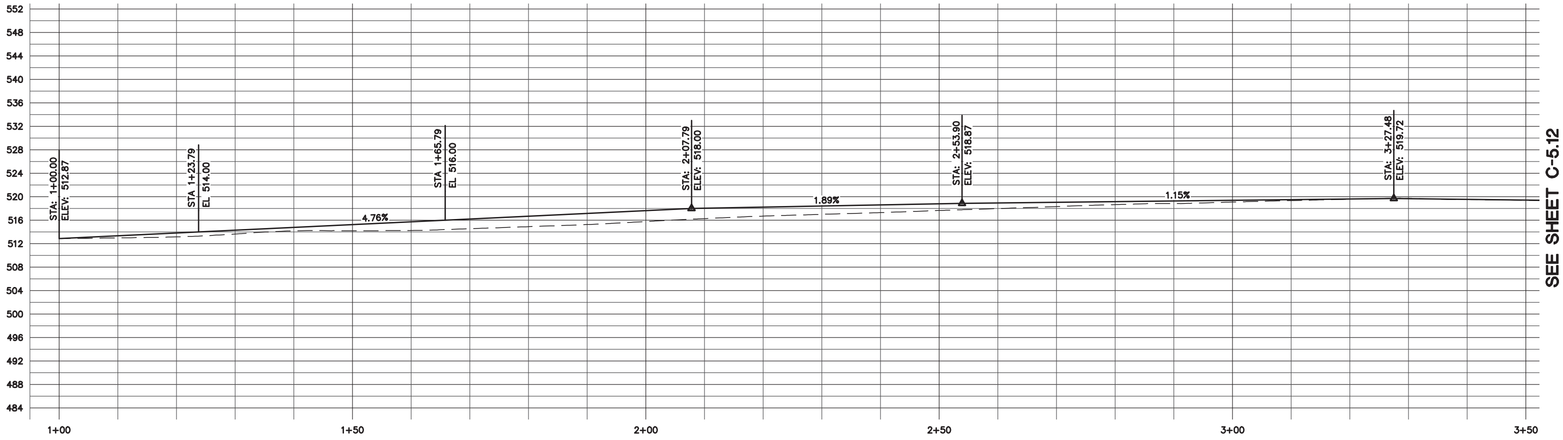
PLAN & PROFILE
STA: 31+00 TO 32+80

	–	–
2	USE PERMIT RESUBMITTAL 08/01/22	TB
1	USE PERMIT RESUBMITTAL 01/12/22	TB
	REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-5.10
49 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





ENCLOSURE ROADWAY

SCALE: 1" = 10' HORIZ & VERT

NOTE:
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No. C79555
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STATE OF CALIFORNIA
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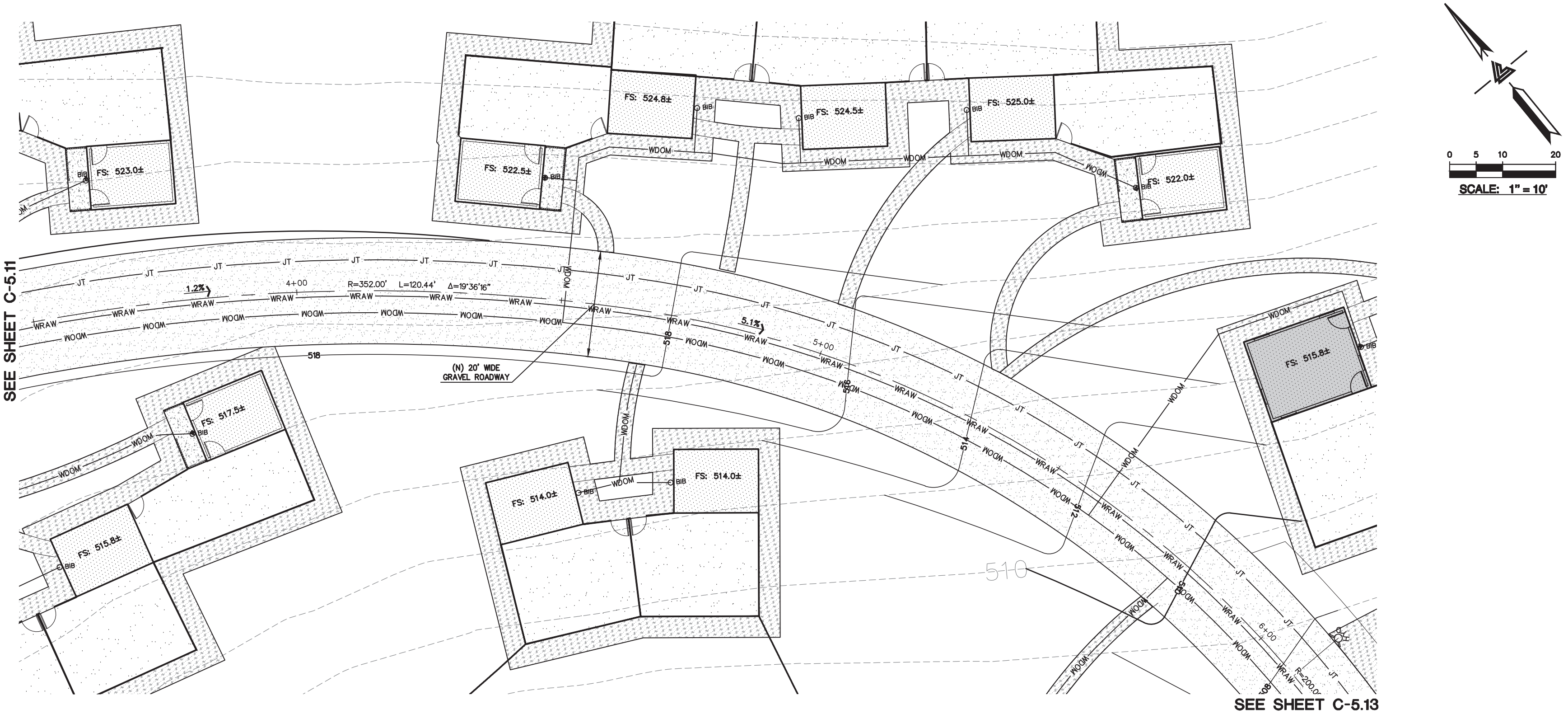
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA
SAN MATEO COUNTY
APN: 082-050-010
082-050-020

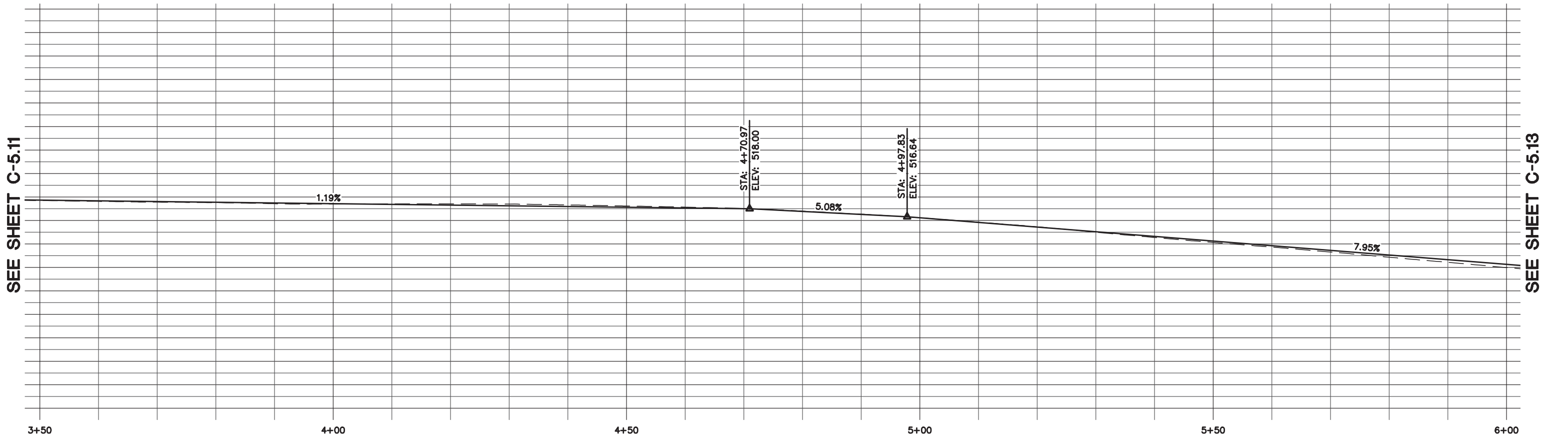
PLAN & PROFILE
STA: 1+00 TO 3+50

-	-
△2 USE PERMIT RESUBMITTAL 08/01/22	TB
△1 USE PERMIT RESUBMITTAL 01/12/22	TB
REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-5.11
50 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL





ENCLOSURE ROADWAY

SCALE: 1" = 10' HORIZ & VERT

NOTE:
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PLEASE CONTACT ALEX ABAYA
AT LEA & BRAZE ENGINEERING
(510)887-4086 EXT 116.
aabaya@leabraze.com

REGISTERED PROFESSIONAL ENGINEER
PETER CARLINO
No. C79555
CIVIL
STATE OF CALIFORNIA
ORIGINAL SIGNATURES IN BLUE INK

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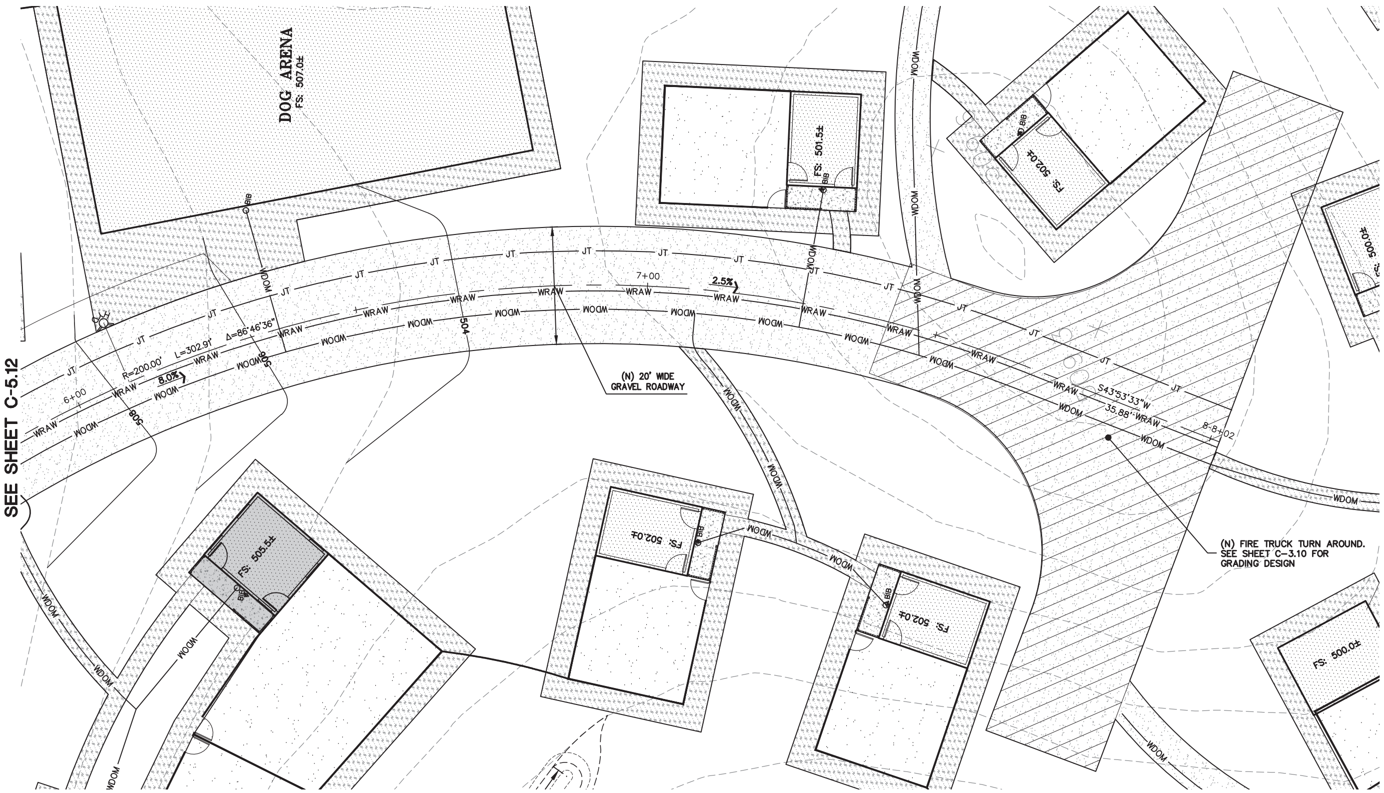
PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA
SAN MATEO COUNTY
APN: 082-050-010
082-050-020

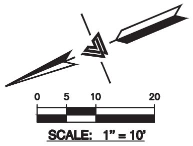
PLAN & PROFILE
STA: 3+50 TO 6+00

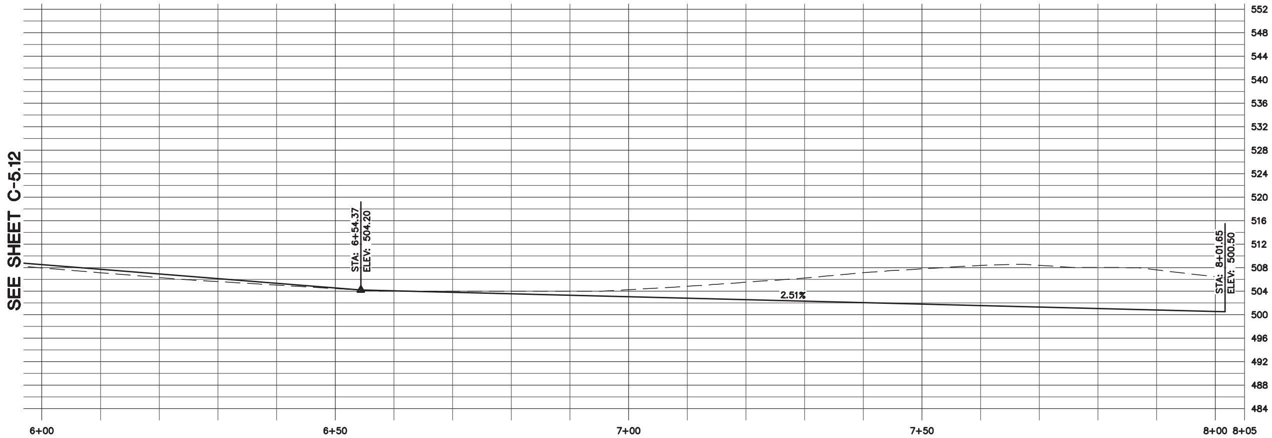
-		-
2	USE PERMIT RESUBMITTAL 08/01/22	TB
1	USE PERMIT RESUBMITTAL 01/12/22	TB
	REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-5.12
51 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL







ENCLOSURE ROADWAY

SCALE: 1" = 10' HORIZ & VERT

NOTE:
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aabaya@leabraze.com

REGISTERED PROFESSIONAL ENGINEER
PETER CARLINO
No. C79555
CIVIL
STATE OF CALIFORNIA
ORIGINAL SIGNATURES IN BLUE INK

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS • LAND SURVEYORS
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ANIMAL SANCTUARY
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA

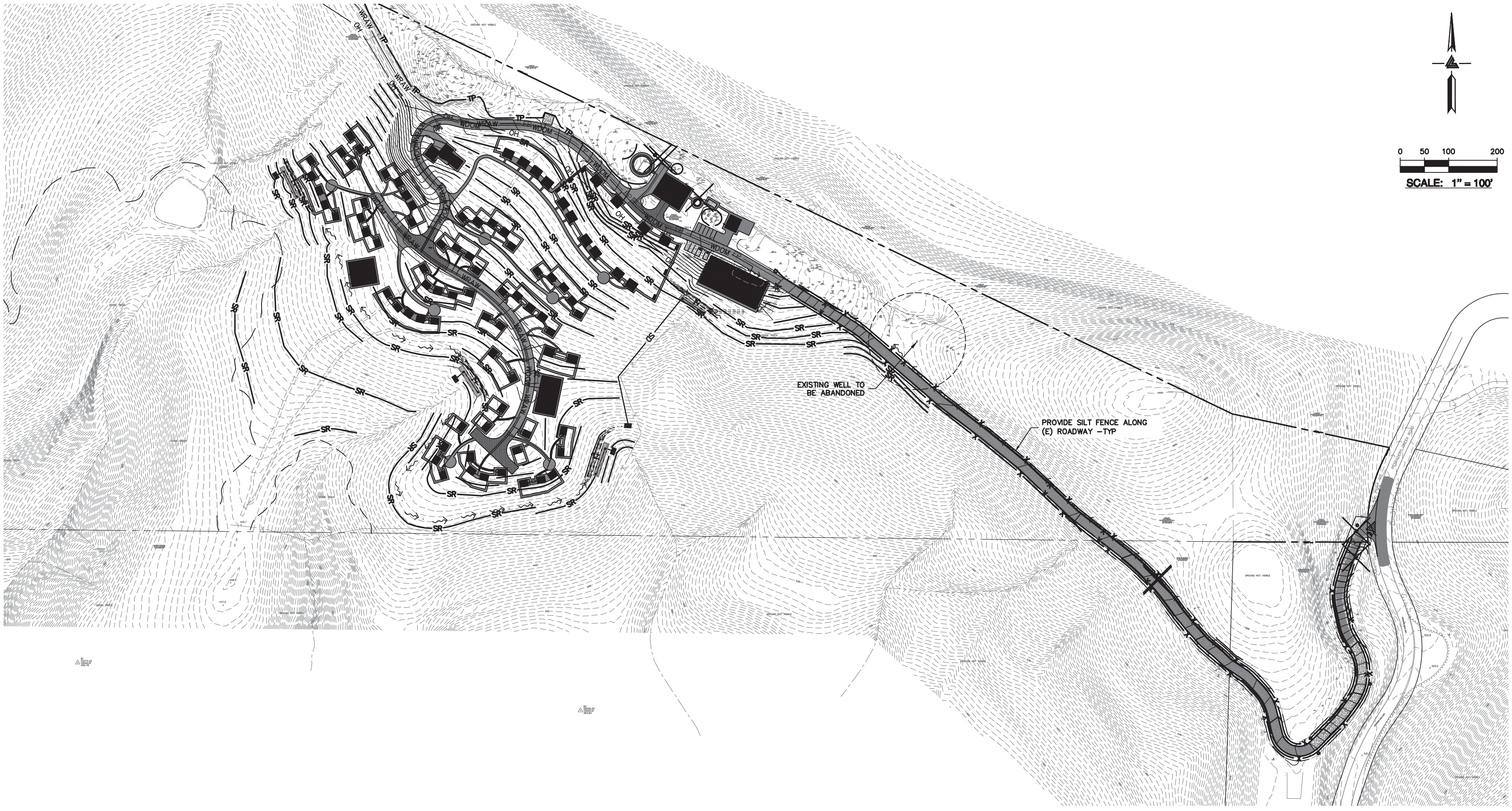
APN: 082-050-010
082-050-020

SAN MATEO COUNTY

PLAN & PROFILE
STA: 6+00 TO 8+00

-	-
△2 USE PERMIT RESUBMITTAL 08/01/22	TB
△1 USE PERMIT RESUBMITTAL 01/12/22	TB
REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 10'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-5.13
52 OF 54 SHEETS



EROSION CONTROL LEGEND

▨	GRAVEL BAG
☒	INLET PROTECTION
——SR——SR——	STRAW ROLL
——X——X——	SILT FENCE
▩	CONCRETE WASHOUT
▨	CONSTRUCTION ENTRANCE
○	TREE PROTECTION

NOTE:
SEAL ALL OTHER INLETS NOT INTENDED TO ACCEPT STORM WATER AND DIRECT FLOWS TEMPORARILY TO FUNCTIONAL SEDIMENTATION BASIN INLETS. –TYP

PETER CARLINO
No. C79555
CIVIL
ORIGINAL SIGNATURES IN BLUE INK

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS • LAND SURVEYORS

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LOMA MAR, CALIFORNIA

SAN MATEO COUNTY

APN: 082-050-010
082-050-020

EROSION CONTROL PLAN

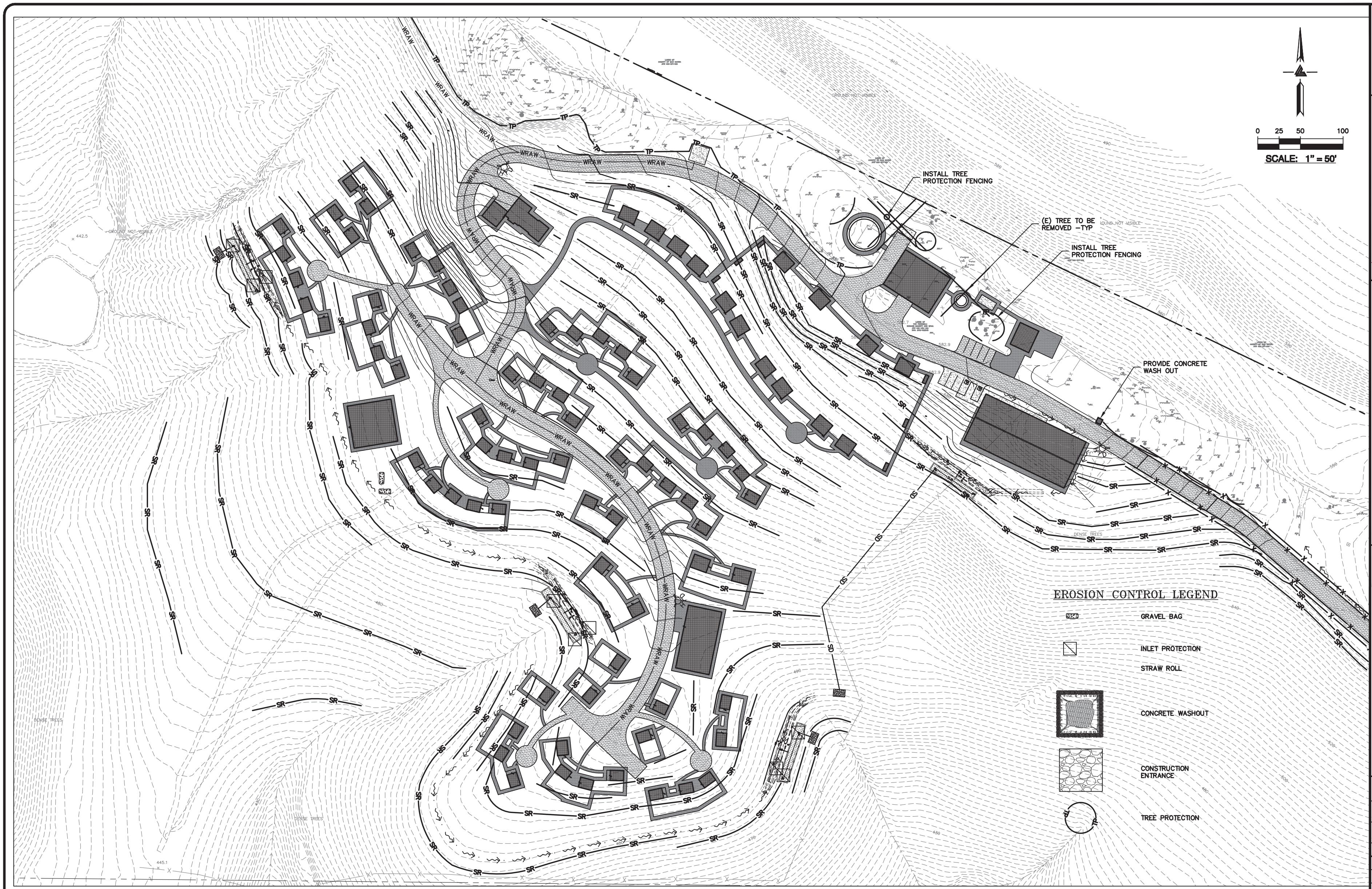
–	–
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB
REVISIONS	BY

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 100'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:

ER-1

53 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL



NOTE:
SEAL ALL OTHER INLETS NOT INTENDED TO ACCEPT STORM WATER AND DIRECT FLOWS TEMPORARILY TO FUNCTIONAL SEDIMENTATION BASIN INLETS. –TYP

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL

PETER CARLINO
No. C79555
CIVIL
ORIGINAL SIGNATURES IN BLUE INK

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CIVIL ENGINEERS • LAND SURVEYORS

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REGIONAL OFFICES:
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ANIMAL SANCTUARY
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA

SAN MATEO COUNTY

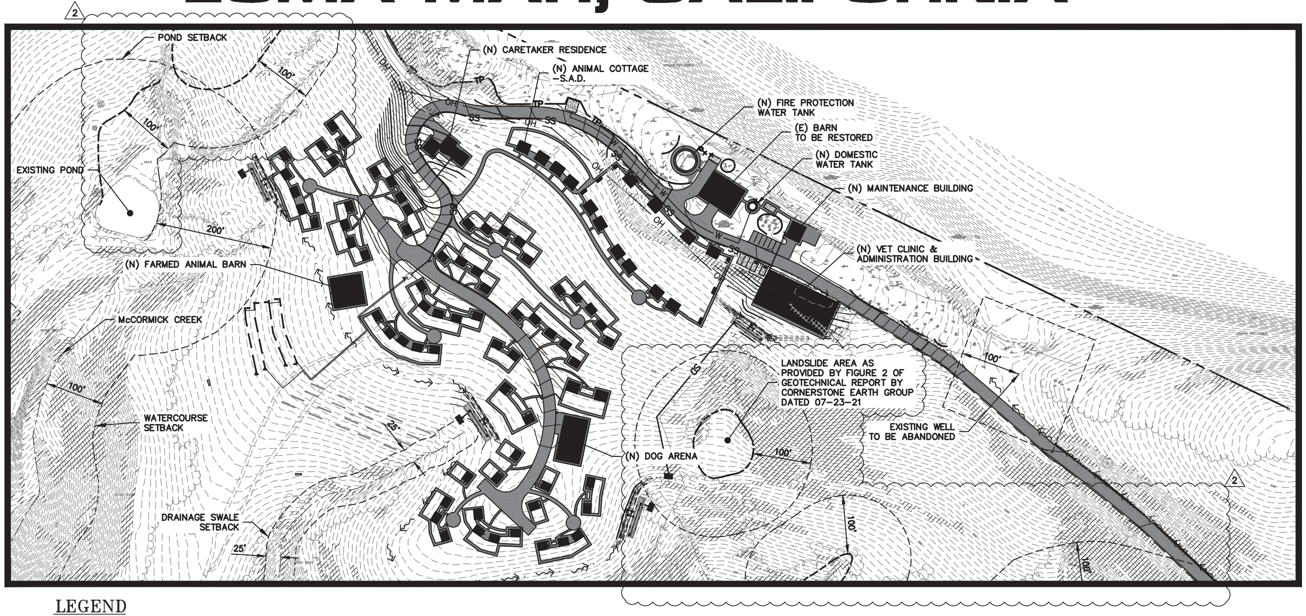
APN: 082-050-010
082-050-020

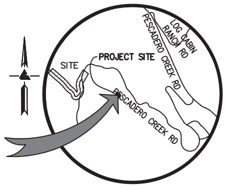
EROSION CONTROL PLAN
(AREA OF DETAIL)

REVISIONS	BY
–	–
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 50'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
ER-2
54 OF 54 SHEETS

SEPTIC CONSTRUCTION PLAN
HASKIN HILL SANCTUARY
12429 PESCADERO CREEK ROAD
LOMA MAR, CALIFORNIA





0 50 100 200
SCALE: 1" = 100'

VICINITY MAP
NTS

OWNER'S INFORMATION

OWNER: PENINSULA HUMANE SOCIETY & SPCA
1450 ROLLINS ROAD
BURLNGAME, CA 94010

APN: 082-050-010
082-050-020

THIS SEPTIC CONTRUCTION PLAN IS SUPPLEMENTAL TO:
1) TOPOGRAPHIC SURVEY BY LEA & BRAZE ENGINEERING, INC., ENTITLED:
"TOPOGRAPHIC SURVEY"
LA HONDA, CA
DATED: 09-09-19
JOB#: 2181427

2) CIVIL PLANS BY LEA & BRAZE ENGINEERING, INC., ENTITLED:
"HASKIN HILL SANCTUARY"
12429 PESCADERO CREEK ROAD
LA HONDA, CA
DATED: 11-05-20
JOB#: 2201144

THE CONTRACTOR SHALL REFER TO THE ABOVE NOTED SURVEY AND PLAN, AND SHALL VERIFY BOTH EXISTING AND PROPOSED ITEMS ACCORDING TO THEM.

LEACHFIELD SIZING NOTE

THE LEACH FIELD DESIGN INCLUDES CALCULATIONS WHICH CONSIDER A TWO (2) BEDROOM CARETAKER RESIDENCE, A VETERINARY CLINIC, AND AN ADMINISTRATION OFFICE WITH "A" AND "B" PERCOLATION RATES AS DENOTED ON THE PLANS.

BASED ON THE ABOVE ASSUMPTIONS, MINIMUM LEACHFIELD LENGTHS REQUIRED:

RESIDENTIAL WASTEWATER FLOW:

(1) CARETAKER RESIDENCE = 2 BEDROOMS = 50 L.F. (FOR AN "A" PERCOLATION RATING)
= 85 L.F. (FOR A "B" PERCOLATION RATING)

COMMERCIAL WASTEWATER FLOW:

DOG RUNS (WITHIN VET CLINIC) = 200 GPD (PROVIDED BY KSH ARCHITECTURE)

FOOD PREPARATION = 210 GPD (PROVIDED BY KSH ARCHITECTURE)

SHOWERING FACILITIES[1] = 11.6 GPD PER EMPLOYEE (ASSUME 1 EMPLOYEE)

LAUNDRY SERVICES = 175 GPD PER CYCLE (ASSUME 8 CYCLES)

MAINTENANCE BUILDING = 25 GPD (PROVIDED BY KSH ARCHITECTURE)

TOTAL COMMERCIAL WASTEWATER FLOW = 200 + 210 + 11.6 + (175*8) + 25 = 1,847 GPD

[1] SHOWERING FACILITIES SIZED AS A SHOWER PER THE EPA ONSITE WASTEWATER TREATMENT SYSTEMS MANUAL TABLE 3-3 (RESIDENTIAL WATER USE BY FIXTURE OR APPLIANCE)

2

WASTE COLLECTION NOTE:
SEPTIC SYSTEM TO COLLECT WASTE ONLY FROM RESIDENTIAL/COMMERCIAL SPACES AS NOTED IN THE LEACHFIELD SIZING NOTES ON SHEET SS-1. ALL OTHER WASTE GENERATED FROM ANIMAL ENCLOSURES, BARNS, COTTAGES, OUTDOOR AREAS, ETC. TO BE COLLECTED AND DISPOSED OF THROUGH OTHER MEANS AND METHODS.

LEGEND

PROPOSED	DESCRIPTION
——— – – ———	BOUNDARY
▬ ▬ ▬ ▬	PRIMARY LEACH LINE
▬ · ▬ · ▬	EXPANSION LEACH LINE
▬ ▬ ▬ ▬	EXISTING LEACH LINE
××××××××	EXISTING LEACH LINE TO BE REMOVED
═══════	RETAINING WALL
═══════	LANDSCAPE RETAINING WALL
——TL——	TIGHTLINE
—— E ——	EFFLUENT LINE
—— —— ——	SET BACK LINE
—— W ——	WATER LINE
—— X ——	FENCE LINE
—— P ——	PRESSURE LINE
—— JT ——	JOINT TRENCH
——SUB——	SUBDRAIN LINE
— — — — —	GRADING LIMIT LINE
○ DIV	DIVERSION VALVE
○ DS	DOWNSPOUT
○ SSCO	SANITARY SEWER CLEANOUT
● AD	AREA DRAIN
× 222.57 INV	SPOT ELEVATION
200	CONTOURS
◎	PERCOLATION TESTING LOCATION

HATCH LEGEND

▨	AREAS OF SLOPE GREATER THAN 35%
▩	AREAS OF SLOPE GREATER THAN 50%

ABBREVIATIONS

AD	AREA DRAIN
BFP	BACKFLOW PREVENTOR
CB	CATCH BASIN
℄	CENTER LINE
CO	CLEANOUT
DIV	DIVERSION VALVE
E	EFFLUENT
ELEV	ELEVATIONS
(E)	EXISTING
FL	FLOW LINE
INV	INVERT ELEVATION
JT	JOINT TRENCH
LNDG	LANDING
MAX	MAXIMUM
MIN	MINIMUM
(N)	NEW
NTS	NOT TO SCALE
O.C.	ON CENTER
⅊	PROPERTY LINE
RIM	RIM ELEVATION
SS	SANITARY SEWER
SSCO	SANITARY SEWER CLEANOUT
SSMH	SANITARY SEWER MANHOLE
STD	STANDARD
TW/FG	TOP OF WALL/FINISH GRADE
TYP	TYPICAL
W/	WITH
W, WL	WATER LINE

GENERAL INSTALLATION NOTES:

PERMITS:
CONSTRUCTION OF THE SEWAGE DISPOSAL SYSTEM SHALL NOT COMMENCE WITHOUT WRITTEN APPROVAL FROM TOWN OF WOODSIDE AND SAN MATEO COUNTY ENVIRONMENTAL HEALTH SERVICES.

PLAN CHANGES:
CHANGES TO THE PLANS OR SPECIFICATIONS SHALL BE MADE ONLY AFTER CONSULTATION WITH AND APPROVAL OF THE DESIGNER AND PERMITTING AGENCY.

INSTALLATION:
ALL INSTALLATION WORK SHALL BE IN ACCORDANCE WITH TOWN OF WOODSIDE AND SAN MATEO COUNTY SEWAGE DISPOSAL ORDINANCES.

LOCATION OF THE SEPTIC TANK AND LEACHING TRENCHES:
LOCATIONS SHOWN ON THE PLANS ARE SUBJECT TO ADJUSTMENT IN THE FIELD BY DESIGNER WITH APPROVAL OF THE PERMITTING AGENCY. TRENCHES SHALL BE INSTALLED ALONG LEVEL CONTOUR TO ENSURE THE TRENCH BOTTOM IS MAINTAINED LEVEL THROUGHOUT THE ENTIRE LENGTH. A TRIPOD-MOUNTED LASER SHALL BE REQUIRED ON SITE.

DRAINFIELDS (LEACHING TRENCH):
THE FOLLOWING SHALL APPLY TO DRAIN FIELD INSTALLATION:
- TEN FEET FROM ANY BUILDING FOUNDATION AND RETAINING WALL.
- TEN FEET FROM ANY PROPERTY LINE.
- TRENCHES SHALL BE OUTSIDE DRIP LINE OF EXISTING TREES UNLESS APPROVED BY PERMITTING AUTHORITY UPON RECOMMENDATION OF LICENSED ARBORIST.
- 100' FROM ANY WELL.
- TWENTY-FIVE FEET (25') FROM ANY SLOPE EXCEEDING 50% AND LESS THAN TWELVE FEET (12') IN HEIGHT.
- FIFTY FEET (50') FROM ANY SLOPE EXCEEDING 50% AND GREATER THAN TWELVE FEET (12') IN HEIGHT.
- ALL LINES ARE SHOWN AT LEAST EIGHT (8) TIMES THE DIAMETER AWAY OF ALL MAJOR TREES.

SEPTIC TANK AND DRAINFIELD CONSTRUCTION NOTES:

1. INSTALL A 3000-GALLON CONCRETE PRECAST SEPTIC TANK.
2. INSTALL GAS-TIGHT RISER TO GRADE.
3. INSTALL A LANGLEY HILL QUARRY DIVERSION VALVE.
4. INSTALL A DUAL LEACHING SYSTEM SEPARATED BY A DIVERSION VALVE.
5. INSTALL AN INSPECTION RISER AT THE END OF EACH TRENCH IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. THE INSPECTION RISER MAY BE CUT BELOW GRADE AND INSTALLED WITHIN A WATERTIGHT LANDSCAPE IRRIGATION ENCLOSURE.

STAKING NOTES:

LEA & BRAZE SHALL STAKE OUT PROPOSED SEPTIC SYSTEM FOR VERIFICATION BY SAN MATEO COUNTY ENVIRONMENTAL HEALTH PRIOR TO SITE INSPECTION

SHEET INDEX

TRENCHING NOTE:
ALL TRENCHING FOR THE PROPOSED LEACHFIELDS WITHIN THE DRIPLINES OF ANY SIGNIFICANT TREE WILL BE DONE BY HAND UNDER THE SUPERVISION OF THE PROJECT ARBORIST

NOTE:
FOR CONSTRUCTION STAKING SCHEDULING OR QUOTATIONS PLEASE CONTACT ALEX ABAYA AT LEA & BRAZE ENGINEERING (510)887-4086 EXT 116.
aabaya@leabraze.com

1-800-227-2600 CALL BEFORE YOU DIG
USA
UNDERGROUND SERVICE ALERT

PETER CARLINO
No. C79555
CIVIL

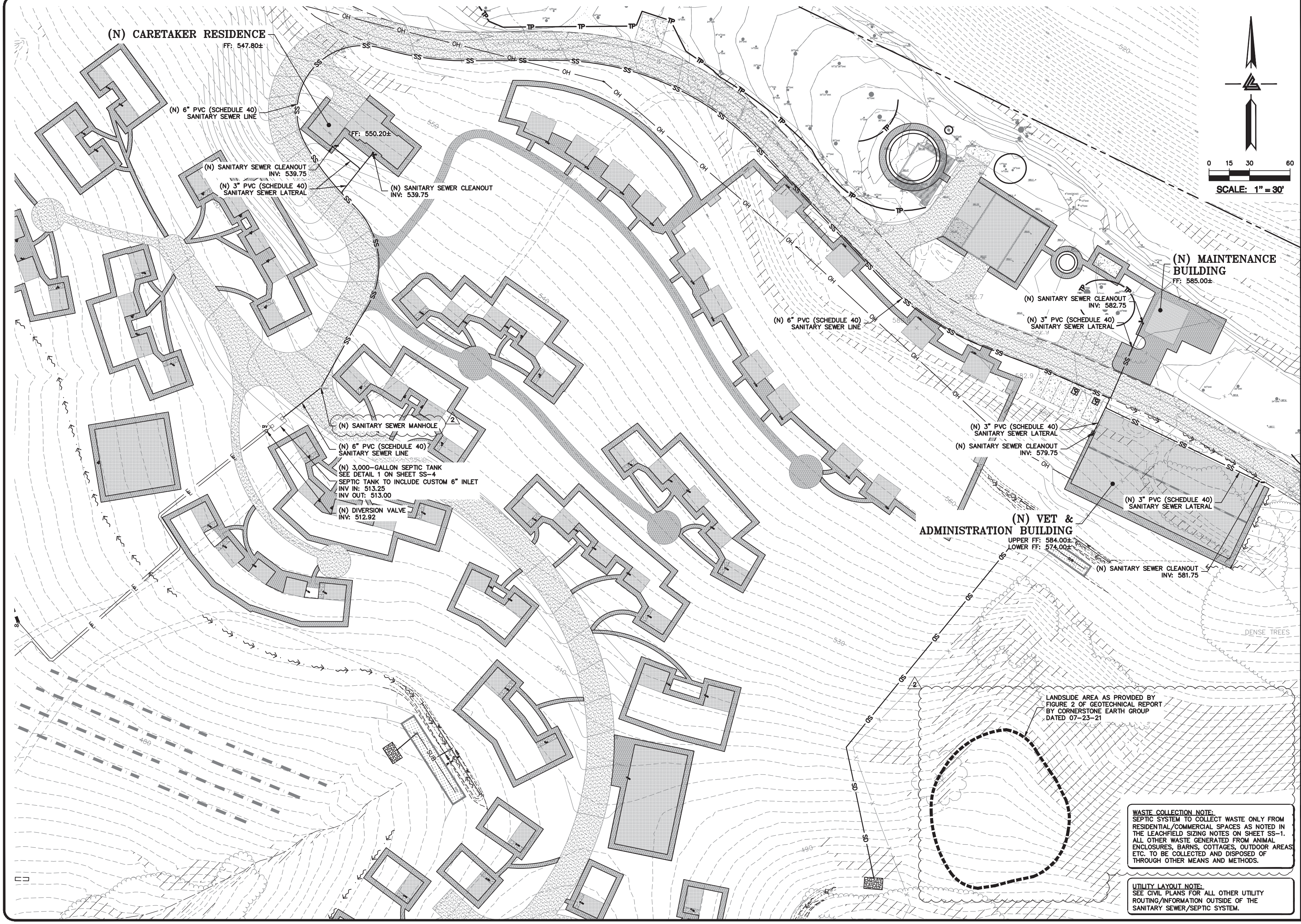
LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS • LAND SURVEYORS
MAIN OFFICE:
2495 INDUSTRIAL PKWY WEST
HAYWARD, CALIFORNIA 94545
(510) 887-4086
REGIONAL OFFICES:
ROSEVILLE
DUBLIN
SAN JOSE (COMING SOON)
WWW.LEABRAZE.COM

HASKIN HILL SANCTUARY
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA
APN: 082-050-010
082-050-020
SAN MATEO COUNTY

SEPTIC CONSTRUCTION PLAN

REVISIONS	BY
–	–
–	–
2 USE PERMIT RESUBMITTAL 08/01/22	RM
1 USE PERMIT RESUBMITTAL 01/12/22	RM

JOB NO: 2201144
DATE: 06-18-21
SCALE: 1"=100'
DESIGN BY: RM
CHECKED BY: JH
SHEET NO:
SS-1
1 OF 4 SHEETS



WASTE COLLECTION NOTE:
SEPTIC SYSTEM TO COLLECT WASTE ONLY FROM RESIDENTIAL/COMMERCIAL SPACES AS NOTED IN THE LEACHFIELD SIZING NOTES ON SHEET SS–1. ALL OTHER WASTE GENERATED FROM ANIMAL ENCLOSURES, BARNS, COTTAGES, OUTDOOR AREAS ETC. TO BE COLLECTED AND DISPOSED OF THROUGH OTHER MEANS AND METHODS.

UTILITY LAYOUT NOTE:
SEE CIVIL PLANS FOR ALL OTHER UTILITY ROUTING/INFORMATION OUTSIDE OF THE SANITARY SEWER/SEPTIC SYSTEM.

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ORIGINAL SIGNATURES IN BLUE INK

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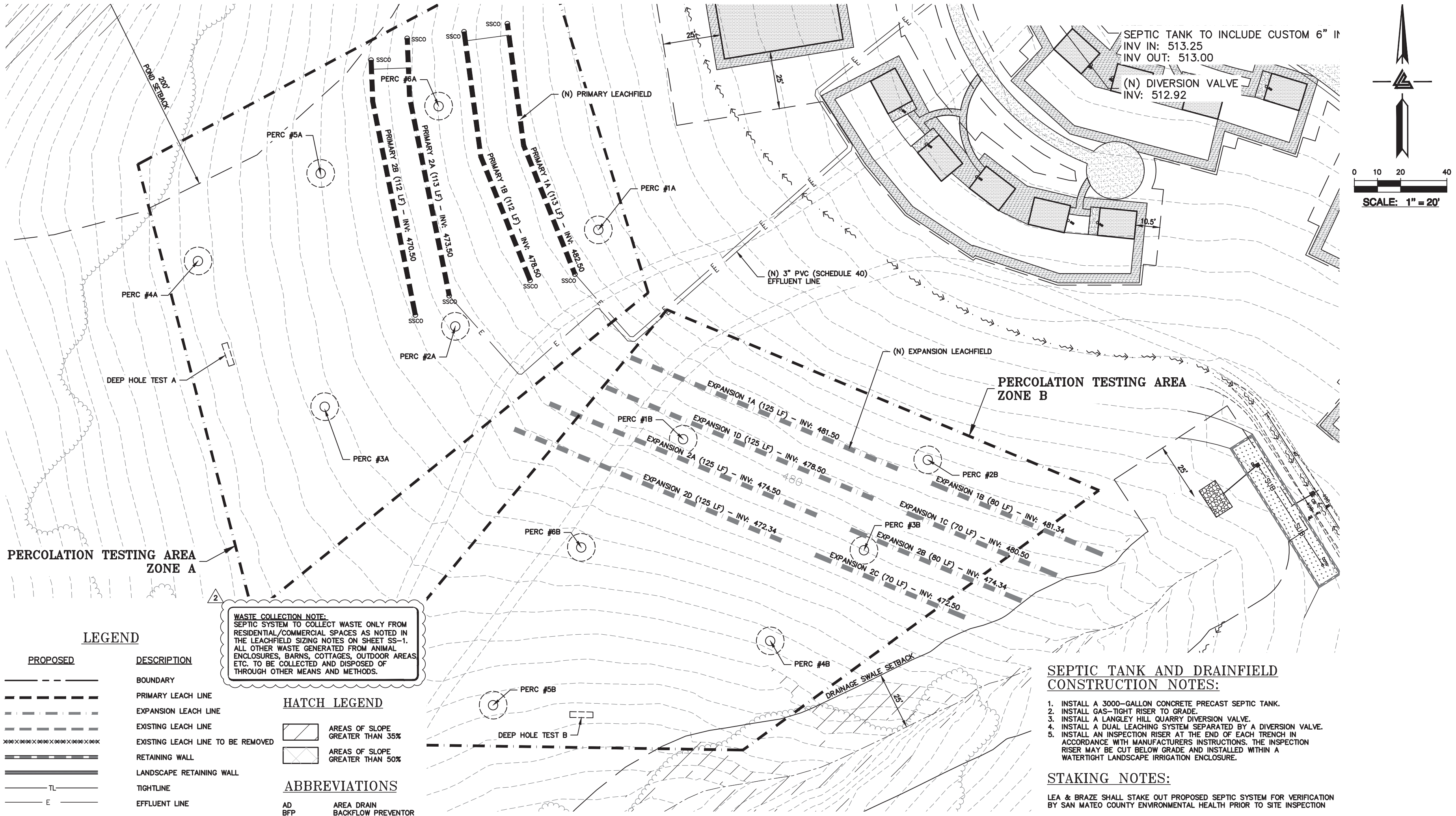
HASKIN HILL SANCTUARY
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA

SAN MATEO COUNTY
APN: 082–050–010
082–050–020

SEWER ROUTING PLAN

REVISIONS	BY
–	–
–	–
2 USE PERMIT RESUBMITTAL 08/01/22	RM
1 USE PERMIT RESUBMITTAL 01/12/22	RM

JOB NO: 2201144
DATE: 06–18–21
SCALE: 1"=30'
DESIGN BY: RM
CHECKED BY: JH
SHEET NO:
SS-2
2 OF 4 SHEETS



WASTE COLLECTION NOTE:
SEPTIC SYSTEM TO COLLECT WASTE ONLY FROM RESIDENTIAL/COMMERCIAL SPACES AS NOTED IN THE LEACHFIELD SIZING NOTES ON SHEET SS-1. ALL OTHER WASTE GENERATED FROM ANIMAL ENCLOSURES, BARNS, COTTAGES, OUTDOOR AREAS, ETC. TO BE COLLECTED AND DISPOSED OF THROUGH OTHER MEANS AND METHODS.

LEGEND

PROPOSED	DESCRIPTION
——— – – ———	BOUNDARY
▬ ▬ ▬ ▬	PRIMARY LEACH LINE
▬ · ▬ · ▬	EXPANSION LEACH LINE
▬ ▬ ▬ ▬	EXISTING LEACH LINE
××××××××××	EXISTING LEACH LINE TO BE REMOVED
▬▬▬▬	RETAINING WALL
▬▬▬▬	LANDSCAPE RETAINING WALL
—TL—	TIGHTLINE
— E —	EFFLUENT LINE
— — —	SET BACK LINE
—W—	WATER LINE
—X—	FENCE LINE
—P—	PRESSURE LINE
—JT—	JOINT TRENCH
—SUB—	SUBDRAIN LINE
— — — —	GRADING LIMIT LINE
○DIV	DIVERSION VALVE
○DS	DOWNSPOUT
○SSCO	SANITARY SEWER CLEANOUT
● AD	AREA DRAIN
× 222.57 INV	SPOT ELEVATION
200	CONTOURS
◎	PERCOLATION TESTING LOCATION

HATCH LEGEND

▨	AREAS OF SLOPE GREATER THAN 35%
▨	AREAS OF SLOPE GREATER THAN 50%

ABBREVIATIONS

AD	AREA DRAIN
BFP	BACKFLOW PREVENTOR
CB	CATCH BASIN
℄	CENTER LINE
CO	CLEANOUT
DIV	DIVERSION VALVE
E	EFFLUENT
ELEV	ELEVATIONS
(E)	EXISTING
FL	FLOW LINE
INV	INVERT ELEVATION
JT	JOINT TRENCH
LNDG	LANDING
MAX	MAXIMUM
MIN	MINIMUM
(N)	NEW
NTS	NOT TO SCALE
O.C.	ON CENTER
PL	PROPERTY LINE
RIM	RIM ELEVATION
SS	SANITARY SEWER
SSCO	SANITARY SEWER CLEANOUT
SSMH	SANITARY SEWER MANHOLE
STD	STANDARD
TW/FG	TOP OF WALL/FINISH GRADE
TYP	TYPICAL
W/	WITH
W, WL	WATER LINE

SEPTIC TANK AND DRAINFIELD CONSTRUCTION NOTES:

1. INSTALL A 3000-GALLON CONCRETE PRECAST SEPTIC TANK.
2. INSTALL GAS-TIGHT RISER TO GRADE.
3. INSTALL A LANGLEY HILL QUARRY DIVERSION VALVE.
4. INSTALL A DUAL LEACHING SYSTEM SEPARATED BY A DIVERSION VALVE.
5. INSTALL AN INSPECTION RISER AT THE END OF EACH TRENCH IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS. THE INSPECTION RISER MAY BE CUT BELOW GRADE AND INSTALLED WITHIN A WATERTIGHT LANDSCAPE IRRIGATION ENCLOSURE.

STAKING NOTES:

LEA & BRAZE SHALL STAKE OUT PROPOSED SEPTIC SYSTEM FOR VERIFICATION BY SAN MATEO COUNTY ENVIRONMENTAL HEALTH PRIOR TO SITE INSPECTION

ZONE A SIZING CALCULATIONS

PROVIDED 7.30 INCHES/HOUR (SEE PERCOLATION TESTING DATA DATED 11-10-20):
TRENCH LENGTH = Q/(R*A)
Q=FLOW RATE (GPD)
R=WASTEWATER APPLICATION RATE (GPD/SQFT)
A=TOTAL INFILTRATIVE AREA PER LINEAR FOOT (SQFT)

PER TABLE 3-2 OF SECTION 3 OF SAN MATEO COUNTY ENVIRONMENTAL HEALTH'S ONSITE SYSTEMS MANUAL
12 INCHES/HOUR --> R = 1.20
7.3 INCHES/HOUR (MEASURED IN FIELD) --> R = 0.88 (INTERPOLATED)
6 INCHES/HOUR --> R = 0.80

1,847/(0.88*12) = 174.91 ≈ 175 LINEAR FEET (L.F.)

TOTAL REQUIRED SYSTEM SIZE = 50 L.F. + 175 L.F. = 225 L.F. (PER PRIMARY/EXPANSION)

PRIMARY LINES #1 PROVIDED: 113 L.F. (1A) + 112 L.F. (1B) = 225 L.F.

PRIMARY LINES #2 PROVIDED: 113 L.F. (2A) + 112 L.F. (2B) = 225 L.F.

ZONE B SIZING CALCUALTIONS

PROVIDED 1.52 INCHES/HOUR (SEE PERCOLATION TESTING DATA DATED 11-10-20):
TRENCH LENGTH = Q/(R*A)
Q=FLOW RATE (GPD)
R=WASTEWATER APPLICATION RATE (GPD/SQFT)
A=TOTAL INFILTRATIVE AREA PER LINEAR FOOT (SQFT)

PER TABLE 3-2 OF SECTION 3 OF SAN MATEO COUNTY ENVIRONMENTAL HEALTH'S ONSITE SYSTEMS MANUAL
2.0 INCHES/HOUR --> R = 0.56
1.52 INCHES/HOUR (MEASURED IN FIELD) --> R = 0.49 (INTERPOLATED)
1.5 INCHES/HOUR --> R = 0.49

1,847/(0.49*12) = 314.12 ≈ 315 LINEAR FEET (L.F.)

TOTAL REQUIRED SYSTEM SIZE = 85 L.F. + 315 L.F. = 400 L.F. (PER PRIMARY/EXPANSION)

EXPANSION LINES #1 PROVIDED: 125 L.F. (1A) + 80 L.F. (1B) + 70 L.F. (1C) + 125 L.F. (1D) = 400 L.F.

EXPANSION LINES #2 PROVIDED: 125 L.F. (2A) + 80 L.F. (2B) + 70 L.F. (2C) + 125 L.F. (2D) = 400 L.F.

NOTE: EXPANSION DRAIN FIELDS SHOWN FOR DEMONSTRATION PURPOSES ONLY AND ARE NOT INTENDED TO BE INSTALLED.

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No. C79555
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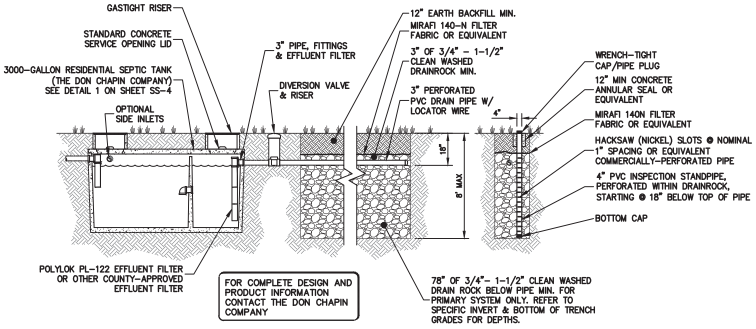
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA
SAN MATEO COUNTY
APN: 082-050-010
082-050-020

SEPTIC CONSTRUCTION PLAN

	-	-
	-	-
2	USE PERMIT RESUBMITTAL 08/01/22	RM
1	USE PERMIT RESUBMITTAL 01/12/22	RM
	REVISIONS	BY

JOB NO: 2201144
DATE: 06-18-21
SCALE: 1"=20'
DESIGN BY: RM
CHECKED BY: JH
SHEET NO:
SS-3
3 OF 4 SHEETS

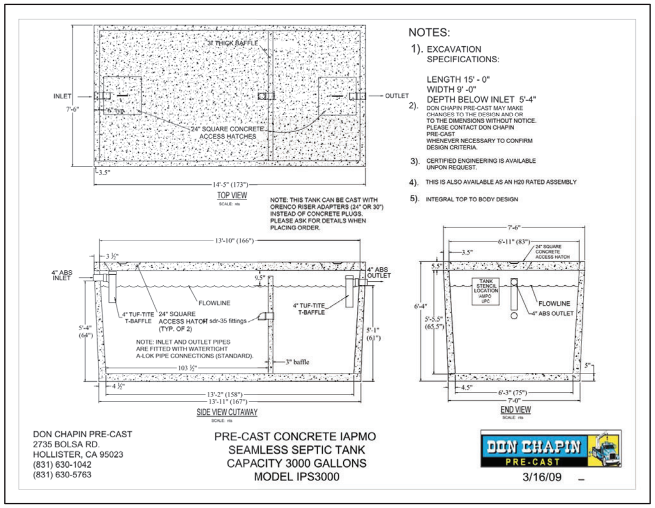


FOR COMPLETE DESIGN AND
PRODUCT INFORMATION
CONTACT THE DON CHAPIN
COMPANY

LIQUID CAPACITY REQUIRED:	3000 GALLONS (RESIDENTIAL + COMMERCIAL SYSTEM)
DOSING CAPACITY REQUIRED:	150 GALLONS (150 GALLONS/BEDROOM PER SAN MATEO COUNTY OWTS X 1 BEDROOMS)
BOX DESIGN LOAD:	NON-TRAFFIC, UP TO 3 FEET OF SOIL COVER, MAXIMUM 500 PSF.

1 SS-4 RESIDENTIAL SEPTIC TANK

NTS



NOTE: INLET AND OUTLET PIPES ARE FITTED WITH WATERTIGHT A-LOK PIPE CONNECTIONS (STANDARD).

NOTE: THIS TANK CAN BE CAST WITH ORENCO RISER ADAPTERS (24" OR 30") INSTEAD OF CONCRETE PLUGS. PLEASE ASK FOR DETAILS WHEN PLACING ORDER.

NOTES:

1). EXCAVATION SPECIFICATIONS:

LENGTH 15' - 0"
WIDTH 9' -0"
DEPTH BELOW INLET 5'-4"

2). DON CHAPIN PRE-CAST MAY MAKE CHANGES TO THE DESIGN AND OR TO THE DIMENSIONS WITHOUT NOTICE. PLEASE CONTACT DON CHAPIN PRE-CAST WHENEVER NECESSARY TO CONFIRM DESIGN CRITERIA.

3). CERTIFIED ENGINEERING IS AVAILABLE UNPON REQUEST.

4). THIS IS ALSO AVAILABLE AS AN H20 RATED ASSEMBLY

5). INTEGRAL TOP TO BODY DESIGN

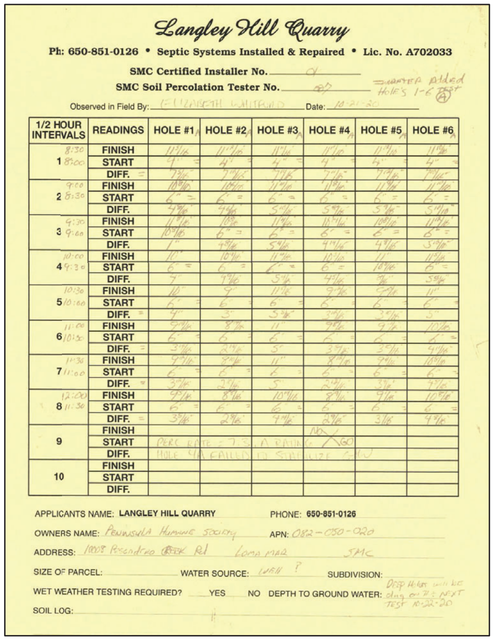
DON CHAPIN PRE-CAST
2735 BOLSA RD.
HOLLISTER, CA 95023
(831) 630-1042
(831) 630-5763

PRE-CAST CONCRETE IAPMO
SEAMLESS SEPTIC TANK
CAPACITY 3000 GALLONS
MODEL IPS3000

3/16/09

2 SS-4 3000-GALLON SEPTIC TANK

NTS



Langley Hill Quarry

Ph: 650-851-0126 • Septic Systems Installed & Repaired • Lic. No. A702033

SMC Certified Installer No. 01

SMC Soil Percolation Tester No. 07 =WATER Added Hole's 1-6 TEST Ⓐ

Observed in Field By: ELIZABETH WHITFORD Date: 10-21-20

1/2 HOUR INTERVALS	READINGS	HOLE #1 A	HOLE #2 A	HOLE #3 A	HOLE #4 A	HOLE #5 A	HOLE #6 A
8:30	FINISH	11 5/16"	11 12/16"	11 11/16"	11 11/16"	11 13/16"	11 11/16"
1 8:00	START	4" =	4" =	4" =	4" =	4" =	4" =
	DIFF. =	7 5/16"	7 12/16"	7 11/16"	7 11/16"	7 13/16"	7 11/16"
9:00	FINISH	10 8/16"	10 6/16"	11 11/16"	11 9/16"	11 9/16"	11 11/16"
2 8:30	START	6" =	6" =	6" =	6" =	6" =	6" =
	DIFF.	4 8/16"	4 6/16"	5 11/16"	5 9/16"	5 9/16"	5 11/16"
9:30	FINISH	11 8/16"	10 8/16"	11 4/16"	10 14/16"	10 8/16"	11 12/16"
3 9:00	START	10 8/16"	6" =	6" =	6" =	6" =	6" =
	DIFF.	1"	4 8/16"	5 4/16"	4 14/16"	4 8/16"	5 12/16"
10:00	FINISH	10"	10 9/16"	11 4/16"	10 5/16"	11"	11 5/16"
4 9:30	START	6" =	6" =	6" =	6" =	10 9/16"	6" =
	DIFF.	4"	4 9/16"	5 4/16"	4 5/16"	8/16"	5 5/16"
10:30	FINISH	10"	9"	11 5/16"	9 11/16"	9 10/16"	11"
5 10:00	START	6" =	6" =	6" =	6" =	6" =	6" =
	DIFF. =	4"	3"	5 5/16"	3 11/16"	3 10/16"	5"
11:00	FINISH	9 11/16"	8 11/16"	11"	9 8/16"	9 10/16"	10 11/16"
6 10:30	START	6" =	6" =	6" =	6" =	6" =	6" =
	DIFF. =	3 11/16"	2 11/16"	5"	3 8/16"	3 10/16"	4 11/16"
11:30	FINISH	9 11/16"	8 10/16"	11"	8 11/16"	9 4/16"	10 8/16"
7 11:00	START	6" =	6" =	6" =	6" =	6" =	6" =
	DIFF. =	3 11/16"	2 10/16"	5"	2 11/16"	3 4/16"	4 8/16"
12:00	FINISH	9 5/16"	8 9/16"	10 11/16"	8 9/16"	9 1/16"	10 8/16"
8 11:30	START	6" =	6" =	6" =	6" =	6" =	6" =
	DIFF. =	3 5/16"	2 9/16"	4 11/16"	2 9/16"	3 1/16"	4 8/16"
	FINISH				NO		
9	START	PERC RATE = 7.3	A RATING		X GO		
	DIFF.	HOLE 4A FAILED	TO STABILIZE	GHW			
	FINISH						
10	START						
	DIFF.						

APPLICANTS NAME: **LANGLEY HILL QUARRY** PHONE: **650-851-0126**

OWNERS NAME: PENINSULA HUMANE SOCIETY APN: 082-050-020

ADDRESS: 10008 Pescadero CREEK Rd LOMA MAR SMC

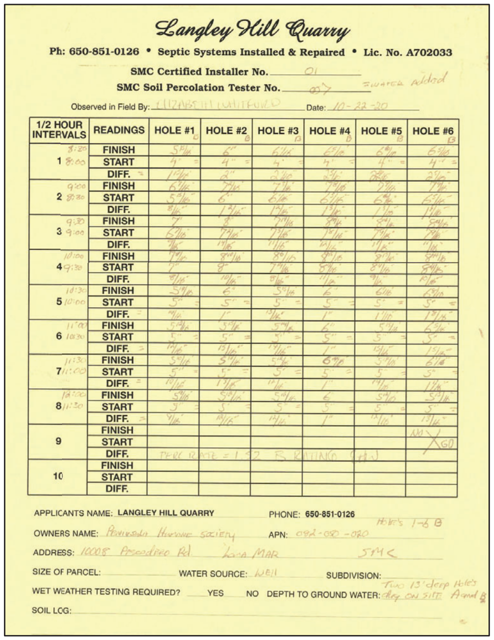
SIZE OF PARCEL: WATER SOURCE: WELL ? SUBDIVISION:

WET WEATHER TESTING REQUIRED? ___YES ___NO DEPTH TO GROUND WATER: DEEP Holes will be dug on the NEXT TEST 10-22-20

SOIL LOG:

3 SS-4 PERCOLATION TEST DATA

NTS



Langley Hill Quarry

Ph: 650-851-0126 • Septic Systems Installed & Repaired • Lic. No. A702033

SMC Certified Installer No. 01

SMC Soil Percolation Tester No. 07 =WATER Added

Observed in Field By: ELIZABETH WHITFORD Date: 10-22-20

1/2 HOUR INTERVALS	READINGS	HOLE #1 B	HOLE #2 B	HOLE #3 B	HOLE #4 B	HOLE #5 B	HOLE #6 B
8:30	FINISH	5 15/16"	6"	6 1/16"	6 5/16"	6 8/16"	6 5/16"
1 8:00	START	4" =	4" =	4" =	4" =	4" =	4" =
	DIFF. =	1 15/16"	2"	2 1/16"	2 5/16"	2 8/16"	2 5/16"
9:00	FINISH	6 11/16"	7 2/16"	7 3/16"	7 8/16"	7 9/16"	7 4/16"
2 8:30	START	5 15/16"	6"	6 1/16"	6 5/16"	6 8/16"	6 5/16"
	DIFF.	8/16"	1 2/16"	1 2/16"	1 3/16"	1 1/16"	1 1/16"
9:30	FINISH	7"	8"	7 14/16"	8 4/16"	8 4/16"	8 4/16"
3 9:00	START	6 7/16"	7 2/16"	7 3/16"	7 8/16"	7 9/16"	7 4/16"
	DIFF.	9/16"	14/16"	11/16"	12/16"	11/16"	11/16"
10:00	FINISH	7 8/16"	8 10/16"	8 6/16"	8 15/16"	8 13/16"	8 14/16"
4 9:30	START	7"	8"	7 14/16"	8 4/16"	8 4/16"	8 4/16"
	DIFF.	8/16"	10/16"	8/16"	11/16"	9/16"	10/16"
10:30	FINISH	5 14/16"	6"	5 13/16"	6"	6 1/16"	6 8/16"
5 10:00	START	5" =	5" =	5" =	5" =	5" =	5" =
	DIFF. =	14/16"	1"	13/16"	1"	1 1/16"	1 8/16"
11:00	FINISH	5 12/16"	5 15/16"	5 14/16"	6"	5 15/16"	6 5/16"
6 10:30	START	5" =	5" =	5" =	5" =	5" =	5" =
	DIFF. =	12/16"	15/16"	14/16"	1"	15/16"	1 5/16"
11:30	FINISH	5 10/16"	5 13/16"	5 12/16"	6"	5 14/16"	6 1/16"
7 11:00	START	5" =	5" =	5" =	5" =	5" =	5" =
	DIFF. =	10/16"	13/16"	12/16"	1"	14/16"	1 1/16"
12:00	FINISH	5 9/16"	5 13/16"	5 12/16"	6"	5 12/16"	5 13/16"
8 11:30	START	5" =	5" =	5" =	5" =	5" =	5" =
	DIFF. =	9/16"	13/16"	12/16"	1"	12/16"	13/16"
	FINISH						NO
9	START						X GO
	DIFF.	PERC RATE = 1.52	B RATING	GHW			
	FINISH						
10	START						
	DIFF.						

APPLICANTS NAME: **LANGLEY HILL QUARRY** PHONE: **650-851-0126**

Hole's 1-6 B

OWNERS NAME: Peninsula Humane society APN: 082-050-020

ADDRESS: 10008 Pescadero Rd Loma MAR SMC

SIZE OF PARCEL: WATER SOURCE: WELL SUBDIVISION:

WET WEATHER TESTING REQUIRED? ___YES ___NO DEPTH TO GROUND WATER: Two 13' deep Hole's dug ON SITE A and B

SOIL LOG:

2

WASTE COLLECTION NOTE:
SEPTIC SYSTEM TO COLLECT WASTE ONLY FROM RESIDENTIAL/COMMERCIAL SPACES AS NOTED IN THE LEACHFIELD SIZING NOTES ON SHEET SS-1. ALL OTHER WASTE GENERATED FROM ANIMAL ENCLOSURES, BARNS, COTTAGES, OUTDOOR AREAS, ETC. TO BE COLLECTED AND DISPOSED OF THROUGH OTHER MEANS AND METHODS.

PETER CARLINO
No. C79555
CIVIL
ORIGINAL SIGNATURES IN BLUE INK

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HASKIN HILL SANCTUARY
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA
SAN MATEO COUNTY
APN: 082-050-010
082-050-020

SEPTIC DETAILS

REVISIONS	BY
–	–
–	–
2 USE PERMIT RESUBMITTAL 08/01/22	RM
1 USE PERMIT RESUBMITTAL 01/12/22	RM

JOB NO: 2201144
DATE: 06-18-21
SCALE:
DESIGN BY: RM
CHECKED BY: JH
SHEET NO:

SS-4

4 OF 4 SHEETS

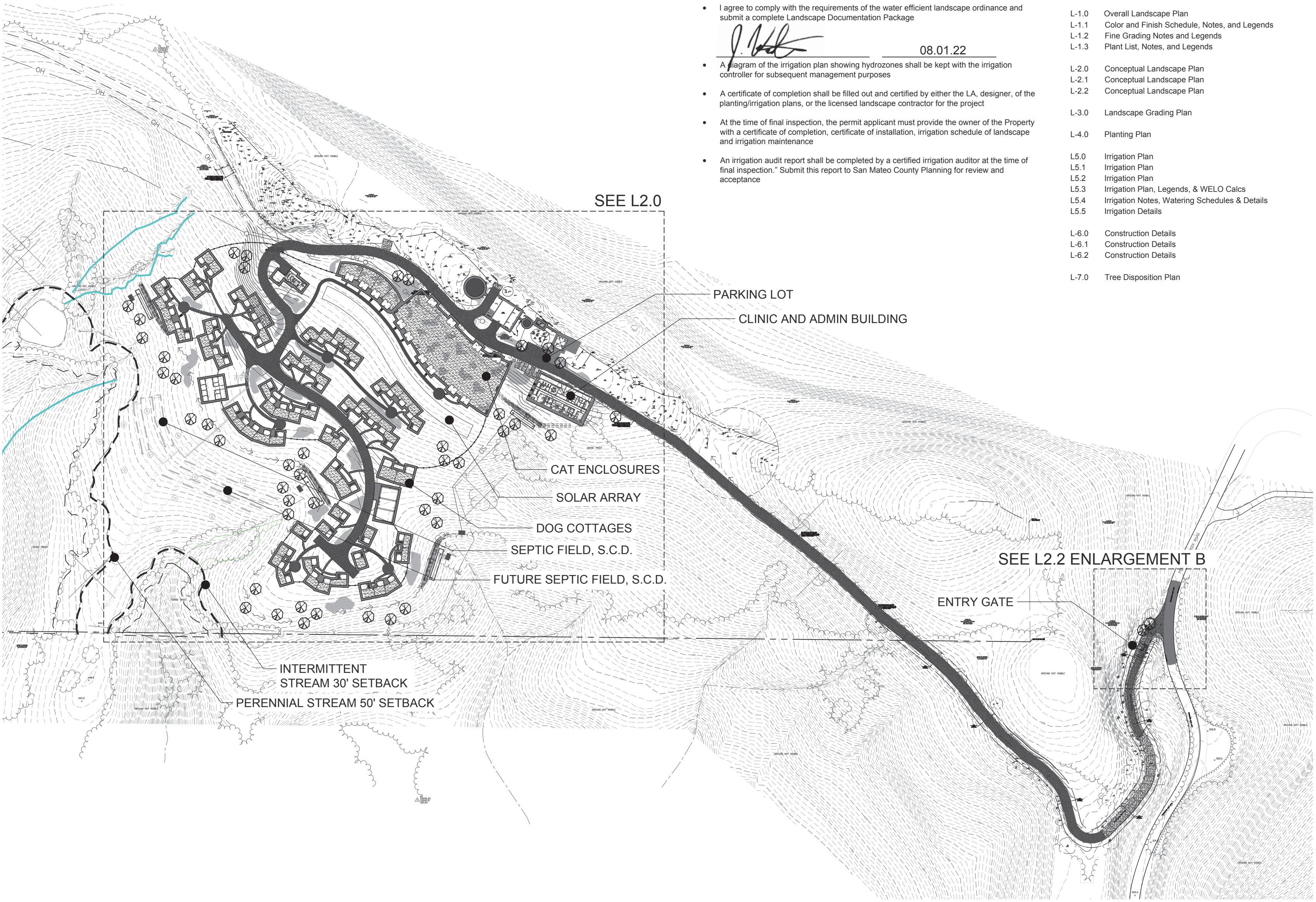
WELO STATEMENT/CERTIFICATION

- I agree to comply with the requirements of the water efficient landscape ordinance and submit a complete Landscape Documentation Package

J. [illegible]   08.01.22

- A diagram of the irrigation plan showing hydrozones shall be kept with the irrigation controller for subsequent management purposes
- A certificate of completion shall be filled out and certified by either the LA, designer, of the planting/irrigation plans, or the licensed landscape contractor for the project
- At the time of final inspection, the permit applicant must provide the owner of the Property with a certificate of completion, certificate of installation, irrigation schedule of landscape and irrigation maintenance
- An irrigation audit report shall be completed by a certified irrigation auditor at the time of final inspection." Submit this report to San Mateo County Planning for review and acceptance

SHEET INDEX



PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY

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GUZZARDO
PARTNERSHIP INC.
Landscape Architects • Land Planners
181 Greenwich Street
San Francisco, CA 94111
T 415 433 4672
F 415 433 5003

Gary D. Laymon No. 2397
6-30-24
Renewal Date
08.01.22
Date

ISSUES AND REVISIONS

No. Date	Description
07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1
08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

PROJECT NUMBER
18042.00

SHEET TITLE
OVERALL LANDSCAPE PLAN

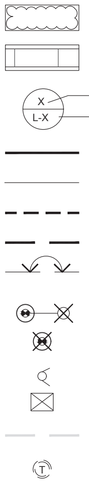
SCALE
Scale: 1" = 200'
0 100 200 400
North

SHEET NUMBER
L1.0

LAYOUT NOTES

1. The Contractor shall verify all distances and dimensions in the field and bring any discrepancies to the attention of the Landscape Architect for a decision before proceeding with the work.
2. Contractor to take all necessary precautions to protect buildings and waterproof membranes from damage. Any damage caused by the Contractor or the Contractor's representatives during their activities shall be repaired at no cost to the Owner.
3. All written dimensions supersede all scaled distances and dimensions. Dimensions shown are from the face of building wall, face of curb, edge of walk, property line, or centerline of column unless otherwise noted on the drawings.
4. Walk scoring, expansion joints and paving shall be located as indicated on the Layout Plans, Landscape Construction Details, in the Specifications, or as field adjusted under the direction of the Landscape Architects.
5. All building information is based on drawings prepared by:
   KSHA
   349 Sutter Street
   San Francisco, CA 94108
   415.954.1960
6. All site civil information is based on drawings prepared by:
   Lea & Braze Engineering, Inc.
   2495 Industrial Parkway West
   Hayward, CA 94545
   510.887.4086
7. The Contractor is to verify location of all on-site utilities before commencing with the work. The Contractor shall be responsible for the repair of any damage to utilities caused by the activities of the Contractor or the Contractor's representatives. Any utilities shown on Landscape Drawings are for reference and coordination purposes only.
8. Protect all existing construction from damage. The Contractor shall be responsible for the repair of any damage to existing construction caused by the activities of the Contractor or the Contractor's representatives.
9. Expansion joints shall be located no less than 16' o.c. nor greater than 20' o.c. and/or as indicated on the Layout Plans, Landscape Construction Details, in Specifications, or as field adjusted under the direction of the Landscape Architect.

LAYOUT LEGEND



Ground Cover
Pedestrian/Vehicular Concrete
Detail Number
Sheet Number
Property Line
Center Line
Phase Line
Match Line
Align
Street Light. S.E.D. and S.C.D.
Pedestrian Scale Pole Light. S.E.D.
See Color and Finish Schedule
Fire Hydrant S.C.D.
Utility Boxes S.C.D.
Below grade utilities as noted. S.C.D.
Trash Receptacle. See Color and Finish Schedule

Pedestrian Gravel Paving

E.J.	Expansion Joint
S.A.D.	See Architect's Drawings
S.C.D.	See Civil Engineer's Drawings
S.E.D.	See Electrical Engineer's Drawings
S.C.F.S.	See Color and Finish Schedule

LANDSCAPE BIDDING NOTES

THE FOLLOWING NOTES ARE FOR BIDDING PURPOSES ONLY, SUBJECT TO SITE SOIL TEST RECOMMENDATIONS IN NOTES #7.

1. The contractor is required to submit plant quantities and unit prices for all plant materials as a part of the bid.
2. Assume 15 gallon plant for any un-labelled or un-sized tree; 5 gallon plant for any un-labelled or un-sized shrub; and 1 gallon @ 18" o.c. for any un-labelled ground cover.
3. Assume 5 gallon plant size at 36" o.c. for all planting beds not provided with planting callouts or planting information.
4. The planting areas on grade shall be ripped to a depth of 8" to reduce compaction. The native subgrade soil shall be treated with 100 lbs of gypsum/1000 sf and leached to improve drainage and reduce the soil interface barrier. Contractor shall coordinate this work with other trades. This is subject to the final recommendations of the soils test (see below) and review by the Landscape Architect and the Owner.
5. All planting areas on grade are to receive Vision Comp OMRI Listed Compost by Vision Recycling, (510) 429-1300, or approved equal, at the rate of 6 cubic yards/1000 square feet, evenly tilled 6" deep into the soil to finish grade. All planting areas shall have 6-20-20 Commercial Fertilizer at 25lbs/1000 square feet evenly distributed into the soil. This is subject to the final recommendations and review of the soils test (see below) by the Landscape Architect and the Owner.
6. Planting pits are to be backfilled with a mixture of 50% native soil and 50% amended native soil per note #5 above.
7. The General Contractor is to provide an agricultural suitability analysis for representative samples of on-site rough graded soil and any imported topsoil. Recommendations for amendments contained in this analysis are to be carried out before planting occurs. Such changes are to be accompanied by equitable adjustments in the contract price if/when necessary. See specifications for testing procedure.
8. The Maintenance Period(s) shall be for 60 (sixty) days. Portions of the installed landscape of a project may be placed on a maintenance period prior to the completion of the project at the Owner's request and with the Owner's concurrence..
9. See civil drawings for imported storm water treatment area soil. Contractor to provide agricultural suitability analysis of the soil with amendment recommendations to the Landscape Architect for review.

COLOR AND FINISH SCHEDULE

KEY	DETAIL	DESCRIPTION	SIZE/COLOR/FINISH	MANUFACTURER	NOTES
PAVING					
PV 1	1 / L6.0	CONCRETE TYPE 1 - PEDESTRIAN	Natural Gray w/ Broom Finish	n/a	Provide Mock-Up
PV 2	2 / L6.0	GRAVEL WALKWAY	3/4" Class II Crushed Rock	Graniterock	Submit Cutsheet & Sample
PV 3	3 / L6.0	GRAVEL PAVING AT ANIMAL ENCLOSURE	3/4" Class II Crushed Rock	Graniterock	Submit Cutsheet & Sample
PV 4	4 / L6.0	GRAVEL PATH STEPS	Borealis Precast Concrete Steps Color Smoked Pine	Techo Bloc	Submit Cutsheet & Sample
FENCING					
F 1	1 / L6.1	PEREMETER DEER FENCE	8' Tall 2x2 Welded Mesh w/ Black PVC Coating	Deerfencing.com 855.921.7900	Submit Shop Drawings
F 2	4 / L6.1	DOG COTTAGE FENCE	8' Tall 2x2 Chain Link w/ Black PVC Coating		Submit Shop Drawings
F 3	4 / L6.1	CAT ENCLOSURE FENCE	8' Tall 2x2 Chain Link w/ Black PVC Coating		Submit Shop Drawings
F 4	4 / L6.1	FARM ANIMAL FENCE	4' Tall 2x2 Welded Mesh w/ Black PVC Coating		Submit Shop Drawings
GATES					
G1	1 / L6.2	PROJECT ENTRY GATE		AD Autogate 800.273.4283	Submit Shop Drawings & Sample
G2	2 / L6.1	PEREMETER DEER FENCE GATE	8' Tall 2x2 Welded Mesh w/ Black PVC Coating	Deerfencing.com 855.921.7900	Submit Cutsheet & Sample
LIGHTS					
E 1	S.E.D.	PEDESTRIAN POLE LIGHT	TBD		

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PROJECT NUMBER
18042.00

SHEET TITLE
LANDSCAPE COLOR AND FINISH SCHEDULE, NOTES, AND LEGENDS

SCALE

SHEET NUMBER

L1.1

FINE GRADING NOTES

1. The Landscape Contractor is responsible for fine grading and positive surface drainage in all landscape areas. The Contractor shall verify all rough grades in the field and bring any discrepancies to the attention of the Landscape Architect and Civil Engineer for a decision before proceeding with the work.

2. See Civil Engineer's drawings for road surface elevations, roadway sections, catch basins, and top of curb elevations. Top of curb elevations shown on Landscape drawings are for reference and coordination purposes only.

3. Earth mounds are shown diagrammatically for form and location. Shaping of mounds to be reviewed and approved in the field by the Landscape Architect.

4. Contractors are to exercise extreme care in back filling and compacting any excavation or trenching in areas previously compacted for other aspects of the work.

5. The Landscape Contractor shall remove from the site all debris and unsuitable material generated by the Contractor's operations.

6. Catch basins, area drains, planter drains, and perforated drain lines are to be connected to the storm drain system as specified in the Civil Engineer's plans. See Civil Engineer's drawings for all connections.

7. All catch basins and other drains are to be free of obstructions and maintained open and free running during and upon completion of the Contractor's work.

8. All on-grade areas to receive planting are to be received by the fine grading Contractor within a tenth of a foot of final grade. The Landscape Contractor shall rip compacted rough graded soil to a depth of 8 inches, then till in the soil amendment. Soil amendment shall be determined by an Agricultural Suitabilities Analysis conducted by a licensed soils laboratory upon sample(s) taken from the rough graded soil. This analysis shall be conducted and paid for by the General Contractor.

9. See structural soils report for recommendations on soil type, grading procedures, soil compaction, maximum allowable slopes, flatwork base material, etc.

10. Minimum paving slope to be 2% typically with a maximum cross slope of 2%. Minimum planting area slope to be 2% typically. Bring any discrepancies to the attention of the Landscape Architect for a decision prior to fine grading.

11. All slopes 2-½:1 and greater shall have jute mesh erosion control netting installed per manufacturer's specifications. Lap netting minimum 2'-0" and stake.

12. Grading shall be in conformance with all local codes and ordinances. Swales shall be a minimum of four (4) feet from all structures.

13. Grades to be constant and uniform between spot elevations.

FINE GRADING AND DRAINAGE LEGEND

+60.3	Spot Elevation
T.C. (60.6)	Top of Curb Elevation (from Civil Engineer's Drawings, verify)
T.C.I. (60.6)	Top of Curb Elevation Interpolated (from Civil Engineer's Drawings, verify)
+H.P. 61.2	Relative High Point
T.S. 61.25	Top of Step Elevation
B.S. 60.1	Bottom of Step Elevation
T.R. 61.25	Top of Ramp Elevation
B.R. 60.1	Bottom of Ramp Elevation
T.W. 63.4	Top of Wall Elevation
B.W. 60.4	Bottom of Wall Elevation. (Finish Grade of Soil or Paving)
T.F. 63.4	Top of Fence
AD 00.00	Area Drain w/Rim Elevation
□	On-Grade Paving: NDS 4" 910B (Brushed)
○	Ground Cover Areas: NDS Spee-D-Basin and Grate, NDS #90 6" Atrium Grate, Black.
▣	Catch Basin See Civil Engineer's Drawings.
——→	Direction of Surface Water Flow
— · →	Direction of Surface Water Flow in Swale (2% Minimum)
—↕—	Grade Break (Ridge Line)
— —	Subsurface Drainpipe: PVC SA34 by Acme Industries. (4"&6" dia.).
— · —	Perforated Drainpipe: PVC AS987 by Acme Industries 4".
◌	Diagrammatic 1' Contours

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SHEET TITLE
LANDSCAPE NOTES AND LEGENDS

SCALE

SHEET NUMBER

L1.2

PLANTING NOTES

1. All work shall be performed by persons familiar with planting work and under supervisions of a qualified planting foreman.
2. Plant material locations shown are diagrammatic and may be subject to change in the field by the Landscape Architect before the maintenance period begins.
3. All trees are to be staked as shown in the staking diagrams.
4. All tree stakes shall be cut 6" above tree ties after stakes have been installed to the depth indicated in the staking diagrams. Single stake all conifers per tree staking diagram.
5. Plant locations are to be adjusted in the field as necessary to screen utilities but not to block windows nor impede access. The Landscape Architect reserves the right to make minor adjustments in tree locations after planting at no cost to the Owner. All planting located adjacent to signs shall be field adjusted so as not to interfere with visibility of the signs.
6. The Landscape Architect reserves the right to make substitutions, additions, and deletions in the planting scheme as felt necessary while work is in progress. Such changes are to be accompanied by equitable adjustments in the contract price if/when necessary and subject to the Owner's approval.
7. The contractor is to secure all vines to walls and columns with approved fasteners, allowing for two (2) years growth. Submit sample of fastener to Landscape Architect for review prior to ordering.
8. All planting areas, except lawns and storm water treatment zones (as defined by the civil engineer), shall be top-dressed with a 3" layer of recycled wood mulch, "Colored Wood Chip" by Vision Recycling (510.429.1300; www.visionrecycling.com) or approved equal. Planter pots shall be top-dressed with "Colored Lumber Fines" mulch by Vision Recycling. Mulch shall be brown in color. Submit sample to Landscape Architect for review prior to ordering. Hold all mulch six (6) inches from all plants where mulch is applied over the rootball.
9. Plants shall be installed to anticipate settlement. See Tree and Shrub Planting Details.
10. All trees noted with 'deep root' and those planted within 5'-0" of concrete paving, curbs, and walls shall have deep root barriers installed per manufacturer's specifications. See specifications and details for materials, depth of material, and location of installation.
11. The Landscape Contractor shall arrange with a nursery to secure plant material noted on the drawings and have those plants available for review by the Owner and Landscape Architect within thirty (30) days of award of contract. The Contractor shall purchase the material and have it segregated and grown for the job upon approval of the plant material. The deposit necessary for such contract growing is to be born by the Contractor.
12. The project has been designed to make efficient use of water through the use of drought tolerant plant materials. Deep rooting shall be encouraged by deep watering plant material as a part of normal landscape maintenance. The irrigation for all planting shall be limited to the amount required to maintain adequate plant health and growth. Water usage should be decreased as plants mature and become established. The irrigation controllers shall be adjusted as necessary to reflect changes in weather and plant requirements.
13. The Landscape Contractor shall verify the location of underground utilities and bring any conflicts with plant material locations to the attention of the Landscape Architect for a decision before proceeding with the work. Any utilities shown on the Landscape drawings are for reference and coordination purposes only. See Civil Drawings.
14. The design intent of the planting plan is to establish an immediate and attractive mature landscape appearance. Future plant growth will necessitate trimming, shaping and, in some cases, removal of trees and shrubs as an on-going maintenance procedure.
15. Install all plants per plan locations and per patterns shown on the plans. Install all shrubs to ensure that anticipated, maintained plant size is at least 2'-0" from the face of building(s) unless shown otherwise on the plans. Refer to Plant Spacing Diagram for plant masses indicated in a diagrammatic manner on the plans. Refer to Plant Spacing Diagram for spacing of formal hedge rows.
16. Contractor to provide one (1) Reference Planting Area for review by Landscape Architect prior to installation of the project planting. The Reference Planting Area shall consist of a representative portion of the site of not less than 900 (nine hundred) square feet. Contractor to set out plants, in containers, in the locations and patterns shown on the plans, for field review by the Landscape Architect. The Reference Planting Area will be used as a guide for the remaining plant installation.
17. The Maintenance Period(s) shall be for 60 (sixty) days. Portions of the installed landscape of a project may be placed on a maintenance period prior to the completion of the project at the Owner's request and with the Owner's concurrence.
18. Contractor to verify drainage of all tree planting pits. See Planting Specifications. Install drainage well per specifications and Tree Planting Detail(s) if the tree planting pit does not drain at a rate to meet the specifications.
19. Contractor shall remove all plant and bar code labels from all installed plants and landscape materials prior to arranging a site visit by the Landscape Architect.
20. The Landscape Contractor shall, as a part of this bid, provide for a planting allowance for the amount of $10,000.000 (Ten Thousand Dollars) to be used for supplying and installing additional plant material as directed by the Landscape Architect and approved by the Owner in writing. The unused portion of the alllowance shall be returned to the Owner at the beginning of the maintenance period.

PLANT SPACING DIAGRAM

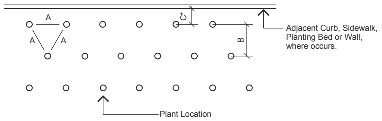
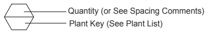


Diagram for use when plants are spaced equidistant from each other as in all ground cover plantings and massed shrub plantings

PLANT CALLOUT SYMBOL



PLANT QUANTITY DIAGRAM

SPACING 'A'	SPACING 'B'	SPACING 'C'	NO. OF PLANTS/SQUARE FOOT
6" O.C.	5.20"	2.60"	4.60
8" O.C.	6.93"	3.47"	2.60
9" O.C.	7.79"	3.90"	1.78
10" O.C.	8.66"	4.33"	1.66
12" O.C.	10.40"	5.20"	1.15
15" O.C.	13.00"	6.50"	0.74
18" O.C.	15.60"	7.80"	0.51
24" O.C.	20.80"	10.40"	0.29
30" O.C.	26.00"	13.00"	0.18
36" O.C.	30.00"	15.00"	0.12
48" O.C.	40.00"	20.00"	0.07
60" O.C.	51.00"	24.00"	0.06
72" O.C.	62.35"	31.18"	0.04

See Plant Spacing Diagram for maximum triangular spacing 'A'. This chart is to be used to determine number of ground cover required in a given area and spacing between shrub massings. Where shrub massings are shown, calculate shrub mass areas before utilizing spacing chart to determine plant quantities.

* Where curb, sidewalk, adjacent planting bed or wall condition occurs, utilize spacing 'C' to determine plant distance from wall, sidewalk, adjacent planting bed or back of curb, where C=1/2 B.

PLANT LIST

KEY	BOTANICAL NAME	COMMON NAME		SIZE	SPACING	WUCOLS	QUANTITY
TREES							
AES CAL	Aesculus californica	California Buckeye	Native			VL	12
CER OCC	Cercis occidentalis	Western Redbud	Native			VL	15
QUE AGR	Quercus agrifolia	Coast Live Oak	Native			VL	16
QUE DOU	Quercus douglasii	Blue Oak	Native			VL	11
QUE KEL	Quercus kelogii	California Black Oak	Native			L	9
QUE LOB	Quercus lobata	Valley Oak	Native			L	10
SHRUB PLANTING AREAS							
AHM	Arctostaphylos 'Howard McMinn'	Manzanita	Native	5 Gal	72" o.c.	L	21
APR	Arctostaphylos uu. 'Point Reyes'	Manzanita (Groundcover)	Native	1 Gal	36" o.c.	L	21
BAC	Bacharis piliularis	Coyote Brush	Native	1 Gal	48" o.c.	L	741
CEA	Ceanothus sp.	Coast Lilac	Native	1 Gal	48" o.c.	L	19
EPI	Epilobium (Zauschneria) canum	California Fuschia	Native	1 Gal	42" o.c.	L	15
HET	Heteromeles arbutifolia	Toyon	Native	5 Gal	72" o.c.	L	70
RHC	Rhamnus californica	Coffeeberry	Native	5 Gal	42" o.c.	L	27
LEY	Leymus c. 'Canyon Prince'	Canyon Prince Wild Rye	Native	1 Gal	30" o.c.	L	141
MRM	Muhlenbergia rigens	Pink Muhly Grass	Native	1 Gal	30" o.c.	L	130
STORMWATER TREATMENT AREAS							
JUN	Juncus patens	California Gray Rush	Native	1 Gal	24" o.c.	L	257
MRM	Muhlenbergia rigens	California Deer Grass	Native	1 Gal	48" o.c.		257
SYS	Sysrinchium bellum	Blue Eyed Grass	Native	1 Gal	24" o.c.		257
HYDROSEED							
Hydroseed mix available from Hedgerow Farms 530.662.6847. Selected to provide native, drought tolerant and low-fuel coverage.							
	Bromus carinatus	California Brome	Native				
	Elymus glaucus	Blue Wildrye	Native				
	Hordeum brachyantherum californicum	California Barley	Native				
	Festuca idahoensis	Idaho Fescue	Native				
	Stpa pulchra	Purple Needlegrass	Native				
	Poa secunda	Pine Bluegrass	Native				
	Eschsholzia californica	Native Calif. Poppy	Native				
	Prunella vulgaris	Purple Selfheal	Native				
	Sisyrinchium bellum	Blue Eyed Grass	Native				

IRRIGATION WATER USE ESTIMATE

PENINSULA HS SHELTER, SAN MATEO COUNTY
ESTIMATED WATER-USE CALCULATIONS

ESTIMATED WATER USE (EWU) = (ETO x PLANT FACTOR x LANDSCAPED AREA x 0.62)/IRRIGATION EFFICIENCY

	ANNUALLY		JANUARY	FEBRUARY	MARCH	APRIL	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER	
ETO	46.31	INCHES	1.86	2.24	3.72	4.8	5.27	5.7	5.58	5.27	4.2	3.41	2.4	1.86	
LANDSCAPED AREA	24,192	SQUARE FEET	24,192	24,192	24,192	24,192	24,192	24,192	24,192	24,192	24,192	24,192	24,192	24,192	
BUBBLER IRRIGATION FOR LOW WATER-USE PLANT MATERIAL															
LANDSCAPED AREA	24,192	SQUARE FEET	24,192	24,192	24,192	24,192	24,192	24,192	24,192	24,192	24,192	24,192	24,192	24,192	
PLANT FACTOR	0.4		0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	
IRRIGATION EFFICIENCY	0.81		0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	
EWU	343,015	GALLONS PER YEAR	13,777	16,592	27,554	35,553	39,035	42,220	41,331	39,035	31,109	25,258	17,777	13,777	GALLONS PER MONTH

FIRE PROTECTION

A fuel break of defensible space is required around the perimeter of all structures to a distance of not less than 30 feet and may be required to a distance of 100 feet or to the property line. This is neither a requirement nor an authorization for the removal of living trees. Trees located within the defensible space shall be pruned to remove dead and dying portions, and limbed up 6 feet above the ground. New trees planted in the defensible space shall be located no closer than 10' adjacent tees when fully grown or at maturity. Remove that portion of any existing trees, which extends within 10 feet of the outlet of a chimney or stovepipe or is within 5' of any structure. Maintain any tree adjacent to or overhanging a building free of dead or dying wood.

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SHEET TITLE
PLANTING NOTES AND LEGENDS

SCALE

SHEET NUMBER

L1.3

LANDSCAPE LEGEND

KEY	DETAIL	DESCRIPTION
PAVING		
PV 1	1 / L6.0	CONCRETE TYPE 1 - PEDESTRIAN
PV 2	2 / L6.0	GRAVEL WALKWAY
PV 3	3 / L6.0	GRAVEL PAVING AT ANIMAL ENCLOSURE
PV 4	4 / L6.0	GRAVEL PATH STEPS
FENCING		
F 1	1 / L6.1	PEREMETER DEER FENCE
F 2	4 / L6.1	DOG COTTAGE FENCE
F 3	4 / L6.1	CAT ENCLOSURE FENCE
F 4	4 / L6.1	FARM ANIMAL FENCE
GATES		
G1	1 / L6.2	PROJECT ENTRY GATE
G2	2 / L6.1	PEREMETER DEER FENCE GATE
LIGHTS		
E 1	S.E.D.	PEDESTRIAN POLE LIGHT

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08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

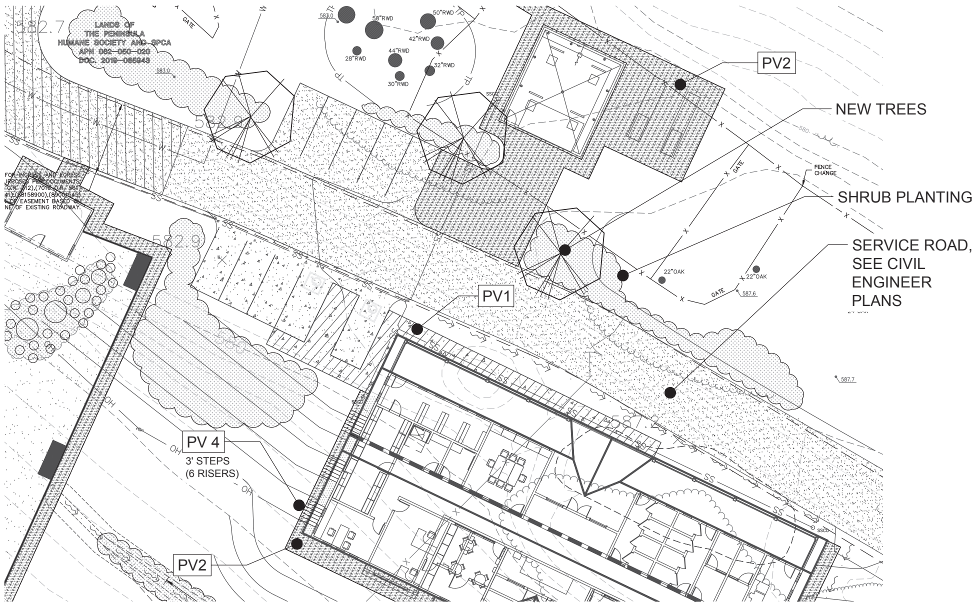
PROJECT NUMBER
18042.00

SHEET TITLE
OVERALL SITE PLAN

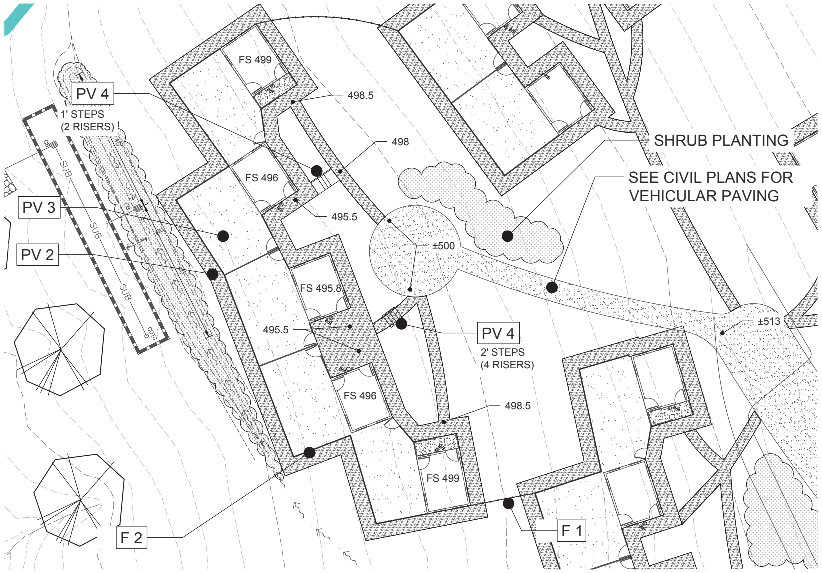
SCALE
Scale: 1" = 50'
0 25 50 100

North

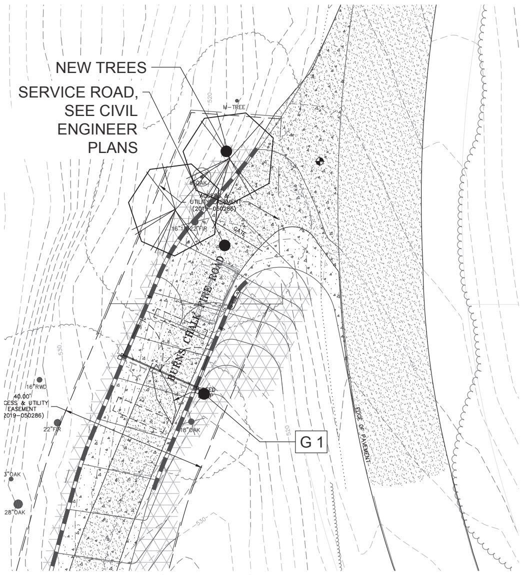
SHEET NUMBER
L2.0



Enlargement A - Admin and Clinic Building



Enlargement B - Dog Cottages



Enlargement C - Entry Gate

LANDSCAPE LEGEND

KEY	DETAIL	DESCRIPTION
PAVING		
PV 1	1 / L6.0	CONCRETE TYPE 1 - PEDESTRIAN
PV 2	2 / L6.0	GRAVEL WALKWAY
PV 3	3 / L6.0	GRAVEL PAVING AT ANIMAL ENCLOSURE
PV 4	4 / L6.0	GRAVEL PATH STEPS
FENCING		
F 1	1 / L6.1	PEREMETER DEER FENCE
F 2	4 / L6.1	DOG COTTAGE FENCE
F 3	4 / L6.1	CAT ENCLOSURE FENCE
F 4	4 / L6.1	FARM ANIMAL FENCE
GATES		
G1	1 / L6.2	PROJECT ENTRY GATE
G2	2 / L6.1	PEREMETER DEER FENCE GATE
LIGHTS		
E 1	S.E.D.	PEDESTRIAN POLE LIGHT

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F 415 433 5003

D. Laymon No. 2397
6-30-24
Renewal Date
08.01.22
Date

ISSUES AND REVISIONS

No. Date	Description
07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1
08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

PROJECT NUMBER
18042.00

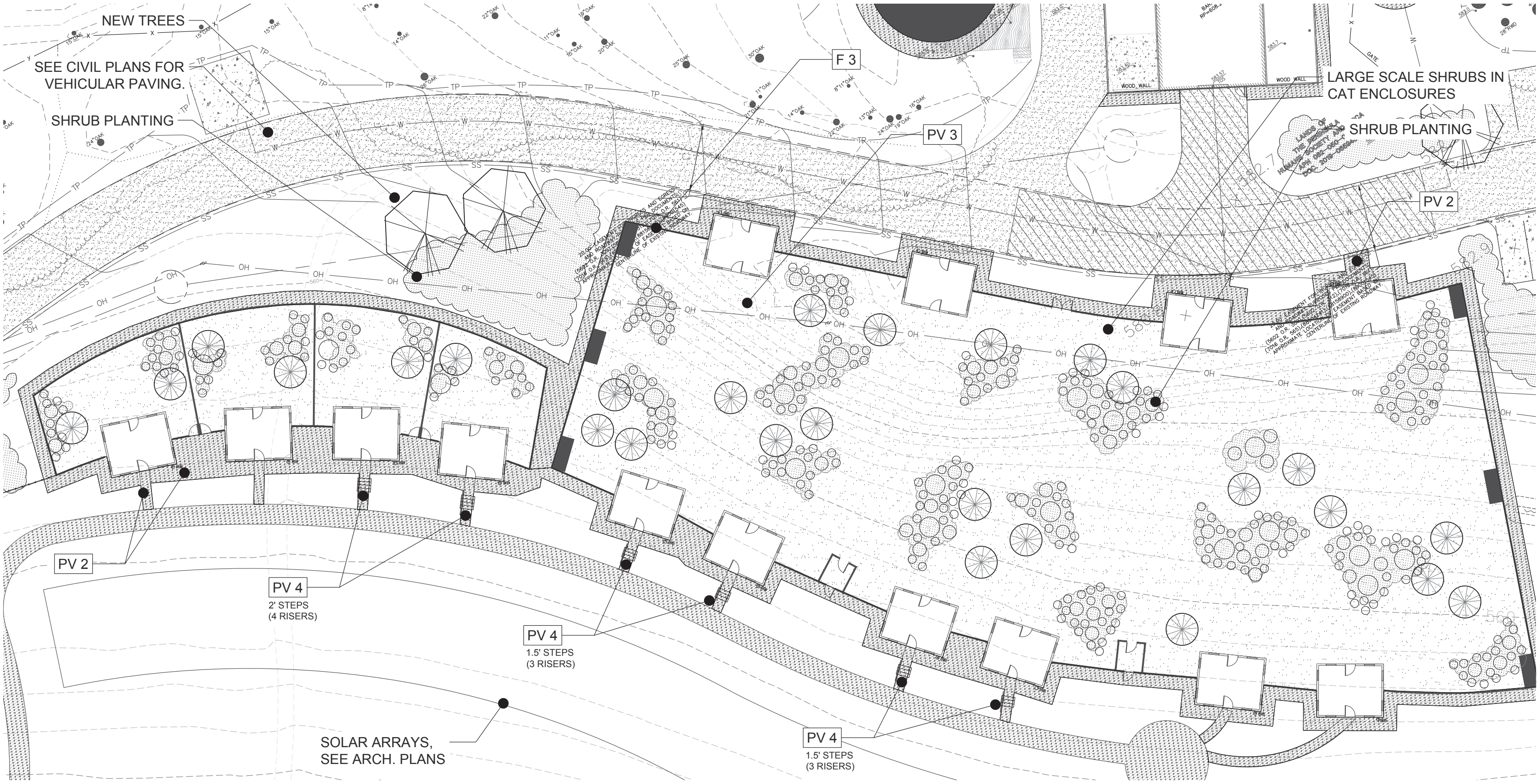
SHEET TITLE
LANDSCAPE PLAN

SCALE
Scale: 1" = 16'
0 8 16 32
North

SHEET NUMBER
L2.1

LANDSCAPE LEGEND

KEY	DETAIL	DESCRIPTION
PAVING		
PV 1	1 / L6.0	CONCRETE TYPE 1 - PEDESTRIAN
PV 2	2 / L6.0	GRAVEL WALKWAY
PV 3	3 / L6.0	GRAVEL PAVING AT ANIMAL ENCLOSURE
PV 4	4 / L6.0	GRAVEL PATH STEPS
FENCING		
F 1	1 / L6.1	PEREMETER DEER FENCE
F 2	4 / L6.1	DOG COTTAGE FENCE
F 3	4 / L6.1	CAT ENCLOSURE FENCE
F 4	4 / L6.1	FARM ANIMAL FENCE
GATES		
G1	1 / L6.2	PROJECT ENTRY GATE
G2	2 / L6.1	PEREMETER DEER FENCE GATE
LIGHTS		
E 1	S.E.D.	PEDESTRIAN POLE LIGHT



Enlargement D - Cat Enclosures

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6-30-24
08.01.22

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No. Date	Description
07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1
08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

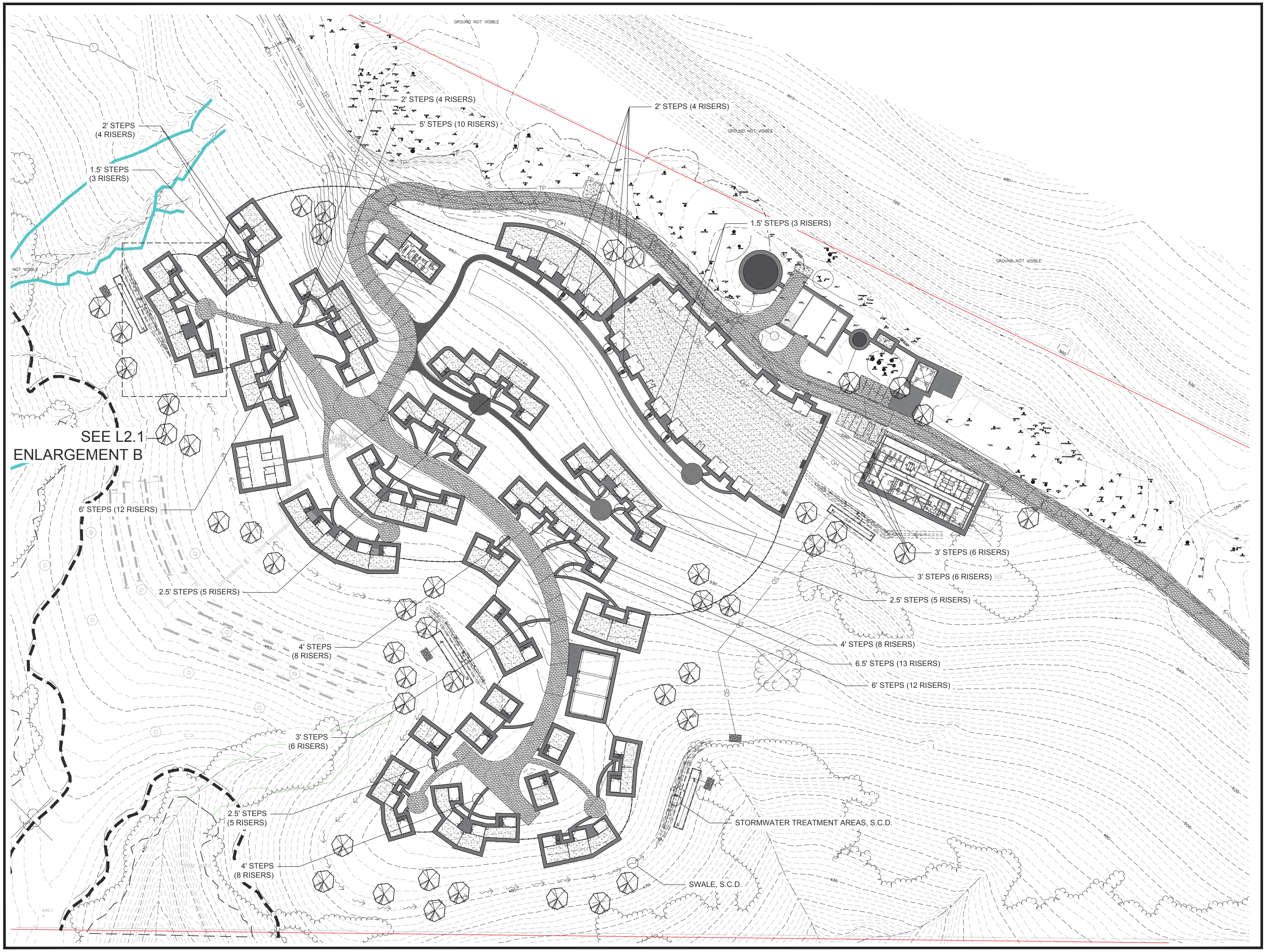
PROJECT NUMBER
18042.00

SHEET TITLE
LANDSCAPE PLAN

SCALE
Scale: 1" = 16'
0 8 16 32

North

SHEET NUMBER
L2.2



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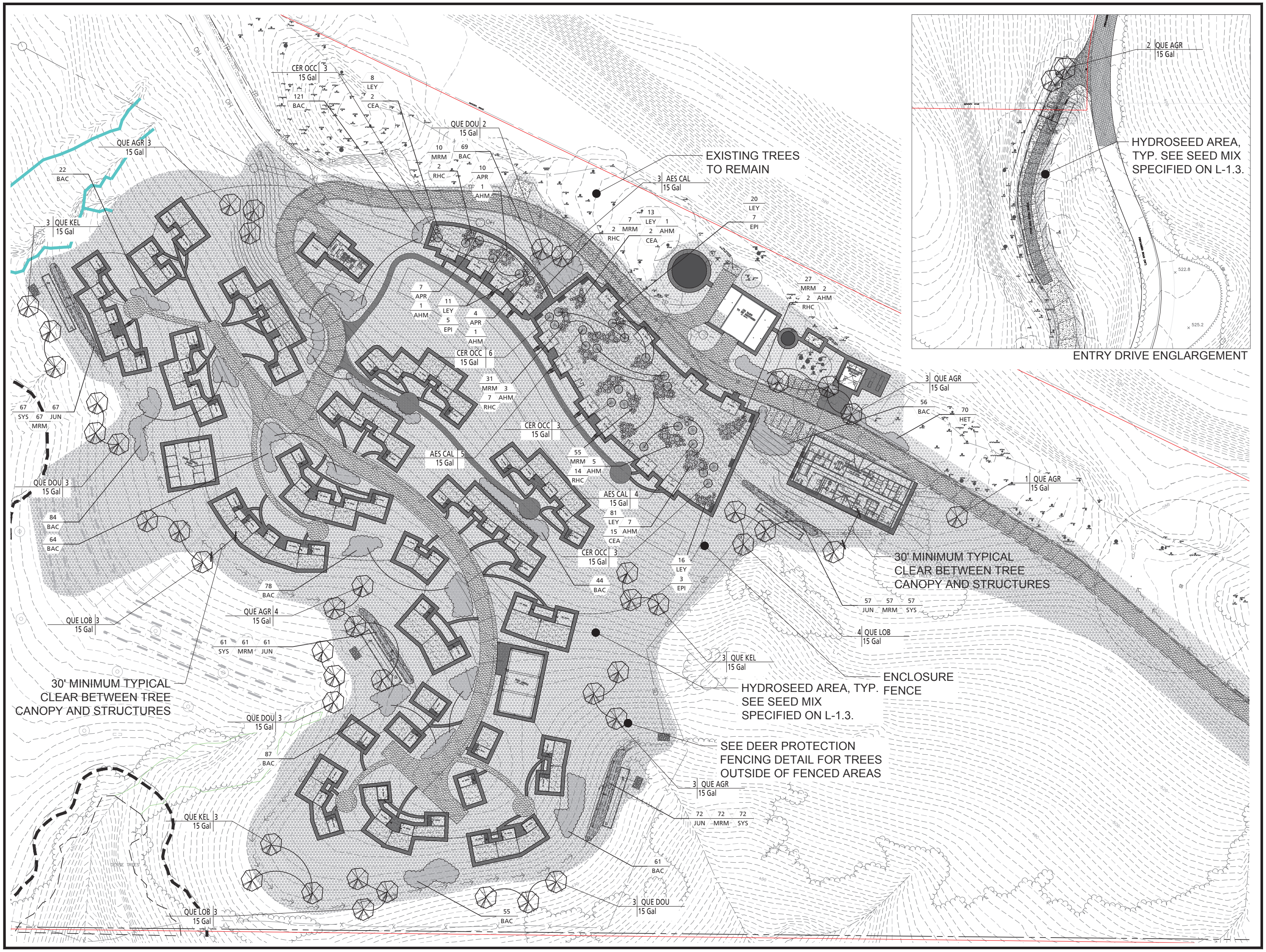
08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

PROJECT NUMBER
18042.00

SHEET TITLE
LANDSCAPE GRADING PLAN

SCALE
Scale: 1" = 50'
0 25 50 100
North

SHEET NUMBER
L3.0



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LICENSED LANDSCAPE ARCHITECT
D. Laymon No. 2397
6-30-24
Renewal Date
08.01.22
Date
STATE OF CALIFORNIA

ISSUES AND REVISIONS

No. Date	Description
07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
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08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

PROJECT NUMBER
18042.00

SHEET TITLE
PLANTING PLAN

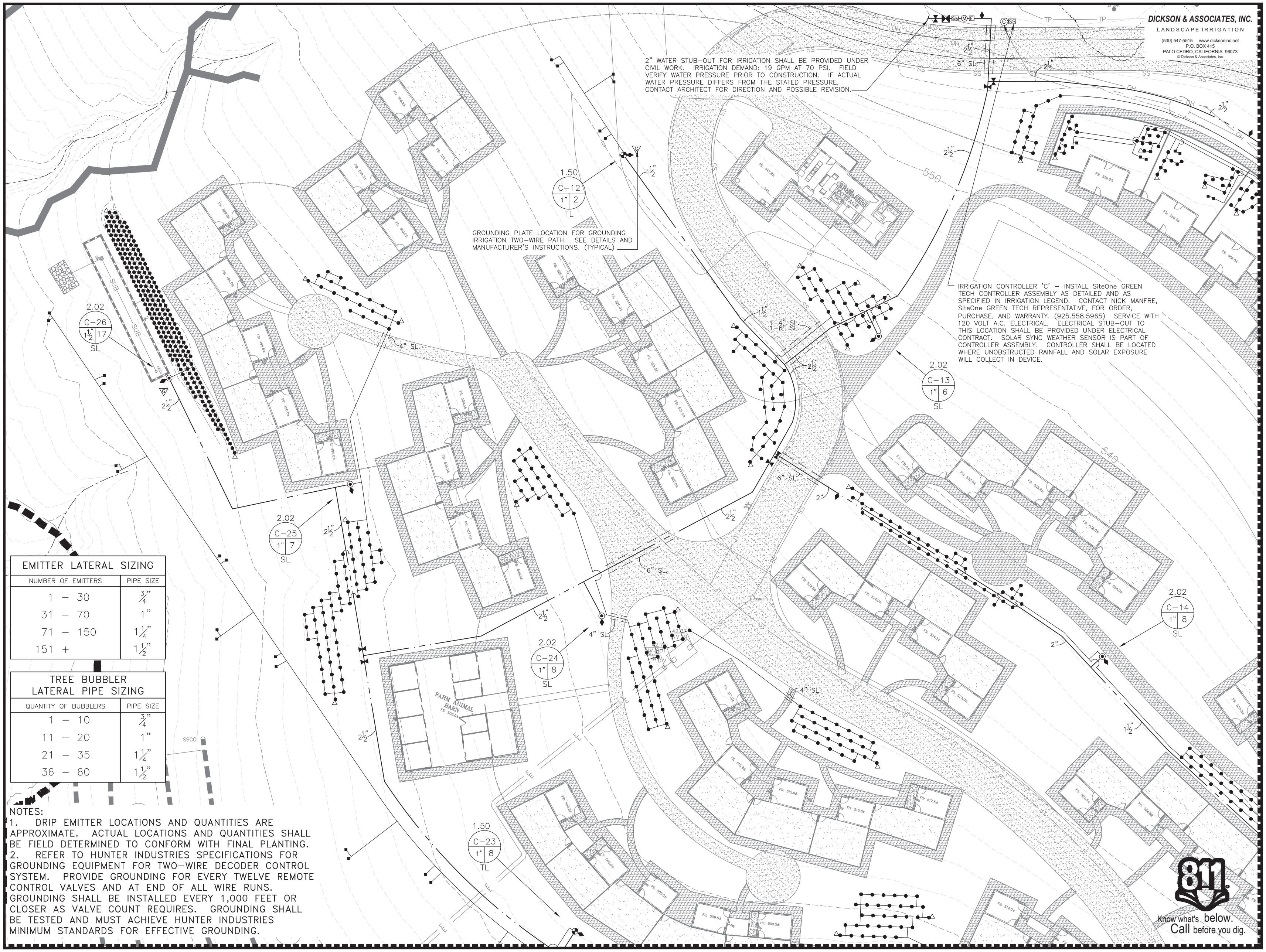
SCALE

North

Scale: 1" = 50'
0 25 50 100

SHEET NUMBER

L4.0



2" WATER STUB–OUT FOR IRRIGATION SHALL BE PROVIDED UNDER CIVIL WORK. IRRIGATION DEMAND: 19 GPM AT 70 PSI. FIELD VERIFY WATER PRESSURE PRIOR TO CONSTRUCTION. IF ACTUAL WATER PRESSURE DIFFERS FROM THE STATED PRESSURE, CONTACT ARCHITECT FOR DIRECTION AND POSSIBLE REVISION.

GROUNDING PLATE LOCATION FOR GROUNDING IRRIGATION TWO–WIRE PATH. SEE DETAILS AND MANUFACTURER'S INSTRUCTIONS. (TYPICAL)

IRRIGATION CONTROLLER 'C' – INSTALL SiteOne GREEN TECH CONTROLLER ASSEMBLY AS DETAILED AND AS SPECIFIED IN IRRIGATION LEGEND. CONTACT NICK MANFRE, SiteOne GREEN TECH REPRESENTATIVE, FOR ORDER, PURCHASE, AND WARRANTY. (925.558.5965) SERVICE WITH 120 VOLT A.C. ELECTRICAL. ELECTRICAL STUB–OUT TO THIS LOCATION SHALL BE PROVIDED UNDER ELECTRICAL CONTRACT. SOLAR SYNC WEATHER SENSOR IS PART OF CONTROLLER ASSEMBLY. CONTROLLER SHALL BE LOCATED WHERE UNOBSTRUCTED RAINFALL AND SOLAR EXPOSURE WILL COLLECT IN DEVICE.

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EMITTER LATERAL SIZING

NUMBER OF EMITTERS	PIPE SIZE
1 – 30	¾"
31 – 70	1"
71 – 150	1¼"
151 +	1½"

TREE BUBBLER LATERAL PIPE SIZING

QUANTITY OF BUBBLERS	PIPE SIZE
1 – 10	¾"
11 – 20	1"
21 – 35	1¼"
36 – 60	1½"

NOTES:
1. DRIP EMITTER LOCATIONS AND QUANTITIES ARE APPROXIMATE. ACTUAL LOCATIONS AND QUANTITIES SHALL BE FIELD DETERMINED TO CONFORM WITH FINAL PLANTING.
2. REFER TO HUNTER INDUSTRIES SPECIFICATIONS FOR GROUNDING EQUIPMENT FOR TWO–WIRE DECODER CONTROL SYSTEM. PROVIDE GROUNDING FOR EVERY TWELVE REMOTE CONTROL VALVES AND AT END OF ALL WIRE RUNS. GROUNDING SHALL BE INSTALLED EVERY 1,000 FEET OR CLOSER AS VALVE COUNT REQUIRES. GROUNDING SHALL BE TESTED AND MUST ACHIEVE HUNTER INDUSTRIES MINIMUM STANDARDS FOR EFFECTIVE GROUNDING.

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Gary D. Laymon No. 2397
6-30-22
01.14.22

ISSUES AND REVISIONS

No. Date	Description
07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1

PROJECT NUMBER
18042.00

SHEET TITLE
IRRIGATION PLAN

SCALE
North
Scale: 1" = 20'
0 10 20 40

SHEET NUMBER
L5.0

PEN. HS ANIMAL SANC/A/JOB/ 21–212/ L–IRR / L5.0 /SYMBOL SIZE: 240 /07–30–2022 ABD/LMD

NOTES:

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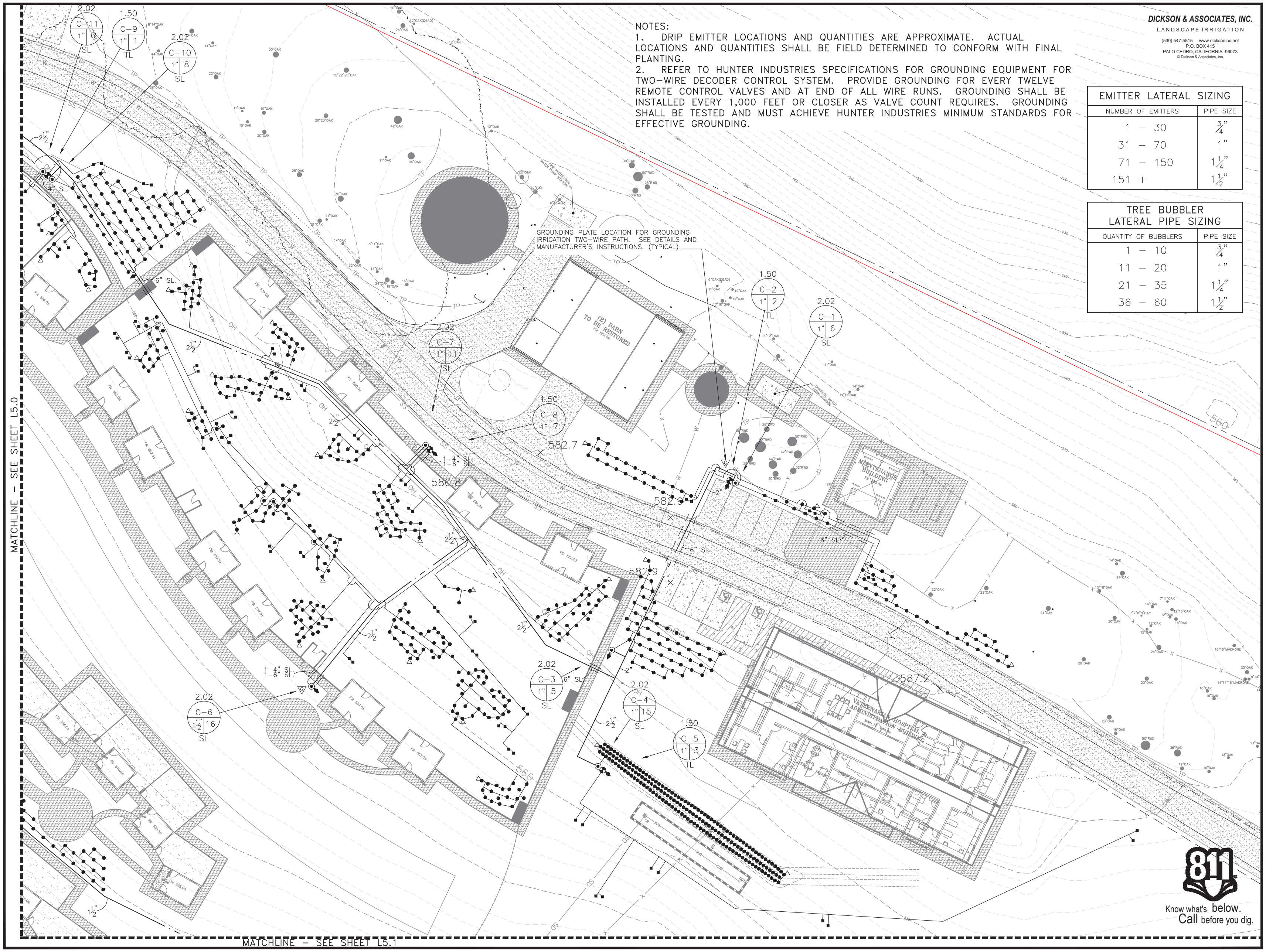
EMITTER LATERAL SIZING

NUMBER OF EMITTERS	PIPE SIZE
1 – 30	¾"
31 – 70	1"
71 – 150	1¼"
151 +	1½"

TREE BUBBLER LATERAL PIPE SIZING

QUANTITY OF BUBBLERS	PIPE SIZE
1 – 10	¾"
11 – 20	1"
21 – 35	1¼"
36 – 60	1½"



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07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
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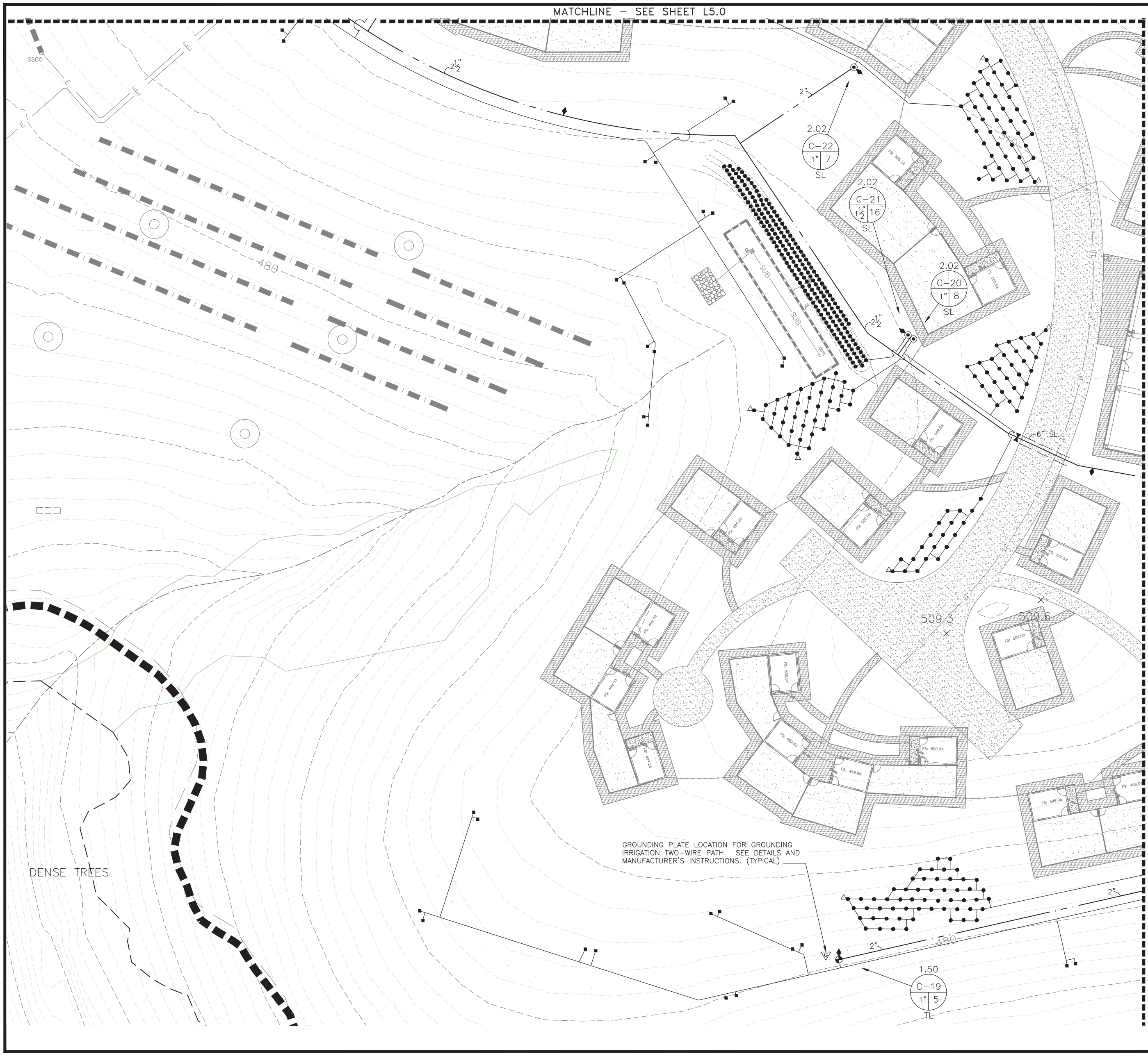
PROJECT NUMBER
18042.00

SHEET TITLE
IRRIGATION PLAN

SCALE
Scale: 1" = 20'
0 10 20 40
North

SHEET NUMBER
L5.1



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EMITTER LATERAL SIZING

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1 – 30	¾"
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QUANTITY OF BUBBLERS	PIPE SIZE
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ISSUES AND REVISIONS

No. Date	Description
07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1

PROJECT NUMBER
18042.00

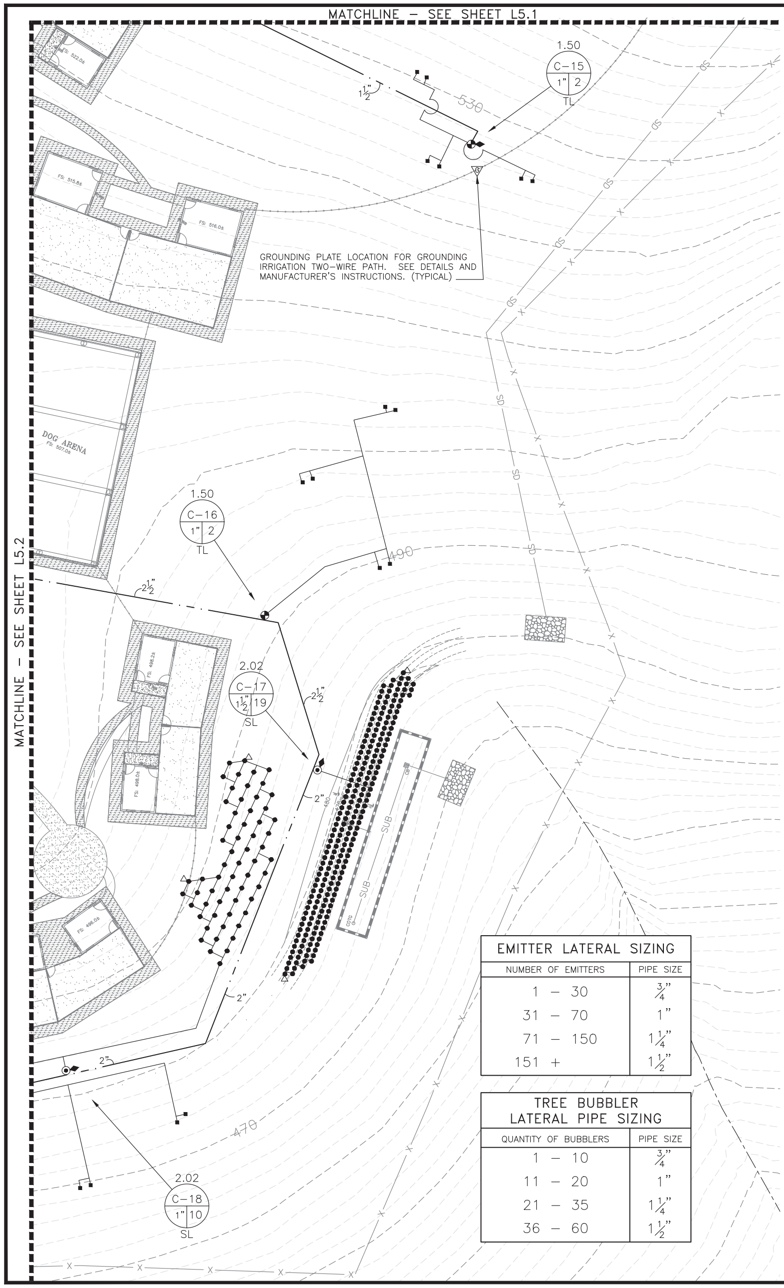
SHEET TITLE
IRRIGATION PLAN

SCALE
Scale: 1" = 20'
0 10 20 40

North

SHEET NUMBER
L5.2

PEN. HS ANIMAL SANC/A/JOB/ 21–212/ L–IRR / L5.2 /SYMBOL SIZE: 240 /07–30–2022 ABD/LMD



EMITTER LATERAL SIZING

NUMBER OF EMITTERS	PIPE SIZE
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TREE BUBBLER LATERAL PIPE SIZING

QUANTITY OF BUBBLERS	PIPE SIZE
1 – 10	¾"
11 – 20	1"
21 – 35	1¼"
36 – 60	1½"

WATER EFFICIENT LANDSCAPE WORKSHEET–WELO

WATER EFFICIENT LANDSCAPE WORKSHEET

This worksheet is filled out by the project applicant and it is a required element of the Landscape Documentation Package.

Reference Evapotranspiration (ETo) 49.5

Hydrozone # /Planting Description[a]	Plant Factor (PF)	Irrigation Method[b]	Irrigation Efficiency (IE)[c]	ETAF (PF/IE)	Landscape Area (sq. ft.)	ETAF x Area	Estimated Total Water Use (ETWU)[e]
Regular Landscape Areas							
Low Water-Use Plants	**0.30**	**Drip**	**0.81**	**0.37**	**34,759**	**12,861**	**394,699**
					(A)	**(B)**	
				Totals	**34,759**	**12,861**	**394,699**
Special Landscape Areas							
	[redacted]	[redacted]	[redacted]				
	[redacted]	[redacted]	[redacted]				
					(C)	**(D)**	
				Totals	**0**	**0**	
						ETWU Total	**394,699**
			Maximum Allowed Water Allowance (MAWA)[e]				**480,039**

[a] ***Hydrozone #/Planting Description***
E.g
1.) front lawn
2.) low water use plantings
3.) medium water use planting

[b] ***Irrigation Method***
overhead spray
or drip

[c] ***Irrigation Efficiency***
0.75 for spray head
0.81 for drip

[d] ***ETWU* (Annual Gallons Required) = *Eto x 0.62 x ETAF x Area***
where 0.62 is a conversion factor that converts acre- inches per acre per year to gallons per square foot per year.

[e] ***MAWA (Annual Gallons Allowed) = (*** *Eto) (0.62) [(ETAF x LA) + ((1-ETAF) x SLA)]*
where 0.62 is a conversion factor that converts acre-inches per acre per year to gallons per square foot per year, LA is the total landscape area in square feet, SLA is the total special landscape area in square feet, and ETAF is .55 for residential areas and 0.45 for non-residential areas.

ETAF Calculations

Average ETAF for Regular Landscape Areas must be 0.55 or below for residential areas, and 0.45 or below for non-residential areas.

Regular Landscape Areas

Total ETAF x Area (B)	12,861
Total Area (A)	34,759
Average ETAF	**0.37**

All Landscape Areas

Total ETAF x Area (B+D)	12,861
Total Area (A+C)	34,759
Sitewide ETAF (B+D) ÷ (A+C)	**0.37**

NOTES:

1. DRIP EMITTER LOCATIONS AND QUANTITIES ARE APPROXIMATE. ACTUAL LOCATIONS AND QUANTITIES SHALL BE FIELD DETERMINED TO CONFORM WITH FINAL PLANTING.
2. REFER TO HUNTER INDUSTRIES SPECIFICATIONS FOR GROUNDING EQUIPMENT FOR TWO–WIRE DECODER CONTROL SYSTEM. PROVIDE GROUNDING FOR EVERY TWELVE REMOTE CONTROL VALVES AND AT END OF ALL WIRE RUNS. GROUNDING SHALL BE INSTALLED EVERY 1,000 FEET OR CLOSER AS VALVE COUNT REQUIRES. GROUNDING SHALL BE TESTED AND MUST ACHIEVE HUNTER INDUSTRIES MINIMUM STANDARDS FOR EFFECTIVE GROUNDING.

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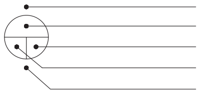
IRRIGATION LEGEND

SYMBOL	MODEL NUMBER	DESCRIPTION
●	PC–05	RAIN BIRD PRESSURE COMPENSATING EMITTER (SHRUB)
■	1401/CV–0500–FM	RAIN BIRD BUBBLER/NDS FLOW MANAGEMENT INLINE SPRING CHECK VALVE (TREE)
△	LT–T	FLUSH VALVE (SEE DETAIL) – KBI SCHEDULE 80 PVC FULL PORT BALL VALVE (THREAD X THREAD) (LINE SIZE)
Ⓜ	3200150–1½"	SUPERIOR NORMALLY CLOSED MASTER CONTROL VALVE
F	FSI–T10–001–1"/ICD–SEN (PART OF CONTROLLER EQUIPMENT PACKAGE)	CREATIVE SENSOR TECHNOLOGY FLOW SENSOR WITH HUNTER SENSOR DECODER
◕	100–PESB–PRS–D/LT–T	RAIN BIRD REMOTE CONTROL VALVE WITH PRESSURE REGULATING DIAL/KBI SCHEDULE 80 PVC FULL PORT BALL VALVE
⊙	XCZ–100–FLOW–PRB (1 GPM TO 15 GPM)	RAIN BIRD CONTROL ZONE KIT – PVC BALL VALVE, 1" PESB VALVE, AND 1" PRESSURE REGULATING (40 PSI) QUICK CHECK BASKET FILTER (200 MESH) WITH FLOW INDICATION
⊙	XCZ–150–LCS / LT–T (16 GPM TO 40 GPM)	RAIN BIRD CONTROL ZONE KIT – 1½" PESB VALVE AND 1½" PRESSURE REGULATING (40 PSI) SCREEN FILTER (120 MESH) / KBI SCHEDULE 80 PVC FULL PORT BALL VALVE
◆	33DRC	RAIN BIRD QUICK COUPLING VALVE
⋈	T–113–LF	NIBCO GATE VALVE – LEAD FREE (LINE SIZE)
⊠	975XL2–1½"	WILKINS REDUCED PRESSURE BACKFLOW ASSEMBLY (LEAD FREE)
▽G	182199IC	GROUNDING PLATE FOR GROUNDING IRRIGATION CONTROL TWO–WIRE PATH. SEE DETAILS AND MANUFACTURER'S (PAIGE ELECTRIC COMPANY) INSTRUCTIONS
Ⓕ	270DCFD	PAIGE ELECTRIC DECODER CABLE FUSE DEVICE
Ⓒ	CA6–HU4–75/HSSE/LPP/EMP–16/FAN–16/GTFS–100P"/ICD–SEN/ICD–100/P7354D	SiteOne GREEN TECH CONTROLLER ASSEMBLY WITH HUNTER ACC2 TWO–WIRE CONTROLLER IN A TOP OPENING STAINLESS STEEL STRONG BOX ENCLOSURE WITH LINE PRIMARY PROTECTION, CST FLOW SENSOR, HUNTER SENSOR DECODER (ICD–SEN), HUNTER SINGLE STATION TWO–WIRE DECODERS (ICD–100), HUNTER JACKETED DECODER CABLE (P7354D), ALL EARTH GROUNDING EQUIPMENT, ENCLOSURE MOUNTING PAD, ENCLOSURE FAN, AND SOLAR SYNC SENSOR ASSEMBLY. CONTACT NICK MANFRE, SiteOne GREEN TECH REPRESENTATIVE, FOR ORDER, PURCHASE, WARRANTY, AND PRE–CONSTRUCTION MEETING. (925.558.5965) PRIOR TO INSTALLATION OF IRRIGATION CONTROLLER AND ASSOCIATED COMPONENTS CONTACT CHRIS McNAIRY, HUNTER INDUSTRIES, (707.695.3890) WITH QUESTIONS REGARDING TWO–WIRE CONTROLLER COMPONENTS, INSTALLATION, WIRING, WIRE SPLICING, GROUNDING AND DECODER PROGRAMMING AS WELL AS PROGRAMMING OF CONTROLLER.
	ICD–HP	HUNTER HAND–HELD DECODER PROGRAMMER. CONTRACTOR SHALL PROVIDE ONE (1) PROGRAMMER TO OWNER AFTER USING TO PROGRAM SYSTEM DECODERS.
SS	SOLAR SYNC–SEN (PART OF CONTROLLER ASSEMBLY)	HUNTER SOLAR SYNC SENSOR (MOUNT IN A STRONG BOX VANDAL RESISTANT ENCLOSURE)



PRECIPITATION RATE
CONTROLLER & STATION NUMBER
APPROXIMATE FLOW (GPM)
REMOTE CONTROL VALVE SIZE AND FILTER SIZE
HYDROZONE – PLANT TYPE/WATER REQUIREMENT
SL – SHRUB & GROUNDCOVER/LOW WATER–USE
TL – TREE/LOW WATER–USE

——— · — · ———	MAINLINE:	1120–SCHEDULE 40 PVC PLASTIC PIPE WITH SCHEDULE 40 PVC SOLVENT–WELD FITTINGS. 18" COVER. 24" COVER UNDER VEHICULAR PAVING.
————	LATERAL LINE:	1120–SCHEDULE 40 PVC PLASTIC PIPE WITH SCHEDULE 40 PVC SOLVENT–WELD FITTINGS. 12" COVER. 24" COVER UNDER VEHICULAR PAVING.
— — — —	SLEEVING:	1120–SCHEDULE 40 PVC PLASTIC PIPE. COVER TO BE AS INDICATED IN SPECIFICATIONS OR AS INDICATED ABOVE FOR PIPE DEPTH OF COVER.

VALVE BOXES SHALL BE BLACK IN COLOR.

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PROJECT NUMBER
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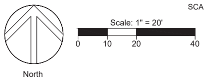
SHEET TITLE
IRRIGATION PLAN , LEGEND & WELO CALCULATION

SCALE


SHEET NUMBER
L5.3

IRRIGATION WATERING SCHEDULES

DRIP EMITTER IRRIGATION FOR LOW WATER-USE SHRUBS			
SPRINKLER MANUFACTURER	RAIN BIRD	LOCATION:	SAN MATEO COUNTY, CALIFORNIA
PRECIPITATION RATE (INCHES/HOUR):	2.02	EMITTER SPACING:	VARIES
IRRIGATION SYSTEM EFFICIENCY	0.81	EMITTER FLOW:	5 GPH
PLANT FACTOR:	0.30		
YEAR 2 REDUCTION AMOUNT:	-10% OF YEAR 1 (ESTABLISHMENT) RUN TIME MINUTES		

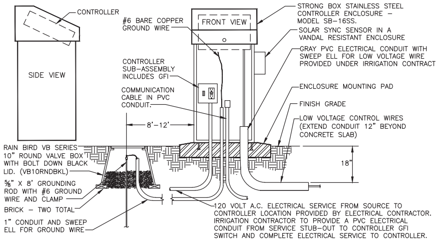
MONTH:		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
ETO PER MONTH (INCHES):		1.80	2.20	3.40	4.80	5.60	6.30	6.50	6.20	4.80	3.70	2.40	1.80	49.50
ETO PER WEEK (INCHES):		0.416	0.508	0.785	1.109	1.293	1.455	1.501	1.432	1.109	0.855	0.554	0.416	
APPLIED ETO PER WEEK (INCHES):		0.154	0.188	0.291	0.411	0.479	0.539	0.556	0.530	0.411	0.316	0.205	0.154	
MINUTES OF WATER PER WEEK:	YEAR 1	5	6	9	12	14	16	17	16	12	9	6	5	
	YEAR 2	4	5	8	11	13	14	15	14	11	8	5	4	
DAYS PER WEEK:	YEAR 1	1	1	2	3	3	3	3	3	3	2	1	1	
	YEAR 2	1	1	2	3	3	3	3	3	3	2	1	1	
MINUTES OF WATER PER DAY:	YEAR 1	5	6	4	4	5	5	6	5	4	5	6	5	
	YEAR 2	4	5	4	4	4	5	5	5	4	4	5	4	
CYCLES PER DAY:	YEAR 1	1	1	1	1	1	1	1	1	1	1	1	1	
	YEAR 2	1	1	1	1	1	1	1	1	1	1	1	1	
MINUTES PER CYCLE:	YEAR 1	5	6	4	4	5	5	6	5	4	5	6	5	
	YEAR 2	4	5	4	4	4	5	5	5	4	4	5	4	

TREE BUBBLER IRRIGATION FOR LOW WATER-USE TREES			
SPRINKLER MANUFACTURER	RAIN BIRD	LOCATION:	SAN MATEO COUNTY, CALIFORNIA
PRECIPITATION RATE (INCHES/HOUR):	1.50	HEAD SPACING:	VARIES
IRRIGATION SYSTEM EFFICIENCY	0.81	HEAD GPM:	0.25 X 2
PLANT FACTOR:	0.30		
YEAR 2 REDUCTION AMOUNT:	-10% OF YEAR 1 (ESTABLISHMENT) RUN TIME MINUTES		

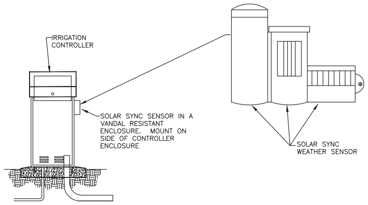
MONTH:		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	TOTAL
ETO PER MONTH (INCHES):		1.80	2.20	3.40	4.80	5.60	6.30	6.50	6.20	4.80	3.70	2.40	1.80	49.50
ETO PER WEEK (INCHES):		0.416	0.508	0.785	1.109	1.293	1.455	1.501	1.432	1.109	0.855	0.554	0.416	
APPLIED ETO PER WEEK (INCHES):		0.154	0.188	0.291	0.411	0.479	0.539	0.556	0.530	0.411	0.316	0.205	0.154	
MINUTES OF WATER PER WEEK:	YEAR 1	6	8	12	16	19	22	22	21	16	13	8	6	
	YEAR 2	6	7	10	15	17	19	20	19	15	11	7	6	
DAYS PER WEEK:	YEAR 1	1	1	1	1	1	1	1	1	1	1	1	1	
	YEAR 2	1	1	1	1	1	1	1	1	1	1	1	1	
MINUTES OF WATER PER DAY:	YEAR 1	6	8	12	16	19	22	22	21	16	13	8	6	
	YEAR 2	6	7	10	15	17	19	20	19	15	11	7	6	
CYCLES PER DAY:	YEAR 1	1	1	1	1	1	1	1	1	1	1	1	1	
	YEAR 2	1	1	1	1	1	1	1	1	1	1	1	1	
MINUTES PER CYCLE:	YEAR 1	6	8	12	16	19	22	22	21	16	13	8	6	
	YEAR 2	6	7	10	15	17	19	20	19	15	11	7	6	

NOTES:
THE CHARTS ARE INTENDED TO BE USED AS A GUIDELINE ONLY AND INDICATE APPROXIMATE RUN TIMES (IN MINUTES) FOR EACH ZONE BASED ON ESTIMATED WEEKLY WATER REQUIREMENTS FOR ESTABLISHED PLANT MATERIAL. THE FIGURES SHOWN IN THIS SCHEDULE ARE APPROXIMATE AND HAVE BEEN DEVELOPED FROM LOCAL CURRENT AVERAGES FOR EVAPOTRANSPIRATION, AND REFLECT MAXIMUM IRRIGATION REQUIREMENTS OF THE PLANT MATERIAL BASED ON PLANT TYPE AND SPACING. ACTUAL RUN TIMES MAY BE DIFFERENT DEPENDING ON A VARIETY OF FACTORS INCLUDING TOPOGRAPHY, SOIL STRUCTURE, SUN AND WIND EXPOSURE, WEATHER, ACTUAL PLANT WATER REQUIREMENTS, ETC.

QUANTITY AND SIZE OF CONDUITS WILL VARY DEPENDING ON CONTROLLER FEATURES. FOLLOW MANUFACTURER'S REQUIREMENTS FOR CONDUITS FOR COMMUNICATION CABLE, SENSOR CABLE, ETC.



CONTROLLER – TOP OPENING ENCLOSURE
NOT TO SCALE



SOLAR SYNC SENSOR
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DICKSON & ASSOCIATES, INC.
LANDSCAPE IRRIGATION
(530) 547-5515 www.dicksoninc.net
P.O. BOX 415
PALO CEDRO, CALIFORNIA 96073

IRRIGATION NOTES

1. THESE IRRIGATION DRAWINGS ARE DIAGRAMMATIC AND INDICATIVE OF THE WORK TO BE INSTALLED. ALL PIPING, VALVES, ETC. SHOWN WITHIN PAVED AREAS IS FOR CLARITY ONLY AND ARE TO BE INSTALLED WITHIN PLANTING AREAS WHERE POSSIBLE. DUE TO THE SCALE OF THE DRAWINGS, IT IS NOT POSSIBLE TO INDICATE ALL OFFSETS, FITTINGS, SLEEVES, ETC., WHICH MAY BE REQUIRED. THE CONTRACTOR IS REQUIRED TO INVESTIGATE THE STRUCTURAL AND FINISHED CONDITIONS AFFECTING ALL OF THE CONTRACT WORK INCLUDING OBSTRUCTIONS, GRADE DIFFERENCES OR AREA DIMENSIONAL DIFFERENCES WHICH MAY NOT HAVE BEEN CONSIDERED IN THE ENGINEERING. IN THE EVENT OF FIELD DIFFERENCES, THE CONTRACTOR IS REQUIRED TO PLAN THE INSTALLATION WORK ACCORDINGLY BY NOTIFICATION AND APPROVAL OF THE OWNER'S AUTHORIZED REPRESENTATIVE AND ACCORDING TO THE CONTRACT SPECIFICATION. THE CONTRACTOR IS ALSO REQUIRED TO NOTIFY AND COORDINATE IRRIGATION CONTRACT WORK WITH ALL APPLICABLE CONTRACTORS FOR THE LOCATION AND INSTALLATION OF PIPE, CONDUIT OR SLEEVES THROUGH OR UNDER WALLS, ROADWAYS, PAVING, STRUCTURE, ETC., BEFORE CONSTRUCTION. IN THE EVENT THESE NOTIFICATIONS ARE NOT PERFORMED, THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR ALL REQUIRED REVISIONS.

2. THE CONTRACTOR SHALL EXERCISE CARE IN LOCATING PIPING AS TO NOT CONFLICT WITH OTHER UTILITIES. DO NOT INSTALL IRRIGATION PIPING PARALLEL TO AND DIRECTLY OVER OTHER UTILITIES.

3. THE INTENT OF THIS IRRIGATION SYSTEM IS TO PROVIDE THE MINIMUM AMOUNT OF WATER REQUIRED TO SUSTAIN GOOD PLANT HEALTH.

4. IT IS THE RESPONSIBILITY OF THE LANDSCAPE MAINTENANCE CONTRACTOR AND/OR OWNER TO PROGRAM THE IRRIGATION CONTROLLER TO PROVIDE THE MINIMUM AMOUNT OF WATER NEEDED TO SUSTAIN GOOD PLANT HEALTH. THIS INCLUDES MAKING ADJUSTMENTS TO THE PROGRAM FOR SEASONAL WEATHER CHANGES, PLANT MATERIAL WATER REQUIREMENTS, MOUNDS AND SLOPES, SUN, SHADE, AND WIND EXPOSURES.

5. AT THE END OF THE REQUIRED MAINTENANCE PERIOD OF THE CONTRACTOR, THE OWNER SHALL PROVIDE REGULAR MAINTENANCE OF THE IRRIGATION SYSTEM TO ENSURE THE EFFICIENT USE OF WATER. MAINTENANCE SHALL INCLUDE, BUT NOT BE LIMITED TO CHECKING, ADJUSTING, AND REPAIRING IRRIGATION EQUIPMENT AND CONTROL SYSTEM.

6. 120 VOLT A.C. (2.5 AMP DEMAND) ELECTRICAL SERVICE TO IRRIGATION CONTROLLER LOCATION TO BE PROVIDED UNDER ELECTRICAL CONTRACT WORK. IRRIGATION CONTRACTOR TO MAKE FINAL CONNECTION FROM ELECTRICAL STUB-OUT TO CONTROLLER AND PROVIDE PROPER GROUNDING PER CONTROLLER MANUFACTURER'S INSTRUCTIONS.

7. CONTROLLER SHALL HAVE ITS OWN GROUND ROD. THE GROUND ROD SHALL BE AN EIGHT FOOT LONG BY 5/8" DIAMETER U.L. APPROVED COPPER CLAD ROD. NO MORE THAN 6" OF THE GROUND ROD TO BE ABOVE GRADE. CONNECT #6 GAUGE WIRE WITH A U.L. APPROVED GROUND ROD CLAMP TO ROD AND BACK TO GROUND SCREW AT BASE OF CONTROLLER WITH APPROPRIATE CONNECTOR. THIS WIRE SHOULD BE AS SHORT AS POSSIBLE, AVOIDING ANY KINKS OR BENDING. GROUND ROD SHALL BE A MINIMUM OF EIGHT FEET (8') FROM IRRIGATION CONTROL WIRE BUNDLE.

8. IRRIGATION CONTROLLER TO HAVE ITS OWN INDEPENDENT 24 VOLT COMMON GROUND WIRE.

9. PRIOR TO INSTALLATION OF IRRIGATION CONTROLLER AND ASSOCIATED COMPONENTS CONTRACTOR SHALL CONTACT HUNTER REPRESENTATIVE (CHRIS McNAIRY 707.695.3890) FOR ON-SITE TUTORIAL ON INSTALLATION PROCEDURES FOR CONTROLLER, DECODERS, TWO-WIRE CABLE, WIRE SPLICES, GROUNDING, INTERFACE WITH FLOW SENSOR AND MASTER VALVE, AS WELL AS PROGRAMING OF CONTROLLER.

10. CONTROLLER PROGRAMMING:
    A. CONTRACTOR SHALL PROGRAM THE IRRIGATION CONTROLLER TO PROVIDE IRRIGATION TO ALL PLANTING WITHIN THE ALLOWED WATERING WINDOW OF TIME AS REQUIRED. THE CONTRACTOR SHALL CREATE CONTROLLER PROGRAMING THAT WILL NOT EXCEED THE MAXIMUM GALLONS PER MINUTE FLOW RATE STATED ON THE DRAWINGS, AND NOT EXCEED THE CAPACITY OF ANY MAINLINE PIPING.
    B. CONTRACTOR SHALL PROGRAM CONTROLLER TO MONITOR FLOW CONDITIONS AND RESPOND WITH CONTROL OF MASTER VALVE AND/OR RECORDING ALARM CONDITIONS FOR USE BY MAINTENANCE PERSONNEL.

11. IRRIGATION CONTROL WIRES SHALL BE HUNTER JACKETED DECODER CABLES (PAIGE ELECTRIC P7354D) WITH U.L. APPROVAL FOR DIRECT BURIAL IN GROUND, SIZE #14-1. SPLICE SHALL BE MADE WITH 3M-DBR/Y-6 SEAL PACKS.

12. CONNECT FLOW SENSOR TO CONTROLLER VIA FLOW SENSOR DECODER AND TWO-WIRE PATH PER HUNTER SPECIFICATIONS.

13. SPLICING OF DECODER CABLES IS NOT PERMITTED EXCEPT IN VALVE BOXES. SEAL WIRE SPLICES WITH 3M-DBR/Y-6 SPLICE SEALING DEVICES OF SIZE COMPATIBLE WITH WIRE SIZE. LEAVE A 36" LONG COIL OF EXCESS CABLE AT EACH SPLICE AND A 36" LONG EXPANSION LOOP EVERY 100 FEET ALONG WIRE RUN. TAPE DECODER CABLES TOGETHER EVERY TEN FEET. TAPING IS NOT REQUIRED INSIDE SLEEVES.

14. PLASTIC VALVE BOXES ARE TO BE BLACK IN COLOR WITH BOLT DOWN, NON-HINGED COVER MARKED "IRRIGATION". BOX BODY SHALL HAVE KNOCK OUTS. MANUFACTURER SHALL BE RAIN BIRD.

15. INSTALL REMOTE CONTROL VALVE BOXES 12" FROM WALK, CURB, HEADER BOARD, BUILDING, OR LANDSCAPE FEATURE. AT MULTIPLE VALVE BOX GROUPS, EACH BOX SHALL BE AN EQUAL DISTANCE FROM THE WALK, CURB, ETC. AND EACH BOX SHALL BE 12" APART. SHORT SIDE OF RECTANGULAR VALVE BOXES SHALL BE PARALLEL TO WALK, CURB, ETC.

16. VALVE LOCATIONS SHOWN ARE DIAGRAMMATIC. INSTALL IN GROUND COVER/SHRUB AREAS WHERE POSSIBLE.

17. THE RAIN BIRD PESB REMOTE CONTROL VALVE SPECIFIED ON THE DRAWINGS IS A PRESSURE REDUCING TYPE. SET THE DISCHARGE PRESSURE TO 30 PSI.

18. THE IRRIGATION CONTRACTOR SHALL FLUSH ALL SYSTEMS FOR OPTIMUM PERFORMANCE AND COVERAGE OF THE LANDSCAPE AREA. THIS SHALL INCLUDE ADJUSTING THE FLOW CONTROL AT EACH VALVE TO OBTAIN THE OPTIMUM OPERATING PRESSURE FOR EACH SYSTEM.

19. ALL IRRIGATION PIPING THAT IS NOT A DIRECT LINE TO TREES SHALL BE A MINIMUM FIVE (5) FEET FROM CENTER OF TREE.

20. LOCATE EMITTERS ON UP-HILL SIDE OF PLANT.

21. LOCATE BUBBLERS ON UP-HILL SIDE OF TREE.

22. INSTALL A NDS FLOW MANAGEMENT INLINE SPRING LOADED CHECK VALVE (CV-0500-FM) BELOW THOSE BUBBLERS WHERE LOW HEAD DRAINAGE WILL CAUSE EROSION AND/OR EXCESS WATER.

23. WHERE IT IS NECESSARY TO EXCAVATE ADJACENT TO EXISTING TREES, THE CONTRACTOR SHALL USE ALL POSSIBLE CARE TO AVOID INJURY TO TREES AND TREE ROOTS. EXCAVATION IN AREAS WHERE TWO (2) INCH AND LARGER ROOTS OCCUR SHALL BE DONE BY HAND. TRENCHES ADJACENT TO TREE SHOULD BE CLOSED WITHIN TWENTY-FOUR (24) HOURS; AND WHERE THIS IS NOT POSSIBLE, THE SIDE OF THE TRENCH ADJACENT TO THE TREE SHALL BE KEPT SHADED WITH BURLAP OR CANVAS.

24. IRRIGATION CONTRACTOR TO NOTIFY ALL LOCAL JURISDICTIONS FOR INSPECTION AND TESTING OF INSTALLED BACKFLOW PREVENTION DEVICE.

25. PRESSURE TEST PROCEDURE. THE CONTRACTOR SHALL:
    A. NOTIFY ARCHITECT AT LEAST THREE (3) DAY IN ADVANCE OF TESTING.
    B. PERFORM TESTING AT HIS OWN EXPENSE.
    C. CENTER LOAD PIPING WITH SMALL AMOUNT OF BACKFILL TO PREVENT ARCHING OR SLIPPING UNDER PRESSURE. NO FITTING SHALL BE COVERED.
    D. APPLY THE FOLLOWING TESTS AFTER WELD PLASTIC PIPE JOINTS HAVE CURED AT LEAST 24 HOURS.
        1. TEST LIVE (CONSTANT PRESSURE) AND QUICK COUPLER LINE HYDROSTATICALLY AT 125 PSI MINIMUM. LINES WILL BE APPROVED IF TEST PRESSURE IS MAINTAINED FOR SIX (6) HOURS. THE LINE WILL BE APPROVED OR NOT APPROVED AS SUCH RESULTS MAY INDICATE. THE CONTRACTOR SHALL MAKE TESTS AND REPAIRS AS NECESSARY UNTIL TEST CONDITIONS ARE MET.
        2. TEST RCV CONTROLLED LATERAL LINES WITH WATER AT LINE PRESSURE AND VISUALLY INSPECT FOR LEAKS. RETEST AFTER CORRECTING DEFECTS.

26. THE SPRINKLER SYSTEM DESIGN IS BASED ON THE MINIMUM OPERATING PRESSURE SHOWN ON THE IRRIGATION DRAWINGS. THE IRRIGATION CONTRACTOR SHALL VERIFY WATER PRESSURE PRIOR TO CONSTRUCTION. REPORT ANY DIFFERENCE BETWEEN THE WATER PRESSURE INDICATED ON THE DRAWINGS AND THE ACTUAL PRESSURE READING AT THE IRRIGATION POINT OF CONNECTION TO THE OWNER'S AUTHORIZED REPRESENTATIVE.

27. IRRIGATION DEMAND: 19 GPM AT 70 PSI STATIC PRESSURE AT IRRIGATION POINT OF CONNECTION. FIELD VERIFY WATER PRESSURE PRIOR TO CONSTRUCTION. IF ACTUAL WATER PRESSURE DIFFERS FROM THE STATED PRESSURE CONTACT ARCHITECT FOR DIRECTION AND POSSIBLE REVISION.

28. PIPE THREAD SEALANT COMPOUND SHALL BE RECTOR SEAL T+2, CHRISTY'S ULTRA SEAL, OR APPROVED EQUAL.

29. RECORD DRAWINGS:
    A. THE CONTRACTOR SHALL MAINTAIN IN GOOD ORDER IN THE FIELD OFFICE ONE COMPLETE SET OF BLACK LINE PRINTS OF ALL IRRIGATION DRAWINGS WHICH FORM A PART OF THE CONTRACT, SHOWING ALL WATER LINES, HEADS, VALVES, CONTROLLERS AND STUB-OUTS. IN THE EVENT ANY WORK IS NOT INSTALLED AS INDICATED ON THE DRAWINGS, SUCH WORK SHALL BE CORRECTED AND DIMENSIONED ACCURATELY FROM THE BUILDING WALLS.
    B. CONTRACTOR SHALL RECORD EACH DECODER NUMBER AND ASSOCIATED CONTROLLER STATION NUMBER. PROVIDE LIST WITH RECORD AS-BUILT DRAWINGS.
    C. ALL UNDERGROUND STUB-OUTS FOR FUTURE CONNECTIONS AND VALVES SHALL BE LOCATED AND DIMENSIONED ACCURATELY FROM BUILDING WALLS ON ALL RECORD DRAWINGS.
    D. UPON COMPLETION OF THE WORK, OBTAIN REPRODUCIBLE PRINTS FROM ARCHITECT AND NEATLY CORRECT THE PRINTS TO SHOW THE AS-BUILT CONDITIONS.

30. FINE TUNE IRRIGATION SYSTEM TO PROVIDE COMPLETE AND UNIFORM COVERAGE OF THE LANDSCAPE WHILE AVOIDING RUNOFF OF WATER ONTO NON-IRRIGATED AREAS, PAVED AND OTHERWISE. THIS INCLUDES PROGRAMMING THE CONTROLLER RUN TIMES FOR OPTIMIZING SOIL INFILTRATION WITH OUT PUDDLING OR RUNOFF.

31. WARRANTY:
    A. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO FILL AND REPAIR ALL NECESSARY PLANTING DUE TO THE SETTLEMENT OF IRRIGATION TRENCHES FOR ONE YEAR FOLLOWING COMPLETION AND ACCEPTANCE OF THE JOB.
    B. THE CONTRACTOR SHALL ALSO WARRANTY ALL MATERIALS, EQUIPMENT AND WORKMANSHIP FURNISHED BY HIM TO BE FREE OF ALL DEFECTS OF WORKMANSHIP AND MATERIALS, AND SHALL AGREE TO REPLACE AT HIS EXPENSE, AT ANY TIME WITHIN ONE YEAR AFTER INSTALLATION IS ACCEPTED, ANY AND ALL DEFECTIVE PARTS THAT MAY BE FOUND.

PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY

Peninsula Humane Society & SPCA

KSH
ARCHITECTS
KORTH SUNSERI HAGEY

THE
GUZZARDO
PARTNERSHIP INC.
Landscape Architects • Land Planners
181 Greenwich Street
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T 415 433 4672
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LICENSED LANDSCAPE ARCHITECT
Gary D. Laymon No. 2397
Signature
6-30-22
Renewal Date
01.14.22
Date
STATE OF CALIFORNIA

ISSUES AND REVISIONS

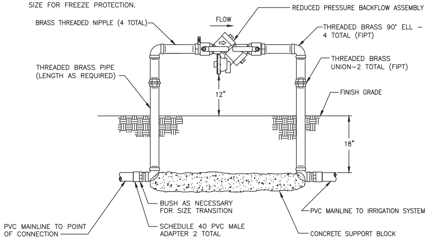
No. Date	Description
07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1

PROJECT NUMBER
18042.00

SHEET TITLE
IRRIGATION NOTES, WATERING SCHEDULES, AND DETAILS
SCALE

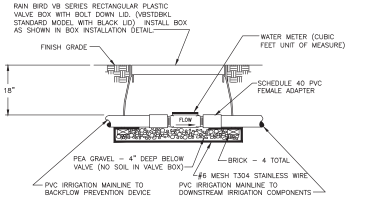
SHEET NUMBER
L5.4

NOTE: PROVIDE POLAR PARKA OF APPROPRIATE SIZE FOR FREEZE PROTECTION.



REDUCED PRESSURE BACKFLOW ASSEMBLY

NOT TO SCALE



SUB–METER DETAIL

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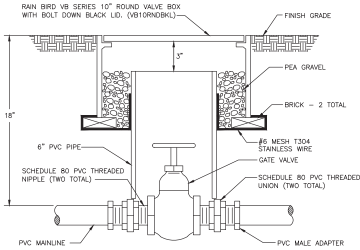
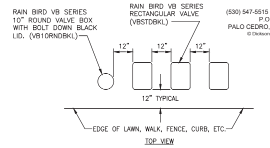


GATE VALVE

NOT TO SCALE



1. CENTER VALVE BOX OVER REMOTE CONTROL VALVE TO FACILITATE SERVICING VALVE.
2. SET BOXES 1" ABOVE FINISH GRADE OR MULCH COVER IN GROUND COVER/SHRUB AREA AND FINISH GRADE IN TURF AREA.
3. SET RCV AND VALVE BOX ASSEMBLY IN GROUND COVER/SHRUB AREA WHERE POSSIBLE. INSTALL IN LAWN ONLY IF GROUND COVER DOES NOT EXIST ADJACENT TO LAWN.
4. SET BOXES PARALLEL TO EACH OTHER AND PERPENDICULAR TO EDGE OF LAWN, WALK, FENCE, CURB, ETC.
5. AVOID HEAVILY COMPACTING SOIL AROUND VALVE BOXES TO PREVENT COLLAPSE AND DEFORMATION OF VALVE BOX SIDES.
6. INSTALL EXTENSION BY VALVE BOX MANUFACTURER AS REQUIRED TO COMPLETELY ENCLOSE ASSEMBLY FOR EASY ACCESS.

VALVE BOX INSTALLATION

NOT TO SCALE

DICKSON & ASSOCIATES, INC.
LANDSCAPE IRRIGATION
(530) 547-5515 www.dicksoninc.net
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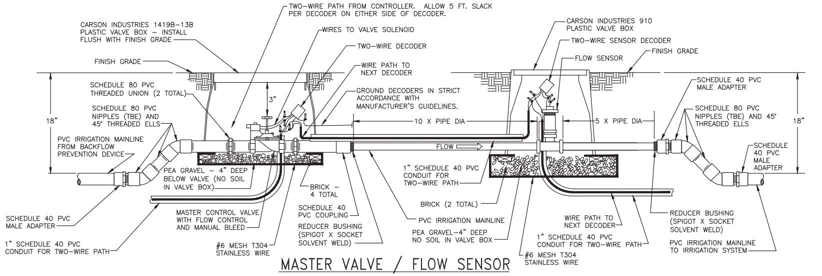
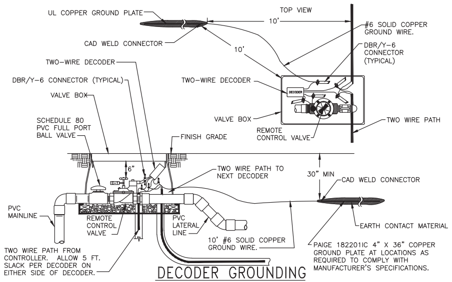
PALO CEDRO, CALIFORNIA 96073



MASTER VALVE / FLOW SENSOR

NOT TO SCALE



DECODER GROUNDING

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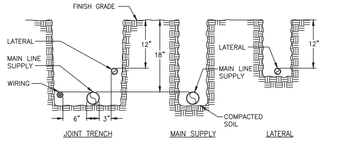
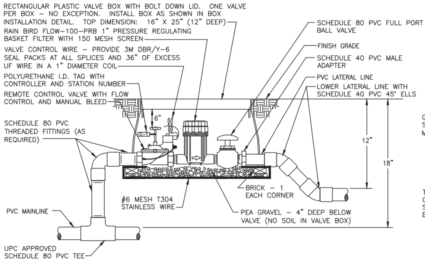


NOTES:
1. ALL PLASTIC PIPING SHALL BE INSTALLED IN THE TRENCH IN A SERPENTINE MANNER AS PER THE MANUFACTURER'S SPECIFICATIONS.
2. ALL SUPPLY LINES TO BE INSTALLED AS PER MANUFACTURER'S SPECIFICATIONS.
3. TAPE AND BUNDLE TUBING OR WIRING AT 10 FEET INTERVALS.
4. ALL 120 VOLT WIRING IN CONDUIT TO BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE CODES.
5. BACKFILL MATERIAL SHALL BE THE EARTH EXCAVATED FROM THE TRENCHES, FREE FROM ROCKS, CONCRETE CHUNKS, AND OTHER FOREIGN OR COARSE MATERIALS. CAREFULLY SELECT BACKFILL THAT IS TO BE PLACED NEXT TO PLASTIC PIPE TO AVOID ANY SHARP OBJECTS WHICH MAY DAMAGE THE PIPE.

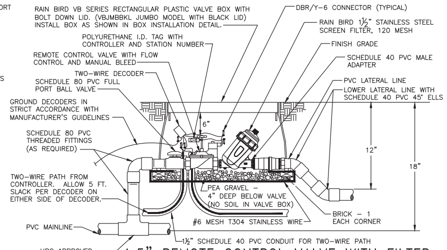
TRENCHING DETAIL

NOT TO SCALE



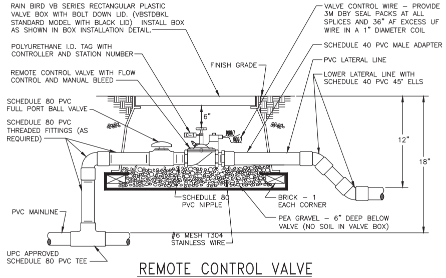
1" REMOTE CONTROL VALVE WITH FILTER & PRESSURE REGULATION FOR DRIP

NOT TO SCALE



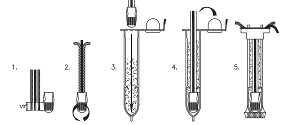
1.5" REMOTE CONTROL VALVE WITH FILTER & PRESSURE REGULATION FOR DRIP

NOT TO SCALE



REMOTE CONTROL VALVE

NOT TO SCALE

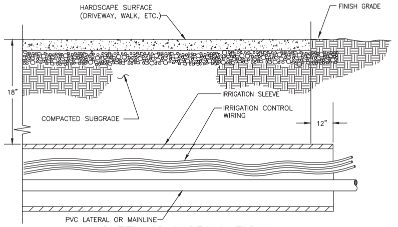


INSTRUCTIONS:
1. USE 3M–DBR/Y–6 WEATHER PROOF SPLICE.
2. STRIP WIRES APPROXIMATELY 1/2" (12.7 MM) TO EXPOSE WIRE.
3. TWIST CONNECTOR AROUND WIRES CLOCKWISE UNTIL HAND TIGHT, DO NOT OVERTIGHTEN.
4. INSERT WIRE ASSEMBLY INTO PLASTIC TUBE UNTIL WIRE CONNECTOR SNAPS PAST LIP IN BOTTOM OF TUBE.
5. PLACE WIRES WHICH EXIT TUBE IN WIRE EXIT HOLES AND CLOSE CAP UNTIL IT SNAPS.
6. INSPECT FINAL SPLICE ASSEMBLY TO BE SECURE AND FINISHED.

WEATHERPROOF SPLICE ASSEMBLY

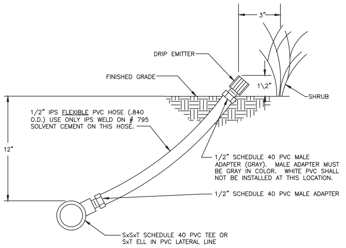
NOT TO SCALE

NOTES:
1. SLEEVE UNDER VEHICULAR PAVING SHALL BE BURIED TO A DEPTH OF 24" COVER.
2. SLEEVE IS TO EXTEND 12" BEYOND EDGE OF PAVING.



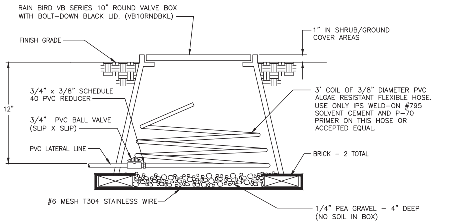
SLEEVING INSTALLATION

NOT TO SCALE



SHRUB DRIP EMITTER WITH FLEXIBLE RISER

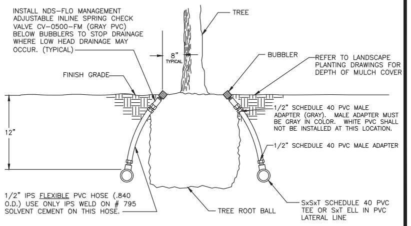
NOT TO SCALE



NOTE: THIS DETAIL IS TYPICAL FOR ALL EMITTER LATERAL ENDS.

EMITTER LINE FLUSH VALVE

NOT TO SCALE



TREE BUBBLERS

NOT TO SCALE

DICKSON & ASSOCIATES, INC.
LANDSCAPE IRRIGATION
(530) 547-5515 www.dicksoninc.net
P.O. BOX 415
PALO CEDRO, CALIFORNIA 96073

PEN. HS ANIMAL SANC/A/JOB/ 21–212/ L–IRR / L5.5 /SYMBOL SIZE: NTS /07–30–2022 ABD/LMD

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San Francisco, CA 94111
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F 415 433 5003

01.14.22

ISSUES AND REVISIONS

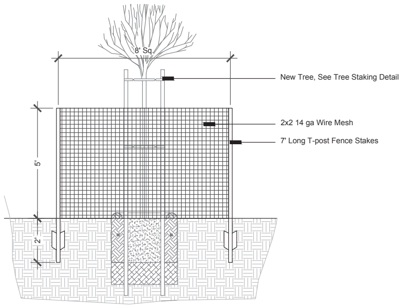
No.	Date	Description
	07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
	01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1

PROJECT NUMBER
18042.00

SHEET TITLE
IRRIGATION DETAILS

SCALE

SHEET NUMBER
L5.5



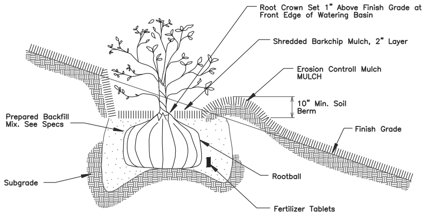
New Tree, See Tree Staking Detail

2x2 14 ga Wire Mesh

7' Long T-post Fence Stakes

8 Deer Protection Fence at Trees

Not to Scale



Root Crown Set 1" Above Finish Grade at Front Edge of Watering Basin

Shredded Barkchip Mulch, 2" Layer

Erosion Controll Mulch MULCH

10" Min. Soil Berm

Prepared Backfill Mix. See Specs

Finish Grade

Rootball

Subgrade

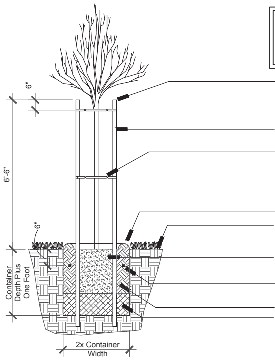
Fertilizer Tablets See Specs

9 Shrub Planting on Slopes

Scale= NTS

NOTES:
Trees in lawn shall not have sod or seed placed over the rootball.

Hold all mulch 6" (six inches) from trunk of tree where mulch applied over rootball



Cut Stakes So That Stake Does Not Intrude Into Tree Canopy

2" Untreated Lodge Pole Pine Stake

"Gro-Strait" Rubber and Wire Tree Tie or Approved Equal. Provide two (2) Per Tree

3" High Watering Basin. Ground Cover Areas Only

Finished Grade (Top of Mulch)

Rootball w/Nursery Container Removed. Top of Rootball to be 1-1/2" Above Finished Grade

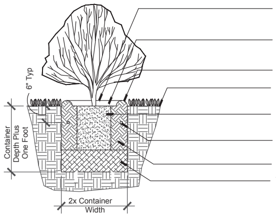
Plant Fertilizer Tablets Installed Per Manufacturer's Instructions And The Specifications

Back Fill Mix. See Planting Notes

Water Settled Native Soil

5 Tree Staking Diagram

Not to Scale



Plant Crown 1" Above Grade for 5 Gal Shrubs and 2" Above Grade for 15 Gal or Larger Shrubs for Settlement

3" Layer of Wood Mulch, 6" clear of stem.

2" High Watering Basin. Ground Cover Areas Only

Finished Grade

Rootball Centered in Pit.

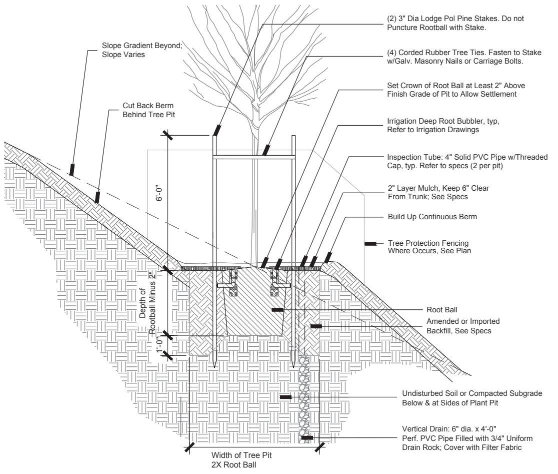
Plant Fertilizer Tablets Installed Per Manufacturer's Instructions And The Specifications

Back Fill Mix. See Planting Notes

Water Settled Native Soil, Prior to Installing Plant

6 Shrub Planting Detail

Not to Scale



Slope Gradient Beyond; Slope Varies

Cut Back Berm Behind Tree Pit

(2) 3" Dia Lodge Pol Pine Stakes. Do not Puncture Rootball with Stake.

(4) Corded Rubber Tree Ties. Fasten to Stake w/Galv. Masonry Nails or Carriage Bolts.

Set Crown of Root Ball at Least 2" Above Finish Grade of Pit to Allow Settlement

Irrigation Deep Root Bubbler, typ, Refer to Irrigation Drawings

Inspection Tube: 4" Solid PVC Pipe w/Threaded Cap, typ. Refer to specs (2 per pit)

2" Layer Mulch, Keep 6" Clear From Trunk; See Specs

Build Up Continuous Berm

Tree Protection Fencing Where Occurs, See Plan

Root Ball

Amended or Imported Backfill, See Specs

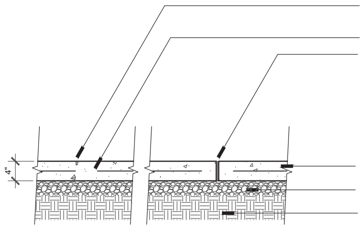
Undisturbed Soil or Compacted Subgrade Below & at Sides of Plant Pit

Vertical Drain: 6" dia. x 4'-0" Perf. PVC Pipe Filled with 3/4" Uniform Drain Rock; Cover with Filter Fabric

Width of Tree Pit 2X Root Ball

7 Tree Planting on Slope, typ.

Not to Scale



3/16" Wide by 1-1/4" Deep Score Joint at 7'-0" o.c. max. or as shown on Drawings

6"x6" #10/#10 W.W.M. Center in Pour.

Expansion Joint. For Natural Grey Concrete use 1/2" Wide Fiberous Asphaltic material For Integral Color Concrete use 1/2" Homex, Non-Asphaltic Joint w/Polysulfide Bead over. Color to Match adjacent pedestrian concrete paving. Homex by Homasote, Trenton, N.J. 609.883.3300. All Joints to occur at 20'-0" o.c. max., at Material Interfaces, and as shown on Drawings

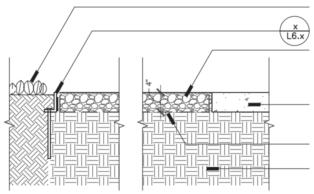
Concrete Paving. See Layout Plans and Color and Finish Schedule for finishes and colors.

Aggregate Base compacted to at least 90% or per Geotechnical Report

Sub-grade compacted to at least 90% or per Geotechnical Report

1 Pedestrian Concrete Paving

Scale: 1" = 1'-0"



Planting Bed

Metal Header.

Pedestrian Gravel Paving. Install and compact in (2) two inch lifts. Compact to 85% relative compaction. See Color and Finish Schedule for material specification. Submit sample to Landscape Architect for review prior to installation

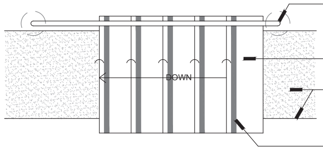
Adjacent Paving. See Layout Plan for condition

Mirafi #140N Filter Fabric. Turn up at edges. Install per Manufacturer's Specifications

Compact Sub-Grade per Table 3 of Geotechnical Report

2 Pedestrian Gravel Paving

Scale: 1" = 1'-0"



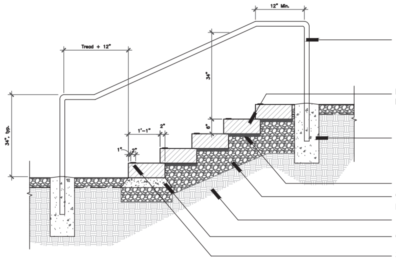
Handrail

Precast Step Blocks, S.C.F.S. Install Per Manufacturer Spec

Gravel Walkway with Edging

2" Wide Contrast Stripe Entire Width of Every Tread. To be Black Duragrip Paint, or Equivalent

STAIR PLAN



Handrail, 1.5" O.D. Tubc Steel Welded Construction. Grind all welds smooth. Contractor to submit complete shop drawings to Landscape Architect for review prior to construction. Apply (1)coat primer, (2) coats finish paint. Paint Color to Match Architectural Metalwork.

Precast Step Blocks, S.C.F.S. Install Per Manufacturer Spec

10"Ø Concrete Handrail Footnig

1" Sand Setting Bed

Class II Compacted Base, to 95% or per Geotechnical Report

Compacted Subgrade

Concrete Haunch at Bottom Step

2" Wide Contrast Stripe Entire Width of Every Tread. To be Black Duragrip Paint, or Equivalent

STAIR SECTION

3 Gravel Path Steps

Scale: 1/2" = 1'-0"

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F 415 433 5003

D. Laymon No. 2397
6-30-24
Renewal Date
08.01.22
Date

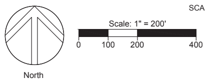
ISSUES AND REVISIONS

No. Date	Description
07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1
08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

PROJECT NUMBER
18042.00

SHEET TITLE
LANDSCAPE DETAILS

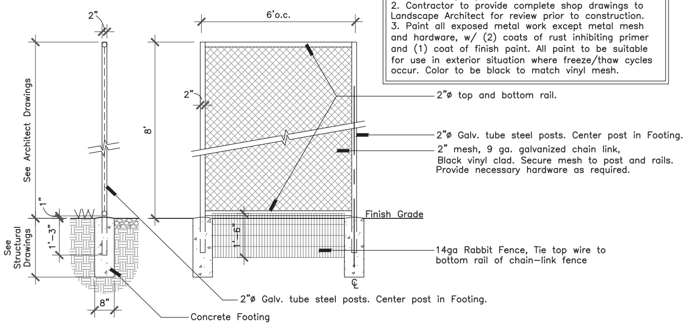
SCALE



SHEET NUMBER

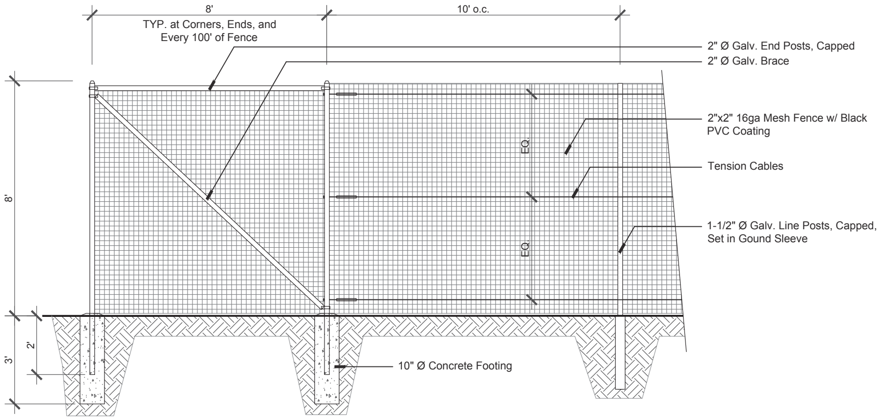
L6.0

NOTES
1. All construction to be welded steel construction. Grind all welds smooth. Welds between all members to be on all 4 (four) sides.
2. Contractor to provide complete shop drawings to Landscape Architect for review prior to construction.
3. Paint all exposed metal work except metal mesh and hardware, w/ (2) coats of rust inhibiting primer and (1) coat of finish paint. All paint to be suitable for use in exterior situation where freeze/thaw cycles occur. Color to be black to match vinyl mesh.



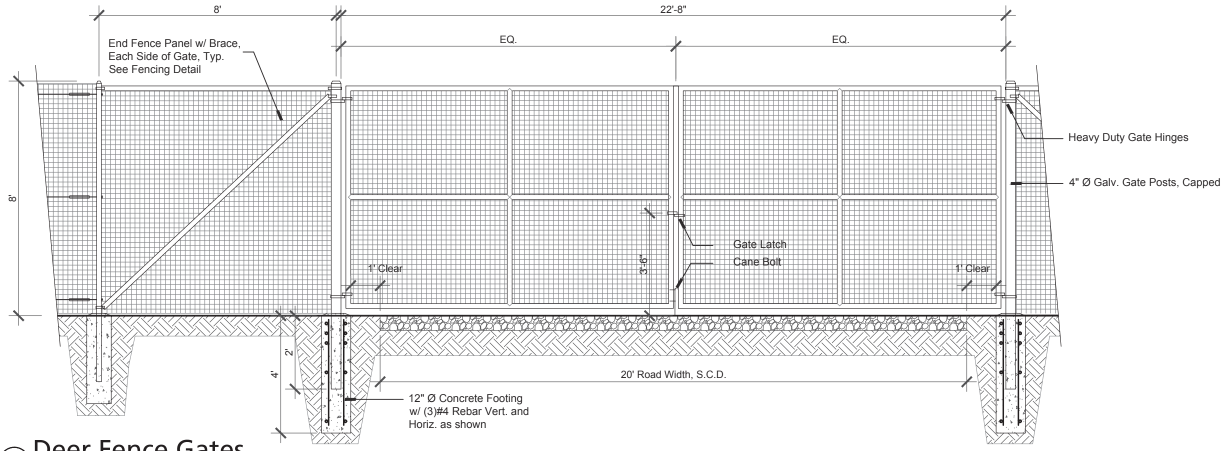
④ Chain Link Fence Enclosures

Scale: 1/2"=1'-0"



① Deer Fence

Scale: 1/2"=1'-0"



② Deer Fence Gates

Scale: 1/2"=1'-0"

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LICENSED LANDSCAPE ARCHITECT
D. Laymon No. 2397
6-30-24
Renewal Date
08.01.22
Date
STATE OF CALIFORNIA

ISSUES AND REVISIONS

No. Date	Description
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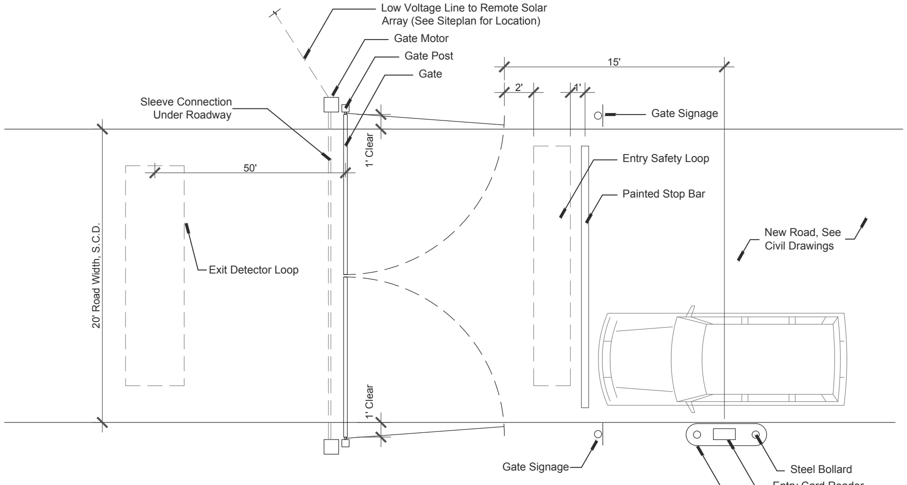
PROJECT NUMBER
18042.00

SHEET TITLE
LANDSCAPE DETAILS

SCALE

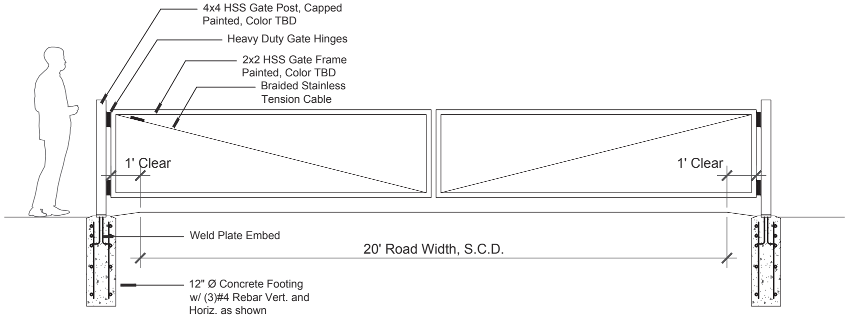
SHEET NUMBER

L6.1



① Site Entry Gate

Scale: 1/2"=1'-0"



② Site Entry Gate

Scale: 1/2"=1'-0"

PENINSULA HUMANE SOCIETY

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08.01.22
Date

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08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

PROJECT NUMBER
18042.00

SHEET TITLE
LANDSCAPE DETAILS

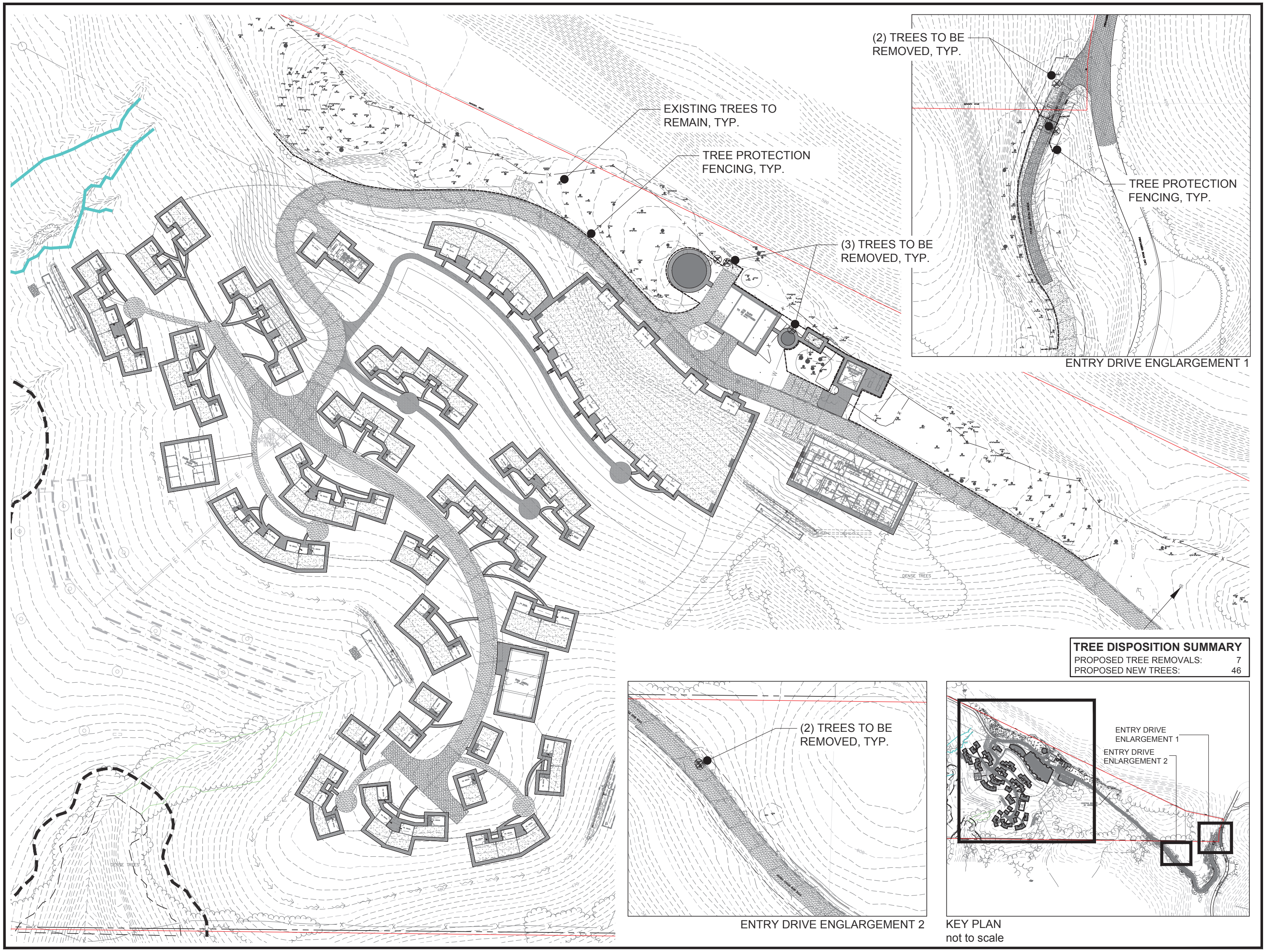
SCALE

North

Scale: 1" = 200'
0 100 200 400

SHEET NUMBER

L6.2



ENTRY DRIVE ENGLARGEMENT 1

ENTRY DRIVE ENGLARGEMENT 2

KEY PLAN
not to scale

TREE DISPOSITION SUMMARY	
PROPOSED TREE REMOVALS:	7
PROPOSED NEW TREES:	46

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D. Laymon No. 2397
6-30-24
Renewal Date
08.01.22
Date

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08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

PROJECT NUMBER
18042.00

SHEET TITLE
TREE DISPOSITION PLAN

SCALE
Scale: 1" = 50'
0 25 50 100

North

SHEET NUMBER

L7.0

COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

ATTACHMENT C

BIOLOGICAL RESOURCES REPORT

12429 Pescadero Creek Road (APN 082-050-010 & 020), San Mateo County, CA

Prepared For:

Ken White
Peninsula Humane Society
1450 Rollins Rd
Burlingame, CA 94010

Project No. 1861

Prepared By:

Dana Riggs
Principal Biologist
P.O. Box 5214
Petaluma, CA 94955
driggs@solecology.com
707-241-7718

February 23, 2021

SOL ECOLOGY

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

CDFG/CDFW	California Department of Fish and Game/Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFGC	California Fish and Game Code
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
ESA	Federal Endangered Species Act
MBTA	Migratory Bird Treaty Act
CRLF	California Red-legged Frog
WPT	Western Pond Turtle
SFDW	San Francisco dusky-footed woodrat
NRCS	Natural Resources Conservation Service
OHWM	Ordinary High-Water Mark
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WBWG	Western Bat Working Group

1.0 INTRODUCTION

On January 11, 2021 Sol Ecology, Inc. performed a biological resources assessment at 12429 Pescadero Creek Road, Loma Mar San Mateo County, California (Project Site). The proposed project includes APNs 082-050-010 & 020 (Appendix A – Figure 1).

The purpose of the assessment was to gather information necessary to complete a review of potential biological resource impacts from development of the proposed Project, under the guidelines of the California Environmental Quality Act (CEQA) for the County of San Mateo Planning Department. This report describes the results of the site assessment for the presence of sensitive biological resources protected by local, state, and federal laws and regulations. This report also contains an evaluation of potential impacts to sensitive biological resources that may occur from the proposed project and potential mitigation measures to compensate for those impacts as warranted. This assessment is based on information available at the time of the study and on-site conditions that were observed on the date of the site visit.

1.1 Project Setting

The Study Area is located on two parcels approximately one-half mile south the intersection of Highway 84 and Pescadero Creek Road, near the town of La Honda. The two parcels together make up the project study area and are approximately 261 acres in size. The site is located on south-facing slope along a ridgeline running east to west. Bisecting the property is the headwaters to McCormick Creek (on the eastern parcel) and the headwaters of a tributary to Kingston Creek (on the western parcel). A small area of development consisting of a roadway, residence and barn is present in the center of the Study Area bounded by dense oak woodland and redwood forest to the north and annual grassland and coastal scrub to the south. Elevations on the property range from 270 meters to 340 meters. The study area is bounded by forest, ranches, rural residential lots, and Sam McDonald Memorial State Park.

1.2 Project Description

The Peninsula Humane Society and SPCA proposes to construct a new animal sanctuary in the Study Area. The Animal Sanctuary would provide a permanent home for dogs, cats, and a limited number of other small farm animals. The project proposes to build 70 dog enclosures, 14 cat enclosures, and 1 barn for farm animals on a 222-acre site within the Resource Management Zoning District. In addition to the animal enclosures, the project also includes a maintenance building, and existing barn, a 1,000 square foot caretaker's residence, and a small veterinary medical center office. The sanctuary will be enclosed by fencing and be primarily located within parcel 082-050-020. Proposed activities also include installation of power poles and a powerline in both parcels on the north side of the site in the annual grassland connecting into coastal scrub on adjacent lands to the Project Study Area.

in both parcels on the north side of the site in the annual grassland connecting into coastal scrub on adjacent lands to the Project Study Area.

2.0 METHODS

On January 11, 2021, the Project Study Area was traversed on foot to determine the presence of (1) plant communities both sensitive and non-sensitive, (2) special status plant and wildlife species, (3) presence of essential habitat elements for any special status plant or wildlife species, and (4) the presence and extent of wetland and non-wetland waters.

2.1 Literature Review

To evaluate whether special status species or other sensitive biological resources (e.g., wetlands) could occur in the study area and vicinity, Sol Ecology biologists reviewed the following:

- California Native Plant Society's (CNPS's) Inventory of Rare and Endangered Plants of California search for U.S. Geological Survey (USGS) 7.5-minute La Honda quadrangle and eight adjacent quadrangles (CNPS 2021a);
- California Natural Diversity Database (CNDDB) records search for USGS 7.5-minute La Honda quadrangle and eight adjacent quadrangles (California Department of Fish and Wildlife [CDFW] 2021);
- U.S. Fish and Wildlife Service (USFWS) list of threatened and endangered species for the Project Study Area (IPaC) (USFWS 2021a);
- CDFG publication "California's Wildlife, Volumes I-III" (Zeiner et al. 1990)
- CDFG publication *California Bird Species of Special Concern* (Shuford and Gardali 2008)
- CDFW and University of California Press publication *California Amphibian and Reptile Species of Special Concern* (Thomson et al. 2016)
- USFWS National Wetlands Inventory, Wetlands Mapper (USFWS 2021b); and
- U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS), Web Soil Survey (USDA 2019).

Based on information from the above sources, Sol Ecology developed lists of special status species and natural communities of special concern that could be present in the Project vicinity (Appendix B). Figures 2 and 3 present the results of a 5-mile CNDDB record search around the study area for special status plants and wildlife (Appendix A). All biological resources are evaluated for their potential to occur within the study area in Section 3.0 of this report.

2.2 Field Survey

Sol Ecology biologists conducted biological resource surveys on January 13, 2019, May 17, 2019, June 1, 2020, and January 11, 2021. Field surveyor qualifications are in Appendix C. Biologists walked throughout the entire study area identifying all plant and wildlife species encountered and mapping vegetation communities. Plant species were recorded and identified to a taxonomic level sufficient to determine rarity using the second edition of the *Jepson Manual* (Baldwin et al. 2012). All plant species observed in the study area are included in Appendix E – Rare Plant Survey Report: Observed Species Table. Vegetation communities were identified using the online version of *A Manual of California Vegetation* (CNPS 2021b). Dispersal habitat, foraging habitat, refugia or estivation habitat, and breeding (or nesting habitat) were noted for wildlife species.

In cases where little information is known about species occurrences and habitat requirements, the species evaluation was based on best professional judgment of Sol Ecology biologists with experience working with the species and habitats. If a special status species was observed during the site visit, its presence is recorded and discussed. For some threatened and endangered species, a site survey at the level conducted for this report may not be sufficient to determine presence or absence of a species to the specifications of regulatory agencies.

A formal wetland delineation was conducted at the time of the January site visits. Sol Ecology identified wetland and non-wetland waters potentially subject to regulation by the federal government (U.S. Army Corps of Engineers [USACE]) and the state of California (Regional Water Quality Control Board [RWQCB] and CDFW). The delineation of wetland boundaries was based on the presence/absence of indicators of hydrophytic vegetation, hydric soil, and wetland hydrology. The boundaries of non-wetland waters were identified by locating the ordinary high-water mark (OHWM).

The USACE and RWQCB recognize a three-parameter approach to wetland delineation where a feature must contain hydrophytic vegetation, hydric soils, and wetland hydrology. The methodology for identifying wetland indicators followed the *USACE Wetlands Delineation Manual* (Environmental Laboratory 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (USACE 2008). Plant species within potential wetlands were assigned a wetland status according to the USACE list of plant species that occur in wetlands (USACE 2018). This wetland plant classification system is based on the expected frequency of occurrence of each species in wetlands. The classification system has the following categories, which determine the frequency with which plants occur in wetlands:

OBL	Obligate, almost always found wetlands	>99% frequency
FACW	Facultative wetland, usually found in wetlands	67-99%
FAC	Facultative, equal in wetland or non-wetlands	34-67%
FACU	Facultative upland, usually found in non-wetlands	1-33%
UPL/NL	Not found in local wetlands	<1%
NI	Wetland preference unknown	

Species with OBL, FACW, and FAC classifications are considered hydrophytic vegetation. If more than 50 percent of the dominant plant species are hydrophytic, the area meets the hydrophytic vegetation criterion.

Soils in the study area were examined for hydric soil indicators. Soils formed under wetland (anaerobic) conditions generally have a low chroma matrix color, designated 0, 1, or 2, and contain mottles or other redoximorphic features. Soil profiles were characterized by depth, color, redoximorphic features, and texture. Soil color and chroma were determined using the *Munsell Soil Color Book* to determine if the soils in a particular area could be considered hydric (Munsell Color 2009).

Positive indicators of wetland hydrology can include direct evidence (primary indicators), such as visible inundation or saturation, surface sediment deposits, oxidized root channels, and drift lines, or indirect indicators (secondary indicators) such as algal mats, shallow restrictive layers in the soil, or vegetation meeting the FAC-neutral test. Depressions, seeps, and topographic low areas were examined for these hydrological indicators.

3.0 RESULTS

3.1 Existing Conditions and General Wildlife Use

Elevations within the Project Study Area range from approximately from 270 to 340 meters (885 to 1115 feet) above mean sea level. The Project Study Area encompasses 7 soil map units identified by the USDA, NRCS (USDA 2019):

- **Lobitos loam, 16 to 30 percent slopes - LID2:** This soil map unit comprises the majority of the Project Study Area. It is a moderately deep, well-drained soil type is mostly used for pasture and range. The soil parent material is moderately hard sandstone and shale. Lobitos loam is not rated as hydric. Minor components include Gazos (4%), Pomponio (5%).
- **Lobitos loam, 7 to 16 percent slopes- LID3:** This soil map unit is similar to the Lobitos Loam described above.
- **Gazos loam 40 to 75 percent slopes- GbF2**: very steep, eroded. It is well drained and occurs in mountain slopes. The soil parent material is shale. Gazos loam is not rated as hydric. Minor components include Sweeney (5%), Lobitos (5%), Cotati (4%), and Calera (5%).
- **Lobitos loam, 30 to 41 percent slopes- LIE2:** This soil map unit is similar to the Lobitos Loam described above.
- **Hugo and Josephine loams, 45 to 75 percent slopes- HuF:** This soil map unit occurs within the northern portion of the study area along the ridgeline. It is well drained and occurs in mountain slopes. The soil parent material is derived from sandstone and shale. Hugo and

Josephine loams are not rated as hydric. Minor components include Los Gatos (10%) and Laughlin (10%).

- **Hugo and Josephine loams, 30 to 45 percent slopes- HuE:** This soil map unit is similar to the Hugo and Josephine loams described above.
- **Mindego clay loam, MdF:** soil map unit occurs in a small portion of the northeastern corner of the study area. It is well drained and occurs in mountain slopes. The soil parent material is basalt. Mindego clay loam is not rated as hydric. Minor components include Lobitos (10%), Santa lucia (5%).

Vegetation communities present in the study area were classified using the online version of *A Manual of California Vegetation* (CNPS 2021b). However, in some cases it is necessary to identify variants of community types or to describe non-vegetated areas that are not described in the literature. Vegetation communities were classified as non-sensitive or sensitive natural communities as defined by CEQA and other applicable laws and regulations. Photographs of the study area are provided in Appendix D.

Two erosional gullies were observed bisecting the property to the north of McCormick Creek and appears to drain directly into the small pond located upslope of the drainage headwaters. Erosional gullies are generally not considered jurisdictional but can over time develop into wetland habitat. A culvert was located across the roadway above the gully feature and appears to convey water from the roadside downslope into the small stock pond below, as shown in Appendix A, Figure 1 and Appendix D, photo 2. This feature will be avoided by the proposed project.

3.1.1 Non-Sensitive Natural Communities

Valley and Foothill Grassland Habitat (Non-Native Annual Grassland)

The Project Site is dominated by valley and foothill grassland habitat, in which native bunch grass species have been largely or entirely supplanted by introduced, annual Mediterranean grasses (Non-Native Annual Grassland), (Appendix D, photos 1-3). Stands rich in natives, however, can usually found on unusual substrates, such as serpentinite or somewhat alkaline soils (CDFW 2018). These non-native grasslands (Holland/CDFW 1986) are dominated by non-native annual grassland characterized by non-native (and invasive) annual grasses and native forbs and wildflowers in this case foxtail fescue (*Festuca myuros*), Italian rye grass (*F. perennis*) and clover species (*Trifolium ssp.*). Common wildlife species in this habitat includes: Botta's pocket gopher (*Sceloporus occidentalis*), deer mouse (*Peromyscus maniculatus*), western kingbird (*Tyrannus verticalis*), and western fence lizard (*Sceloporus occidentalis*).

3.1.2 Sensitive Natural Communities

Sensitive communities (based on vegetation alliances) are listed below and shown in Appendix A, Figure 1 (except for Redwood Forest which is present to the north of the Study Area, and in patches along the eastern road). These alliances may also support other sensitive species such as special status plants and animals described in Section 3.2 and 3.3. In addition, potential federal and/or state jurisdictional areas are also considered sensitive as shown in Figure 1.

Redwood Forest

Redwood forest is present to the north of the Study Area on north facing slopes, mainly surrounding the existing barn with a patch of forest located along the road to the east. Redwood forest is also intermixed with riparian forest described below. This community has a rank of S3, which is the lowest of the sensitive ranks and thus any effects to this community would need to be considered under CEQA. In the Study Area, this vegetation alliance is mixed with coastal oak woodland, Douglas fir, black oak, and madrone (Appendix D, photo 3).

Intermittent Streams

Several potentially jurisdictional waters are present in the Study Area, including the headwaters to two blue-line streams, McCormick Creek and a tributary to Kingston Creek, which are considered to be Waters of the State and possibly the U.S., (Appendix A, Figure 1). A tributary to McCormick Creek is also present. McCormick Creek is considered perennial, though water does not flow year-round within the study area. The McCormick Creek tributary and the tributary to Kingston Creek are considered intermittent features. These features are highly eroded and top of bank as such, varies in width within the project study area.

Ponds

Two stock ponds and a small seep are also present and likely jurisdictional waters of the State based on their location relative to other waters (Appendix D, photos 4 and 5). These features have highly eroded banks due to heavy cattle use, and neither emergent nor submerged vegetation was evident.

Riparian

Riparian habitat surrounding stream features on the site consists of Coast live oak (*Quercus agrifolia*), redwood (*Sequoia sempervirens*), with an underlying shrub layer consisting of Himalayan blackberry (*Rubus armeniacus*), and coyote brush (*Baccharis pilularis*), (Appendix D, photo 6). No riparian vegetation is present surrounding the two stock ponds.

3.2 Special-Status Plants

Special status plant species include plant species that have been formally listed, are proposed as endangered or threatened, or are candidates for such listing under the Federal Endangered Species Act (ESA) or California Endangered Species Act (CESA). These acts afford protection to both listed species and those that are formal candidates for listing. Plant species on CNPS' Inventory of Rare and Endangered Plants of California with California Rare Plant Ranks of 1 and

2 are also considered special status plant species and must be considered under CEQA. Further, California Rare Plant Ranks 3 and 4 are evaluated within this report to ensure locally important plant species are evaluated for effect significance.

Based upon a review of the resources and databases given in Section 2.1, 89 special status plant species have been documented within a 9-quad search of the study area (Appendix B). Based on the presence of vegetation communities described above and soils at the site, the study area has the potential to support 7 special status plant species. In accordance with 2018 statewide protocols[1], floristic special-status plant surveys were performed on May 17, 2019 within the Project Area within the blooming period for the seven identified target species: *Arctostaphylos* andersonii (Anderson's manzanita)*, A. regismontana* (Kings Mountain manzanita)*, Plagiobothrys chorisianus* (Choris' popcornflower)*, Pedicularis dudleyi* (Dudley's lousewort)*, Malacothamus arculatus* (arcuate bush-mallow)*, Fissidens pauperculus* (minute pocket moss)*, and Dirca occidentalis* (western leatherwood). The findings from this site survey are included in the Rare Plant Survey (Appendix E). Additionally, floristic special-status plant surveys were performed during the site visit on June 1, 2020 for these seven and other special status plants. None of these species or other special status plants were found on site during either survey.

Other special status plant species documented within the 9-quad search are unlikely or have no potential to occur in the study area for one or more of the following reasons:

- Hydrologic conditions (e.g. marsh habitat, seeps, coastal habitat) necessary to support the special-status plants do not exist on site;
- Edaphic (soil) conditions (e.g. rocky or clay soils) necessary to support the special-status plants do not exist on site;
- Topographic conditions (e.g. flat plains, low altitude) necessary to support the special-status plants do not exist on site;
- Unique pH conditions (e.g. serpentine) necessary to support the special-status plant species are not present on the Project Site;
- Associated vegetation communities (e.g. cismontane woodland, broadleaved upland forest) necessary to support the special-status plants do not exist on site.

3.3 Special Status Wildlife

In addition to wildlife listed as federal or state endangered and/or threatened, federal and state candidate species, CDFW Species of Special Concern, CDFW California Fully Protected species, USFWS Birds of Conservation Concern, and CDFW Special-status Invertebrates are all considered special-status species. Although these species generally have no special legal status, they are given special consideration under CEQA. The federal Bald and Golden Eagle Protection Act also

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[1] CDFW. 2018. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. March 20, 2018.

provides broad protections to both eagle species that are roughly analogous to those of listed species. Bat species are also evaluated for conservation status by the Western Bat Working Group (WBWG), a non-governmental entity; bats named as a “High Priority” or “Medium Priority” species for conservation by the WBWG are typically considered special-status and considered under CEQA; bat roosts are protected under CDFW Fish and Game Code. In addition to regulations for special-status species, most native birds in the United States (including non-status species) are protected by the federal Migratory Bird Treaty Act of 1918 (MBTA) and the California Fish and Game Code (CFGC), i.e., sections 3503, 3503.5 and 3513. Under these laws, deliberately destroying active bird nests, eggs, and/or young is illegal.

Based on the databases given in Section 2.1, 60 special status wildlife species have been documented within a 9-quad search of the study area (Appendix B). Based on the presence of biological communities described above, the Project Study Area has the potential to support 8 of these species, 2 of which are federal and/or state listed (Table 1). A discussion of potential effects or unlikelihood for effects to occur is provided in Section 4.1. Other special status wildlife species documented within the 9-quad search are unlikely or have no potential to occur in the study area for one or more of the following reasons:

- Absence of suitable hydrologic conditions (e.g., riverine, freshwater stream habitat, salt or brackish waters) necessary to support the special-status wildlife (e.g., tidewater goby, steelhead, foothill yellow-legged frog, Santa Cruz black salamander, California giant salamander).
- Absence of associated vegetation communities (e.g., marsh habitat) necessary to support special-status wildlife (e.g., saltmarsh harvest mouse, San Francisco garter snake, black rail, saltmarsh common yellowthroat, monarch butterfly, bay checkerspot butterfly).
- Absence of suitable habitat elements (e.g., cliffs, caves, mines, outcrops, snags, etc.) for most special-status bats (e.g., Townsend’s big-eared bat or pallid bat).
- Absence of suitably sized burrows or evidence of potential dens on or immediately adjacent to the study area (e.g., for burrowing owl or American badger).

Note, while McCormick creek may provide foraging habitat for San Francisco garter snake and California giant salamander downstream of the property, these species are not likely to be found in headwaters near the project footprint. Furthermore, lack of vegetation and cover within the two stock pond habitats likely precludes San Francisco garter snake as well as western pond turtle.

Table 1. Special Status Animals with Potential to Occur in the Study Area

Scientific Name/ Common Name	Status[1]	Habitat	Potential for Occurrence
Mammals			
Lasiurus cinereus Hoary bat	WBWG Medium	Open forested habitats or mosaics, with access to trees for cover and open areas or edges for foraging. Requires water.	**Moderate potential**. May maternity roost in dense foliage of medium to large trees in redwood forest and oak woodland habitats near the project footprint.
San Francisco dusky-footed woodrat *Neotoma fuscipes annectens*	SSC	Forest habitats of moderate canopy and moderate to dense understory. Also, in chaparral habitats. Constructs nests of shredded grass, leaves, and other material. May be limited by availability of nest-building materials.	**Low potential**. Suitable habitat is present in scrub habitats outside of the project footprint including McCormick Creek. Relatively steep slopes may preclude this species close to the project site. No woodrat houses were observed during any of the site visits.
Birds			
Aquila chrysaetos Golden eagle	CFP, BCC	Rolling foothills, mountain areas, and deserts. Nests in cliff-walled canyons and large trees within otherwise open areas.	**Low potential**. May nest in large trees located on ridgeline in Study Area; no nest structures observed during any of the site visits.
Brachyramphus marmoratus Marbled Murrelet	FT, SE	Nests in old-growth coniferous forests up to 30 miles inland from coast. Nests are highly cryptic and typically located on platform-like branches of mature redwoods and Douglas firs.	**Low Potential.** May nest **off-site** in forest habitat to the north or near access road; documented within one mile to south. Not likely to nest along habitat edges.
long-eared owl *Asio otus*	SSC	Occurs year-round in California. Nests in trees in a variety of woodland habitats, including oak and riparian. Requires adjacent open land with rodents for foraging, and the presence of old nests of larger birds (hawks, crows, magpies) for breeding.	**High potential.** Long-eared owls may be present in adjacent forest habitat near to open grassland foraging habitat, outside of the project footprint. This species is highly secretive and primarily nocturnal.
wrentit *Chamaea fasciata*	BCC	Lives in chaparral, oak woodlands, and scrub habitat. Often in areas with thick vegetation; nests on the ground.	**Moderate potential**. Suitable habitat is present in scrub habitat outside of the project footprint.
Amphibians and Reptiles			
Emys marmorata Western pond turtle	SSC	Aquatic turtle present in ponds, marshes, rivers, streams, and irrigation ditches with	**Low potential.** Ponds on the site do not contain suitable basking substrate and lack emergent vegetation cover. This

		aquatic vegetation and basking sites. Nests in uplands within 100 m of breeding sites.	species may seek refuge near ponds during periods of high flow in downstream habitats but are not likely to nest on the site due to the lack of loose soils and presence of cows.
Rana draytonii California red-legged frog	FT, SSC	Breeds in quiet perennial to intermittent ponds and stream pools that hold water for 11 to 20 weeks. Prefers shorelines with extensive vegetation. Disperse though uplands after rains.	**Moderate potential.** May utilize ponds on the site for non-breeding aquatic habitat during the summer months; not likely to estivate on the site. Drainages to the south also provide dispersal habitat and cover. The project area is not within any known dispersal corridor. The project is not located within designated critical habitat for CRLF.

[1] FE/SE – Federal/State Endangered FT/ST – Federal/State Threatened
SCE/T – State Candidate Endangered/Threatened CFP – California Fully Protected
SSC – Species of Special Concern BCC – Bird of Conservation Concern
SSI – Special Status Invertebrate LC – Species of Local Concern
WBWG – Western Bat Working Group – Medium or High Priority Species

4.0 POTENTIAL EFFECTS AND MITIGATION

The assessment of effects under CEQA is based on the change caused by the Project relative to the existing conditions within the Project Study Area. In applying CEQA Appendix G, the terms "substantial" and "substantially" are used as the basis for significance determinations in many of the thresholds but are not defined qualitatively or quantitatively in CEQA or in technical literature. In some cases, the determination requires application of best professional judgment based on knowledge of site conditions as well as the ecology and physiology of biological resources present in a given area. The CEQA and State CEQA Guidelines defines "significant effect on the environment" as "a substantial adverse change in the physical conditions which exist in the area affected by the proposed project." Pursuant to Appendix G, Section IV of the State CEQA Guidelines, the proposed Project would have a significant effect on biological resources if it would:

A. 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 the California Department of Fish and Game or U.S. Fish and Wildlife Service.

B. Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service.

C. Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means.

D. 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.

E. Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan.

4.1 Potentially Significant Effects and Mitigation Measures

4.1.1 Sensitive Biological Communities

Sensitive communities present in the Study Area include redwood forest vegetation alliance, riparian habitat, and potential Waters of the State including two headwater streams, two stock ponds, and a small seep. An erosional gully located to the west of the project is not likely jurisdictional, but verification is needed to confirm; however, this feature will be avoided by the proposed project. The proposed project has been designed to avoid all sensitive communities on the site, including wetlands, riparian habitat, and species habitats (including movement corridors). Construction in proximity to intermittent streams may potentially result in accidental discharges of materials which in turn may affect water quality and/or contribute to erosional processes within headwater streams. Accidental discharges during construction would be considered a significant effect. The project will not conflict with the provisions of any habitat conservation or community conservation plan.

4.1.2 Special-Status Plant Species

In accordance with 2018 statewide protocols, floristic special-status plant surveys were performed on May 17, 2019 and June 1, 2020 within the Project Study Area for the seven species with potential to occur which are not identifiable year-round. No special status plants were found on site at either visit, and their absence indicates that their occurrence is unlikely. Thus, no potentially significant effects to special status plants are anticipated.

4.1.3 Special-Status Wildlife Species

Eight special status wildlife species have potential to occur in or adjacent the Project Study Area, including two federal listed species: marbled murrelet, and California red-legged frog. In addition, the study area provides suitable nesting substrate for several migratory bird species protected under the MBTA. Many of these special status species are likely to occur only incidentally in the Project Study Area or in adjacent habitats. Potentially significant effects or the unlikelihood for such effects are described below.

Special Status Bats – Hoary Bat

One special status bat species may potentially roost solitarily in tree foliage within the Project Study Area between spring and fall; no suitable hibernacula is present. Other special status bats may potentially occur in woodland habitat outside the project footprint. No tree removal is proposed and the project footprint borders but is not in the woodlands on site. As such **the project is not likely to affect special status bats**.

San Francisco Dusky-Footed Woodrat

SFDW may potentially occur in scrub habitats to the south of the project study area. A minimum 25-foot setback is prescribed where woodrat nests are present. Due to prescribed setbacks greater than 25 feet from these areas, the **project is not likely to affect SFDW**.

Migratory Birds Protected Under MBTA – Including Golden Eagle, Marbled Murrelet, Long-Eared Owl, and Wrentit

The Project Study Area and surrounding habitats provide suitable nesting substrate (trees, shrubs, grasses) for many non-status migratory birds, as well as special status birds and raptors. Effects to nesting birds and raptors resulting in nest abandonment or direct mortality to chicks or eggs is considered a significant effect under CEQA. Such effects can occur as a result vegetation removal, proximity to noise and/or visual disturbances during construction.

Given existing development on the site, it is not likely that the proposed project will result in any new effects to species that occur in this area. A small amount of foraging habitat would be affected but given availability of suitable foraging habitat in the immediate surrounding area, the project would not likely adversely affect foraging habitat for these species, if present.

Western pond turtle (WPT)
WPT may seek refuge near ponds during periods of high flow in downstream habitats during the winter season but are not likely to nest on the site due the absence of loose friable soils for egg laying and presence of cows which could trample nests. Because the proposed project will not result in any effects to pond habitat nor create any barriers to dispersal, the project is **not likely to affect WPT.**

California red-legged frog (CRLF)
Suitable aquatic non-breeding and dispersal habitat is present within the Project Study Area. The lack of emergent and/or submerged vegetation for egg attachment within either pond precludes breeding. CRLF may disperse from aquatic habitats downstream via headwater streams to utilize pond habitat during the summer months. However, the project study area is not within any viable dispersal corridor between these features. The proximity of activities to CRLF habitat may potentially deter dispersing adults or individuals foraging on the site. Incidental take (mortality, harassment, or harm) to CRLF if present would be considered a significant effect under CEQA. Avoidance measures are prescribed below to ensure **the project will not affect CRLF**.

4.2 Recommended Avoidance and Minimization Measures

The following avoidance and minimization measures are recommended to avoid and/or reduce potentially significant effects described in Section 4.1 to a less than significant level.

MM-1. Prescribed Setbacks to Potentially Jurisdictional Waters of the State

A minimum 50-foot setback from McCormick Creek and 30-foot setback from all other streams and their associated riparian habitat shall be maintained to ensure accidental discharge to streams and their associated riparian habitat is avoided. Prescribed stream setbacks are depicted in the attached figure (Appendix A, Figure 1). No work within these areas is currently proposed.

MM-2. Best Management Practices (BMPs) for Work Occurring Near Waterways

Implementation of BMPs such as silt fence or straw wattles shall be installed and maintained between the work area and adjacent waterways to prevent any contaminants from entering the waterway. Plastic monofilament netting (erosion control matting) rolled erosion control products, or similar material should not be used to ensure amphibian and reptile species do not get trapped. Acceptable substitutes include coconut coir matting or tackified hydroseeding compounds.

MM-3. Exclusion Fencing

Temporary exclusion fence should be placed between the project footprint and sensitive vegetation communities to avoid potential effects during grading/vegetation removal activities.

MM-4. Nesting Bird and Raptor Surveys

If work is initiated between February 1 and August 31, a pre-construction nesting bird and raptor survey shall be performed in all areas within one quarter mile of proposed activities. If nests are found, an appropriately sized no-disturbance buffer should be placed around the nest at the direction of the qualified biologist conducting the survey. Buffers should remain in place until all young have fledged, or the biologist has confirmed that the nest has been naturally predated.

Nest buffers for special status species shall be set as follows:

- For golden eagle or marbled murrelet = one quarter mile
- For long eared-owl or other raptor species = 250 feet
- For wrentit and/or other songbird species = 25 to 50 feet

MM-5. Worker Environmental Awareness Program (WEAP)

Environmental awareness training should be provided to all construction crew prior to the start of work. Training will include a description of all biological resources that may be found on or near the Project site, the laws and regulations that protect those resources, the consequences of non-compliance with those laws and regulations, instructions for inspecting equipment each morning prior to activities, and a contact person if protected biological resources are discovered on the Project site.

MM-6. Pre-Construction Wildlife Surveys

A pre-construction survey for special status reptiles and amphibians is recommended within 48 hours of any ground disturbing activities within 300 feet of any aquatic (pond) or riparian habitat when water is present. Non-listed species if found, may be relocated to suitable habitat outside the Project Site. If CRLF is found, work shall be halted, and the USFWS and CDFW contacted. Work shall remain halted until authorized to resume by the project biologist.

MM-7. Biological Monitoring

If CRLF is observed during pre-construction surveys or at any time during construction, a biological monitor is recommended to be present until work in the affected area is completed.

MM-8. Work Windows

No work shall be performed within 300 feet of stock pond habitats during or within 24 hours of any rain event (greater than 0.5 inches) between February 1 and April 31 when frogs are most likely to utilize upland habitats. No work shall occur within 30 minutes of sunrise or sunset.

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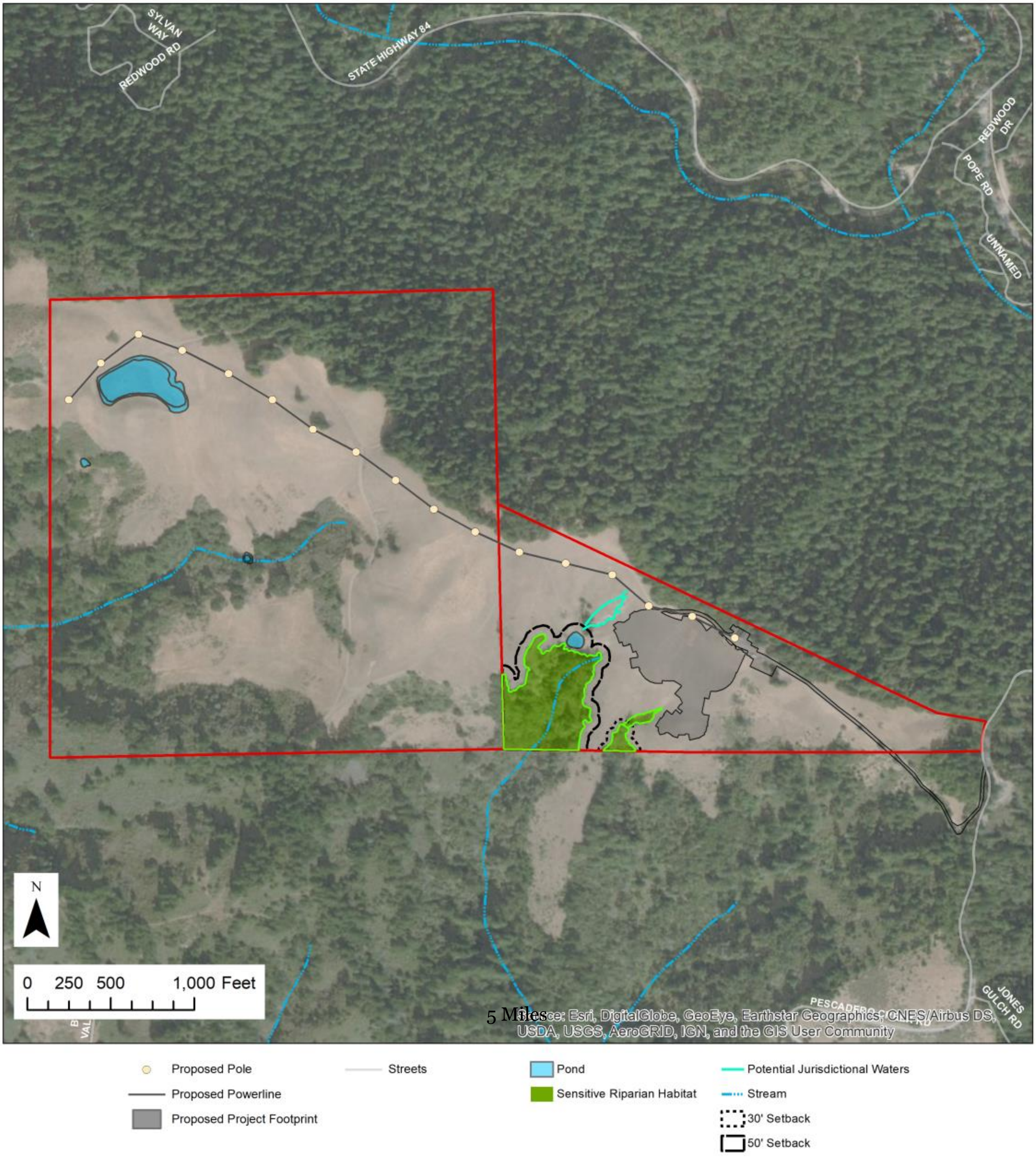
APPENDIX A

PROJECT FIGURES: SENSITIVE HABITATS MAP AND CNDDB DATABASE RESULTS

Figure 1: Sensitive Communities Within the Study Area

12429 Pescadero Creek Road, Loma Mar, CA



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

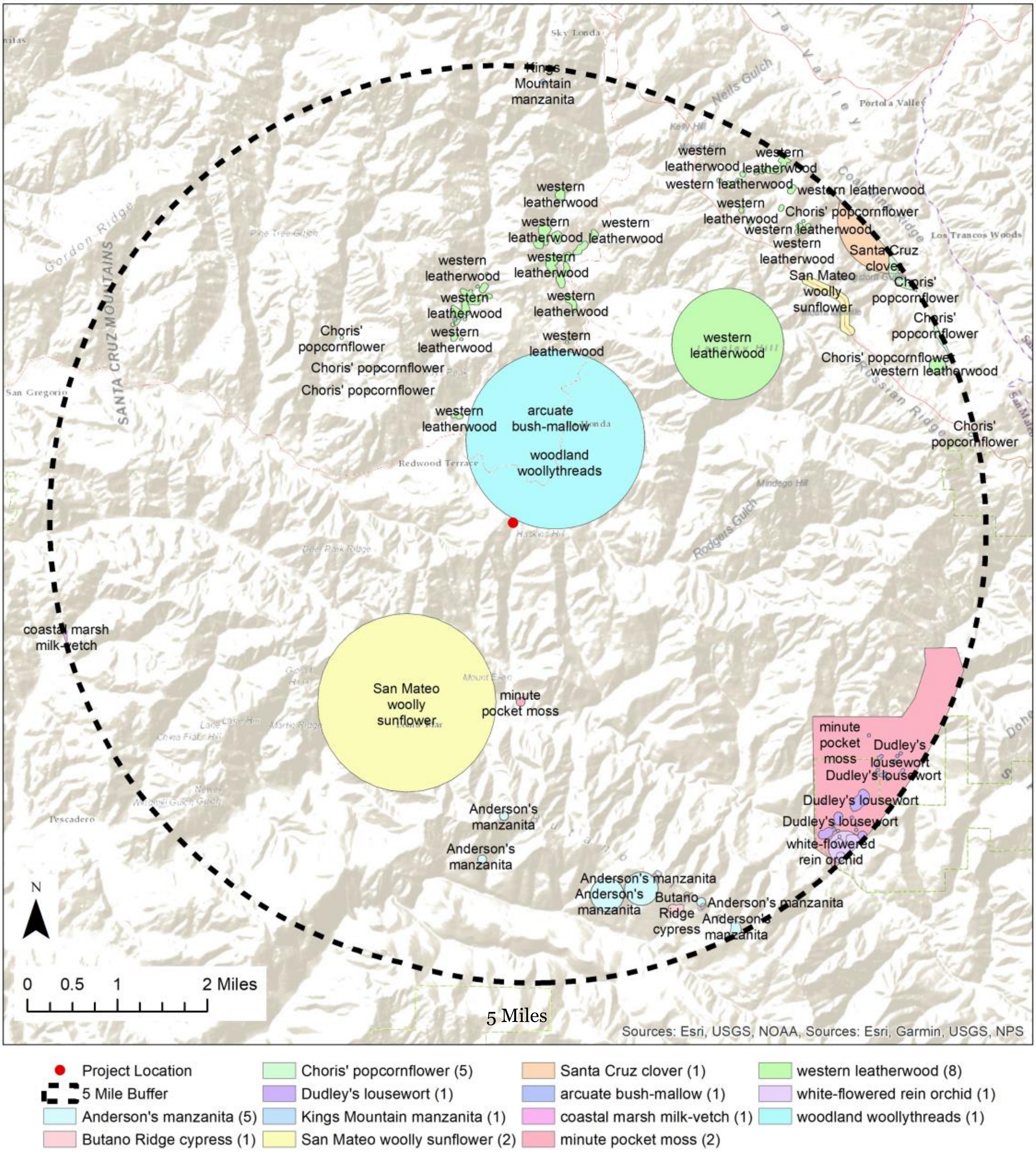
Date: 2-11-2021
Data: Sol Ecology Inc.
San Mateo Co., PHS/SPCA

Base: San Mateo Co
GIS: AG1831

SOL ECOLOGY
solecology.com

Figure 2: Special Status Plant Species within 5 Miles of the Project Site

12429 Pescadero Creek Road, Loma Mar, CA



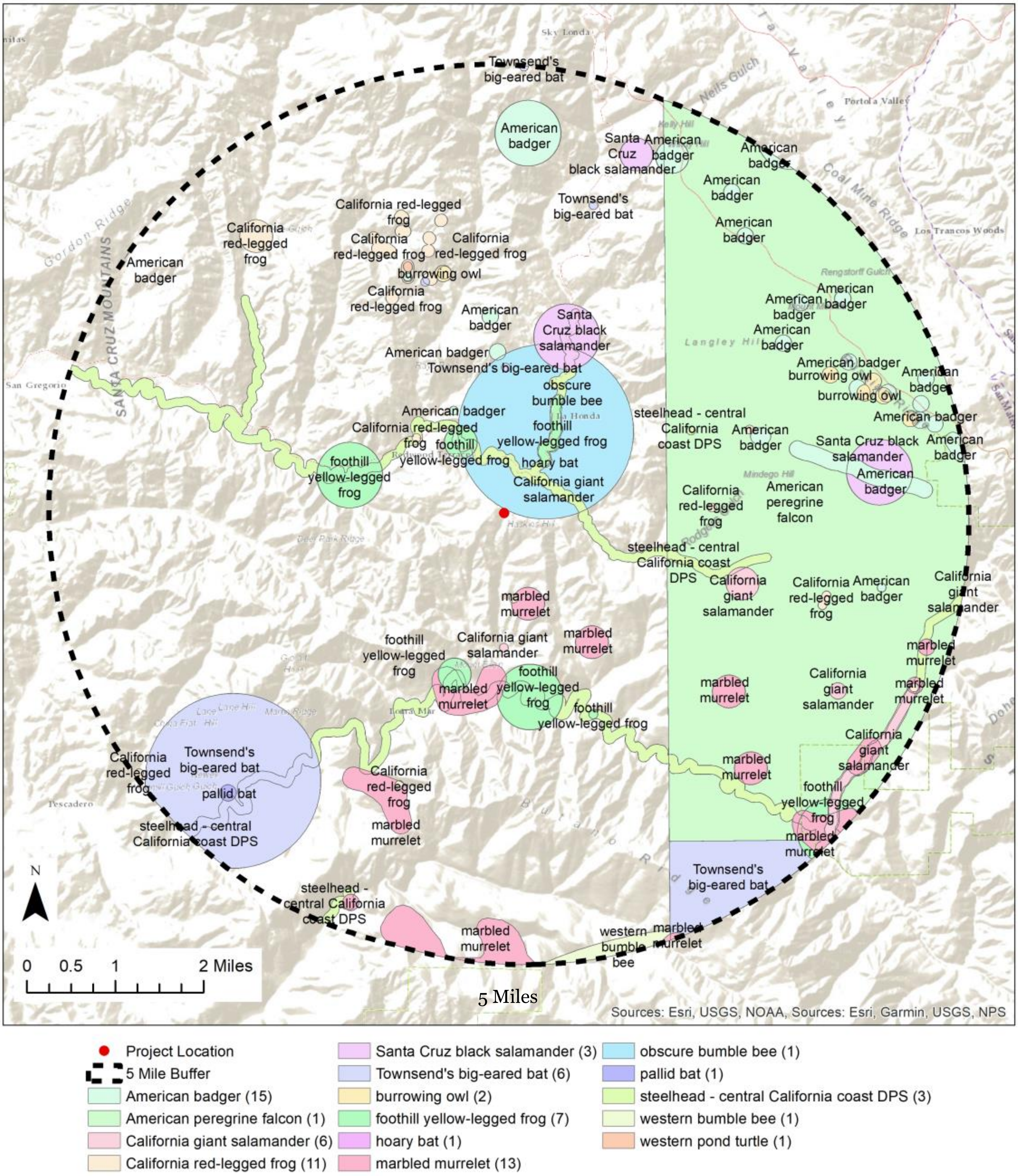
Date: 11-11-2020
Data: Sol Ecology Inc., CDFW
San Mateo Co., PHS/SPCA

Base: ESRI
GIS: AJG

SOL ECOLOGY
solecology.com

Figure 3: Special Status Animal Species within 5 Miles of the Project Site

12429 Pescadero Creek Road, Loma Mar, CA



Date: 11-11-2020
Data: Sol Ecology Inc., CDFW
San Mateo Co., PHS/SPCA

Base: ESRI
GIS: AJG

SOL ECOLOGY
solecology.com

APPENDIX B

CNDDB, CNPS, AND IPAC SUMMARY TABLES

Summary Table Report

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Quad IS (Half Moon Bay (3712244) OR Woodside (3712243) OR Palo Alto (3712242) OR San Gregorio (3712234) OR La Honda (3712233) OR Mindego Hill (3712232) OR Pigeon Point (3712224) OR Franklin Point (3712223) OR Big Basin (3712222))
 AND Taxonomic Group IS (Dune OR Scrub OR Herbaceous OR Marsh OR Riparian OR Woodland OR Forest OR Alpine OR Inland Waters OR Marine OR Estuarine OR Riverine OR Palustrine OR Ferns OR Gymnosperms OR Monocots OR Dicots OR Lichens OR Bryophytes OR Fungi)

						Element Occ. Ranks						Population Status		Presence		
Name (Scientific/Common)	**CNDDB Ranks**	**Listing Status (Fed/State)**	**Other Lists**	**Elev. Range (ft.)**	**Total EO's**	**A**	**B**	**C**	**D**	**X**	**U**	**Historic > 20 yr**	**Recent <= 20 yr**	**Extant**	**Poss. Extirp.**	**Extirp.**
Acanthomintha duttonii San Mateo thorn-mint	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_UCBG-UC Botanical Garden at Berkeley	170 600	5 S:3	0	1	0	1	1	0	1	2	2	0	1
Agrostis blasdalei Blasdale's bent grass	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_UCSC-UC Santa Cruz	25 35	62 S:3	0	0	0	0	0	3	1	2	3	0	0
Allium peninsulare var. franciscanum Franciscan onion	G5T2 S2	None None	Rare Plant Rank - 1B.2	170 670	25 S:11	2	2	1	0	0	6	2	9	11	0	0
Amsinckia lunaris bent-flowered fiddleneck	G3 S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_UCBG-UC Botanical Garden at Berkeley SB_UCSC-UC Santa Cruz		93 S:1	0	0	0	0	0	1	1	0	1	0	0
Anomobryum julaceum slender silver moss	G5? S2	None None	Rare Plant Rank - 4.2		13 S:1	0	0	0	0	0	1	0	1	1	0	0
Arctostaphylos andersonii Anderson's manzanita	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden SB_UCSC-UC Santa Cruz	525 2,400	64 S:26	2	8	4	3	0	9	8	18	26	0	0

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				Elev.		Element Occ. Ranks						Population Status		Presence		
Name (Scientific/Common)	**CNDDB Ranks**	**Listing Status (Fed/State)**	**Other Lists**	**Range (ft.)**	**Total EO's**	**A**	**B**	**C**	**D**	**X**	**U**	**Historic > 20 yr**	**Recent <= 20 yr**	**Extant**	**Poss. Extirp.**	**Extirp.**
Arctostaphylos glutinosa Schreiber's manzanita	G1 S1	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden SB_UCSC-UC Santa Cruz SB_USDA-US Dept of Agriculture	1,800 2,230	7 S:2	1	0	0	1	0	0	1	1	2	0	0
Arctostaphylos ohloneana Ohlone manzanita	G1 S1	None None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden SB_USDA-US Dept of Agriculture	1,700 1,700	4 S:1	0	0	0	0	0	1	0	1	1	0	0
Arctostaphylos regismontana Kings Mountain manzanita	G2 S2	None None	Rare Plant Rank - 1B.2	586 2,300	17 S:15	1	3	3	3	0	5	3	12	15	0	0
Arctostaphylos silvicola Bonny Doon manzanita	G1 S1	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	900 900	16 S:1	1	0	0	0	0	0	0	1	1	0	0
Astragalus pycnostachyus var. pycnostachyus coastal marsh milk-vetch	G2T2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden SB_SBBG-Santa Barbara Botanic Garden SB_UCBG-UC Botanical Garden at Berkeley	10 500	25 S:10	0	5	1	0	1	3	4	6	9	1	0
Calyptridium parryi var. hesseae Santa Cruz Mountains pussypaws	G3G4T2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive	2,300 2,600	11 S:2	0	0	0	0	0	2	2	0	2	0	0
Centromadia parryi ssp. congdonii Congdon's tarplant	G3T1T2 S1S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_RSABG-Rancho Santa Ana Botanic Garden	2 2	98 S:1	0	0	1	0	0	0	0	1	1	0	0
Chorizanthe pungens var. hartwegiana Ben Lomond spineflower	G2T1 S1	Endangered None	Rare Plant Rank - 1B.1	800 1,160	18 S:3	0	1	0	0	0	2	2	1	3	0	0

				Elev.		Element Occ. Ranks						Population Status		Presence		
Name (Scientific/Common)	**CNDDB Ranks**	**Listing Status (Fed/State)**	**Other Lists**	**Range (ft.)**	**Total EO's**	**A**	**B**	**C**	**D**	**X**	**U**	**Historic > 20 yr**	**Recent <= 20 yr**	**Extant**	**Poss. Extirp.**	**Extirp.**
Cirsium andrewsii Franciscan thistle	G3 S3	None None	Rare Plant Rank - 1B.2	80 80	31 S:1	0	0	0	0	1	0	1	0	0	1	0
Cirsium fontinale var. fontinale fountain thistle	G2T1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	150 600	5 S:4	0	0	3	0	1	0	1	3	3	1	0
Cirsium praeteriens lost thistle	GX SX	None None	Rare Plant Rank - 1A	50 50	1 S:1	0	0	0	0	1	0	1	0	0	1	0
Clarkia concinna ssp. automixa Santa Clara red ribbons	G5?T3 S3	None None	Rare Plant Rank - 4.3	1,500 2,750	20 S:2	0	0	0	0	0	2	2	0	2	0	0
Collinsia corymbosa round-headed Chinese-houses	G1 S1	None None	Rare Plant Rank - 1B.2		13 S:1	0	0	0	0	1	0	1	0	0	0	1
Collinsia multicolor San Francisco collinsia	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden SB_UCSC-UC Santa Cruz	100 560	36 S:3	0	2	0	0	0	1	1	2	3	0	0
Dirca occidentalis western leatherwood	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	150 2,100	71 S:20	5	6	2	0	0	7	5	15	20	0	0
Eriophyllum latilobum San Mateo woolly sunflower	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	2,000 2,000	8 S:2	0	0	0	0	1	1	2	0	1	1	0
Eryngium aristulatum var. hooveri Hoover's button-celery	G5T1 S1	None None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden	80 80	16 S:1	0	0	0	0	1	0	1	0	0	1	0
Eryngium jepsonii Jepson's coyote-thistle	G2 S2	None None	Rare Plant Rank - 1B.2	525 625	19 S:2	0	0	0	0	0	2	1	1	2	0	0
Erysimum ammophilum sand-loving wallflower	G2 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive SB_CRES-San Diego Zoo CRES Native Gene Seed Bank SB_SBBG-Santa Barbara Botanic Garden	100 100	58 S:1	0	0	0	0	0	1	1	0	1	0	0

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Fissidens pauperculus minute pocket moss	G3? S2	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	250 300	22 S:3	0	0	0	0	0	3	1	2	3	0	0
Fritillaria liliacea fragrant fritillary	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden USFS_S-Sensitive	33 720	82 S:5	0	4	0	0	0	1	2	3	5	0	0
Grimmia torenii Toren's grimmia	G2 S2	None None	Rare Plant Rank - 1B.3	1,970 2,325	13 S:4	0	0	0	0	0	4	0	4	4	0	0
Grimmia vaginulata vaginulate grimmia	G3 S1	None None	Rare Plant Rank - 1B.1	2,250 2,250	2 S:1	0	0	0	0	0	1	0	1	1	0	0
Hesperevax sparsiflora var. brevifolia short-leaved evax	G4T3 S2	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	850 850	56 S:1	0	0	0	0	0	1	1	0	1	0	0
Hesperocyparis abramsiana var. abramsiana Santa Cruz cypress	G1T1 S1	Threatened Endangered	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden SB_UCSC-UC Santa Cruz	1,000 2,000	7 S:2	0	1	0	0	0	1	0	2	2	0	0
Hesperocyparis abramsiana var. butanoensis Butano Ridge cypress	G1T1 S1	Threatened Endangered	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	1,400 1,400	1 S:1	0	0	0	0	0	1	0	1	1	0	0
Hesperolinon congestum Marin western flax	G1 S1	Threatened Threatened	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden SB_UCBG-UC Botanical Garden at Berkeley	200 700	27 S:5	0	3	1	0	1	0	1	4	4	1	0
Horkelia cuneata var. sericea Kellogg's horkelia	G4T1? S1?	None None	Rare Plant Rank - 1B.1 SB_UCSC-UC Santa Cruz USFS_S-Sensitive	600 600	58 S:1	0	0	0	0	0	1	1	0	1	0	0
Lasthenia californica ssp. macrantha perennial goldfields	G3T2 S2	None None	Rare Plant Rank - 1B.2	25 50	59 S:5	0	2	1	2	0	0	0	5	5	0	0

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Legenere limosa legenere	G2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_UCBG-UC Botanical Garden at Berkeley	1,200 1,200	83 S:1	0	0	0	0	0	1	1	0	1	0	0
Leptosiphon rosaceus rose leptosiphon	G1 S1	None None	Rare Plant Rank - 1B.1	70 70	31 S:3	0	1	0	0	2	0	2	1	1	2	0
Lessingia arachnoidea Crystal Springs lessingia	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	440 550	11 S:2	0	0	1	0	0	1	0	2	2	0	0
Limnanthes douglasii ssp. sulphurea Point Reyes meadowfoam	G4T1 S1	None Endangered	Rare Plant Rank - 1B.2	240 240	12 S:1	0	0	1	0	0	0	1	0	1	0	0
Malacothamnus arcuatus arcuate bush-mallow	G2Q S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	300 2,400	30 S:11	0	0	1	1	0	9	5	6	11	0	0
Microseris paludosa marsh microseris	G2 S2	None None	Rare Plant Rank - 1B.2 SB_SBBG-Santa Barbara Botanic Garden SB_UCSC-UC Santa Cruz	40 300	38 S:3	1	0	0	0	2	0	2	1	1	1	1
Monolopia gracilens woodland woollythreads	G3 S3	None None	Rare Plant Rank - 1B.2	400 1,850	68 S:13	0	1	0	0	1	11	7	6	12	1	0
Monterey Pine Forest Monterey Pine Forest	G1 S1.1	None None		400 400	11 S:1	0	0	0	0	0	1	1	0	1	0	0
N. Central Coast Calif. Roach/Stickleback/Steelhead Stream N. Central Coast Calif. Roach/Stickleback/Steelhead Stream	GNR SNR	None None		130 200	2 S:2	0	2	0	0	0	0	2	0	2	0	0
North Central Coast Drainage Sacramento Sucker/Roach River North Central Coast Drainage Sacramento Sucker/Roach River	GNR SNR	None None		400 400	4 S:1	0	1	0	0	0	0	1	0	1	0	0
North Central Coast Short-Run Coho Stream North Central Coast Short-Run Coho Stream	GNR SNR	None None		50 50	2 S:1	0	0	1	0	0	0	1	0	1	0	0

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Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
North Central Coast Steelhead/Sculpin Stream North Central Coast Steelhead/Sculpin Stream	GNR SNR	None None		160 160	1 S:1	0	1	0	0	0	0	1	0	1	0	0
Northern Coastal Salt Marsh Northern Coastal Salt Marsh	G3 S3.2	None None		10 10	53 S:3	0	1	0	0	0	2	3	0	3	0	0
Northern Interior Cypress Forest Northern Interior Cypress Forest	G2 S2.2	None None		1,000 2,100	22 S:3	0	0	0	0	0	3	3	0	3	0	0
Orthotrichum kellmanii Kellman's bristle moss	G1 S1	None None	Rare Plant Rank - 1B.2 USFS_S-Sensitive	2,133 2,247	4 S:2	0	0	0	0	0	2	0	2	2	0	0
Pedicularis dudleyi Dudley's lousewort	G2 S2	None Rare	Rare Plant Rank - 1B.2 USFS_S-Sensitive	500 500	11 S:2	0	1	0	0	0	1	1	1	2	0	0
Penstemon rattanii var. kleei Santa Cruz Mountains beardtongue	G4T2 S2	None None	Rare Plant Rank - 1B.2	2,000 2,000	5 S:1	0	0	0	0	0	1	1	0	1	0	0
Pentachaeta bellidiflora white-rayed pentachaeta	G1 S1	Endangered Endangered	Rare Plant Rank - 1B.1 SB_UCBG-UC Botanical Garden at Berkeley	520 2,000	14 S:5	1	0	0	0	2	2	4	1	3	2	0
Pinus radiata Monterey pine	G1 S1	None None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden SB_UCSC-UC Santa Cruz	400 400	5 S:1	1	0	0	0	0	0	0	1	1	0	0
Piperia candida white-flowered rein orchid	G3 S3	None None	Rare Plant Rank - 1B.2 BLM_S-Sensitive	500 1,300	188 S:4	0	0	0	0	0	4	2	2	4	0	0
Plagiobothrys chorisianus var. chorisianus Choris' popcornflower	G3T1Q S1	None None	Rare Plant Rank - 1B.2 SB_UCSC-UC Santa Cruz	25 2,300	42 S:25	2	7	4	0	0	12	9	16	25	0	0
Plagiobothrys diffusus San Francisco popcornflower	G1Q S1	None Endangered	Rare Plant Rank - 1B.1 SB_UCSC-UC Santa Cruz	160 160	17 S:1	0	0	1	0	0	0	1	0	1	0	0
Sacramento-San Joaquin Coastal Lagoon Sacramento-San Joaquin Coastal Lagoon	GNR SNR	None None		10 10	2 S:2	0	2	0	0	0	0	2	0	2	0	0

						Element Occ. Ranks						Population Status		Presence		
Name (Scientific/Common)	**CNDDB Ranks**	**Listing Status (Fed/State)**	**Other Lists**	**Elev. Range (ft.)**	**Total EO's**	**A**	**B**	**C**	**D**	**X**	**U**	**Historic > 20 yr**	**Recent <= 20 yr**	**Extant**	**Poss. Extirp.**	**Extirp.**
Senecio aphanactis chaparral ragwort	G3 S2	None None	Rare Plant Rank - 2B.2 SB_RSABG-Rancho Santa Ana Botanic Garden	640 1,200	98 S:2	0	0	0	0	0	2	2	0	2	0	0
Serpentine Bunchgrass Serpentine Bunchgrass	G2 S2.2	None None		720 5,800	22 S:2	1	0	0	0	0	1	2	0	2	0	0
Silene scouleri ssp. scouleri Scouler's catchfly	G5T4T5 S2S3	None None	Rare Plant Rank - 2B.2		23 S:1	0	0	0	0	0	1	0	1	1	0	0
Silene verecunda ssp. verecunda San Francisco campion	G5T1 S1	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden SB_UCSC-UC Santa Cruz	600 600	20 S:1	0	0	0	0	1	0	1	0	0	1	0
Stebbinsoseris decipiens Santa Cruz microseris	G2 S2	None None	Rare Plant Rank - 1B.2 SB_RSABG-Rancho Santa Ana Botanic Garden SB_UCSC-UC Santa Cruz	875 875	19 S:2	0	0	0	0	0	2	2	0	2	0	0
Stuckenia filiformis ssp. alpina slender-leaved pondweed	G5T5 S2S3	None None	Rare Plant Rank - 2B.2	50 50	21 S:2	0	0	0	0	0	2	2	0	2	0	0
Trifolium amoenum two-fork clover	G1 S1	Endangered None	Rare Plant Rank - 1B.1 SB_RSABG-Rancho Santa Ana Botanic Garden SB_UCBG-UC Botanical Garden at Berkeley SB_USDA-US Dept of Agriculture		26 S:1	0	0	0	0	0	1	1	0	1	0	0
Trifolium buckwestiorum Santa Cruz clover	G2 S2	None None	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_SBBG-Santa Barbara Botanic Garden SB_UCSC-UC Santa Cruz SB_USDA-US Dept of Agriculture		64 S:1	0	0	0	0	0	1	1	0	1	0	0

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Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Trifolium polyodon Pacific Grove clover	G1 S1	None Rare	Rare Plant Rank - 1B.1 BLM_S-Sensitive SB_USDA-US Dept of Agriculture	870 870	21 S:1	0	0	0	0	0	1	1	0	1	0	0
Usnea longissima Methuselah's beard lichen	G4 S4	None None	Rare Plant Rank - 4.2 BLM_S-Sensitive	590 2,040	206 S:2	0	0	0	0	2	0	2	0	0	1	1
Valley Needlegrass Grassland Valley Needlegrass Grassland	G3 S3.1	None None		400 400	45 S:1	0	0	0	0	0	1	1	0	1	0	0
Valley Oak Woodland Valley Oak Woodland	G3 S2.1	None None		40 40	91 S:1	0	0	0	0	0	1	1	0	1	0	0

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Query Criteria: Quad IS (Half Moon Bay (3712244) OR Woodside (3712243) OR Palo Alto (3712242) OR San Gregorio (3712234) OR La Honda (3712233) OR Mindego Hill (3712232) OR Pigeon Point (3712224) OR Franklin Point (3712223) OR Big Basin (3712222))
 AND Taxonomic Group IS (Fish OR Amphibians OR Reptiles OR Birds OR Mammals OR Mollusks OR Arachnids OR Crustaceans OR Insects)

						Element Occ. Ranks						Population Status		Presence		
Name (Scientific/Common)	**CNDDB Ranks**	**Listing Status (Fed/State)**	**Other Lists**	**Elev. Range (ft.)**	**Total EO's**	**A**	**B**	**C**	**D**	**X**	**U**	**Historic > 20 yr**	**Recent <= 20 yr**	**Extant**	**Poss. Extirp.**	**Extirp.**
Ambystoma californiense California tiger salamander	G2G3 S2S3	Threatened Threatened	CDFW_WL-Watch List IUCN_VU-Vulnerable	40 400	1231 S:5	0	1	0	0	3	1	3	2	2	1	2
Aneides niger Santa Cruz black salamander	G3 S3	None None	CDFW_SSC-Species of Special Concern	49 2,300	78 S:16	0	0	0	0	0	16	10	6	16	0	0
Antrozous pallidus pallid bat	G5 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	70 420	420 S:3	0	0	0	0	0	3	3	0	3	0	0
Ardea herodias great blue heron	G5 S4	None None	CDF_S-Sensitive IUCN_LC-Least Concern	5 5	155 S:1	0	0	0	0	0	1	1	0	1	0	0
Asio otus long-eared owl	G5 S3?	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	2,000 2,000	48 S:1	0	0	0	0	0	1	1	0	1	0	0
Athene cunicularia burrowing owl	G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFWS_BCC-Birds of Conservation Concern	713 2,253	1989 S:3	0	0	0	0	0	3	0	3	3	0	0
Bombus caliginosus obscure bumble bee	G4? S1S2	None None	IUCN_VU-Vulnerable	40 500	181 S:5	0	0	0	0	0	5	5	0	5	0	0
Bombus crotchii Crotch bumble bee	G3G4 S1S2	None Candidate Endangered		100 100	276 S:1	0	0	0	0	0	1	1	0	1	0	0

				Elev.		Element Occ. Ranks						Population Status		Presence		
Name (Scientific/Common)	**CNDDB Ranks**	**Listing Status (Fed/State)**	**Other Lists**	**Range (ft.)**	**Total EO's**	**A**	**B**	**C**	**D**	**X**	**U**	**Historic > 20 yr**	**Recent <= 20 yr**	**Extant**	**Poss. Extirp.**	**Extirp.**
Bombus occidentalis western bumble bee	G2G3 S1	None Candidate Endangered	USFS_S-Sensitive XERCES_IM-Imperiled	15 400	279 S:8	0	0	0	0	0	8	8	0	8	0	0
Brachyramphus marmoratus marbled murrelet	G3G4 S1	Threatened Endangered	CDF_S-Sensitive IUCN_EN-Endangered NABCI_RWL-Red Watch List	200 1,800	110 S:36	0	1	0	0	0	35	19	17	36	0	0
Calicina minor Edgewood blind harvestman	G1 S1	None None		560 560	2 S:1	0	0	0	0	0	1	1	0	1	0	0
Charadrius alexandrinus nivosus western snowy plover	G3T3 S2S3	Threatened None	CDFW_SSC-Species of Special Concern NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	0 17	138 S:5	1	1	0	0	2	1	3	2	3	1	1
Corynorhinus townsendii Townsend's big-eared bat	G3G4 S2	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern USFS_S-Sensitive WBWG_H-High Priority	30 2,250	635 S:12	0	1	1	0	0	10	6	6	12	0	0
Coturnicops noveboracensis yellow rail	G4 S1S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern NABCI_RWL-Red Watch List USFS_S-Sensitive USFWS_BCC-Birds of Conservation Concern	8 18	45 S:3	0	0	0	0	0	3	3	0	3	0	0
Cypseloides niger black swift	G4 S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern NABCI_YWL-Yellow Watch List USFWS_BCC-Birds of Conservation Concern	540 540	46 S:1	0	0	0	0	0	1	1	0	1	0	0
Danaus plexippus pop. 1 monarch - California overwintering population	G4T2T3 S2S3	None None	USFS_S-Sensitive	40 200	383 S:9	0	4	2	0	1	2	8	1	8	1	0

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						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Dicamptodon ensatus California giant salamander	G3 S2S3	None None	CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened	80 2,400	234 S:30	1	1	0	0	0	28	14	16	30	0	0
Dipodomys venustus venustus Santa Cruz kangaroo rat	G4T1 S1	None None		20 600	29 S:3	0	0	0	0	3	0	3	0	0	3	0
Emys marmorata western pond turtle	G3G4 S3	None None	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable USFS_S-Sensitive	21 949	1385 S:10	1	5	1	0	0	3	3	7	10	0	0
Eucyclogobius newberryi tidewater goby	G3 S3	Endangered None	AFS_EN-Endangered CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable	15 20	127 S:3	0	2	0	0	0	1	3	0	3	0	0
Euphydryas editha bayensis Bay checkerspot butterfly	G5T1 S1	Threatened None	XERCES_CI-Critically Imperiled	500 640	30 S:3	0	1	0	0	2	0	2	1	1	1	1
Falco peregrinus anatum American peregrine falcon	G4T4 S3S4	Delisted Delisted	CDF_S-Sensitive CDFW_FP-Fully Protected USFWS_BCC-Birds of Conservation Concern	1,871 1,871	56 S:1	0	0	0	0	0	1	0	1	1	0	0
Geothlypis trichas sinuosa saltmarsh common yellowthroat	G5T3 S3	None None	CDFW_SSC-Species of Special Concern USFWS_BCC-Birds of Conservation Concern	4 360	112 S:11	1	2	2	0	0	6	10	1	11	0	0
Haliaeetus leucocephalus bald eagle	G5 S3	Delisted Endangered	BLM_S-Sensitive CDF_S-Sensitive CDFW_FP-Fully Protected IUCN_LC-Least Concern USFS_S-Sensitive USFWS_BCC-Birds of Conservation Concern	430 430	327 S:1	0	0	1	0	0	0	0	1	1	0	0
Hydrochara rickseckeri Ricksecker's water scavenger beetle	G2? S2?	None None		280 280	13 S:1	0	0	0	0	0	1	1	0	1	0	0
Lasiurus cinereus hoary bat	G5 S4	None None	IUCN_LC-Least Concern WBWG_M-Medium Priority		238 S:6	0	0	0	0	0	6	6	0	6	0	0

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Laterallus jamaicensis coturniculus California black rail	G3G4T1 S1	None Threatened	BLM_S-Sensitive CDFW_FP-Fully Protected IUCN_NT-Near Threatened NABCI_RWL-Red Watch List USFWS_BCC-Birds of Conservation Concern	5 5	303 S:1	0	1	0	0	0	0	0	1	1	0	0
Margaritifera falcata western pearlshell	G4G5 S1S2	None None		50 50	78 S:1	0	0	0	0	0	1	1	0	1	0	0
Melospiza melodia pusillula Alameda song sparrow	G5T2? S2S3	None None	CDFW_SSC-Species of Special Concern USFWS_BCC-Birds of Conservation Concern	4 70	38 S:6	0	3	0	0	0	3	3	3	6	0	0
Microcina edgewoodensis Edgewood Park micro-blind harvestman	G1 S1	None None		600 600	1 S:1	0	0	0	0	0	1	1	0	1	0	0
Neotoma fuscipes annectens San Francisco dusky-footed woodrat	G5T2T3 S2S3	None None	CDFW_SSC-Species of Special Concern	215 460	42 S:5	0	2	2	0	0	1	0	5	5	0	0
Oncorhynchus kisutch pop. 4 coho salmon - central California coast ESU	G4 S2?	Endangered Endangered	AFS_EN-Endangered	40 400	23 S:2	0	0	1	1	0	0	2	0	2	0	0
Oncorhynchus mykiss irideus pop. 8 steelhead - central California coast DPS	G5T2T3Q S2S3	Threatened None	AFS_TH-Threatened	40 1,200	44 S:9	0	2	0	0	0	7	6	3	9	0	0
Rallus obsoletus obsoletus California Ridgway's rail	G5T1 S1	Endangered Endangered	CDFW_FP-Fully Protected NABCI_RWL-Red Watch List	1 4	99 S:3	1	1	1	0	0	0	0	3	3	0	0
Rana boylii foothill yellow-legged frog	G3 S3	None Candidate Threatened	BLM_S-Sensitive CDFW_SSC-Species of Special Concern IUCN_NT-Near Threatened USFS_S-Sensitive	80 1,654	2468 S:15	0	1	0	0	6	8	15	0	9	2	4
Rana draytonii California red-legged frog	G2G3 S2S3	Threatened None	CDFW_SSC-Species of Special Concern IUCN_VU-Vulnerable	10 1,880	1543 S:66	13	19	10	1	2	21	21	45	64	1	1
Reithrodontomys raviventris salt-marsh harvest mouse	G1G2 S1S2	Endangered Endangered	CDFW_FP-Fully Protected IUCN_EN-Endangered	0 0	144 S:3	0	1	2	0	0	0	3	0	3	0	0

Name (Scientific/Common)	CNDDB Ranks	Listing Status (Fed/State)	Other Lists	Elev. Range (ft.)	Total EO's	Element Occ. Ranks						Population Status		Presence		
						A	B	C	D	X	U	Historic > 20 yr	Recent <= 20 yr	Extant	Poss. Extirp.	Extirp.
Riparia riparia bank swallow	G5 S2	None Threatened	BLM_S-Sensitive IUCN_LC-Least Concern		298 S:1	0	0	0	0	0	1	1	0	1	0	0
Sorex vagrans halicoetes salt-marsh wandering shrew	G5T1 S1	None None	CDFW_SSC-Species of Special Concern	2 2	12 S:1	0	0	0	0	0	1	1	0	1	0	0
Speyeria adiaste adiaste unsilvered fritillary	G1G2T1 S1	None None		1,600 2,300	2 S:2	0	1	0	0	0	1	2	0	2	0	0
Speyeria zerene myrtleae Myrtle's silverspot butterfly	G5T1 S1	Endangered None	XERCES_CI-Critically Imperiled	28 28	17 S:1	0	0	0	0	1	0	1	0	0	0	1
Spirinchus thaleichthys longfin smelt	G5 S1	Candidate Threatened		0 20	46 S:2	0	0	0	0	0	2	2	0	2	0	0
Sternula antillarum browni California least tern	G4T2T3Q S2	Endangered Endangered	CDFW_FP-Fully Protected NABCI_RWL-Red Watch List	1 1	75 S:1	0	0	0	0	1	0	1	0	0	0	1
Taricha rivularis red-bellied newt	G4 S2	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	1,800 2,000	136 S:2	0	0	0	0	0	2	0	2	2	0	0
Taxidea taxus American badger	G5 S3	None None	CDFW_SSC-Species of Special Concern IUCN_LC-Least Concern	30 2,542	592 S:26	0	0	0	0	0	26	3	23	26	0	0
Thamnophis sirtalis tetrataenia San Francisco gartersnake	G5T2Q S2	Endangered Endangered	CDFW_FP-Fully Protected	5 2,030	66 S:41	6	10	8	0	0	17	29	12	41	0	0
Tryonia imitator mimic tryonia (=California brackishwater snail)	G2 S2	None None	IUCN_DD-Data Deficient	3 40	39 S:2	0	1	0	0	0	1	1	1	2	0	0

CNPS California Native Plant Society

Inventory of Rare and Endangered Plants

*The database used to provide updates to the Online Inventory is under construction. View updates and changes made since May 2019 here.

Plant List

62 matches found. *Click on scientific name for details*

Search Criteria

California Rare Plant Rank is one of [1A, 1B, 2A, 2B], Found in Quads 3712244, 3712243, 3712242, 3712234, 3712233, 3712232, 3712224 3712223 and 3712222;

Modify Search Criteria Export to Excel Modify Columns Modify Sort Display Photos

Scientific Name	Common Name	Family	Lifeform	Blooming Period	CA Rare Plant Rank	State Rank	Global Rank
Acanthomintha duttonii	San Mateo thorn-mint	Lamiaceae	annual herb	Apr-Jun	1B.1	S1	G1
Agrostis blasdalei	Blasdale's bent grass	Poaceae	perennial rhizomatous herb	May-Jul	1B.2	S2	G2
Allium peninsulare var. franciscanum	Franciscan onion	Alliaceae	perennial bulbiferous herb	(Apr)May-Jun	1B.2	S2	G5T2
Amsinckia lunaris	bent-flowered fiddleneck	Boraginaceae	annual herb	Mar-Jun	1B.2	S3	G3
Arctostaphylos andersonii	Anderson's manzanita	Ericaceae	perennial evergreen shrub	Nov-May	1B.2	S2	G2
Arctostaphylos glutinosa	Schreiber's manzanita	Ericaceae	perennial evergreen shrub	(Nov)Mar-Apr	1B.2	S1	G1
Arctostaphylos ohloneana	Ohlone manzanita	Ericaceae	evergreen shrub	Feb-Mar	1B.1	S1	G1
Arctostaphylos regismontana	Kings Mountain manzanita	Ericaceae	perennial evergreen shrub	Dec-Apr	1B.2	S2	G2
Arctostaphylos silvicola	Bonny Doon manzanita	Ericaceae	perennial evergreen shrub	Jan-Mar	1B.2	S1	G1
Astragalus pycnostachyus var. pycnostachyus	coastal marsh milk-vetch	Fabaceae	perennial herb	(Apr)Jun-Oct	1B.2	S2	G2T2
Calyptridium parryi var. hesseae	Santa Cruz Mountains pussypaws	Montiaceae	annual herb	May-Aug	1B.1	S2	G3G4T2
Centromadia parryi ssp. congdonii	Congdon's tarplant	Asteraceae	annual herb	May-Oct(Nov)	1B.1	S1S2	G3T1T2
Chorizanthe pungens var. hartwegiana	Ben Lomond spineflower	Polygonaceae	annual herb	Apr-Jul	1B.1	S1	G2T1
Cirsium andrewsii	Franciscan thistle	Asteraceae	perennial herb	Mar-Jul	1B.2	S3	G3
Cirsium fontinale var. fontinale	Crystal Springs fountain thistle	Asteraceae	perennial herb	(Apr)May-Oct	1B.1	S1	G2T1

Cirsium praeteriens	lost thistle	Asteraceae	perennial herb	Jun-Jul	1A	SX	GX
Collinsia corymbosa	round-headed Chinese-houses	Plantaginaceae	annual herb	Apr-Jun	1B.2	S1	G1
Collinsia multicolor	San Francisco collinsia	Plantaginaceae	annual herb	(Feb)Mar-May	1B.2	S2	G2
Dirca occidentalis	western leatherwood	Thymelaeaceae	perennial deciduous shrub	Jan-Mar(Apr)	1B.2	S2	G2
Eriogonum nudum var. decurrens	Ben Lomond buckwheat	Polygonaceae	perennial herb	Jun-Oct	1B.1	S1	G5T1
Eriophyllum latilobum	San Mateo woolly sunflower	Asteraceae	perennial herb	May-Jun	1B.1	S1	G1
Eryngium aristulatum var. hooveri	Hoover's button-celery	Apiaceae	annual / perennial herb	(Jun)Jul(Aug)	1B.1	S1	G5T1
Eryngium jepsonii	Jepson's coyote thistle	Apiaceae	perennial herb	Apr-Aug	1B.2	S2?	G2?
Erysimum ammophilum	sand-loving wallflower	Brassicaceae	perennial herb	Feb-Jun	1B.2	S2	G2
Fissidens pauperculus	minute pocket moss	Fissidentaceae	moss		1B.2	S2	G3?
Fritillaria liliacea	fragrant fritillary	Liliaceae	perennial bulbiferous herb	Feb-Apr	1B.2	S2	G2
Grimmia torenii	Toren's grimmia	Grimmiaceae	moss		1B.3	S2	G2
Grimmia vaginulata	vaginulate grimmia	Grimmiaceae	moss		1B.1	S1	G2G3
Hesperevax sparsiflora var. brevifolia	short-leaved evax	Asteraceae	annual herb	Mar-Jun	1B.2	S2	G4T3
Hesperocyparis abramsiana var. abramsiana	Santa Cruz cypress	Cupressaceae	perennial evergreen tree		1B.2	S1	G1T1
Hesperocyparis abramsiana var. butanoensis	Butano Ridge cypress	Cupressaceae	perennial evergreen tree	Oct	1B.2	S1	G1T1
Hesperolinon congestum	Marin western flax	Linaceae	annual herb	Apr-Jul	1B.1	S1	G1
Horkelia cuneata var. sericea	Kellogg's horkelia	Rosaceae	perennial herb	Apr-Sep	1B.1	S1?	G4T1?
Lasthenia californica ssp. macrantha	perennial goldfields	Asteraceae	perennial herb	Jan-Nov	1B.2	S2	G3T2
Legenere limosa	legenere	Campanulaceae	annual herb	Apr-Jun	1B.1	S2	G2
Leptosiphon croceus	coast yellow leptosiphon	Polemoniaceae	annual herb	Apr-Jun	1B.1	S1	G1
Leptosiphon rosaceus	rose leptosiphon	Polemoniaceae	annual herb	Apr-Jul	1B.1	S1	G1
Lessingia arachnoidea	Crystal Springs lessingia	Asteraceae	annual herb	Jul-Oct	1B.2	S2	G2
Limnanthes douglasii ssp. sulphurea	Point Reyes meadowfoam	Limnanthaceae	annual herb	Mar-May	1B.2	S1	G4T1
Malacothamnus arcuatus	arcuate bush-mallow	Malvaceae	perennial evergreen shrub	Apr-Sep	1B.2	S2	G2Q
Malacothamnus davidsonii	Davidson's bush-mallow	Malvaceae	perennial deciduous shrub	Jun-Jan	1B.2	S2	G2
Microseris paludosa	marsh microseris	Asteraceae	perennial herb	Apr-Jun(Jul)	1B.2	S2	G2
Monolopia gracilens	woodland woolythreads	Asteraceae	annual herb	(Feb)Mar-Jul	1B.2	S3	G3

Orthotrichum kellmanii	Kellman's bristle moss	Orthotrichaceae	moss	Jan-Feb	1B.2	S2	G2
Pedicularis dudleyi	Dudley's lousewort	Orobanchaceae	perennial herb	Apr-Jun	1B.2	S2	G2
Penstemon rattanii var. kleei	Santa Cruz Mountains beardtongue	Plantaginaceae	perennial herb	May-Jun	1B.2	S2	G4T2
Pentachaeta bellidiflora	white-rayed pentachaeta	Asteraceae	annual herb	Mar-May	1B.1	S1	G1
Pinus radiata	Monterey pine	Pinaceae	perennial evergreen tree		1B.1	S1	G1
Piperia candida	white-flowered rein orchid	Orchidaceae	perennial herb	(Mar)May-Sep	1B.2	S3	G3
Plagiobothrys chorisianus var. chorisianus	Choris' popcornflower	Boraginaceae	annual herb	Mar-Jun	1B.2	S1	G3T1Q
Plagiobothrys diffusus	San Francisco popcornflower	Boraginaceae	annual herb	Mar-Jun	1B.1	S1	G1Q
Polemonium carneum	Oregon polemonium	Polemoniaceae	perennial herb	Apr-Sep	2B.2	S2	G3G4
Senecio aphanactis	chaparral ragwort	Asteraceae	annual herb	Jan-Apr(May)	2B.2	S2	G3
Sidalcea hickmanii ssp. viridis	Marin checkerbloom	Malvaceae	perennial herb	May-Jun	1B.1	SH	G3TH
Silene scouleri ssp. scouleri	Scouler's catchfly	Caryophyllaceae	perennial herb	(Mar-May)Jun-Aug(Sep)	2B.2	S2S3	G5T4T5
Silene verecunda ssp. verecunda	San Francisco campion	Caryophyllaceae	perennial herb	(Feb)Mar-Jun(Aug)	1B.2	S1	G5T1
Stebbinsoseris decipiens	Santa Cruz microseris	Asteraceae	annual herb	Apr-May	1B.2	S2	G2
Stuckenia filiformis ssp. alpina	slender-leaved pondweed	Potamogetonaceae	perennial rhizomatous herb (aquatic)	May-Jul	2B.2	S2S3	G5T5
Trifolium amoenum	two-fork clover	Fabaceae	annual herb	Apr-Jun	1B.1	S1	G1
Trifolium buckwestiorum	Santa Cruz clover	Fabaceae	annual herb	Apr-Oct	1B.1	S2	G2
Trifolium polyodon	Pacific Grove clover	Fabaceae	annual herb	Apr-Jun(Jul)	1B.1	S1	G1
Tropidocarpum capparideum	caper-fruited tropidocarpum	Brassicaceae	annual herb	Mar-Apr	1B.1	S1	G1

Suggested Citation

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Search the Inventory

- Simple Search
- Advanced Search
- Glossary

Information

- About the Inventory
- About the Rare Plant Program
- CNPS Home Page
- About CNPS
- Join CNPS

Contributors

- The Calflora Database
- The California Lichen Society
- California Natural Diversity Database
- The Jepson Flora Project
- The Consortium of California Herbaria
- CalPhotos

Questions and Comments

rareplants@cnps.org

IPaC **U.S. Fish & Wildlife Service**

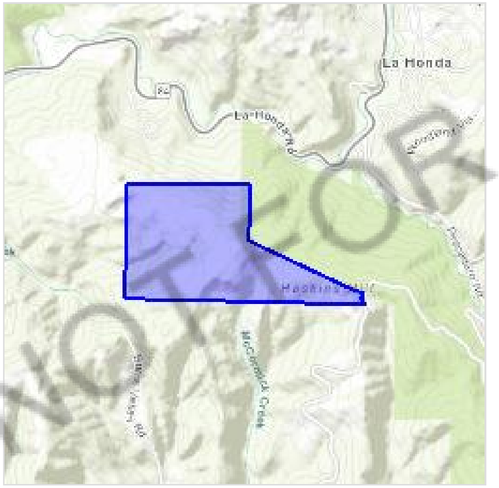
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

San Mateo County, California



Local office

Sacramento Fish And Wildlife Office

☎ (916) 414-6600
(916) 414-6713

Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species[1] and their critical habitats are managed by the Ecological Services Program of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries[2]).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact NOAA Fisheries for species under their jurisdiction.

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1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the listing status page for more information.
2. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME	STATUS

California Least Tern Sterna antillarum browni No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/8104	Endangered
Marbled Murrelet Brachyramphus marmoratus There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/4467	Threatened

Reptiles

NAME	STATUS
Green Sea Turtle Chelonia mydas No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/6199	Threatened
San Francisco Garter Snake Thamnophis sirtalis tetrataenia No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/5956	Endangered

Amphibians

NAME	STATUS
California Red-legged Frog Rana draytonii There is **final** critical habitat for this species. Your location overlaps the critical habitat. https://ecos.fws.gov/ecp/species/2891	Threatened

Fishes

NAME	STATUS
Delta Smelt Hypomesus transpacificus There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/321	Threatened
Tidewater Goby Eucyclogobius newberryi There is **final** critical habitat for this species. Your location is outside the critical habitat. https://ecos.fws.gov/ecp/species/57	Endangered

Insects

NAME	STATUS

San Bruno Elfin Butterfly Callophrys mossii bayensis There is **proposed** critical habitat for this species. The location of the critical habitat is not available. https://ecos.fws.gov/ecp/species/3394	Endangered

Flowering Plants

NAME	STATUS
San Mateo Woolly Sunflower Eriophyllum latilobum No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/7791	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

This location overlaps the critical habitat for the following species:

NAME	TYPE
California Red-legged Frog Rana draytonii https://ecos.fws.gov/ecp/species/2891#crithab	Final
Marbled Murrelet Brachyramphus marmoratus https://ecos.fws.gov/ecp/species/4467#crithab	Final

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php
- Measures for avoiding and minimizing impacts to birds http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php

- Nationwide conservation measures for birds
  http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
Allen's Hummingbird Selasphorus sasin This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9637	Breeds Feb 1 to Jul 15
Common Yellowthroat Geothlypis trichas sinuosa This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/2084	Breeds May 20 to Jul 31

Golden Eagle Aquila chrysaetos Breeds Jan 1 to Aug 31

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.
https://ecos.fws.gov/ecp/species/1680

Nuttall's Woodpecker Picoides nuttallii Breeds Apr 1 to Jul 20

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/9410

Oak Titmouse Baeolophus inornatus Breeds Mar 15 to Jul 15

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.
https://ecos.fws.gov/ecp/species/9656

Song Sparrow Melospiza melodia Breeds Feb 20 to Sep 5

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Spotted Towhee Pipilo maculatus clementae Breeds Apr 15 to Jul 20

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA
https://ecos.fws.gov/ecp/species/4243

Wrentit Chamaea fasciata Breeds Mar 15 to Aug 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (🟩)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

APPENDIX C

FIELD SURVEYOR QUALIFICATIONS

Biological Assessment and Wildlife Surveys

Dana Riggs, Principal Biologist for Sol Ecology received her Bachelor of Science degree in Earth Systems, Science and Policy at California State University of Monterey Bay in 2001. Prior to founding Sol Ecology, she was a principal biologist and head of the Wildlife and Fisheries Department at WRA, a mid-size environmental consulting firm in San Rafael, California. She has 20 years of experience directing a broad range of resource studies from planning level to post-construction including: biological habitat assessments and mapping, special status species surveys, corridor studies, site restoration and monitoring, federal and state regulatory permitting, local permitting, mitigation, and restoration planning for aquatic species, and NEPA and CEQA documentation for a variety of public and private sector clients. Dana has extensive experience working with species including California red-legged frog and California tiger salamander and has been approved by USFWS and CDFW to monitor for these species on projects throughout the state.

Wetland Delineation

Mark Kalnins, Senior Regulatory Specialist for Sol Ecology received a Bachelor of Science in Plant Biology from The Ohio State University in 1997 and a Master of Science in Environmental Science from Christopher Newport University-Virginia in 2000. He has worked as a professional wetland delineator, biologist, and regulatory permitting specialist in public, private, and non-profit sectors for over 17 years. Mark specializes in wetland delineation, assessments, and permitting, special status plant surveys, floristic inventories, and vegetation community mapping in the SF Bay Area and Northern California.

Biological Assessment and Botanical Surveys

Elspeth Mathau, Associate Biologist for Sol Ecology received an Honors Bachelor of Science degree in Environmental Studies, Biology and Psychology at the he University of Toronto in 2016, and a Master of Science in Ethnobotany at the University of Kent, in Canterbury UK with Training at Kew Royal Botanical Gardens in 2018. She started working in the environmental science education field in 2009, and has experience with plant restoration projects, floristic inventories. Her master's research was on ecological change and climate adaptation in the Moroccan High Atlas Mountains with indigenous communities. She has also worked with sustainable agriculture and STEM education non-profits focused on equity and inclusion programs.

APPENDIX D

SITE PHOTOGRAPHS

Photo 1. California annual grassland and disturbed communities on eastern parcel.

Photo 2. Existing development area including house, barn, staging area, and access road.

Photo 3. East facing view of the project study area including pole alignment area and development area. Erosional gully features in the grassland are not likely jurisdictional but will be avoided.

Photo 4. Larger stock pond and cattle on western parcel. Power poles will be placed 25 feet from pond OHWM.

Photo 5. Smaller stock pond located on eastern parcel, below the project study area

Photo 6. McCormick creek riparian vegetative community south east of the project study area.

APPENDIX E

RARE PLANT SURVEY REPORT

SOL ECOLOGY

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July 5, 2019

Ken White
Peninsula Humane Society & SPCA
1450 Rollins Road
Burlingame, CA 94010

Re: Special Status Plant Survey at the 12429 Pescadero Creek Road (APN 082-050-010 & 020)

Dear Mr. White,

This letter discusses the findings of a spring protocol-level special-status plant survey at 12429 Pescadero Creek Road (APN 082-050-010 & 020), Loma Mar, California (Project Area). In accordance with 2018 statewide protocols[1], floristic special-status plant surveys were performed on May 17, 2019 within the Project Area within the blooming period for the following target species: *Arctostaphylos* andersonii (Anderson's manzanita)*, A. regismontana* (Kings Mountain manzanita)*, Plagiobothrys chorisianus* (Choris' popcornflower)*, Pedicularis dudleyi* (Dudley's lousewort)*, Malacothamus arculatus* (arcuate bush-mallow)*, Fissidens pauperculus* (minute pocket moss)*, and Dirca occidentalis* (western leatherwood). Species with potential to occur in the Project Area are further described in the Preliminary Biological Reconnaissance Report for the PHS completed by Sol Ecology in January 2019.

Project Site Description

The proposed project at this location is to construct an animal sanctuary which consists of road expansion and re-surfacing to accommodate emergency vehicle access, cat and dog enclosures, and supporting structures (barns, vet clinics, visitor center, parking, on-site caretaker residences, storage, potential solar array) for the operation and maintenance of the site.

The Project Area is located on two parcels approximately one-half mile south the intersection of Highway 84 and Pescadero Creek Road, near the town of La Honda. The two parcels together are approximately 225 acres in size. A small area of development consisting of a roadway, residence and barn is present in the center of the Project Area bounded by dense oak woodland and redwood forest to the north and annual grassland and coastal scrub to the south. The site is located on south-facing slope along a ridgeline running east to west; bisecting the property is the headwaters to McCormick Creek (on the eastern parcel) and the headwaters of a tributary to Kingston Creek (on the western parcel). Elevations on the property range from 270 meters to 340 meters.

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[1] CDFW. 2018. Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. March 20, 2018.

Soil types on the Study Area include Lobitos loam which consists of moderately deep, well drained soils that formed on moderately hard sandstone and shale. This soil type is found in uplands on slopes between 5 to 50 percent and have moderately slow permeability and medium to rapid runoff. This soil type is mostly used for pasture and range. Typical vegetation includes annual grasses and forbs, with some brush including coyote brush, cascara berry, and poison oak. Along the ridgeline, at the edge of the Study Area, Hugo and Josephine loams are present. This soil type is found on very steep slopes and includes consists of deep, well drained soils formed in material weathered from sandstone, shale, schist, and conglomerate. It is primarily used for timber production and vegetation is typically mixed conifer-hardwood including Douglas-fir, coast redwood, tanoak, and madrone.

Methods

In the Preliminary Biological Assessment, a database query of the CNDDB[2] and the CNPS Electronic Inventory[3] was conducted within the La Honda and surrounding eight quadrangles to determine rare plants with potential to occur within the Project Area. A total of 13 occurrences for rare plants are recorded within five miles of the Project Area. Based on the Preliminary Biological Assessment, seven (7) rare plants were determined to have potential to occur on site and all are expected to be identifiable in May.

A rare plant survey was performed on May 17, 2019. Transect surveys were performed and the entire Project Area was traversed on foot to examine suitable habitat for the presence of special status plants known to occur in the vicinity of the Project Area. The survey followed the protocol described in the March 20, 2018 Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities. All rare plant populations and sensitive communities, if found, were mapped using handheld Global Positioning System equipment with sub-meter accuracy.

Adverse conditions from yearly weather patterns, as well as disease, drought, predation, fire, herbivory, or other disturbances may preclude presence in a given year. The timing of this survey was based on a determination of the blooming period for the seven (7) special status plant identified to have potential to occur on site in a normal (or average) rainfall year. No evidence of disease, drought, or predation was observed, although the presence of actively grazing cows on site may preclude detection of plants.

Field Surveyor Qualifications

Andrew Georgeades, Senior Ecologist at Sol Ecology received his Bachelor of Science degree in Environment Studies: Natural Resource Management and Conservation at San Francisco State University in 2005. Prior to working at Sol Ecology, Andrew worked as a natural resource

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[2] **Error! Main Document Only.**California Department of Fish and Wildlife (CDFW). 2019. California Natural Diversity Database.   Wildlife and Habitat Data Analysis Branch, Sacramento, CA. Accessed May 2019.

[3] California Native Plant Society (CNPS). 2019. Inventory of Rare and Endangered Plants (online edition, v8-02). Sacramento, California. Online at: http://rareplants.cnps.org/; most recently accessed: May 2019.

specialist for the Golden Gate National Recreation Area where he was responsible for monitoring native and rare plant populations and planning and supervising revegetation projects within the park. Andrew also previously worked for the California Native Plant Society as a vegetation project lead on the "Manual of California Vegetation, 2nd Ed." Publication. As a lead, he performed plant surveys, identified vegetation habitat types, landforms, environmental conditions, and plant species following the project protocol. Andrew currently is responsible for all floristic and focused plant surveys at Sol Ecology. He has extensive field experience identifying rare plant populations in the coastal zone. He maintains a current Scientific Collecting Permit with the California Department of Fish and Wildlife (CDFW).

Results and Discussion

Vegetation communities observed in the Project Area include annual grassland, montane hardwood, and coastal oak woodland. Sensitive communities include coast redwood forest (*Sequoia sempervirens* alliance) north of the Project Site, as well as potentially jurisdictional features. These communities are described in greater detail in the Preliminary Biological Assessment report under Section 3.2, Sensitive Vegetation Communities.

Based on a review of the literature and site assessments, the Project Area is potentially suitable for seven (7) rare plant species [as depicted in Table 1 of the Preliminary Biological Assessment prepared by Sol Ecology dated January 11, 2019]. A total of 114 plant species were observed in the project area during the May 17, 2019 site visit as shown in Attachment A, Table 1. No rare plant species were observed.

Given that no special status plants were observed during the survey in the Project Area or surrounding habitats, it is unlikely the project will result in any impacts to rare and/or endangered plant populations.

Should you have any questions or concerns, please feel free to contact me.

Sincerely,

Andrew Georgeades
Senior Ecologist/Botanist

Attachments: A – Table 1. Observed Species Table

Attachment A – Table 1. Observed Species Table

Scientific Name	Common Name	Life Form	Status	Family	Kennel Area	Road Expansion Area
Sambucus nigra	black elderberry	shrub	native	Adoxaceae	Y	N
Chloragalum pomeridianum	Soap plant	perennial herb	native	Agavaceae	N	Y
Toxicodendron diversilobum	Poison oak	vine, shrub	native	Anacardiaceae	Y	Y
Conium maculatum	poison hemlock	perennial herb	non-native	Apiaceae	Y	N
Heracleum maximum	Cow parsnip	perennial herb	native	Apiaceae	N	Y
Sanicula crassicaulis	Pacific sanicle	perennial herb	native	Apiaceae	N	Y
Achillea millefolium	common yarrow	perennial herb	native	Asteraceae	Y	Y
Anisocarpus madioides	woodland madia	perennial herb	native	Asteraceae	N	Y
Artemisia douglasiana	mugwort	perennial herb	native	Asteraceae	Y	Y
Baccharis pilularis	coyote brush	shrub	native	Asteraceae	Y	Y
Carduus pycnocephalus	Italian thistle	annual herb	non-native	Asteraceae	Y	Y
Cirsium vulgare	Bull thistle	perennial herb	non-native	Asteraceae	Y	Y
Helminthotheca echioides	Bristly ox tongue	annual or perennial herb	non-native	Asteraceae	Y	N
Hypochaeris radicata	Rough cats ear	perenninal herb	non-native	Asteraceae	Y	N
Lactuca serriola	prickly leaf lettuce	annual herb	non-native	Asteraceae	N	Y
Matricaria discoidea	pineapple weed	annual herb	native	Asteraceae	Y	N
Pseudognaphalium microcephalum	Wright's cudweed	perennial herb	native	Asteraceae	N	Y
Silybum marianum	Milk thistle	annual or perennial herb	non-native	Asteraceae	Y	N
Sonchus asper	spiny sow thistle	annual herb	non-native	Asteraceae	Y	Y
Symphyotrichum chilense	Chilean aster	perennial herb	native	Asteraceae	N	Y
Wyethia helenioides	Mules ears	perennial herb	native	Asteraceae	Y	N
Corylus cornuta	Beaked hazelnut	shrub	native	Betulaceae	Y	Y
Myosotis latifolia	Forget me not	perennial herb	non-native	Boraginaceae	N	Y
Brassica nigra	black mustard	annual herb	invasive non-native	Brassicaceae	Y	N

Scientific Name	**Common Name**	**Life Form**	**Status**	**Family**	**Kennel Area**	**Road Expansion Area**
Brassica rapa	common mustard	annual herb	non-native	Brassicaceae	Y	Y
Capsella bursa-pastoris	shepard's purse	annual herb	non-native	Brassicaceae	Y	N
Hirschfeldia incana	shortpod mustard	perennial herb	invasive non-native	Brassicaceae	Y	Y
Raphanus raphanistrum	Jointed charlock	annual or perennial herb	non-native	Brassicaceae	Y	N
Raphaus sativus	Wild radish	annual, biennial herb	non-native	Brassicaceae	Y	N
Lonicera hispidula	pink honeysuckle	vine or shrub	native	Caprifoliaceae	Y	Y
Silene gallica	windmill pink	annual herb	non-native	Caryophyllaceae	Y	N
Stellaria media	chickweed	annual herb	non-native	Caryophyllaceae	Y	Y
Convolvulus arvensis	field bind weed	perennial herb, vine	non-native	Convolvulaceae	Y	N
Marah fabacea	manroot	perennial herb or vine	native	Cucurbitaceae	Y	Y
Sequoia sempervirens	Coast redwood	tree	native	Cupressaceae	Y	N
Cyperus eragrostis	tall flatsedge	perennial grasslike herb	native	Cyperaceae	Y	N
Pteridium aquilinum	western bracken fern	fern	native	Dennstaedtiaceae	Y	Y
Dryopteris arguta	Wood fern	fern	native	Dryopteridaceae	Y	N
Polystichum munitum	Western sword fern	fern	native	Dryopteridaceae	Y	N
Arbutus menziesii	Madrono	tree	native	Ericaceae	N	Y
Euphorbia carachias	Albanian spurge	perennial herb	non-native	Euphorbiaceae	Y	N
Acmispon americanus	Spanish lotus	annual herb	native	Fabaceae	Y	Y
Acmispon glaber	deerweed	perennial herb	native	Fabaceae	Y	Y
Acmispon parviflorus	hill lotus	annual herb	native	Fabaceae	Y	N
Genista monspessulana	French broom	shrub	invasive non-native	Fabaceae	Y	N
Lathyrus vestitus	common Pacific pea	perennial herb	native	Fabaceae	Y	N
Lupinus bicolor	lupine	annual herb	native	Fabaceae	Y	N
Medicago polymorpha	bur clover	annual herb	non-native	Fabaceae	Y	N

Scientific Name	**Common Name**	**Life Form**	**Status**	**Family**	**Kennel Area**	**Road Expansion Area**
Melilotus indica	annual yellow sweetclover	annual herb	non-native	Fabaceae	Y	Y
Trifolium angustifolium	narrow leafed clover	annual herb	non-native	Fabaceae	N	Y
Trifolium dubium	shamrock	annual herb	non-native	Fabaceae	Y	Y
Trifolium hirtum	rose clover	annual herb	invasive non-native	Fabaceae	Y	Y
Trifolium subterraneum	Subterranean clover	annual herb	non-native	Fabaceae	Y	N
Vicia sativa ssp. nigra	smaller common vetch	annual herb or vine	non-native	Fabaceae	N	Y
Vicia sativa ssp. sativa	common vetch	annual herb or vine	non-native	Fabaceae	Y	Y
Notholithocarpus densiflorus	Tanoak	Tree, Shrub	native	Fagaceae	N	Y
Quercus agrifolia	coast live oak	tree	native	Fagaceae	Y	Y
Quercus spp.		tree	native	Fagaceae	Y	Y
Erodium botrys	big heron bill	annual herb	non-native	Geraniaceae	Y	N
Erodium cicutarium	coastal heron's bill	annual herb	invasive non-native	Geraniaceae	Y	N
Geranium dissectum	wild geranium	annual herb	non-native	Geraniaceae	Y	Y
Geranium molle	dovefoot geranium	annual or perennial herb	non-native	Geraniaceae	Y	N
Sisyrinchium bellum	Blue eyed grass	perennial herb	native	Iridaceae	Y	Y
Juncus bufonius	common toad rush	annual grasslike herb	native	Juncaceae	Y	N
Juncus effusus	common bog rush	annual grasslike herb	native	Juncaceae	Y	N
Juncus occidentalis	Western rush	Perennial herb	Native	Juncaceae	Y	N
Clinopodium douglasii	yerba buena	Perennial herb	native	Lamiaceae	N	Y
Stachys bullata	Hedge nettle	perennial herb	native	Lamiaceae	N	Y
Linum bienne	narrowleaf flax	Annual herb	non-native	Linaceae	Y	Y
Linum lewisii	Blue flax	Perennial herb	native	Linaceae	Y	Y
Malva nicaeensis	Bull mallow	annual herb	non-native	Malvaceae	Y	N

Scientific Name	**Common Name**	**Life Form**	**Status**	**Family**	**Kennel Area**	**Road Expansion Area**
Claytonia perfoliata	miner's lettuce	annual herb	native	Montiaceae	Y	N
Lysimachia arvensis	scarlet pimpernel	annual herb	non-native	Myrsinaceae	Y	Y
Taraxia ovata	Sun cups	perennial herb	native	Onagraceae	Y	N
Bellardia trixago	Mediterranean lineseed	annual herb	non-native	Orobanchaceae	Y	Y
Castilleja tenuiflora	Santa Catalina Indian paintbrush			Orobanchaceae	Y	N
Eschscholzia californica	California poppy	annual herb	native	Papaveraceae	Y	Y
Diplacus aurantiacus	Sticky monkeyflower	Shrub	native	Phyrmaceae	Y	Y
Pseudotsuga menziesii	Douglas fir	tree	native	Pinaceae	Y	N
Plantago coronopus	cut leaf plaintain	annual herb	non-native	Plantaginaceae	Y	N
Plantago lanceolata	English paintain	annual herb	non-native	Plantaginaceae	Y	Y
Avena barbata	slim oat	annual or perennial grass	non-native	Poaceae	Y	Y
Avena fatua	wild oat	annual grass	non-native	Poaceae	Y	Y
Brachypodium distachyon	Purple falsebrome	annual or perennial grass	non-native	Poaceae	Y	N
Briza maxima	Rattlesnake grass	annual grass	invasive non-native	Poaceae	Y	Y
Briza minor	little rattlesnake grass	annual grass	non-native	Poaceae	Y	Y
Bromus diandrus	ripgut brome	annual grass	invasive non-native	Poaceae	Y	Y
Bromus hordeaceus	soft chess	annual grass	invasive non-native	Poaceae	Y	Y
Festuca bromoides	Brome fescue	annual grass	non-native	Poaceae	Y	N
Festuca perennis	Italian rye grass	annual, perennial grass	invasive non-native	Poaceae	Y	N
Holchus lanatus	Velvetgrass	perennial grasslike herb	non-native	Poaceae	N	Y
Hordeum marinum	seaside barley	annual grass	non-native	Poaceae	Y	N

Scientific Name	**Common Name**	**Life Form**	**Status**	**Family**	**Kennel Area**	**Road Expansion Area**
Hordeum murinum	foxtail barley	annual grass	non-native	Poaceae	Y	Y
Phalaris aquatica	Harding grass	perennial grass	non-native	Poaceae	Y	Y
Poa annua	annual bluegrass	annual grass	non-native	Poaceae	Y	Y
Polypogon monspeliensis	rabbitsfoot grass	annual grass	non-native	Poaceae	Y	N
Stipa pulchra	purple needle grass	perennial grass	native	Poaceae	N	Y
Rumex crispus	curly dock	perennial herb	non-native	Polygonaceae	Y	Y
Pentagramma triangularis	Gold back fern	fern	native	Pteridaceae	Y	N
Ranunculus occidentalis	western buttercup	perennial herb	native	Ranunculaceae	Y	Y
Ceanothus thyrsiflorus	blueblossom	tree, shrub	native	Rhamnaceae	N	Y
Frangula californica	California coffeeberry	Shrub	native	Rhamnaceae	Y	Y
Fragaria vesca	Wild strawberry	perennial herb	native	Rosaceae	Y	Y
Heteromeles arbutifolia	Toyon	Shrub	native	Rosaceae	N	Y
Holodiscus discolor	Oceanspray	Shrub	native	Rosaceae	N	Y
Rubus ursinus	California blackberry	vine, shrub	native	Rosaceae	Y	Y
Galium aparine	common bedstraw	annual herb	native	Rubiaceae	Y	Y
Sherardia arvensis	Field madder	annual herb	non-native	Rubiaceae	Y	Y
Acer macrophyllum	Bigleaf maple	tree	native	Sapindaceae	N	Y
Scrophularia californica	California bee plant	perennial herb	native	Scrophulariaceae	Y	Y
Urtica dioica	Stinging nettle	perennial herb	native	Urticaceae	N	Y
Verbena lasiostachys	western vervain	perennial herb	native	Verbenaceae	Y	Y
	Liverwort				N	Y

SOL ECOLOGY

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MEMORANDUM

TO: San Mateo County Planning Department

FROM: Dana Riggs, CEO

SUBJECT: Addendum to the February 23, 2021, Biological Resources Report for 12429 Pescadero Creek Road, San Mateo County, CA Preliminary Biological Resources

DATE: July 1, 2022

CC: Ken White, Peninsula Humane Society

The purpose of this memorandum to addend the Biological Resources Report (Report) that Sol Ecology prepared on February 23, 2021, for the proposed project located at 12429 Pescadero Creek Road, Loma Mar, in San Mateo County, California. The purpose of the project is to construct a humane society to house domestic animals that are not adopted and need long term housing.

Sol Ecology performed an assessment of the approximately 225-acre property (Project Study Area) to identify sensitive biological resources and potential permitting issues. Addended findings are as follows:

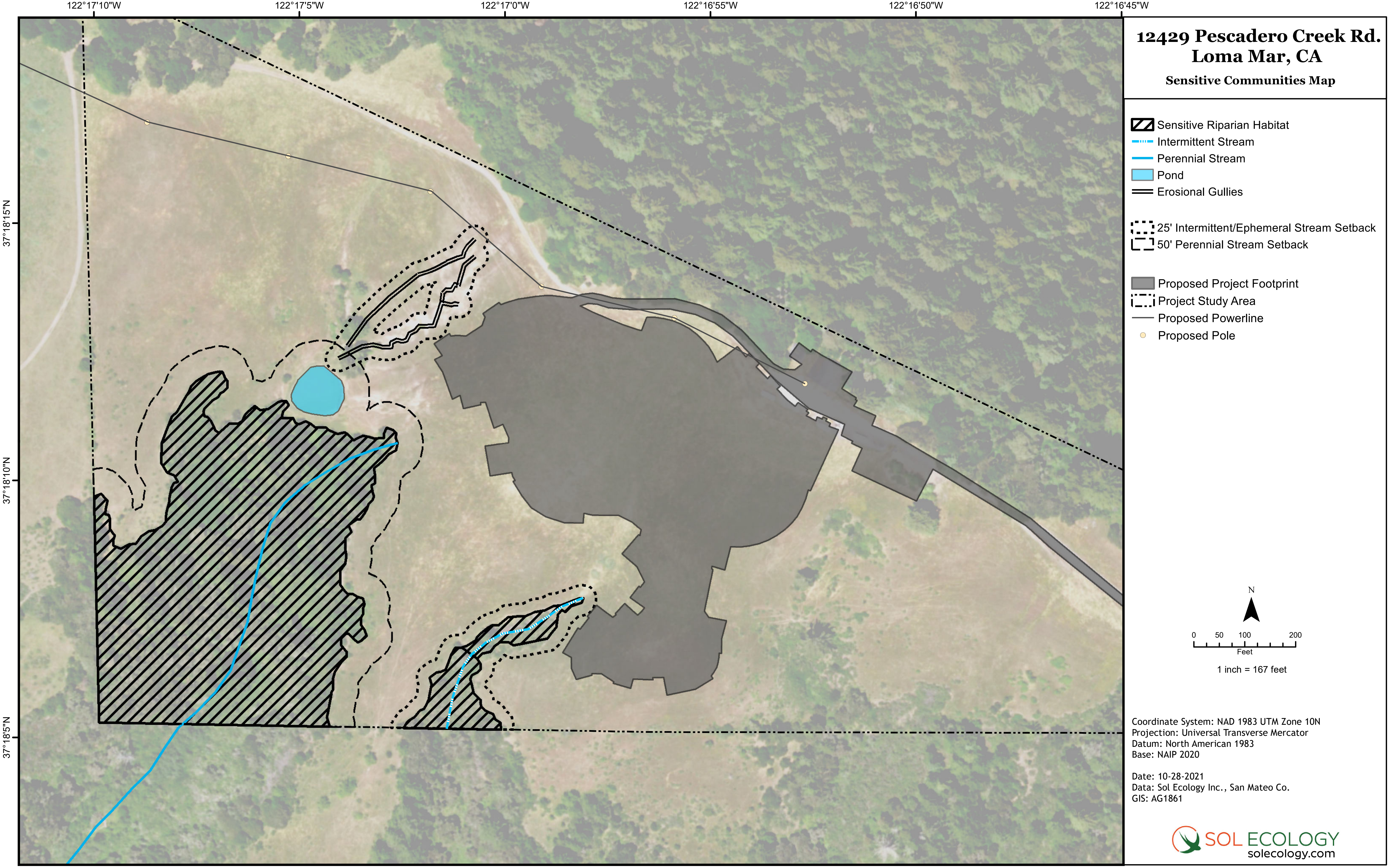
1. Several likely jurisdictional aquatic features were identified during the biological resources survey and are described in Section 3.1 of the Report. A discussion of impacts on page 11 suggests that accidental discharges near waterways would be considered significant. The purpose of this statement is to ensure that BMPs are employed to protect waterways. However, all Project related structures are at minimum, a distance of 25-feet from aquatic features, which is the minimum standard setback for wetlands and waterways per the Regional Water Quality Control Board. Because no work will occur within 25 feet of any waterway, no impacts are expected and no additional measures necessary.

2. Setbacks have been updated as shown on the attached figure (Figure 1) to 50 feet from perennial waters (including the man-made pond), and 25 feet from intermittent and ephemeral waters, including erosional gullies.

Consistent with our 2021 report, no work will occur within proximity to any jurisdictional feature including wetlands, waters, riparian, nor floodplain habitat and as such no regulatory permits are required.

Attachments (1): Figure 1. Sensitive Communities Update, July 2022

Figure 1. Sensitive Communities



12429 Pescadero Creek Rd.
Loma Mar, CA
Sensitive Communities Map

Coordinate System: NAD 1983 UTM Zone 10N
Projection: Universal Transverse Mercator
Datum: North American 1983
Base: NAIP 2020

Date: 10-28-2021
Data: Sol Ecology Inc., San Mateo Co.
GIS: AG1861

SOL ECOLOGY

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MEMORANDUM

TO: Summer Burlison, San Mateo County Planning Department

FROM: Dana Riggs, CEO

SUBJECT: PLN 2021-00316 - Addendum to the February 23, 2021, Biological Resources Report for 12429 Pescadero Creek Road, San Mateo County, California

DATE: October 13, 2022

CC: Jerry Griffin, Jordan Blum, and Jim Summers

The purpose of this Addendum is to provide additional information including a description of potential impacts and prescribed mitigation measures related to the removal of 7 trees on the project site not identified in the previously submitted February 23, 2021, Biological Resources Report prepared by Sol Ecology, Inc. for the proposed project located at 12429 Pescadero Creek Road (PLN 2021-00316).

Specifically, Section 4.1.3 of the February 23, 2021, report concludes that while special status bats may potentially occur in woodland habitat outside the project footprint, no tree removal is proposed and as such, the project is not likely to affect special status bats. Plans prepared after the biological report was submitted now show that 7 trees (6 oaks and 1 fir tree) will be removed within the project footprint. To address this discrepancy, the following revisions/additions shall be appended to the report:

Section 4.1.1 of the report should be revised [in red] as follows:

Sensitive communities present in the Study Area include redwood forest vegetation alliance, riparian habitat, and potential Waters of the State including two headwater streams, two stock ponds, and a small seep. An erosional gully located to the west of the project is not likely jurisdictional, but verification is needed to confirm; however, this feature will be avoided by the proposed project. The proposed project has been designed to avoid all sensitive communities on the site, including wetlands, riparian habitat, and species habitats (including movement corridors). While not a sensitive community, oak woodlands on the site are protected under the

Oak Woodland Protection Act which requires compensatory mitigation for the removal of any oak trees in conjunction with the project. Construction in proximity to intermittent streams may potentially result in accidental discharges of materials which in turn may affect water quality and/or contribute to erosional processes within headwater streams. Accidental discharges during construction would be considered a significant effect. The project will not conflict with the provisions of any habitat conservation or community conservation plan.

Section 4.1.3 of the report should be revised as follows:

Special Status Bats – Hoary Bat, Pallid Bat (and other cavity roosting bats)

~~One~~ Two special status bat species may potentially roost solitarily or colonially in oak woodland habitat in tree foliage, cavities, and/or under peeling bark within the Project Study Area. ~~between spring and fall, no suitable hibernacula is present. Other special status bats may potentially occur in woodland habitat outside the project footprint. No tree removal is proposed and the project footprint borders but is not in the woodlands on site. As such~~ ~~**the project is not likely to affect special status bats**.~~ The project would result in the removal of 6 oak trees (various species) and one fir that may provide suitable roost habitat for special status and/or common bats, including hoary bat (*Lasiurus cinereus*) and pallid bat (*Antrozous pallidus*). Removal of trees may be potentially significant if bats are present at the time of removal a maternity roost is present. Impacts resulting in direct mortality to roosting bats, and/or that results in removal of a maternity roost or hibernacula, are considered significant under CEQA.

Section 4.2 of the report should also be revised [in red] as follows:

MM.BIO-10. Tree Mitigation Plan. A tree removal plan and tree mitigation plan has been submitted; copies of the tree removal and mitigation plans are attached here. Mitigation for the loss of 7 trees (6 oaks and one fir) includes replacement at a 3:1 ratio. A mix of buckeye, redbud, and oaks (coast live, black, and valley oak) will be planted within the project footprint to offset the loss of the 7 trees to be removed.

MM.BIO-10. Special Status Bat Surveys. Prior to any tree removal, a qualified biologist shall conduct a habitat assessment for bats a minimum of 30 to 90 days prior to removal. The assessment should include a visual inspection of all potential roosting features (e.g., cavities, crevices, peeling bark, etc.). If suitable trees are found the following measures shall be initiated:

1. To the extent feasible, tree removal should be initiated between September 1 and October 15 to avoid maternity roosting bats if present and/or between March 1 and April 15 to avoid bats in hibernation. Trees may be removed during these two periods using the two-step removal process described below:

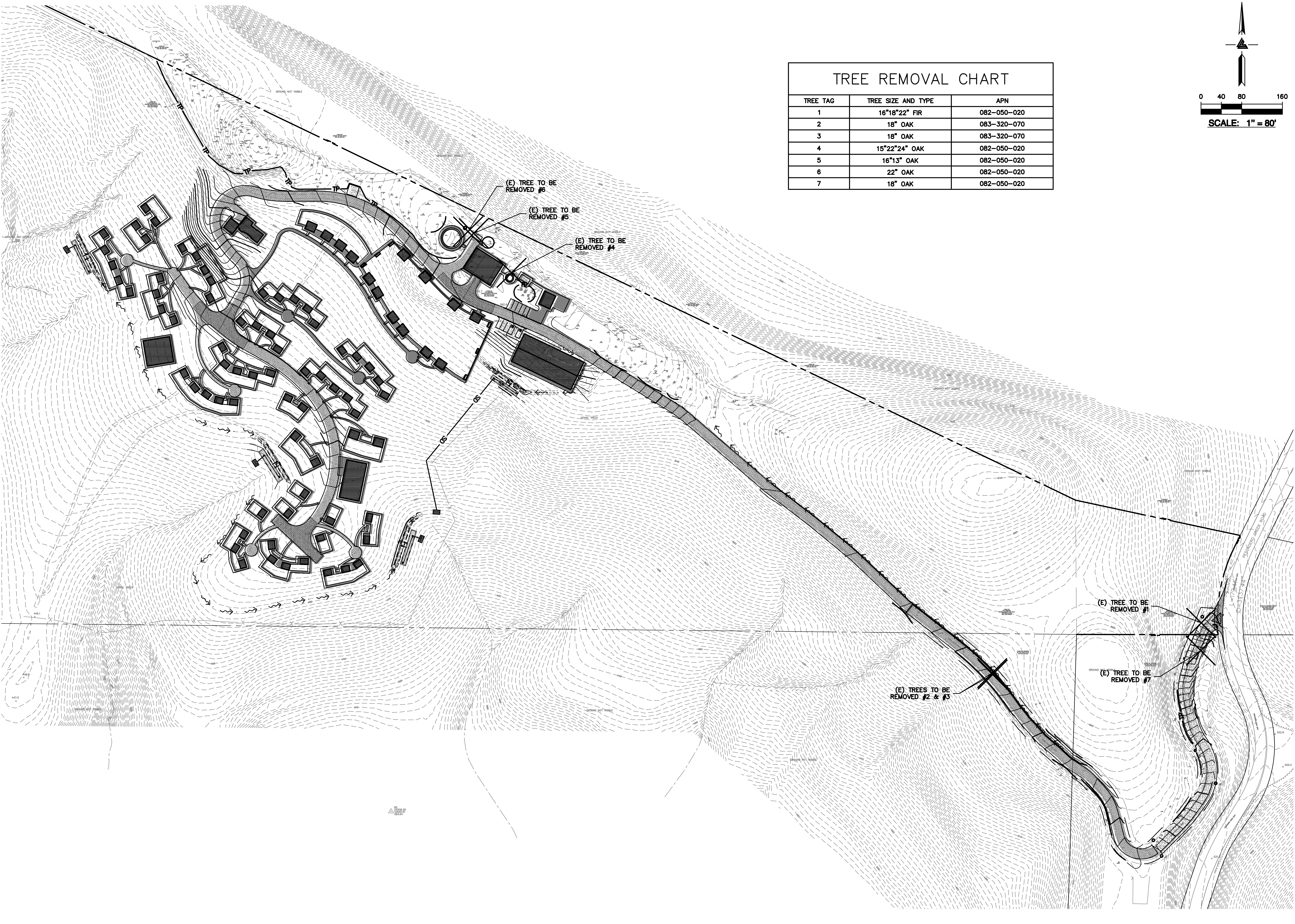
    a. On the first day, in the afternoon, under the direct supervision of a qualified biologist, limbs and branches shall be removed by a tree cutter using chainsaws only. Limbs with cavities, crevices, or deep bark fissures shall be avoided.

    b. On the second day, the entire tree shall be removed and left overnight prior to chipping or hauling off the site to allow any bats to exit.

2. If tree removal must be performed outside the windows prescribed above and bat habitat is observed, an acoustic bat roost survey shall be performed by a qualified biologist between April 15 and September 1 to evaluate whether a maternity roost (solitary or colonial) is present. If a maternity roost is found, a no-disturbance buffer should be placed around the roost until September 1 when pups are likely to be weaned; the buffer shall be determined by the qualified biologist. Additionally, a bat mitigation and monitoring plan shall be prepared and submitted to CDFW for approval. No tree removal shall occur between October 15 and April 15 to avoid impacts to hibernating bats.

Implementation of the above measures will ensure potentially significant impacts to special status bats are mitigated to a less than significant level.

Attachments (2): Tree Removal Plan (C-2.0) and Tree Mitigation Plan (L7.0).



TREE REMOVAL CHART

TREE TAG	TREE SIZE AND TYPE	APN
1	16"18"22" FIR	082–050–020
2	18" OAK	083–320–070
3	18" OAK	083–320–070
4	15"22"24" OAK	082–050–020
5	16"13" OAK	082–050–020
6	22" OAK	082–050–020
7	18" OAK	082–050–020

PETER CARLINO
No. C79555
CIVIL
ORIGINAL SIGNATURES IN BLUE INK

LEA & BRAZE ENGINEERING, INC.
CIVIL ENGINEERS • LAND SURVEYORS
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2495 INDUSTRIAL PKWY WEST
HAYWARD, CALIFORNIA 94545
(510) 887–4086
REGIONAL OFFICES:
ROSEVILLE
DUBLIN
SAN JOSE (COMING SOON)
WWW.LEABRAZE.COM

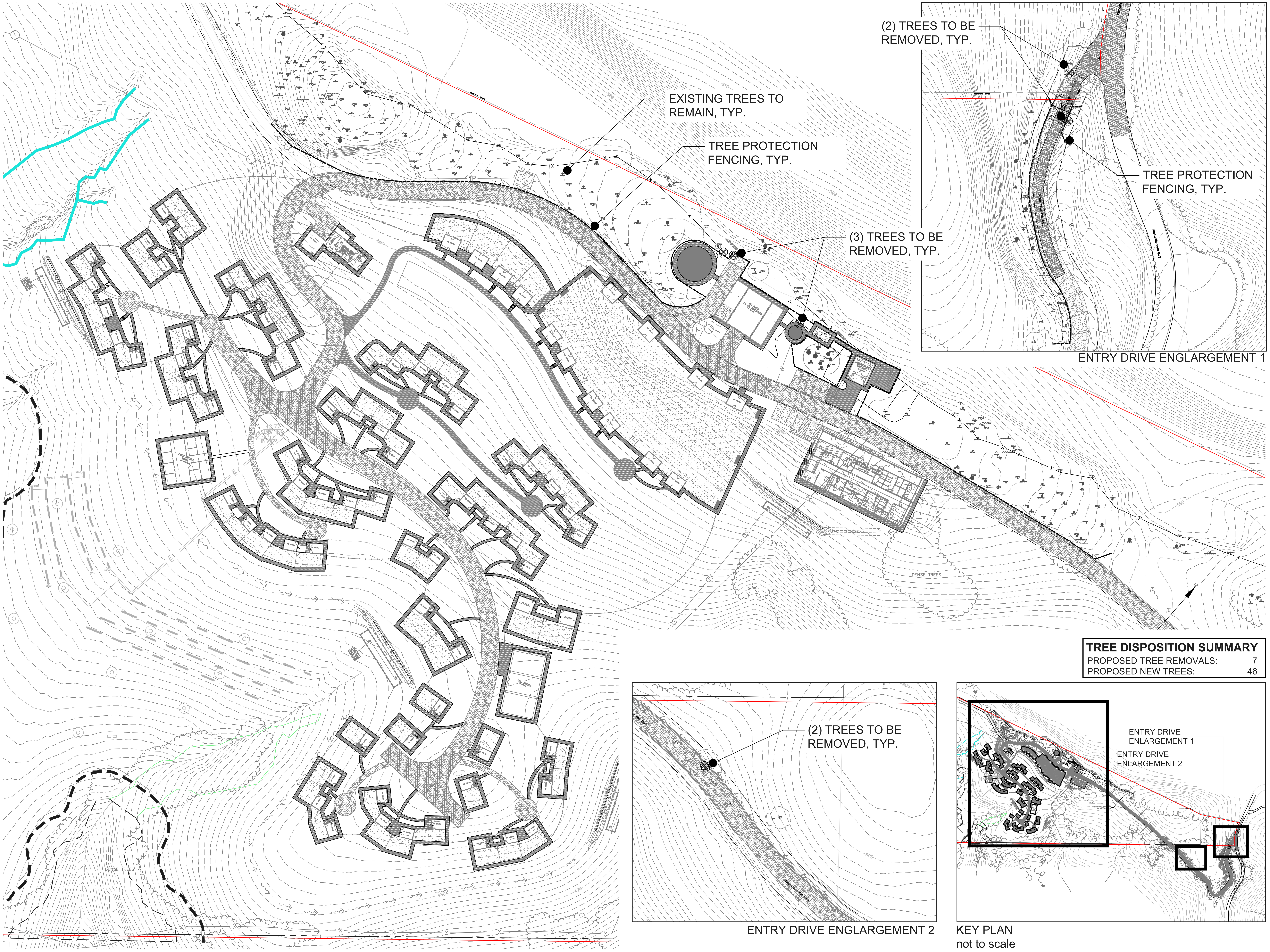
PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY
12429 PESCADERO CREEK RD
LOMA MAR, CALIFORNIA
SAN MATEO COUNTY
APN: 082–050–010
082–050–020

TREE REMOVAL PLAN

REVISIONS	BY
–	–
2 USE PERMIT RESUBMITTAL 08/01/22	TB
1 USE PERMIT RESUBMITTAL 01/12/22	TB

JOB NO: 2201144
DATE: 07/12/21
SCALE: 1" = 80'
DESIGN BY: TB
CHECKED BY: CA
SHEET NO:
C-2.0
03 OF 54 SHEETS

COUNTY OF SAN MATEO USE PERMIT SUBMITTAL



TREE DISPOSITION SUMMARY

PROPOSED TREE REMOVALS:	7
PROPOSED NEW TREES:	46

PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY

Peninsula Humane Society & SPCA

KSH
ARCHITECTS
KORTH SUNSERI HAGEY

THE
GUZZARDO
PARTNERSHIP INC.
Landscape Architects • Land Planners

181 Greenwich Street
San Francisco, CA 94111
T 415 433 4672
F 415 433 5003

LICENSED LANDSCAPE ARCHITECT
Gary D. Laymon No. 2397
Gary D. Laymon
Signature
6-30-24
Renewal Date
08.01.22
Date
STATE OF CALIFORNIA

ISSUES AND REVISIONS

No. Date	Description
07.12.21	COUNTY OF SAN MATEO USE PERMIT SUBMITTAL
01.14.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 1
08.01.22	COUNTY OF SAN MATEO USE PERMIT RESUBMITTAL 2

PROJECT NUMBER
18042.00

SHEET TITLE
TREE DISPOSITION PLAN

SCALE
North
Scale: 1" = 50'
0 25 50 100

SHEET NUMBER
L7.0

COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

ATTACHMENT D

PENINSULA HUMANE SOCIETY
ANIMAL SANCTUARY

TREE PROTECTION & REMOVAL PLAN

Prepared for:

Jerry Griffin
Peninsula Humane Society
1450 Rollins Road
Burlingame, CA 94010

Prepared by:

Ralph Osterling Consultants, Inc.
Registered Professional Forester #38

346 Rheem, Suite 104
Moraga, CA 94556
(650) 573-8733

August 4, 2021

RALPH OSTERLING
CONSULTANTS, INC.
PHONE (650) 573-8733
1650 BOREL PLACE SUITE 204
SAN MATEO, CA 94402

TREE REMOVAL PLAN

PENINSULA HUMANE SOCIETY ANIMAL SANCTUARY

12429 Pescadero Creek Road
Loma Mar, CA

The Peninsula Humane Society Humane Sanctuary is located at 12429 Pescadero Creek Road, Loma Mar, is displayed on Sheet TR-1 Tree Removal exhibit by Lea and Braze Engineering dated 07-12-21. By reference this plan and attachment are made part of that plan set. The attached Tree Protection Plan is included in this Plan Set to assure removals and tree protection criteria are properly included in the development process.

A total of seven trees as listed below are proposed for removal to allow for safe road access and development footprint.

Road
1, 2,
3, 7

Water
4 -6

TREE 1
Douglas-fir (*Pseudotsuga menziesii*) is multi trunk with dbh 16, 23 and 14 inches. Condition is fair to poor with the roots being undercut by previous grading activities leaving is potentially unstable. Additionally, old fence wire is imbedded in the lower trunk.

TREE 2
Coast live oak, (*Quercus agrifolia*) single trunk, dbh 22 inches, poor condition, leaning and off-balance crown adjacent to existing road.

TREE 3
Coast live oak, (*Quercus agrifolia*) single trunk, dbh 18 inches, leaning with off balance crown, poor condition

TREE 4
Coast live oak, (*Quercus agrifolia*) multi trunk, dbh 15, 22, 24, fair condition with off balance heavy crown subject to potential failure.

TREE 5
Coast live oak (*Quercus agrifolia*) multi trunk, dbh 16, 13, fair condition with off-balance crown.

TREE 6
Coast live oak (*Quercus agrifolia*) dbh, 22 inches, in good condition showing some deferred maintenance.

TREE 7
Coast live oak (*Quercus agrifolia*) dbh, 18 inches, in fair-to-good condition with about 40% of the rooting area being cut from previous grading activities. The crown is full and balanced.

DISCUSSION

Trees 1, 2, 3 and 7 are along the existing road that needs improvement for ready safe access. Trees 4, 5, and 6 are within the vigorous stand of coast live oak that dominates the ridge area around the administration features. Maintenance pruning is recommended on the remaining trees to enhance the safety and esthetics of the site.

Respectfully,

Ralph Osterling

Ralph Osterling, President, ACF, CLFA
Registered Professional Forester #38
State of California

RALPH S.
OSTERLING
#38

RSO:js

Attachment: Site Plan

TREE PROTECTION PLAN
PENINSULA HUMANE SOCIETY ANIMAL SANCTUARY
12429 Pescadero Creek Road
Loma Mar, CA

This Tree Protection Plan is to be included as a detail on the final site plans used for construction.

1 A Certified Arborist or Registered Professional Forester is to be retained to act as the Project Forester to monitor any construction activities that may impact the health of protected trees at the site.

2 Supplemental Water
(maybe)

3 Prior to the start of grading and construction, trees within the construction area that are to be retained are to be checked for equipment and building clearance and professionally pruned prior to work commencing.

4 Prior to the start of grading and construction, a minimum six inch layer of clean wood chips is to be installed and maintained within the dripline of protected trees.

5 Prior to the start of grading and construction activities, temporary protective barriers consisting of chain link fencing six (6) feet high and attached to 1.5 inch diameter metal posts driven firmly into the ground, spaced no more than 10 feet apart are to be placed one foot beyond the dripline or at limits specified for each tree by the Project Forester.

6 Final configuration of the tree protection fencing is to be determined and approved in the field by the Project Forester.

7 Access (gate or panel) is to be provided to allow examination of the trees.

8 The tree protection fencing is not to be moved without approval from the Project Forester.

9 The fencing is not to be moved without approval from the Project Forester.

10 The area within the fencing is the Tree Protection Zone (TPZ).

11 Tree Protection Zone (TPZ) Restrictions

11.1 All work within the TPZ is to be approved by the Project Forester prior to the commencement of the task.

11.2 No vehicles or equipment are allowed within the dripline or TPZ of any protected tree.

11.3 Do not store or dumping construction materials, equipment, supplies, chemicals, paints, concrete or spoils within the TPZ.

11.4 All work within the TPZ is to be performed by hand held equipment. The use of compressed air such as an Air Spade® for excavation is encouraged.

11.5 Grade changes or excavations within the TPZ are to be first authorized and later supervised by the Project Forester.

12 Tree Contractors

12.1 All tree work tasks (pruning, tree removal and stump grinding) are to be performed by a State of California Licensed Tree Contractor. All pruning is to be performed or directed by a Certified Project Forester or a Certified Tree Worker in accordance with the Best Management Practices for Pruning (International Society of Arboriculture) and adhere to the most recent editions of the American National Standards Institute (ANSI) for Tree Care Operations (Z133.1) and Pruning (A300). The Project Forester should monitor any pruning of the trees.

13 Post Construction Care

13.1 Trees preserved at the construction site will experience a physical environment different from that of pre-development. As a result, tree health and structural stability should be monitored. Occasional pruning, mulch, pest management and irrigation may be required. These trees may require pruning on a 5 to 7 year cycle.

COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

ATTACHMENT E

CORNERSTONE
EARTH GROUP

Date: July 23, 2021
Project No.: 1142-1-2

Prepared For: Mr. Ken White
PENINSULA HUMANE SOCIETY & SPCA
1450 Rollins Road
Burlingame, California 94010

Re: Geotechnical Review of Use Permit Plans
Peninsula Humane Society Animal Sanctuary Plan Review
12429 Pescadero Creek Road
Loma Mar, California

Dear Mr. White:

As requested, we reviewed the geotechnical aspects of the architectural, civil and landscape Use Permit plans for the above-referenced project. We previously performed a geotechnical investigation for the project and presented our findings in our report titled, "Geotechnical Investigation Peninsula Humane Society Animal Sanctuary, 12429 Pescadero Creek Road, Loma Mar, California," dated July 23, 2021.

The documents reviewed include the following:

- Project plan set including architectural, titled, "Animal Sanctuary Peninsula Humane Society & SPCA, Loma Mar, CA, Sheets A0.00, A0.01, A1.02, A1.03, A1.2, A1.3, A1.4, AA2.0, AA3.0, AB.1, AC.1, AD.1AE2.0, AE3.0, AF.1, and AG.1," prepared by KSH Architects dated July 12, 2021, Use Permit Submittal.
- Project plan set including civil, titled, "Peninsula Humane Society Animal Sanctuary, 12429 Pescadero Creek Road, Loma Mar, CA, Sheets C-1.0, C-1.1, C-3.0, C-3.1, C-3.2, C-3.3, C-3.4, C-3.5, C-3.6, C-3.7, C-3.8, C-3.9, C-3.10, C-3.11, C-3.12, C-3.13, C-3.14, C-4.0, C-4.1, C-4.2, C-4.3, C-4.4, C-4.5, C-4.6, C-4.7, C-4.8, C-4.9, C-4.10, C-4.11, C-4.12, C-4.13, C-4.14, C-4.15, C-4.16, C-4.17, C-4.18, C-4.19, C-4.20, SS-1, SS-2, SS-3, and SS-4," prepared by Lea & Braze Engineering Inc. dated July 12, 2021.
- Project plan set including civil, titled, "Peninsula Humane Society Animal Sanctuary, Loma Mar, CA, Sheets L1.0, L1.1, L1.2, L1.3, L2.0, L2.1, L2.2, L3.0, L4.0, L6.0, L6.1, L6.2, and L7.0," prepared by The Guzzardo Partnership Inc., dated July 12, 2021, Use Permit Submittal.

Based on our review, the architectural, civil and landscape plans are in general conformance with the recommendations in our geotechnical report.

As recommended in our report, we should be retained to provide geotechnical observation and testing services during construction to complete our role as the Geotechnical Engineer-of-Record for the project.

Closure

This review of plans has been prepared for the sole use of Peninsula Humane Society & SPCA in accordance with generally accepted geotechnical engineering principles and practices in the San Francisco Bay Area at this time. No warranties are either expressed or implied.

Should you have any questions, or if we may be of further service, please contact us at your convenience.

Sincerely,

Cornerstone Earth Group, Inc.

Stephen C. Ohlsen, P.E.
Project Engineer

REGISTERED PROFESSIONAL ENGINEER
STEPHEN C. OHLSEN
C 90614
CIVIL
STATE OF CALIFORNIA

Danh T. Tran, P.E.
Senior Principal Engineer

SCO:DTT

Copies: Addressee (1 by email)

CORNERSTONE
EARTH GROUP

TYPE OF SERVICES	Geotechnical Investigation
PROJECT NAME	Peninsula Humane Society Animal Sanctuary
LOCATION	12429 Pescadero Road Loma Mar, California
CLIENT	Peninsula Humane Society & SPCA
PROJECT NUMBER	1142-1-1
DATE	July 23, 2021

GEOTECHNICAL

CORNERSTONE
EARTH GROUP

Type of Services	Geotechnical Investigation
Project Name	Peninsula Humane Society Animal Sanctuary
Location	12429 Pescadero Road Loma Mar, California
Client	Peninsula Humane Society & SPCA
Client Address	1450 Rollins Road Burlingame, California
Project Number	1142-1-1
Date	July 23, 2021

Prepared by

Stephen C. Ohlsen, P.E.
Project Engineer
Geotechnical Project Manager

REGISTERED PROFESSIONAL ENGINEER
STEPHEN C. OHLSEN
C 90614
CIVIL
STATE OF CALIFORNIA

Craig S. Harwood, P.G., C.E.G
Senior Project Geologist

CERTIFIED ENGINEERING GEOLOGIST
CRAIG S. HARWOOD
No. 2275
STATE OF CALIFORNIA

Danh T. Tran, P.E.
Senior Principal Engineer
Quality Assurance Reviewer

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1220 Oakland Boulevard, Suite 220 | Walnut Creek, CA 94596
T 925 988 9500 | F 925 988 9501

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TABLE OF CONTENTS

Type of Services | **Geotechnical Investigation**
Project Name | **Peninsula Humane Society Animal Sanctuary**
Location | **12429 Pescadero Road**
Loma Mar, California

SECTION 1: INTRODUCTION

This geotechnical report was prepared for the sole use of Peninsula Humane Society & SPCA for the Peninsula Humane Society Animal Sanctuary project in Loma Mar, California. The approximate location of the site is shown on the Vicinity Map, Figure 1. For our use, we were provided with the following documents:

- A set of architectural plans, titled, "Peninsula Humane Society Animal Sanctuary," prepared by KSH Architects, County of San Mateo Use Permit Submittal, dated July 12, 2021.
- A set of civil plans titled, "Peninsula Humane Society Animal Sanctuary, 12429 Pescadero Creek Road, Loma Mar, California," prepared by Lea & Braze Engineering, Inc., dated July 12, 2021.
- A set of landscape plans titled, "Peninsula Humane Society Animal Sanctuary," prepared by The Guzzardo Partnership Inc., County of San Mateo Use Permit Submittal, dated July 12, 2021.

1.1 PROJECT DESCRIPTION

The irregularly shaped 213-acre project site is located off of Pescadero Road in Loma Mar, California, about 3500 feet west of the intersection of Pescadero Road and Alpine Road. The site is bounded by Pescadero Road to the east and essentially undeveloped properties surrounding the project site. The site is mostly undeveloped, with a fire road crossing the site transverse to the hillside and an existing barn and caretaker residence to the north of the fire road. Based on the provided architectural plans, we understand that an animal sanctuary campus is planned consisting of a two-level administrator/visitor structure ("Building 2"), cat enclosures ("Buildings B and C"), the restored existing barn ("Building 1"), a new 2,000-square-foot farm animal barn with covered corral ("Building 4"), a 3,000-square-foot covered dog arena, access roads, new caretaker residence with garage ("Building 3"), several maintenance buildings (“Buildings A”), a fire prevention water storage tank and associated pump station, a service yard for generators and a new domestic and landscape irrigation tank and associated pump station, a solar array, and dog enclosures (“Buildings D, E, and F”). Additionally, an on-site septic system with leach field is proposed southwest of the dog enclosures and new animal barn. This development will be clustered along the ridge top and most of the remainder of the site will remain undeveloped with a new gravel road connecting the improvements.

It is expected that the structures will likely be single-story wood-frame structures. Appurtenant parking, utilities, access roads and paths, landscaping and other improvements necessary for site development are also planned.

Structural loads are not currently known for the proposed structures; however, structural loads are expected to be light and typical of similar type structures. Based on our preliminary discussions with the project structural engineer we understand that the cat and dog enclosures will be supported by slabs-on-grade, that the maintenance buildings and animal barns will likely be supported on shallow spread footing foundations, and that the administrator/veterinary building, and caretaker residence will likely be supported on drilled pier foundations. The tank foundation type is unknown at this time. Based on the results of our site investigation and lab testing, we are providing our geotechnical recommendations for these structures in this report.

1.2 SCOPE OF SERVICES

Our scope of services was presented in our proposal dated June 12, 2019 and consisted of field and laboratory programs to evaluate physical and engineering properties of the subsurface soils, engineering analysis to prepare recommendations for site work and grading, building foundations, flatwork, retaining walls, and pavements, and preparation of this report. Brief descriptions of our exploration and laboratory programs are presented below.

1.3 EXPLORATION PROGRAM

Field exploration consisted of seven borings drilled on January 20 and 21, 2020 with track-mounted, limited-access hollow-stem auger drilling equipment and two borings drilled on January 21, 2020 with hand-auger equipment. The borings were drilled to depths ranging from 13½ to 21½ feet, while the hand augers were advanced to depths of 4 to 4½ feet. The borings and hand augers were backfilled with cement grout in accordance with local requirements; exploration permits were obtained as required by local jurisdictions.

The approximate locations of our exploratory borings are shown on the Geologic Site Plan, Figure 2, respectively. Details regarding our field program are included in Appendix A.

1.4 LABORATORY TESTING PROGRAM

In addition to visual classification of samples, the laboratory program focused on obtaining data for foundation design and seismic ground deformation estimates. Testing included moisture contents, dry densities, and Plasticity Index tests. Details regarding our laboratory program are included in Appendix B.

1.5 ENVIRONMENTAL SERVICES

Environmental services were not requested for this project. If environmental concerns are determined to be present during future evaluations we should be notified and the project environmental consultant should review our geotechnical recommendations for compatibility with the environmental concerns.

SECTION 2: REGIONAL SETTING

2.1 REGIONAL GEOLOGIC SETTING

The site is located within the north-central Santa Cruz Mountains, a northwest-southeast mountain range within the Coast Range Geomorphic Province. The Santa Cruz Mountains are within the San Francisco Bay Block, which is bounded to the east by the Hayward and Calaveras Faults and to the west by the San Andreas Fault. The San Andreas Fault is a NW-trending, right-lateral, strike-slip fault that is comprised of many strands that form a zone, which is up to 1 km wide within the area. The fault system distributes shearing across a complex system of primarily northwest trending, right-lateral, strike-slip faults that includes the Hayward and Calaveras Faults.

The geology of the La Honda 7.5-minute Quadrangle is characterized by two basement assemblages that are separated by the San Andreas Fault, which extends through the northeastern corner of the quadrangle. Northeast of the San Andreas Fault is a composite Mesozoic basement assemblage consisting of the Franciscan Complex, Coast Range Ophiolite, and the Great Valley Sequence. Southwest of the San Andreas Fault is the Salinian Terrane of the Santa Cruz block, a basement assemblage of granitic and metamorphic crystalline rocks. Rocks within the north-central Santa Cruz Mountains have undergone a complex structural history and have been strongly deformed by faulting and folding. The basement is overlain by Miocene marine strata and Pliocene and Pleistocene sediment. Miocene and later strata have been deformed by reverse faulting along the Sargent, Berrocal and Shannon Fault zones (Hitchcock et a.,1994).

2.2 REGIONAL SEISMICITY

While seismologists cannot predict earthquake events, geologists from the U.S. Geological Survey have recently updated (in 2015) earlier estimates from their 2014 Uniform California Earthquake Rupture Forecast (Version 3; UCERF3) publication. The estimated probability of one or more magnitude 6.7 earthquakes (the size of the destructive 1994 Northridge earthquake) expected to occur somewhere in the San Francisco Bay Area has been revised (increased) to 72 percent for the period 2014 to 2043 (Aagaard et al., 2016). The faults in the region with the highest estimated probability of generating damaging earthquakes between 2014 and 2043 are the Hayward (33%), Calaveras (26%), and San Andreas Faults (22%). In this 30-year period, the probability of an earthquake of magnitude 6.7 or larger occurring is 22 percent along the San Andreas Fault and 33 percent for the Hayward Fault.

The faults considered capable of generating significant earthquakes are generally associated with the well-defined areas of crustal movement, which trend northwesterly. The table below presents the State-considered active faults within 25 kilometers of the site.

Table 1: Approximate Fault Distances

Fault Name	Distance	
	(miles)	(kilometers)
San Andreas (1906)	5.5	8.8
Sargent-Berrocal	6.2	10
Monte Vista-Shannon	6.7	10.8
San Gregorio	7.5	12
Zayante	8.4	13.5

In addition, the Hayward Fault, Calaveras Fault zone, and the San Gregorio Fault Zone (major branching faults of the San Andreas system) are located 24 miles (38.3 km) northeast, 27.7 miles (44.5 km) northeast, and 7.5 miles west of the site. Additionally, two undifferentiated Quaternary faults exist in the general area including: the Butano Fault located about 2 miles (3.2 km) south of the site and the Pilarcitos Fault is located about 4.76 (7.6 km) miles northeast of the site. More locally, Jennings and Bryant (2010) show the (pre-Quaternary) La Honda Fault as projected toward the site with a southeasterly trend. It would intersect the far eastern edge of the site near Pescadero Creek Road (Jennings and Bryant, 2010). Pre-Quaternary Faults are not considered potential seismic sources and do not represent a geologic constraint for fault surface rupture.

A regional fault map is presented as Figure 3 illustrating the relative distances of the site to significant fault zones.

SECTION 3: SITE CONDITIONS

3.1 SITE HISTORY AND AIR PHOTO REVIEW

A review of historic topographic maps extending back to 1940 and aerial photos extending back to 1931 shows that the site has been used as livestock rangeland for decades. As of the date of the 1931 aerial photos, the site appears to be totally undeveloped with no dirt roads and no structures present.

A review of the historical topographic maps (U.S.G.S.) indicates that a dirt access road (“Burns Chalk Fire Road”) has existed along the spine of the ridge since at least as early as 1940. A barn structure was constructed at its current location and a stock pond established just downslope of the access road in the central portion of the site sometime between 1968 and 1980. Between 1982 and 1991 a residence was constructed just on the west side of the barn. Sometime between 1991 and 2005 numerous fenced livestock pens were constructed adjacent to the barn. Sometime between 2005 and 2009 additional soil was placed across from the barn in order to extend a parking area alongside the dirt road for parking of storage vehicles and farm equipment. Additional dirt roads were established along the top of the ridge further to the west in this period.

3.2 SURFACE DESCRIPTION AND TOPOGRAPHY

The site is located on a northwesterly trending ridge southern flank in an area of complex and highly varied topography. The southerly flank of the ridge varies from gently inclined to moderately inclined and steep. The areas where the proposed improvements are to be located can generally be characterized according to the following:

3.2.1 Area of Existing Barn/Adjacent Parking Lot Area

The area of the existing barn and existing caretaker's residence is relatively flat with steep downslopes located within 40 feet north of the existing structures. Although this area is largely flat, there are local variations resulting in approximately 2 feet of topographic relief across the pad area. We understand that the existing caretaker's residence will be demolished and a new fire prevention water tank and pump station will be constructed in its place. The proposed domestic water tank, pump station, and maintenance building located just east of the existing barn is on flat ground, however, there is an existing (undocumented) wedge of fill along the northern edge of this proposed improvement area the slopes become steep immediately adjacent to the area.

The proposed maintenance building and adjacent service yard for generators is located adjacent to the northern edge of the relatively flat area, which is at the crest of a steep slope where localized fill has been placed in order to create a flat pad.

3.2.2 Proposed Caretaker's Residence, Dog Enclosures, and New Barn Area

The proposed caretaker's residence ("Building 3"), dog enclosures ("Buildings D, E, and F"), and new farm animal barn ("Building 4") is on a moderately inclined slope on the downhill side of the existing fire access road.

There is approximately 6 to 8 feet of topographic relief across the pad area. Claystone bedrock is exposed at shallow depths within erosion gullies located just downslope of the building pad area.

3.2.3 Proposed Veterinarian/Administration Building

The area of the proposed Vet/Admin building (Building 2) is in a transitional area where the ground changes from nearly level to gently inclined toward the south. The northern and eastern portion of the building footprint is in an area where undocumented fills exist. These fill berms occur on both the west and the east side of the building footprint and, based on a review of the surrounding natural topography, may be up to 10 feet thick. There is approximately 8 to 12 feet of topographic relief across the pad area. Based on the provided topographic and architectural plans, we understand that the downslope side of the vet/admin building will have a basement level, which will be cut into the existing slope.

The group of proposed “cat enclosures” are located on a gently to moderately inclined slope just to the west of the Administration building. Relief across these pads is on the order to 4 to 6 feet. Bedrock is not exposed in this area of the site.

3.2.4 South Dog Loop Area

The “South Dog Loop” is a proposed group of kennels will include a 3,000 s.f. enclosed “dog arena”, and a series of large and small dog “cottages” around the brow or crest of the flanking slopes around the perimeter of the knoll. The proposed road at the “east dog loop” is located on the top a of a knoll where the slopes are gently inclined to moderately inclined. There is approximately 4 to 6 feet of topographic relief across the dog cottages pads and there is approximately 2 to 3 feet of relief across the the dog arena area. Sandstone bedrock is exposed locally at the ground surface on the top of the knoll.

3.3 SITE GEOLOGY AND SUBSURFACE CONDITIONS

Several regional geologic maps have been prepared of the area surrounding the campus, including those by; Rogers (1971), Brabb (1970 and 1980). We have adopted the nomenclature of Brabb (1980) in assigning geologic unit names for our characterization of the site. Brabb shows the bedrock in the area of the site as the Tahana member of the (Tertiary) Purisima Formation. A vicinity geologic map is presented as figure 6. The geologic units are characterized by Brabb as follows: “Greenish-gray to white or buff, medium to very fine grained sandstone and siltstone, with some silty mudstone. Locally the sandstone is tuffaceous and it weathers white. Pebble conglomerate occurs near the base.” In terms of rock characterization, the bedrock is generally weak, friable, moderately severely weathered.

Our site reconnaissance resulted in the following observations: Bedrock is exposed at road cuts, at erosion scars on site slopes, and at a large cut located just northeast of the proposed caretaker’s residence. A large exposure of bedrock located just on the north side of the caretaker’s residence exposes interbedded silty sandstone and thin bedded siltstone. Claystone is exposed within erosion gullies located on the south of these proposed structure. Our borings encountered primarily claystone with some layers of sandstone. The bedrock is thin to medium bedded (laminated locally) folded locally and displays a variety of structural trends varying from northwesterly, moderately dipping to southwesterly, steeply dipping.

The sloping portions of the site have experienced severe erosion where runoff is not controlled or, alternatively where the surface runoff is focused by roadways or culverts, or swales or gullies. This severe erosion appears to be exacerbated by an abrupt permeability contract between the sandy (erodible) surficial soils and the underlying consolidated sedimentary bedrock units that are more resistant to erosion. The erosion gullies trend downslope toward the southwest and vary from 3 feet deep to as much as 10 feet deep onsite.

Existing stockpiled fill: Two large accumulations of fill exist just south of the access road in the area of the barn, existing caretaker's residence, proposed new fire prevention water tank and pump station, domestic water tank and pump station, and maintenance building. This material forms a sliver of material that extends outward toward the south from the existing dirt road. This material is non-engineered and apparently was placed in order to create additional parking area for farm machinery and vehicles. This fill cannot be relied upon for support of improvements (see Recommendations).

Our site exploration consisted of drilling, logging and sampling within seven conventional geotechnical borings and two hand auger borings at various locations at the site. The exploration was accomplished with a track-mounted drill rig using hollow stem augers and standard geotechnical sampling equipment. The results of the borings are presented below according to location:

3.3.1 Area of Existing Barn/Adjacent Parking Lot Area

Boring EB-6 was located near the northwest corner of the current fenced in "corral" area, the future location of a domestic water tank and associated pump station, and maintenance building. Here the subsurface profile consisted of a 3½ foot-thick layer of surficial (undocumented fill) sandy lean clay. The fill was underlain by black fat clay (residual soil) to a depth of 7½ feet. Below the depth of 7½ feet is the sandy claystone bedrock. The fill and residual soil layers were found to be in a stiff to very stiff condition, however the undocumented fill is judged to be moderately compressible. The claystone was found to be in a generally weak condition in terms of bedrock characterization and produced standard penetration test blow counts that ranged from10 blows-per-foot (bpf) to 21 bpf. We understand that the existing caretaker's residence will be demolished and a fire prevention water tank and associated pump station will be constructed partially within the old residence footprint. We anticipate that up to several feet of undocumented fill may be encountered due to the previous development.

3.3.2 Proposed Caretaker's and New Barn

Boring EB-2 was located in the general area of the Caretaker's cottage and new barn. As noted already, a large exposure of bedrock located just on the north side of the caretaker's residence and guest cottages exposes interbedded silty sandstone and thin bedded siltstone. Claystone is exposed within erosion gullies located on the south of these proposed structures. The change in lithology between the cut exposure and the exploratory boring and erosion gullies further downslope is likely due to the result of folding that trends through the immediate area. At the Boring EB-2 location, the subsurface profile consisted of a 2½-foot-thick layer of surficial (colluvium) fat clay with sand. The residual soil was underlain by claystone bedrock. The residual soil layer was found to be in a medium stiff condition in terms of soil characterization. The claystone was found to be in a generally weak condition in terms of bedrock characterization and produced standard penetration test blow counts that ranged from 22 blows-per-foot (bpf) to 34 bpf. A geologic cross section A-A' developed for this area is shown on Figure G.

3.3.3 Proposed Veterinarian/Administration Building

Boring EB-7 was located in the general area of the veterinarian/administration building. Here the subsurface profile consisted of a 1½-foot-thick layer of surficial (colluvium) clayey sand. The residual soil was underlain by sandstone bedrock. The residual soil layer was found to be in a medium dense condition. The sandstone and claystone was found to be in a generally weak condition in terms of bedrock characterization and produced standard penetration test blow counts that ranged from 21 blows-per-foot (bpf) to 36 bpf. As discussed earlier, there are fill berms on both the west and the east side of the building footprint that may be up to 10 feet thick based on a review of the surrounding natural topography.

3.3.4 Proposed Cat and Dog Enclosure Area

Boring EB-3 and EB-7 was located in the general area of the cat enclosure area. Here the subsurface profile consisted of a 2- to 4-foot-thick layer of surficial (colluvium) fat clay with sand. The residual soil was underlain by sandstone bedrock. The residual soil layer was found to be in a stiff condition. The claystone was found to be in a generally weak condition in terms of bedrock characterization and produced standard penetration test blow counts that ranged from 18 blows-per-foot (bpf) to 37 bpf.

3.3.5 Plasticity/Expansion Potential

We performed two Plasticity Index (PI) tests on representative samples. Test results were used to evaluate expansion potential of surficial soils and underlying bedrock. The result of the surficial PI test indicated a PI of 34, indicating very high expansion potential to wetting and drying cycles. The result of the PI test on the underlying claystone indicated a PI of 60, which indicates very high expansive potential to wetting and drying cycles.

3.3.6 In-Situ Moisture Contents

Laboratory testing indicated that the in-situ moisture contents within the upper 10 feet range from 2 percent under to 15 percent over the estimated laboratory optimum moisture.

3.4 GROUNDWATER

The site encompasses high elevation ground along the top and southerly crest of a ridgetop in the rugged La Honda region of the Santa Cruz Mountains. The site is underlain at shallow depths by sedimentary bedrock and our research suggests this formation does not serve as a laterally continuous shallow aquifer. The only water noted at the site exists within two large stock ponds that exist in the lower portion of the site slopes located well below (downslope) of the proposed improvements. These stock ponds are fed by surface runoff. We did not encounter evidence of groundwater in any of our explorations. It should be noted that, in general, fluctuations in groundwater levels could occur due to many factors including perched water, and regional groundwater variations, and rainfall or irrigation. We note that perched groundwater conditions are often present in the bedrock on hillside sites.

SECTION 4: GEOLOGIC HAZARDS

4.1 FAULT SURFACE RUPTURE

As stated earlier, published maps do not show any faults trending through the subject site (Rogers, 1971; Brabb, 1970 and 1980; Brabb and Olsen 1983; Jennings and Bryant, 2010; CDMG, 2003; USGS Fault and Fault database, 2006). The site is not located within a State Earthquake Fault Zone (CDMG 2003). We did not encounter evidence during our research or site reconnaissance of faults trending through the site. The potential for fault surface rupture occurring at the site should be considered low.

4.2 ESTIMATED GROUND SHAKING

Moderate to severe (design-level) earthquakes can cause strong ground shaking, which is the case for most sites within the Bay Area. A peak ground acceleration (PGA) was estimated for analysis using a value equal to F_{PGA}*PGA, as allowed in the 2019 edition of the California Building Code per Exception 2 of Section 11.4.8 of ASCE 7-16. For our analyses, we used a PGA of 1.114g.

4.3 LIQUEFACTION POTENTIAL

Published geotechnical hazard maps do not show the site in an area identified as having a liquefaction potential. This is due primarily to the fact that very shallow bedrock exists at the site and it is located at a high elevation in rugged terrain. The site is not located within a County-designated Liquefaction Hazard Zone (San Mateo County, 2008), and is within a zone mapped as having a low liquefaction potential by the Association of Bay Area Governments (ABAG). We screened the site for liquefaction during our site exploration by retrieving samples from the site, performing visual classification on sampled materials, and performing various tests to further classify the soil properties.

During strong seismic shaking, cyclically induced stresses can cause increased pore pressures within the soil matrix that can result in liquefaction triggering, soil softening due to shear stress loss, potentially significant ground deformation due to settlement within sandy liquefiable layers as pore pressures dissipate, and/or flow failures in sloping ground or where open faces are present (lateral spreading) (NCEER 1998). Limited field and laboratory data is available regarding ground deformation due to settlement; however, in clean sand layers settlement on the order of 2 to 4 percent of the liquefied layer thickness can occur. Soils most susceptible to liquefaction are loose, non-cohesive soils that are saturated and are bedded with poor drainage, such as sand and silt layers bedded with a cohesive cap.

As discussed in the “Subsurface” section above, we primarily encountered surficial soils consisting of lean clays or sandstone, siltstone and claystone bedrock. These materials are generally not susceptible to liquefaction. Based on the above, our screening of the site for liquefaction indicates a low potential for liquefaction.

4.4 LATERAL SPREADING

Lateral spreading is horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope. As failure tends to propagate as block failures, it is difficult to analyze and estimate where the first tension crack will form. There are no open faces within a distance considered susceptible to lateral spreading; therefore, in our opinion, the potential for lateral spreading to affect the site is low.

4.5 SEISMIC SETTLEMENT/UNSATURATED SAND SHAKING

Loose unsaturated sandy soils can settle during strong seismic shaking. As the soils encountered at the site were predominantly medium stiff to very stiff clays, and medium dense clayey sands, or claystone and sandstone bedrock, in our opinion, the potential for significant differential seismic settlement affecting the proposed improvements is low.

4.6 LANDSLIDING

4.6.1 General

The California Geological Survey (CGS) has not yet produced a Seismic Hazard Zone report or accompanying map for the La Honda 7.5-minute quadrangle during their ongoing program to map Seismic Hazard Zones on a 7.5-minute quadrangle scale (1:24,000) in the Bay Area. The County of San Mateo has not established regulatory zones for landsliding, however, the planning department maintains a map of "Existing Landslides" in the county (based on the USGS publication), open File Report 975-C. The published landslide-themed map of Brabb and Pampeyan (1972) which covers the County of San Mateo shows the site in an area of suspected large-scale landsliding (Figure 5 is a partial reproduction of the map of Brabb and Pampeyan. Specifically, the ridge top and the crests of adjacent slope son the south side are shown in a headscarp area of a large-scale landslide complex, which is shown s encompassing the rolling topography on the slopes below the slope crests. The proposed improvements are outside the mapped landslide mass. The county planning department shows the site in a zone designated as "areas of mostly landslides". The CGS interactive map showing reported recent landslides (CGS, 2018) does not show any reported landslides in the immediate area. These mapped landslides and classifications are the result of interpretive mapping and are not based on site-specific studies. These maps serve as a planning resource. Maps and publications published after the damaging El Niño rainfall events in 1982, and 1995 (Ellen & Weiczorek, 1982; Ellen et al., 1997) depicting landslides that resulted from those large-scale damaging events do not show any landslides that occurred from those events at the site.

Our site-specific geologic evaluation has resulted in an interpretation that differs from the published mapping in terms of the nature and extent of landsliding at the site.

4.6.2 Site-Specific

Our review of aerial photos, our site reconnaissance and subsurface exploration has led to our conclusion that, although the lower portions of slopes on the south flank of the ridge display rolling topography, these slopes are not part of a large-scale landslide as suggested on the map of Brabb and Pampeyan (1972). Landsliding identified in this evaluation is based on geomorphic features discernible at the ground surface and in stereo aerial photographs. We have mapped several landslides on the subject property and have depicted these features on the site plan (Figure 2) and have designated some of these individual slides on the map with numbers as a convenience in description in this text. Some of these identified features are located well beyond the proposed improvements and are not considered a constraint to the siting of structures or grading. The establishment of a septic system leachfield at the site is located closer to these identified landslides (see Figure 7) and the layout and design of these leachfields should take into account the constraints (see Recommendations section). Of the landslides that have been mapped during our study, the following landslides are located more proximal to the proposed features and are discussed below:

Qls1: This slide is located just downslope of the existing and proposed access road in the north-central portion of the property (see Figure 2). This feature is a slump-type failure and, based on the relative topography surrounding this feature, is inferred to be relatively shallow (approximately 15 feet thick or less) and consists of colluvial soils overlying thin bedded mudstone and sandstone. A culvert trends beneath the road which delivers surface runoff from the road into the headscarp of this feature. This may have served as the triggering mechanism for this shallow landslide. Drainage improvements should be modified in this area in order to help mitigate this condition. Recommendations are offered for reducing this constraint (see Section 6.12 titled “Site Drainage”).

Qls2: This suspected landslide is a relatively small, shallow landslide (a slump) located adjacent to the downslope side of the vet/admin building and several cat enclosure structures (see Figure 2). Although poorly defined in terms of slope morphology. The scarp area is located less than 10 feet from the nearest proposed enclosure and admin building. Our exploratory boring (EB-7) drilled near the scarp of this mapped slide indicates bedrock is shallow in this area. This feature may have been triggered by a lack of surface runoff coming off the top of the ridge. This runoff pattern my no longer exist due to the establishment of the graded dirt access road and fill berms that have been placed in the last 30 or so years.

Qls4: This is a suspected landslide scarp, however, it lacks topographic patterns that would suggest a debris field is present below the scarp (see Figure 2). This feature is located adjacent to the main site access road. A landslide below this scarp would most probably move downslope and away from the road, however, the scarp would not be expected to “back step” over time into the roadway area provided that surface runoff is controlled and directed away from this feature.

Qls3 and Qls5 are all located well outside any proposed developed areas and therefore do not pose a constraint to any proposed features for the current version of the development concept (see Figures 2). Aside from seismic shaking, proximity to some small to moderate sized landslides, and the more general hazard of erosion, there are no other geologic constraints that potentially impact the proposed project as currently conceived.

Control of construction phase runoff and long-term runoff is essential for the stability of slopes at the site. All runoff should be collected and directed to suitable discharge points which specifically avoid the mapped landslides and these discharge points should be located well downslope of the proposed development features, including roads. We do not recommend allowing or directing development runoff toward the very steep slopes on the north side of the north property line (see Site Drainage Recommendations).

SECTION 5: CONCLUSIONS

5.1 SUMMARY

From a geotechnical viewpoint, the project is feasible provided the concerns listed below are addressed in the project design. Descriptions of each concern with brief outlines of our recommendations follow the listed concerns.

- Presence of highly expansive soil and bedrock
- Presence of undocumented fills
- Potential for cut/fill transitions
- Redevelopment considerations
- Slope stability and building/leach field setbacks
- Presence of cohesionless soils
- Potential for difficult excavation
- Soil Corrosion Potential

5.1.1 Presence of Highly Expansive Soil and Bedrock

Our borings disclosed the presence of both sandstone and claystone bedrock of the Tahana formation at the site. Our Plasticity Index testing of the claystone and residual clay soils indicate that these materials are highly to very highly expansive. Expansive soils can undergo significant volume change with changes in moisture content. They shrink and harden when dried and expand and soften when wetted. To reduce the potential for damage to the planned structures, slabs-on-grade should have sufficient reinforcement and be supported on a layer of non-expansive fill; footings should extend below the zone of seasonal moisture fluctuation or the structures should be supported on a drilled pier foundation system. Because of these expansive soils and the close proximity of the bedrock, we recommend the care takers residence, fire prevention water tank and pump station, domestic water tank and pump station, maintenance building, and vet/admin building should be supported on drilled pier foundations. While the PI testing indicates highly expansive soils and bedrock, we are not aware of any published geologic or geotechnical information which suggests these materials are subject to extreme uplift pressures and movement as claystone bedrock of the Whiskey Hill formation is known for, which is located in the vicinity of Menlo Park. This report does not provide recommendations to address extreme uplift and movement of claystone because it has not been documented for this unit in the published literature or in our experience with this geologic unit. However, we would recommend that the grading plan be developed to limit cuts to about 3 feet to mitigate potential heave of the very highly expansive claystone. In areas of the structures where there will be greater than 3 feet of cut into the claystone, we recommend the minimum drilled pier embedment be increased to 15 feet. It is important to limit moisture changes in the surficial soils by using positive drainage away from buildings as well as limiting landscaping watering. Detailed grading and foundation recommendations addressing these expansive soil and bedrock concerns are presented in the following “Earthwork” and “Foundation” sections.

5.1.2 Presence of Undocumented Fills

Our borings encountered undocumented fill ranging up to 3½ feet in depth, and two fill berms were observed the west and the east side of the approximate vet/admin building footprint that may be up to 10 feet thick based on our review of the surrounding natural topography. To reduce the potential for differential settlement, we recommend that the undocumented fill be over-excavated and recompacted following the recommendations presented in the “Earthwork” section below. In addition, where fill placement results in a cut/fill transition within a building pad that will be supported on shallow foundations, we recommend that the entire building pad be overexcavated to provide uniform support. Additional recommendations are provided in the “Earthwork” section of this report.

5.1.3 Potential for Cut/Fill Transitions

Based on the proposed level building pads for many of the structures, and the existing topography of the site, new structures could potentially span cut/fill transitions, if not mitigated. The performance of a structure supported on a shallow foundation overlying a cut/fill transition could result in increased differential settlement. Therefore, we recommend that cut/fill transitions be over-excavated and that shallow foundations bear uniformly on similar, undisturbed native soil or bedrock, or a relatively uniform section of engineered fill over undisturbed native soil and/or bedrock. Recommendations addressing this are presented in the “Earthwork” section.

5.1.4 Redevelopment Considerations

As discussed, the site is currently occupied by existing buildings, site fixtures, and landscaping. We understand that some of the existing improvements, such as the existing caretaker’s residence, will be demolished for the construction of the new site improvements. We understand the new fire prevention water tank and pump station will be constructed partially within the footprint of the existing residence. Potential issues that are often associated with redeveloping sites include demolition of existing improvements, abandonment of existing utilities, and undocumented fills. Please refer to the “Earthwork” section below for further recommendations.

5.1.5 Slope Stability and Building Setbacks

Several potential landslides and areas of slope instability were identified during our investigation. However, it appears that the proposed project layout has been made to avoid these areas. Our recommendations for building and leach field setbacks are presented in the “Earthwork” section of this report.

5.1.6 Presence of Cohesionless Soils

As mentioned, some areas of the site are underlain by cohesionless, sandy soils with low fines content. The sandy soils may not stand vertical when excavated and excavation sidewalls for foundations, utility trenches, temporary slopes, basement excavation, etc., may cave in or accumulate significant amount of slough. Grading and excavation contractors should be made aware of this condition and plan on forming footings, preparing slab-on-grade subgrade just prior to concrete placement, and other similar construction issues as relates to temporary shoring, utility excavations, etc. Our recommendations for excavation of cohesionless soils are presented in the “Earthwork” section of this report.

5.1.7 Potential for Difficult Excavation

Our borings encountered moderately hard, moderately to deeply weathered Tahana Claystone and Sandstone. Based on the project plans, excavations into claystone and sandstone is anticipated and should be anticipated. In our opinion, moderately to deeply weathered areas of bedrock would be excavatable with heavy-duty excavating equipment (such as large backhoes or excavators). However, slightly weathered to fresh bedrock areas, if encountered, will likely require excavation with a hoe-ram. Additionally, drilled pier contractors should anticipate difficult drilling conditions and should be experienced in drilling in bedrock conditions and the use of appropriate equipment (such as coring barrels) to advance the piers to design depths. Additional recommendations are provided in the “Earthwork” and “Foundation” sections of this report.

5.1.8 Soil Corrosion Potential

Soil corrosion screening was not performed during our investigation; however, based on our experience with similar soil, the subsurface soil is likely to be considered corrosive to buried metal and potentially concrete as well. We recommend soil corrosion screening be performed during design.

5.2 PLANS AND SPECIFICATIONS REVIEW

We recommend that we be retained to review the geotechnical aspects of the project structural, civil, and landscape plans and specifications, allowing sufficient time to provide the design team with any comments prior to issuing the plans for construction.

5.3 CONSTRUCTION OBSERVATION AND TESTING

As site conditions may vary significantly between the small-diameter borings performed during this investigation, we also recommend that a Cornerstone representative be present to provide geotechnical observation and testing during earthwork and foundation construction. This will allow us to form an opinion and prepare a letter at the end of construction regarding contractor compliance with project plans and specifications, and with the recommendations in our report. We will also be allowed to evaluate any conditions differing from those encountered during our investigation, and provide supplemental recommendations as necessary. For these reasons, the recommendations in this report are contingent of Cornerstone providing observation and testing during construction. Contractors should provide at least a 48-hour notice when scheduling our field personnel.

SECTION 6: EARTHWORK

6.1 SITE DEMOLITION

All existing improvements not to be reused for the current development, including all foundations, flatwork, pavements, utilities, and other improvements should be demolished and removed from the site. Recommendations in this section apply to the removal of these improvements, which may be present on the site, prior to the start of mass grading or the construction of new improvements for the project. It is noted that “unknown” buried structures such as septic systems, leach fields, seepage piles, debris pits, and/or wells, etc. may be encountered during grading. If these are encountered during grading, we should provide recommendations to address them on a case-by-case basis.

Cornerstone should be notified prior to the start of demolition, and should be present on at least a part-time basis during all backfill and mass grading as a result of demolition.

6.1.1 Abandonment of Existing Utilities

All utilities should be completely removed from within planned building areas. For any utility line to be considered acceptable to remain within building areas, the utility line must be completely backfilled with grout or sand-cement slurry (sand slurry is not acceptable), the ends outside the building area capped with concrete, and the trench fills either removed and replaced as engineered fill with the trench side slopes flattened to at least 1:1, or the trench fills are determined not to be a risk to the structure. The assessment of the level of risk posed by the particular utility line will determine whether the utility may be abandoned in place or needs to be completely removed. The contractor should assume that all utilities will be removed from within building areas unless provided written confirmation from both the owner and the geotechnical engineer.

Utilities extending beyond the building area may be abandoned in place provided the ends are plugged with concrete, they do not conflict with planned improvements, and that the trench fills do not pose significant risk to the planned surface improvements.

The risk for owners associated with abandoning utilities in place include the potential for future differential settlement of existing trench fills, and/or partial collapse and potential ground loss into utility lines that are not completely filled with grout.

6.2 SITE CLEARING AND PREPARATION

6.2.1 Site Stripping

The site should be stripped of all surface vegetation, and surface and subsurface improvements to be removed within the proposed development area. Demolition of existing improvements is discussed in the prior paragraphs. A detailed discussion of removal of existing fills is provided later in this report. Surface vegetation and topsoil should be stripped to a sufficient depth to remove all material greater than 3 percent organic content by weight. Based on our site observations, surficial stripping should extend about 4 to 6 inches below existing grade in vegetated areas.

6.2.2 Tree and Shrub Removal

Trees and shrubs designated for removal should have the root balls and any roots greater than ½-inch diameter removed completely. Mature trees are estimated to have root balls extending to depths of 2 to 4 feet, depending on the tree size. Significant root zones are anticipated to extend to the diameter of the tree canopy. Grade depressions resulting from root ball removal should be cleaned of loose material and backfilled in accordance with the recommendations in the “Compaction” section of this report.

6.3 REMOVAL OF EXISTING FILLS

As discussed, our borings encountered undocumented fill to depths of 3½ feet and two fill berms observed directly west of and within the east side of the vet/admin building footprint that may be up to 10 feet thick, much of this fill will likely be removed during grading. In addition, we anticipate up to several feet of undocumented fill may be encountered below and in the vicinity of the existing caretaker’s residence due to previous site grading activities. All fills should be completely removed from within building areas and tank areas, and to a lateral distance of at least 5 feet beyond the building footprint or to a lateral distance equal to fill depth below the perimeter footing, whichever is greater. We also recommend that all undocumented fill be removed from pavement and flatwork areas. Provided the fills meet the “Material for Fill” requirements below, the fills may be reused when backfilling the excavations. Based on review of the fill berms, the material may be reused if all debris, wood, trash, and other unsuitable material is screened out of the remaining material and removed from the site. If materials are encountered that do not meet the requirements, such as debris, wood, trash, those materials should screened out of the remaining material and be removed from the site. Backfill of excavations should be placed in lifts and compacted in accordance with the "Compaction" section below.

6.4 BUILDING AND LEACH FIELD SETBACKS

In general, we recommend that the proposed buildings, equipment pads, and water tanks be setback at least 25 feet from the mapped landslides and 15 feet from the top of slopes. Where structures are within 15 feet of a slope, we recommend they be supported on drill piers designed in accordance with the recommendations in this report. This would apply to the caretaker residence, fire prevention and domestic water tank pads and associated pump stations, maintenance building, and administration/veterinary clinic building. We note that one of the cat enclosures is positioned about 10 feet away from the top of Landslide #2. We note that EB-7 was drilled between the Cat Enclosure and the top of Landslide #2. Since the boring disclosed that the sandstone bedrock is at a shallow depth in this area, the location of this Cat Enclosure is acceptable from a geologic viewpoint. The leach field should be set back at least 50 feet from the top of the mapped landslides. General recommendations for release of water onto the slopes is presented in the "Site Drainage" portion of this report.

6.5 TEMPORARY CUT AND FILL SLOPES

The contractor is responsible for maintaining all temporary slopes and providing temporary shoring where required. Temporary shoring, bracing, and cuts/fills should be performed in accordance with the strictest government safety standards. On a preliminary basis, the upper 10 feet at the site may be classified as OSHA Soil Type C materials. A Cornerstone representative should be retained to confirm the preliminary site classification.

Excavations performed during site demolition and fill removal should be sloped at no greater than 1:1 (horizontal:vertical) within the upper 5 feet below building subgrade, unless the OSHA soil classification indicates that slope should be flatter.

6.6 SUBGRADE PREPARATION

After site clearing and demolition is complete, and prior to backfilling any excavations resulting from fill removal or demolition, the excavation subgrade and subgrade within areas to receive additional site fills, slabs-on-grade and/or pavements should be scarified to a depth of 6 inches, moisture conditioned, and compacted in accordance with the "Compaction" section below.

6.7 SUBGRADE STABILIZATION MEASURES

Soil subgrade and fill materials, especially soils with high fines contents such as clays and silty soils, can become unstable due to high moisture content, whether from natural high in-situ moisture contents or from winter rains. As the moisture content increases over the laboratory optimum, it becomes more likely the materials will be subject to softening and yielding (pumping) from construction loading or become unworkable during placement and compaction.

There are several potential methods to address potential unstable soil conditions and facilitate fill placement and trench backfill. Some of the methods are briefly discussed below. Implementation of the appropriate stabilization measures should be evaluated on a case-by-case basis according to the project construction goals and the particular site conditions.

6.7.1 Scarification and Drying

The subgrade may be scarified to a depth of 12 to 18 inches and allowed to dry to near optimum conditions, if sufficient dry weather is anticipated to allow sufficient drying. More than one round of scarification may be needed to break up the soil clods.

6.7.2 Removal and Replacement

As an alternative to scarification, the contractor may choose to over-excavate the unstable soils and replace them with dry on-site or import materials. A Cornerstone representative should be present to provide recommendations regarding the appropriate depth of over-excavation, whether a geosynthetic (stabilization fabric or geogrid) is recommended, and what materials are recommended for backfill.

6.7.3 Chemical Treatment

Where the unstable area exceeds about 5,000 to 10,000 square feet and/or site winterization is desired, chemical treatment with quicklime (CaO), kiln-dust, or cement may be more cost-effective than removal and replacement. Recommended chemical treatment depths will typically range from 12 to 18 inches depending on the magnitude of the instability.

6.8 MATERIAL FOR FILL

6.8.1 Re-Use of On-site Soils

On-site soils with an organic content less than 3 percent by weight may be reused as general fill below the non-expansive fill section. General fill should not have lumps, clods or cobble pieces larger than 6 inches in diameter; 85 percent of the fill should be smaller than 2½ inches in diameter. Minor amounts of oversize material (smaller than 12 inches in diameter) may be allowed provided the oversized pieces are not allowed to nest together and the compaction method will allow for loosely placed lifts not exceeding 12 inches.

6.8.2 Potential Import Sources

Imported and non-expansive material should be inorganic with a Plasticity Index (PI) of 15 or less, and not contain recycled asphalt concrete where it will be used within the habitable building areas. To prevent significant caving during trenching or foundation construction, imported material should have sufficient fines. Samples of potential import sources should be delivered to our office at least 10 days prior to the desired import start date. Information regarding the import source should be provided, such as any site geotechnical reports. If the material will be derived from an excavation rather than a stockpile, potholes will likely be required to collect samples from throughout the depth of the planned cut that will be imported. At a minimum, laboratory testing will include PI tests. Material data sheets for select fill materials (Class 2 aggregate base, ¾-inch crushed rock, quarry fines, etc.) listing current laboratory testing data (not older than 6 months from the import date) may be provided for our review without providing a sample. If current data is not available, specification testing will need to be completed prior to approval.

Environmental and soil corrosion characterization should also be considered by the project team prior to acceptance. Suitable environmental laboratory data to the planned import quantity should be provided to the project environmental consultant; additional laboratory testing may be required based on the project environmental consultant’s review. The potential import source should also not be more corrosive than the on-site soils, based on pH, saturated resistivity, and soluble sulfate and chloride testing.

6.8.3 Non-Expansive Fill Using Lime Treatment

As discussed above, non-expansive fill should have a Plasticity Index (PI) of 15 or less. Due to the high clay content and PI of the on-site soil and bedrock materials, it is not likely that sufficient quantities of non-expansive fill would be generated from cut materials. As an alternative to importing non-expansive fill, chemical treatment can be considered to create non-expansive fill. If this option is considered, additional laboratory tests should be performed prior to initial site grading to further evaluate the optimum percentage of quicklime required.

6.9 COMPACTION REQUIREMENTS

All fills, and subgrade areas where fill, slabs-on-grade, and pavements are planned, should be placed in loose lifts 8 inches thick or less and compacted in accordance with ASTM D1557 (latest version) requirements as shown in the table below. In general, clayey soils should be compacted with sheepsfoot equipment and sandy/gravelly soils with vibratory equipment; open-graded materials such as crushed rock should be placed in lifts no thicker than 18 inches consolidated in place with vibratory equipment. Each lift of fill and all subgrade should be firm and unyielding under construction equipment loading in addition to meeting the compaction requirements to be approved. The contractor (with input from a Cornerstone representative) should evaluate the in-situ moisture conditions, as the use of vibratory equipment on soils with high moistures can cause unstable conditions. General recommendations for soil stabilization are provided in the “Subgrade Stabilization Measures” section of this report. Where the soil’s PI is 20 or greater, the expansive soil criteria should be used.

Table 2: Compaction Requirements

Description	Material Description	Minimum Relative[1] Compaction (percent)	Moisture[2] Content (percent)
General Fill (within upper 5 feet)	On-Site Expansive Soils	87 – 92	>3
	Low Expansion Soils	90	>1
General Fill (below a depth of 5 feet)	On-Site Expansive Soils	95	>3
	Low Expansion Soils	95	>1
Trench Backfill	On-Site Expansive Soils	87 – 92	>3
Trench Backfill	Low Expansion Soils	90	>1
Trench Backfill (upper 6 inches of subgrade)	On-Site Low Expansion Soils	95	>1
Crushed Rock Fill	¾-inch Clean Crushed Rock	Consolidate In-Place	NA
Non-Expansive Fill	Imported Non-Expansive Fill	90	Optimum
Flatwork Subgrade	On-Site Expansive Soils	87 - 92	>3
Flatwork Subgrade	Low Expansion Soils	90	>1
Flatwork Aggregate Base	Class 2 Aggregate Base[3]	90	Optimum
Pavement Subgrade	On-Site Expansive Soils	87 - 92	>3
Pavement Subgrade	Low Expansion Soils	95	>1
Pavement Aggregate Base	Class 2 Aggregate Base[3]	95	Optimum
Asphalt Concrete	Asphalt Concrete	95 (Marshall)	NA

1 – Relative compaction based on maximum density determined by ASTM D1557 (latest version)
2 – Moisture content based on optimum moisture content determined by ASTM D1557 (latest version)
3 – Class 2 aggregate base shall conform to Caltrans Standard Specifications, latest edition, except that the relative compaction should be determined by ASTM D1557 (latest version)

6.9.1 Construction Moisture Conditioning

Expansive soils can undergo significant volume change when dried then wetted. The contractor should keep all exposed expansive soil subgrade (and also trench excavation side walls) moist until protected by overlying improvements (or trenches are backfilled). If expansive soils are allowed to dry out significantly, re-moisture conditioning may require several days of re-wetting (flooding is not recommended), or deep scarification, moisture conditioning, and re-compaction.

6.10 TRENCH BACKFILL

Utility lines constructed within public right-of-way should be trenched, bedded and shaded, and backfilled in accordance with the local or governing jurisdictional requirements. Utility lines in private improvement areas should be constructed in accordance with the following requirements unless superseded by other governing requirements.

All utility lines should be bedded and shaded to at least 6 inches over the top of the lines with crushed rock (⅜-inch-diameter or greater) or well-graded sand and gravel materials conforming to the pipe manufacturer's requirements. Open-graded shading materials should be consolidated in place with vibratory equipment and well-graded materials should be compacted to at least 90 percent relative compaction with vibratory equipment prior to placing subsequent backfill materials.

General backfill over shading materials may consist of on-site native materials provided they meet the requirements in the "Material for Fill" section, and are moisture conditioned and compacted in accordance with the requirements in the "Compaction" section.

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

On expansive soils sites it is desirable to reduce the potential for water migration into building and pavement areas through the granular shading materials. We recommend that a plug of low-permeability clay soil, sand-cement slurry, or lean concrete be placed within trenches just outside where the trenches pass into building and pavement areas.

6.11 PERMANENT CUT AND FILL SLOPES

All permanent cut and fill slopes in soil should have a maximum inclination of 2:1 (horizontal:vertical) for slopes up to 10 feet high; slopes greater than 10 feet should be inclined at no greater than 2.5:1 (H:V). Fill slopes should be overbuilt and trimmed back, exposing engineered fill when complete. We would also recommend that in the building areas cuts be limited to 3 feet to reduce the potential for heave in the claystone bedrock. Refer to the "Erosion Control" section of this report for a discussion regarding protection of slope surfaces.

6.11.1 Keyways and Benches

Fill placed on existing ground inclined at 6:1 or greater should be benched into the existing slope and a keyway constructed at the toe of the fill. Benches should be angled slightly into the slope be spaced vertically at no greater than 4 feet between benches, and be at least 8 feet wide. Depending on the thickness of any colluvial/residual soil layer that blankets the bedrock, the benches may need to be widened beyond the minimum width to extend into competent bedrock. The keyway should also be angled slightly into the slope (minimum 2 percent inclination), extend at least 2 feet into moderately weathered bedrock, and be at least 12 feet wide. A typical key and construction is depicted in Figure 8.

6.11.2 Fill Drainage

A permanent subsurface drainage system consisting of a series of perforated gravity pipes or drainage strips should be constructed between engineered fill placed against a bedrock slope and within all keyways. This system is intended to intercept perched water flowing through the bedrock and transmit it to suitable outlet structures and reduce the potential for hydrostatic pressures building up behind the fills and causing slope instability. The drain lines should be placed at the back of the keyways and benches. Bench drains should be spaced vertically at no greater than 10 feet.

The drainage system should be constructed in small trenches or v-ditches and consist of a minimum 4-inch-diameter perforated (perforations placed downward) pipe, bedded and shaded in Caltrans Class 2 Permeable Material (latest version) or ¾-inch crushed rock; if crushed rock is used, the rock should be encapsulated in filter fabric (Mirafi 140N or equivalent). The bedding should be at least 2 inches, and the trench should be at least 8 inches in width and depth. Alternatively, geocomposite strip drains may be used. All drainage lines should slope towards suitable outlet structures at an inclination of at least 0.5 percent. Suitable outlet structures may consist of connecting the drainage lines to a storm drain system, with a sump if required; if the drain lines will outlet overland at the toe of the slope, an appropriate rock spill pad should be provided; the drain lines should not outlet onto the slope.

Vertical cleanouts should be provided at all upslope ends of the drainage lines and at all 90-degree bends.

6.11.3 Plan Review and Construction Monitoring

We should be retained to review the conceptual grading and sub-drainage plans and we can provide more specific input regarding the location of keyways and fill drainage for the final plans. A Cornerstone representative should be on site during keyway and fill slope construction. Field modifications to the planned keyway and benching may be required based on encountered field conditions. In addition, it has been our experience that cut slopes in the Tahana Formation are prone to localized weak zones and sloughing along bedding planes. We recommend that a Cornerstone engineering geologist observe the condition of all cut slopes and evaluate the potential for localized adverse materials or bedding orientation.

We recommend that the project civil engineer or land surveyor be retained to survey in place all keyways, sub-drainage lines, solid pipes, and cleanouts, and create an as-built plan. This plan will be of use for any future maintenance or repair work.

6.12 CUT/FILL TRANSITION OVER-EXCAVATION

Structures underlain by cut/fill transitions should be over-excavated to provide a relatively uniform fill thickness beneath the structure footprint. The depth of over-excavation below pad grade should be equal to at least 3 feet below the bottom of foundations to provide a uniform engineered fill pad. The final depth of the over-excavation will depend on the type of material exposed, and will be determined in the field during construction. In general, over-excavation should extend to at least 5 feet beyond the building footprint. Adjustments to the depth and lateral limits of the over-excavation may need to be made at the time of construction depending on the actual conditions encountered during grading.

6.13 SITE DRAINAGE

6.13.1 Surface Drainage

Surface runoff should not be allowed to flow over the top of or pond at the top or toe of engineered slopes or retaining walls. We recommend that the development runoff be directed through solid drain pipes to suitable discharge facilities located well downslope of the developed areas. Alternatively, runoff may be directed in solid pipes to the existing stock ponds located in the western and in the eastern portions of the site. Discharge areas for runoff should be setback a minimum distance of 100 feet from identified landslides scarps. Runoff should not be allowed to flow over the steep to very steep slopes that are adjacent to the north property line. Ponding should also not be allowed on or adjacent to building foundations, slabs-on-grade, or pavements. Hardscape surfaces should slope at least 2 percent towards suitable discharge facilities; landscape areas should slope at least 3 percent towards suitable discharge facilities. Roof runoff should be directed away from building areas in closed conduits, to approved infiltration facilities, or on to hardscaped surfaces that drain to suitable facilities. Retention, detention or infiltration facilities should be spaced at least 10 feet from buildings, and preferably at least 5 feet from slabs-on-grade or pavements. These facilities are not recommended where stormwater infiltration may affect slopes at lower elevations on or adjacent to the site. However, if slopes are not present at lower elevations that could potentially be affected, and if retention, detention or infiltration facilities are located within these zones, we recommend that these treatment facilities meet the requirements in the Storm Water Treatment Design Considerations section of this report.

Lined v-ditches should be included at the top of slopes and intermediate benches, and at the toe of slopes or behind retaining walls adjacent to planned or existing development. All v-ditches and drain inlets should be sized to accommodate the design storm events for the upslope tributary area. Concrete-lined v-ditches should be reinforced as required and have adequate control and construction joints, and should be constructed neat in excavations; backfill around formed ditches should not be allowed.

Upslope sources of water should be evaluated. If upslope irrigation of is present or planned, additional surface and subsurface drainage, or construction of drained buttress fills may be needed to protect site improvements. We should be consulted if this issue will affect the project.

We recommend that the septic leach fields are designed to disperse effluent over as large an area as practicable, or alternatively, that the effluent be directed deeper into the subsurface profile within sandstone that underlies the surficial soils and claystone layers. The infiltration or percolation rate should be evaluated by the leach field designer.

6.13.2 Subsurface Drainage

As discussed in the “Permanent Cut and Fill Slopes” section, subsurface drainage improvements might be installed as part of earthwork for fill construction if perched groundwater is observed. These improvements should include positive surface gradients for keyways and benches and the installation of a subdrain system consisting of perforated pipe and permeable gravel or drain rock. If drain rock is used, the rock and pipe should be entirely wrapped with a permeable geotextile fabric. Subdrains should also be installed at the toe of any proposed cut slopes depending on the actual conditions observed during construction. As previously discussed, a conceptual subdrain plan should be prepared once preliminary grading plans are finalized. The actual location of subdrains should be determined in the field at the time of construction.

6.14 LOW-IMPACT DEVELOPMENT (LID) IMPROVEMENTS

The Municipal Regional Permit (MRP) requires regulated projects to treat 100 percent of the amount of runoff identified in Provision C.3.d from a regulated project’s drainage area with low impact development (LID) treatment measures onsite or at a joint stormwater treatment facility. LID treatment measures are defined as rainwater harvesting and use, infiltration, evapotranspiration, or biotreatment. A biotreatment system may only be used if it is infeasible to implement harvesting and use, infiltration, or evapotranspiration at a project site.

Technical infeasibility of infiltration may result from site conditions that restrict the operability of infiltration measures and devices. Various factors affecting the feasibility of infiltration treatment may create an environmental risk, structural stability risk, or physically restrict infiltration. The presence of any of these limiting factors may render infiltration technically infeasible for a proposed project. To aid in determining if infiltration may be feasible at the site, we provide the following site information regarding factors that may aid in determining the feasibility of infiltration facilities at the site.

- The near-surface soils at the site are clayey, and categorized as Hydrologic Soil Group D, and is expected to have infiltration rates of less than 0.2 inches per hour. In our opinion, these clayey soils will significantly limit the infiltration of stormwater.

- No groundwater production wells are within 100 feet of potential locations for infiltration facilities.

- The site is not known, to our knowledge, to have pollutants with the potential for mobilization as a result of stormwater infiltration.

- The site has a known geotechnical hazard consisting of steep slopes and areas with landslide potential; therefore, stormwater infiltration facilities may not be feasible.

- In our opinion, infiltration locations within 10 feet of the buildings and top of slopes or on the slopes would create a geotechnical hazard.

6.14.1 Storm Water Treatment Design Considerations

If storm water treatment improvements, such as shallow bio-retention swales, basins or pervious pavements, are required as part of the site improvements to satisfy Storm Water Quality (C.3) requirements, we recommend the following items be considered for design and construction.

6.14.1.1 General Bioswale Design Guidelines

- If possible, avoid placing bioswales or basins within 10 feet of the building perimeter or within 5 feet of exterior flatwork or pavements. If bioswales must be constructed within these setbacks, the side(s) and bottom of the trench excavation should be lined with 10-mil visqueen to reduce water infiltration into the surrounding expansive clay.

- Bioswales constructed within 3 feet of proposed buildings may be within the foundation zone of influence for perimeter wall loads. Therefore, where bioswales will parallel foundations and will extend below the “foundation plane of influence,” an imaginary 1:1 plane projected down from the bottom edge of the foundation, the foundation will need to be deepened so that the bottom edge of the bioswale filter material is above the foundation plane of influence.

- The bottom of bioswale or detention areas should include a perforated drain placed at a low point, such as a shallow trench or sloped bottom, to reduce water infiltration into the surrounding soils near structural improvements, and to address the low infiltration capacity of the on-site clay soils.

6.14.1.2 Bioswale Infiltration Material

- Gradation specifications for bioswale filter material, if required, should be specified on the grading and improvement plans.

- Compaction requirements for bioswale filter material in non-landscaped areas or in pervious pavement areas, if any, should be indicated on the plans and specifications to satisfy the anticipated use of the infiltration area.

- If required, infiltration (percolation) testing should be performed on representative samples of potential bioswale materials prior to construction to check for general conformance with the specified infiltration rates.

- It should be noted that multiple laboratory tests may be required to evaluate the properties of the bioswale materials, including percolation, landscape suitability and possibly environmental analytical testing depending on the source of the material. We recommend that the landscape architect provide input on the required landscape suitability tests if bioswales are to be planted.

- If bioswales are to be vegetated, the landscape architect should select planting materials that do not reduce or inhibit the water infiltration rate, such as covering the bioswale with grass sod containing a clayey soil base.

- If required by governing agencies, field infiltration testing should be specified on the grading and improvement plans. The appropriate infiltration test method, duration and frequency of testing should be specified in accordance with local requirements.

- Due to the relatively loose consistency and/or high organic content of many bioswale filter materials, long-term settlement of the bioswale medium should be anticipated. To reduce initial volume loss, bioswale filter material should be wetted in 12 inch lifts during placement to pre-consolidate the material. Mechanical compaction should not be allowed, unless specified on the grading and improvement plans, since this could significantly decrease the infiltration rate of the bioswale materials.

- It should be noted that the volume of bioswale filter material may decrease over time depending on the organic content of the material. Additional filter material may need to be added to bioswales after the initial exposure to winter rains and periodically over the life of the bioswale areas, as needed.

6.14.1.3 Bioswale Construction Adjacent to Pavements

If bio-infiltration swales or basins are considered adjacent to proposed parking lots or exterior flatwork, we recommend that mitigative measures be considered in the design and construction of these facilities to reduce potential impacts to flatwork or pavements. Exterior flatwork, concrete curbs, and pavements located directly adjacent to bio-swales may be susceptible to settlement or lateral movement, depending on the configuration of the bioswale and the setback between the improvements and edge of the swale. To reduce the potential for distress to these improvements due to vertical or lateral movement, the following options should be considered by the project civil engineer:

- Improvements should be setback from the vertical edge of a bioswale such that there is at least 1 foot of horizontal distance between the edge of improvements and the top edge of the bioswale excavation for every 1 foot of vertical bioswale depth, or

- Concrete curbs for pavements, or lateral restraint for exterior flatwork, located directly adjacent to a vertical bioswale cut should be designed to resist lateral earth pressures in accordance with the recommendations in the “Retaining Walls” section of this report, or concrete curbs or edge restraint should be adequately keyed into the native soil or engineered to reduce the potential for rotation or lateral movement of the curbs.

6.15 PERMANENT EROSION CONTROL MEASURES

Hillside grading will require periodic maintenance after construction to reduce the potential for erosion and sloughing. At a minimum all slopes should be vegetated by hydroseeding or other landscape ground cover. The establishment of vegetation will help reduce runoff velocities, allow some infiltration and transpiration, trap sediment within runoff, and protect the soil from raindrop impact. Depending on the exposed material type and the slope inclination, more aggressive erosion control measures may be needed to protect slopes for one or more winter seasons while vegetation is establishing. For slopes with inclinations of 2:1 (horizontal:vertical) or greater, erosion control may consist of straw matting, or erosion control blankets used in combination with hydroseeding.

Both construction and post-construction Storm Water Pollution Prevention Plans (SWPPPs) should be prepared for the project-specific requirements. We recommend that final grading plans be provided for our review.

6.16 LANDSCAPE CONSIDERATIONS

Since the near-surface soils are moderately to highly expansive, we recommend greatly reducing the amount of surface water infiltrating these soils near foundations and exterior slabs-on-grade. This can typically be achieved by:

- Using drip irrigation
- Avoiding open planting within 3 feet of the building perimeter or near the top of existing slopes
- Regulating the amount of water distributed to planter areas by using irrigation timers
- Selecting landscaping that requires little or no watering, especially near foundations.

We recommend that the landscape architect consider these items when developing landscaping plans.

SECTION 7: FOUNDATIONS

7.1 SUMMARY OF RECOMMENDATIONS

In our opinion, the proposed structures may be supported on shallow foundations and/or drilled piers provided the recommendations in the “Earthwork” section and the sections below are followed.

7.2 SEISMIC DESIGN CRITERIA

Our explorations generally encountered colluvium and residual soil overlying Tahana Formation claystone and sandstone to depths of 21½ feet, the maximum depth explored. Based on our borings and review of local geology, the site is underlain by shallow alluvial soils underlain by shallow rock with typical SPT “N” values above 50 blows per foot. Therefore, we have classified the site as Soil Classification C. The mapped spectral acceleration parameters S_s and S_1 were calculated using the web-based program ATC Hazards by Locations, located at https://hazards.atcouncil.org/, based on the site coordinates presented below and the site classification. Recommended values for design are presented in Table 3. The table below lists the various factors used to determine the seismic coefficients and other parameters.

Table 3: 2019 CBC Site Categorization and Site Coefficients

Classification/Coefficient	Design Value
Site Class	D
Site Latitude	37.302572°
Site Longitude	-122.279724°
0.2-second Period Mapped Spectral Acceleration[1], S_S	2.11g
1-second Period Mapped Spectral Acceleration[1], S_1	0.815g
Short-Period Site Coefficient – Fa	1.2
Long-Period Site Coefficient – Fv	1.4
0.2-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects - S_{MS}	2.532g
1-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects – S_{M1}	1.141g
0.2-second Period, Design Earthquake Spectral Response Acceleration – S_{DS}	1.688g
1-second Period, Design Earthquake Spectral Response Acceleration – S_{D1}	0.76g
MCE_G Peak Ground Acceleration – PGA	0.929g
Site Amplification Factor at PGA – F_{PGA}	1.2
Site Modified Peak Ground Acceleration – PGA_M	1.114g

7.3 SHALLOW FOUNDATIONS

7.3.1 Spread Footings – Animal Barn and Enclosed Dog Arena

The proposed animal barn and enclosed dog arena may be supported on shallow spread footings. Spread footings should bear on natural, undisturbed soil or engineered fill, be at least 12 inches wide, and extend at least 30 inches below the lowest adjacent grade. Lowest adjacent grade is defined as the deeper of the following: 1) bottom of the adjacent interior slab-on-grade, or 2) finished exterior grade, excluding landscaping topsoil. The deeper footing embedment is due to the presence of highly expansive soils, and is intended to embed the footing below the zone of significant seasonal moisture fluctuation, reducing the potential for differential movement.

Footings constructed to the above dimensions and in accordance with the “Earthwork” recommendations of this report are capable of supporting maximum allowable bearing pressures of 2,500 psf for dead loads, 3,750 psf for combined dead plus live loads, and 5,000 psf for all loads including wind and seismic. These pressures are based on factors of safety of 3.0, 2.0, and 1.5 applied to the ultimate bearing pressure for dead, dead plus live, and all loads, respectively. These pressures are net values; the weight of the footing may be neglected for the portion of the footing extending below grade (typically, the full footing depth). Top and bottom mats of reinforcing steel should be included in continuous footings to help span irregularities and differential settlement.

7.3.2 Footing Settlement

Structural loads were not provided to us at the time this report was prepared; therefore, we assumed isolated column loading of 30 to 50 kips. Based on the assumed loading and the allowable bearing pressures presented above, we estimate that the total static footing settlement will be on the order of ½-inch, with about ¼-inch of post-construction differential settlement between adjacent foundation elements. As our footing loads were assumed, we recommend we be retained to review the final footing layout and loading, and verify the settlement estimates above.

7.3.3 Lateral Loading

Lateral loads may be resisted by friction between the bottom of footing and the supporting subgrade, and also by passive pressures generated against footing sidewalls. An ultimate frictional resistance of 0.45 applied to the footing dead load, and an ultimate passive pressure based on an equivalent fluid pressure of 450 pcf may be used in design. The structural engineer should apply an appropriate factor of safety (such as 1.5) to the ultimate values above. Where footings are adjacent to landscape areas without hardscape, the upper 12 inches of soil should be neglected when determining passive pressure capacity.

7.3.4 Spread Footing Construction Considerations

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the “foundation plane of influence,” an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

Footing excavations should be filled as soon as possible or be kept moist until concrete placement by regular sprinkling to prevent desiccation. A Cornerstone representative should observe all footing excavations prior to placing reinforcing steel and concrete. If there is a significant schedule delay between our initial observation and concrete placement, we may need to re-observe the excavations.

7.4 DRILLED PIER FOUNDATIONS – CARETAKER RESIDENCE, MAINTENANCE BUILDING, VETERINARY/ADMINISTRATION BUILDING, AND FIRE PREVENTION AND DOMESTIC WATER TANK PADS AND PUMP STATIONS

As discussed, the proposed caretaker residence, maintenance building, and fire prevention and domestic water tank pads and associated pump stations sit near/at the top of a slope while the veterinary/admin building is in close proximity to the landslide labeled Qls #2 on our Site Plan. We recommend that these structures be supported on drilled, cast-in-place, straight-shaft friction piers with a structural slab spanning between. The piers should have a minimum diameter of 18 inches and extend to a depth of at least 10 feet into bedrock beneath the fill, residual soils, and colluvium. In areas of the building where there will be cuts into the claystone greater than 3 feet, we recommend the minimum pier embedment be increased to 15 feet into bedrock. Adjacent piers centers should be spaced at least three diameters apart, otherwise, a reduction for group effects may be required. Grade beams should span between piers and/or pier caps in accordance with structural requirements. Conventional slabs-on-grade may be used provided the subgrade soils are prepared in accordance with the “Earthwork” section.

7.4.1 Vertical Capacity and Estimated Settlement

The vertical capacity of the piers may be designed based on an allowable skin friction of 750 psf for combined dead plus live loads based on a factor of safety of 2.0; dead loads should not exceed two-thirds of the allowable capacities. The allowable skin friction may be increased by one-third for wind and seismic loads. Frictional resistance to uplift loads may be developed along the pier shafts based on an ultimate frictional resistance of 450 psf; the structural engineer should apply an appropriate factor of safety (such as 1.5) to the ultimate uplift capacity.

Total settlement of individual piers should not exceed ½-inch to mobilize static capacities and post-construction differential settlement between each pier should not exceed ¼-inch due to static loads.

7.4.2 Lateral Capacity

Lateral loads exerted on the structure may be resisted by a passive resistance based on an ultimate equivalent fluid pressure of 450 pcf acting against twice the projected area of piers below the pier cap or grade beam. The lateral pressure may be increased up to a maximum uniform pressure of 4,000 psf at depth. The upper 5 feet of soil should be neglected when determining lateral capacity due to the sloping ground conditions. The structural engineer should apply an appropriate factor of safety to the ultimate passive pressures.

7.4.3 Construction Considerations

The excavation of all drilled shafts should be observed by a Cornerstone representative to confirm the soil profile, verify that the piers extend the minimum depth into suitable materials and that the piers are constructed in accordance with our recommendations and project requirements. The drilled shafts should be straight, dry, and relatively free of loose material before reinforcing steel is installed and concrete is placed. If groundwater cannot be removed from the excavations prior to concrete placement, drilling slurry or casing may be required to stabilize the shaft and the concrete should be placed using a tremie pipe, keeping the tremie pipe below the surface of the concrete to avoid entrapment of water or drilling slurry in the concrete.

Based on our explorations, medium dense to dense clayey sands were encountered at the site. We performed our borings with hollow-stem auger drilling equipment and as such were not able to evaluate the potential for caving soils, which can create difficult drilling conditions. Additionally, the soils are generally fill material and may contain adverse materials. The contractor should plan on encountering potentially caving soils and other materials that may require casing or other stability measures to prevent caving and sloughing into the pier foundations.

Contractors should note that embedment is into bedrock materials, and difficult drilling conditions may occur. Equipment capable of excavating the rock materials will be required. Equipment that includes rock bits, core barrels, downhole percussion hammers, and techniques such as pilot holes may also be required and should be anticipated.

SECTION 8: CONCRETE SLABS AND PEDESTRIAN PAVEMENTS

8.1 SLABS-ON-GRADE

The structural engineer should determine the appropriate slab reinforcement for the loading requirements and considering the expansion potential of the underlying soils. For unreinforced concrete slabs, ACI 302.1R recommends limiting control joint spacing to 24 to 36 times the slab thickness in each direction, or a maximum of 18 feet.

8.1.1 Animal Barn

As the Plasticity Index (PI) of the surficial soils ranges up to 34, the proposed interior slabs-on-grade should be at supported on at least 18 inches of non-expansive fill (NEF) to reduce the potential for slab damage due to soil heave. The NEF layer should be constructed over subgrade prepared in accordance with the recommendations in the “Earthwork” section of this report. If moisture-sensitive floor coverings are planned, the recommendations in the “Interior Slabs Moisture Protection Considerations” section below may be incorporated in the project design if desired. If significant time elapses between initial subgrade preparation and slab-on-grade NEF construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil has been allowed to dry out, the subgrade should be re-moisture conditioned to at least 3 percent over the optimum moisture content.

8.1.2 Cat and Dog Enclosures

As the Plasticity Index (PI) of the surficial soils ranges up to 34, the proposed slabs-on-grade should be supported on at least 12 inches of non-expansive fill (NEF) to reduce the potential for slab damage due to soil heave. Per discussions with the design team, we understand that the cat and dog enclosures are not sensitive structures and some movement of the slabs-on-grade might occur and is considered acceptable. The NEF layer should be constructed over subgrade prepared in accordance with the recommendations in the “Earthwork” section of this report. If moisture-sensitive floor coverings are planned, the recommendations in the “Interior Slabs Moisture Protection Considerations” section below may be incorporated in the project design if desired. If significant time elapses between initial subgrade preparation and slab-on-grade NEF construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil has been allowed to dry out, the subgrade should be re-moisture conditioned to at least 3 percent over the optimum moisture content.

8.1.3 Maintenance Buildings

As the Plasticity Index (PI) of the surficial soils ranges up to 34, the proposed slabs-on-grade should be supported on at least 18 inches of non-expansive fill (NEF) to reduce the potential for slab damage due to soil heave. The NEF layer should be constructed over subgrade prepared in accordance with the recommendations in the “Earthwork” section of this report. If moisture-sensitive floor coverings are planned, the recommendations in the “Interior Slabs Moisture Protection Considerations” section below may be incorporated in the project design if desired. If significant time elapses between initial subgrade preparation and slab-on-grade NEF construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil has been allowed to dry out, the subgrade should be re-moisture conditioned to at least 3 percent over the optimum moisture content.

8.1.4 Fire Water Storage Tank

As discussed above, we recommend that the fire water storage tank be constructed on a built up level pad and slab-on-grade supported on drilled piers due to the close proximity to steep slopes to the north. As the Plasticity Index (PI) of the surficial soils ranges up to 34, the proposed slab-on-grade should be supported on at least 18 inches of non-expansive fill (NEF) to reduce the potential for slab damage due to soil heave. The NEF layer should be constructed over subgrade prepared in accordance with the recommendations in the “Earthwork” section of this report.   If significant time elapses between initial subgrade preparation and slab-on-grade NEF construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil has been allowed to dry out, the subgrade should be re-moisture conditioned to at least 3 percent over the optimum moisture content.

8.2 INTERIOR SLABS MOISTURE PROTECTION CONSIDERATIONS

The following general guidelines for concrete slab-on-grade construction where floor coverings are planned are presented for the consideration by the developer, design team, and contractor. These guidelines are based on information obtained from a variety of sources, including the American Concrete Institute (ACI) and are intended to reduce the potential for moisture-related problems causing floor covering failures, and may be supplemented as necessary based on project-specific requirements. The application of these guidelines or not will not affect the geotechnical aspects of the slab-on-grade performance.

- Place a minimum 10-mil vapor retarder conforming to ASTM E 1745, Class C requirements or better directly below the concrete slab; the vapor retarder should extend to the slab edges and be sealed at all seams and penetrations in accordance with manufacturer's recommendations and ASTM E 1643 requirements. A 4-inch-thick capillary break, consisting of crushed rock should be placed below the vapor retarder and consolidated in place with vibratory equipment. The mineral aggregate shall be of such size that the percentage composition by dry weight as determined by laboratory sieves will conform to the following gradation:

Sieve Size	Percentage Passing Sieve
1"	100
¾"	90 – 100
No. 4	0 - 10

  The capillary break rock may be considered as the upper 4 inches of the non-expansive fill previously recommended.

- The concrete water:cement ratio should be 0.45 or less. Mid-range plasticizers may be used to increase concrete workability and facilitate pumping and placement.

- Water should not be added after initial batching unless the slump is less than specified and/or the resulting water:cement ratio will not exceed 0.45.

- Polishing the concrete surface with metal trowels is not recommended.

- Where floor coverings are planned, all concrete surfaces should be properly cured.

- Water vapor emission levels and concrete pH should be determined in accordance with ASTM F1869 and F710 requirements and evaluated against the floor covering manufacturer's requirements prior to installation.

8.3 EXTERIOR FLATWORK

Exterior flatwork, such as pedestrian walkways, patios, driveways, and sidewalks, may experience seasonal movement due to the native expansive soils; therefore, some cracking or vertical movement of conventional slabs should be anticipated where imported fill is not planned in flatwork areas. There are several alternatives for mitigating the impacts of expansive soils beneath concrete flatwork. We are providing recommendations to reduce distress to concrete flatwork that includes moisture conditioning the subgrade soils, using non-expansive fill, and providing adequate construction and control joints to control cracks that do occur. It should be noted that minor slab movement or localized cracking and/or distress could still occur.

- The minimum recommendation for concrete flatwork constructed on moderately to highly expansive soils is to properly prepare the clayey soils prior to placing concrete. This is typically achieved by scarifying, moisture conditioning, and re-compacting the subgrade soil. Subgrade soil should be moisture conditioned to at least 3 percent over the laboratory optimum and compacted using moderate compaction effort to a relative compaction of 87 to 92 percent (ASTM Test Method D1557). Since the near surface soils may have been previously compacted and tested, the subgrade soils could possibly be moisture conditioned by gradually wetting the soil, depending on the time of year slab construction occurs. This should not include flooding or excessively watering the soil, which would likely result in a soft, unstable subgrade condition, and possible delays in the construction while waiting for the soil to dry out. In general, the subgrade should be relatively firm and non-yielding prior to construction.

- Concrete flatwork, excluding pavements that would be subject to wheel loads, should be at least 4 inches thick and underlain by at least 12 inches of non-expansive fill. Non-expansive fill may include aggregate base, crushed rock, or imported soil with a PI of 15 or less. Non-expansive fill should be compacted to at least 90 percent relative compaction. Flatwork that will be subject to heavier or frequent vehicular loading should be designed in accordance with the recommendations in the “Vehicular Pavements” section below.

- We recommend a maximum control joint spacing of about 2 feet in each direction for each inch of concrete thickness and a construction joint spacing of 10 to 12 feet. Construction joints that abut the foundations or garage slabs should include a felt strip, or approved equivalent, that extends the full depth of the exterior slab. This will help to reduce the potential for permanent vertical offset between the slabs due to friction between the concrete edges. We recommend that exterior slabs be isolated from adjacent foundations.

At the owner’s option, if desired to reduce the potential for vertical offset or widening of concrete cracks, consideration should be given to using reinforcing steel, such as No. 3 rebar spaced at 18 inches on center each direction.

SECTION 9: VEHICULAR PAVEMENTS

9.1 ASPHALT CONCRETE

The following asphalt concrete pavement recommendations tabulated below are based on the Procedure 608 of the Caltrans Highway Design Manual, estimated traffic indices for various pavement-loading conditions, and on a design R-value of 5. The design R-value was chosen based on the results of the laboratory testing performed on a surficial sample collected from the proposed pavement area and engineering judgment considering the variable surface conditions.

Table 4: Asphalt Concrete Pavement Recommendations, Design R-value = 5

Design Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base* (inches)	Total Pavement Section Thickness (inches)
4.0	2.5	7.5	10.0
4.5	2.5	9.5	12.0
5.0	3.0	10.0	13.0
5.5	3.0	12.0	15.0
6.0	3.5	12.5	16.0
6.5	4.0	14.0	18.0

*Caltrans Class 2 aggregate base; minimum R-value of 78

Frequently, the full asphalt concrete section is not constructed prior to construction traffic loading. This can result in significant loss of asphalt concrete layer life, rutting, or other pavement failures. To improve the pavement life and reduce the potential for pavement distress through construction, we recommend the full design asphalt concrete section be constructed prior to construction traffic loading. Alternatively, a higher traffic index may be chosen for the areas where construction traffic will use the pavements.

Asphalt concrete pavements constructed on expansive subgrade where the adjacent areas will not be irrigated for several months after the pavements are constructed may experience longitudinal cracking parallel to the pavement edge. These cracks typically form within a few feet of the pavement edge and are due to seasonal wetting and drying of the adjacent soil. The cracking may also occur during construction where the adjacent grade is allowed to significantly dry during the summer, pulling moisture out of the pavement subgrade. Any cracks that form should be sealed with bituminous sealant prior to the start of winter rains. One alternative to reduce the potential for this type of cracking is to install a moisture barrier at least 24 inches deep behind the pavement curb. Another alternative is to lime treat the subgrade. We also recommend limiting cuts to 3 feet to reduce the potential for heave of the claystone bedrock.

9.2 PORTLAND CEMENT CONCRETE

The exterior Portland Cement Concrete (PCC) pavement recommendations tabulated below are based on methods presented in the Portland Cement Association (PCA) design manual (PCA, 1984). Recommendations for garage slabs-on-grade were provided in the “Concrete Slabs and Pedestrian Pavements” section above. We have provided a few pavement alternatives as an anticipated Average Daily Truck Traffic (ADTT) was not provided. An allowable ADTT should be chosen that is greater than what is expected for the development.

Table 5: PCC Pavement Recommendations, Design R-value = 5

Allowable ADTT	Minimum PCC Thickness (inches)
13	5.5
130	6.0

The PCC thicknesses above are based on a concrete compressive strength of at least 3,500 psi, supporting the PCC on at least 4 inches of Class 2 aggregate base compacted as recommended in the “Earthwork” section, and laterally restraining the PCC with curbs or concrete shoulders. Adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness. Due to the expansive surficial soils present, we recommend that the construction and expansion joints be dowelled.

9.3 PAVEMENT CUTOFF

Surface water penetration into the pavement section can significantly reduce the pavement life, due to the native expansive clays. While quantifying the life reduction is difficult, a normal 20-year pavement design could be reduced to less than 10 years; therefore, increased long-term maintenance may be required.

It would be beneficial to include a pavement cut-off, such as deepened curbs, redwood-headers, or “Deep-Root Moisture Barriers” that are keyed at least 4 inches into the pavement subgrade. This will help limit the additional long-term maintenance.

SECTION 10: RETAINING WALLS

10.1 STATIC LATERAL EARTH PRESSURES

The structural design of any site retaining wall should include resistance to lateral earth pressures that develop from the soil behind the wall, any undrained water pressure, and surcharge loads acting behind the wall. Provided a drainage system is constructed behind the wall to prevent the build-up of hydrostatic pressures as discussed in the section below, we recommend that the walls with level backfill be designed for the following pressures:

Table 6: Recommended Lateral Earth Pressures

Sloping Backfill Inclination (horizontal:vertical)	Lateral Earth Pressure*	
	Unrestrained – Cantilever Wall	Restrained – Braced Wall
Level	45 pcf	45 pcf + 8H**
2:1	65 pcf	65 pcf + 8H**

* Lateral earth pressures are based on an equivalent fluid pressure
** H is the distance in feet between the bottom of footing and top of retained soil

If adequate drainage cannot be provided behind the wall, an additional equivalent fluid pressure of 40 pcf should be added to the values above for both restrained and unrestrained walls for the portion of the wall that will not have drainage. Damp proofing or waterproofing of the walls may be considered where moisture penetration and/or efflorescence are not desired.

10.2 SEISMIC LATERAL EARTH PRESSURES

10.2.1 Basement Walls

The 2019 California Building Code (CBC) states that lateral pressures from earthquakes should be considered in the design of basements and retaining walls. We checked seismic earth pressures for the proposed restrained and unrestrained (cantilever) retaining walls in accordance with CBC 1803.5.12 and ASCE 7-16 Section 11.8.3 using the Design level earthquake. We developed seismic earth pressures for the proposed basement using interim recommendations generally based on refinement of the Mononobe-Okabe method (Lew et al., SEAOC 2010).

Because the veterinary/admin building basement walls will be at or greater than 12 feet in height, and peak ground accelerations are greater than 0.40g, we checked the result of the seismic increment when added to the recommended active earth pressure against the recommended fixed wall earth pressures. Basement walls are not free to deflect, and should therefore be designed for static conditions as a restrained wall, which is also a CBC requirement. Based on current recommendations for seismic earth pressures, it appears that active earth pressures plus a seismic increment exceed the restrained (i.e. at-rest), static wall earth pressures. Therefore, we recommend checking the walls for the seismic condition in accordance with the interim recommendations of the above referenced paper and the 2013 CBC.

The CBC prescribes basic load combinations for structures, components and foundations with the intention that their design strength equals or exceeds the effects of the factored loads. With respect to the load from lateral earth pressure and ground water pressure, the CBC prescribes the basic combinations shown in CBC equations 16-2 and 16-7 below.

$1.2(D + F) + 1.6(L + H) + 0.5(L_r \text{ or } S \text{ or } R)$ [Eq. 16-2]

In Eq. 16-2: H - should represent the total static lateral earth pressure, which for the basement wall will be restrained (use 45 pcf + 8H psf)

$0.9(D + F) + 1.0E + 1.6H$ [Eq. 16-7]

In Eq. 16-7: H - should represent the static "active" earth pressure component under seismic loading conditions (use 45 pcf)

E - should represent the seismic increment component in Eq. 16-7, a triangular load with a resultant force of $8H^2$, which should be applied one third of the height up from the base of the wall (and which can also be expressed as an equivalent fluid pressure equal to 24 pcf).

The interim recommendations in the SEAOC paper more appropriately split out "active" earth pressure (and not the restrained "at-rest" pressure) from our report and provide the total seismic increment so that different load factors can be applied in accordance with different risk levels.

10.2.2 Site Walls

The 2019 CBC states that lateral pressures from earthquakes should be considered in the design of basements and retaining walls. At this time, we are not aware of any site retaining walls for the project. However, minor landscaping walls (i.e. walls 6 feet or less in height) may be proposed. In our opinion, design of these walls for seismic lateral earth pressures in addition to static earth pressures is not warranted.

10.3 WALL DRAINAGE

Adequate drainage should be provided by a subdrain system behind all walls. This system should consist of a 4-inch minimum diameter perforated pipe placed near the base of the wall (perforations placed downward). The pipe should be bedded and backfilled with Class 2 Permeable Material per Caltrans Standard Specifications, latest edition. The permeable backfill should extend at least 12 inches out from the wall and to within 2 feet of outside finished grade. Alternatively, ½-inch to ¾-inch crushed rock may be used in place of the Class 2 Permeable Material provided the crushed rock and pipe are enclosed in filter fabric, such as Mirafi 140N or approved equivalent. The upper 2 feet of wall backfill should consist of compacted on-site soil. The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or equivalent drainage matting can be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill. Horizontal strip drains connecting to the vertical drainage matting may be used in lieu of the perforated pipe and crushed rock section. The vertical drainage panel should be connected to the perforated pipe or horizontal drainage strip at the base of the wall, or to some other closed or through-wall system such as the TotalDrain system from AmerDrain. Sections of horizontal drainage strips should be connected with either the manufacturer's connector pieces or by pulling back the filter fabric, overlapping the panel dimples, and replacing the filter fabric over the connection. At corners, a corner guard, corner connection insert, or a section of crushed rock covered with filter fabric must be used to maintain the drainage path.

Drainage panels should terminate 18 to 24 inches from final exterior grade. The Miradrain panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil.

10.4 BACKFILL

Where surface improvements will be located over the retaining wall backfill, backfill placed behind the walls should be compacted to at least 95 percent relative compaction using light compaction equipment. Where no surface improvements are planned, backfill should be compacted to at least 90 percent. If heavy compaction equipment is used, the walls should be temporarily braced.

10.5 FOUNDATIONS

Retaining walls may be supported on a continuous spread footing or drilled piers designed in accordance with the recommendations presented in the "Foundations" section of this report.

SECTION 11: LIMITATIONS

This report, an instrument of professional service, has been prepared for the sole use of Peninsula Humane Society & SPCA specifically to support the design of the Peninsula Humane Society Animal Sanctuary project in Loma Mar, California. The opinions, conclusions, and recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in Northern California at the time this report was prepared. No warranty, expressed or implied, is made or should be inferred.

Recommendations in this report are based upon the soil and groundwater conditions encountered during our subsurface exploration. If variations or unsuitable conditions are encountered during construction, Cornerstone must be contacted to provide supplemental recommendations, as needed.

Peninsula Humane Society & SPCA may have provided Cornerstone with plans, reports and other documents prepared by others. Peninsula Humane Society & SPCA understands that Cornerstone reviewed and relied on the information presented in these documents and cannot be responsible for their accuracy.

Cornerstone prepared this report with the understanding that it is the responsibility of the owner or his representatives to see that the recommendations contained in this report are presented to other members of the design team and incorporated into the project plans and specifications, and that appropriate actions are taken to implement the geotechnical recommendations during construction.

Conclusions and recommendations presented in this report are valid as of the present time for the development as currently planned. Changes in the condition of the property or adjacent properties may occur with the passage of time, whether by natural processes or the acts of other persons. In addition, changes in applicable or appropriate standards may occur through legislation or the broadening of knowledge. Therefore, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes beyond Cornerstone's control. This report should be reviewed by Cornerstone after a period of three (3) years has elapsed from the date of this report. In addition, if the current project design is changed, then Cornerstone must review the proposed changes and provide supplemental recommendations, as needed.

An electronic transmission of this report may also have been issued. While Cornerstone has taken precautions to produce a complete and secure electronic transmission, please check the electronic transmission against the hard copy version for conformity.

Recommendations provided in this report are based on the assumption that Cornerstone will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design, and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If we are not retained for these services, Cornerstone cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of Cornerstone's report by others. Furthermore, Cornerstone will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services.

SECTION 12: REFERENCES

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Aerial Photos Reviewed

Vertical photos:
1953, 1956, 1960, 1968, 1980, 1982, 1991, 2005, 2009, 2010, 2012, 2014, 2016

Stereo Aerial Photos:
March 30, 1931, black and white, flight C-1471, frames 118, 119, scale: 1:18,000.

April 24, 1948, black and white, flight CDF5, frames 1-58, scale: 1:20,000.

May 1, 1965, black and white, flight CAS-65-130, frame 3-56, scale: 1:12,000.

APPENDIX A: FIELD INVESTIGATION

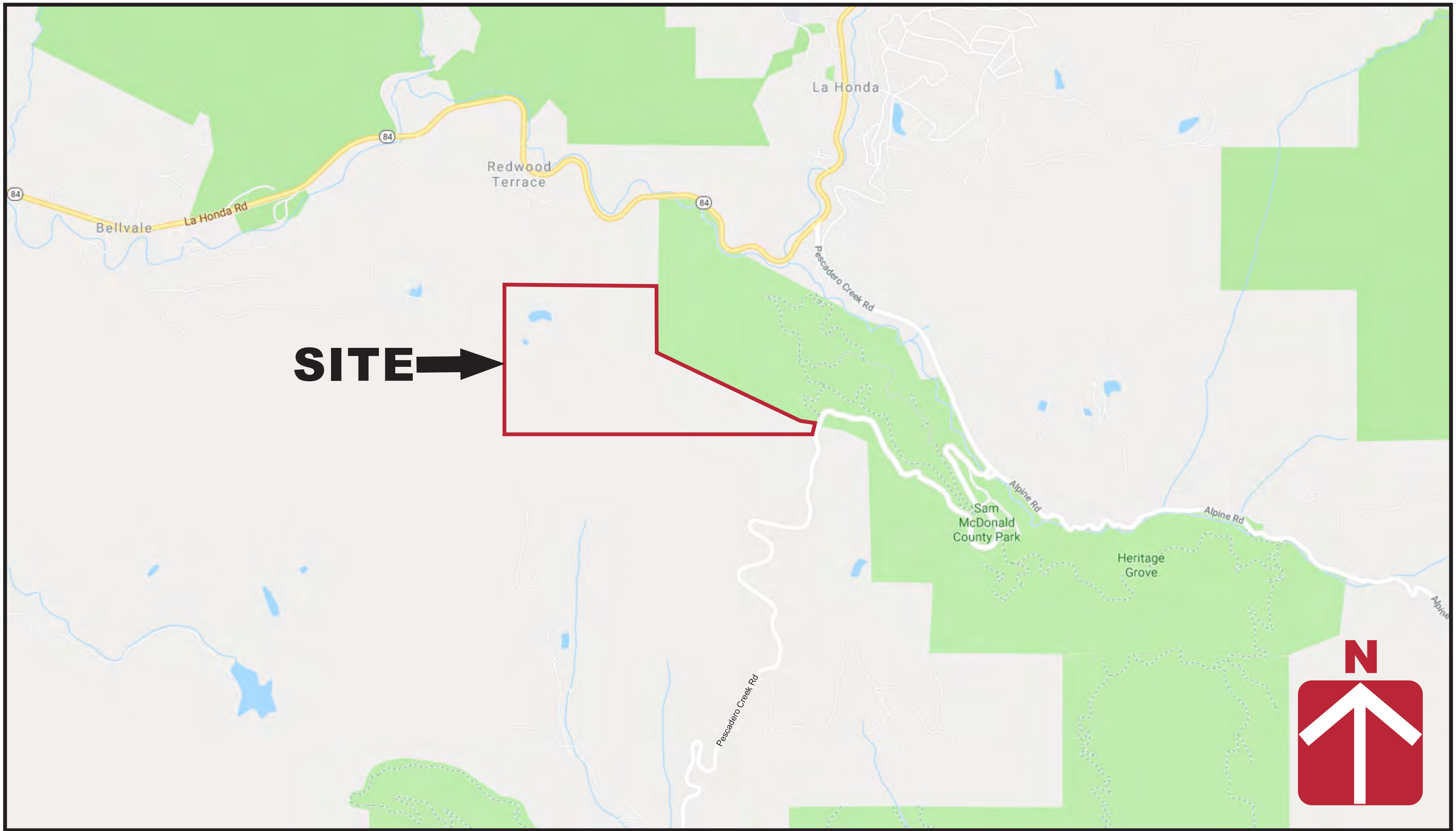
The field investigation consisted of a surface reconnaissance and a subsurface exploration program using track-mounted, hollow-stem, limited-access auger drilling equipment. Seven 6½-inch-diameter exploratory borings were drilled on January 20 and 21, 2020 to depths of 15 to 21½ feet. Two 3-inch diameter exploratory hand auger borings were drilled on January 21, 2020, to a depth of 4 to 4½ feet. The approximate locations of exploratory borings are shown on the Site Plan, Figure 2. The soils encountered were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). Boring logs, as well as a key to the classification of the soil and bedrock, are included as part of this appendix.

Boring locations were approximated using existing site boundaries, and other site features as references. Boring elevations were not determined. The locations of the borings should be considered accurate only to the degree implied by the method used.

Representative soil samples were obtained from the borings at selected depths. All samples were returned to our laboratory for evaluation and appropriate testing. The standard penetration resistance blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The 2-inch O.D. split-spoon sampler was driven 18 inches and the number of blows was recorded for each 6 inches of penetration (ASTM D1586). 2.5-inch I.D. samples were obtained using a Modified California Sampler driven into the soil with the 140-pound hammer previously described. Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows required to drive the last 12 inches. The various samplers are denoted at the appropriate depth on the boring logs.

Field tests included an evaluation of the unconfined compressive strength of the soil samples using a pocket penetrometer device. The results of these tests are presented on the individual boring logs at the appropriate sample depths.

Attached boring logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.



CORNERSTONE EARTH GROUP

Vicinity Map

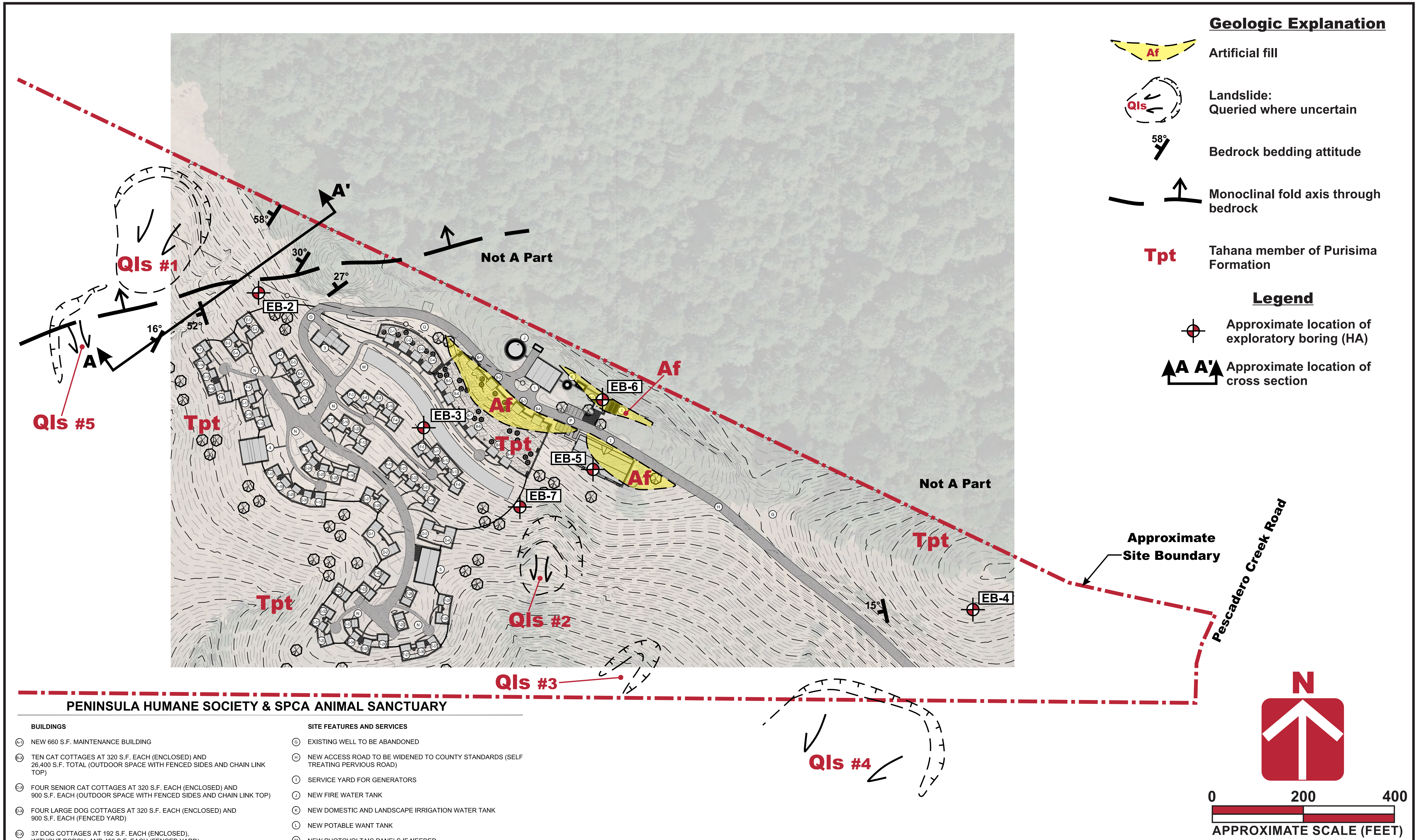
Peninsula Humane Society Animal Sanctuary
Pescadero Creek Road
Loma Mar, CA

Project Number
1142-1-1

Figure Number
Figure 1

Date
July 2021

Drawn By
RRN



PENINSULA HUMANE SOCIETY & SPCA ANIMAL SANCTUARY

BUILDINGS

- (A-1) NEW 660 S.F. MAINTENANCE BUILDING
- (B-X) TEN CAT COTTAGES AT 320 S.F. EACH (ENCLOSED) AND 26,400 S.F. TOTAL (OUTDOOR SPACE WITH FENCED SIDES AND CHAIN LINK TOP)
- (C-X) FOUR SENIOR CAT COTTAGES AT 320 S.F. EACH (ENCLOSED) AND 900 S.F. EACH (OUTDOOR SPACE WITH FENCED SIDES AND CHAIN LINK TOP)
- (D-X) FOUR LARGE DOG COTTAGES AT 320 S.F. EACH (ENCLOSED) AND 900 S.F. EACH (FENCED YARD)
- (E-X) 37 DOG COTTAGES AT 192 S.F. EACH (ENCLOSED), WITHOUT PORCH AND 450 S.F. EACH (FENCED YARD)
- (F-X) 29 DOG COTTAGES AT 192 S.F. EACH (ENCLOSED), WITH 4' PORCH AND 450 S.F. EACH (FENCED YARD)
- ① EXISTING 3,000 S.F. BARN TO REMAIN AND BE RESTORED
- ② NEW 6,500 S.F. VET AND ADMINISTRATION BUILDING
- ③ NEW CARETAKER RESIDENCE 995 S.F. PLUS GARAGE
- ④ NEW 2,000 S.F. FARMED ANIMAL BARN WITH COVERED CORRAL
- ⑤ NEW 3,000 S.F. DOG ARENA

SITE FEATURES AND SERVICES

- Ⓖ EXISTING WELL TO BE ABANDONED
- Ⓗ NEW ACCESS ROAD TO BE WIDENED TO COUNTY STANDARDS (SELF TREATING PERVIOUS ROAD)
- Ⓘ SERVICE YARD FOR GENERATORS
- Ⓙ NEW FIRE WATER TANK
- Ⓚ NEW DOMESTIC AND LANDSCAPE IRRIGATION WATER TANK
- Ⓛ NEW POTABLE WANT TANK
- Ⓜ NEW PHOTOVOLTAIC PANELS IF NEEDED
- Ⓝ NEW ATV TRAILS AND WALKING PATHS
- Ⓞ NEW DEER FENCING WITH ACCESS GATE
- Ⓟ NEW PARKING
- Ⓠ NEW OVERHEAD POWER EXTENSION

Base by KSH Architects, Enlarged Site Plan - A1.03, dated 07/12/2021

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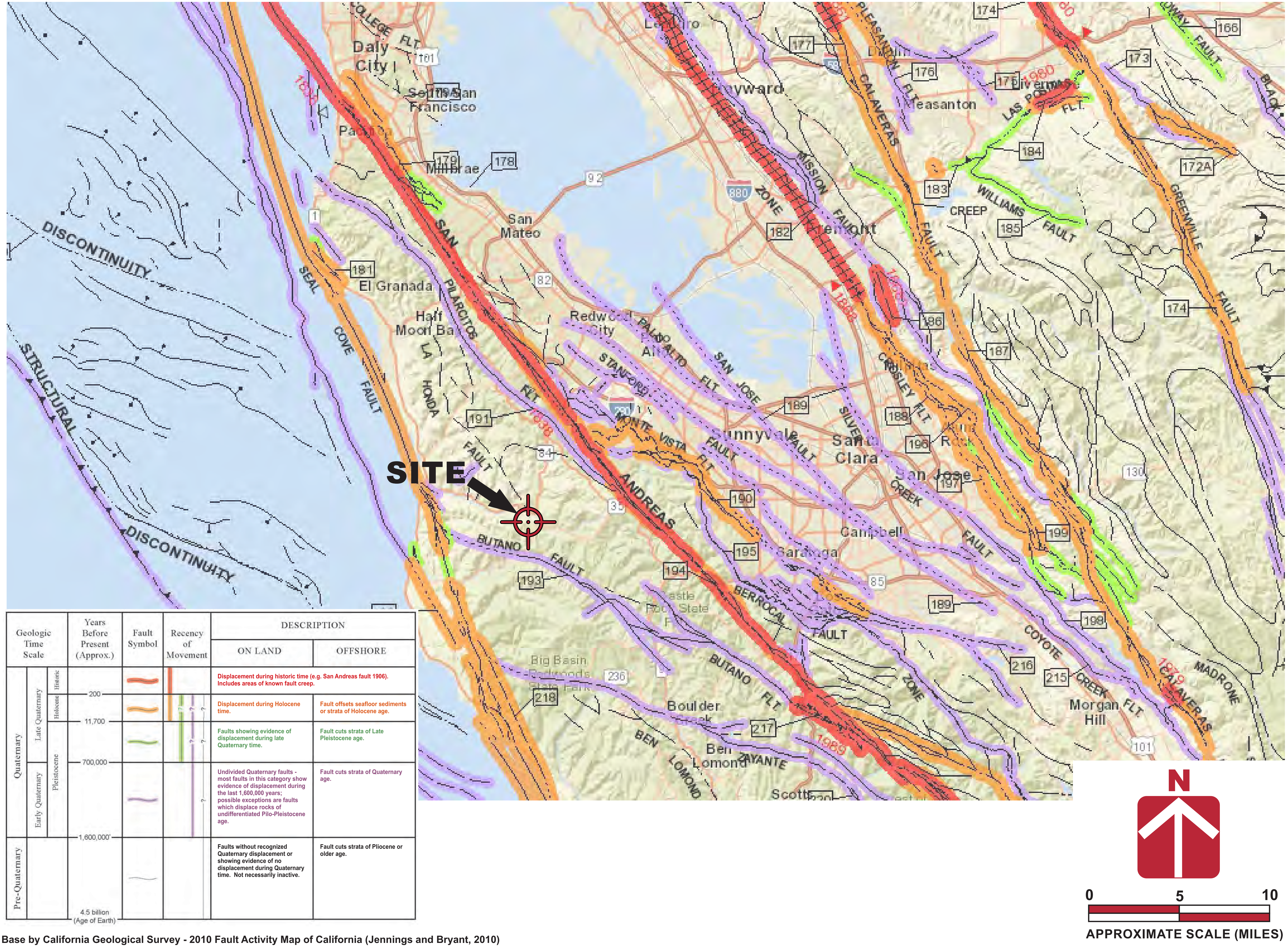
Geologic Site Plan

Peninsula Humane Society Animal Sanctuary
Pescadero Creek Road
Loma Mar, CA

Project Number	1142-1-1
Figure Number	Figure 2
Date	July 2021
Drawn By	RRN



Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement	DESCRIPTION	
						ON LAND	OFFSHORE
Quaternary	Late Quaternary	Historic		🟥		Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
		Holocene	200	🟧	? ?	Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
		Pleistocene	11,700	🟩	? ?	Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
	Early Quaternary		700,000	🟪	?	Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Pilo-Pleistocene age.	Fault cuts strata of Quaternary age.
Pre-Quaternary			1,600,000	—		Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.
			4.5 billion (Age of Earth)				

Base by California Geological Survey - 2010 Fault Activity Map of California (Jennings and Bryant, 2010)

Project Number
1142-1-1

Figure Number
Figure 3

Drawn By
RRN

Date
July 2021

Regional Fault Map

Peninsula Humane Society Animal Sanctuary
Pescadero Creek Road
Loma Mar, CA

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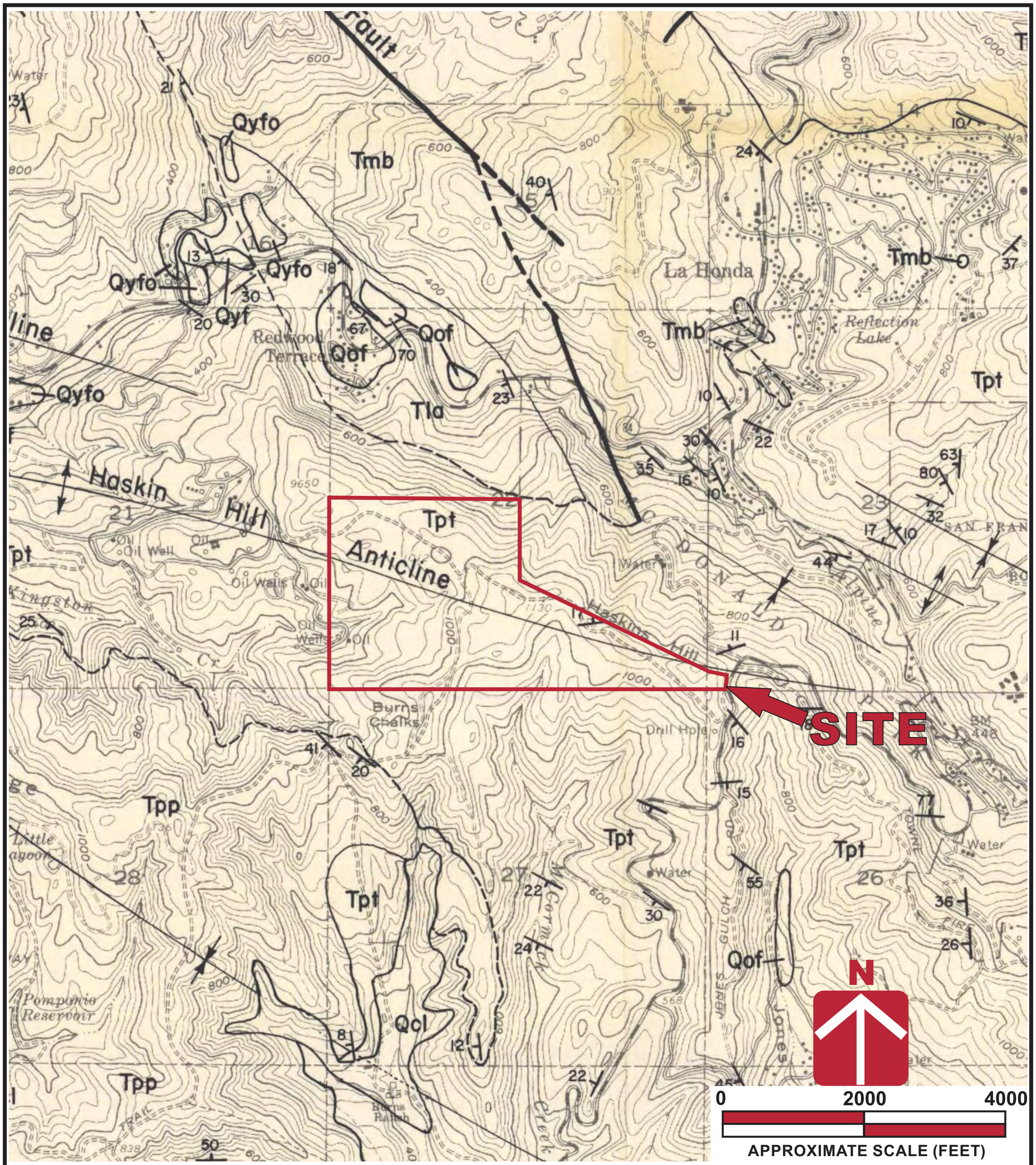

Geologic Units

Qof	Older Aluvial Fan and Stream deposits (Pleistocene)
Tpt	Tahana Member of Purisima Formation (upper Mioceene and Pliocene)
Tla	Lambert Shale (Oligocene and lower Miocene)

Explanation

Contact- dashed where approximate, dotted where concealed

Fault- dashed where approximate, dotted where concealed

Anticlinal fold axis

Base by Earl E. Brabb, Preliminary Geologic Map of the La Honda and San Gregorio Quadrangles, dated 1980, Palo Alto 30'x60' Quad.

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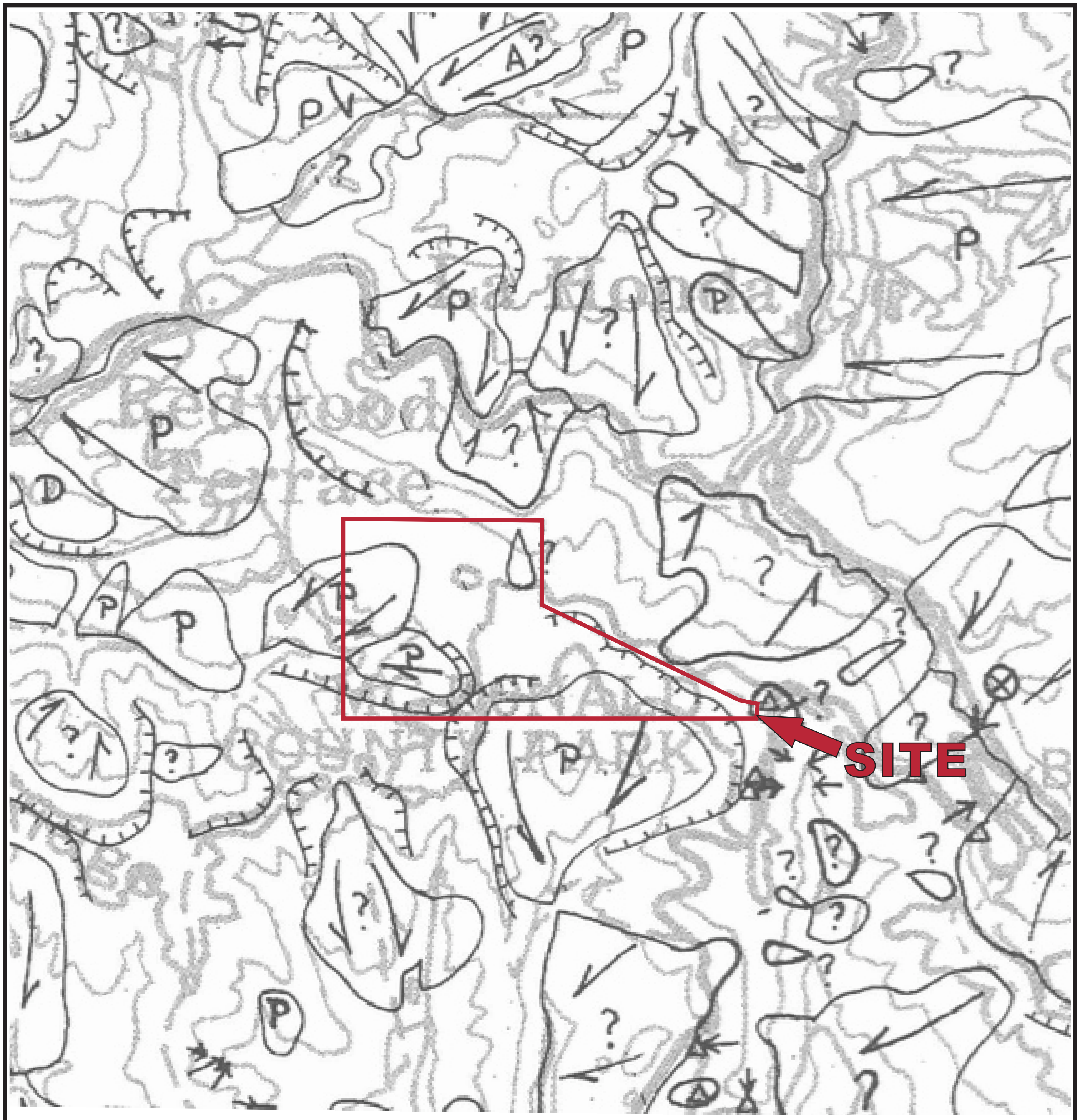
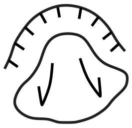
Vicinity Geologic Map

Peninsula Humane Society Animal Sanctuary
Pescadero Creek Road
Loma Mar, CA

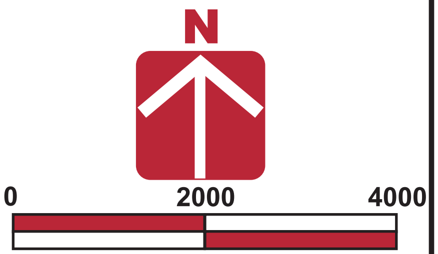
Project Number	1142-1-1
Figure Number	Figure 4
Date	July 2021
Drawn By	FLL/RRN



Explanation



Landslide: P = Probable,
queried where interpretation
is uncertain



APPROXIMATE SCALE (FEET)

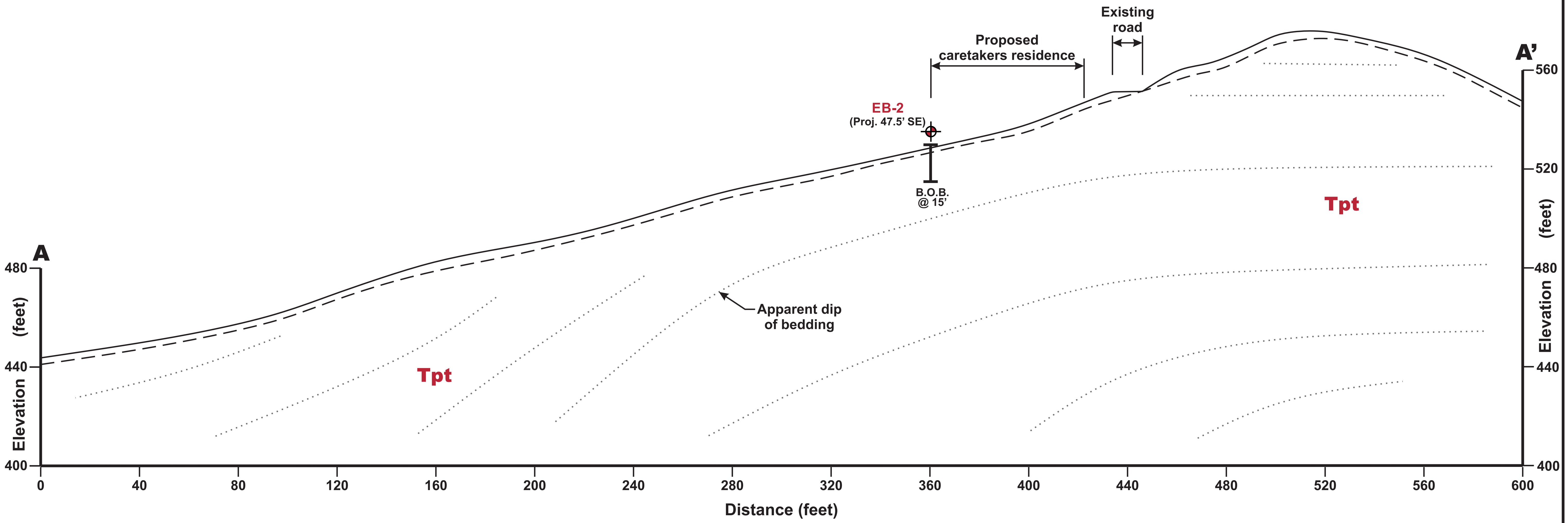
Base by Earl E. Brabb and Pampeyan, 1972.

CORNERSTONE
EARTH GROUP

Published Landslide Map

Peninsula Humane Society Animal Sanctuary
Pescadero Creek Road
Loma Mar, CA

Project Number	1142-1-1
Figure Number	Figure 5
Date	July 2021
Drawn By	RRN



Section A-A'

(View Looking Northwest)
1"=40' H:V

Explanation

Geologic Units

Tpt Tahana member of Purisima Formation

Symbols

⊕ Approximate location of exploratory boring (EB)

Notes:
1) Surficial fills associated with existing pavements, landscaping or utilities are not shown.
2) The subsurface profile is conceptual and is based on limited subsurface data obtained from widely spaced borings. Actual subsurface conditions may vary significantly between borings.
3) See Figure 2 for location of cross section.

CORNERSTONE
EARTH GROUP

Geologic Cross Section A-A'

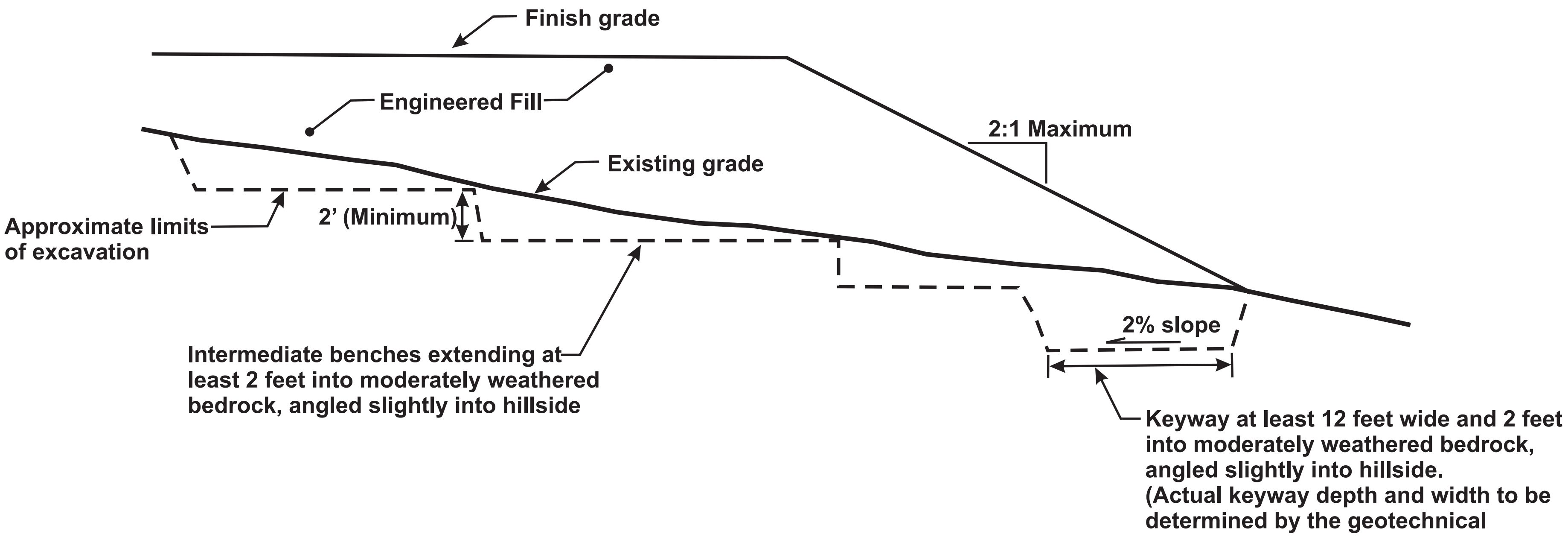
Peninsula Humane Society Animal Sanctuary
Pescadero Creek Road
Loma Mar, CA

Project Number
1142-1-1

Figure Number
Figure 6

Date
July 2021

Drawn By
RRN



Typical Bench and Keyway Detail

Not to scale

Note: Fill slopes should be over-built at least 18 to 24 inches and trimmed to expose compacted fill.

CORNERSTONE
EARTH GROUP

Typical Bench and Keyway Detail

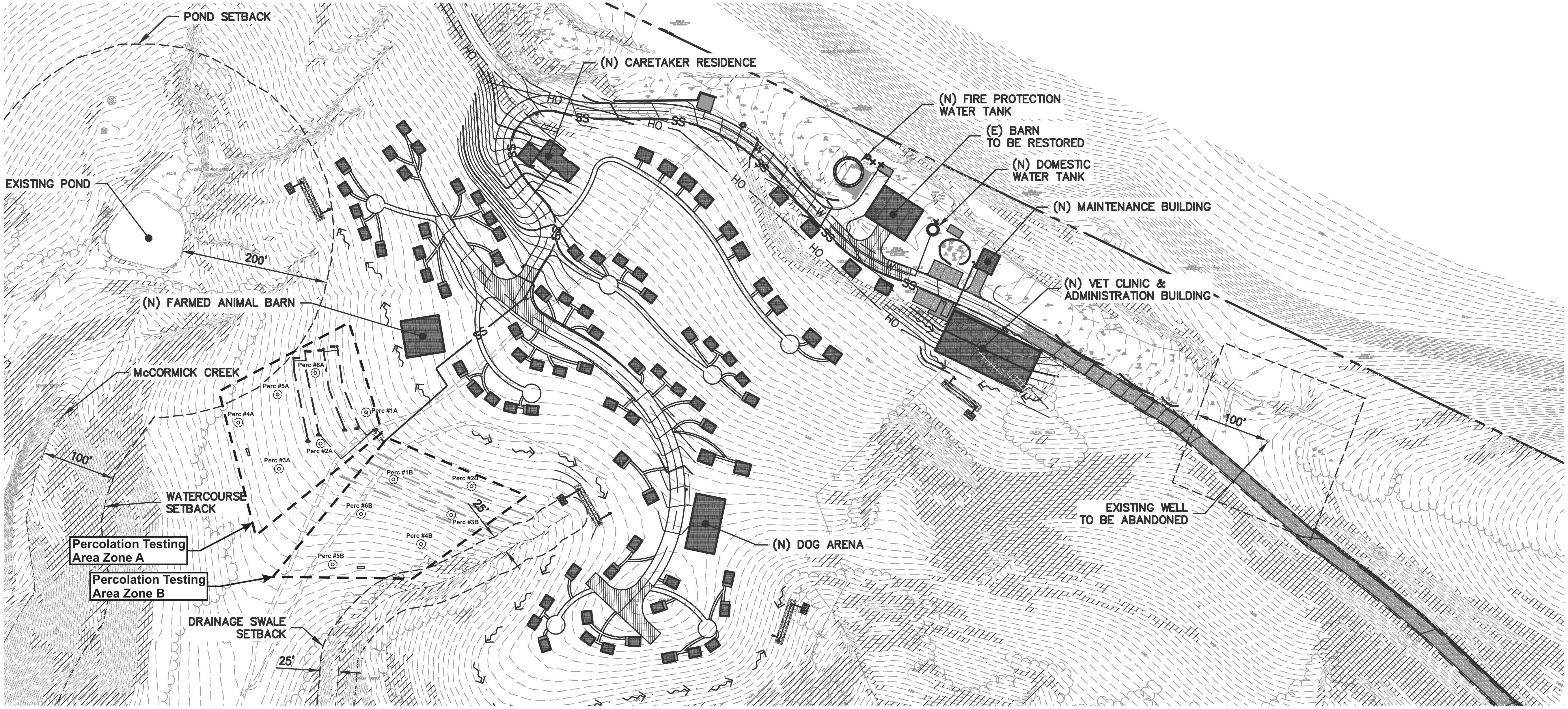
Peninsula Humane Society Animal Sanctuary
Pescadero Creek Road
Loma Mar, CA

Project Number
1142-1-1

Figure Number
Figure 7

Date
July 2021

Drawn By
RRN



Proposed Septic System Leachfield Area

Legend

- BOUNDARY
- PRIMARY LEACH LINE
- EXPANSION LEACH LINE
- EXISTING LEACH LINE
- EXISTING LEACH LINE TO BE REMOVED
- ◎ PERCOLATION TESTING LOCATION

N

0 150 300

APPROXIMATE SCALE (FEET)

Base by Lea & Braze Engineering, Inc., Septic Construction Plan - SS-1, dated 06/18/2021

Proposed Septic System Leachfield Areas

Peninsula Humane Society Animal Sanctuary
Pescadero Creek Road
Loma Mar, CA

Project Number
1142-1-1

Figure Number
Figure A-1

Date
July 2021

Drawn By
RRN

CORNERSTONE EARTH GROUP

APPENDIX B: LABORATORY TEST PROGRAM

The laboratory testing program was performed to evaluate the physical and mechanical properties of the soils retrieved from the site to aid in verifying soil classification.

Moisture Content: The natural water content was determined (ASTM D2216) on 41 samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

Dry Densities: In place dry density determinations (ASTM D2937) were performed on 17 samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Plasticity Index: One Plasticity Index determination (ASTM D4318) was performed on a sample of the subsurface soil to measure the range of water contents over which this material exhibits plasticity. The Plasticity Index was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of this test are shown on the boring log at the appropriate sample depth.

UNIFIED SOIL CLASSIFICATION (ASTM D-2487-10)

MATERIAL TYPES	CRITERIA FOR ASSIGNING SOIL GROUP NAMES			GROUP SYMBOL	SOIL GROUP NAMES & LEGEND
COARSE-GRAINED SOILS >50% RETAINED ON NO. 200 SIEVE	GRAVELS >50% OF COARSE FRACTION RETAINED ON NO 4. SIEVE	CLEAN GRAVELS <5% FINES	Cu>4 AND 1<Cc<3	GW	WELL-GRADED GRAVEL
			Cu>4 AND 1>Cc>3	GP	POORLY-GRADED GRAVEL
		GRAVELS WITH FINES >12% FINES	FINES CLASSIFY AS ML OR CL	GM	SILTY GRAVEL
			FINES CLASSIFY AS CL OR CH	GC	CLAYEY GRAVEL
	SANDS >50% OF COARSE FRACTION PASSES ON NO 4. SIEVE	CLEAN SANDS <5% FINES	Cu>6 AND 1<Cc<3	SW	WELL-GRADED SAND
			Cu>6 AND 1>Cc>3	SP	POORLY-GRADED SAND
		SANDS AND FINES >12% FINES	FINES CLASSIFY AS ML OR CL	SM	SILTY SAND
			FINES CLASSIFY AS CL OR CH	SC	CLAYEY SAND
FINE-GRAINED SOILS >50% PASSES NO. 200 SIEVE	SILTS AND CLAYS LIQUID LIMIT<50	INORGANIC	PI>7 AND PLOTS>"A" LINE	CL	LEAN CLAY
			PI>4 AND PLOTS<"A" LINE	ML	SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OL	ORGANIC CLAY OR SILT
	SILTS AND CLAYS LIQUID LIMIT>50	INORGANIC	PI PLOTS >"A" LINE	CH	FAT CLAY
			PI PLOTS <"A" LINE	MH	ELASTIC SILT
		ORGANIC	LL (oven dried)/LL (not dried)<0.75	OH	ORGANIC CLAY OR SILT
HIGHLY ORGANIC SOILS		PRIMARILY ORGANIC MATTER, DARK IN COLOR, AND ORGANIC ODOR		PT	PEAT

OTHER MATERIAL SYMBOLS

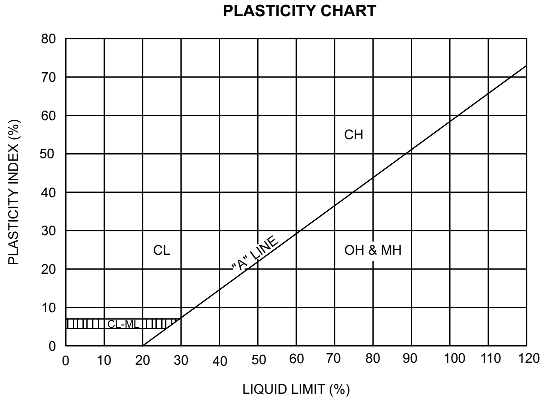
- Poorly-Graded Sand with Clay
- Clayey Sand
- Sandy Silt
- Artificial/Undocumented Fill
- Poorly-Graded Gravelly Sand
- Topsoil
- Well-Graded Gravel with Clay
- Well-Graded Gravel with Silt
- Sand
- Silt
- Well Graded Gravelly Sand
- Gravelly Silt
- Asphalt
- Boulders and Cobble

SAMPLER TYPES

- SPT
- Modified California (2.5" I.D.)
- Rock Core
- Shelby Tube
- No Recovery
- Grab Sample

ADDITIONAL TESTS

CA	-	CHEMICAL ANALYSIS (CORROSIVITY)	PI	-	PLASTICITY INDEX
CD	-	CONSOLIDATED DRAINED TRIAXIAL	SW		SWELL TEST
CN	-	CONSOLIDATION	TC	-	CYCLIC TRIAXIAL
CU	-	CONSOLIDATED UNDRAINED TRIAXIAL	TV	-	TORVANE SHEAR
DS	-	DIRECT SHEAR	UC	-	UNCONFINED COMPRESSION
PP	-	POCKET PENETROMETER (TSF)	(1.5)	- -	(WITH SHEAR STRENGTH IN KSF)
(3.0)	-	(WITH SHEAR STRENGTH IN KSF)			
RV	-	R-VALUE	UU	-	UNCONSOLIDATED UNDRAINED TRIAXIAL
SA	-	SIEVE ANALYSIS: % PASSING #200 SIEVE			
▼	-	WATER LEVEL			


PLASTICITY CHART

PENETRATION RESISTANCE (RECORDED AS BLOWS / FOOT)				
SAND & GRAVEL		SILT & CLAY		
RELATIVE DENSITY	BLOWS/FOOT*	CONSISTENCY	BLOWS/FOOT*	STRENGTH** (KSF)
VERY LOOSE	0 - 4	VERY SOFT	0 - 2	0 - 0.25
LOOSE	4 - 10	SOFT	2 - 4	0.25 - 0.5
MEDIUM DENSE	10 - 30	MEDIUM STIFF	4 - 8	0.5-1.0
DENSE	30 - 50	STIFF	8 - 15	1.0 - 2.0
VERY DENSE	OVER 50	VERY STIFF	15 - 30	2.0 - 4.0
		HARD	OVER 30	OVER 4.0

* NUMBER OF BLOWS OF 140 LB HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1-3/8 INCH I.D.) SPLIT-BARREL SAMPLER THE LAST 12 INCHES OF AN 18-INCH DRIVE (ASTM-1586 STANDARD PENETRATION TEST).

** UNDRAINED SHEAR STRENGTH IN KIPS/SQ. FT. AS DETERMINED BY LABORATORY TESTING OR APPROXIMATED BY THE STANDARD PENETRATION TEST, POCKET PENETROMETER, TORVANE, OR VISUAL OBSERVATION.

CORNERSTONE
EARTH GROUP

LEGEND TO SOIL DESCRIPTIONS

Figure Number
A-1

HARDNESS

Soft – Reserved for plastic material alone.
Low hardness – Can be gouged deeply or carved easily with a knife blade.
Moderately hard – Can be readily scratched by a knife blade: scratch leaves a heavy trace of dust and is readily visible after the powder has been blown away.
Hard – Can be scratched with difficulty: scratch produces little powder and is often faintly visible.
Very hard – Cannot be scratched with knife blade: leaves a metallic streak.

STRENGTH

Plastic or very low strength.
Friable – Crumbles easily by rubbing with fingers.
Weak – An unfractured specimen of such material will crumble under light hammer blows.
Moderately strong – Specimen will withstand a few heavy hammer blows before breaking.
Strong – Specimen will withstand a few heavy ringing blows and will yield with difficulty only dust and small flying fragments.
Very strong – Specimen will resist heavy ringing hammer blows and will yield with difficulty only dust and small flying fragments.

WEATHERING – The physical and chemical disintegration and decomposition of rocks and minerals by natural processes such as oxidation, reduction, hydration, solution, carbonation, and freezing and thawing.

Deep – Moderate to complete mineral decomposition: extensive disintegration: deep and thorough discoloration: many fractures, all extensively coated or filled with oxides, carbonates and/or clay or silt.
Moderate – Slight change or partial decomposition of minerals: little disintegration: cementation little to unaffected. Moderate to occasionally intense discoloration. Moderately coated fractures.
Little – No megascopic decomposition of minerals: little or no effect on normal cementation. Slight and intermittent, or localized discoloration. Few stains or fracture surfaces.
Fresh – Unaffected by weathering agents. No disintegration or discoloration. Fractures usually less numerous than joints.

FRACTURING

Intensity	**Size of Pieces in Feet**
Very little fractured	Greater than 4.0
Occasionally fractured	1.0 to 4.0
Moderately fractured	0.5 to 1.0
Closely fractured	0.1 to 0.5
Intensely fractured	0.05 to 0.1
Crushed	Less than 0.05

BEDDING OF SEDIMENTARY ROCKS

Splitting Property	**Thickness**	**Stratification**
Massive	Greater than 4.0 feet	very thick-bedded
Blocky	2.0 to 4.0 feet	thick-bedded
Slabby	0.2 to 2.0 feet	thin-bedded
Flaggy	0.05 to 0.2 feet	very thin-bedded
Shaly or Platy	0.01 to 0.05 feet	laminated
Papery	less than 0.01 feet	thinly laminated

CORNERSTONE
EARTH GROUP

Physical Properties of Rock Descriptions

Figure Number
A-2

CORNERSTONE EARTH GROUP

BORING NUMBER EB-1

PAGE 1 OF 1

PROJECT NAME Haskins Ridge
PROJECT NUMBER 1142-1-1
PROJECT LOCATION La Honda, CA
DATE STARTED 1/20/20 **DATE COMPLETED** 1/20/20
GROUND ELEVATION **BORING DEPTH** 16.5 ft.
DRILLING CONTRACTOR Cuesta Geo
LATITUDE **LONGITUDE**
DRILLING METHOD MPP LAD Track Rig, 6½ inch Hollow-Stem Auger
GROUNDWATER LEVELS:
LOGGED BY CSH
▽ **AT TIME OF DRILLING** Not Encountered
NOTES
▼ **AT END OF DRILLING** Not Encountered

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UNDRAINED SHEAR STRENGTH, ksf: ○ HAND PENETROMETER; △ TORVANE; ● UNCONFINED COMPRESSION; ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL (scale 1.0, 2.0, 3.0, 4.0)

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf
	0	▨	**Fat Clay with Sand (CH) [Residual Soil]** medium stiff, moist, dark brown to brown, fine sand, high plasticity Liquid Limit = 57, Plastic Limit = 23	7	MC-1B	95	28	34		○
			becomes very stiff	13	MC-2B	95	28			○
	5	▨	**Claystone [Tpt]** low hardness, weak, deep weathering, olive gray with brown mottles, moderate to high plasticity Liquid Limit = 95, Plastic Limit = 35	10	MC-3A	71	43	60		>4.5 ○
				6	SPT-4		43			
	10									
				16	MC-5B	77	46			
	15			19	SPT					
			Bottom of Boring at 16.5 feet.							
	20									
	25									

BORING NUMBER EB-2

PAGE 1 OF 1

CORNERSTONE EARTH GROUP

PROJECT NAME Haskins Ridge
PROJECT NUMBER 1142-1-1
PROJECT LOCATION La Honda, CA
DATE STARTED 1/20/20 **DATE COMPLETED** 1/20/20
GROUND ELEVATION **BORING DEPTH** 15 ft.
DRILLING CONTRACTOR Cuesta Geo
LATITUDE **LONGITUDE**
DRILLING METHOD MPP LAD Track Rig, 6½ inch Hollow-Stem Auger
GROUNDWATER LEVELS:
LOGGED BY CSH
▽ **AT TIME OF DRILLING** Not Encountered
NOTES
▼ **AT END OF DRILLING** Not Encountered

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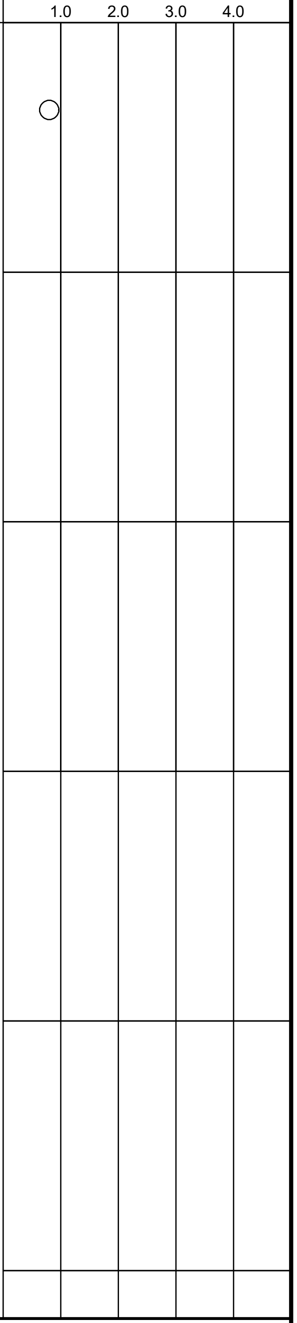
ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX	PERCENT PASSING No. 200 SIEVE
	0	▨	**Fat Clay with Sand (CH) [Colluvium]** medium stiff, moist, dark brown to brown, fine sand, high plasticity	19	MC-1A	93	30		
		▨	**Sandy Claystone [Tpt]** low hardness, weak, deep weathering, olive gray with reddish brown mottles, fine sand, high plasticity	36 22	MC-2A SPT-3	95	26 21		
	5								
		▨	**Claystone [Tpt]** low hardness, weak, deep weathering, olive gray with brown mottles, high plasticity	20	SPT-4		34		
	10								
				34	MC-5B	80	44		
	15		Bottom of Boring at 15.0 feet.						
	20								
	25								

UNDRAINED SHEAR STRENGTH, ksf

○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL



BORING NUMBER EB-3

PAGE 1 OF 1

CORNERSTONE EARTH GROUP

PROJECT NAME Haskins Ridge
PROJECT NUMBER 1142-1-1
PROJECT LOCATION La Honda, CA
DATE STARTED 1/20/20 **DATE COMPLETED** 1/20/20
GROUND ELEVATION **BORING DEPTH** 15 ft.
DRILLING CONTRACTOR Cuesta Geo
LATITUDE **LONGITUDE**
DRILLING METHOD MPP LAD Track Rig, 6½ inch Hollow-Stem Auger
GROUNDWATER LEVELS:
LOGGED BY CSH
▽ **AT TIME OF DRILLING** Not Encountered
NOTES
▼ **AT END OF DRILLING** Not Encountered

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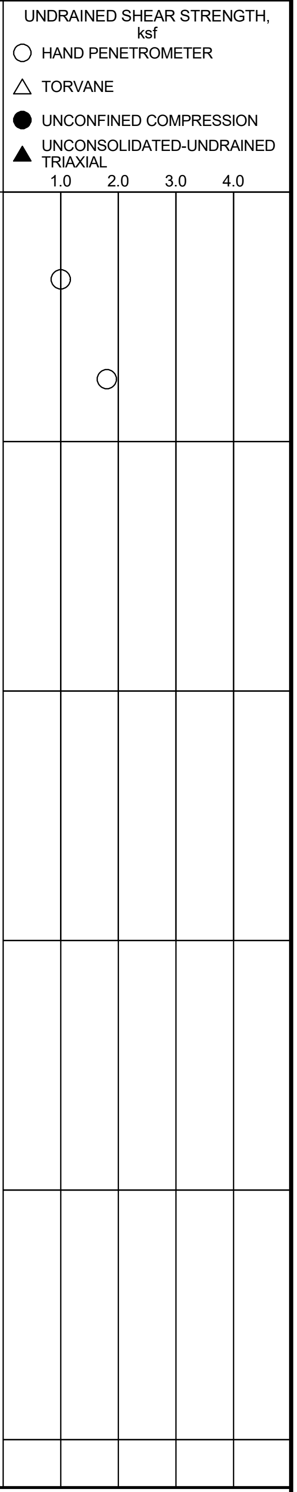
ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf
	0		**Fat Clay with Sand (CH) [Colluvium]** stiff, moist, dark brown to brown, fine sand, high plasticity	7	MC-1B	95	30			○
				13	MC-2B	85	32			○
	5		**Sandy Claystone [Tpt]** low hardness, weak, deep weathering, gray with brown mottles, high plasticity	24	SPT-3		37			
	10		**Silty Sandstone [Tpt]** low hardness, weak, deep weathering, gray with brown mottles, fine sand	37	SPT-4		19			
				40	SPT-5		18			
	15		Bottom of Boring at 15.0 feet.							
	20									
	25									



BORING NUMBER EB-4

PAGE 1 OF 1

CORNERSTONE EARTH GROUP

PROJECT NAME Haskins Ridge

PROJECT NUMBER 1142-1-1

PROJECT LOCATION La Honda, CA

DATE STARTED 1/21/20 **DATE COMPLETED** 1/21/20

GROUND ELEVATION **BORING DEPTH** 15 ft.

DRILLING CONTRACTOR Cuesta Geo

LATITUDE **LONGITUDE**

DRILLING METHOD MPP LAD Track Rig, 6½ inch Hollow-Stem Auger

GROUNDWATER LEVELS:

LOGGED BY CSH

▽ **AT TIME OF DRILLING** Not Encountered

NOTES

▼ **AT END OF DRILLING** Not Encountered

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UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf
	0		**Fat Clay with Sand (CH) [Residual soil]** medium stiff, moist, dark brown to brown, fine sand, high plasticity							
			Sandy Claystone [Tpt] low hardness, weak, deep weathering, gray with brown mottles, high plasticity	25	MC-1B	97	27			
				48	MC-2B	98	28			
	5		**Silty Sandstone [Tpt]** low hardness, weak, deep weathering, gray with brown mottles, fine sand	31	SPT-3		21			
	10		**Sandy Claystone [Tpt]** low hardness, weak, deep weathering, gray with brown mottles, high plasticity	73	SPT-4		22			
			Silty Sandstone [Tpt] low hardness, weak, deep weathering, gray with brown mottles, fine sand	60	SPT-5		19			
	15		Bottom of Boring at 15.0 feet.							
	20									
	25									

BORING NUMBER EB-5

PAGE 1 OF 1

CORNERSTONE EARTH GROUP

PROJECT NAME Haskins Ridge
PROJECT NUMBER 1142-1-1
PROJECT LOCATION La Honda, CA
DATE STARTED 1/21/20 **DATE COMPLETED** 1/21/20
GROUND ELEVATION **BORING DEPTH** 20 ft.
DRILLING CONTRACTOR Cuesta Geo
LATITUDE **LONGITUDE**
DRILLING METHOD MPP LAD Track Rig, 6½ inch Hollow-Stem Auger
GROUNDWATER LEVELS:
LOGGED BY CSH
▽ **AT TIME OF DRILLING** Not Encountered
NOTES
▼ **AT END OF DRILLING** Not Encountered

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ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION
	0	▨	**Fat Clay with Sand (CH) [Colluvium]** very stiff, moist, dark brown to brown, fine sand, high plasticity
		▨	**Sandy Claystone [Tpt]** low hardness, weak, deep weathering, gray with reddish brown mottles, fine sand, high plasticity
	5		
	10		
	15		
	20		Bottom of Boring at 20.0 feet.
	25		

N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf
34	MC-1A	119	28			○
41	MC-2B	99	25			
18	SPT-3		29			
29	MC-4A		26			
17	SPT-5		34			
24	SPT-6		32			

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

CORNERSTONE EARTH GROUP2 - CORNERSTONE 0812.GDT - 2/26/20 07:26 - P:\DRAFTING\GINT FILES\1142-1-1 HASKINS RIDGE.GPJ

CORNERSTONE EARTH GROUP

BORING NUMBER EB-6

PAGE 1 OF 1

PROJECT NAME Haskins Ridge
PROJECT NUMBER 1142-1-1
PROJECT LOCATION La Honda, CA
DATE STARTED 1/21/20 **DATE COMPLETED** 1/21/20
GROUND ELEVATION **BORING DEPTH** 21.5 ft.
DRILLING CONTRACTOR Cuesta Geo
LATITUDE **LONGITUDE**
DRILLING METHOD MPP LAD Track Rig, 6½ inch Hollow-Stem Auger
GROUNDWATER LEVELS:
LOGGED BY CSH
▽ **AT TIME OF DRILLING** Not Encountered
NOTES
▼ **AT END OF DRILLING** Not Encountered

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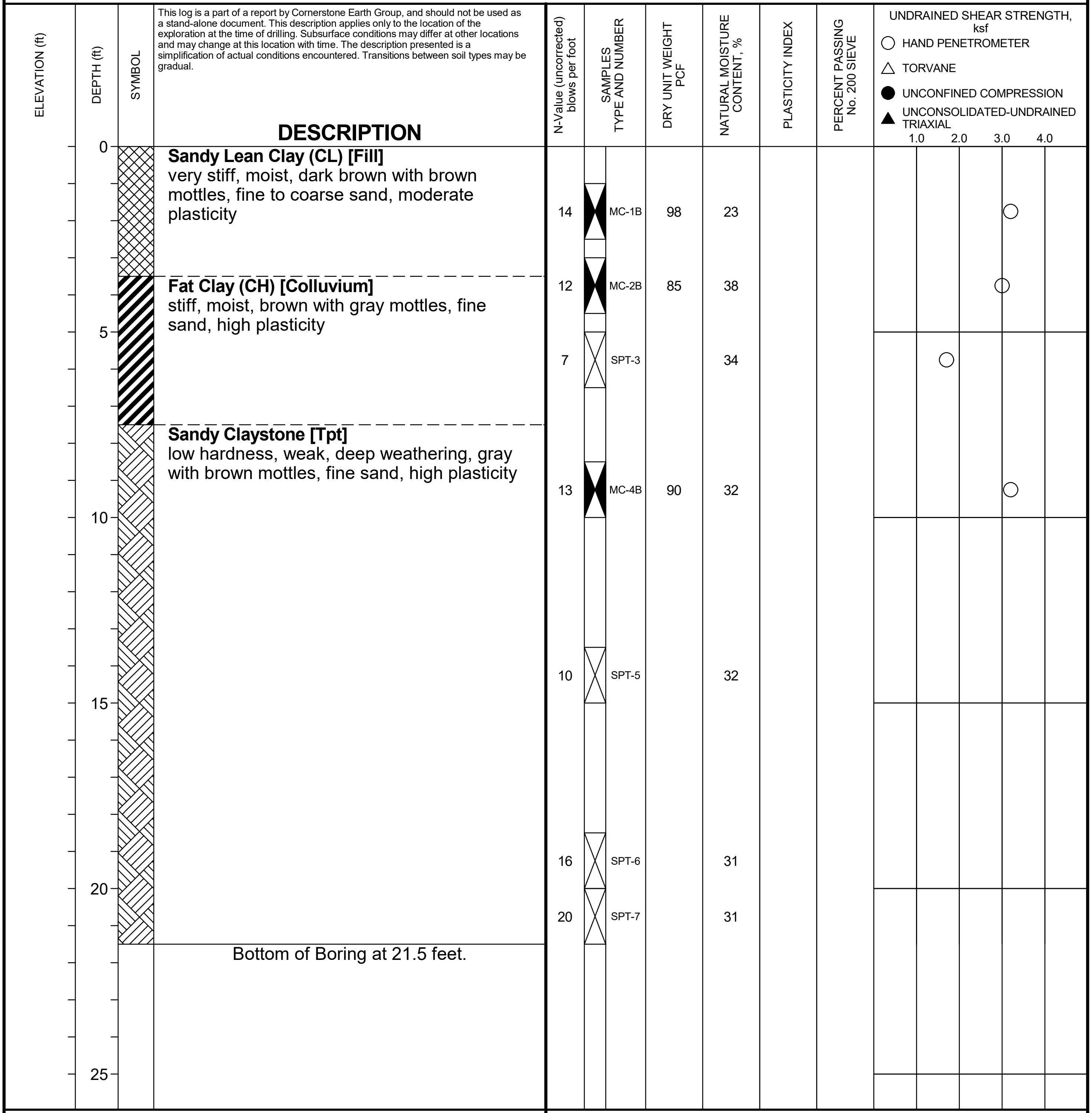

DESCRIPTION

Sandy Lean Clay (CL) [Fill]
very stiff, moist, dark brown with brown mottles, fine to coarse sand, moderate plasticity

Fat Clay (CH) [Colluvium]
stiff, moist, brown with gray mottles, fine sand, high plasticity

Sandy Claystone [Tpt]
low hardness, weak, deep weathering, gray with brown mottles, fine sand, high plasticity

Bottom of Boring at 21.5 feet.

N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX	PERCENT PASSING No. 200 SIEVE
14	MC-1B	98	23		
12	MC-2B	85	38		
7	SPT-3		34		
13	MC-4B	90	32		
10	SPT-5		32		
16	SPT-6		31		
20	SPT-7		31		

BORING NUMBER EB-7

PAGE 1 OF 1

CORNERSTONE EARTH GROUP

PROJECT NAME Haskins Ridge
PROJECT NUMBER 1142-1-1
PROJECT LOCATION La Honda, CA
DATE STARTED 1/20/20 **DATE COMPLETED** 1/20/20
GROUND ELEVATION ____ **BORING DEPTH** 13.5 ft.
DRILLING CONTRACTOR Cuesta Geo
LATITUDE ____ **LONGITUDE** ____
DRILLING METHOD MPP LAD Track Rig, 6½ inch Hollow-Stem Auger
GROUNDWATER LEVELS:
LOGGED BY CSH
▽ **AT TIME OF DRILLING** Not Encountered
NOTES ____
▼ **AT END OF DRILLING** Not Encountered

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UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf
	0		**Clayey Sand (SC) [Colluvium]** medium dense, moist, dark brown to brown, fine sand							
			Silty Sandstone [Tpt] low hardness, weak, deep weathering, gray with brown mottles, fine sand	30	MC-1A	100	25			
				31	SPT-2		25			
	5			29	SPT-3		28			
			some interbedded claystone layers							
			Sandy Claystone [Tpt] low hardness, weak, deep weathering, gray with brown mottles, fine sand, high plasticity	31	SPT-4		24			
	10		some interbedded sandstone layers							
				21	SPT-5		28			
			Bottom of Boring at 13.5 feet.							
	15									
	20									
	25									

BORING NUMBER HA-1

CORNERSTONE
EARTH GROUP

PROJECT NAME Haskins Ridge
PROJECT NUMBER 1142-1-1
PROJECT LOCATION La Honda, CA
DATE STARTED 1/21/20 **DATE COMPLETED** 1/21/20
GROUND ELEVATION **BORING DEPTH** 4.25 ft.
DRILLING CONTRACTOR N/A
LATITUDE **LONGITUDE**
DRILLING METHOD
GROUNDWATER LEVELS:
LOGGED BY
▽ **AT TIME OF DRILLING** Not Encountered
NOTES
▼ **AT END OF DRILLING** Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

UNDRAINED SHEAR STRENGTH, ksf
○ HAND PENETROMETER
△ TORVANE
● UNCONFINED COMPRESSION
▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL
1.0 2.0 3.0 4.0

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf
	0	▨	**Fat Clay with Sand (CH) [Residual Soil]** very stiff, moist, dark brown to brown, fine sand, high plasticity		GB-1		27			
		▨	**Sandy Claystone [Tpt]** low hardness, weak, deep weathering, gray with brown mottles, fine sand, high plasticity		GB					
			Bottom of Boring at 4.3 feet.							
	5									
	10									
	15									
	20									
	25									

BORING NUMBER HA-2

PAGE 1 OF 1

CORNERSTONE
EARTH GROUP

PROJECT NAME Haskins Ridge

PROJECT NUMBER 1142-1-1

PROJECT LOCATION La Honda, CA

DATE STARTED 1/21/20 **DATE COMPLETED** 1/21/20

GROUND ELEVATION **BORING DEPTH** 4.25 ft.

DRILLING CONTRACTOR N/A

LATITUDE **LONGITUDE**

DRILLING METHOD

GROUNDWATER LEVELS:

LOGGED BY

▽ **AT TIME OF DRILLING** Not Encountered

NOTES

▼ **AT END OF DRILLING** Not Encountered

This log is a part of a report by Cornerstone Earth Group, and should not be used as a stand-alone document. This description applies only to the location of the exploration at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with time. The description presented is a simplification of actual conditions encountered. Transitions between soil types may be gradual.

ELEVATION (ft)	DEPTH (ft)	SYMBOL	DESCRIPTION	N-Value (uncorrected) blows per foot	SAMPLES TYPE AND NUMBER	DRY UNIT WEIGHT PCF	NATURAL MOISTURE CONTENT, %	PLASTICITY INDEX	PERCENT PASSING No. 200 SIEVE	UNDRAINED SHEAR STRENGTH, ksf ○ HAND PENETROMETER △ TORVANE ● UNCONFINED COMPRESSION ▲ UNCONSOLIDATED-UNDRAINED TRIAXIAL 1.0 2.0 3.0 4.0
	0	▨	**Fat Clay with Sand (CH) [Residual Soil]** very stiff, moist, dark brown to brown, fine sand, high plasticity		✋ GB-1		23			
		▧	**Sandy Claystone [Tpt]** low hardness, weak, deep weathering, gray with brown mottles, fine sand, high plasticity		✋ GB-2		28			
			Bottom of Boring at 4.3 feet.							
	5									
	10									
	15									
	20									
	25									

CORNERSTONE
EARTH GROUP

Type of Services	**Geotechnical Investigation**
Project Name	**Peninsula Humane Society Animal Sanctuary**
Location	**12429 Pescadero Road** **Loma Mar, California**
Client	**Peninsula Humane Society & SPCA**
Client Address	**1450 Rollins Road** **Burlingame, California**
Project Number	**1142-1-1**
Date	**July 23, 2021**

Prepared by

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Type of Services	**Geotechnical Investigation**
Project Name	**Peninsula Humane Society Animal Sanctuary**
Location	**12429 Pescadero Road Loma Mar, California**

SECTION 1: INTRODUCTION

This geotechnical report was prepared for the sole use of Peninsula Humane Society & SPCA for the Peninsula Humane Society Animal Sanctuary project in Loma Mar, California. The approximate location of the site is shown on the Vicinity Map, Figure 1. For our use, we were provided with the following documents:

- A set of architectural plans, titled, "Peninsula Humane Society Animal Sanctuary," prepared by KSH Architects, County of San Mateo Use Permit Submittal, dated July 12, 2021.
- A set of civil plans titled, "Peninsula Humane Society Animal Sanctuary, 12429 Pescadero Creek Road, Loma Mar, California," prepared by Lea & Braze Engineering, Inc., dated July 12, 2021.
- A set of landscape plans titled, "Peninsula Humane Society Animal Sanctuary," prepared by The Guzzardo Partnership Inc., County of San Mateo Use Permit Submittal, dated July 12, 2021.

1.1 PROJECT DESCRIPTION

The irregularly shaped 213-acre project site is located off of Pescadero Road in Loma Mar, California, about 3500 feet west of the intersection of Pescadero Road and Alpine Road. The site is bounded by Pescadero Road to the east and essentially undeveloped properties surrounding the project site. The site is mostly undeveloped, with a fire road crossing the site transverse to the hillside and an existing barn and caretaker residence to the north of the fire road. Based on the provided architectural plans, we understand that an animal sanctuary campus is planned consisting of a two-level administrator/visitor structure ("Building 2"), cat enclosures ("Buildings B and C"), the restored existing barn ("Building 1"), a new 2,000-square-foot farm animal barn with covered corral ("Building 4"), a 3,000-square-foot covered dog arena, access roads, new caretaker residence with garage ("Building 3"), several maintenance buildings (“Buildings A”), a fire prevention water storage tank and associated pump station, a service yard for generators and a new domestic and landscape irrigation tank and associated pump station, a solar array, and dog enclosures (“Buildings D, E, and F”). Additionally, an on-site septic system with leach field is proposed southwest of the dog enclosures and new animal barn. This development will be clustered along the ridge top and most of the remainder of the site will remain undeveloped with a new gravel road connecting the improvements.

It is expected that the structures will likely be single-story wood-frame structures. Appurtenant parking, utilities, access roads and paths, landscaping and other improvements necessary for site development are also planned.

Structural loads are not currently known for the proposed structures; however, structural loads are expected to be light and typical of similar type structures. Based on our preliminary discussions with the project structural engineer we understand that the cat and dog enclosures will be supported by slabs-on-grade, that the maintenance buildings and animal barns will likely be supported on shallow spread footing foundations, and that the administrator/veterinary building, and caretaker residence will likely be supported on drilled pier foundations. The tank foundation type is unknown at this time. Based on the results of our site investigation and lab testing, we are providing our geotechnical recommendations for these structures in this report.

1.2 SCOPE OF SERVICES

Our scope of services was presented in our proposal dated June 12, 2019 and consisted of field and laboratory programs to evaluate physical and engineering properties of the subsurface soils, engineering analysis to prepare recommendations for site work and grading, building foundations, flatwork, retaining walls, and pavements, and preparation of this report. Brief descriptions of our exploration and laboratory programs are presented below.

1.3 EXPLORATION PROGRAM

Field exploration consisted of seven borings drilled on January 20 and 21, 2020 with track-mounted, limited-access hollow-stem auger drilling equipment and two borings drilled on January 21, 2020 with hand-auger equipment. The borings were drilled to depths ranging from 13½ to 21½ feet, while the hand augers were advanced to depths of 4 to 4½ feet. The borings and hand augers were backfilled with cement grout in accordance with local requirements; exploration permits were obtained as required by local jurisdictions.

The approximate locations of our exploratory borings are shown on the Geologic Site Plan, Figure 2, respectively. Details regarding our field program are included in Appendix A.

1.4 LABORATORY TESTING PROGRAM

In addition to visual classification of samples, the laboratory program focused on obtaining data for foundation design and seismic ground deformation estimates. Testing included moisture contents, dry densities, and Plasticity Index tests. Details regarding our laboratory program are included in Appendix B.

1.5 ENVIRONMENTAL SERVICES

Environmental services were not requested for this project. If environmental concerns are determined to be present during future evaluations we should be notified and the project environmental consultant should review our geotechnical recommendations for compatibility with the environmental concerns.

SECTION 2: REGIONAL SETTING

2.1 REGIONAL GEOLOGIC SETTING

The site is located within the north-central Santa Cruz Mountains, a northwest-southeast mountain range within the Coast Range Geomorphic Province. The Santa Cruz Mountains are within the San Francisco Bay Block, which is bounded to the east by the Hayward and Calaveras Faults and to the west by the San Andreas Fault. The San Andreas Fault is a NW-trending, right-lateral, strike-slip fault that is comprised of many strands that form a zone, which is up to 1 km wide within the area. The fault system distributes shearing across a complex system of primarily northwest trending, right-lateral, strike-slip faults that includes the Hayward and Calaveras Faults.

The geology of the La Honda 7.5-minute Quadrangle is characterized by two basement assemblages that are separated by the San Andreas Fault, which extends through the northeastern corner of the quadrangle. Northeast of the San Andreas Fault is a composite Mesozoic basement assemblage consisting of the Franciscan Complex, Coast Range Ophiolite, and the Great Valley Sequence. Southwest of the San Andreas Fault is the Salinian Terrane of the Santa Cruz block, a basement assemblage of granitic and metamorphic crystalline rocks. Rocks within the north-central Santa Cruz Mountains have undergone a complex structural history and have been strongly deformed by faulting and folding. The basement is overlain by Miocene marine strata and Pliocene and Pleistocene sediment. Miocene and later strata have been deformed by reverse faulting along the Sargent, Berrocal and Shannon Fault zones (Hitchcock et a.,1994).

2.2 REGIONAL SEISMICITY

While seismologists cannot predict earthquake events, geologists from the U.S. Geological Survey have recently updated (in 2015) earlier estimates from their 2014 Uniform California Earthquake Rupture Forecast (Version 3; UCERF3) publication. The estimated probability of one or more magnitude 6.7 earthquakes (the size of the destructive 1994 Northridge earthquake) expected to occur somewhere in the San Francisco Bay Area has been revised (increased) to 72 percent for the period 2014 to 2043 (Aagaard et al., 2016). The faults in the region with the highest estimated probability of generating damaging earthquakes between 2014 and 2043 are the Hayward (33%), Calaveras (26%), and San Andreas Faults (22%). In this 30-year period, the probability of an earthquake of magnitude 6.7 or larger occurring is 22 percent along the San Andreas Fault and 33 percent for the Hayward Fault.

The faults considered capable of generating significant earthquakes are generally associated with the well-defined areas of crustal movement, which trend northwesterly. The table below presents the State-considered active faults within 25 kilometers of the site.

Table 1: Approximate Fault Distances

Fault Name	Distance	
	(miles)	(kilometers)
San Andreas (1906)	5.5	8.8
Sargent-Berrocal	6.2	10
Monte Vista-Shannon	6.7	10.8
San Gregorio	7.5	12
Zayante	8.4	13.5

In addition, the Hayward Fault, Calaveras Fault zone, and the San Gregorio Fault Zone (major branching faults of the San Andreas system) are located 24 miles (38.3 km) northeast, 27.7 miles (44.5 km) northeast, and 7.5 miles west of the site. Additionally, two undifferentiated Quaternary faults exist in the general area including: the Butano Fault located about 2 miles (3.2 km) south of the site and the Pilarcitos Fault is located about 4.76 (7.6 km) miles northeast of the site. More locally, Jennings and Bryant (2010) show the (pre-Quaternary) La Honda Fault as projected toward the site with a southeasterly trend. It would intersect the far eastern edge of the site near Pescadero Creek Road (Jennings and Bryant, 2010). Pre-Quaternary Faults are not considered potential seismic sources and do not represent a geologic constraint for fault surface rupture.

A regional fault map is presented as Figure 3 illustrating the relative distances of the site to significant fault zones.

SECTION 3: SITE CONDITIONS

3.1 SITE HISTORY AND AIR PHOTO REVIEW

A review of historic topographic maps extending back to 1940 and aerial photos extending back to 1931 shows that the site has been used as livestock rangeland for decades. As of the date of the 1931 aerial photos, the site appears to be totally undeveloped with no dirt roads and no structures present.

A review of the historical topographic maps (U.S.G.S.) indicates that a dirt access road (“Burns Chalk Fire Road”) has existed along the spine of the ridge since at least as early as 1940. A barn structure was constructed at its current location and a stock pond established just downslope of the access road in the central portion of the site sometime between 1968 and 1980. Between 1982 and 1991 a residence was constructed just on the west side of the barn. Sometime between 1991 and 2005 numerous fenced livestock pens were constructed adjacent to the barn. Sometime between 2005 and 2009 additional soil was placed across from the barn in order to extend a parking area alongside the dirt road for parking of storage vehicles and farm equipment. Additional dirt roads were established along the top of the ridge further to the west in this period.

3.2 SURFACE DESCRIPTION AND TOPOGRAPHY

The site is located on a northwesterly trending ridge southern flank in an area of complex and highly varied topography. The southerly flank of the ridge varies from gently inclined to moderately inclined and steep. The areas where the proposed improvements are to be located can generally be characterized according to the following:

3.2.1 Area of Existing Barn/Adjacent Parking Lot Area

The area of the existing barn and existing caretaker’s residence is relatively flat with steep downslopes located within 40 feet north of the existing structures. Although this area is largely flat, there are local variations resulting in approximately 2 feet of topographic relief across the pad area. We understand that the existing caretaker’s residence will be demolished and a new fire prevention water tank and pump station will be constructed in its place. The proposed domestic water tank, pump station, and maintenance building located just east of the existing barn is on flat ground, however, there is an existing (undocumented) wedge of fill along the northern edge of this proposed improvement area the slopes become steep immediately adjacent to the area.

The proposed maintenance building and adjacent service yard for generators is located adjacent to the northern edge of the relatively flat area, which is at the crest of a steep slope where localized fill has been placed in order to create a flat pad.

3.2.2 Proposed Caretaker’s Residence, Dog Enclosures, and New Barn Area

The proposed caretaker’s residence (“Building 3”), dog enclosures (“Buildings D, E, and F”), and new farm animal barn (“Building 4”) is on a moderately inclined slope on the downhill side of the existing fire access road.

There is approximately 6 to 8 feet of topographic relief across the pad area. Claystone bedrock is exposed at shallow depths within erosion gullies located just downslope of the building pad area.

3.2.3 Proposed Veterinarian/Administration Building

The area of the proposed Vet/Admin building (Building 2) is in a transitional area where the ground changes from nearly level to gently inclined toward the south. The northern and eastern portion of the building footprint is in an area where undocumented fills exist. These fill berms occur on both the west and the east side of the building footprint and, based on a review of the surrounding natural topography, may be up to 10 feet thick. There is approximately 8 to 12 feet of topographic relief across the pad area. Based on the provided topographic and architectural plans, we understand that the downslope side of the vet/admin building will have a basement level, which will be cut into the existing slope.

The group of proposed “cat enclosures” are located on a gently to moderately inclined slope just to the west of the Administration building. Relief across these pads is on the order to 4 to 6 feet. Bedrock is not exposed in this area of the site.

3.2.4 South Dog Loop Area

The “South Dog Loop” is a proposed group of kennels will include a 3,000 s.f. enclosed “dog arena”, and a series of large and small dog “cottages” around the brow or crest of the flanking slopes around the perimeter of the knoll. The proposed road at the “east dog loop” is located on the top a of a knoll where the slopes are gently inclined to moderately inclined. There is approximately 4 to 6 feet of topographic relief across the dog cottages pads and there is approximately 2 to 3 feet of relief across the the dog arena area. Sandstone bedrock is exposed locally at the ground surface on the top of the knoll.

3.3 SITE GEOLOGY AND SUBSURFACE CONDITIONS

Several regional geologic maps have been prepared of the area surrounding the campus, including those by; Rogers (1971), Brabb (1970 and 1980). We have adopted the nomenclature of Brabb (1980) in assigning geologic unit names for our characterization of the site. Brabb shows the bedrock in the area of the site as the Tahana member of the (Tertiary) Purisima Formation. A vicinity geologic map is presented as figure 6. The geologic units are characterized by Brabb as follows: “Greenish-gray to white or buff, medium to very fine grained sandstone and siltstone, with some silty mudstone. Locally the sandstone is tuffaceous and it weathers white. Pebble conglomerate occurs near the base.” In terms of rock characterization, the bedrock is generally weak, friable, moderately severely weathered.

Our site reconnaissance resulted in the following observations: Bedrock is exposed at road cuts, at erosion scars on site slopes, and at a large cut located just northeast of the proposed caretaker’s residence. A large exposure of bedrock located just on the north side of the caretaker’s residence exposes interbedded silty sandstone and thin bedded siltstone. Claystone is exposed within erosion gullies located on the south of these proposed structure. Our borings encountered primarily claystone with some layers of sandstone. The bedrock is thin to medium bedded (laminated locally) folded locally and displays a variety of structural trends varying from northwesterly, moderately dipping to southwesterly, steeply dipping.

The sloping portions of the site have experienced severe erosion where runoff is not controlled or, alternatively where the surface runoff is focused by roadways or culverts, or swales or gullies. This severe erosion appears to be exacerbated by an abrupt permeability contract between the sandy (erodible) surficial soils and the underlying consolidated sedimentary bedrock units that are more resistant to erosion. The erosion gullies trend downslope toward the southwest and vary from 3 feet deep to as much as 10 feet deep onsite.

Existing stockpiled fill: Two large accumulations of fill exist just south of the access road in the area of the barn, existing caretaker's residence, proposed new fire prevention water tank and pump station, domestic water tank and pump station, and maintenance building. This material forms a sliver of material that extends outward toward the south from the existing dirt road. This material is non-engineered and apparently was placed in order to create additional parking area for farm machinery and vehicles. This fill cannot be relied upon for support of improvements (see Recommendations).

Our site exploration consisted of drilling, logging and sampling within seven conventional geotechnical borings and two hand auger borings at various locations at the site. The exploration was accomplished with a track-mounted drill rig using hollow stem augers and standard geotechnical sampling equipment. The results of the borings are presented below according to location:

3.3.1 Area of Existing Barn/Adjacent Parking Lot Area

Boring EB-6 was located near the northwest corner of the current fenced in "corral" area, the future location of a domestic water tank and associated pump station, and maintenance building. Here the subsurface profile consisted of a 3½ foot-thick layer of surficial (undocumented fill) sandy lean clay. The fill was underlain by black fat clay (residual soil) to a depth of 7½ feet. Below the depth of 7½ feet is the sandy claystone bedrock. The fill and residual soil layers were found to be in a stiff to very stiff condition, however the undocumented fill is judged to be moderately compressible. The claystone was found to be in a generally weak condition in terms of bedrock characterization and produced standard penetration test blow counts that ranged from10 blows-per-foot (bpf) to 21 bpf. We understand that the existing caretaker's residence will be demolished and a fire prevention water tank and associated pump station will be constructed partially within the old residence footprint. We anticipate that up to several feet of undocumented fill may be encountered due to the previous development.

3.3.2 Proposed Caretaker's and New Barn

Boring EB-2 was located in the general area of the Caretaker's cottage and new barn. As noted already, a large exposure of bedrock located just on the north side of the caretaker's residence and guest cottages exposes interbedded silty sandstone and thin bedded siltstone. Claystone is exposed within erosion gullies located on the south of these proposed structures. The change in lithology between the cut exposure and the exploratory boring and erosion gullies further downslope is likely due to the result of folding that trends through the immediate area. At the Boring EB-2 location, the subsurface profile consisted of a 2½-foot-thick layer of surficial (colluvium) fat clay with sand. The residual soil was underlain by claystone bedrock. The residual soil layer was found to be in a medium stiff condition in terms of soil characterization. The claystone was found to be in a generally weak condition in terms of bedrock characterization and produced standard penetration test blow counts that ranged from 22 blows-per-foot (bpf) to 34 bpf. A geologic cross section A-A' developed for this area is shown on Figure G.

3.3.3 Proposed Veterinarian/Administration Building

Boring EB-7 was located in the general area of the veterinarian/administration building. Here the subsurface profile consisted of a 1½-foot-thick layer of surficial (colluvium) clayey sand. The residual soil was underlain by sandstone bedrock. The residual soil layer was found to be in a medium dense condition. The sandstone and claystone was found to be in a generally weak condition in terms of bedrock characterization and produced standard penetration test blow counts that ranged from 21 blows-per-foot (bpf) to 36 bpf. As discussed earlier, there are fill berms on both the west and the east side of the building footprint that may be up to 10 feet thick based on a review of the surrounding natural topography.

3.3.4 Proposed Cat and Dog Enclosure Area

Boring EB-3 and EB-7 was located in the general area of the cat enclosure area. Here the subsurface profile consisted of a 2- to 4-foot-thick layer of surficial (colluvium) fat clay with sand. The residual soil was underlain by sandstone bedrock. The residual soil layer was found to be in a stiff condition. The claystone was found to be in a generally weak condition in terms of bedrock characterization and produced standard penetration test blow counts that ranged from 18 blows-per-foot (bpf) to 37 bpf.

3.3.5 Plasticity/Expansion Potential

We performed two Plasticity Index (PI) tests on representative samples. Test results were used to evaluate expansion potential of surficial soils and underlying bedrock. The result of the surficial PI test indicated a PI of 34, indicating very high expansion potential to wetting and drying cycles. The result of the PI test on the underlying claystone indicated a PI of 60, which indicates very high expansive potential to wetting and drying cycles.

3.3.6 In-Situ Moisture Contents

Laboratory testing indicated that the in-situ moisture contents within the upper 10 feet range from 2 percent under to 15 percent over the estimated laboratory optimum moisture.

3.4 GROUNDWATER

The site encompasses high elevation ground along the top and southerly crest of a ridgetop in the rugged La Honda region of the Santa Cruz Mountains. The site is underlain at shallow depths by sedimentary bedrock and our research suggests this formation does not serve as a laterally continuous shallow aquifer. The only water noted at the site exists within two large stock ponds that exist in the lower portion of the site slopes located well below (downslope) of the proposed improvements. These stock ponds are fed by surface runoff. We did not encounter evidence of groundwater in any of our explorations. It should be noted that, in general, fluctuations in groundwater levels could occur due to many factors including perched water, and regional groundwater variations, and rainfall or irrigation. We note that perched groundwater conditions are often present in the bedrock on hillside sites.

SECTION 4: GEOLOGIC HAZARDS

4.1 FAULT SURFACE RUPTURE

As stated earlier, published maps do not show any faults trending through the subject site (Rogers, 1971; Brabb, 1970 and 1980; Brabb and Olsen 1983; Jennings and Bryant, 2010; CDMG, 2003; USGS Fault and Fault database, 2006). The site is not located within a State Earthquake Fault Zone (CDMG 2003). We did not encounter evidence during our research or site reconnaissance of faults trending through the site. The potential for fault surface rupture occurring at the site should be considered low.

4.2 ESTIMATED GROUND SHAKING

Moderate to severe (design-level) earthquakes can cause strong ground shaking, which is the case for most sites within the Bay Area. A peak ground acceleration (PGA) was estimated for analysis using a value equal to F_{PGA}*PGA, as allowed in the 2019 edition of the California Building Code per Exception 2 of Section 11.4.8 of ASCE 7-16. For our analyses, we used a PGA of 1.114g.

4.3 LIQUEFACTION POTENTIAL

Published geotechnical hazard maps do not show the site in an area identified as having a liquefaction potential. This is due primarily to the fact that very shallow bedrock exists at the site and it is located at a high elevation in rugged terrain. The site is not located within a County-designated Liquefaction Hazard Zone (San Mateo County, 2008), and is within a zone mapped as having a low liquefaction potential by the Association of Bay Area Governments (ABAG). We screened the site for liquefaction during our site exploration by retrieving samples from the site, performing visual classification on sampled materials, and performing various tests to further classify the soil properties.

During strong seismic shaking, cyclically induced stresses can cause increased pore pressures within the soil matrix that can result in liquefaction triggering, soil softening due to shear stress loss, potentially significant ground deformation due to settlement within sandy liquefiable layers as pore pressures dissipate, and/or flow failures in sloping ground or where open faces are present (lateral spreading) (NCEER 1998). Limited field and laboratory data is available regarding ground deformation due to settlement; however, in clean sand layers settlement on the order of 2 to 4 percent of the liquefied layer thickness can occur. Soils most susceptible to liquefaction are loose, non-cohesive soils that are saturated and are bedded with poor drainage, such as sand and silt layers bedded with a cohesive cap.

As discussed in the “Subsurface” section above, we primarily encountered surficial soils consisting of lean clays or sandstone, siltstone and claystone bedrock. These materials are generally not susceptible to liquefaction. Based on the above, our screening of the site for liquefaction indicates a low potential for liquefaction.

4.4 LATERAL SPREADING

Lateral spreading is horizontal/lateral ground movement of relatively flat-lying soil deposits towards a free face such as an excavation, channel, or open body of water; typically lateral spreading is associated with liquefaction of one or more subsurface layers near the bottom of the exposed slope. As failure tends to propagate as block failures, it is difficult to analyze and estimate where the first tension crack will form. There are no open faces within a distance considered susceptible to lateral spreading; therefore, in our opinion, the potential for lateral spreading to affect the site is low.

4.5 SEISMIC SETTLEMENT/UNSATURATED SAND SHAKING

Loose unsaturated sandy soils can settle during strong seismic shaking. As the soils encountered at the site were predominantly medium stiff to very stiff clays, and medium dense clayey sands, or claystone and sandstone bedrock, in our opinion, the potential for significant differential seismic settlement affecting the proposed improvements is low.

4.6 LANDSLIDING

4.6.1 General

The California Geological Survey (CGS) has not yet produced a Seismic Hazard Zone report or accompanying map for the La Honda 7.5-minute quadrangle during their ongoing program to map Seismic Hazard Zones on a 7.5-minute quadrangle scale (1:24,000) in the Bay Area. The County of San Mateo has not established regulatory zones for landsliding, however, the planning department maintains a map of “Existing Landslides” in the county (based on the USGS publication), open File Report 975-C. The published landslide-themed map of Brabb and Pampeyan (1972) which covers the County of San Mateo shows the site in an area of suspected large-scale landsliding (Figure 5 is a partial reproduction of the map of Brabb and Pampeyan. Specifically, the ridge top and the crests of adjacent slope son the south side are shown in a headscarp area of a large-scale landslide complex, which is shown s encompassing the rolling topography on the slopes below the slope crests. The proposed improvements are outside the mapped landslide mass. The county planning department shows the site in a zone designated as “areas of mostly landslides”. The CGS interactive map showing reported recent landslides (CGS, 2018) does not show any reported landslides in the immediate area. These mapped landslides and classifications are the result of interpretive mapping and are not based on site-specific studies. These maps serve as a planning resource. Maps and publications published after the damaging El Niño rainfall events in 1982, and 1995 (Ellen & Weiczorek, 1982; Ellen et al., 1997) depicting landslides that resulted from those large-scale damaging events do not show any landslides that occurred from those events at the site.

Our site-specific geologic evaluation has resulted in an interpretation that differs from the published mapping in terms of the nature and extent of landsliding at the site.

4.6.2 Site-Specific

Our review of aerial photos, our site reconnaissance and subsurface exploration has led to our conclusion that, although the lower portions of slopes on the south flank of the ridge display rolling topography, these slopes are not part of a large-scale landslide as suggested on the map of Brabb and Pampeyan (1972). Landsliding identified in this evaluation is based on geomorphic features discernible at the ground surface and in stereo aerial photographs. We have mapped several landslides on the subject property and have depicted these features on the site plan (Figure 2) and have designated some of these individual slides on the map with numbers as a convenience in description in this text. Some of these identified features are located well beyond the proposed improvements and are not considered a constraint to the siting of structures or grading. The establishment of a septic system leachfield at the site is located closer to these identified landslides (see Figure 7) and the layout and design of these leachfields should take into account the constraints (see Recommendations section). Of the landslides that have been mapped during our study, the following landslides are located more proximal to the proposed features and are discussed below:

Qls1: This slide is located just downslope of the existing and proposed access road in the north-central portion of the property (see Figure 2). This feature is a slump-type failure and, based on the relative topography surrounding this feature, is inferred to be relatively shallow (approximately 15 feet thick or less) and consists of colluvial soils overlying thin bedded mudstone and sandstone. A culvert trends beneath the road which delivers surface runoff from the road into the headscarp of this feature. This may have served as the triggering mechanism for this shallow landslide. Drainage improvements should be modified in this area in order to help mitigate this condition. Recommendations are offered for reducing this constraint (see Section 6.12 titled “Site Drainage”).

Qls2: This suspected landslide is a relatively small, shallow landslide (a slump) located adjacent to the downslope side of the vet/admin building and several cat enclosure structures (see Figure 2). Although poorly defined in terms of slope morphology. The scarp area is located less than 10 feet from the nearest proposed enclosure and admin building. Our exploratory boring (EB-7) drilled near the scarp of this mapped slide indicates bedrock is shallow in this area. This feature may have been triggered by a lack of surface runoff coming off the top of the ridge. This runoff pattern my no longer exist due to the establishment of the graded dirt access road and fill berms that have been placed in the last 30 or so years.

Qls4: This is a suspected landslide scarp, however, it lacks topographic patterns that would suggest a debris field is present below the scarp (see Figure 2). This feature is located adjacent to the main site access road. A landslide below this scarp would most probably move downslope and away from the road, however, the scarp would not be expected to “back step” over time into the roadway area provided that surface runoff is controlled and directed away from this feature.

Qls3 and Qls5 are all located well outside any proposed developed areas and therefore do not pose a constraint to any proposed features for the current version of the development concept (see Figures 2). Aside from seismic shaking, proximity to some small to moderate sized landslides, and the more general hazard of erosion, there are no other geologic constraints that potentially impact the proposed project as currently conceived.

Control of construction phase runoff and long-term runoff is essential for the stability of slopes at the site. All runoff should be collected and directed to suitable discharge points which specifically avoid the mapped landslides and these discharge points should be located well downslope of the proposed development features, including roads. We do not recommend allowing or directing development runoff toward the very steep slopes on the north side of the north property line (see Site Drainage Recommendations).

SECTION 5: CONCLUSIONS

5.1 SUMMARY

From a geotechnical viewpoint, the project is feasible provided the concerns listed below are addressed in the project design. Descriptions of each concern with brief outlines of our recommendations follow the listed concerns.

- Presence of highly expansive soil and bedrock
- Presence of undocumented fills
- Potential for cut/fill transitions
- Redevelopment considerations
- Slope stability and building/leach field setbacks
- Presence of cohesionless soils
- Potential for difficult excavation
- Soil Corrosion Potential

5.1.1 Presence of Highly Expansive Soil and Bedrock

Our borings disclosed the presence of both sandstone and claystone bedrock of the Tahana formation at the site. Our Plasticity Index testing of the claystone and residual clay soils indicate that these materials are highly to very highly expansive. Expansive soils can undergo significant volume change with changes in moisture content. They shrink and harden when dried and expand and soften when wetted. To reduce the potential for damage to the planned structures, slabs-on-grade should have sufficient reinforcement and be supported on a layer of non-expansive fill; footings should extend below the zone of seasonal moisture fluctuation or the structures should be supported on a drilled pier foundation system. Because of these expansive soils and the close proximity of the bedrock, we recommend the care takers residence, fire prevention water tank and pump station, domestic water tank and pump station, maintenance building, and vet/admin building should be supported on drilled pier foundations. While the PI testing indicates highly expansive soils and bedrock, we are not aware of any published geologic or geotechnical information which suggests these materials are subject to extreme uplift pressures and movement as claystone bedrock of the Whiskey Hill formation is known for, which is located in the vicinity of Menlo Park. This report does not provide recommendations to address extreme uplift and movement of claystone because it has not been documented for this unit in the published literature or in our experience with this geologic unit. However, we would recommend that the grading plan be developed to limit cuts to about 3 feet to mitigate potential heave of the very highly expansive claystone. In areas of the structures where there will be greater than 3 feet of cut into the claystone, we recommend the minimum drilled pier embedment be increased to 15 feet. It is important to limit moisture changes in the surficial soils by using positive drainage away from buildings as well as limiting landscaping watering. Detailed grading and foundation recommendations addressing these expansive soil and bedrock concerns are presented in the following “Earthwork” and “Foundation” sections.

5.1.2 Presence of Undocumented Fills

Our borings encountered undocumented fill ranging up to 3½ feet in depth, and two fill berms were observed the west and the east side of the approximate vet/admin building footprint that may be up to 10 feet thick based on our review of the surrounding natural topography. To reduce the potential for differential settlement, we recommend that the undocumented fill be over-excavated and recompacted following the recommendations presented in the “Earthwork” section below. In addition, where fill placement results in a cut/fill transition within a building pad that will be supported on shallow foundations, we recommend that the entire building pad be overexcavated to provide uniform support. Additional recommendations are provided in the “Earthwork” section of this report.

5.1.3 Potential for Cut/Fill Transitions

Based on the proposed level building pads for many of the structures, and the existing topography of the site, new structures could potentially span cut/fill transitions, if not mitigated. The performance of a structure supported on a shallow foundation overlying a cut/fill transition could result in increased differential settlement. Therefore, we recommend that cut/fill transitions be over-excavated and that shallow foundations bear uniformly on similar, undisturbed native soil or bedrock, or a relatively uniform section of engineered fill over undisturbed native soil and/or bedrock. Recommendations addressing this are presented in the “Earthwork” section.

5.1.4 Redevelopment Considerations

As discussed, the site is currently occupied by existing buildings, site fixtures, and landscaping. We understand that some of the existing improvements, such as the existing caretaker’s residence, will be demolished for the construction of the new site improvements. We understand the new fire prevention water tank and pump station will be constructed partially within the footprint of the existing residence. Potential issues that are often associated with redeveloping sites include demolition of existing improvements, abandonment of existing utilities, and undocumented fills. Please refer to the “Earthwork” section below for further recommendations.

5.1.5 Slope Stability and Building Setbacks

Several potential landslides and areas of slope instability were identified during our investigation. However, it appears that the proposed project layout has been made to avoid these areas. Our recommendations for building and leach field setbacks are presented in the “Earthwork” section of this report.

5.1.6 Presence of Cohesionless Soils

As mentioned, some areas of the site are underlain by cohesionless, sandy soils with low fines content. The sandy soils may not stand vertical when excavated and excavation sidewalls for foundations, utility trenches, temporary slopes, basement excavation, etc., may cave in or accumulate significant amount of slough. Grading and excavation contractors should be made aware of this condition and plan on forming footings, preparing slab-on-grade subgrade just prior to concrete placement, and other similar construction issues as relates to temporary shoring, utility excavations, etc. Our recommendations for excavation of cohesionless soils are presented in the “Earthwork” section of this report.

5.1.7 Potential for Difficult Excavation

Our borings encountered moderately hard, moderately to deeply weathered Tahana Claystone and Sandstone. Based on the project plans, excavations into claystone and sandstone is anticipated and should be anticipated. In our opinion, moderately to deeply weathered areas of bedrock would be excavatable with heavy-duty excavating equipment (such as large backhoes or excavators). However, slightly weathered to fresh bedrock areas, if encountered, will likely require excavation with a hoe-ram. Additionally, drilled pier contractors should anticipate difficult drilling conditions and should be experienced in drilling in bedrock conditions and the use of appropriate equipment (such as coring barrels) to advance the piers to design depths. Additional recommendations are provided in the “Earthwork” and “Foundation” sections of this report.

5.1.8 Soil Corrosion Potential

Soil corrosion screening was not performed during our investigation; however, based on our experience with similar soil, the subsurface soil is likely to be considered corrosive to buried metal and potentially concrete as well. We recommend soil corrosion screening be performed during design.

5.2 PLANS AND SPECIFICATIONS REVIEW

We recommend that we be retained to review the geotechnical aspects of the project structural, civil, and landscape plans and specifications, allowing sufficient time to provide the design team with any comments prior to issuing the plans for construction.

5.3 CONSTRUCTION OBSERVATION AND TESTING

As site conditions may vary significantly between the small-diameter borings performed during this investigation, we also recommend that a Cornerstone representative be present to provide geotechnical observation and testing during earthwork and foundation construction. This will allow us to form an opinion and prepare a letter at the end of construction regarding contractor compliance with project plans and specifications, and with the recommendations in our report. We will also be allowed to evaluate any conditions differing from those encountered during our investigation, and provide supplemental recommendations as necessary. For these reasons, the recommendations in this report are contingent of Cornerstone providing observation and testing during construction. Contractors should provide at least a 48-hour notice when scheduling our field personnel.

SECTION 6: EARTHWORK

6.1 SITE DEMOLITION

All existing improvements not to be reused for the current development, including all foundations, flatwork, pavements, utilities, and other improvements should be demolished and removed from the site. Recommendations in this section apply to the removal of these improvements, which may be present on the site, prior to the start of mass grading or the construction of new improvements for the project. It is noted that “unknown” buried structures such as septic systems, leach fields, seepage piles, debris pits, and/or wells, etc. may be encountered during grading. If these are encountered during grading, we should provide recommendations to address them on a case-by-case basis.

Cornerstone should be notified prior to the start of demolition, and should be present on at least a part-time basis during all backfill and mass grading as a result of demolition.

6.1.1 Abandonment of Existing Utilities

All utilities should be completely removed from within planned building areas. For any utility line to be considered acceptable to remain within building areas, the utility line must be completely backfilled with grout or sand-cement slurry (sand slurry is not acceptable), the ends outside the building area capped with concrete, and the trench fills either removed and replaced as engineered fill with the trench side slopes flattened to at least 1:1, or the trench fills are determined not to be a risk to the structure. The assessment of the level of risk posed by the particular utility line will determine whether the utility may be abandoned in place or needs to be completely removed. The contractor should assume that all utilities will be removed from within building areas unless provided written confirmation from both the owner and the geotechnical engineer.

Utilities extending beyond the building area may be abandoned in place provided the ends are plugged with concrete, they do not conflict with planned improvements, and that the trench fills do not pose significant risk to the planned surface improvements.

The risk for owners associated with abandoning utilities in place include the potential for future differential settlement of existing trench fills, and/or partial collapse and potential ground loss into utility lines that are not completely filled with grout.

6.2 SITE CLEARING AND PREPARATION

6.2.1 Site Stripping

The site should be stripped of all surface vegetation, and surface and subsurface improvements to be removed within the proposed development area. Demolition of existing improvements is discussed in the prior paragraphs. A detailed discussion of removal of existing fills is provided later in this report. Surface vegetation and topsoil should be stripped to a sufficient depth to remove all material greater than 3 percent organic content by weight. Based on our site observations, surficial stripping should extend about 4 to 6 inches below existing grade in vegetated areas.

6.2.2 Tree and Shrub Removal

Trees and shrubs designated for removal should have the root balls and any roots greater than ½-inch diameter removed completely. Mature trees are estimated to have root balls extending to depths of 2 to 4 feet, depending on the tree size. Significant root zones are anticipated to extend to the diameter of the tree canopy. Grade depressions resulting from root ball removal should be cleaned of loose material and backfilled in accordance with the recommendations in the “Compaction” section of this report.

6.3 REMOVAL OF EXISTING FILLS

As discussed, our borings encountered undocumented fill to depths of 3½ feet and two fill berms observed directly west of and within the east side of the vet/admin building footprint that may be up to 10 feet thick, much of this fill will likely be removed during grading. In addition, we anticipate up to several feet of undocumented fill may be encountered below and in the vicinity of the existing caretaker’s residence due to previous site grading activities. All fills should be completely removed from within building areas and tank areas, and to a lateral distance of at least 5 feet beyond the building footprint or to a lateral distance equal to fill depth below the perimeter footing, whichever is greater. We also recommend that all undocumented fill be removed from pavement and flatwork areas. Provided the fills meet the “Material for Fill” requirements below, the fills may be reused when backfilling the excavations. Based on review of the fill berms, the material may be reused if all debris, wood, trash, and other unsuitable material is screened out of the remaining material and removed from the site. If materials are encountered that do not meet the requirements, such as debris, wood, trash, those materials should screened out of the remaining material and be removed from the site. Backfill of excavations should be placed in lifts and compacted in accordance with the “Compaction” section below.

6.4 BUILDING AND LEACH FIELD SETBACKS

In general, we recommend that the proposed buildings, equipment pads, and water tanks be setback at least 25 feet from the mapped landslides and 15 feet from the top of slopes. Where structures are within 15 feet of a slope, we recommend they be supported on drill piers designed in accordance with the recommendations in this report. This would apply to the caretaker residence, fire prevention and domestic water tank pads and associated pump stations, maintenance building, and administration/veterinary clinic building. We note that one of the cat enclosures is positioned about 10 feet away from the top of Landslide #2. We note that EB-7 was drilled between the Cat Enclosure and the top of Landslide #2. Since the boring disclosed that the sandstone bedrock is at a shallow depth in this area, the location of this Cat Enclosure is acceptable from a geologic viewpoint. The leach field should be set back at least 50 feet from the top of the mapped landslides. General recommendations for release of water onto the slopes is presented in the “Site Drainage” portion of this report.

6.5 TEMPORARY CUT AND FILL SLOPES

The contractor is responsible for maintaining all temporary slopes and providing temporary shoring where required. Temporary shoring, bracing, and cuts/fills should be performed in accordance with the strictest government safety standards. On a preliminary basis, the upper 10 feet at the site may be classified as OSHA Soil Type C materials. A Cornerstone representative should be retained to confirm the preliminary site classification.

Excavations performed during site demolition and fill removal should be sloped at no greater than 1:1 (horizontal:vertical) within the upper 5 feet below building subgrade, unless the OSHA soil classification indicates that slope should be flatter.

6.6 SUBGRADE PREPARATION

After site clearing and demolition is complete, and prior to backfilling any excavations resulting from fill removal or demolition, the excavation subgrade and subgrade within areas to receive additional site fills, slabs-on-grade and/or pavements should be scarified to a depth of 6 inches, moisture conditioned, and compacted in accordance with the “Compaction” section below.

6.7 SUBGRADE STABILIZATION MEASURES

Soil subgrade and fill materials, especially soils with high fines contents such as clays and silty soils, can become unstable due to high moisture content, whether from natural high in-situ moisture contents or from winter rains. As the moisture content increases over the laboratory optimum, it becomes more likely the materials will be subject to softening and yielding (pumping) from construction loading or become unworkable during placement and compaction.

There are several potential methods to address potential unstable soil conditions and facilitate fill placement and trench backfill. Some of the methods are briefly discussed below. Implementation of the appropriate stabilization measures should be evaluated on a case-by-case basis according to the project construction goals and the particular site conditions.

6.7.1 Scarification and Drying

The subgrade may be scarified to a depth of 12 to 18 inches and allowed to dry to near optimum conditions, if sufficient dry weather is anticipated to allow sufficient drying. More than one round of scarification may be needed to break up the soil clods.

6.7.2 Removal and Replacement

As an alternative to scarification, the contractor may choose to over-excavate the unstable soils and replace them with dry on-site or import materials. A Cornerstone representative should be present to provide recommendations regarding the appropriate depth of over-excavation, whether a geosynthetic (stabilization fabric or geogrid) is recommended, and what materials are recommended for backfill.

6.7.3 Chemical Treatment

Where the unstable area exceeds about 5,000 to 10,000 square feet and/or site winterization is desired, chemical treatment with quicklime (CaO), kiln-dust, or cement may be more cost-effective than removal and replacement. Recommended chemical treatment depths will typically range from 12 to 18 inches depending on the magnitude of the instability.

6.8 MATERIAL FOR FILL

6.8.1 Re-Use of On-site Soils

On-site soils with an organic content less than 3 percent by weight may be reused as general fill below the non-expansive fill section. General fill should not have lumps, clods or cobble pieces larger than 6 inches in diameter; 85 percent of the fill should be smaller than 2½ inches in diameter. Minor amounts of oversize material (smaller than 12 inches in diameter) may be allowed provided the oversized pieces are not allowed to nest together and the compaction method will allow for loosely placed lifts not exceeding 12 inches.

6.8.2 Potential Import Sources

Imported and non-expansive material should be inorganic with a Plasticity Index (PI) of 15 or less, and not contain recycled asphalt concrete where it will be used within the habitable building areas. To prevent significant caving during trenching or foundation construction, imported material should have sufficient fines. Samples of potential import sources should be delivered to our office at least 10 days prior to the desired import start date. Information regarding the import source should be provided, such as any site geotechnical reports. If the material will be derived from an excavation rather than a stockpile, potholes will likely be required to collect samples from throughout the depth of the planned cut that will be imported. At a minimum, laboratory testing will include PI tests. Material data sheets for select fill materials (Class 2 aggregate base, ¾-inch crushed rock, quarry fines, etc.) listing current laboratory testing data (not older than 6 months from the import date) may be provided for our review without providing a sample. If current data is not available, specification testing will need to be completed prior to approval.

Environmental and soil corrosion characterization should also be considered by the project team prior to acceptance. Suitable environmental laboratory data to the planned import quantity should be provided to the project environmental consultant; additional laboratory testing may be required based on the project environmental consultant's review. The potential import source should also not be more corrosive than the on-site soils, based on pH, saturated resistivity, and soluble sulfate and chloride testing.

6.8.3 Non-Expansive Fill Using Lime Treatment

As discussed above, non-expansive fill should have a Plasticity Index (PI) of 15 or less. Due to the high clay content and PI of the on-site soil and bedrock materials, it is not likely that sufficient quantities of non-expansive fill would be generated from cut materials. As an alternative to importing non-expansive fill, chemical treatment can be considered to create non-expansive fill. If this option is considered, additional laboratory tests should be performed prior to initial site grading to further evaluate the optimum percentage of quicklime required.

6.9 COMPACTION REQUIREMENTS

All fills, and subgrade areas where fill, slabs-on-grade, and pavements are planned, should be placed in loose lifts 8 inches thick or less and compacted in accordance with ASTM D1557 (latest version) requirements as shown in the table below. In general, clayey soils should be compacted with sheepsfoot equipment and sandy/gravelly soils with vibratory equipment; open-graded materials such as crushed rock should be placed in lifts no thicker than 18 inches consolidated in place with vibratory equipment. Each lift of fill and all subgrade should be firm and unyielding under construction equipment loading in addition to meeting the compaction requirements to be approved. The contractor (with input from a Cornerstone representative) should evaluate the in-situ moisture conditions, as the use of vibratory equipment on soils with high moistures can cause unstable conditions. General recommendations for soil stabilization are provided in the "Subgrade Stabilization Measures" section of this report. Where the soil's PI is 20 or greater, the expansive soil criteria should be used.

Table 2: Compaction Requirements

Description	Material Description	Minimum Relative[1] Compaction (percent)	Moisture[2] Content (percent)
General Fill (within upper 5 feet)	On-Site Expansive Soils	87 – 92	>3
	Low Expansion Soils	90	>1
General Fill (below a depth of 5 feet)	On-Site Expansive Soils	95	>3
	Low Expansion Soils	95	>1
Trench Backfill	On-Site Expansive Soils	87 – 92	>3
Trench Backfill	Low Expansion Soils	90	>1
Trench Backfill (upper 6 inches of subgrade)	On-Site Low Expansion Soils	95	>1
Crushed Rock Fill	¾-inch Clean Crushed Rock	Consolidate In-Place	NA
Non-Expansive Fill	Imported Non-Expansive Fill	90	Optimum
Flatwork Subgrade	On-Site Expansive Soils	87 - 92	>3
Flatwork Subgrade	Low Expansion Soils	90	>1
Flatwork Aggregate Base	Class 2 Aggregate Base[3]	90	Optimum
Pavement Subgrade	On-Site Expansive Soils	87 - 92	>3
Pavement Subgrade	Low Expansion Soils	95	>1
Pavement Aggregate Base	Class 2 Aggregate Base[3]	95	Optimum
Asphalt Concrete	Asphalt Concrete	95 (Marshall)	NA

1 – Relative compaction based on maximum density determined by ASTM D1557 (latest version)
2 – Moisture content based on optimum moisture content determined by ASTM D1557 (latest version)
3 – Class 2 aggregate base shall conform to Caltrans Standard Specifications, latest edition, except that the relative compaction should be determined by ASTM D1557 (latest version)

6.9.1 Construction Moisture Conditioning

Expansive soils can undergo significant volume change when dried then wetted. The contractor should keep all exposed expansive soil subgrade (and also trench excavation side walls) moist until protected by overlying improvements (or trenches are backfilled). If expansive soils are allowed to dry out significantly, re-moisture conditioning may require several days of re-wetting (flooding is not recommended), or deep scarification, moisture conditioning, and re-compaction.

6.10 TRENCH BACKFILL

Utility lines constructed within public right-of-way should be trenched, bedded and shaded, and backfilled in accordance with the local or governing jurisdictional requirements. Utility lines in private improvement areas should be constructed in accordance with the following requirements unless superseded by other governing requirements.

All utility lines should be bedded and shaded to at least 6 inches over the top of the lines with crushed rock (⅜-inch-diameter or greater) or well-graded sand and gravel materials conforming to the pipe manufacturer's requirements. Open-graded shading materials should be consolidated in place with vibratory equipment and well-graded materials should be compacted to at least 90 percent relative compaction with vibratory equipment prior to placing subsequent backfill materials.

General backfill over shading materials may consist of on-site native materials provided they meet the requirements in the "Material for Fill" section, and are moisture conditioned and compacted in accordance with the requirements in the "Compaction" section.

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

On expansive soils sites it is desirable to reduce the potential for water migration into building and pavement areas through the granular shading materials. We recommend that a plug of low-permeability clay soil, sand-cement slurry, or lean concrete be placed within trenches just outside where the trenches pass into building and pavement areas.

6.11 PERMANENT CUT AND FILL SLOPES

All permanent cut and fill slopes in soil should have a maximum inclination of 2:1 (horizontal:vertical) for slopes up to 10 feet high; slopes greater than 10 feet should be inclined at no greater than 2.5:1 (H:V). Fill slopes should be overbuilt and trimmed back, exposing engineered fill when complete. We would also recommend that in the building areas cuts be limited to 3 feet to reduce the potential for heave in the claystone bedrock. Refer to the "Erosion Control" section of this report for a discussion regarding protection of slope surfaces.

6.11.1 Keyways and Benches

Fill placed on existing ground inclined at 6:1 or greater should be benched into the existing slope and a keyway constructed at the toe of the fill. Benches should be angled slightly into the slope be spaced vertically at no greater than 4 feet between benches, and be at least 8 feet wide. Depending on the thickness of any colluvial/residual soil layer that blankets the bedrock, the benches may need to be widened beyond the minimum width to extend into competent bedrock. The keyway should also be angled slightly into the slope (minimum 2 percent inclination), extend at least 2 feet into moderately weathered bedrock, and be at least 12 feet wide. A typical key and construction is depicted in Figure 8.

6.11.2 Fill Drainage

A permanent subsurface drainage system consisting of a series of perforated gravity pipes or drainage strips should be constructed between engineered fill placed against a bedrock slope and within all keyways. This system is intended to intercept perched water flowing through the bedrock and transmit it to suitable outlet structures and reduce the potential for hydrostatic pressures building up behind the fills and causing slope instability. The drain lines should be placed at the back of the keyways and benches. Bench drains should be spaced vertically at no greater than 10 feet.

The drainage system should be constructed in small trenches or v-ditches and consist of a minimum 4-inch-diameter perforated (perforations placed downward) pipe, bedded and shaded in Caltrans Class 2 Permeable Material (latest version) or ¾-inch crushed rock; if crushed rock is used, the rock should be encapsulated in filter fabric (Mirafi 140N or equivalent). The bedding should be at least 2 inches, and the trench should be at least 8 inches in width and depth. Alternatively, geocomposite strip drains may be used. All drainage lines should slope towards suitable outlet structures at an inclination of at least 0.5 percent. Suitable outlet structures may consist of connecting the drainage lines to a storm drain system, with a sump if required; if the drain lines will outlet overland at the toe of the slope, an appropriate rock spill pad should be provided; the drain lines should not outlet onto the slope.

Vertical cleanouts should be provided at all upslope ends of the drainage lines and at all 90-degree bends.

6.11.3 Plan Review and Construction Monitoring

We should be retained to review the conceptual grading and sub-drainage plans and we can provide more specific input regarding the location of keyways and fill drainage for the final plans. A Cornerstone representative should be on site during keyway and fill slope construction. Field modifications to the planned keyway and benching may be required based on encountered field conditions. In addition, it has been our experience that cut slopes in the Tahana Formation are prone to localized weak zones and sloughing along bedding planes. We recommend that a Cornerstone engineering geologist observe the condition of all cut slopes and evaluate the potential for localized adverse materials or bedding orientation.

We recommend that the project civil engineer or land surveyor be retained to survey in place all keyways, sub-drainage lines, solid pipes, and cleanouts, and create an as-built plan. This plan will be of use for any future maintenance or repair work.

6.12 CUT/FILL TRANSITION OVER-EXCAVATION

Structures underlain by cut/fill transitions should be over-excavated to provide a relatively uniform fill thickness beneath the structure footprint. The depth of over-excavation below pad grade should be equal to at least 3 feet below the bottom of foundations to provide a uniform engineered fill pad. The final depth of the over-excavation will depend on the type of material exposed, and will be determined in the field during construction. In general, over-excavation should extend to at least 5 feet beyond the building footprint. Adjustments to the depth and lateral limits of the over-excavation may need to be made at the time of construction depending on the actual conditions encountered during grading.

6.13 SITE DRAINAGE

6.13.1 Surface Drainage

Surface runoff should not be allowed to flow over the top of or pond at the top or toe of engineered slopes or retaining walls. We recommend that the development runoff be directed through solid drain pipes to suitable discharge facilities located well downslope of the developed areas. Alternatively, runoff may be directed in solid pipes to the existing stock ponds located in the western and in the eastern portions of the site. Discharge areas for runoff should be setback a minimum distance of 100 feet from identified landslides scarps. Runoff should not be allowed to flow over the steep to very steep slopes that are adjacent to the north property line. Ponding should also not be allowed on or adjacent to building foundations, slabs-on-grade, or pavements. Hardscape surfaces should slope at least 2 percent towards suitable discharge facilities; landscape areas should slope at least 3 percent towards suitable discharge facilities. Roof runoff should be directed away from building areas in closed conduits, to approved infiltration facilities, or on to hardscaped surfaces that drain to suitable facilities. Retention, detention or infiltration facilities should be spaced at least 10 feet from buildings, and preferably at least 5 feet from slabs-on-grade or pavements. These facilities are not recommended where stormwater infiltration may affect slopes at lower elevations on or adjacent to the site. However, if slopes are not present at lower elevations that could potentially be affected, and if retention, detention or infiltration facilities are located within these zones, we recommend that these treatment facilities meet the requirements in the Storm Water Treatment Design Considerations section of this report.

Lined v-ditches should be included at the top of slopes and intermediate benches, and at the toe of slopes or behind retaining walls adjacent to planned or existing development. All v-ditches and drain inlets should be sized to accommodate the design storm events for the upslope tributary area. Concrete-lined v-ditches should be reinforced as required and have adequate control and construction joints, and should be constructed neat in excavations; backfill around formed ditches should not be allowed.

Upslope sources of water should be evaluated. If upslope irrigation of is present or planned, additional surface and subsurface drainage, or construction of drained buttress fills may be needed to protect site improvements. We should be consulted if this issue will affect the project.

We recommend that the septic leach fields are designed to disperse effluent over as large an area as practicable, or alternatively, that the effluent be directed deeper into the subsurface profile within sandstone that underlies the surficial soils and claystone layers. The infiltration or percolation rate should be evaluated by the leach field designer.

6.13.2 Subsurface Drainage

As discussed in the “Permanent Cut and Fill Slopes” section, subsurface drainage improvements might be installed as part of earthwork for fill construction if perched groundwater is observed. These improvements should include positive surface gradients for keyways and benches and the installation of a subdrain system consisting of perforated pipe and permeable gravel or drain rock. If drain rock is used, the rock and pipe should be entirely wrapped with a permeable geotextile fabric. Subdrains should also be installed at the toe of any proposed cut slopes depending on the actual conditions observed during construction. As previously discussed, a conceptual subdrain plan should be prepared once preliminary grading plans are finalized. The actual location of subdrains should be determined in the field at the time of construction.

6.14 LOW-IMPACT DEVELOPMENT (LID) IMPROVEMENTS

The Municipal Regional Permit (MRP) requires regulated projects to treat 100 percent of the amount of runoff identified in Provision C.3.d from a regulated project’s drainage area with low impact development (LID) treatment measures onsite or at a joint stormwater treatment facility. LID treatment measures are defined as rainwater harvesting and use, infiltration, evapotranspiration, or biotreatment. A biotreatment system may only be used if it is infeasible to implement harvesting and use, infiltration, or evapotranspiration at a project site.

Technical infeasibility of infiltration may result from site conditions that restrict the operability of infiltration measures and devices. Various factors affecting the feasibility of infiltration treatment may create an environmental risk, structural stability risk, or physically restrict infiltration. The presence of any of these limiting factors may render infiltration technically infeasible for a proposed project. To aid in determining if infiltration may be feasible at the site, we provide the following site information regarding factors that may aid in determining the feasibility of infiltration facilities at the site.

- The near-surface soils at the site are clayey, and categorized as Hydrologic Soil Group D, and is expected to have infiltration rates of less than 0.2 inches per hour. In our opinion, these clayey soils will significantly limit the infiltration of stormwater.

- No groundwater production wells are within 100 feet of potential locations for infiltration facilities.

- The site is not known, to our knowledge, to have pollutants with the potential for mobilization as a result of stormwater infiltration.

- The site has a known geotechnical hazard consisting of steep slopes and areas with landslide potential; therefore, stormwater infiltration facilities may not be feasible.

- In our opinion, infiltration locations within 10 feet of the buildings and top of slopes or on the slopes would create a geotechnical hazard.

6.14.1 Storm Water Treatment Design Considerations

If storm water treatment improvements, such as shallow bio-retention swales, basins or pervious pavements, are required as part of the site improvements to satisfy Storm Water Quality (C.3) requirements, we recommend the following items be considered for design and construction.

6.14.1.1 General Bioswale Design Guidelines

- If possible, avoid placing bioswales or basins within 10 feet of the building perimeter or within 5 feet of exterior flatwork or pavements. If bioswales must be constructed within these setbacks, the side(s) and bottom of the trench excavation should be lined with 10-mil visqueen to reduce water infiltration into the surrounding expansive clay.

- Bioswales constructed within 3 feet of proposed buildings may be within the foundation zone of influence for perimeter wall loads. Therefore, where bioswales will parallel foundations and will extend below the "foundation plane of influence," an imaginary 1:1 plane projected down from the bottom edge of the foundation, the foundation will need to be deepened so that the bottom edge of the bioswale filter material is above the foundation plane of influence.

- The bottom of bioswale or detention areas should include a perforated drain placed at a low point, such as a shallow trench or sloped bottom, to reduce water infiltration into the surrounding soils near structural improvements, and to address the low infiltration capacity of the on-site clay soils.

6.14.1.2 Bioswale Infiltration Material

- Gradation specifications for bioswale filter material, if required, should be specified on the grading and improvement plans.

- Compaction requirements for bioswale filter material in non-landscaped areas or in pervious pavement areas, if any, should be indicated on the plans and specifications to satisfy the anticipated use of the infiltration area.

- If required, infiltration (percolation) testing should be performed on representative samples of potential bioswale materials prior to construction to check for general conformance with the specified infiltration rates.

- It should be noted that multiple laboratory tests may be required to evaluate the properties of the bioswale materials, including percolation, landscape suitability and possibly environmental analytical testing depending on the source of the material. We recommend that the landscape architect provide input on the required landscape suitability tests if bioswales are to be planted.

- If bioswales are to be vegetated, the landscape architect should select planting materials that do not reduce or inhibit the water infiltration rate, such as covering the bioswale with grass sod containing a clayey soil base.

- If required by governing agencies, field infiltration testing should be specified on the grading and improvement plans. The appropriate infiltration test method, duration and frequency of testing should be specified in accordance with local requirements.

- Due to the relatively loose consistency and/or high organic content of many bioswale filter materials, long-term settlement of the bioswale medium should be anticipated. To reduce initial volume loss, bioswale filter material should be wetted in 12 inch lifts during placement to pre-consolidate the material. Mechanical compaction should not be allowed, unless specified on the grading and improvement plans, since this could significantly decrease the infiltration rate of the bioswale materials.

- It should be noted that the volume of bioswale filter material may decrease over time depending on the organic content of the material. Additional filter material may need to be added to bioswales after the initial exposure to winter rains and periodically over the life of the bioswale areas, as needed.

6.14.1.3 Bioswale Construction Adjacent to Pavements

If bio-infiltration swales or basins are considered adjacent to proposed parking lots or exterior flatwork, we recommend that mitigative measures be considered in the design and construction of these facilities to reduce potential impacts to flatwork or pavements. Exterior flatwork, concrete curbs, and pavements located directly adjacent to bio-swales may be susceptible to settlement or lateral movement, depending on the configuration of the bioswale and the setback between the improvements and edge of the swale. To reduce the potential for distress to these improvements due to vertical or lateral movement, the following options should be considered by the project civil engineer:

- Improvements should be setback from the vertical edge of a bioswale such that there is at least 1 foot of horizontal distance between the edge of improvements and the top edge of the bioswale excavation for every 1 foot of vertical bioswale depth, or

- Concrete curbs for pavements, or lateral restraint for exterior flatwork, located directly adjacent to a vertical bioswale cut should be designed to resist lateral earth pressures in accordance with the recommendations in the "Retaining Walls" section of this report, or concrete curbs or edge restraint should be adequately keyed into the native soil or engineered to reduce the potential for rotation or lateral movement of the curbs.

6.15 PERMANENT EROSION CONTROL MEASURES

Hillside grading will require periodic maintenance after construction to reduce the potential for erosion and sloughing. At a minimum all slopes should be vegetated by hydroseeding or other landscape ground cover. The establishment of vegetation will help reduce runoff velocities, allow some infiltration and transpiration, trap sediment within runoff, and protect the soil from raindrop impact. Depending on the exposed material type and the slope inclination, more aggressive erosion control measures may be needed to protect slopes for one or more winter seasons while vegetation is establishing. For slopes with inclinations of 2:1 (horizontal:vertical) or greater, erosion control may consist of straw matting, or erosion control blankets used in combination with hydroseeding.

Both construction and post-construction Storm Water Pollution Prevention Plans (SWPPPs) should be prepared for the project-specific requirements. We recommend that final grading plans be provided for our review.

6.16 LANDSCAPE CONSIDERATIONS

Since the near-surface soils are moderately to highly expansive, we recommend greatly reducing the amount of surface water infiltrating these soils near foundations and exterior slabs-on-grade. This can typically be achieved by:

- Using drip irrigation
- Avoiding open planting within 3 feet of the building perimeter or near the top of existing slopes
- Regulating the amount of water distributed to planter areas by using irrigation timers
- Selecting landscaping that requires little or no watering, especially near foundations.

We recommend that the landscape architect consider these items when developing landscaping plans.

SECTION 7: FOUNDATIONS

7.1 SUMMARY OF RECOMMENDATIONS

In our opinion, the proposed structures may be supported on shallow foundations and/or drilled piers provided the recommendations in the “Earthwork” section and the sections below are followed.

7.2 SEISMIC DESIGN CRITERIA

Our explorations generally encountered colluvium and residual soil overlying Tahana Formation claystone and sandstone to depths of 21½ feet, the maximum depth explored. Based on our borings and review of local geology, the site is underlain by shallow alluvial soils underlain by shallow rock with typical SPT “N” values above 50 blows per foot. Therefore, we have classified the site as Soil Classification C. The mapped spectral acceleration parameters S_s and S_1 were calculated using the web-based program ATC Hazards by Locations, located at https://hazards.atcouncil.org/, based on the site coordinates presented below and the site classification. Recommended values for design are presented in Table 3. The table below lists the various factors used to determine the seismic coefficients and other parameters.

Table 3: 2019 CBC Site Categorization and Site Coefficients

Classification/Coefficient	Design Value
Site Class	D
Site Latitude	37.302572°
Site Longitude	-122.279724°
0.2-second Period Mapped Spectral Acceleration[1], S_S	2.11g
1-second Period Mapped Spectral Acceleration[1], S_1	0.815g
Short-Period Site Coefficient – Fa	1.2
Long-Period Site Coefficient – Fv	1.4
0.2-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects - S_{MS}	2.532g
1-second Period, Maximum Considered Earthquake Spectral Response Acceleration Adjusted for Site Effects – S_{M1}	1.141g
0.2-second Period, Design Earthquake Spectral Response Acceleration – S_{DS}	1.688g
1-second Period, Design Earthquake Spectral Response Acceleration – S_{D1}	0.76g
MCE_G Peak Ground Acceleration – PGA	0.929g
Site Amplification Factor at PGA – F_{PGA}	1.2
Site Modified Peak Ground Acceleration – PGA_M	1.114g

7.3 SHALLOW FOUNDATIONS

7.3.1 Spread Footings – Animal Barn and Enclosed Dog Arena

The proposed animal barn and enclosed dog arena may be supported on shallow spread footings. Spread footings should bear on natural, undisturbed soil or engineered fill, be at least 12 inches wide, and extend at least 30 inches below the lowest adjacent grade. Lowest adjacent grade is defined as the deeper of the following: 1) bottom of the adjacent interior slab-on-grade, or 2) finished exterior grade, excluding landscaping topsoil. The deeper footing embedment is due to the presence of highly expansive soils, and is intended to embed the footing below the zone of significant seasonal moisture fluctuation, reducing the potential for differential movement.

Footings constructed to the above dimensions and in accordance with the “Earthwork” recommendations of this report are capable of supporting maximum allowable bearing pressures of 2,500 psf for dead loads, 3,750 psf for combined dead plus live loads, and 5,000 psf for all loads including wind and seismic. These pressures are based on factors of safety of 3.0, 2.0, and 1.5 applied to the ultimate bearing pressure for dead, dead plus live, and all loads, respectively. These pressures are net values; the weight of the footing may be neglected for the portion of the footing extending below grade (typically, the full footing depth). Top and bottom mats of reinforcing steel should be included in continuous footings to help span irregularities and differential settlement.

7.3.2 Footing Settlement

Structural loads were not provided to us at the time this report was prepared; therefore, we assumed isolated column loading of 30 to 50 kips. Based on the assumed loading and the allowable bearing pressures presented above, we estimate that the total static footing settlement will be on the order of ½-inch, with about ¼-inch of post-construction differential settlement between adjacent foundation elements. As our footing loads were assumed, we recommend we be retained to review the final footing layout and loading, and verify the settlement estimates above.

7.3.3 Lateral Loading

Lateral loads may be resisted by friction between the bottom of footing and the supporting subgrade, and also by passive pressures generated against footing sidewalls. An ultimate frictional resistance of 0.45 applied to the footing dead load, and an ultimate passive pressure based on an equivalent fluid pressure of 450 pcf may be used in design. The structural engineer should apply an appropriate factor of safety (such as 1.5) to the ultimate values above. Where footings are adjacent to landscape areas without hardscape, the upper 12 inches of soil should be neglected when determining passive pressure capacity.

7.3.4 Spread Footing Construction Considerations

Where utility lines will cross perpendicular to strip footings, the footing should be deepened to encase the utility line, providing sleeves or flexible cushions to protect the pipes from anticipated foundation settlement, or the utility lines should be backfilled to the bottom of footing with sand-cement slurry or lean concrete. Where utility lines will parallel footings and will extend below the “foundation plane of influence,” an imaginary 1:1 plane projected down from the bottom edge of the footing, either the footing will need to be deepened so that the pipe is above the foundation plane of influence or the utility trench will need to be backfilled with sand-cement slurry or lean concrete within the influence zone. Sand-cement slurry used within foundation influence zones should have a minimum compressive strength of 75 psi.

Footing excavations should be filled as soon as possible or be kept moist until concrete placement by regular sprinkling to prevent desiccation. A Cornerstone representative should observe all footing excavations prior to placing reinforcing steel and concrete. If there is a significant schedule delay between our initial observation and concrete placement, we may need to re-observe the excavations.

7.4 DRILLED PIER FOUNDATIONS – CARETAKER RESIDENCE, MAINTENANCE BUILDING, VETERINARY/ADMINISTRATION BUILDING, AND FIRE PREVENTION AND DOMESTIC WATER TANK PADS AND PUMP STATIONS

As discussed, the proposed caretaker residence, maintenance building, and fire prevention and domestic water tank pads and associated pump stations sit near/at the top of a slope while the veterinary/admin building is in close proximity to the landslide labeled Qls #2 on our Site Plan. We recommend that these structures be supported on drilled, cast-in-place, straight-shaft friction piers with a structural slab spanning between. The piers should have a minimum diameter of 18 inches and extend to a depth of at least 10 feet into bedrock beneath the fill, residual soils, and colluvium. In areas of the building where there will be cuts into the claystone greater than 3 feet, we recommend the minimum pier embedment be increased to 15 feet into bedrock. Adjacent piers centers should be spaced at least three diameters apart, otherwise, a reduction for group effects may be required. Grade beams should span between piers and/or pier caps in accordance with structural requirements. Conventional slabs-on-grade may be used provided the subgrade soils are prepared in accordance with the "Earthwork" section.

7.4.1 Vertical Capacity and Estimated Settlement

The vertical capacity of the piers may be designed based on an allowable skin friction of 750 psf for combined dead plus live loads based on a factor of safety of 2.0; dead loads should not exceed two-thirds of the allowable capacities. The allowable skin friction may be increased by one-third for wind and seismic loads. Frictional resistance to uplift loads may be developed along the pier shafts based on an ultimate frictional resistance of 450 psf; the structural engineer should apply an appropriate factor of safety (such as 1.5) to the ultimate uplift capacity.

Total settlement of individual piers should not exceed ½-inch to mobilize static capacities and post-construction differential settlement between each pier should not exceed ¼-inch due to static loads.

7.4.2 Lateral Capacity

Lateral loads exerted on the structure may be resisted by a passive resistance based on an ultimate equivalent fluid pressure of 450 pcf acting against twice the projected area of piers below the pier cap or grade beam. The lateral pressure may be increased up to a maximum uniform pressure of 4,000 psf at depth. The upper 5 feet of soil should be neglected when determining lateral capacity due to the sloping ground conditions. The structural engineer should apply an appropriate factor of safety to the ultimate passive pressures.

7.4.3 Construction Considerations

The excavation of all drilled shafts should be observed by a Cornerstone representative to confirm the soil profile, verify that the piers extend the minimum depth into suitable materials and that the piers are constructed in accordance with our recommendations and project requirements. The drilled shafts should be straight, dry, and relatively free of loose material before reinforcing steel is installed and concrete is placed. If groundwater cannot be removed from the excavations prior to concrete placement, drilling slurry or casing may be required to stabilize the shaft and the concrete should be placed using a tremie pipe, keeping the tremie pipe below the surface of the concrete to avoid entrapment of water or drilling slurry in the concrete.

Based on our explorations, medium dense to dense clayey sands were encountered at the site. We performed our borings with hollow-stem auger drilling equipment and as such were not able to evaluate the potential for caving soils, which can create difficult drilling conditions. Additionally, the soils are generally fill material and may contain adverse materials. The contractor should plan on encountering potentially caving soils and other materials that may require casing or other stability measures to prevent caving and sloughing into the pier foundations.

Contractors should note that embedment is into bedrock materials, and difficult drilling conditions may occur. Equipment capable of excavating the rock materials will be required. Equipment that includes rock bits, core barrels, downhole percussion hammers, and techniques such as pilot holes may also be required and should be anticipated.

SECTION 8: CONCRETE SLABS AND PEDESTRIAN PAVEMENTS

8.1 SLABS-ON-GRADE

The structural engineer should determine the appropriate slab reinforcement for the loading requirements and considering the expansion potential of the underlying soils. For unreinforced concrete slabs, ACI 302.1R recommends limiting control joint spacing to 24 to 36 times the slab thickness in each direction, or a maximum of 18 feet.

8.1.1 Animal Barn

As the Plasticity Index (PI) of the surficial soils ranges up to 34, the proposed interior slabs-on-grade should be at supported on at least 18 inches of non-expansive fill (NEF) to reduce the potential for slab damage due to soil heave. The NEF layer should be constructed over subgrade prepared in accordance with the recommendations in the “Earthwork” section of this report. If moisture-sensitive floor coverings are planned, the recommendations in the “Interior Slabs Moisture Protection Considerations” section below may be incorporated in the project design if desired. If significant time elapses between initial subgrade preparation and slab-on-grade NEF construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil has been allowed to dry out, the subgrade should be re-moisture conditioned to at least 3 percent over the optimum moisture content.

8.1.2 Cat and Dog Enclosures

As the Plasticity Index (PI) of the surficial soils ranges up to 34, the proposed slabs-on-grade should be supported on at least 12 inches of non-expansive fill (NEF) to reduce the potential for slab damage due to soil heave. Per discussions with the design team, we understand that the cat and dog enclosures are not sensitive structures and some movement of the slabs-on-grade might occur and is considered acceptable. The NEF layer should be constructed over subgrade prepared in accordance with the recommendations in the “Earthwork” section of this report. If moisture-sensitive floor coverings are planned, the recommendations in the “Interior Slabs Moisture Protection Considerations” section below may be incorporated in the project design if desired. If significant time elapses between initial subgrade preparation and slab-on-grade NEF construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil has been allowed to dry out, the subgrade should be re-moisture conditioned to at least 3 percent over the optimum moisture content.

8.1.3 Maintenance Buildings

As the Plasticity Index (PI) of the surficial soils ranges up to 34, the proposed slabs-on-grade should be supported on at least 18 inches of non-expansive fill (NEF) to reduce the potential for slab damage due to soil heave. The NEF layer should be constructed over subgrade prepared in accordance with the recommendations in the “Earthwork” section of this report. If moisture-sensitive floor coverings are planned, the recommendations in the “Interior Slabs Moisture Protection Considerations” section below may be incorporated in the project design if desired. If significant time elapses between initial subgrade preparation and slab-on-grade NEF construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil has been allowed to dry out, the subgrade should be re-moisture conditioned to at least 3 percent over the optimum moisture content.

8.1.4 Fire Water Storage Tank

As discussed above, we recommend that the fire water storage tank be constructed on a built up level pad and slab-on-grade supported on drilled piers due to the close proximity to steep slopes to the north. As the Plasticity Index (PI) of the surficial soils ranges up to 34, the proposed slab-on-grade should be supported on at least 18 inches of non-expansive fill (NEF) to reduce the potential for slab damage due to soil heave. The NEF layer should be constructed over subgrade prepared in accordance with the recommendations in the “Earthwork” section of this report. If significant time elapses between initial subgrade preparation and slab-on-grade NEF construction, the subgrade should be proof-rolled to confirm subgrade stability, and if the soil has been allowed to dry out, the subgrade should be re-moisture conditioned to at least 3 percent over the optimum moisture content.

8.2 INTERIOR SLABS MOISTURE PROTECTION CONSIDERATIONS

The following general guidelines for concrete slab-on-grade construction where floor coverings are planned are presented for the consideration by the developer, design team, and contractor. These guidelines are based on information obtained from a variety of sources, including the American Concrete Institute (ACI) and are intended to reduce the potential for moisture-related problems causing floor covering failures, and may be supplemented as necessary based on project-specific requirements. The application of these guidelines or not will not affect the geotechnical aspects of the slab-on-grade performance.

- Place a minimum 10-mil vapor retarder conforming to ASTM E 1745, Class C requirements or better directly below the concrete slab; the vapor retarder should extend to the slab edges and be sealed at all seams and penetrations in accordance with manufacturer's recommendations and ASTM E 1643 requirements. A 4-inch-thick capillary break, consisting of crushed rock should be placed below the vapor retarder and consolidated in place with vibratory equipment. The mineral aggregate shall be of such size that the percentage composition by dry weight as determined by laboratory sieves will conform to the following gradation:

Sieve Size	Percentage Passing Sieve
1"	100
¾"	90 – 100
No. 4	0 - 10

  The capillary break rock may be considered as the upper 4 inches of the non-expansive fill previously recommended.

- The concrete water:cement ratio should be 0.45 or less. Mid-range plasticizers may be used to increase concrete workability and facilitate pumping and placement.

- Water should not be added after initial batching unless the slump is less than specified and/or the resulting water:cement ratio will not exceed 0.45.

- Polishing the concrete surface with metal trowels is not recommended.

- Where floor coverings are planned, all concrete surfaces should be properly cured.

- Water vapor emission levels and concrete pH should be determined in accordance with ASTM F1869 and F710 requirements and evaluated against the floor covering manufacturer's requirements prior to installation.

8.3 EXTERIOR FLATWORK

Exterior flatwork, such as pedestrian walkways, patios, driveways, and sidewalks, may experience seasonal movement due to the native expansive soils; therefore, some cracking or vertical movement of conventional slabs should be anticipated where imported fill is not planned in flatwork areas. There are several alternatives for mitigating the impacts of expansive soils beneath concrete flatwork. We are providing recommendations to reduce distress to concrete flatwork that includes moisture conditioning the subgrade soils, using non-expansive fill, and providing adequate construction and control joints to control cracks that do occur. It should be noted that minor slab movement or localized cracking and/or distress could still occur.

- The minimum recommendation for concrete flatwork constructed on moderately to highly expansive soils is to properly prepare the clayey soils prior to placing concrete. This is typically achieved by scarifying, moisture conditioning, and re-compacting the subgrade soil. Subgrade soil should be moisture conditioned to at least 3 percent over the laboratory optimum and compacted using moderate compaction effort to a relative compaction of 87 to 92 percent (ASTM Test Method D1557). Since the near surface soils may have been previously compacted and tested, the subgrade soils could possibly be moisture conditioned by gradually wetting the soil, depending on the time of year slab construction occurs. This should not include flooding or excessively watering the soil, which would likely result in a soft, unstable subgrade condition, and possible delays in the construction while waiting for the soil to dry out. In general, the subgrade should be relatively firm and non-yielding prior to construction.

- Concrete flatwork, excluding pavements that would be subject to wheel loads, should be at least 4 inches thick and underlain by at least 12 inches of non-expansive fill. Non-expansive fill may include aggregate base, crushed rock, or imported soil with a PI of 15 or less. Non-expansive fill should be compacted to at least 90 percent relative compaction. Flatwork that will be subject to heavier or frequent vehicular loading should be designed in accordance with the recommendations in the “Vehicular Pavements” section below.

- We recommend a maximum control joint spacing of about 2 feet in each direction for each inch of concrete thickness and a construction joint spacing of 10 to 12 feet. Construction joints that abut the foundations or garage slabs should include a felt strip, or approved equivalent, that extends the full depth of the exterior slab. This will help to reduce the potential for permanent vertical offset between the slabs due to friction between the concrete edges. We recommend that exterior slabs be isolated from adjacent foundations.

At the owner’s option, if desired to reduce the potential for vertical offset or widening of concrete cracks, consideration should be given to using reinforcing steel, such as No. 3 rebar spaced at 18 inches on center each direction.

SECTION 9: VEHICULAR PAVEMENTS

9.1 ASPHALT CONCRETE

The following asphalt concrete pavement recommendations tabulated below are based on the Procedure 608 of the Caltrans Highway Design Manual, estimated traffic indices for various pavement-loading conditions, and on a design R-value of 5. The design R-value was chosen based on the results of the laboratory testing performed on a surficial sample collected from the proposed pavement area and engineering judgment considering the variable surface conditions.

Table 4: Asphalt Concrete Pavement Recommendations, Design R-value = 5

Design Traffic Index (TI)	Asphalt Concrete (inches)	Class 2 Aggregate Base* (inches)	Total Pavement Section Thickness (inches)
4.0	2.5	7.5	10.0
4.5	2.5	9.5	12.0
5.0	3.0	10.0	13.0
5.5	3.0	12.0	15.0
6.0	3.5	12.5	16.0
6.5	4.0	14.0	18.0

*Caltrans Class 2 aggregate base; minimum R-value of 78

Frequently, the full asphalt concrete section is not constructed prior to construction traffic loading. This can result in significant loss of asphalt concrete layer life, rutting, or other pavement failures. To improve the pavement life and reduce the potential for pavement distress through construction, we recommend the full design asphalt concrete section be constructed prior to construction traffic loading. Alternatively, a higher traffic index may be chosen for the areas where construction traffic will use the pavements.

Asphalt concrete pavements constructed on expansive subgrade where the adjacent areas will not be irrigated for several months after the pavements are constructed may experience longitudinal cracking parallel to the pavement edge. These cracks typically form within a few feet of the pavement edge and are due to seasonal wetting and drying of the adjacent soil. The cracking may also occur during construction where the adjacent grade is allowed to significantly dry during the summer, pulling moisture out of the pavement subgrade. Any cracks that form should be sealed with bituminous sealant prior to the start of winter rains. One alternative to reduce the potential for this type of cracking is to install a moisture barrier at least 24 inches deep behind the pavement curb. Another alternative is to lime treat the subgrade. We also recommend limiting cuts to 3 feet to reduce the potential for heave of the claystone bedrock.

9.2 PORTLAND CEMENT CONCRETE

The exterior Portland Cement Concrete (PCC) pavement recommendations tabulated below are based on methods presented in the Portland Cement Association (PCA) design manual (PCA, 1984). Recommendations for garage slabs-on-grade were provided in the “Concrete Slabs and Pedestrian Pavements” section above. We have provided a few pavement alternatives as an anticipated Average Daily Truck Traffic (ADTT) was not provided. An allowable ADTT should be chosen that is greater than what is expected for the development.

Table 5: PCC Pavement Recommendations, Design R-value = 5

Allowable ADTT	Minimum PCC Thickness (inches)
13	5.5
130	6.0

The PCC thicknesses above are based on a concrete compressive strength of at least 3,500 psi, supporting the PCC on at least 4 inches of Class 2 aggregate base compacted as recommended in the “Earthwork” section, and laterally restraining the PCC with curbs or concrete shoulders. Adequate expansion and control joints should be included. Consideration should be given to limiting the control joint spacing to a maximum of about 2 feet in each direction for each inch of concrete thickness. Due to the expansive surficial soils present, we recommend that the construction and expansion joints be dowelled.

9.3 PAVEMENT CUTOFF

Surface water penetration into the pavement section can significantly reduce the pavement life, due to the native expansive clays. While quantifying the life reduction is difficult, a normal 20-year pavement design could be reduced to less than 10 years; therefore, increased long-term maintenance may be required.

It would be beneficial to include a pavement cut-off, such as deepened curbs, redwood-headers, or “Deep-Root Moisture Barriers” that are keyed at least 4 inches into the pavement subgrade. This will help limit the additional long-term maintenance.

SECTION 10: RETAINING WALLS

10.1 STATIC LATERAL EARTH PRESSURES

The structural design of any site retaining wall should include resistance to lateral earth pressures that develop from the soil behind the wall, any undrained water pressure, and surcharge loads acting behind the wall. Provided a drainage system is constructed behind the wall to prevent the build-up of hydrostatic pressures as discussed in the section below, we recommend that the walls with level backfill be designed for the following pressures:

Table 6: Recommended Lateral Earth Pressures

Sloping Backfill Inclination (horizontal:vertical)	Lateral Earth Pressure*	
	Unrestrained – Cantilever Wall	Restrained – Braced Wall
Level	45 pcf	45 pcf + 8H**
2:1	65 pcf	65 pcf + 8H**

* Lateral earth pressures are based on an equivalent fluid pressure
** H is the distance in feet between the bottom of footing and top of retained soil

If adequate drainage cannot be provided behind the wall, an additional equivalent fluid pressure of 40 pcf should be added to the values above for both restrained and unrestrained walls for the portion of the wall that will not have drainage. Damp proofing or waterproofing of the walls may be considered where moisture penetration and/or efflorescence are not desired.

10.2 SEISMIC LATERAL EARTH PRESSURES

10.2.1 Basement Walls

The 2019 California Building Code (CBC) states that lateral pressures from earthquakes should be considered in the design of basements and retaining walls. We checked seismic earth pressures for the proposed restrained and unrestrained (cantilever) retaining walls in accordance with CBC 1803.5.12 and ASCE 7-16 Section 11.8.3 using the Design level earthquake. We developed seismic earth pressures for the proposed basement using interim recommendations generally based on refinement of the Mononobe-Okabe method (Lew et al., SEAOC 2010).

Because the veterinary/admin building basement walls will be at or greater than 12 feet in height, and peak ground accelerations are greater than 0.40g, we checked the result of the seismic increment when added to the recommended active earth pressure against the recommended fixed wall earth pressures. Basement walls are not free to deflect, and should therefore be designed for static conditions as a restrained wall, which is also a CBC requirement. Based on current recommendations for seismic earth pressures, it appears that active earth pressures plus a seismic increment exceed the restrained (i.e. at-rest), static wall earth pressures. Therefore, we recommend checking the walls for the seismic condition in accordance with the interim recommendations of the above referenced paper and the 2013 CBC.

The CBC prescribes basic load combinations for structures, components and foundations with the intention that their design strength equals or exceeds the effects of the factored loads. With respect to the load from lateral earth pressure and ground water pressure, the CBC prescribes the basic combinations shown in CBC equations 16-2 and 16-7 below.

$$1.2(D + F) + 1.6(L + H) + 0.5(L_r \text{ or } S \text{ or } R) \qquad \text{[Eq. 16-2]}$$

In Eq. 16-2: H - should represent the total static lateral earth pressure, which for the basement wall will be restrained (use 45 pcf + 8H psf)

$$0.9(D + F) + 1.0E + 1.6H \qquad \text{[Eq. 16-7]}$$

In Eq. 16-7: H - should represent the static “active” earth pressure component under seismic loading conditions (use 45 pcf)

E - should represent the seismic increment component in Eq. 16-7, a triangular load with a resultant force of $8H^2$, which should be applied one third of the height up from the base of the wall (and which can also be expressed as an equivalent fluid pressure equal to 24 pcf).

The interim recommendations in the SEAOC paper more appropriately split out "active" earth pressure (and not the restrained "at-rest" pressure) from our report and provide the total seismic increment so that different load factors can be applied in accordance with different risk levels.

10.2.2 Site Walls

The 2019 CBC states that lateral pressures from earthquakes should be considered in the design of basements and retaining walls. At this time, we are not aware of any site retaining walls for the project. However, minor landscaping walls (i.e. walls 6 feet or less in height) may be proposed. In our opinion, design of these walls for seismic lateral earth pressures in addition to static earth pressures is not warranted.

10.3 WALL DRAINAGE

Adequate drainage should be provided by a subdrain system behind all walls. This system should consist of a 4-inch minimum diameter perforated pipe placed near the base of the wall (perforations placed downward). The pipe should be bedded and backfilled with Class 2 Permeable Material per Caltrans Standard Specifications, latest edition. The permeable backfill should extend at least 12 inches out from the wall and to within 2 feet of outside finished grade. Alternatively, ½-inch to ¾-inch crushed rock may be used in place of the Class 2 Permeable Material provided the crushed rock and pipe are enclosed in filter fabric, such as Mirafi 140N or approved equivalent. The upper 2 feet of wall backfill should consist of compacted on-site soil. The subdrain outlet should be connected to a free-draining outlet or sump.

Miradrain, Geotech Drainage Panels, or equivalent drainage matting can be used for wall drainage as an alternative to the Class 2 Permeable Material or drain rock backfill. Horizontal strip drains connecting to the vertical drainage matting may be used in lieu of the perforated pipe and crushed rock section. The vertical drainage panel should be connected to the perforated pipe or horizontal drainage strip at the base of the wall, or to some other closed or through-wall system such as the TotalDrain system from AmerDrain. Sections of horizontal drainage strips should be connected with either the manufacturer’s connector pieces or by pulling back the filter fabric, overlapping the panel dimples, and replacing the filter fabric over the connection. At corners, a corner guard, corner connection insert, or a section of crushed rock covered with filter fabric must be used to maintain the drainage path.

Drainage panels should terminate 18 to 24 inches from final exterior grade. The Miradrain panel filter fabric should be extended over the top of and behind the panel to protect it from intrusion of the adjacent soil.

10.4 BACKFILL

Where surface improvements will be located over the retaining wall backfill, backfill placed behind the walls should be compacted to at least 95 percent relative compaction using light compaction equipment. Where no surface improvements are planned, backfill should be compacted to at least 90 percent. If heavy compaction equipment is used, the walls should be temporarily braced.

10.5 FOUNDATIONS

Retaining walls may be supported on a continuous spread footing or drilled piers designed in accordance with the recommendations presented in the “Foundations” section of this report.

SECTION 11: LIMITATIONS

This report, an instrument of professional service, has been prepared for the sole use of Peninsula Humane Society & SPCA specifically to support the design of the Peninsula Humane Society Animal Sanctuary project in Loma Mar, California. The opinions, conclusions, and recommendations presented in this report have been formulated in accordance with accepted geotechnical engineering practices that exist in Northern California at the time this report was prepared. No warranty, expressed or implied, is made or should be inferred.

Recommendations in this report are based upon the soil and groundwater conditions encountered during our subsurface exploration. If variations or unsuitable conditions are encountered during construction, Cornerstone must be contacted to provide supplemental recommendations, as needed.

Peninsula Humane Society & SPCA may have provided Cornerstone with plans, reports and other documents prepared by others. Peninsula Humane Society & SPCA understands that Cornerstone reviewed and relied on the information presented in these documents and cannot be responsible for their accuracy.

Cornerstone prepared this report with the understanding that it is the responsibility of the owner or his representatives to see that the recommendations contained in this report are presented to other members of the design team and incorporated into the project plans and specifications, and that appropriate actions are taken to implement the geotechnical recommendations during construction.

Conclusions and recommendations presented in this report are valid as of the present time for the development as currently planned. Changes in the condition of the property or adjacent properties may occur with the passage of time, whether by natural processes or the acts of other persons. In addition, changes in applicable or appropriate standards may occur through legislation or the broadening of knowledge. Therefore, the conclusions and recommendations presented in this report may be invalidated, wholly or in part, by changes beyond Cornerstone’s control. This report should be reviewed by Cornerstone after a period of three (3) years has elapsed from the date of this report. In addition, if the current project design is changed, then Cornerstone must review the proposed changes and provide supplemental recommendations, as needed.

An electronic transmission of this report may also have been issued. While Cornerstone has taken precautions to produce a complete and secure electronic transmission, please check the electronic transmission against the hard copy version for conformity.

Recommendations provided in this report are based on the assumption that Cornerstone will be retained to provide observation and testing services during construction to confirm that conditions are similar to that assumed for design, and to form an opinion as to whether the work has been performed in accordance with the project plans and specifications. If we are not retained for these services, Cornerstone cannot assume any responsibility for any potential claims that may arise during or after construction as a result of misuse or misinterpretation of Cornerstone's report by others. Furthermore, Cornerstone will cease to be the Geotechnical-Engineer-of-Record if we are not retained for these services.

SECTION 12: REFERENCES

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Aerial Photos Reviewed

Vertical photos:
1953, 1956, 1960, 1968, 1980, 1982, 1991, 2005, 2009, 2010, 2012, 2014, 2016

Stereo Aerial Photos:
March 30, 1931, black and white, flight C-1471, frames 118, 119, scale: 1:18,000.

April 24, 1948, black and white, flight CDF5, frames 1-58, scale: 1:20,000.

May 1, 1965, black and white, flight CAS-65-130, frame 3-56, scale: 1:12,000.

APPENDIX A: FIELD INVESTIGATION

The field investigation consisted of a surface reconnaissance and a subsurface exploration program using track-mounted, hollow-stem, limited-access auger drilling equipment. Seven 6½-inch-diameter exploratory borings were drilled on January 20 and 21, 2020 to depths of 15 to 21½ feet. Two 3-inch diameter exploratory hand auger borings were drilled on January 21, 2020, to a depth of 4 to 4½ feet. The approximate locations of exploratory borings are shown on the Site Plan, Figure 2. The soils encountered were continuously logged in the field by our representative and described in accordance with the Unified Soil Classification System (ASTM D2488). Boring logs, as well as a key to the classification of the soil and bedrock, are included as part of this appendix.

Boring locations were approximated using existing site boundaries, and other site features as references. Boring elevations were not determined. The locations of the borings should be considered accurate only to the degree implied by the method used.

Representative soil samples were obtained from the borings at selected depths. All samples were returned to our laboratory for evaluation and appropriate testing. The standard penetration resistance blow counts were obtained by dropping a 140-pound hammer through a 30-inch free fall. The 2-inch O.D. split-spoon sampler was driven 18 inches and the number of blows was recorded for each 6 inches of penetration (ASTM D1586). 2.5-inch I.D. samples were obtained using a Modified California Sampler driven into the soil with the 140-pound hammer previously described. Unless otherwise indicated, the blows per foot recorded on the boring log represent the accumulated number of blows required to drive the last 12 inches. The various samplers are denoted at the appropriate depth on the boring logs.

Field tests included an evaluation of the unconfined compressive strength of the soil samples using a pocket penetrometer device. The results of these tests are presented on the individual boring logs at the appropriate sample depths.

Attached boring logs and related information depict subsurface conditions at the locations indicated and on the date designated on the logs. Subsurface conditions at other locations may differ from conditions occurring at these boring locations. The passage of time may result in altered subsurface conditions due to environmental changes. In addition, any stratification lines on the logs represent the approximate boundary between soil types and the transition may be gradual.

APPENDIX B: LABORATORY TEST PROGRAM

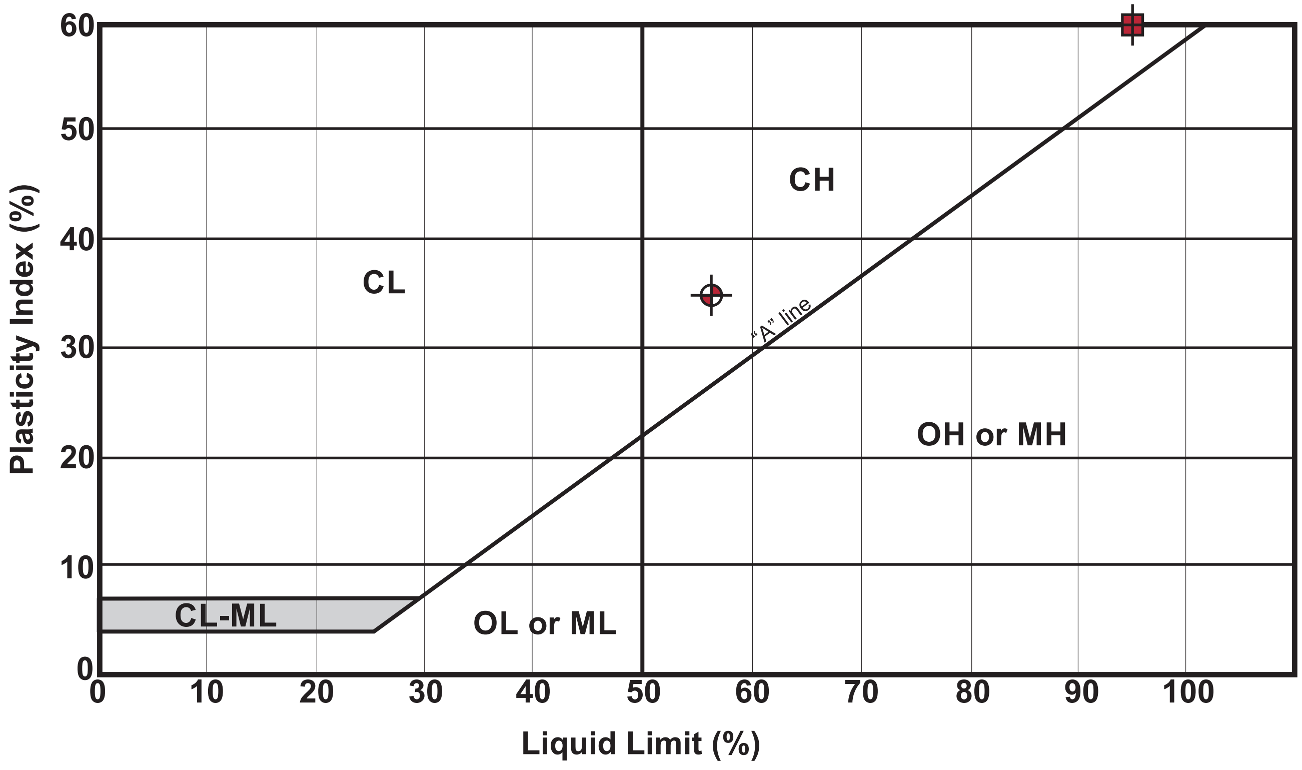
The laboratory testing program was performed to evaluate the physical and mechanical properties of the soils retrieved from the site to aid in verifying soil classification.

Moisture Content: The natural water content was determined (ASTM D2216) on 41 samples of the materials recovered from the borings. These water contents are recorded on the boring logs at the appropriate sample depths.

Dry Densities: In place dry density determinations (ASTM D2937) were performed on 17 samples to measure the unit weight of the subsurface soils. Results of these tests are shown on the boring logs at the appropriate sample depths.

Plasticity Index: One Plasticity Index determination (ASTM D4318) was performed on a sample of the subsurface soil to measure the range of water contents over which this material exhibits plasticity. The Plasticity Index was used to classify the soil in accordance with the Unified Soil Classification System and to evaluate the soil expansion potential. Results of this test are shown on the boring log at the appropriate sample depth.

Plasticity Index (ASTM D4318) Testing Summary



Symbol	Boring No.	Depth (ft)	Natural Water Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index	Passing No. 200 (%)	Group Name (USCS - ASTM D2487)
⊕	EB-1	2.0	28	57	23	34	—	Fat Clay with Sand (CH) [Residual Soil]
■	EB-1	5.5	43	95	35	60	—	Claystone [Tpt]

CORNERSTONE
EARTH GROUP

Plasticity Index Testing Summary

Haskin's Ridge Animal Sanctuary
Pescadero Creek Road
La Honda, CA

Project Number
1142-1-1

Figure Number
Figure B1

Date
February 2020

Drawn By
FLL

COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

ATTACHMENT F

Department of Public Works
X Approved
___ Approved as Noted
___ Revise as Noted
Note: All work outside of the property lines must have approved utility and encroachment permits
Harry Yip 9/12/22
Reviewed by/Date

HEXAGON TRANSPORTATION CONSULTANTS, INC.

Memorandum

Date: May 31, 2022

To: Mr. Jerry Griffin, Peninsula Humane Society

From: Gary Black
Selvi Sivaraj

Subject: Transportation Study for Proposed Animal Sanctuary at 12429 Pescadero Creek Road in San Mateo County

Introduction

Hexagon Transportation Consultants, Inc. has completed a transportation study for the proposed new animal sanctuary at 12429 Pescadero Creek Road in San Mateo County. The Animal Sanctuary would provide a permanent home for dogs, cats, and a limited number of other small animals. The Animal Sanctuary would also provide a home for a small number of farm animals. The project proposes to build 70 dog enclosures, 14 cat enclosures and 1 barn for farm animals on a 261-acre site within the Resource Management (RM) Zoning District. In addition to the animal enclosures, the project also includes a maintenance building, an existing barn, a 1,000 s.f. caretaker's residence, and an approximately 6,500 square-foot administration building including a small veterinary medical center office, break rooms, and ancillary support spaces for staff and volunteers. The project also proposes to include 10 parking spaces (including 1 ADA) and an unstriped overflow parking area.

This memorandum documents the number of trips that are anticipated to be generated by the proposed animal sanctuary, a sight distance evaluation for the proposed driveway on Pescadero Creek Road, and a Vehicle Miles Traveled (VMT) analysis.

Animal Sanctuary Trip Generation

The trip estimates for the proposed project use are based on operational information for the animal sanctuary provided by the Peninsula Humane Society.

The facility would be open from 8:00 AM to 7:00 PM every day. During this time, there would be a maximum of ten employees including animal care staff, veterinary medical staff, behavior & training staff, facilities maintenance staff, a sanctuary director, and three to five volunteers on site. The caretakers on site would be responsible for monitoring the safety and security of the property and animals after hours. Shifts for animal care and facilities staff would start first, with admin staff and veterinary medical staff working a more typical 9-5 work day. A second Animal Care employee shift would start around mid-day and work until approximately 7 PM. Volunteer shifts would start late morning, be staggered throughout the day, and conclude by 7 PM.

Based on the facility operation, to be conservative, all employees are assumed to arrive at work during the AM peak hour and leave during the PM peak hour, even though a few animal care employees would commute during non-peak hours. During the morning commute peak period, which is 7:00-9:00 AM, there could be up to 10 staff members arriving at the facility. This calculates to ten AM peak-hour staff trips. During the evening commute peak period, which is 4:00-6:00 PM, there could be up to ten staff members and three volunteers leaving the facility. This calculates to thirteen PM peak-hour trips. The facility is estimated to generate approximately 32 daily trips including 20 trips by staff, 10 trips by volunteers and two trips by staff transporting animals or supplies to the site.

Table 1
Project Trip Generation Estimates for Animal Sanctuary

Land Use	Size		Daily Trips	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total
Animal Sanctuary [1]									
Staff[2]	10	employees	20	10	0	10	0	10	10
Volunteers[3]	5		10	-	-	-	0	3	3
Delivery (new animals/supplies)[4]			2	-	-	-	-	-	-
Total trips			**32**	**10**	**0**	**10**	**0**	**13**	**13**

[1] Trip rates based on the operation of the proposed animal sanctuary

[2] Employees arrive to work during the AM peak hour and leave during the PM peak hour.

[3] Approximately 5 volunteers are expected to arrive late morning, and staggered throughout the day and conclude by 7 PM.

[4] Assuming one trip by staff transporting animals or supplies to the site during the day time daily.

Traffic on Pescadero Creek Road

The project-generated trips that are estimated to occur at the project driveway are 32 daily trips. Based on traffic counts conducted along Pescadero Creek Road in the vicinity of the proposed project driveway, the average daily traffic is 308 vehicles. Thus, the project would increase the daily traffic by about 10%. Because of the relatively low traffic volume near the site, the project traffic can be accommodated on Pescadero Creek Road. The count data is included in Appendix A.

Vehicle Miles Traveled

Senate Bill 743 (SB 743) requires new developments to be analyzed with Vehicle Miles Traveled (VMT) instead of Level of Service (LOS). The County of San Mateo established procedures for determining project impacts on Vehicle Miles Traveled (VMT) based on the project description, size of the project, characteristics, and/or location. VMT is the total miles of travel by personal motorized vehicles a project is expected to generate in a day. VMT measures the full distance of personal motorized vehicle-trips with one end at the project site. The County has adopted the recommended standards published by the Governor's Office of Planning and Research (OPR). The OPR standard state that small projects that generate fewer than 110 trips per day can be considered to have a less than significant impact on VMT. Because the proposed project would be generating fewer than 110 daily trips (see Table 1), its VMT impact would be less than significant.

Project Driveway Sight Distance Analysis

A sight distance evaluation was conducted for the proposed project driveway, located on the west side of Pescadero Creek Road, to determine if there would be any deficiencies with the intersection design or layout that would cause operational problems. Sight distances were evaluated in accordance with the standards and methodologies contained in the 7th edition of the American Association of State Highway and Transportation Officials (AASHTO) design manual, *A Policy on Geometric Design of Highways and Streets*. It should be noted that there are numerous driveways and cross-streets on Pescadero Creek Road and Highway 84 through La Honda that have limited sight distance. The area is mountainous and forested, which creates sight distance challenges. There are caution signs denoting blind driveways, and many driveways have convex mirrors to aid with sight distance.

This analysis is based on stopping sight distance. The minimum stopping sight distance is the distance required by a vehicle on the primary road, traveling at a given speed, to bring the vehicle to stop after an object (vehicle, pedestrian, bicyclist, debris, etc.) on the road becomes visible. The stopping sight distance is the minimum sight distance that must be available for a vehicle to exit the project driveway safely.

When checking sight distances at an intersection, the position of the driver on the side street approach must be assumed. In this analysis, the driver's eye position is assumed to be 14.5 feet from the edge of pavement on Pescadero Creek Road, based on section 9.5.3.2.1 in the AASHTO design manual.

The minimum stopping sight distance was determined based on the 85th percentile speed of traffic and the grade of the roadway. Based on speed counts conducted along Pescadero Creek Road in the vicinity of the proposed project driveway, the 85th percentile speeds are 39.4 MPH in the northbound direction and 42.6 MPH in the southbound direction (see Appendix A). In the vicinity of the proposed project driveway, Pescadero Creek Road has an approximately 6% downgrade in the northbound direction and an approximately 5% upgrade in the southbound direction.

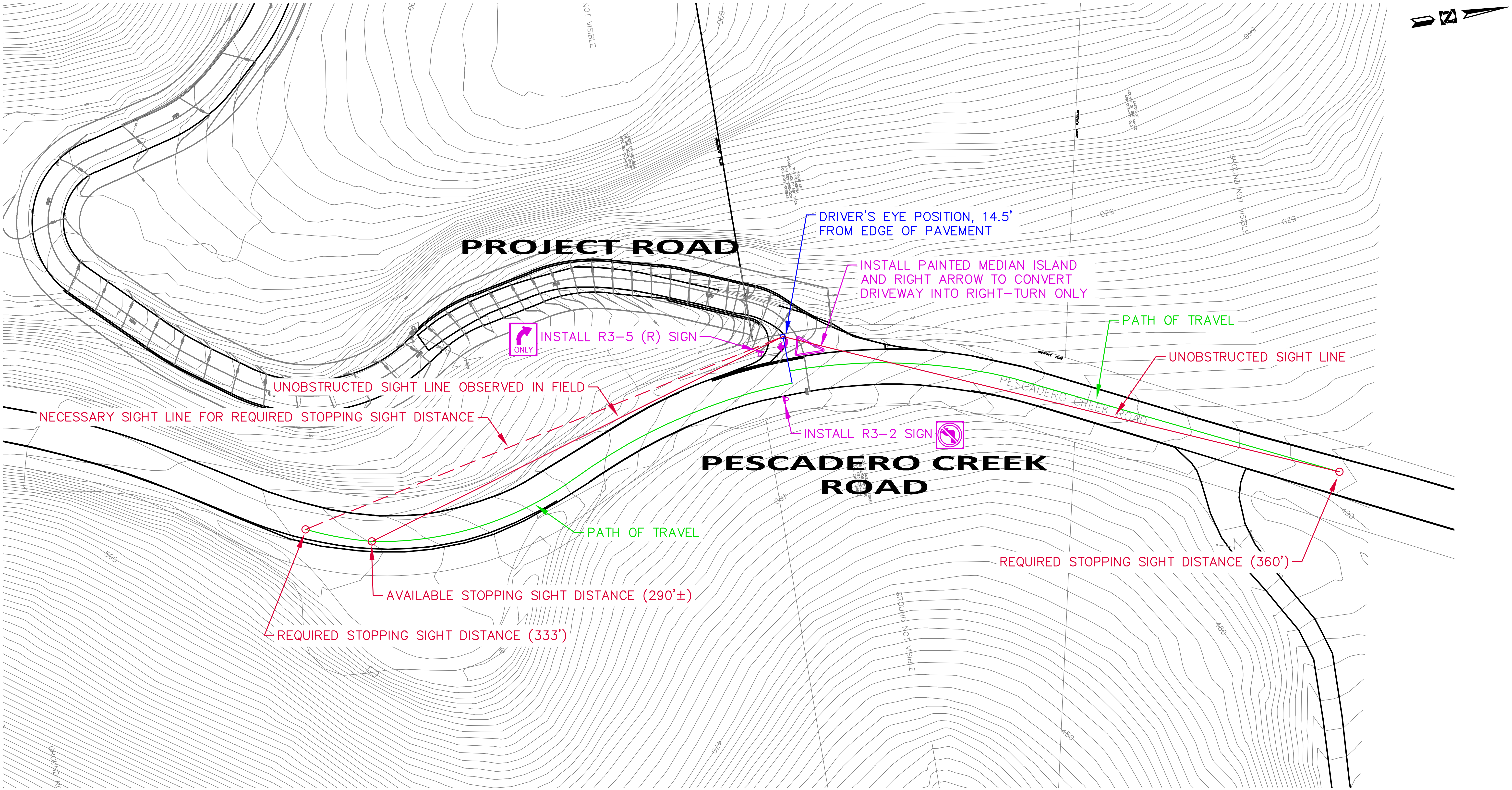
Per Table 3-1 and Table 3-2 in the AASHTO design manual, the stopping sight distance for the two design speeds are:

- 333 feet for 40 MPH on a 6% downgrade (northbound direction)
- 360 feet for 45 MPH on a level grade (southbound direction)

Figure 1 shows the estimated available sight distances at the project driveway. The driver's line of sight to the left (southbound Pescadero Creek Road traffic) was determined to be more than the minimum required stopping sight distance, even with the conservative design criteria of 45 MPH and a level grade. The driver's available line of sight to the right (northbound Pescadero Creek Road traffic) was observed in the field to be limited to approximately 312 feet due to the curvature of Pescadero Creek Road and the embankment on the west side of the road.

Correcting the sight distance deficiency would require regrading the embankment on the west side of Pescadero Creek Road or relocating the project driveway approximately 50-75 feet north of the current proposed location. Either of these options would involve extensive regrading of hillsides and substantial loss of trees.

There is no other location on the property where an access road could be developed. It should be noted that the proposed driveway location is where the existing property access road is located. Hexagon recommends the installation of "blind driveway" warning signs on Pescadero Creek Road to alert approaching drivers to the existence of the driveway. In addition, Hexagon recommends that the proposed driveway be converted to a right-turn in and right-turn out only driveway. A median island and right arrow would be installed at the entrance of the driveway. Additional signage at the driveway (see Figure 1) should be installed to alert northbound drivers along Pescadero Creek Road and exiting drivers of the right-in, right-out only driveway.



° THIS PLAN IS A CONCEPTUAL DRAWING, NOT FOR CONSTRUCTION.

Hexagon Transportation Consultants, Inc.

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San Jose, California 95112
Phone: (408) 971-6100
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FIGURE 1
PROJECT ROAD AT PESCADERO CREEK ROAD
SIGHT DISTANCE EXHIBIT

DRAWN BY: T. CHANG
DATE: 6/1/2022

GRAPHIC SCALE
0 60 80 100 120
1 INCH = 60 FEET

Animal Sanctuary Transportation Study at 12429 Pescadero Creek Road in San Mateo County

Appendices

Appendix A

Count Data

Vehicle Classification Report Summary

Location: **Pescadero Creek Rd, North of Burns Valley Rd**

Count Direction: **Northbound / Southbound**

Date Range: **11/17/2020 to 11/17/2020**

Site Code: **01**

	FHWA Vehicle Classification													Total
	1	2	3	4	5	6	7	8	9	10	11	12	13	Volume
							Study Total							
Northbound	2	86	41	1	26	3	0	0	0	0	0	0	0	159
Percent	1.3%	54.1%	25.8%	0.6%	16.4%	1.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Southbound	1	83	38	0	26	1	0	0	0	0	0	0	0	149
Percent	0.7%	55.7%	25.5%	0.0%	17.4%	0.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Total	3	169	79	1	52	4	0	0	0	0	0	0	0	308
Percent	1.0%	54.9%	25.6%	0.3%	16.9%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%

FHWA Vehicle Classification

Class 1 - Motorcycles
Class 2 - Passenger Cars
Class 3 - Other Two-Axle, Four-Tire Single Unit Vehicles
Class 4 - Buses
Class 5 - Two-Axle, Six-Tire, Single-Unit Trucks
Class 6 - Three-Axle Single-Unit Trucks
Class 7 - Four or More Axle Single-Unit Trucks
Class 8 - Four or Fewer Axle Single-Trailer Trucks
Class 9 - Five-Axle Single-Trailer Trucks
Class 10 - Six or More Axle Single-Trailer Trucks
Class 11 - Five or fewer Axle Multi-Trailer Trucks
Class 12 - Six-Axle Multi-Trailer Trucks
Class 13 - Seven or More Axle Multi-Trailer Trucks

Project Manager: (415) 310-6469
project.manager.ca@idaxdata.com

Location: Pescadero Creek Rd, North of Burns Valley Rd
Date Range: 11/17/2020 to 11/17/2020
Site Code: 01

Tuesday, November 17, 2020
Northbound

Time	FHWA Vehicle Classification													Total Volume
	1	2	3	4	5	6	7	8	9	10	11	12	13	
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:00 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	**2**
6:00 AM	0	3	1	0	1	0	0	0	0	0	0	0	0	**5**
7:00 AM	0	3	1	0	1	0	0	0	0	0	0	0	0	**5**
8:00 AM	0	8	6	0	4	0	0	0	0	0	0	0	0	**18**
9:00 AM	0	6	1	0	2	0	0	0	0	0	0	0	0	**9**
10:00 AM	1	13	1	0	1	1	0	0	0	0	0	0	0	**17**
11:00 AM	0	3	4	0	1	0	0	0	0	0	0	0	0	**8**
12:00 PM	0	6	5	1	4	0	0	0	0	0	0	0	0	**16**
1:00 PM	0	9	1	0	2	0	0	0	0	0	0	0	0	**12**
2:00 PM	0	3	2	0	1	0	0	0	0	0	0	0	0	**6**
3:00 PM	0	9	4	0	0	1	0	0	0	0	0	0	0	**14**
4:00 PM	1	6	5	0	2	0	0	0	0	0	0	0	0	**14**
5:00 PM	0	7	5	0	3	0	0	0	0	0	0	0	0	**15**
6:00 PM	0	3	1	0	1	0	0	0	0	0	0	0	0	**5**
7:00 PM	0	6	1	0	0	0	0	0	0	0	0	0	0	**7**
8:00 PM	0	1	1	0	0	0	0	0	0	0	0	0	0	**2**
9:00 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	**2**
10:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	**2**
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**2**	**86**	**41**	**1**	**26**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**159**
Percent	**1.3%**	**54.1%**	**25.8%**	**0.6%**	**16.4%**	**1.9%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

Location: Pescadero Creek Rd, North of Burns Valley Rd
Date Range: 11/17/2020 to 11/17/2020
Site Code: 01

Tuesday, November 17, 2020
Southbound

	FHWA Vehicle Classification													Total
Time	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**Volume**
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
4:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
5:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
6:00 AM	0	2	1	0	0	0	0	0	0	0	0	0	0	**3**
7:00 AM	0	7	5	0	2	0	0	0	0	0	0	0	0	**14**
8:00 AM	0	4	2	0	4	0	0	0	0	0	0	0	0	**10**
9:00 AM	0	3	4	0	3	0	0	0	0	0	0	0	0	**10**
10:00 AM	0	6	2	0	3	0	0	0	0	0	0	0	0	**11**
11:00 AM	1	4	0	0	0	1	0	0	0	0	0	0	0	**6**
12:00 PM	0	11	6	0	3	0	0	0	0	0	0	0	0	**20**
1:00 PM	0	6	4	0	1	0	0	0	0	0	0	0	0	**11**
2:00 PM	0	9	5	0	2	0	0	0	0	0	0	0	0	**16**
3:00 PM	0	13	2	0	2	0	0	0	0	0	0	0	0	**17**
4:00 PM	0	6	1	0	0	0	0	0	0	0	0	0	0	**7**
5:00 PM	0	4	3	0	3	0	0	0	0	0	0	0	0	**10**
6:00 PM	0	1	0	0	2	0	0	0	0	0	0	0	0	**3**
7:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
8:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
9:00 PM	0	2	1	0	1	0	0	0	0	0	0	0	0	**4**
10:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
11:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
Total	**1**	**83**	**38**	**0**	**26**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**149**
Percent	**0.7%**	**55.7%**	**25.5%**	**0.0%**	**17.4%**	**0.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

Location: **Pescadero Creek Rd, North of Burns Valley Rd**
Date Range: **11/17/2020 to 11/17/2020**
Site Code: **01**

IDAX DATA SOLUTIONS

Total Study Average
Northbound

Time	FHWA Vehicle Classification													Total Volume
	1	2	3	4	5	6	7	8	9	10	11	12	13	
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:00 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	**2**
6:00 AM	0	3	1	0	1	0	0	0	0	0	0	0	0	**5**
7:00 AM	0	3	1	0	1	0	0	0	0	0	0	0	0	**5**
8:00 AM	0	8	6	0	4	0	0	0	0	0	0	0	0	**18**
9:00 AM	0	6	1	0	2	0	0	0	0	0	0	0	0	**9**
10:00 AM	1	13	1	0	1	1	0	0	0	0	0	0	0	**17**
11:00 AM	0	3	4	0	1	0	0	0	0	0	0	0	0	**8**
12:00 PM	0	6	5	1	4	0	0	0	0	0	0	0	0	**16**
1:00 PM	0	9	1	0	2	0	0	0	0	0	0	0	0	**12**
2:00 PM	0	3	2	0	1	0	0	0	0	0	0	0	0	**6**
3:00 PM	0	9	4	0	0	1	0	0	0	0	0	0	0	**14**
4:00 PM	1	6	5	0	2	0	0	0	0	0	0	0	0	**14**
5:00 PM	0	7	5	0	3	0	0	0	0	0	0	0	0	**15**
6:00 PM	0	3	1	0	1	0	0	0	0	0	0	0	0	**5**
7:00 PM	0	6	1	0	0	0	0	0	0	0	0	0	0	**7**
8:00 PM	0	1	1	0	0	0	0	0	0	0	0	0	0	**2**
9:00 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	**2**
10:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	**2**
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**2**	**86**	**41**	**1**	**26**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**159**
Percent	**1.3%**	**54.1%**	**25.8%**	**0.6%**	**16.4%**	**1.9%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

Note: Average only condsidered on days with 24-hours of data.

Location: Pescadero Creek Rd, North of Burns Valley Rd
Date Range: 11/17/2020 to 11/17/2020
Site Code: 01

Total Study Average
Southbound

	FHWA Vehicle Classification													Total
Time	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**Volume**
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
4:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
5:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
6:00 AM	0	2	1	0	0	0	0	0	0	0	0	0	0	**3**
7:00 AM	0	7	5	0	2	0	0	0	0	0	0	0	0	**14**
8:00 AM	0	4	2	0	4	0	0	0	0	0	0	0	0	**10**
9:00 AM	0	3	4	0	3	0	0	0	0	0	0	0	0	**10**
10:00 AM	0	6	2	0	3	0	0	0	0	0	0	0	0	**11**
11:00 AM	1	4	0	0	0	1	0	0	0	0	0	0	0	**6**
12:00 PM	0	11	6	0	3	0	0	0	0	0	0	0	0	**20**
1:00 PM	0	6	4	0	1	0	0	0	0	0	0	0	0	**11**
2:00 PM	0	9	5	0	2	0	0	0	0	0	0	0	0	**16**
3:00 PM	0	13	2	0	2	0	0	0	0	0	0	0	0	**17**
4:00 PM	0	6	1	0	0	0	0	0	0	0	0	0	0	**7**
5:00 PM	0	4	3	0	3	0	0	0	0	0	0	0	0	**10**
6:00 PM	0	1	0	0	2	0	0	0	0	0	0	0	0	**3**
7:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
8:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
9:00 PM	0	2	1	0	1	0	0	0	0	0	0	0	0	**4**
10:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
11:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
Total	**1**	**83**	**38**	**0**	**26**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**149**
Percent	**0.7%**	**55.7%**	**25.5%**	**0.0%**	**17.4%**	**0.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

Note: Average only condsidered on days with 24-hours of data.

Location: Pescadero Creek Rd, North of Burns Valley Rd
Date Range: 11/17/2020 to 11/17/2020
Site Code: 01

3-Day (Tuesday - Thursday) Average
Northbound

Time	FHWA Vehicle Classification													Total Volume
	1	2	3	4	5	6	7	8	9	10	11	12	13	
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:00 AM	0	0	1	0	0	1	0	0	0	0	0	0	0	**2**
6:00 AM	0	3	1	0	1	0	0	0	0	0	0	0	0	**5**
7:00 AM	0	3	1	0	1	0	0	0	0	0	0	0	0	**5**
8:00 AM	0	8	6	0	4	0	0	0	0	0	0	0	0	**18**
9:00 AM	0	6	1	0	2	0	0	0	0	0	0	0	0	**9**
10:00 AM	1	13	1	0	1	1	0	0	0	0	0	0	0	**17**
11:00 AM	0	3	4	0	1	0	0	0	0	0	0	0	0	**8**
12:00 PM	0	6	5	1	4	0	0	0	0	0	0	0	0	**16**
1:00 PM	0	9	1	0	2	0	0	0	0	0	0	0	0	**12**
2:00 PM	0	3	2	0	1	0	0	0	0	0	0	0	0	**6**
3:00 PM	0	9	4	0	0	1	0	0	0	0	0	0	0	**14**
4:00 PM	1	6	5	0	2	0	0	0	0	0	0	0	0	**14**
5:00 PM	0	7	5	0	3	0	0	0	0	0	0	0	0	**15**
6:00 PM	0	3	1	0	1	0	0	0	0	0	0	0	0	**5**
7:00 PM	0	6	1	0	0	0	0	0	0	0	0	0	0	**7**
8:00 PM	0	1	1	0	0	0	0	0	0	0	0	0	0	**2**
9:00 PM	0	0	1	0	1	0	0	0	0	0	0	0	0	**2**
10:00 PM	0	0	0	0	2	0	0	0	0	0	0	0	0	**2**
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**2**	**86**	**41**	**1**	**26**	**3**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**159**
Percent	**1.3%**	**54.1%**	**25.8%**	**0.6%**	**16.4%**	**1.9%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

Location: **Pescadero Creek Rd, North of Burns Valley Rd**
Date Range: **11/17/2020 to 11/17/2020**
Site Code: **01**

3-Day (Tuesday - Thursday) Average
Southbound

	FHWA Vehicle Classification													Total
Time	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**Volume**
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
4:00 AM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
5:00 AM	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
6:00 AM	0	2	1	0	0	0	0	0	0	0	0	0	0	**3**
7:00 AM	0	7	5	0	2	0	0	0	0	0	0	0	0	**14**
8:00 AM	0	4	2	0	4	0	0	0	0	0	0	0	0	**10**
9:00 AM	0	3	4	0	3	0	0	0	0	0	0	0	0	**10**
10:00 AM	0	6	2	0	3	0	0	0	0	0	0	0	0	**11**
11:00 AM	1	4	0	0	0	1	0	0	0	0	0	0	0	**6**
12:00 PM	0	11	6	0	3	0	0	0	0	0	0	0	0	**20**
1:00 PM	0	6	4	0	1	0	0	0	0	0	0	0	0	**11**
2:00 PM	0	9	5	0	2	0	0	0	0	0	0	0	0	**16**
3:00 PM	0	13	2	0	2	0	0	0	0	0	0	0	0	**17**
4:00 PM	0	6	1	0	0	0	0	0	0	0	0	0	0	**7**
5:00 PM	0	4	3	0	3	0	0	0	0	0	0	0	0	**10**
6:00 PM	0	1	0	0	2	0	0	0	0	0	0	0	0	**3**
7:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
8:00 PM	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
9:00 PM	0	2	1	0	1	0	0	0	0	0	0	0	0	**4**
10:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
11:00 PM	0	1	0	0	0	0	0	0	0	0	0	0	0	**1**
Total	**1**	**83**	**38**	**0**	**26**	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**149**
Percent	**0.7%**	**55.7%**	**25.5%**	**0.0%**	**17.4%**	**0.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

Vehicle Speed Report Summary

Location: Pescadero Creek Rd, North of Burns Valley Rd

Count Direction: Northbound / Southbound

Date Range: 11/17/2020 to 11/17/2020

Site Code: 01

	Speed Range (mph)																	Total Volume
	0 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80	80 - 85	85 +	
									Study Total									
Northbound	0	1	2	10	24	54	51	15	2	0	0	0	0	0	0	0	0	159
Percent	0.0%	0.6%	1.3%	6.3%	15.1%	34.0%	32.1%	9.4%	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Southbound	0	2	5	12	9	23	57	28	13	0	0	0	0	0	0	0	0	149
Percent	0.0%	1.3%	3.4%	8.1%	6.0%	15.4%	38.3%	18.8%	8.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%
Total	0	3	7	22	33	77	108	43	15	0	0	0	0	0	0	0	0	308
Percent	0.0%	1.0%	2.3%	7.1%	10.7%	25.0%	35.1%	14.0%	4.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100%

Total Study Percentile Speed Summary			Total Study Speed Statistics		
Northbound			**Northbound**		
50th Percentile (Median)	33.8	mph	Mean (Average) Speed	33.6	mph
85th Percentile	39.4	mph	10 mph Pace	30.9 - 40.9	mph
95th Percentile	41.6	mph	Percent in Pace	69.8	%
Southbound			**Southbound**		
50th Percentile (Median)	36.7	mph	Mean (Average) Speed	35.7	mph
85th Percentile	42.9	mph	10 mph Pace	31.9 - 41.9	mph
95th Percentile	46.8	mph	Percent in Pace	61.7	%

Location: Pescadero Creek Rd, North of Burns Valley Rd
Date Range: 11/17/2020 to 11/17/2020
Site Code: 01

Tuesday, November 17, 2020
Northbound

	Speed Range (mph)																	Total Volume
Time	0 - 10	10 - 15	15 - 20	20 - 25	25 - 30	30 - 35	35 - 40	40 - 45	45 - 50	50 - 55	55 - 60	60 - 65	65 - 70	70 - 75	75 - 80	80 - 85	85 +	
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:00 AM	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	**2**
6:00 AM	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0	**5**
7:00 AM	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	**5**
8:00 AM	0	0	0	1	3	7	4	2	1	0	0	0	0	0	0	0	0	**18**
9:00 AM	0	0	0	0	2	0	6	1	0	0	0	0	0	0	0	0	0	**9**
10:00 AM	0	0	0	0	3	4	9	1	0	0	0	0	0	0	0	0	0	**17**
11:00 AM	0	0	0	2	1	1	4	0	0	0	0	0	0	0	0	0	0	**8**
12:00 PM	0	1	0	1	3	4	5	2	0	0	0	0	0	0	0	0	0	**16**
1:00 PM	0	0	0	0	1	8	3	0	0	0	0	0	0	0	0	0	0	**12**
2:00 PM	0	0	0	1	2	3	0	0	0	0	0	0	0	0	0	0	0	**6**
3:00 PM	0	0	0	3	3	4	3	1	0	0	0	0	0	0	0	0	0	**14**
4:00 PM	0	0	2	2	0	5	2	2	1	0	0	0	0	0	0	0	0	**14**
5:00 PM	0	0	0	0	3	9	2	1	0	0	0	0	0	0	0	0	0	**15**
6:00 PM	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	**5**
7:00 PM	0	0	0	0	2	1	2	2	0	0	0	0	0	0	0	0	0	**7**
8:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	**2**
9:00 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	**2**
10:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	**2**
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**0**	**1**	**2**	**10**	**24**	**54**	**51**	**15**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**159**
Percent	**0.0%**	**0.6%**	**1.3%**	**6.3%**	**15.1%**	**34.0%**	**32.1%**	**9.4%**	**1.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

Daily Percentile Speed Summary			Speed Statistics		
50th Percentile (Median)	33.8	mph	Mean (Average) Speed	33.6	mph
85th Percentile	39.4	mph	10 mph Pace	30.9 - 40.9	mph
95th Percentile	41.6	mph	Percent in Pace	69.8	%

Location: **Pescadero Creek Rd, North of Burns Valley Rd**
Date Range: **11/17/2020 to 11/17/2020**
Site Code: **01**

Tuesday, November 17, 2020
Southbound

	Speed Range (mph)																	Total
Time	**0 - 10**	**10 - 15**	**15 - 20**	**20 - 25**	**25 - 30**	**30 - 35**	**35 - 40**	**40 - 45**	**45 - 50**	**50 - 55**	**55 - 60**	**60 - 65**	**65 - 70**	**70 - 75**	**75 - 80**	**80 - 85**	**85 +**	**Volume**
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
4:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
5:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
6:00 AM	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	**3**
7:00 AM	0	1	0	1	0	1	5	6	0	0	0	0	0	0	0	0	0	**14**
8:00 AM	0	0	0	0	2	4	2	1	1	0	0	0	0	0	0	0	0	**10**
9:00 AM	0	0	0	0	1	2	5	2	0	0	0	0	0	0	0	0	0	**10**
10:00 AM	0	0	2	0	0	0	5	4	0	0	0	0	0	0	0	0	0	**11**
11:00 AM	0	0	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0	**6**
12:00 PM	0	0	0	3	0	10	5	1	1	0	0	0	0	0	0	0	0	**20**
1:00 PM	0	0	1	2	2	0	3	1	2	0	0	0	0	0	0	0	0	**11**
2:00 PM	0	1	0	1	0	3	7	3	1	0	0	0	0	0	0	0	0	**16**
3:00 PM	0	0	1	1	2	1	7	2	3	0	0	0	0	0	0	0	0	**17**
4:00 PM	0	0	0	1	0	0	2	3	1	0	0	0	0	0	0	0	0	**7**
5:00 PM	0	0	1	0	0	2	5	2	0	0	0	0	0	0	0	0	0	**10**
6:00 PM	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	**3**
7:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
8:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
9:00 PM	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	**4**
10:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
11:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
Total	**0**	**2**	**5**	**12**	**9**	**23**	**57**	**28**	**13**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**149**
Percent	**0.0%**	**1.3%**	**3.4%**	**8.1%**	**6.0%**	**15.4%**	**38.3%**	**18.8%**	**8.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

Daily Percentile Speed Summary			**Speed Statistics**		
50th Percentile (Median)	36.7	mph	Mean (Average) Speed	35.7	mph
85th Percentile	42.9	mph	10 mph Pace	31.9 - 41.9	mph
95th Percentile	46.8	mph	Percent in Pace	61.74	%

Location: **Pescadero Creek Rd, North of Burns Valley Rd**
Date Range: **11/17/2020 to 11/17/2020**
Site Code: **01**

idax DATA SOLUTIONS

Total Study Average
Northbound

Time	Speed Range (mph)																	Total Volume
	0 - 10	**10 - 15**	**15 - 20**	**20 - 25**	**25 - 30**	**30 - 35**	**35 - 40**	**40 - 45**	**45 - 50**	**50 - 55**	**55 - 60**	**60 - 65**	**65 - 70**	**70 - 75**	**75 - 80**	**80 - 85**	**85 +**	
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
4:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
5:00 AM	0	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0	0	**2**
6:00 AM	0	0	0	0	0	1	3	1	0	0	0	0	0	0	0	0	0	**5**
7:00 AM	0	0	0	0	0	0	5	0	0	0	0	0	0	0	0	0	0	**5**
8:00 AM	0	0	0	1	3	7	4	2	1	0	0	0	0	0	0	0	0	**18**
9:00 AM	0	0	0	0	2	0	6	1	0	0	0	0	0	0	0	0	0	**9**
10:00 AM	0	0	0	0	3	4	9	1	0	0	0	0	0	0	0	0	0	**17**
11:00 AM	0	0	0	2	1	1	4	0	0	0	0	0	0	0	0	0	0	**8**
12:00 PM	0	1	0	1	3	4	5	2	0	0	0	0	0	0	0	0	0	**16**
1:00 PM	0	0	0	0	1	8	3	0	0	0	0	0	0	0	0	0	0	**12**
2:00 PM	0	0	0	1	2	3	0	0	0	0	0	0	0	0	0	0	0	**6**
3:00 PM	0	0	0	3	3	4	3	1	0	0	0	0	0	0	0	0	0	**14**
4:00 PM	0	0	2	2	0	5	2	2	1	0	0	0	0	0	0	0	0	**14**
5:00 PM	0	0	0	0	3	9	2	1	0	0	0	0	0	0	0	0	0	**15**
6:00 PM	0	0	0	0	1	4	0	0	0	0	0	0	0	0	0	0	0	**5**
7:00 PM	0	0	0	0	2	1	2	2	0	0	0	0	0	0	0	0	0	**7**
8:00 PM	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	**2**
9:00 PM	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	**2**
10:00 PM	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	**2**
11:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
Total	**0**	**1**	**2**	**10**	**24**	**54**	**51**	**15**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**159**
Percent	**0.0%**	**0.6%**	**1.3%**	**6.3%**	**15.1%**	**34.0%**	**32.1%**	**9.4%**	**1.3%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

Note: Average only condsidered on days with 24-hours of data.

Total Study Percentile Speed Summary			**Total Study Speed Statistics**		
50th Percentile (Median)	33.8	mph	Mean (Average) Speed	33.6	mph
85th Percentile	39.4	mph	10 mph Pace	30.9 - 40.9	mph
95th Percentile	41.6	mph	Percent in Pace	69.8	%

Location: **Pescadero Creek Rd, North of Burns Valley Rd**
Date Range: **11/17/2020 to 11/17/2020**
Site Code: **01**

Total Study Average
Southbound

	Speed Range (mph)																	Total Volume
Time	**0 - 10**	**10 - 15**	**15 - 20**	**20 - 25**	**25 - 30**	**30 - 35**	**35 - 40**	**40 - 45**	**45 - 50**	**50 - 55**	**55 - 60**	**60 - 65**	**65 - 70**	**70 - 75**	**75 - 80**	**80 - 85**	**85 +**	
12:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
1:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
2:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**0**
3:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
4:00 AM	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	**1**
5:00 AM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
6:00 AM	0	0	0	1	0	0	0	1	1	0	0	0	0	0	0	0	0	**3**
7:00 AM	0	1	0	1	0	1	5	6	0	0	0	0	0	0	0	0	0	**14**
8:00 AM	0	0	0	0	2	4	2	1	1	0	0	0	0	0	0	0	0	**10**
9:00 AM	0	0	0	0	1	2	5	2	0	0	0	0	0	0	0	0	0	**10**
10:00 AM	0	0	2	0	0	0	5	4	0	0	0	0	0	0	0	0	0	**11**
11:00 AM	0	0	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0	**6**
12:00 PM	0	0	0	3	0	10	5	1	1	0	0	0	0	0	0	0	0	**20**
1:00 PM	0	0	1	2	2	0	3	1	2	0	0	0	0	0	0	0	0	**11**
2:00 PM	0	1	0	1	0	3	7	3	1	0	0	0	0	0	0	0	0	**16**
3:00 PM	0	0	1	1	2	1	7	2	3	0	0	0	0	0	0	0	0	**17**
4:00 PM	0	0	0	1	0	0	2	3	1	0	0	0	0	0	0	0	0	**7**
5:00 PM	0	0	1	0	0	2	5	2	0	0	0	0	0	0	0	0	0	**10**
6:00 PM	0	0	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0	**3**
7:00 PM	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**1**
8:00 PM	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	**1**
9:00 PM	0	0	0	0	0	0	3	0	1	0	0	0	0	0	0	0	0	**4**
10:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
11:00 PM	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	**1**
Total	**0**	**2**	**5**	**12**	**9**	**23**	**57**	**28**	**13**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**149**
Percent	**0.0%**	**1.3%**	**3.4%**	**8.1%**	**6.0%**	**15.4%**	**38.3%**	**18.8%**	**8.7%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	

Note: Average only condsidered on days with 24-hours of data.

Total Study Percentile Speed Summary			Total Study Speed Statistics		
50th Percentile (Median)	36.7	mph	Mean (Average) Speed	35.7	mph
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Location: **Pescadero Creek Rd, North of Burns Valley Rd**
Date Range: **11/17/2020 - 11/23/2020**
Site Code: **01**

	Tuesday			Wednesday			Thursday			Friday			Saturday			Sunday			Monday					
	11/17/2020			11/18/2020			11/19/2020			11/20/2020			11/21/2020			11/22/2020			11/23/2020			Mid-Week Average		
Time	**NB**	**SB**	**Total**	**NB**	**SB**	**Total**	**NB**	**SB**	**Total**	**NB**	**SB**	**Total**	**NB**	**SB**	**Total**	**NB**	**SB**	**Total**	**NB**	**SB**	**Total**	**NB**	**SB**	**Total**
12:00 AM	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
1:00 AM	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
2:00 AM	0	0	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	0
3:00 AM	0	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1
4:00 AM	0	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1
5:00 AM	2	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	3
6:00 AM	5	3	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	3	8
7:00 AM	5	**14**	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	**14**	19
8:00 AM	**18**	10	**28**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**18**	10	**28**
9:00 AM	9	10	19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9	10	19
10:00 AM	17	11	**28**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	11	**28**
11:00 AM	8	6	14	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	6	14
12:00 PM	**16**	**20**	**36**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	**16**	**20**	**36**
1:00 PM	12	11	23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12	11	23
2:00 PM	6	16	22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	16	22
3:00 PM	14	17	31	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	17	31
4:00 PM	14	7	21	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	14	7	21
5:00 PM	15	10	25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	15	10	25
6:00 PM	5	3	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5	3	8
7:00 PM	7	1	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	1	8
8:00 PM	2	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	3
9:00 PM	2	4	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	6
10:00 PM	2	1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	3
11:00 PM	0	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1
Total	159	149	308	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	159	149	308
Percent	52%	48%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	52%	48%	-
AM Peak	08:00	07:00	08:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	08:00	07:00	08:00
Vol.	18	14	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	18	14	28
PM Peak	12:00	12:00	12:00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	12:00	12:00	12:00
Vol.	16	20	36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16	20	36

1. Mid-week average includes data between Tuesday and Thursday.

COUNTY OF SAN MATEO - PLANNING AND BUILDING DEPARTMENT

ATTACHMENT G

WILSON IHRIG
ACOUSTICS, NOISE & VIBRATION

CALIFORNIA
WASHINGTON
NEW YORK

WI #20-108

18 February 2021

Peninsula Humane Society
1450 Rollins Road
Burlingame, CA 94010
Attn: Mr. Jim Griffin

Subject: **Noise study for the Peninsula Humane Society & SPCA Haskin Hill Sanctuary, Loma Mar, CA**

Dear Mr. Griffin:

Wilson Ihrig has completed this noise study for the proposed Haskin Hill Sanctuary for the Peninsula Humane Society & SPCA in Loma Mar, California (Project). The site is located south of SR-84/La Honda Road and Pescadero Road and west of Pescadero Creek Road, as shown in Figure 1. The purpose of this study is to compare the expected noise from the completed project to the noise guidelines included in the Noise Element of the San Mateo County General Plan and the noise regulations of the San Mateo Country Municipal Code, Chapter 4.88. The Project was also reviewed for compliance with the conditions for Negative Declaration for noise per the California Environmental Quality Act (CEQA).

The study included noise survey measurements at three locations, two within the residential area along SR-84/La Honda and Pescadero Road, north of the project, and one location near YMCA Camp Jones Gulch to the east. Figure 1 shows the project area and measurement locations. These measurements were used as a basis for determining Project compliance with the guidelines of the General Plan, the regulations of the Municipal Code, and CEQA.

Section 6 evaluates the Project against the CEQA checklist, and the conclusions of this report are that the Project would not exceed applicable thresholds as

- the Project would not affect the 24-hour CNEL at nearby sensitive areas, satisfying guidance in the San Mateo County General Plan Noise Element.
- noise from Project sources would comply with the San Mateo County Municipal Code Noise Level Standards.

In addition, the Project would not annoy reasonable persons of normal sensitivities, based on comparing Project noise to existing conditions.

A glossary of acoustical terminology has been attached to this report in Appendix A for reference.

1 DESCRIPTION OF THE PROJECT

This study is based upon Project drawings provided by KSH Architects, dated 12 October 2020, and the Site Plan is shown in Figure 2. The Peninsula Humane Society and SPCA proposes to construct a new Animal Sanctuary on a 261- acre site within an RM Zoning District. The Animal Sanctuary would provide a permanent home for dogs, cats, and a limited number of other small animals. The Animal Sanctuary would also provide a home for a small number of farm animals. The project proposes to build 70 dog enclosures, 14 cat enclosures and 1 barn for farm animals on a 261-acre site within the Resource Management (RM) Zoning District. In addition to the animal enclosures, the project also includes a maintenance building, an existing barn, a 1,000 square-foot caretaker's residence, and an approximately 6,500 square-foot administration building including a small veterinary medical center office, break rooms, and ancillary support spaces for staff and volunteers.

Dog cottages would be situated within the fenced area to minimize proximity to one another and line-of-site between cottages. Dogs would be strategically matched up to live together in pairs or small groups. This arrangement would innately foster play and social structure which helps alleviate boredom and stress, both of which can contribute to nuisance barking. Staff would conduct regularly scheduled play groups in the arena for dogs who don't reside with one another but who are suited to such activities. Should a group of dogs decide to start barking in unison, it would likely be in one "cluster" of cottages (up to 10 dogs). Staff would quiet them down in 15 minutes or less.

Dogs would be inside their cottages space (areas 6 and 7 in Figure 2 site plan) with no outdoor access from dusk each day until approximately 8 a.m. the following morning. Should any dog need to be let outside to relieve themselves after hours, they would be directly supervised by staff. This would minimize opportunities for barking.

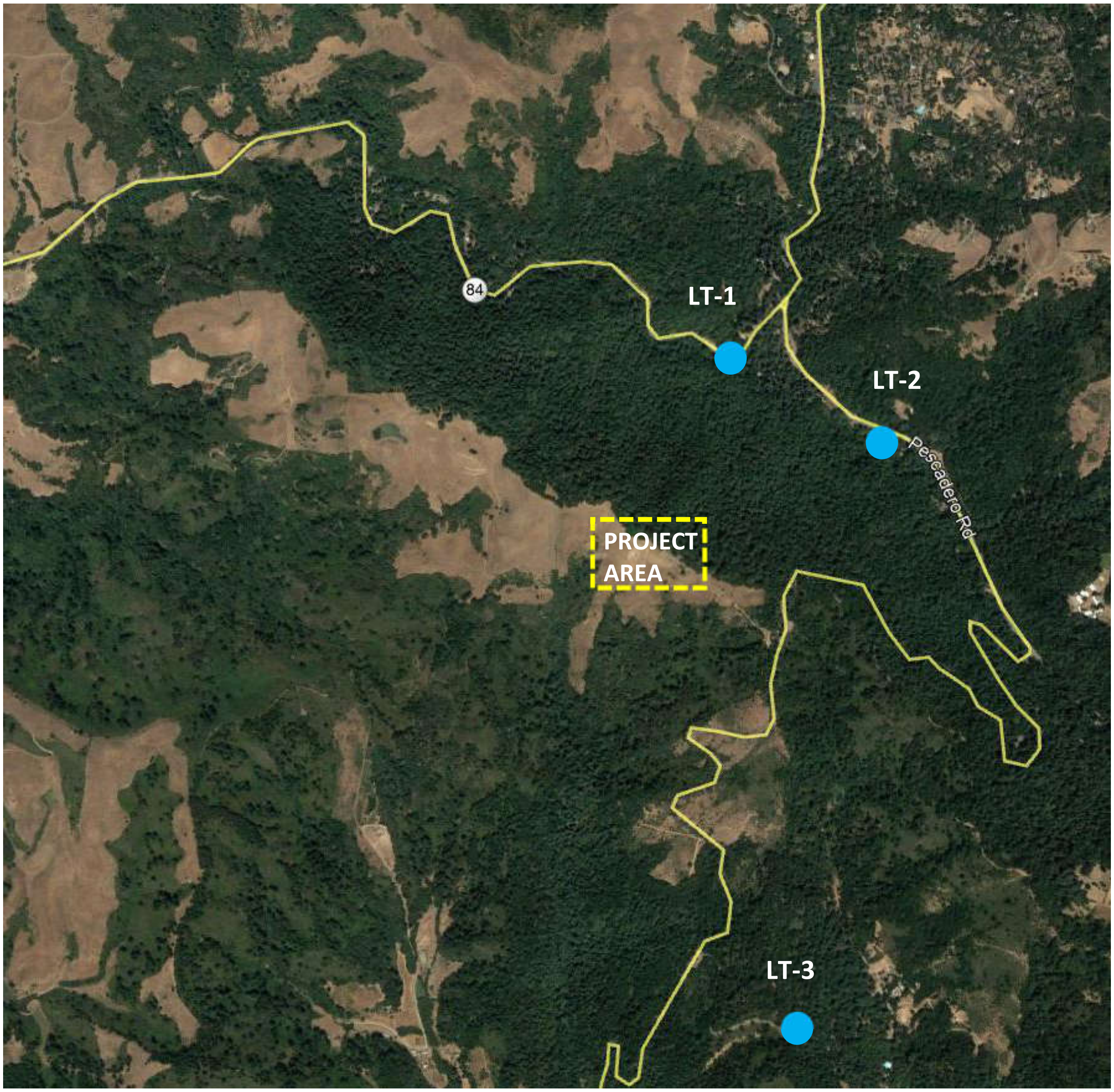
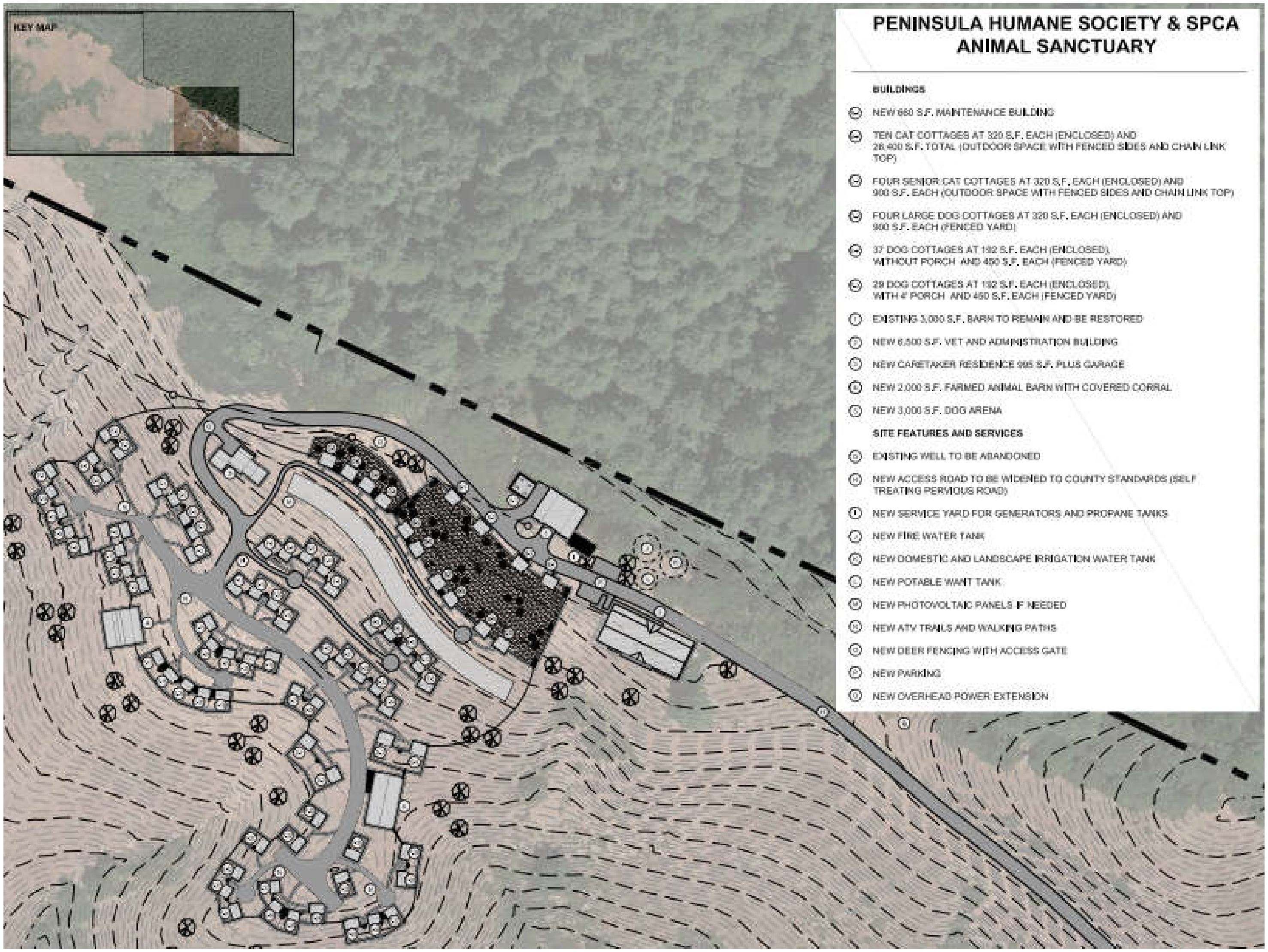


Figure 1 PROJECT AREA AND NOISE SURVEY MEASUREMENT LOCATIONS



SOURCE: KSH ARCHITECTS, 12 October 2020

Figure 2 ENLARGED SITE PLAN

2 NOISE CRITERIA

2.1 San Mateo County General Plan, Noise Element

The Noise Element for the San Mateo County General Plan includes maximum outdoor noise levels expressed in terms of the Community Noise Exposure Level (CNEL). The CNEL is the level of a steady noise which would have the same energy as the fluctuating A-weighted noise level integrated over a 24-hour period with a 5 dB penalty applied to noise levels between 7 p.m. and 10 p.m. and a 10 dB penalty applied to noise levels between 10 p.m. and 7 a.m. In other words, the CNEL is the energy of the A-weighted noise averaged over a 24-hour period with penalties added as described above.

The maximum outdoor noise level recommended in the Noise Element is 60 CNEL. In cases where these limits are already exceeded by noise sources not related to a project, it is common practice for the existing levels to be used as the limit.

2.2 San Mateo County Municipal Code

Section 4.88.333 of the San Mateo Municipal Codes states the following:

> *It is unlawful for any person at any location within the unincorporated area of the County to create any noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the exterior noise level when measured at any single or multiple family residence, school, hospital, church, public library situated in either the incorporated or unincorporated area to exceed the noise level standards as set forth in Table I following:*
>
> *Table I - Receiving Land use: Single or Multiple Family Residence, School, Hospital, Church, or Public Library Properties.*

NOISE LEVEL STANDARDS, dBA			
Category	**Cumulative Number of Minutes in any one hour time period**	**Daytime 7 A.M.—10 P.M.**	**Nighttime 10 P.M.—7 A.M.**
1	30	55	50
2	15	60	55
3	5	65	60
4	1	70	65
5	0	75	70

> *a) In the event the measured background noise level exceeds the applicable noise level standard in any category above, the applicable standard shall be adjusted in five (5) dBA increments so as to encompass the background noise level.*
>
> *b) Each of the noise level standards specified above shall be reduced by 5 dBA for simple tone noises, consisting primarily of speech or music, or for recurring or intermittent impulsive noises.*

Section 4.88.360 states the following:

> *The following activities shall be exempted from the provisions of this chapter:*

e) Noise sources associated with demolition, construction, repair, remodeling, or grading of any real property, provided said activities do not take place between the hours of 6:00 P.M. and 7:00 A.M. weekdays, 5:00 P.M. and 9:00 A.M. on Saturdays or at any time on Sundays, Thanksgiving and Christmas.

2.3 Impact Thresholds

As discussed above, the maximum CNEL recommended in the San Mateo County Noise Element is 60 dBA, unless the existing conditions are higher. Based on the existing noise environment discussed below in Section 3, the more conservative threshold of CNEL 60 is used.

The San Mateo County Municipal Code indicates maximum daytime and nighttime noise level standards based on cumulative number of minutes in a one-hour period. Per operation assumptions described in Section 2, project impact thresholds are summarized in Table 3-1 below.

Table 2-1 Summary of Project Impact Criteria Based on Municipal Code

Project Related Noise Source	**Assumed Duration**	**Municipal Code Criteria, dBA**
Single dog barking	no more than 5 min (nighttime)	60
Ten dogs barking	no more than 15 min (daytime)	60
Mechanical noise (single tone noise)	continuous, 24-hour	45

2.4 Annoyance

This report includes additional comments on potential annoyance from the Project, and these are based on the existing conditions. Project noise sources that would occur 10 dB below existing prevailing sound levels characterized by the equivalent sound levels Leq would not be expected to annoy reasonable persons of normal sensitivities. Levels well below background sound levels characterized by the L90 would generally be difficult to detect at sensitive receivers.

3 EXISTING CONDITIONS

Sensitive areas near the project include residences along SR-84 and Pescadero Road, approximately 2700 feet north and YMCA Camp Jones Gulch, approximately 6200 feet southeast. The Log Cabin Ranch juvenile facility is located more than 6000 feet northeast of the project. It is our understanding that the facility is currently not operational, and no time has been set for reopening.

Wilson Ihrig installed three precision, digitally logging sound level meters in the area: one installed on a utility pole on SR-84/La Honda Road north of the project (LT-1), one on a tree on Pescadero Road (LT-2), and one installed on a utility pole on Jones Gulch Road near YMCA Camp Jones Gulch. Figure 2 indicates the approximate locations of the sound level meters and project area in an aerial photograph of the vicinity. The sound level meters were installed on Tuesday, 24 November 2020, and recovered on the following Thursday, 3 December 2020. The meters continually logged noise levels, providing data summaries every 15 minutes for a total of eight full 24-hour periods between these dates.

Figure 3 summarizes the average equivalent sound levels at each site measured over the survey period. Appendix B contains additional figures, and Figures B-1 through B-3 indicate the time varying equivalent sound levels for each 15-minute period measured each day during the survey. The corresponding CNEL levels are indicated in the legend. Thursday, November 26 was a holiday. Typical CNEL measured in the vicinity of residences closest to the project site ranged between 60 and 65 dBA at LT-1 and LT-2. The most notable source of noise in this area in traffic on SR-84 and Pescadero Road. Typical CNEL measured at LT-3 ranged from 35 to 44 dBA. YMCA Camp Jones Gulch is currently closed due to the COVID19 pandemic, resulting in very low traffic or other activity along Jones Gulch Road.

Appendix B also includes plots showing the background, characterized by the L90. Figures B-4 through B-6 indicate the 15-minute L90 sound levels measured at the three survey locations. The L90 generally represents the level of noise present from distant sources when all other sources of noise are not present, such as nearby automobiles and aircraft (i.e. the background noise). Typical nighttime L90 levels measured at LT-1 and LT-2 ranged between 30 and 33 dBA and at LT-3 ranged between 20 and 23 dBA. Project noise sources are compared below to these background levels to provide additional observations on potential annoyance.

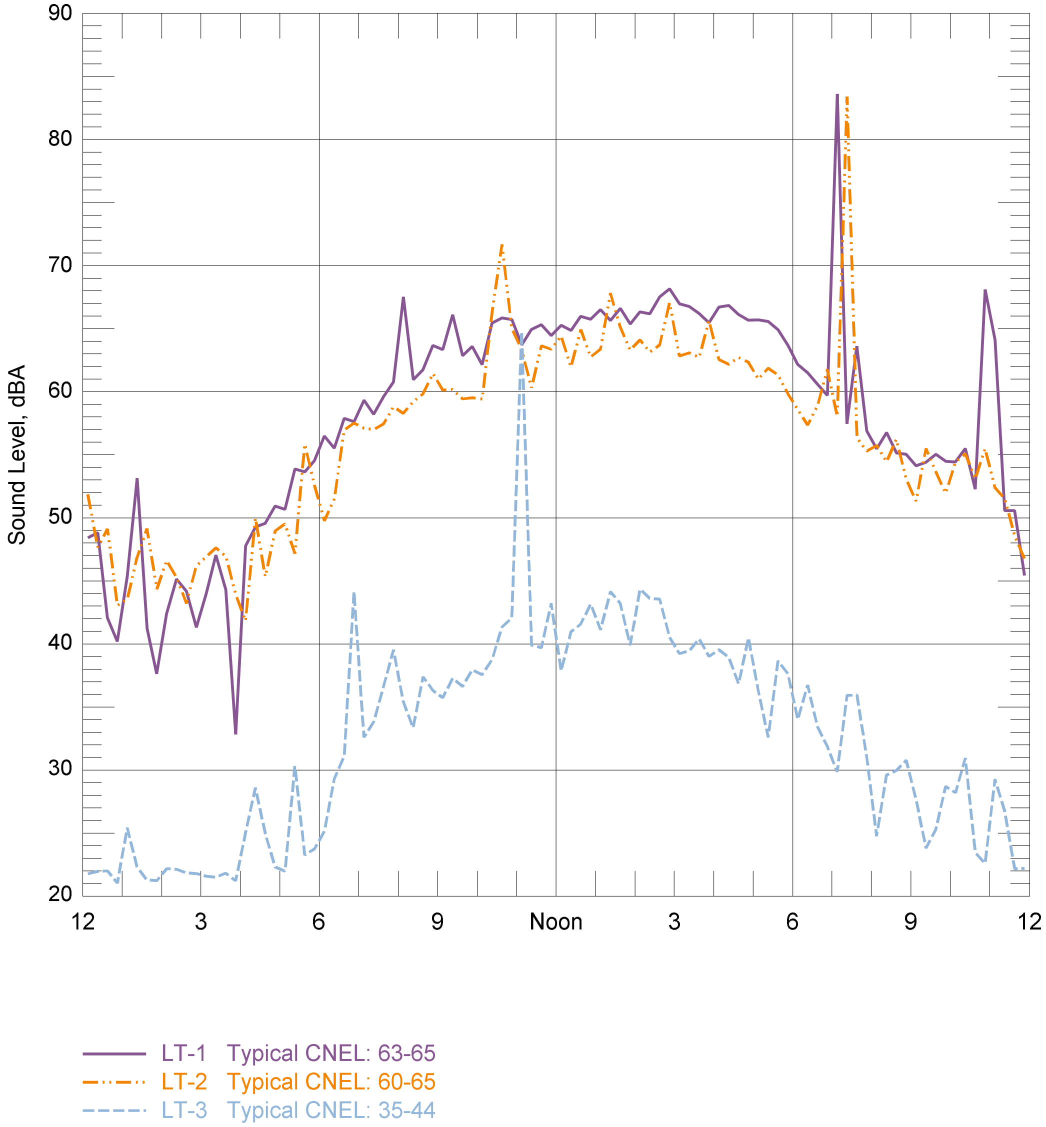


Figure 3: AVERAGE 15-MINUTE EQUIVALENT NOISE LEVELS MEASURED AT LT1, LT-2, and LT-3

4 PROJECT RELATED NOISE

Four sources of noise related to the Project were considered: 1) nighttime animal noise, 2) daytime noise from animals in outdoor areas, 3) mechanical equipment, and 4) traffic. Table 4-1 summarizes reference levels used for noise sources.

This study focuses on dog barks, which are expected to be the highest noise source from animals on site. All noise levels discussed for barking dogs are based upon data which Wilson Ihrig had obtained for previous, unrelated projects. The maximum noise level at five feet from a barking dog is approximately 96 dBA with a sound level meter set on “fast” response which is appropriate for discrete, very short duration noise events like a single dog bark.

The Project also includes HVAC equipment, and typical heat pump units are assumed to have sound power levels of 75 to 85 dBA for animal cottages, 100 dBA for residential buildings, and 105 for the administration building.

The noise analysis is based on a model developed with CadnaA[1], and the model incorporates contours from the U.S. Geological Survey National Geospatial Technical Operations Center[2] to determine noise reduction from local terrain and the resulting noise levels at the nearest noise sensitive receptors.

The Project would not include any operational vibration sources, and therefore no groundborne vibration or groundborne noise would be generated.

Table 4-1 Noise Source Reference Levels

Noise Source	**Metric**	**Reference Level, dBA**
Barking Dog	Sound Pressure Leve at 5 feet (Lmax)	96
Heat Pumps	Sound Power Level	
192 sq. ft. Cottages		75
320 sq. ft. Cottages		85
Caretaker/Volunteer Cottages		100
Administration Building		105
Construction Equipment	Sound Pressure Leve at 50 feet (Lmax)	85

4.1 Nighttime Animal Noise

As noted in the Project description in Section 1, dogs would not have the opportunity to bark outside during nighttime hours. For the rare occurrence that a dog would bark outside in the middle of the night, the maximum expected noise level at the closest residence, approximately 2700 feet away with noise reduction from local terrain, would be 10 dBA. Maximum expected noise level at the YMCA camp from the Project would be 20 dBA. The construction of the cottage assembly is expected to further reduce levels by 10 to 15 dB. This would meet the San Mateo Municipal Code Nighttime Noise Level Standards.

4.2 Daytime Animal Noise

As noted in the Project description in Section 1, most dog barking would be controlled, but should a group of 10 dogs bark in unison while they are outdoors in the daytime, the expected maximum noise level would be 20 dBA at the residences and 30 dBA at the YMCA camp. This meets the San Mateo Municipal Code Daytime Noise Level Standards.

Extrapolating these Project noise levels from dog barking, the Project CNEL would be less than 25 dBA, well below the 60 to 65 dBA existing CNEL measured at nearest residences. Based upon the data and information given above, it can be concluded that noise from animals outside the Project would

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[1] CadnaA software provides tools for the calculation, presentation, assessment and prediction of environmental noise.

[2] https://prdtnm.s3.amazonaws.com/StagedProducts/TopoMapVector/CA/Shape/VECTOR_La_Honda_CA_7_5_Min_Shape.zip

not have any effect upon the 24-hour CNEL in the residential area along SR-84 and the camp. Thus, there would be no impact, as the Project would satisfy Noise Element guidance and would be below the evaluation threshold.

4.3 Mechanical Equipment

The Project would include heat and ventilation for 84 animal cottages, caretaker's residence, volunteer cottage, and veterinary/administration building. The worst case expected maximum noise level from Project HVAC equipment, assuming all air handlers were operating simultaneously and that all the equipment were located at one spot on the project, would be 11 dBA.

Noise from Project mechanical equipment would not have any effect upon the 24-hour CNEL in either the vicinity of the Project or at the nearest receptors. This analysis result is based upon the unlikely event that all mechanical equipment would operate simultaneously over the entire 24-hour period. Thus, the noise from Project mechanical equipment would comply with the guidelines of the Noise Element and the requirements of the Municipal Code for simple tone noises. There would be no impact, as the Project would satisfy Noise Element guidance and would be below the evaluation threshold.

4.4 Traffic

Traffic project is expected to increase traffic along Pescadero Creek Road by 10%, per the information provided by Hexagon Transportation Consultants, Inc., dated 8 December 2020. A 10% increase in traffic would correspond to a 0.4 dB increase in noise and the overall CNEL would remain unaffected in the 60 to 65 dBA CNEL range. Traffic related to the project would not cause any change at the closest residences along SR-84 and there would no impact.

4.5 Annoyance

The maximum expected noise levels from project sources would be 10 dB below average existing equivalent levels and lower at nearest residences and well below existing background (L90) levels. Therefore, the Project would not be expected to annoy reasonable persons of normal sensitivities at the residences. Dogs barking and HVAC equipment operating at full power could be just audible during periods of low noise levels at the nighttime period at the YMCA camp.

Table 4-2 Existing and Predicted Noise Levels at Nearest Sensitive Receivers

Receiver	Typical Existing Equivalent Level, dBA	Single Dog Bark, Lmax, dBA	Mechanical Noise, Lmax, dBA
La Honda Road/ SR-84 Residences (LT-1)	55-65 (daytime) 45-55 (nighttime)	10	11
Pescadero Road Residences (LT-2)	55-65 (daytime) 45-55 (nighttime)	7-10	8-11
YMCA Camp (LT-3)	35-45 (daytime) 20-25 (nighttime)	20	23

4.6 Construction Noise and Vibration

During construction of the project, the maximum noise level from three pieces of standard construction equipment, used simultaneously, would be 24 dBA at the nearest residence. Noise from construction equipment would not have any effect upon the 24-hour CNEL at the nearest receptors.

There may be some temporary noise increase in the daytime ambient noise levels in the immediate vicinity of the project during restoration of the existing barn and during the construction phase of the project. All construction activity would take place during daytime hours.

The project would not include any construction vibration sources and therefore no groundborne vibration or groundborne noise would be generated during the construction phase.

5 CUMULATIVE NOISE LEVELS

As discussed above and shown in Table 5-1, noise from Project related sources would be 10 dBA less than the existing, and the combination of the Project with the existing noise would be unchanged from the existing range of 60 to 65 CNEL. Thus, the Project would have no effect on the cumulative noise level, and there would be no cumulative impact.

Table 5-1 Existing and Predicted Cumulative CNEL at Nearest Sensitive Receivers

Receiver (measurement reference)	Typical Existing CNEL, dBA	Cumulative Noise CNEL, dBA
La Honda Road/ SR-84 Residences (LT-1)	63-65	63-65
Pescadero Road Residences (LT-2)	60-65	60-65
YMCA Camp (LT-3)	35-44	35-44

6 CEQA CHECKLIST SUMMARY

The following is a summary of the Project compliance with the conditions for Negative Declaration for noise per CEQA.

CEQA Environmental Checklist:

XI. NOISE – Would the project result in:

a) 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?

No Impact. Noise from the Project would meet the guidelines included in the Noise Element of San Mateo County and the Noise Ordinance of the San Mateo County Municipal Code.

b) Generation of excessive groundborne vibration or groundborne noise levels?

No Impact. The Project would not generate groundborne vibration or groundborne noise.

c) *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 airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?*

   No Impact. This project area falls outside of the noise contours of nearby large airports and the closest private airstrip is more than 10 miles away.

7 CONCLUSIONS

Noise from the proposed Peninsula Humane Society & SPCA Haskin Hill Sanctuary would meet the guidelines of the Noise Element of the San Mateo County General Plan and the requirements of the San Mateo County Municipal Code and would not generate noise impacts. No noise control measures are required for the project.

Please do not hesitate to contact our office if you have any questions regarding this report or require further information.

Very truly yours,

WILSON IHRIG

Ani S. Toncheva, Associate

Deborah A. Jue, Principal

cc: Ken White, Peninsula Humane Society & SPCA

ATTACHMENT A

GLOSSARY OF ACOUSTICAL TERMINOLOGY

DESCRIPTION OF ACOUSTICAL TERMS

A-Weighted Sound Level (dBA):

The sound pressure level in decibels as measured on a sound level meter using the internationally standardized A-weighting filter or as computed from sound spectral data to which A-weighting adjustments have been made. A-weighting de-emphasizes the low and very high frequency components of the sound in a manner similar to the response of the average human ear. A-weighted sound levels correlate well with subjective reactions of people to noise and are universally used for community noise evaluations.

Airborne Sound:

Sound that travels through the air, as opposed to structure-borne sound.

Ambient Noise:

The prevailing general noise existing at a location or in a space, which usually consists of a composite of sounds from many sources near and far.

Community Noise Exposure Level (CNEL):

The L_{eq} of the A-weighted noise level over a 24-hour period with a 5 dB penalty applied to noise levels between 7 p.m. and 10 p.m. and a 10 dB penalty applied to noise levels between 10 p.m. and 7 a.m.

Day-Night Sound Level (L_{dn}):

The L_{eq} of the A-weighted noise level over a 24-hour period with a 10 dB penalty applied to noise levels between 10 p.m. and 7 a.m.

Decibel (dB):

The decibel is a measure on a logarithmic scale of the magnitude of a particular quantity (such as sound pressure, sound power, sound intensity) with respect to a standardized quantity.

Energy Equivalent Level / Equivalent Noise Level (L_{eq}):

The level of a steady noise which would have the same energy as the fluctuating noise level integrated over the time period of interest. L_{eq} is widely used as a single-number descriptor of environmental noise. L_{eq} is based on the logarithmic or energy summation and it places more emphasis on high noise level periods than does L_{50} or a straight arithmetic average of noise level over time. This energy average is not the same as the average sound pressure levels over the period of interest, but must be computed by a procedure involving summation or mathematical integration.

Field Impact Isolation Class (FIIC):

A single number rating similar to the IIC except that the impact sound pressure levels are measured in the field.

Field Sound Transmission Class (FSTC):

A single number rating similar to STC, except that the transmission loss values used to derive the FSTC are measured in the field. All sound transmitted from the source room to the receiving room is assumed to be through the separating wall or floor-ceiling assembly.

Frequency (Hz):

The number of oscillations per second of a periodic noise (or vibration) expressed in Hertz (abbreviated Hz). Frequency in Hertz is the same as cycles per second.

Impact Insulation Class (IIC):

A single number rating used to compare the effectiveness of floor-ceiling assemblies in providing reduction of impact generated sounds such as footsteps. It is derived from the measurement of impact sound pressure levels across a series of 16 test bands using a standardized tapping machine.

Narrowband Analysis:

A narrowband analysis determines the amplitudes of the different frequency components of a noise. The results of the analysis are presented as plots with frequency on the horizontal axis and the amplitude (or narrowband noise level) on the vertical axis. The set of narrowband noise levels associated with each frequency for a particular noise is called the *spectrum* of the noise (or *spectra* in plural). Pure tones, such as those generated by the rotating blades of a fan, appear as sharp spikes in the spectrum curve.

Noise Isolation Class (NIC):

A single number rating derived from measured values of noise reduction between two enclosed spaces that are connected by one or more paths. The NIC is not adjusted or normalized to a standard reverberation time.

Noise Level:

See Sound Pressure Level.

Normalized Noise Isolation Class (NNIC):

A single number rating similar to the NIC, except that the measured noise reduction values are normalized to a reverberation time of 1/2 second.

Octave Band - 1/3 Octave Band:

One octave is an interval between two sound frequencies that have a ratio of two. For example, the frequency range of 200 Hz to 400 Hz is one octave, as is the frequency range of 2000 Hz to 4000 Hz. An octave band is a frequency range that is one octave wide. A standard series of octaves is used in acoustics, and they are specified by their center frequencies. In acoustics, to increase resolution, the frequency content of a sound or vibration is often analyzed in terms of 1/3 octave bands, where each octave is divided into three 1/3 octave bands.

Sound Absorption Coefficient (α):

The absorption coefficient of a material is the ratio of the sound absorbed by the material to that absorbed by an equivalent area of open window. The absorption coefficient of a perfectly absorbing surface would be 1.0 while that for concrete or marble slate is approximately 0.01 (a perfect reflector would have an absorption of 0.00).

Sound Pressure Level (SPL):

The sound pressure level of sound in decibels is 20 times the logarithm to the base of 10 of the ratio of the RMS value of the sound pressure to the RMS value of a reference sound pressure. The standard reference sound pressure is 20 micro-pascals as indicated in ANSI S1.8-1969, "Preferred Reference Quantities for Acoustical Levels".

Sound Transmission Class (STC):

STC is a single number rating, specified by the American Society for Testing and Materials, which can be used to measure the sound insulation properties for comparing the sound transmission capability, in decibels, of interior building partitions for noise sources such as speech, radio, and television. It is used extensively for rating sound insulation characteristics of building materials and products.

Structure-Borne Sound:

Sound propagating through building structure. Rapidly fluctuating elastic waves in gypsum board, joists, studs, etc.

Statistical Distribution Terms:

L_{99} and L_{90} are descriptors of the typical minimum or "residual" background noise (or vibration) levels observed during a measurement period, normally made up of the summation of a large number of sound sources distant from the measurement position and not usually recognizable as individual noise sources. Generally, the prevalent source of this residual noise is distant street traffic. L_{90} and L_{99} are not strongly influenced by occasional local motor vehicle passbys. However, they can be influenced by stationary sources such as air conditioning equipment.

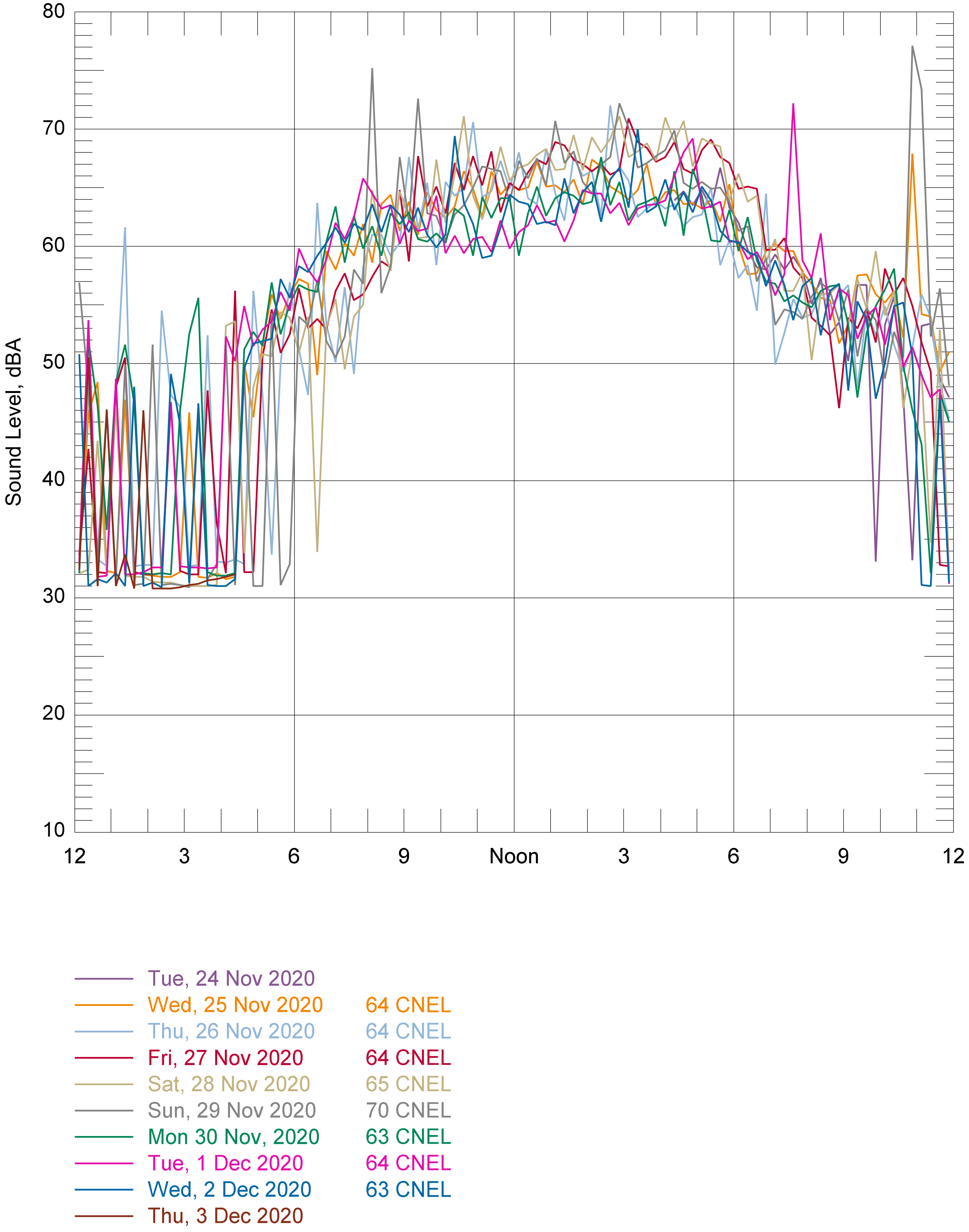
L_{50} represents a long-term statistical median noise level over the measurement period and does reveal the long-term influence of local traffic.

L_{10} describes typical levels or average for the maximum noise levels occurring, for example, during nearby passbys of trains, trucks, buses and automobiles, when there is relatively steady traffic. Thus, while L_{10} does not necessarily describe the typical maximum noise levels observed at a point, it is strongly influenced by the momentary maximum noise level occurring during vehicle passbys at most locations.

L_1, the noise level exceeded for 1% of the time is representative of the occasional, isolated maximum or peak level which occurs in an area. L_1 is usually strongly influenced by the maximum short-duration noise level events which occur during the measurement time period and are often determined by aircraft or large vehicle passbys.

ATTACHMENT B

NOISE MEASUREMENTS


Sound Level, dBA
80
70
60
50
40
30
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9
Noon
3
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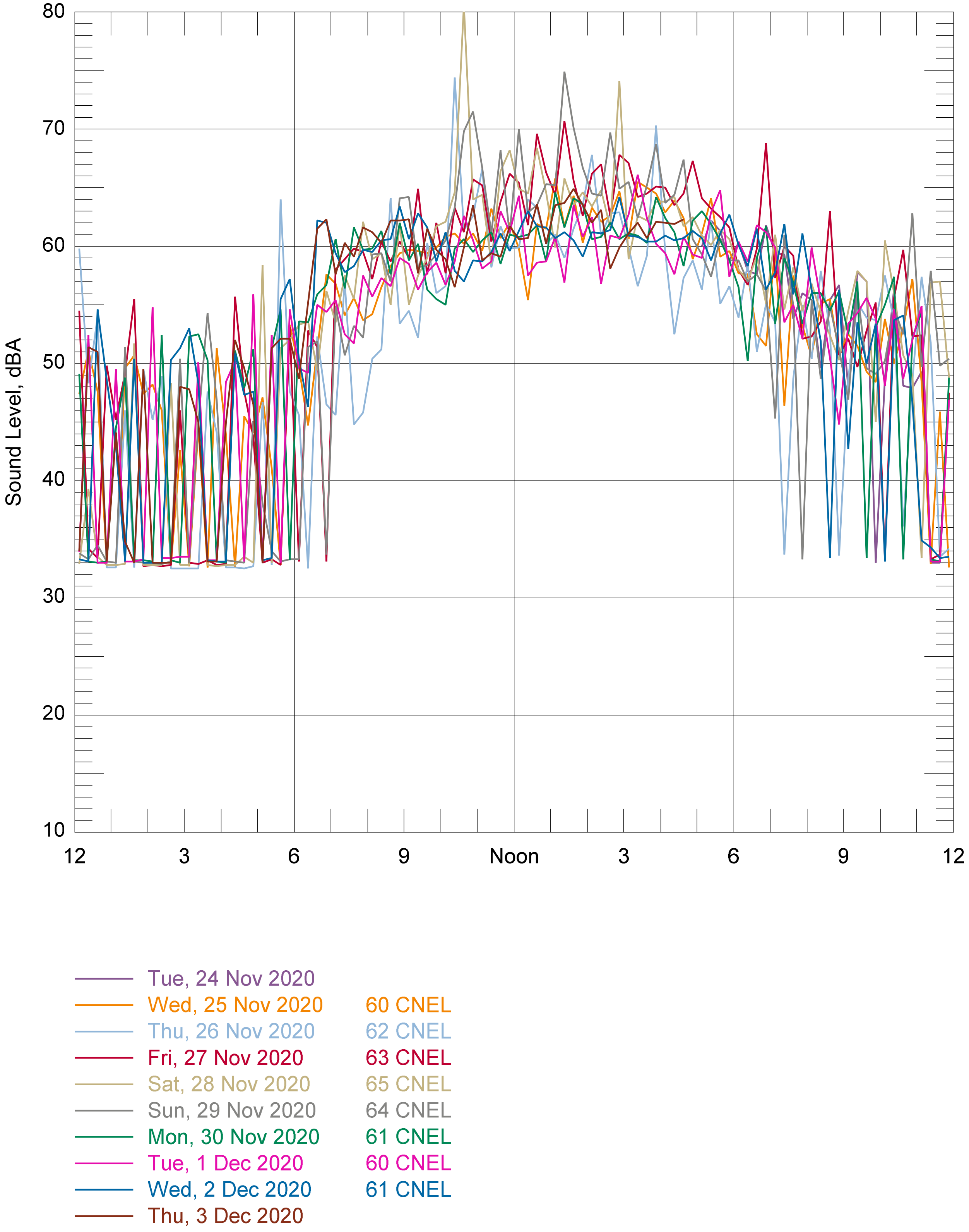
9
12
Tue, 24 Nov 2020
Wed, 25 Nov 2020 64 CNEL
Thu, 26 Nov 2020 64 CNEL
Fri, 27 Nov 2020 64 CNEL
Sat, 28 Nov 2020 65 CNEL
Sun, 29 Nov 2020 70 CNEL
Mon 30 Nov, 2020 63 CNEL
Tue, 1 Dec 2020 64 CNEL
Wed, 2 Dec 2020 63 CNEL
Thu, 3 Dec 2020

Figure B-1: 15-MINUTE EQUIVALENT NOISE LEVELS MEASURED AT LT-1


80
70
60
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40
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20
10
Sound Level, dBA
12
3
6
9
Noon
3
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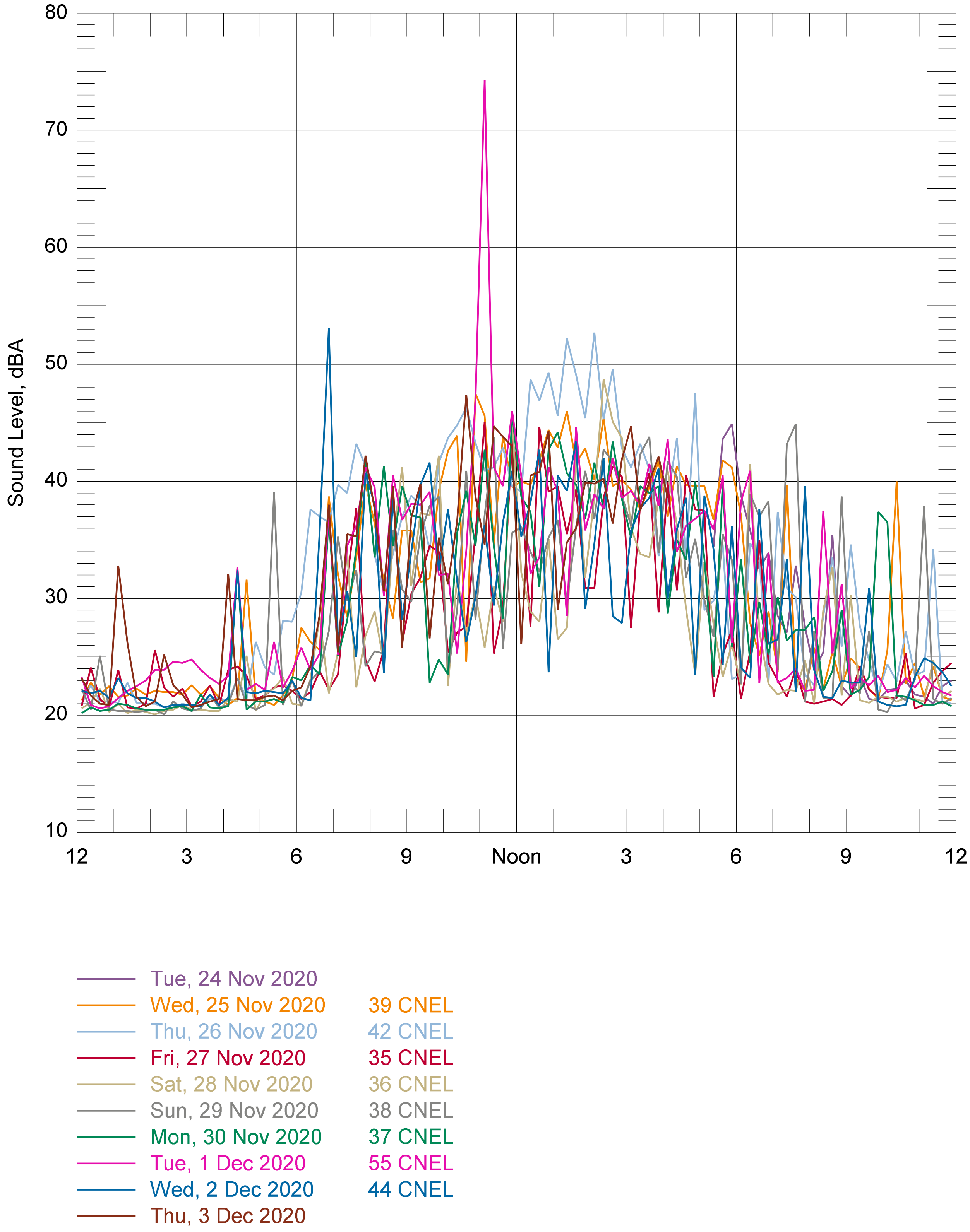
12
Tue, 24 Nov 2020
Wed, 25 Nov 2020 60 CNEL
Thu, 26 Nov 2020 62 CNEL
Fri, 27 Nov 2020 63 CNEL
Sat, 28 Nov 2020 65 CNEL
Sun, 29 Nov 2020 64 CNEL
Mon, 30 Nov 2020 61 CNEL
Tue, 1 Dec 2020 60 CNEL
Wed, 2 Dec 2020 61 CNEL
Thu, 3 Dec 2020

Figure B-2: 15-MINUTE EQUIVALENT NOISE LEVELS MEASURED AT LT-2


Sound Level, dBA
80
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3
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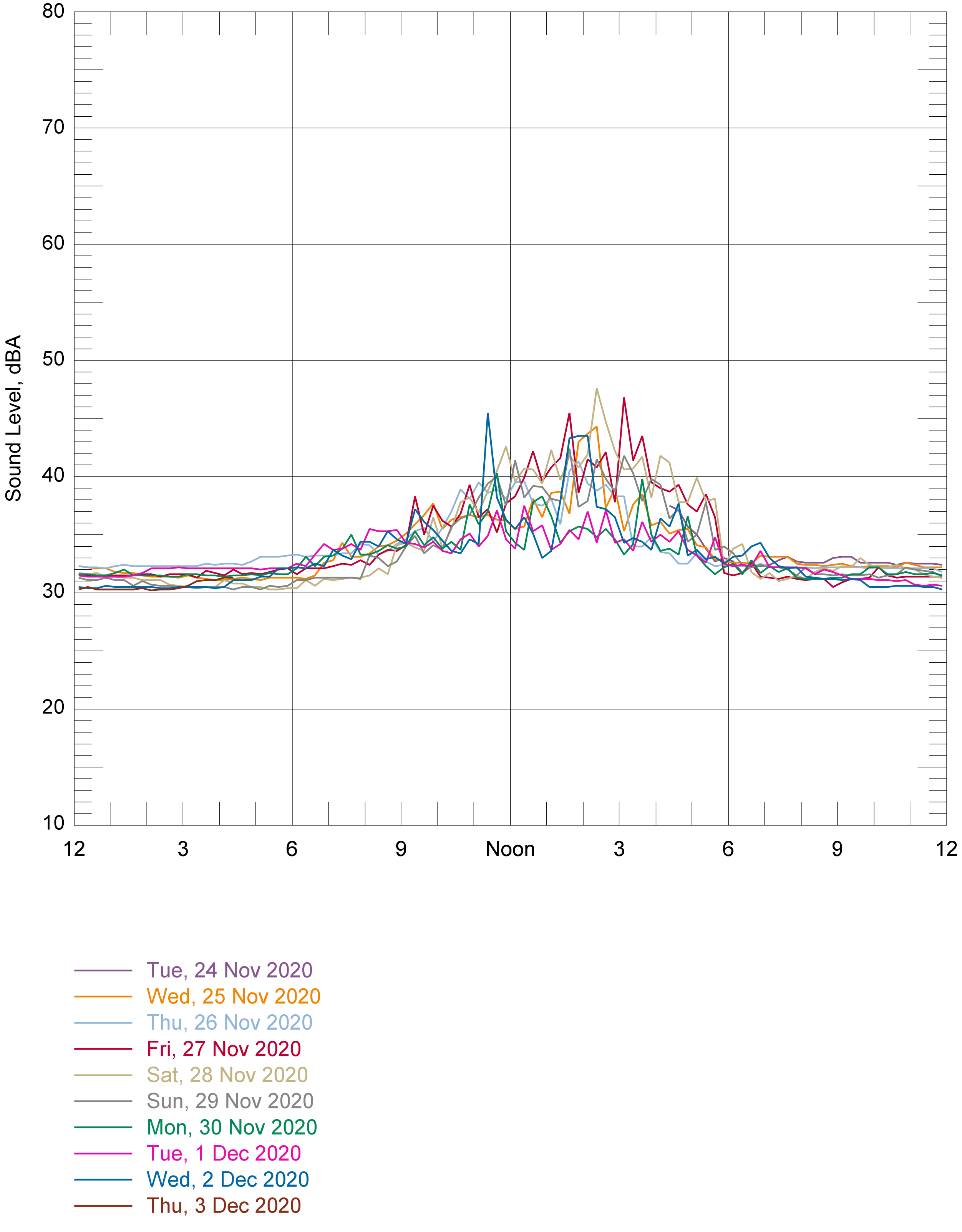
9
Noon
3
6
9
12
Tue, 24 Nov 2020
Wed, 25 Nov 2020 39 CNEL
Thu, 26 Nov 2020 42 CNEL
Fri, 27 Nov 2020 35 CNEL
Sat, 28 Nov 2020 36 CNEL
Sun, 29 Nov 2020 38 CNEL
Mon, 30 Nov 2020 37 CNEL
Tue, 1 Dec 2020 55 CNEL
Wed, 2 Dec 2020 44 CNEL
Thu, 3 Dec 2020

Figure B-3: 15-MINUTE EQUIVALENT NOISE LEVELS MEASURED AT LT-3


Sound Level, dBA
80
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12
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Noon
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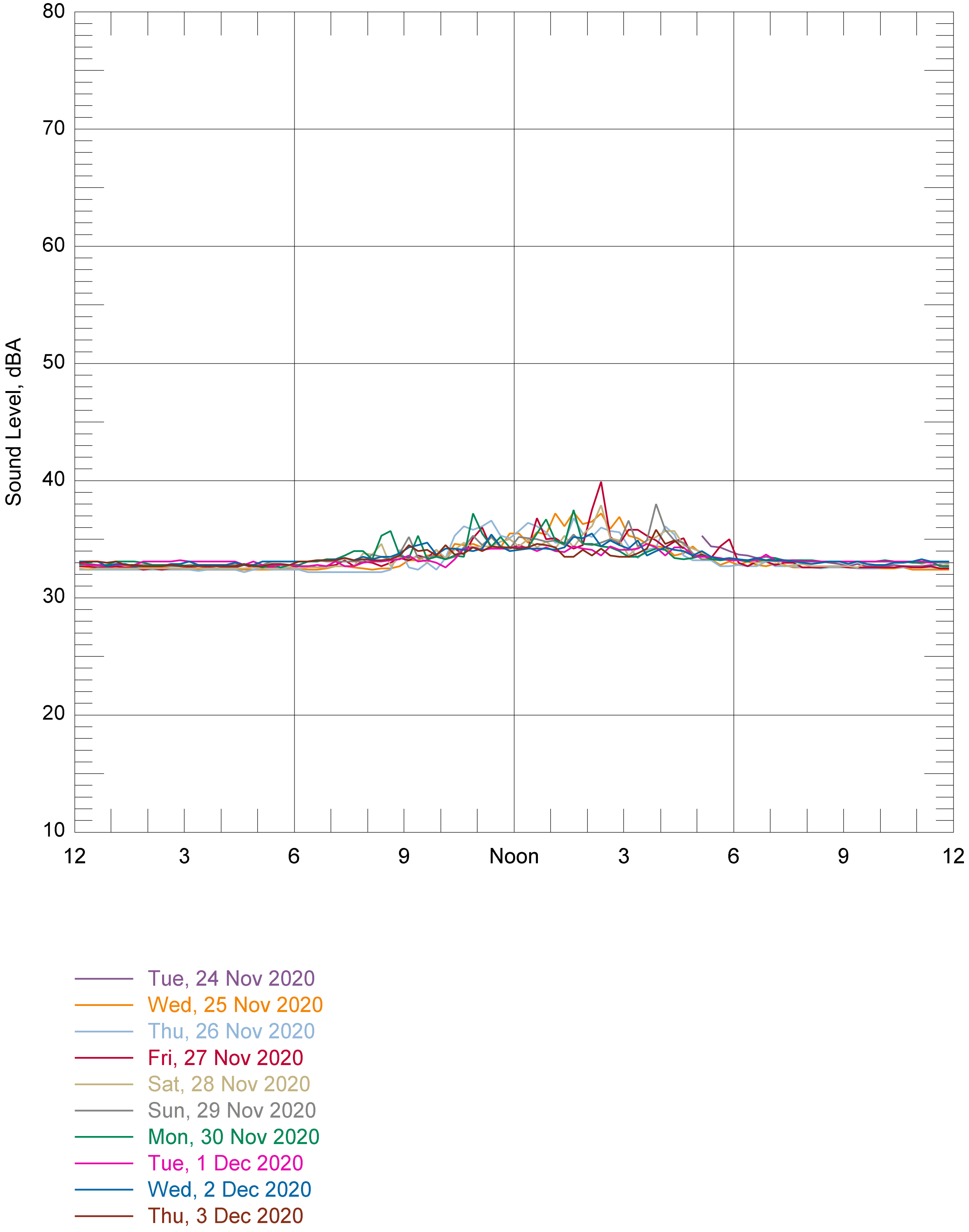
12
Tue, 24 Nov 2020
Wed, 25 Nov 2020
Thu, 26 Nov 2020
Fri, 27 Nov 2020
Sat, 28 Nov 2020
Sun, 29 Nov 2020
Mon, 30 Nov 2020
Tue, 1 Dec 2020
Wed, 2 Dec 2020
Thu, 3 Dec 2020

Figure B-4: 15-MINUTE L90 NOISE LEVELS MEASURED AT LT-1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Sound Level, dBA
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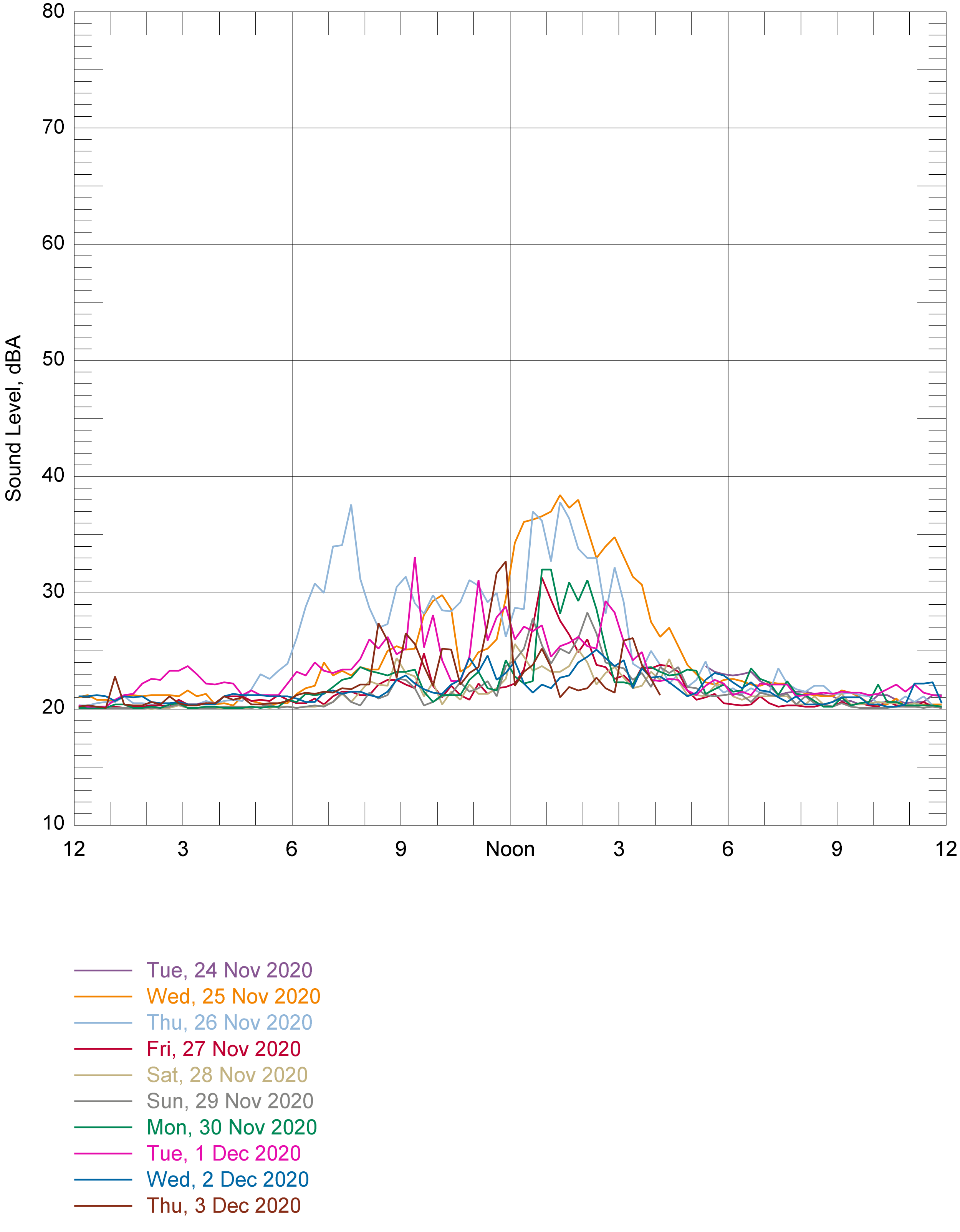
Tue, 24 Nov 2020
Wed, 25 Nov 2020
Thu, 26 Nov 2020
Fri, 27 Nov 2020
Sat, 28 Nov 2020
Sun, 29 Nov 2020
Mon, 30 Nov 2020
Tue, 1 Dec 2020
Wed, 2 Dec 2020
Thu, 3 Dec 2020

Figure B-5: 15-MINUTE L90 NOISE LEVELS MEASURED AT LT-2


Sound Level, dBA
80
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Noon
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12
Tue, 24 Nov 2020
Wed, 25 Nov 2020
Thu, 26 Nov 2020
Fri, 27 Nov 2020
Sat, 28 Nov 2020
Sun, 29 Nov 2020
Mon, 30 Nov 2020
Tue, 1 Dec 2020
Wed, 2 Dec 2020
Thu, 3 Dec 2020

Figure B-6: 15-MINUTE L90 NOISE LEVELS MEASURED AT LT-3