MEMORANDUM

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To: Felix Meneau, Marin County
From: Dona Mann, A3GEO
Date: October 4, 2019
Project: Corte Madera Creek Levee Evaluation **A3GEO Project #:** 1158-1A
Subject: Existing Conditions Technical Memorandum

This memorandum summarizes the relevant findings from our site inspection and data review tasks for the Corte Madera Creek Levee Evaluation project in Marin County. Corte Madera Creek (CMC) stationing at the center of the creek is used as reference along the existing levees (Plate No.1). Our project extends from the end of the concrete channel in Kentfield, California (Station 319+00) downstream to San Francisco Bay. Our findings have been separated into two sections, Surface Conditions and Subsurface Conditions. The **Surface Conditions** section includes the findings of our site inspections and review of the U.S. Army Corps of Engineers (USACE) Routine Inspection Reports (RI). The **Subsurface Conditions** section includes the findings of our review of existing geotechnical/geologic data in the project vicinity.

I. SURFACE CONDITIONS

Surface conditions of the existing levee system were evaluated based on the following:

- Reviewing the following US Army Corps of Engineers (USACE) Routine Inspection Reports of the existing levees along Corte Madera Creek:
    - Flood Damage Reduction Segment/System Inspection Report - Inspection Date: 7/18/2011;
    - Flood Damage Reduction Segment/System Inspection Report - Inspection Date: 7/24/2013;
    - Flood Damage Reduction Segment/System Inspection Report - Inspection Date: 7/10/2017.
- Conducting site reconnaissance visits to assess current conditions compared to the USACE inspection findings, and evaluate the general state of the existing levee system

A. *Background - USACE Routine Inspections (RI)*

The USACE has performed Routine Inspections (RI) of the Flood Damage Reduction Channels within Corte Madera Creek to verify proper maintenance, owner preparedness and component operation of the system. During Routine Inspections of Flood Damage Reduction Channels, the following ten "**Items**" are examined:

1. Vegetation and Obstructions
2. Shoaling (sediment deposition)
3. Encroachments
4. Erosion
5. Concrete Surfaces
6. Tilting, Sliding or Settlement of Concrete Structures
7. Foundation of Concrete Structures
8. Slab and Monolith Joints
9. Flap Gates/Flap Valves/Pinch Valves
10. Riprap Revetments & Banks

Each Item is evaluated as follows:

- ***Acceptable (A) Item*:** The inspected item is in satisfactory condition, with no deficiencies, and will function as intended during the next flood event;
- ***Minimally Acceptable (M) Item*:** The inspected item has one or more minor deficiencies that need to be corrected. The minor deficiency or deficiencies will not seriously impair the functioning of the item as intended during the next flood event; and
- ***Unacceptable (U) Item:*** The inspected item has one or more serious deficiencies that need to be corrected. The serious deficiency or deficiencies will seriously impair the functioning of the item as intended during the next flood event.

Once each Item has been evaluated, the overall performance of the Flood Damage Reduction "**System"** is rated as follows:

- ***Acceptable (A) System*:** All items are rated as Acceptable;
- ***Minimally Acceptable (M) System:*** One or more items are rated as Minimally Acceptable or one or more items are rated as Unacceptable and an engineering determination concludes that the Unacceptable items would not prevent the segment / system from performing as intended during the next flood event; and,
- ***Unacceptable (U) System:*** One or more items are rated as Unacceptable and would prevent the segment/system from performing as intended, or a serious deficiency noted in past inspections (which had previously resulted in a minimally acceptable system rating) has not been corrected within the established timeframe, not to exceed two years.

The 2011, 2013 and 2017 USACE Routine Inspection evaluations are summarized in Table 1 below. As indicated in Table 1, the general condition of the overall system has not significantly changed between 2011 and 2017. **The overall System has been rated "Minimally Acceptable" each inspection year.** It is important to note that the overall System also includes the concrete channel which is not part of this Corte Madera Creek Levee Evaluation project.

Table 1 - USACE Routine Inspection Summary

Rated Item	USACE Routine Inspection Reports								
	2011			2013			2017		
	A	M	U	A	M	U	A	M	U
1. Vegetation and Obstructions		●		●				●	
2. Shoaling (sediment deposition)		●			●			●	
3. Encroachments	●				●		●		
4. Erosion		●		●			●		
5. Concrete Surfaces		●			●			●	
6. Tilting, Sliding or Settlement of Concrete Structures	●			●			●		
7. Foundation of Concrete Structures	●			●			●		
8. Slab and Monolith Joints	●			●			●		
9. Flap Gates/Flap Valves/Pinch Valves		●			●			●	
10. Riprap Revetments & Banks	●			●			●		
Overall System Rating		●			●			●	

Key: A=Acceptable; M = Minimally Acceptable; U = Unacceptable

B. Site Inspection Visits

We conducted several site inspection visits in July and August 2018 to document the current conditions of the Corte Madera Creek levee system. Our inspections included: 1) field verification of the recently performed periodic inspections performed by the USACE San Francisco District; and 2) a thorough evaluation of the existing levee system between Station 282+00 and 319+00 (from Bon Air Bridge to the concrete channel).

Conditions were evaluated at the eight USACE 2017 inspection points (Plate No.1, A through H) between Station 282+00 and 319+00 which primarily focused on shoaling (sediment deposition) and culverts. Photographs at each inspection point are presented on Plates No.2 through 9. A summary of the current condition observed versus the USACE 2017 inspection findings is presented in Table 2 (Pages 3 and 4 of this memo). Corte Madera Creek (CMC) stationing shown on Plate No.1 is used to reference the location of each Inspection Point (third column, Table 2).

Table 2 - Current Conditions Observed vs. USACE 2017 Inspection Findings

Rated item	Inspection Point (Plate No. 1)	Corresponding USACE Inspect ID (Station)	Description	USACE 2017 Routine Inspection Findings		Current Conditions Observed by A3GEO		Comparison Results
				Rating	2017 USACE Remarks	A3GEO Photo	2018 A3GEO Remarks	
Shoaling (Sediment Deposition)	A	CREM_2017_a_0002 (see Remarks for stationing)	Shoaling (within Creek)	M	Unvegetated shoaling 15 to 20 ft wide and 2 to 3 ft in height was observed from Sta. 286+00 to 291+00. The area should be monitored to determine if shoaling is significantly impacting capacity.	Plate No. 2	Shoaling was observed on both sides of the channel from ~Sta. 283+00 to the Stilling Basin (Sta 319+00). Some vegetated shoaling was also observed along channel.	Shoaling appears more prominent than reported in 2017.
	B	CREM_2017_a_0008 (~Sta. 316+00 to ~319+00)	Shoaling (Stilling Basin)	M	Looking downstream at shoaling in the stilling basin immediately downstream of the concrete channel is approx. 450 ft long, 60 ft wide, and 2 to 4 ft high. Although the shoal is not vegetated, hydraulic capacity is likely substantively reduced.	Plate No. 3	Substantial shoaling with light vegetation was observed in the stilling basin.	Shoaling appears more prominent than reported in 2017. Light vegetation is now observed on the shoal.
	C	CREM_2017_a_007 (~Sta. 317+00)	Shoaling (Concrete Box Culverts- Right bank)	M	Approximately 30 to 50% sedimentation of the two 8x8ft concrete box culverts was observed. The condition is approximately the same as in previous inspection cycles. No negative performance has been reported, but the sediment should be cleared.	Plate No. 4	Approximately 30 to 50% sediment buildup inside two concrete box culverts was observed.	No significant change since 2017. Sediment has not been removed.

Key: A=Acceptable; M = Minimally Acceptable; U = Unacceptable; Left Bank = bank on left when looking downstream; Right Bank = bank on right when looking downstream

Table 2. Current Conditions Observed vs. USACE 2017 Inspection Findings – cont'd

Rated item	Inspection Point (Plate No. 1)	Corresponding USACE Inspect ID (CMC Stationing)	Description	USACE 2017 Routine Inspection Findings		Current Conditions Observed by A3GEO		Comparison Results
				Rating	2017 USACE Remarks	A3GEO Photo	2018 A3GEO Remarks	
Flap Gates/Flap Valves/Pinch Valves	D	CREM_2017_a_0006 (~Sta. 284+50)	Three 36-inch HDPE Culverts (Left Bank)	A	The 60-inch CMP noted in the 2013 RI has been replaced with three 36-inch HDPE culverts. The culverts are in excellent condition and provide tidal exchange between the channel and the wetland.	Plate No.5	Culverts were observed to be in good condition. The southernmost culvert was 30-50% infilled.	Sedimentation appears to have increased since 2017.
	E	CREM_2017_a_0003 (~Sta. 299+50)	Four 60-inch CMP Culverts (Left Bank)	M	Four 60-inch CMP culverts were observed to be severely deteriorated/corroded. The culverts provide tidal exchange between the channel and the wetland. The culverts are continuing to function but have become a public safety hazard.	Plate No.6	Severe corrosion and deterioration observed. Culverts clear of sediment and debris.	No obvious change since 2017. Wooden fence installed along sides of pedestrian path at top levee above culverts.
	F	CREM_2017_a_0005_1 (~Sta. 308+00)	One 36-inch HDPE Culvert with Flap Gate (Left Bank)	A	No remarks were made regarding this culvert in 2017 routine inspection report.	Plate No.7	Culvert in good condition. Sediment is accumulating on sides of culvert entrance. The flap gate looks in good condition. Vegetation was observed in front of culvert opening on landside of the levee.	N/A (no remarks provided in 2017)
	G	CREM_2017_a_0005_2 (~Sta. 312+50)	Three 36-inch HDPE Culverts (Left Bank)	A	The culvert is in good condition and provide tidal exchange between the channel and the wetland. The outlet is clear of sediment/debris that would impact flow	Plate No.8	Culverts were observed to be in good condition and free of sediment/debris. Only one of the three culverts is currently active. Two exterior culverts are capped. Rip rap surrounds pipe entrance.	No significant change since 2017.
	H	CREM_2017_a_0004 (~Sta. 302+00)	Three 60-inch CMP Culverts (Right Bank)	M	Three 60-inch CMP culverts are 30 to 50% infilled; unchanged from 2013. The culverts are in good condition and provide tidal exchange between the channel and the wetland.	Plate No.9	Two exterior culverts significantly infilled (~50%). Middle culvert 10-25% infilled.	No significant change since 2017.

Key: A=Acceptable; M = Minimally Acceptable; U = Unacceptable; Left Bank = bank on left when looking downstream; Right Bank = bank on right when looking downstream

The conclusions from our evaluation of the existing levee system between Station 282+00 and 319+00 (from Bon Air Bridge to the concrete channel) are summarized below. Photographs on Plates No.10 through 18 supplement the photos taken at each USACE inspection point (Plates No. 2 through 9).

Shoaling, Vegetation and Obstructions

- Significant sediment accumulation was observed within the earthen channel and stilling basin.
- Shoaling is visible on both sides of the channel from Station 283+00 to the concrete channel.
- Shoals are well established and support vegetation. Vegetation consists of weeds, vines and brush (Plate No. 10).
- Multiple large tree trunks (12 to 18-inch diameter, > 5 feet long) were observed in the earthen channel (~Sta. 289+00 and 301+50, Plate No.11).
- Significant vegetation was observed on riverside and landside levee embankments including an abundant number of fully-grown trees (up 18-inches in diameter), brush, weeds and long grasses (Plate No. 12). Existing vegetation may threaten the integrity of the levee and does not appear to be controlled.

Encroachments

- Ross Valley Sanitary District installed a new sewer force main (42-inch diameter) in the left bank of the existing levee in 2012. Portions of the previous force main remain within the left bank levee. Additional information about the force main is included in Section II. C. of this memo.
- Private property fencing and low retaining walls encroach on the landside levee embankment at several locations (~Sta. 300+30 and 301+00, Plate No.13).
- Several private properties have small bridges and/or elevated dirt walkways connecting their backyards to the crown of the existing levee on the left and right banks.

Erosion

- Significant growth of vegetation made it difficult to visually assess erosion on levee embankments.
- Erosion (1.5 to 2-foot vertical drop) was observed near the riverside toe of the existing **right** bank levee between ~Sta. 284+00 and 285+00 and between ~Sta. 302+00 to 310+00 (Plate No.14, top). Erosion (1 to 1.5-foot vertical drop) was observed near the riverside toe of the existing **left** bank levee between ~Sta. 285+00 and 290+00 (Plate No.14, bottom). Erosion appears to be occurring within the accumulated sediment along the toe of the embankment and does not appear to be currently threatening the integrity of the existing levees.

Embankment Stability

- Significant growth of vegetation made it difficult to visually assess slope instability.
- No obvious signs of slope failures were observed.
- Some indications of rodent activity were observed on the existing levee right bank particularly near existing storm drain outlets.

Depressions/ Rutting/Cracking

- No depressions or rutting were observed in crowns of levees.
- Gravel access road on left bank levee is in good condition (Plate No.15).
- Asphalt concrete paved access road on right bank levee is in good condition (Plate No.16).
- No major longitudinal cracking was observed on levee crowns.

Seepage

- No obvious signs of seepage were observed.

Culverts/ Flap Gates

- Inspection details for culverts and culvert flap gates are included in Table 2.
- Four 60-inch CMP Culverts at ~Sta. 299+50 (left bank) are severely corroded with holes (Plate No. 6).
- Several culverts are up to 50% infilled with sediment (Plates No. 4, 5 and 9).

Riprap

- Riprap was visible during low tide at all culvert discharge points into Corte Madera Creek on the left and right embankments but was often covered by vegetation and/or sediment (Plates No.5 through No.9).
- Riprap near stilling basin extends from ~Sta. 318+50 to Sta. 319+00 on both the right and left levee banks. Significant vegetation was observed on/through the riprap (Plate No.17).

Storm Drains

- Many CMP storm drains daylight near the toe of the right bank levee (~Sta. 282+00, 284+20, 289+30, 292+80, 296+60, 299+70, and 301+10). Some of the more easily accessible outlets are shown on Plate No.18. All CMP storm drains were corroded. Flap gates did not appear functional. CMP drains without flap gates were partially infilled with sediment.

II. SUBSURFACE CONDITIONS

A. Review of Published Information

A3GEO reviewed a variety of published references containing geologic and historical information relevant to the project area including aerial photographs, USGS topographic maps and geologic maps. The 1946 Aerial Photograph on Plate No. 19 shows the pre-development alignment of Corte Madera Creek and the surrounding marshland with the current (2017) creek alignment (shown as blue dashed lines) superimposed for reference. The historic USGS topographic maps on Plate No. 20. show the historic development in the area which generally consisted of filling in the marshlands, developing urban areas on former marshlands and channelizing Corte Madera Creek. The centerline of the current (2017) creek alignment is superimposed on the historic maps for reference. The Geologic Map on Plate No. 21 shows that the existing underlying surficial deposits along the creek consist of artificial fill over marine and marsh deposits (map symbol Qfm). Alluvial deposits (map symbol Qal) and Franciscan Complex bedrock (map symbols fsr, Kfs, Jfgs and KJfch) underlie the fill and marine/marsh deposits.

B. Review of Existing Geotechnical and Environmental Reports

A3GEO reviewed the following available geotechnical and environmental reports prepared by various consultants for projects surrounding Corte Madera Creek downstream of the concrete channel (listed in alphabetical order by consultant):

- A3GEO, Inc., 2017, “Draft Geotechnical Investigation Report, Maintenance & Operations (M&O) Complex; College of Marin, Kentfield Campus; Marin County, California”, dated July 21, 2017.
- A3GEO, Inc., 2017, “Draft Geotechnical Investigation Report, Athletic Fields Synthetic Turf Project; College of Marin, Kentfield, California”, dated June 29, 2017.
- A3GEO, Inc., 2011, “Geotechnical Investigation, PE Track Renovation Project; College of Marin, Kentfield Campus”, dated June 27, 2011.
- Caltrans, 1992, “Logs of Test Borings, Corte Madera Creek Bridge, Caltrans, California”, Plans approval dated 1992.
- DCM GeoEngineers, 2010, “Geotechnical Investigation Report, Sanitary District No.1 of Marin County Kentfield Force Main Replacement Project, Marin County, California”, dated February 2010.
- Delta Consultants, Inc., 2006, “Site Conceptual Model, 501 Sir Francis Drake Boulevard, Greenbrae, California”, dated December 5, 2006.
- Earth Mechanics Consulting Engineers, 2003, “Geotechnical Investigation Report, 14 Boardwalk One,

Larkspur, California", dated May 20, 2003.
- ERG Environmental Resource Group, Inc., 2013, "Phase II Environmental Site Assessment and Low Threat Closure Evaluation, College of Marin Corporation Yard, Kentfield, California", dated July 2013.
- Fugro West, Inc. (FWI), 2007, "Geologic Hazards Evaluation and Geotechnical Study, Diamond Physical Education Complex Renovation, College of Marin, Kentfield, California," dated February 16, 2007.
- Fugro West, Inc. (FWI), 2005, "Baseline Geologic Hazards Study, College of Marin, California", dated December 15, 2005.
- GeoEngineering Inc., 2013, "Geotechnical Evaluation, 444 Riviera Circle, Larkspur, California", dated June 5, 2013.
- Harding Miller Lawson & Associates, 1967, "Foundation Investigation Report, College Avenue Bridge, Kentfield, California", dated December 1967.
- Miller Pacific Engineering Group, 2017, "Geotechnical Investigation Report, Sir Francis Drake Boulevard, MMWD Pipeline Replacement Project, Larkspur and Kentfield, California", dated June 16, 2017.
- Miller Pacific Engineering Group, 2015, "Geotechnical Investigation Report, Creekside Marsh Culvert Replacement, Kentfield, California", dated May 6, 2015.
- Miller Pacific Engineering Group, 2007, "Geotechnical Investigation Report, College of Marin Math Science Building, Kentfield, California", dated November 7, 2007.
- Parsons Brinckerhoff, 2014, "Final Foundation Report, Bon Air Road Bridge Replacement Project, City of Larkspur, California", dated May 2014.
- Questa Engineering, 1996, "Environmental Site Assessment/Subsurface Investigation, Abandoned Sewage Treatment Plant, Larkspur, California", dated September 1996.
- RGA Environmental, 2014, "Well Destruction Report, Tamalpais Union High School District, Larkspur, California", dated January 9, 2014.
- SalemHowes Associates Inc., 2007, "Geotechnical Investigation Repot, 300 Riviera Circle, Larkspur, California", date March 20, 2007.
- USACE, 1968, "Log of Exploration Holes, Corte Madera Creek Channel Improvements, Marin County, California", dated April 10, 1968.

As part of our review, A3GEO created a Geographic Information System (GIS) database which included the investigation logs (boreholes and CPTs) from the above referenced reports. The GIS database was developed using ArcGIS in accordance with District guidelines as described in the "Geographic Data Contract Deliverables Guidelines, County of Marin, DPW - Flood Control" document. The database was submitted to Marin County on July 5, 2018.

The investigation points (i.e., boreholes and CPTs) included in the database are shown on Plate No. 22. At each investigation point, the GIS database includes a link to view the borehole or CPT log along with the following information:

- Hole ID
- Latitude
- Longitude
- Company ID
- Completion Date
- Surface Elevation (in NAVD_88)
- Total Depth
- Purpose of Exploration
- Source Document
- Drill Method

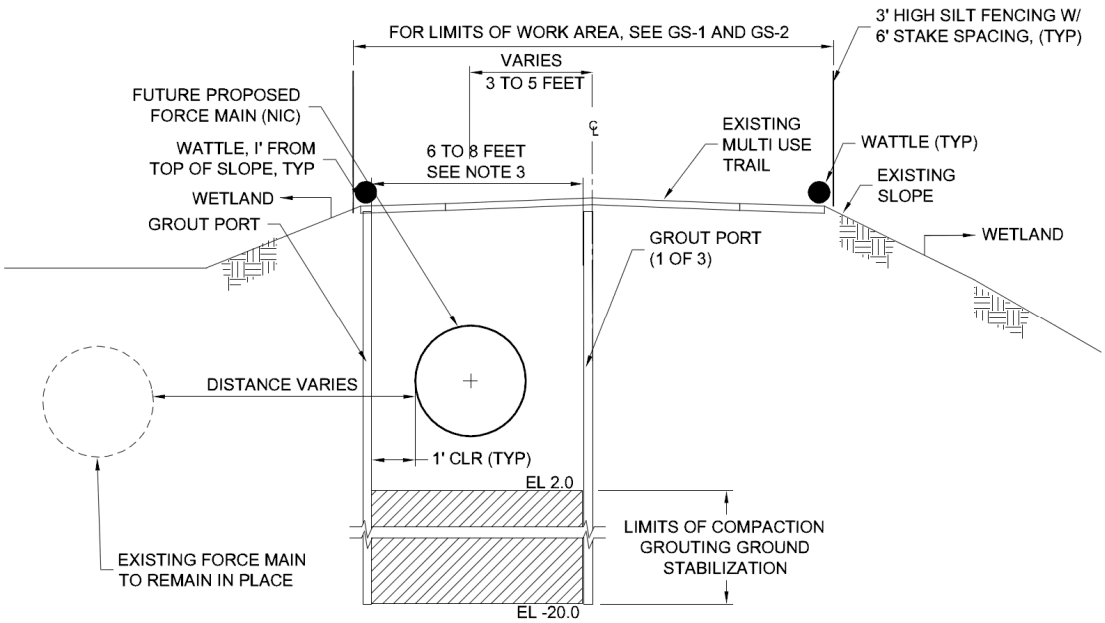
C. Review of Documents Related to the Ross Valley Sanitary District's Force Main Construction

The following documents were reviewed regarding the new force main construction:

- USACE 2013 Routine Inspection Report.
- Brown and Caldwell, 2012, "Ross Valley Sanitary District - Record Drawing Plans for Kentfield Force Main Replacement Project, Segment 1A – Pipeline", dated September 2012.
- DCM GeoEngineers, 2010, "Geotechnical Investigation Report, Sanitary District No.1 of Marin County Kentfield Force Main Replacement Project, Marin County, California", dated February 2010.
- DCM GeoEngineers, 2010, "CPT-Liquefaction Evaluation Memorandums 1 to 9, Kentfield Force Main Replacement Project", dated September to October 2010.

A summary of our review follows:

1. The Ross Valley Sanitary District replaced their force main **downstream** of Bon Air Bridge in 2012 and implemented an extensive ground improvement program beneath the existing left bank levee from Bon Air Bridge upstream to the stilling basin (~Sta. 283+50 to 319+00) to mitigate the effects of liquefaction and lateral spreading for a portion of the existing force main that is currently located beneath the left bank levee and for a planned force main which will be constructed under the left bank levee at some future time.
2. The ground improvement program consisted of creating an approximately 12-foot wide by 22-foot high grouted soil prism 8 to 30 feet below the ground surface from ~Sta. 283+50 to 319+00. Detail C on Sheet C-10 of the Brown and Caldwell 2012 Record Drawings is shown below.



D. Interpreted Stratigraphy

To evaluate subsurface conditions within the project area, A3GEO: 1) developed three preliminary subsurface profiles (College Court, Existing Left Bank Levee and South Eliseo) at the locations shown on Plate No.22, and 2) reviewed available laboratory test results. The Subsurface Profiles are included on Plates No.23 through 25. A summary of the laboratory test results is included in Table 3 (Pages 10 and 11 of this memo). A brief summary of the geologic units identified on the profiles is included below. The laboratory test results and SPT blow counts corresponding to each geologic unit are plotted on Plates No. 26 through 28.

Artificial Fill (including levees) – typically consists of weak and variable, loose to medium dense clayey, sandy and gravelly soils (SC, GC and CL) generally with greater than 30% fines. Thickness generally varies between about 4 and 8 feet.

Upper Marsh/Marine Deposits – include native material (locally known as Bay Mud) consisting of soft, compressible clays with an undrained shear strength (S_u) of 500 pounds per square foot (psf) or less. Thickness varies between about 10 and 50 feet. Plasticity Indices (PIs) generally range from 15 to 80; moisture content generally ranges from approximately 25% to 120%; dry density ranges from 50 to 100 pounds per cubic foot (pcf). The sand content is generally less than 15%.

Sand Pockets within Marsh/Marine Deposits – generally consist of discontinuous layers of alluvial/fluvial, medium dense sands and gravels. Thickness of the sand pockets generally varies between about 3 to 10 feet at various isolated locations within the marsh/marine deposits. The sand pockets are shown in dotted yellow on the subsurface profiles.

Lower Marsh/Marine Deposits – consist of native stiff to very stiff clays with an undrained shear strength (S_u) greater than 500 (psf). Thickness varies between about 10 and 50 feet. Plasticity Indices (PIs) generally range from 10 to 25; moisture content generally ranges from approximately 20% to 40%; dry density generally ranges from 100 to 125 (pcf). The sand content is generally between 5% and 35%.

Alluvium Deposits – consist of dense to very dense granular sands and gravels Pleistocene to early Holocene in age. Moisture content generally below 25%; dry density ranges from 115 to 140 (pcf). The alluvium is underlain by Franciscan complex bedrock. The contact between the alluvium and underlying bedrock is not defined on the Subsurface Profiles (Plates No. 23 through 25).

Table 3. Summary of Existing Lab Data

Source	Boring Name	Sample Type*	Sample Depth	USCS Soil Classification	Water Content	Dry Density	Sieve		Atterberg		Shear Test Results**		Corrosion				Consolidation Test Results Available?	Assigned Geological Formation
			ft		%	pcf	% >#4	%<#200	LL	PI	Test Type	tsf	PH	R (ohms-cm)	Sulfate (mg/kg)	Chloride (mg/kg)		
Fugro 2007_"Geotechnical: COM PE Complex" Project	B-1	MC	2	GC	13	133			31	16								Fill
	B-1	MC	3.5	GC									7.6	1800	23	22		Fill
	B-1	SPT	5	CL/CH	31	91					UC	0.07						Upper Marsh Deposits
	B-1	MC	9	CL/CH														Lower Marsh Deposits
	B-1	MC	12	CH														Lower Marsh Deposits
	B-1	SPT	17	CH														Lower Marsh Deposits
	B-1	MC	20	CH														Lower Marsh Deposits
	B-1	SPT	25	CL														Lower Marsh Deposits
	B-1	MC	30	CL														Lower Marsh Deposits
	B-1	MC	34	GC														Alluvium
USACE 1968_"Geotechnical: Corte Madera Creek Channel Improvements" Project	2F-97	Not Specified	5	CH	34													Upper Marsh Deposits
	2F-97	Not Specified	7	CH	47													Upper Marsh Deposits
	2F-97	Not Specified	10	CH	33													Upper Marsh Deposits
	2F-97	Not Specified	15	CL	27													Lower Marsh Deposits
	2F-97	Not Specified	17	CH	30													Lower Marsh Deposits
	2F-97	Not Specified	19	CL	37													Lower Marsh Deposits
	2F-97	Not Specified	22	SC	25													Lower Marsh Deposits
	2F-97	Not Specified	25	CL	40		6	67	39	16								Lower Marsh Deposits
	2F-97	Not Specified	26	SM	31													Lower Marsh Deposits
	2F-97	Not Specified	28	CL	75													Lower Marsh Deposits
	2F-97	Not Specified	30	SC	22													Alluvium
	2F-97	Not Specified	34	SC	36													Alluvium
	2F-97	Not Specified	37	SC	17													Alluvium
	2F-97	Not Specified	40	GC	12		58	25	31	13								Alluvium
USACE 1968_"Geotechnical: Corte Madera Creek Channel Improvements" Project	2F-45	Not Specified	3.5	CL	21													Fill
	2F-45	Not Specified	5.5	CL	30		15	54	30	8								Fill
	2F-45	Not Specified	7.5	CL	41													Upper Marsh Deposits
	2F-45	Not Specified	10	CH	44													Upper Marsh Deposits
	2F-45	Not Specified	15	CL			12	60	32	12								Lower Marsh Deposits
	2F-45	Not Specified	18	CL	31													Lower Marsh Deposits
	2F-45	Not Specified	21.5	CL	29													Lower Marsh Deposits
	2F-45	Not Specified	25	CL			5	70	31	11								Lower Marsh Deposits
	2F-45	Not Specified	31	GC	20													Lower Marsh Deposits
	2F-45	Not Specified	35	CL	24													Lower Marsh Deposits
	2F-45	Not Specified	48	CL			2	60	26	7								Alluvium
	2F-45	Not Specified	52	SC	23													Alluvium
	2F-45	Not Specified	57	CL	23		1	72	28	10								Alluvium
Fugro 2005_"Geotechnical: COM Geologic Hazard Study" Project	B-17	MC	3	SC	19	103		40			PP	1.5						Fill
	B-17	SPT	4.5	CH														Upper Marsh Deposits
	B-17	MC	11	CL	22	107					UC	2.35						Lower Marsh Deposits
	B-17	MC	16	CH	41	81					UC	0.8						Lower Marsh Deposits
	B-17	SPT	21	Rock														Alluvium
Fugro 2005_"Geotechnical: COM Geologic Hazard Study" Project	B-16	MC	2	SC	10	113		41										Fill
	B-16	SPT	3.5	SC														Fill
	B-16	MC	9	CH	75	55					UC	0.1						Upper Marsh Deposits
	B-16	MC	16	CH	52	70					UC	0.05						Upper Marsh Deposits
	B-16	MC	21	GW-GC	14	123		21										Alluvium
	B-16	SPT	25	Rock														Alluvium
A3GEO 2017_"Geotechnical: COM M&O Complex Design" Project	B-1	MC	5.5	ML	28	95					PP	0.375	6.7	381	22	1885		Fill
	B-1	MC	11	CH					35	15	UC	0.185						Upper Marsh Deposits
	B-1	Shelby	17	CL	27	98			33	13	TXUU	0.33					Yes	Lower Marsh Deposits
	B-1	MC	21	CL							PP	0.5						Lower Marsh Deposits
	B-1	Shelby	26	CL	26	99			46	22	TXUU	0.68					Yes	Lower Marsh Deposits
	B-1	MC	31	CL							PP	0.375						Lower Marsh Deposits
	B-1	Shelby	46	CL							PP	2.25						Lower Marsh Deposits
A3GEO 2017_"Geotechnical: COM M&O Complex Design" Project	B-2	Shelby	35	CL							PP	0.375						Lower Marsh Deposits
	B-2	Shelby	36	CL							PP	0.75						Lower Marsh Deposits
	B-2	MC	61	SP							PP	0.5						Alluvium
USACE 1968_"Geotechnical: Corte Madera Creek Channel Improvements" Project	2F-92	Not Specified	6	CH	38													Upper Marsh Deposits
	2F-92	Not Specified	10	CH	76													Upper Marsh Deposits
	2F-92	Not Specified	15	CH	34													Lower Marsh Deposits
	2F-92	Not Specified	18	CL	27													Lower Marsh Deposits
	2F-92	Not Specified	21	SC	24													Lower Marsh Deposits
	2F-92	Not Specified	24	CL	30		0	96	38	16								Lower Marsh Deposits
	2F-92	Not Specified	30	GC	21													Alluvium
	2F-92	Not Specified	36	SC	21													Alluvium
	2F-92	Not Specified	40	GP-GM	14													Alluvium
USACE 1968_"Geotechnical: Corte Madera Creek Channel Improvements" Project	2F-46	Not Specified	1	CH	15													Fill
	2F-46	Not Specified	5	SC			33	46	41	18								Fill
	2F-46	Not Specified	10	CH	66													Upper Marsh Deposits
	2F-46	Not Specified	13	CH	47													Upper Marsh Deposits
	2F-46	Not Specified	22	CL	27		0	79	37	18								Upper Marsh Deposits
	2F-46	Not Specified	28	CL	29													Lower Marsh Deposits
	2F-46	Not Specified	33	CL	22		0	73	28	11								Lower Marsh Deposits
	2F-46	Not Specified	46	SC			15	34	22	7								Alluvium
	2F-46	Not Specified	65	GC			67	13	24	7								Alluvium
A3GEO 2011_"Geotechnical: COM PE Track Replacement" Project	B-1	MC	2	SC	17	119			46	23	PP	1.25						Fill
	B-1	SPT	4	SC	19		28	39	43	23								Fill
	B-1	MC	7	CH														Upper Marsh Deposits
	B-1	MC	11	CH														Upper Marsh Deposits
	B-1	MC	16	CH														Upper Marsh Deposits
A3GEO 2011_"Geotechnical: COM PE Track Replacement" Project	B-2	MC	2	ML	13	106												Fill
	B-2	MC	4	CH														Fill
	B-2	MC	6	CH							PP	0.375						Fill
	B-2	MC	8	CH														Upper Marsh Deposits
	B-2	SPT	10	CH														Upper Marsh Deposits
Fugro 2007_"Geotechnical: COM PE Complex" Project	B-6	MC	2	GC	9	125												Fill
	B-6	MC	5	GC														Fill
	B-6	Shelby	10	CL/CH	48	73											Yes	Upper Marsh Deposits
	B-6	MC	16	CH	24	103					UC	0.176						Lower Marsh Deposits
	B-6	MC	20	CH	22	104												Lower Marsh Deposits
	B-6	SPT	25	CH														Lower Marsh Deposits
	B-6	MC	28.5	CH														Lower Marsh Deposits
	B-6	SPT	31.5	CH														Lower Marsh Deposits
	B-6	MC	36	CH														Lower Marsh Deposits
	B-6	MC	41	CH	22	108					TXUU	0.45						Lower Marsh Deposits
	B-6	MC	46	CH	22	107												Lower Marsh Deposits
	B-6	SPT	51	CH														Lower Marsh Deposits
	B-6	MC	55	CH	27	101					UC	0.352						Lower Marsh Deposits
	B-6	SPT	60	SC														Alluvium
	B-6	SPT	66	GC														Alluvium
DCM GeoEngineers 2010_"Geotechnical: Kentfield Forcemain Replacement" Project	B-1	Bulk	5	CL/ML	10													Fill
	B-1	MC	8	CH	71	58					UC	0.26						Upper Marsh Deposits
	B-1	SPT	12.5	CH			0	89	55	26								Upper Marsh Deposits
	B-1	Shelby	15.5	CH	30	94											Yes	Lower Marsh Deposits
	B-1	MC	16	CL	32	91					Direct Shear	0.15						Lower Marsh Deposits
	B-1	SSS	17	CL			0	93										Lower Marsh Deposits
	B-1	SPT	21	CL					40	17								Lower Marsh Deposits
	B-1	MC	24	CL	31	101					UC	0.3						Lower Marsh Deposits
	B-1	SPT	27.5	CH														Lower Marsh Deposits
	B-1	SPT	32	CH	25													Lower Marsh Deposits
	B-1	SPT	39.5	CH	25													Lower Marsh Deposits
	B-2	Bulk	4	SM	15													Fill
	B-2	SPT	11	Rock	13	118					UC	1						Alluvium
	B-2	SPT	17	Rock	10		7	41										Alluvium
USACE 1968_"Geotechnical: Corte Madera Creek Channel Improvements" Project	2F-91	Not Specified	2.5	CL	36													Upper Marsh Deposits
	2F-91	Not Specified	5.5	CH	94													Upper Marsh Deposits
	2F-91	Not Specified	8	CH	108		0	98	117	78								Upper Marsh Deposits
	2F-91	Not Specified	12	CH	37													Upper Marsh Deposits
	2F-91	Not Specified	16.5	CL	26													Lower Marsh Deposits
	2F-91	Not Specified	17.5	SC	24		0	47	25	9								Sand Pocket
	2F-91	Not Specified	19	CL	26													Lower Marsh Deposits
	2F-91	Not Specified	22	CL	28		0	76	27	9								Lower Marsh Deposits
	2F-91	Not Specified	24.5	CL	30													Lower Marsh Deposits
	2F-91	Not Specified	46	CL	27		0	92	35	14								Lower Marsh Deposits
	2F-91	Not Specified	58	SC	18													Alluvium
	2F-91	Not Specified	61	GP-GC	13													Alluvium
	2F-91	Not Specified	64	CL	12													Alluvium
	2F-91	Not Specified	66	SC	15													Alluvium
Parsons Brinkerhoff 2014_"Geotechnical: Bon Air Bridge Replacement" Project	B-1	SPT	2	SM	5.4													Fill
	B-1	MC	5	SM	8.8													Fill
	B-1	MC	10	CH	90	46.6					UU	0.165	7.57	90	371.3	4905.2		Upper Marsh Deposits
	B-1	MC	15	CH	91.2	48.3		98										Upper Marsh Deposits
	B-1	MC	20	CH	89	50.3			108	69			7.78	40	373	10538.4	Yes	Upper Marsh Deposits
	B-1	MC	25	SM	16.9	134.1	8	14										Sand Pocket
	B-1	MC	30	CL	66.7													Upper Marsh Deposits
	B-1	MC	35	CL	60	62.5					UU	0.195						Upper Marsh Deposits
	B-1	MC	40	CL	41.4	112.4					Vs	0.15						Lower Marsh Deposits
	B-1	MC	45	CL	27.7	125.2					Vs	0.335						Lower Marsh Deposits
	B-1	MC	50	SM	12.2	139.2		11										Alluvium
	B-1	MC	60	SM	36.1	115.3		35										Alluvium
	B-1	MC	70	SM	22.5	128.4												Alluvium
	B-1	MC	80	SM	8.2													Alluvium
	B-1	SPT	90	SM	9.2													Alluvium
	B-1	SPT	95	Rock	8.8													Alluvium

Table 3. Summary of Existing Lab Data - Cont'd

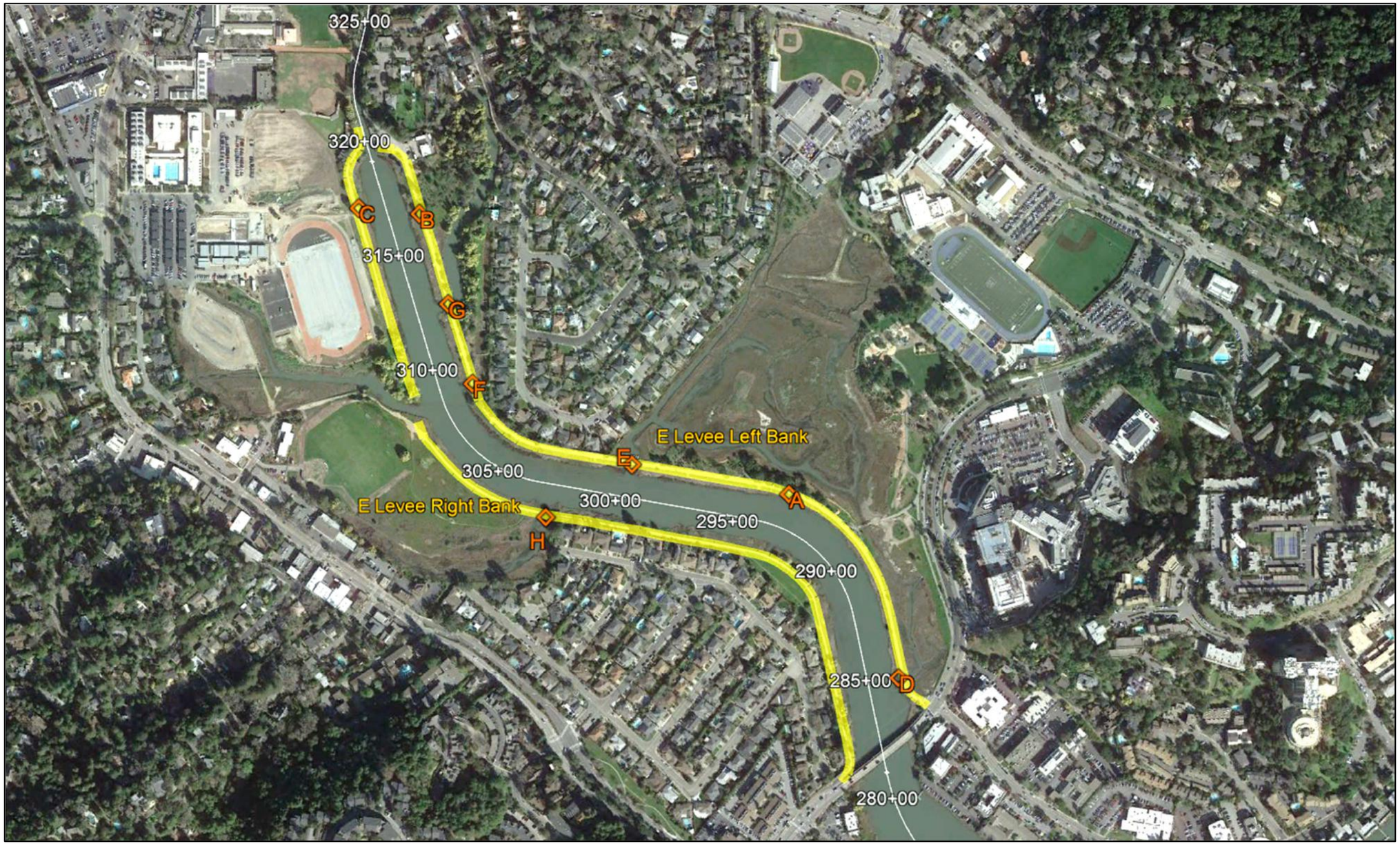
Source	Boring Name	Sample Type*	Sample Depth	USCS Soil Classification	Water Content	Dry Density	Sieve		Atterberg		Shear Test Results**		Corrosion				Consolidation Test Results Available?	Assigned Geological Formation
			ft		%	pcf	% >#4	%<#200	LL	PI	Test Type	tsf	PH	R (ohms-cm)	Sulfate (mg/kg)	Chloride (mg/kg)		
Parsons Brinkerhoff 2014_"Geotechnical: Bon Air Bridge Replacement" Project	B-2	MC	4	CH														Upper Marsh Deposits
	B-2	MC	8.5	CH	49.4	73.2					Vs	0.19	7.72	50	802.4	9632.7		Upper Marsh Deposits
	B-2	MC	13.5	SW-SM	12.5		34	10										Sand Pocket
	B-2	MC	18.5	CH	101.7	44.5					Vs	0.15						Upper Marsh Deposits
	B-2	MC	23	CH	146	32.5			149	94								Upper Marsh Deposits
	B-2	MC	28	CH	79	52.4					UU	0.15						Upper Marsh Deposits
	B-2	MC	33	CH	71.4	57.8					UU	0.29						Upper Marsh Deposits
	B-2	MC	37	CH	29.9	92.9					Vs	0.21						Upper Marsh Deposits
	B-2	MC	42	CL	21.9	106.2		85										Lower Marsh Deposits
	B-2	MC	47	CL	23.8	103.6					UC	0.525						Lower Marsh Deposits
	B-2	MC	52	CL	25.4	101.9												Lower Marsh Deposits
	B-2	MC	56	CL	24.5	103.7												Lower Marsh Deposits
	B-2	MC	61	CL	21.5	109.1												Lower Marsh Deposits
	B-2	SPT	70	Rock	11.2													Alluvium
Parsons Brinkerhoff 2014_"Geotechnical: Bon Air Bridge Replacement" Project	B-3	MC	4	CH	53.9	68.4												Upper Marsh Deposits
	B-3	MC	9	CH	62.7	62.7		93										Upper Marsh Deposits
	B-3	MC	13	SM	21.8	106.5	5	15										Sand Pocket
	B-3	MC	18	CH	100.6	44.5												Upper Marsh Deposits
	B-3	MC	23	CH		57.8			86	51								Upper Marsh Deposits
	B-3	MC	28	CH		69.6					Vs	0.19						Upper Marsh Deposits
	B-3	MC	32	CH							UU	0.432						Lower Marsh Deposits
	B-3	MC	37	CH	33.4	90.1			40	18								Lower Marsh Deposits
	B-3	MC	42	CH	24.6	103.6												Lower Marsh Deposits
	B-3	MC	47	CH	25	101.2					UC	1.025						Lower Marsh Deposits
	B-3	MC	52	CH	17.4	116.9					UC	0.225						Lower Marsh Deposits
	B-3	MC	56	SM	15.6	119.6												Alluvium
	B-3	SPT	60	SM	7.1													Alluvium
	B-3	SPT	70	Rock	10.4													Alluvium
	B-3	SPT	80	Rock														Alluvium
Parsons Brinkerhoff 2014_"Geotechnical: Bon Air Bridge Replacement" Project	B-4	MC	2	CL	11.9	118.9												Fill
	B-4	MC	5	CL	23.4													Fill
	B-4	MC	10	CH							Vs	0.24						Upper Marsh Deposits
	B-4	MC	15	CH	94.9	47			104	62								Upper Marsh Deposits
	B-4	MC	20	CH	89.7	49.4												Upper Marsh Deposits
	B-4	MC	25	CH	87	51.2												Upper Marsh Deposits
	B-4	MC	30	CH	84	52.2											Yes	Upper Marsh Deposits
	B-4	MC	35	CH	89	48.3					UU	0.2						Upper Marsh Deposits
	B-4	MC	40	CH	77.2	53.1		85			Vs	0.26						Upper Marsh Deposits
	B-4	MC	45	CL	23.4	105												Lower Marsh Deposits
	B-4	MC	50	CL	17.5	113.7												Lower Marsh Deposits
	B-4	SPT	60	Rock	6.4													Alluvium
	B-4	SPT	65	Rock	3.6													Alluvium
	B-4	SPT	75	Rock	8.8													Alluvium
	B-4	SPT	85	Rock	12													Alluvium
	B-4	SPT	98	Rock	12.6													Alluvium
USACE 1968_"Geotechnical: Corte Madera Creek Channel Improvements" Project	2F-10	Not Specified	3.7	CH			0	93	102	59								Upper Marsh Deposits
	2F-10	Not Specified	30	CH			0	95	97	57								Upper Marsh Deposits
	2F-10	Not Specified	47	CL														Lower Marsh Deposits
USACE 1968_"Geotechnical: Corte Madera Creek Channel Improvements" Project	2F-41	Not Specified	1.5	CL/ML	18													Fill
	2F-41	Not Specified	3	CH	47													Upper Marsh Deposits
	2F-41	Not Specified	4	CH	67													Upper Marsh Deposits
	2F-41	Not Specified	8	CH				99										Upper Marsh Deposits
	2F-41	Not Specified	12	CH	116													Upper Marsh Deposits
	2F-41	Not Specified	17	CH	98													Upper Marsh Deposits
	2F-41	Not Specified	21	CL	45													Upper Marsh Deposits
	2F-41	Not Specified	25	CL	90													Upper Marsh Deposits
USACE 1968_"Geotechnical: Corte Madera Creek Channel Improvements" Project	2F-42	Not Specified	2	CL	37		0	80	53	25								Fill
	2F-42	Not Specified	4	CH	64.4													Upper Marsh Deposits
	2F-42	Not Specified	8	CH	60													Upper Marsh Deposits
	2F-42	Not Specified	10	CH	85													Upper Marsh Deposits
	2F-42	Not Specified	15	CH	110		0	99	120	81								Upper Marsh Deposits
	2F-42	Not Specified	20	CH	69													Upper Marsh Deposits
	2F-42	Not Specified	22	SC	33		13	47	36	17								Sand Pocket
Caltrans As-Builts 1992_"Geotechnical: Caltrans Corte Madera Bridge Crossings" Project	B-1	MC	30	CH	83	52												Upper Marsh Deposits
	B-1	MC	60	CH														Upper Marsh Deposits
	B-1	MC	75	GM	14	120												Sand Pocket
	B-1	SPT	95	CL														Lower Marsh Deposits
	B-1	MC	100	Rock														Alluvium
	B-1	MC	105	Rock														Alluvium
Caltrans As-Builts 1992_"Geotechnical: Caltrans Corte Madera Bridge Crossings" Project	B-2	MC	15	CH														Upper Marsh Deposits
	B-2	MC	25	Rock														Alluvium
	B-3	SPT	3	SM														Fill
	B-3	SPT	20	SM														Alluvium
	B-3	SPT	25	SM														Alluvium
Caltrans As-Builts 1992_"Geotechnical: Caltrans Corte Madera Bridge Crossings" Project	B-4	MC	2	CH	121													Upper Marsh Deposits
	B-4	MC	8	CH	83	51												Upper Marsh Deposits
	B-4	MC	14	CH	94	47												Upper Marsh Deposits
	B-4	MC	20	CH	23	108												Lower Marsh Deposits
	B-4	MC	28	Rock														Alluvium
Caltrans As-Builts 1992_"Geotechnical: Caltrans Corte Madera Bridge Crossings" Project	B-5	MC	5	CH														Upper Marsh Deposits
	B-5	MC	10	CH							UC	0.12						Upper Marsh Deposits
	B-5	SPT	14	CH														Lower Marsh Deposits
	B-5	MC	20	CL							UC	0.675						Lower Marsh Deposits
	B-5	SPT	30	CL														Lower Marsh Deposits
	B-5	MC	35	Rock														Alluvium
Caltrans As-Builts 1992_"Geotechnical: Caltrans Corte Madera Bridge Crossings" Project	B-6	MC	5	CH														Upper Marsh Deposits
	B-6	MC	10	CH							UC	0.05						Upper Marsh Deposits
	B-6	MC	20	CH							UC	0.25						Upper Marsh Deposits
	B-6	MC	30	Rock														Alluvium
DCM GeoEngineers 2010_"Geotechnical: Kentfield Forcemain Replacement" Project	B-3	Bulk	2.5	CL/CH	26													Upper Marsh Deposits
	B-3	MC	6	CL/SM	25	98					UC	0.87						Lower Marsh Deposits
	B-3	MC	11	SM	14	122					UC	1.19						Alluvium
	B-3	SPT	15	Rock														Alluvium
Fugro 2007_"Geotechnical: COM PE Complex" Project	B-5	MC	1	CL	22				40	20								Fill
	B-5	SPT	2	CL														Fill
	B-5	MC	3.5	GC														Fill
	B-5	SPT	4.5	GC														Fill
	B-5	Shelby	10	CH	72	58					UC	0.175						Upper Marsh Deposits
	B-5	SPT	16	CH														Upper Marsh Deposits
	B-5	MC	21	GW														Sand Pocket
	B-5	SPT	26	GC				17										Sand Pocket
	B-5	SPT	31	GC														Sand Pocket
	B-5	SPT	33	GC														Sand Pocket
	B-5	MC	36	GC														Sand Pocket
	B-5	SPT	41	GW														Sand Pocket
	B-5	SPT	46	CH														Lower Marsh Deposits
	B-5	MC	48	CH	23	106												Lower Marsh Deposits
	B-5	MC	51	CH														Lower Marsh Deposits
	B-5	SPT	55	ML														Lower Marsh Deposits
	B-5	MC	60	GC														Alluvium
Fugro 2007_"Geotechnical: COM PE Complex" Project	B-4	MC	1.5	GC	11	120												Fill
	B-4	SPT	3	GC														Fill
	B-4	MC	5	GC	10	112												Fill
	B-4	MC	9.5	CH	48	73					UC	0.151						Upper Marsh Deposits
	B-4	Shelby	12	CH	42	79											Yes	Upper Marsh Deposits
	B-4	SPT	19	CH														Upper Marsh Deposits
	B-4	MC	25	GW-GC				9										Sand Pocket
	B-4	SPT	30	CH														Lower Marsh Deposits
	B-4	MC	35	GP-GC				13										Alluvium
	B-4	SPT	40	SC														Alluvium
	B-4	SPT	41.5	SC														Alluvium
	B-4	SPT	43	SC				29										Alluvium
	B-4	SPT	46	SC														Alluvium
	B-4	MC	48	CH														Alluvium
	B-4	SPT	50.5	GC														Alluvium
	B-4	SPT	55	GC														Alluvium
DCM GeoEngineers 2011_"Geotechnical: Kentfield Forcemain Replacement" Project	B-4	Bulk	2.5	CL			18	37										Fill
	B-4	Bulk	5.5	CL					40	18								Fill
	B-4	Shelby	7	CH	57	68					UC	0.21						Upper Marsh Deposits
	B-4	SSS	10	CH					127	79								Upper Marsh Deposits
	B-4	Shelby	13	CH	95	48					Direct Shear	0.135					Yes	Upper Marsh Deposits
	B-4	SPT	14	CH														Upper Marsh Deposits
	B-4	SPT	19	SM			20	10										Sand Pocket
Miller Pacific Engineering Group,_2015_ "Geotechnical Investigation Report, Creekside Marsh Culvert Replacement" Project	B-1A	MC	2	SM	10.3	124												Levee
	B-1A	MC	5	SC	9.8	128												Levee
	B-1B	MC	3	CL	9.8	128												Levee
	B-1B	MC	7	CH	18.4	113												Upper Marsh Deposits
	B-1B	MC	10	CH	44.3	74												Upper Marsh Deposits
	B-1B	MC	13	SC	18.6	112												Sand Pocket
	B-1B	MC	15	CH	21.1													Upper Marsh Deposits
	B-2	MC	2	SC	8.6	125					UC	0.45						Levee
	B-2	MC	4	CL														Levee
	B-2	MC	5.5	CL	12.1	103												Levee
	B-2	MC	7	CL	16													Levee
	B-2	SPT	8.5	CH	21.6													Upper Marsh Deposits
	B-2	MC	10	CH	38.2	85												Upper Marsh Deposits

Sample Types:

MC	*Modified California Sampler*
SPT	*Standard Penetration Test Sampler*
SSS	*Split Spoon Sampler*

Shear Test Types

PP	*Pocket Pen Test*
UC	*Unconfined Compression Test*
UU	Unconsolidated Undrained Compression Test
TXUU	*Unconsolidated Undrained Triaxial Test*
VS	*Vane Shear Test*



SCALE

0 1,000 Feet

LEGEND

A3GEO Inspection Points

Existing Levees

Plate No. 1

CMC Stationing and A3GEO Inspection Points

Photo Taken Looking North-West from Left Bank (at Appx CMC Station 293+00)

Photo Taken Looking South-East from Left Bank (at Appx CMC Station 293+00)

Plate No. 2

A3GEO Inspection Point A

Photo Taken Looking South-West from Left Bank (at Appx CMC Station 319+00)

Photo Taken Looking East from Right Bank (at Appx CMC Station 317+00)

Plate No. 3

A3GEO Inspection Point B

Plate No. 4

Concrete Box Culverts (Right Bank - Appx CMC station 317+00)

A3GEO Inspection Point C

Plate No. 5

36-inch HDPE Culverts (Left Bank – Appx CMC Station 284+50)

A3GEO Inspection Point D

Plate No. 6

60-inch CMP Culverts (Left Bank – Appx CMC Station 299+50)

A3GEO Inspection Point E

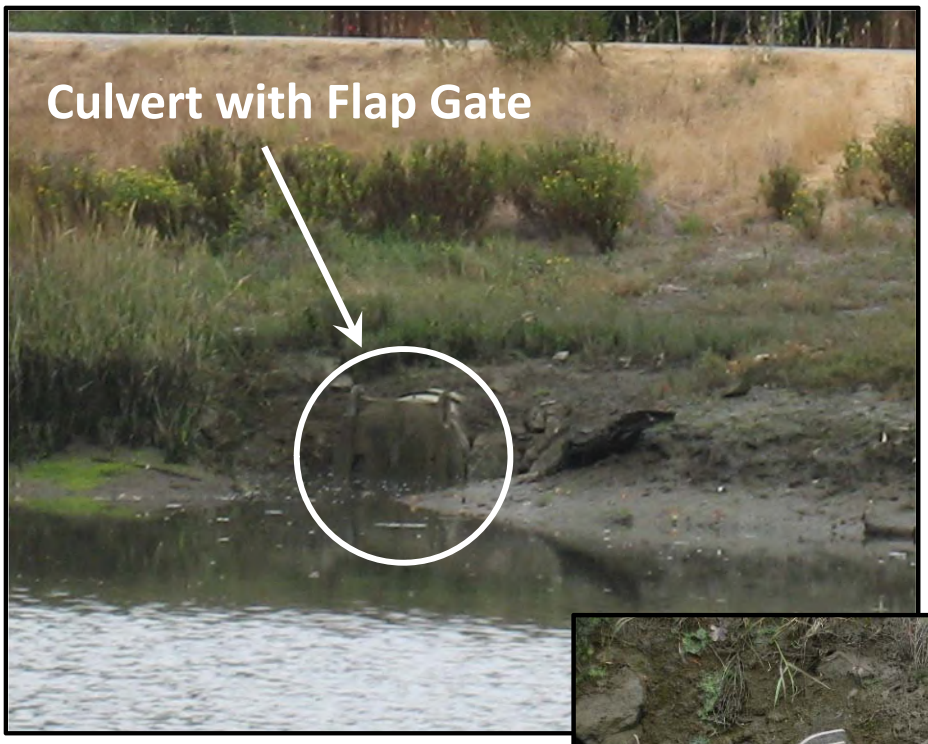


Plate No. 7

36-inch HDPE Culvert with Flap Gate – (Left Bank - Appx CMC Station 308+00)
A3GEO Inspection Point F

Plate No. 8

36-inch HDPE Culverts – (Left Bank - Appx CMC Station 312+50)

A3GEO Inspection Point G

Plate No. 9

60-inch CMP Culverts (Right Bank - Appx CMC Station 302+00)

A3GEO Inspection Point H

Photo Taken Looking North-East from Right Bank (at Appx CMC Station 286+50)

Photo Taken Looking North from Right Bank (at Appx CMC Station 301+00)

Plate No. 10

Photo Taken Looking East from Right Bank (at Appx CMC Station 289+00)

Photo Taken Looking South-West from Left Bank (at Appx CMC Station 301+50)

Plate No. 11

Photo Taken Looking South-East from Right Bank
(at Appx CMC Station 284+00)

Photo Taken Looking North-West from Right Bank
(at Appx CMC Station 285+50)

Photo Taken Looking South-East from Left Bank
(at Appx CMC Station 317+00)

Photo Taken Looking South-East from Left Bank
(at Appx CMC Station 309+00)

Plate No. 12

Photo Taken Looking North-West from Left Bank (at Appx CMC Station 300+30)

Photo Taken Looking East from Right Bank (at Appx CMC Station 301+00)

Plate No. 13

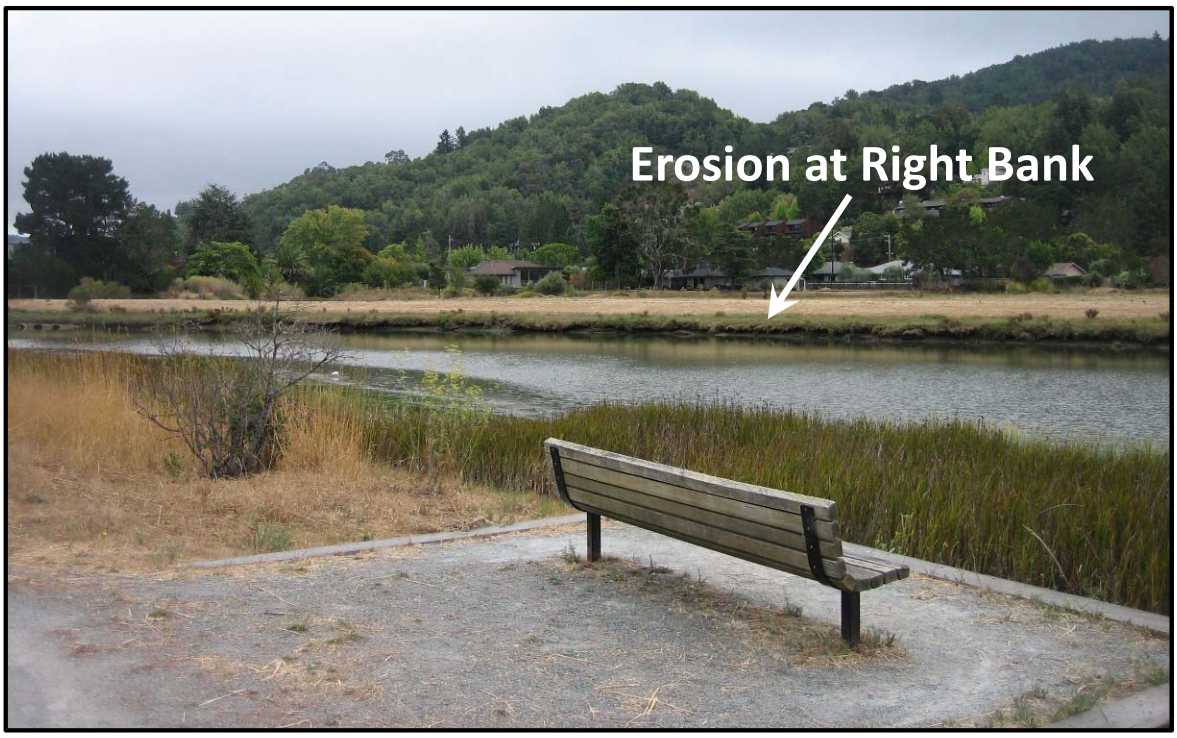


Photo Taken Looking South from left bank (at Appx CMC Station 306+00)

Photo Taken Looking North-East from Right bank (at Appx CMC Station 286+00)

Plate No. 14

Photo Taken Looking South-East from Right Bank (at Appx CMC Station 300+00)

Photo Taken Looking North-West from Right Bank (at Appx CMC Station 304+00)

Plate No. 15

Photo Taken Looking South-West from Left Bank (at Appx CMC Station 293+00)

Photo Taken Looking North-West from Left Bank (at Appx CMC Station 310+00)

Plate No. 16

Photo Taken Looking South-West from Left Bank (at Appx CMC Station 319+00)

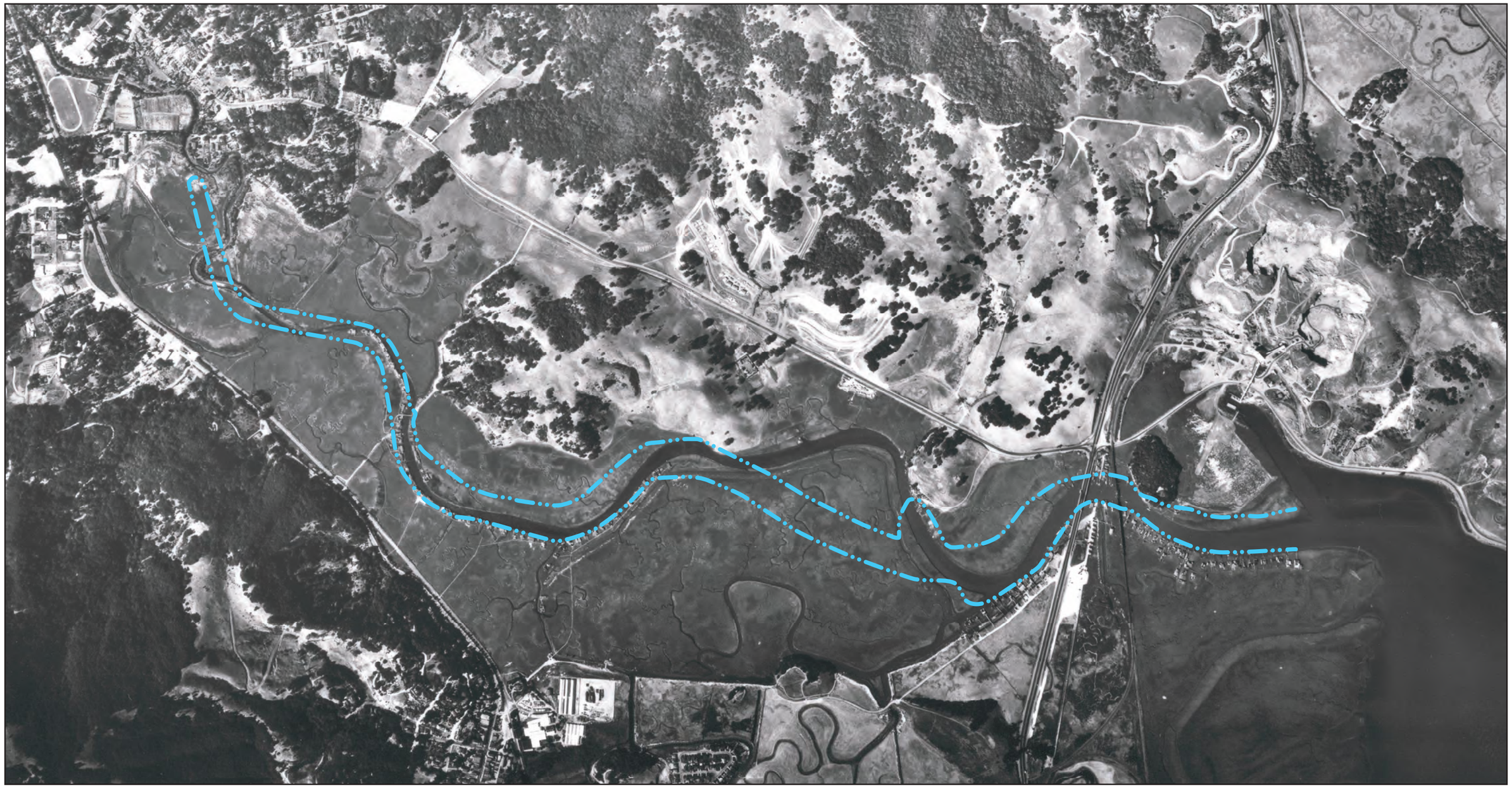
Photo Taken Looking North-East from Right Bank (at Appx CMC Station 318+20)

Plate No. 17

Plate No. 18

Storm Drains at Right Bank of Existing Levee

A3GEO



LEGEND

2017 Corte Madera Creek

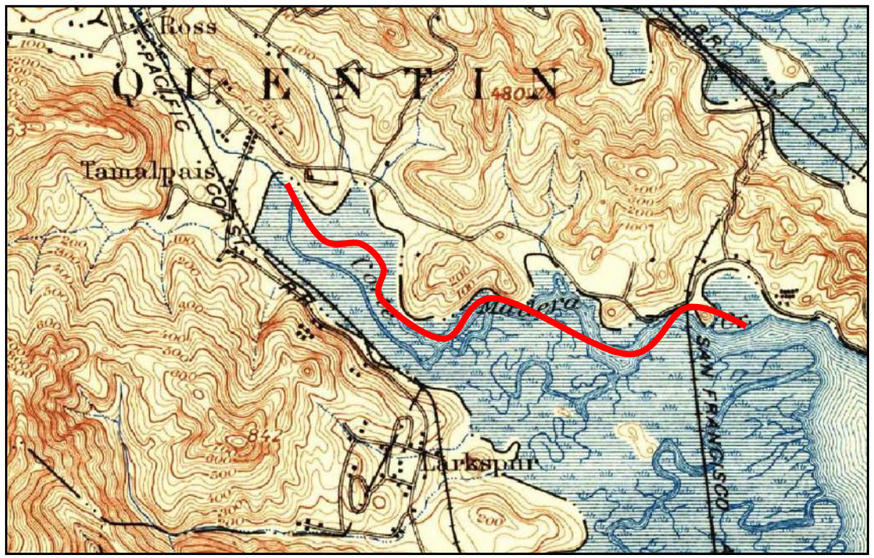
SCALE

0 1,000 2,000 Feet

Plate No. 19

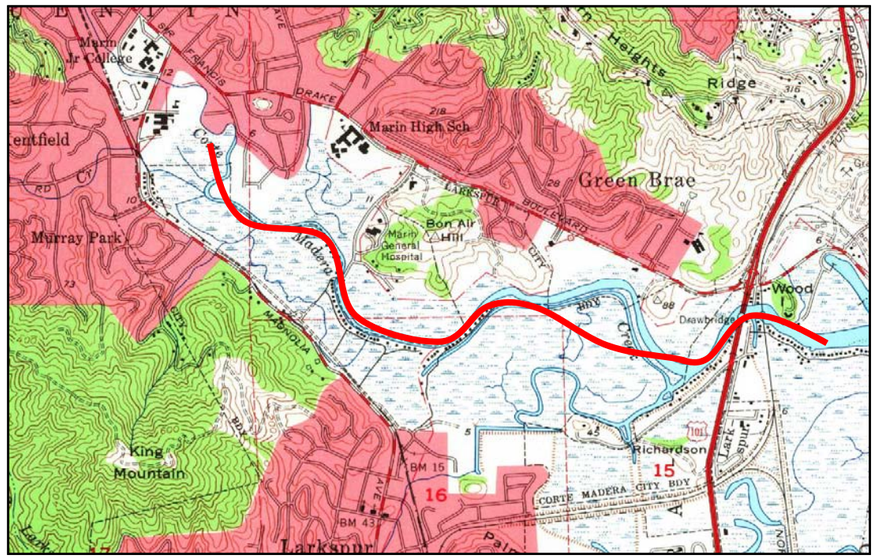
Corte Madera Creek 1946 Air Photo and Current Alignment

1897



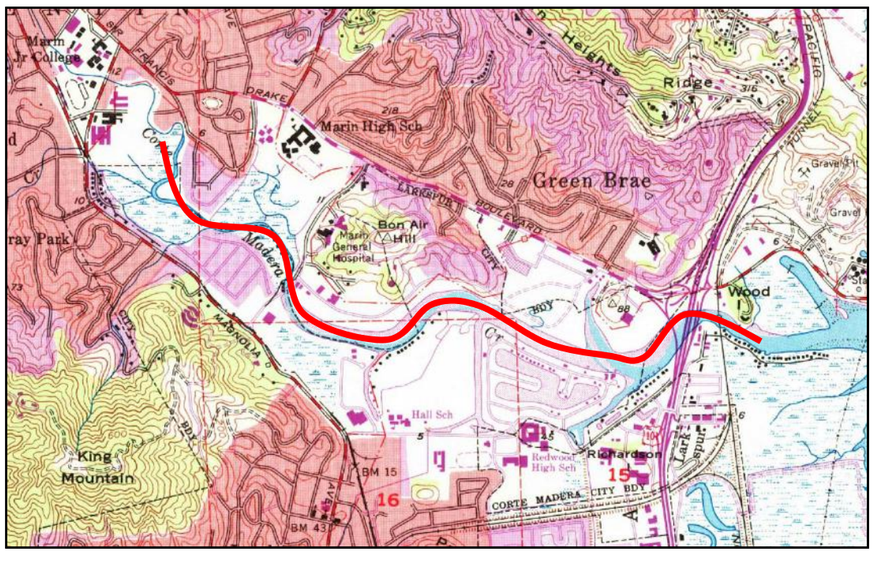
Map Source: U.S. Geological Survey (1897), Mount Tamalpais 15 Minute Quadrangle

1954



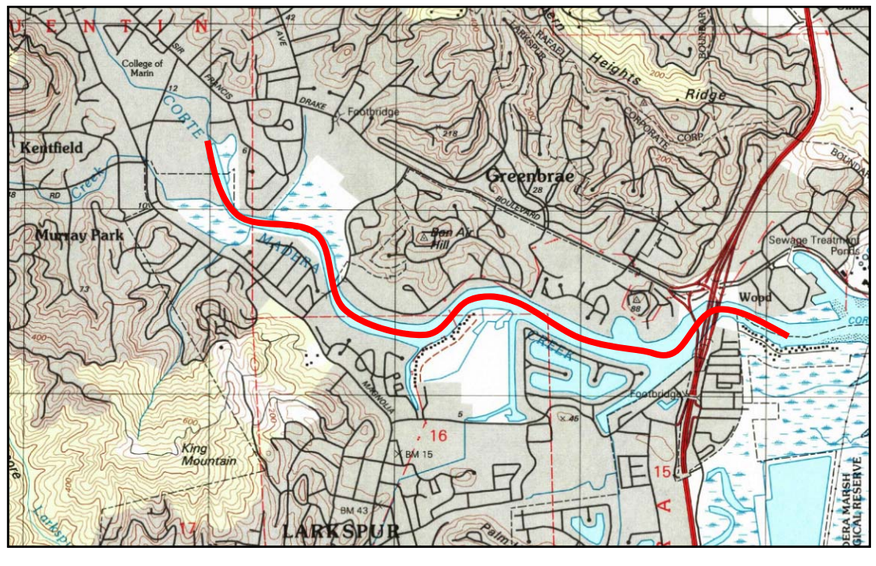
Map Source: U.S. Geological Survey (1954), San Rafael 7.5 Minute Quadrangle

1968



Map Source: U.S. Geological Survey (1968), San Rafael 7.5 Minute Quadrangle

1995



Map Source: U.S. Geological Survey (1995), San Rafael 7.5 Minute Quadrangle

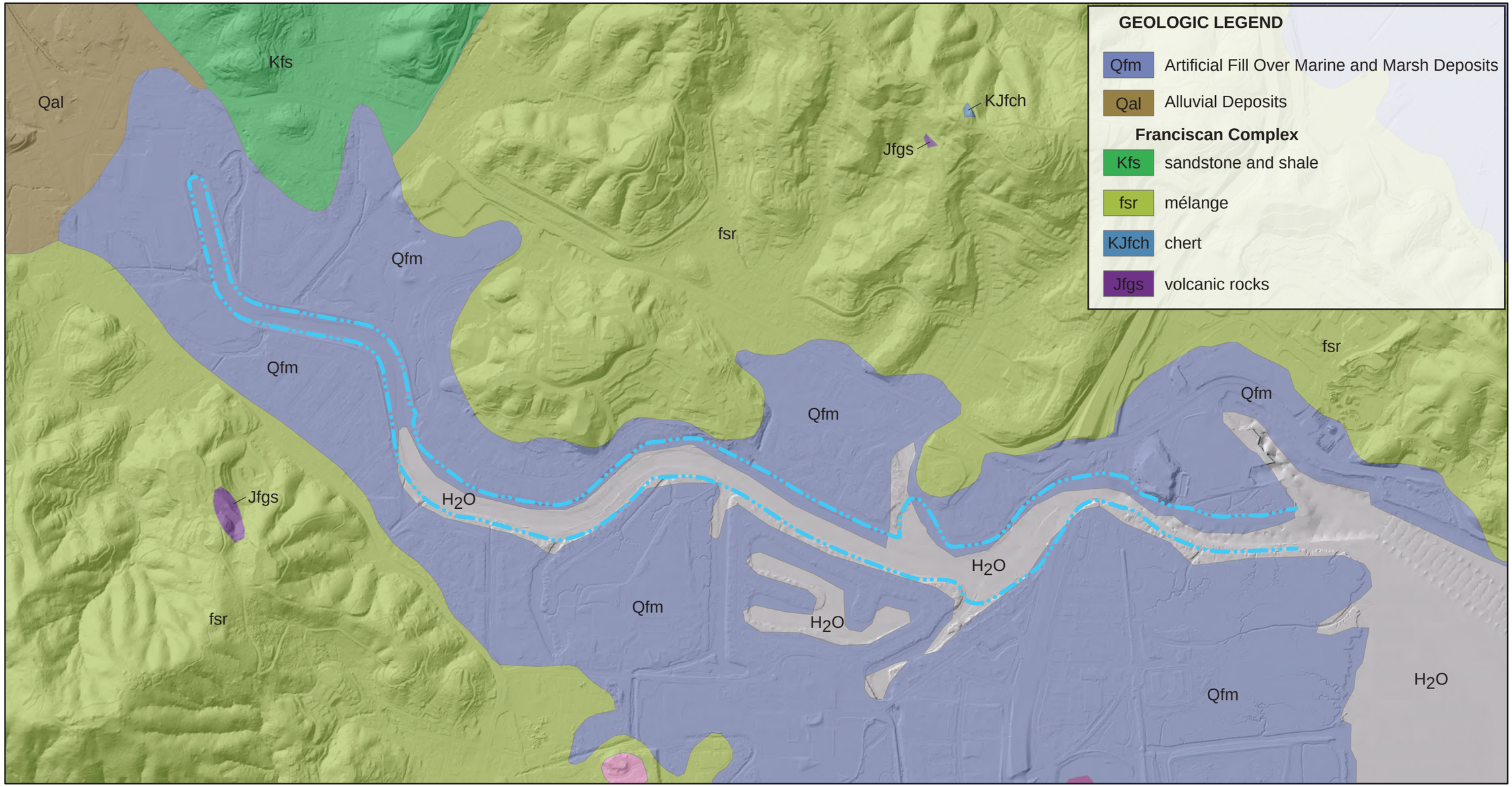
LEGEND

Current Corte Madera Creek Centerline

Plate No. 20

USGS Historical Topographic Maps

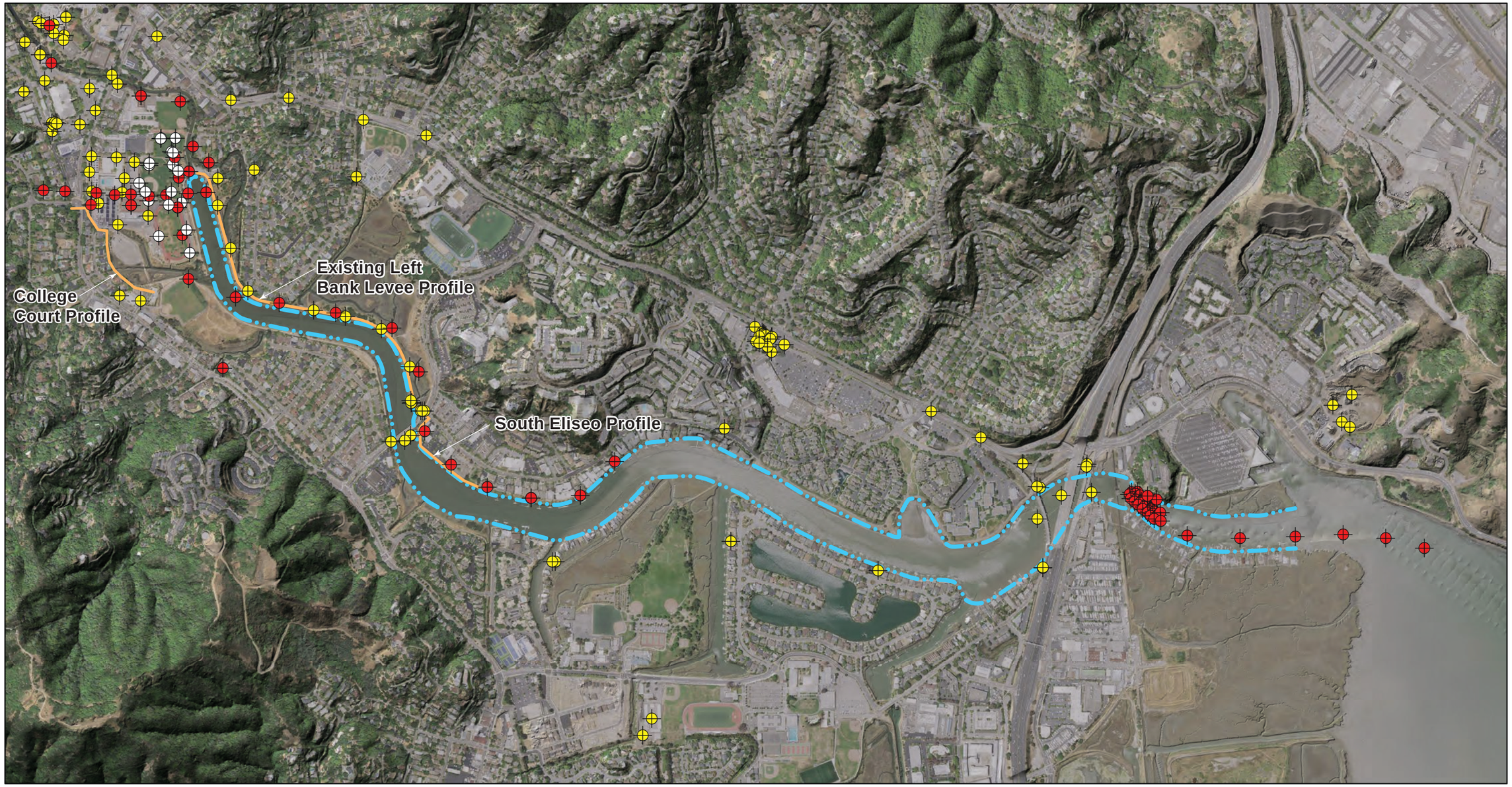
Source: Blake, M.C., Graymer, R.W., Jones, D.L., and Soule, Adam, 2000, Geologic map and map database of parts of Marin, San Francisco, Alameda, Contra Costa, and Sonoma Counties, California.



SCALE
0 1,000 2,000 Feet

Plate No. 21
Regional Geology Map

A3GEO



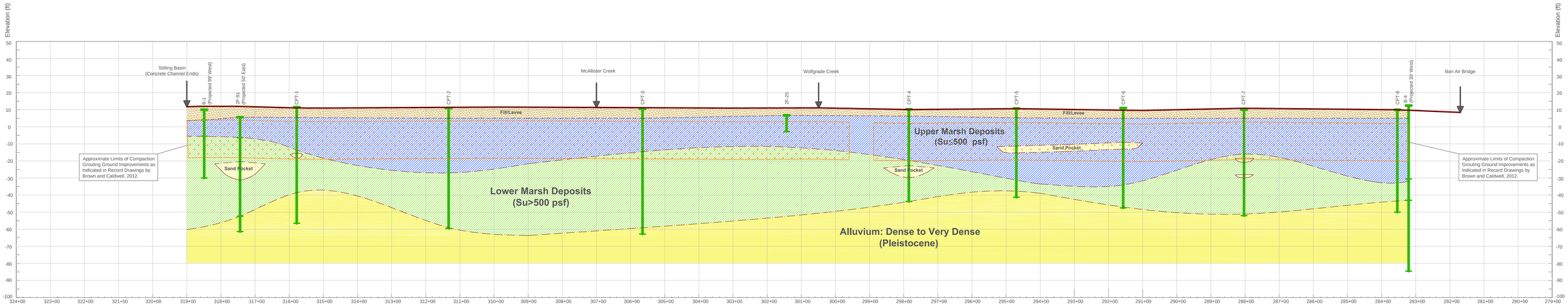
LEGEND

- US Army Corps of Engineers Exploratory Borings
- Other Consultants Exploratory Borings/CPT's
- A3GEO Exploratory Borings/CPT's
- 2017 Corte Madera Creek
- Location of Subsurface Profile

SCALE

0 1,000 2,000 Feet

Plate No. 22



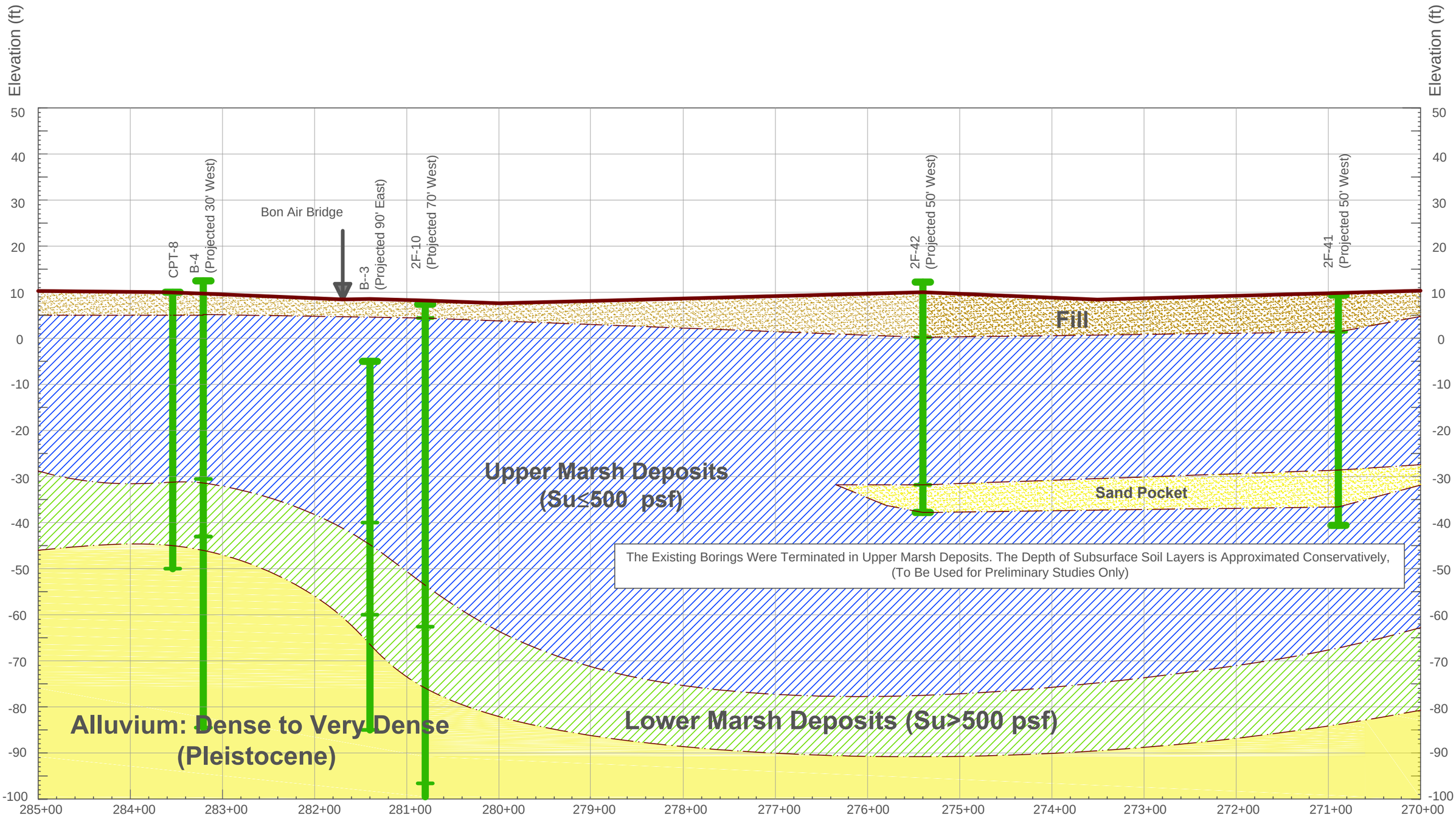
CMC Stationing

Vertical 1"=20'
Horizontal 1"=100'
Reference Datum for Elevation: NAVD88

Plate No. 23

Approximate Subsurface Profile - along North (E) Levee of Corte Madera Creek

A3GEO

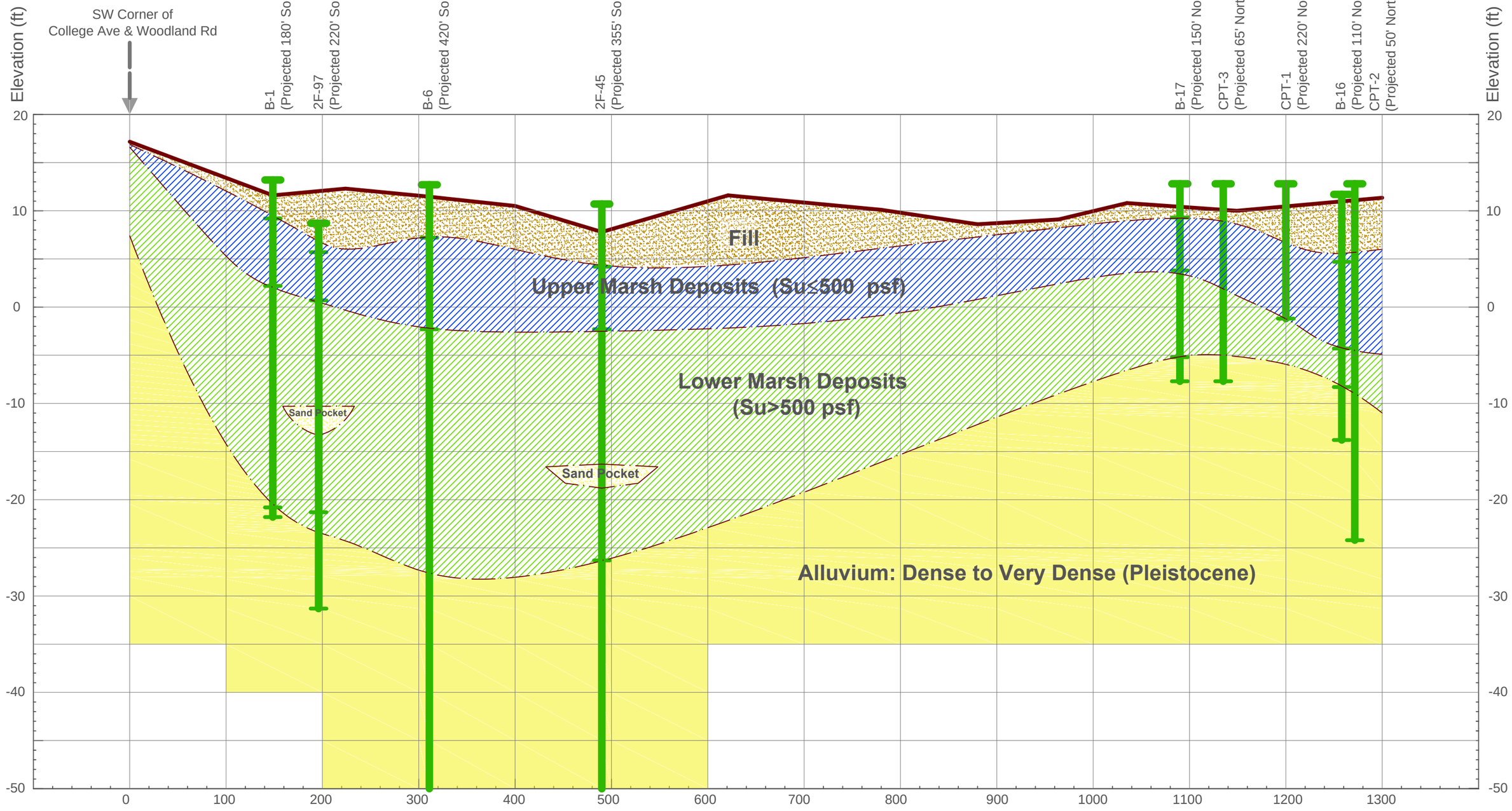


Vertical 1"=20'
Horizontal 1"=100'
Reference Datum for Elevation: NAVD 88

Plate No. 24

Approximate Subsurface Profile along South Eliseo

A3GEO

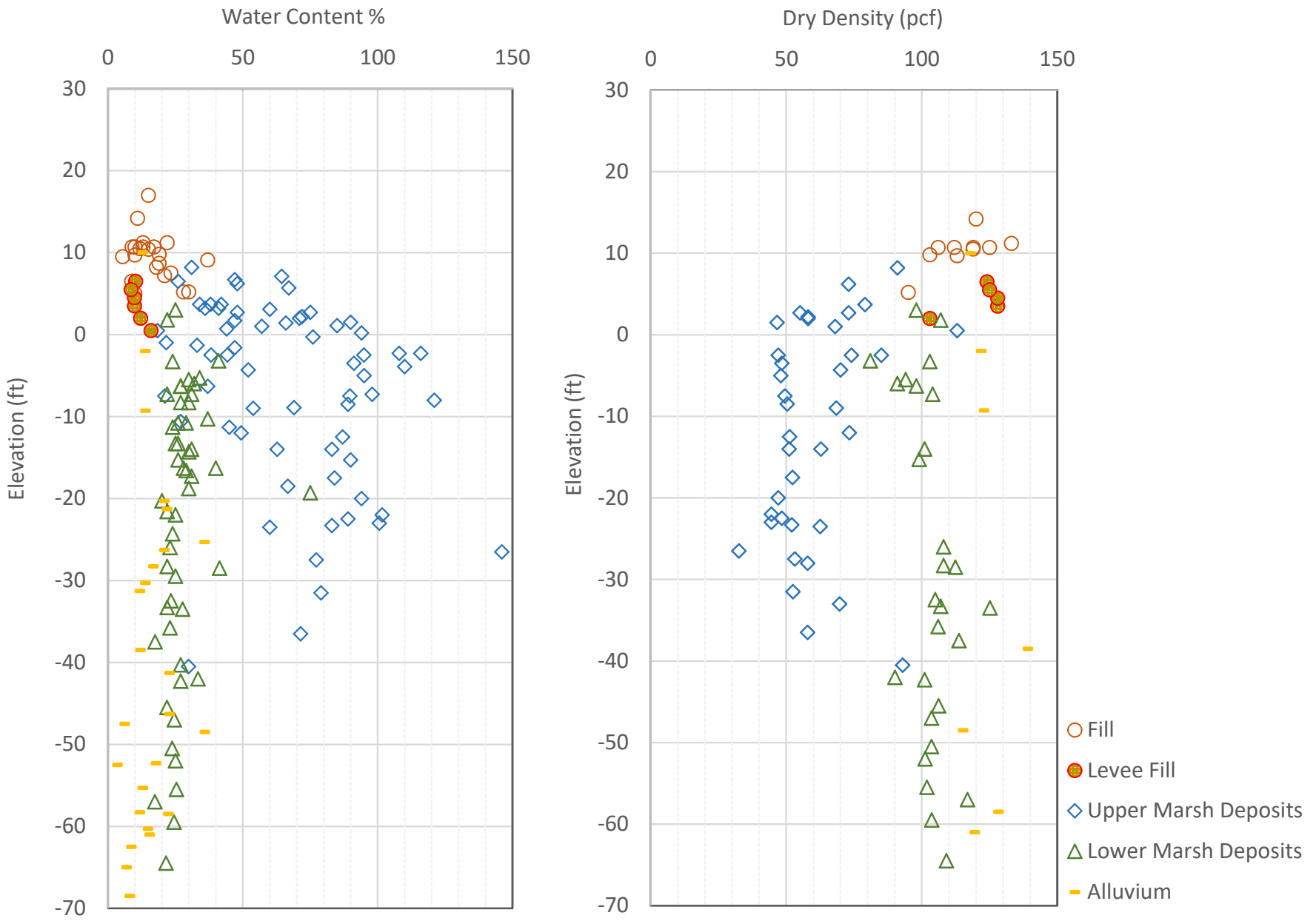


Vertical 1"=10'
Horizontal 1"=100'
Reference Datum for Elevation: NAVD 88

Plate No. 25

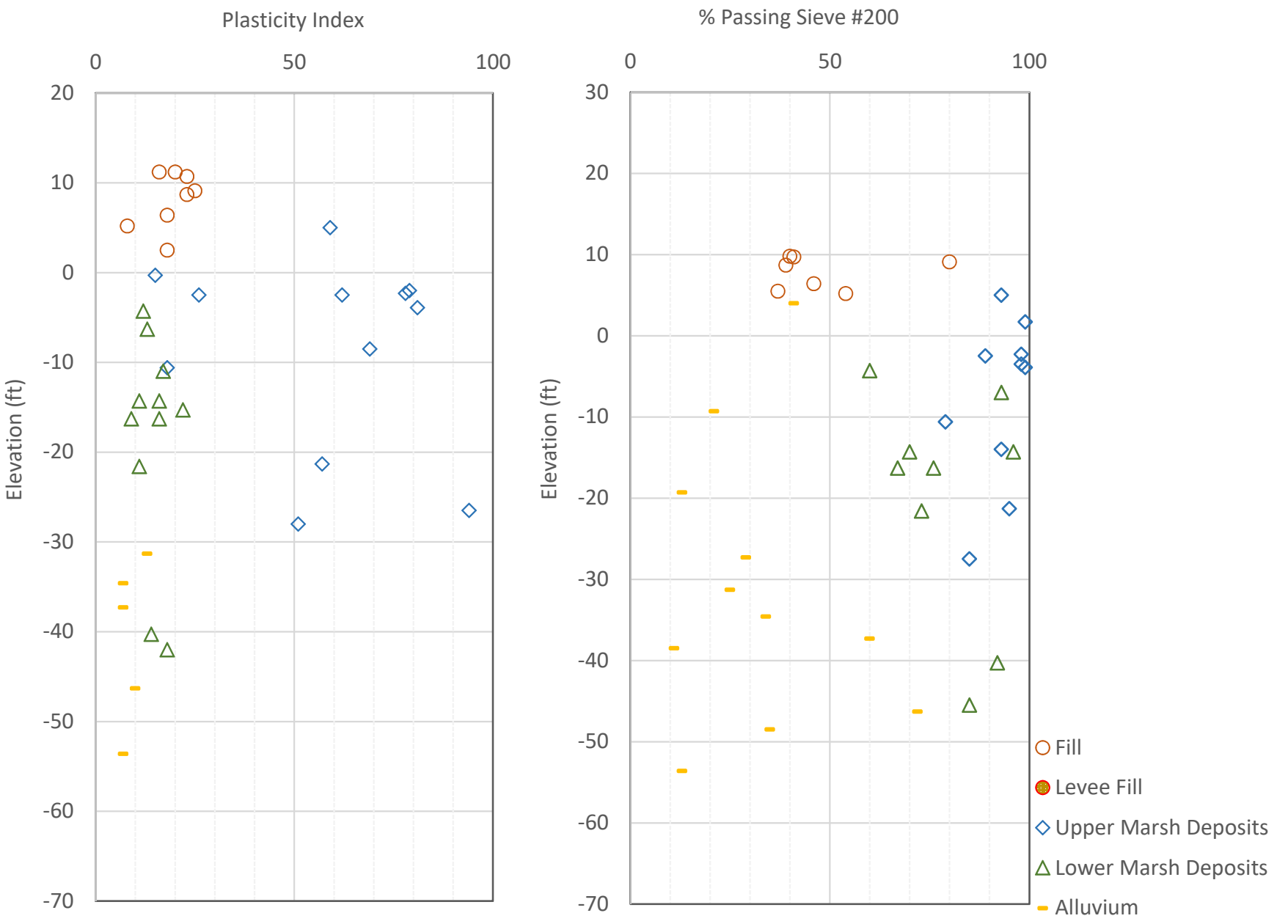
Approximate Subsurface Profile along College Court

A3GEO



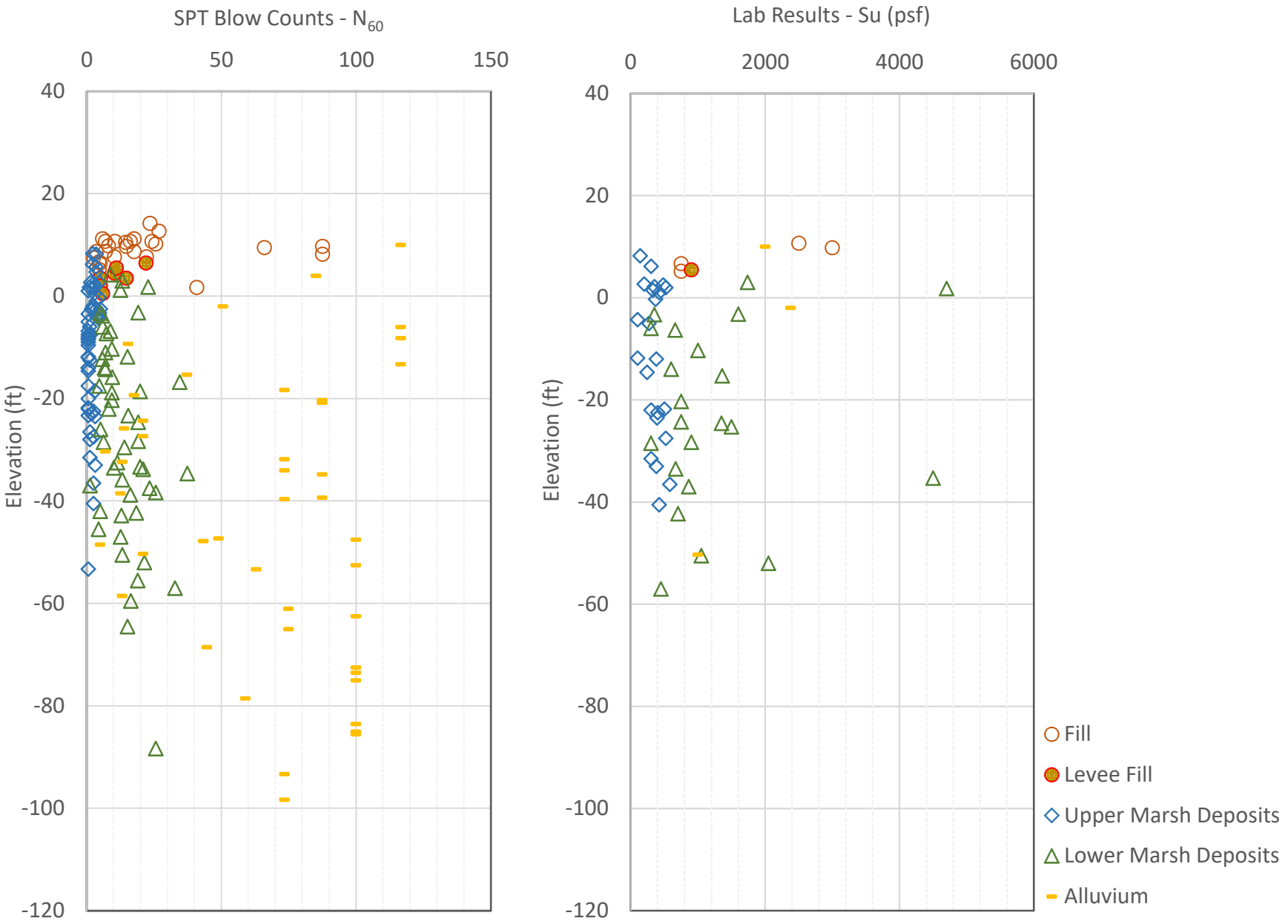
Reference Datum for Elevation: NAVD 88

Plate No. 26



Reference Datum for Elevation: NAVD 88

Plate No. 27



Reference Datum for Elevation: NAVD 88

Plate No. 28