State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

Memorandum

Making conservation a California way of life

To: ELIAS KARAM
Division of Engineering Services
District 3
North Region Division of Project Management
Branch Chief, Design M14

Date: April 06, 2021

Attn. Jony Tji

File: 01-MEN-001 PM 59.8/62.1
EA 01-0B220
E-FIS 0112000110
Fort Bragg ADA

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Division of Engineering Services

Subject: GEOTECHNICAL RECOMMENDATIONS FOR FORT BRAGG ADA STANDARD RETAINING WALL

The Office of Geotechnical Design West (OGDW) has prepared this Memorandum for the proposed Fort Bragg ADA project located along State Route (SR) 1 near the intersection with SR 20 in Mendocino County, from PM 59.8 to 62.1.

The purpose of this memorandum is to provide geotechnical recommendations for the proposed retaining wall. The scope of work included review of pertinent documents, engineering analysis and preparation of this memorandum. No subsurface investigation was performed. The recommendations in this memorandum are based on the Project Plans provided in an email dated July 9, 2020.

Project Description

The Fort Bragg ADA pedestrian infrastructure project consists of the following proposed improvements: replacement and installation of curb ramps, installation of sidewalks, installation of driveways, installation of a retaining wall, and grade corrections by the intersections and crosswalk pavement markings. This memorandum provides geotechnical recommendations for the retaining wall only.

The proposed retaining wall is a Standard Retaining Wall, Type 6. The wall will be parallel to SR 1 in an existing vegetated slope. The slope is approximately 1:1 (H:V) near the bottom and 3:1 (H:V) near the top. The wall is approximately 727 feet long, from Station 118+36.93 to Station 125+63.69, with a maximum height of 6 feet.

Pertinent Reports and Investigations

A 461-foot long Standard Retaining Wall – Type 6 was constructed near the intersection of SR 1 and SR 20 (EA: 01-0A2304). The proposed wall is a continuation of this existing wall. A subsurface investigation was conducted for the existing wall in August and September 2011. Three hand auger borings and four mud rotary borings were performed. The hand auger borings were advanced to depths of 1.5 to 5.5 feet below ground surface. The mud rotary borings were extended to depths of 15 and 20 feet below ground surface. A complete description of the subsurface investigation, including the boring locations and boring logs, are provided in Appendix A.

Subsurface Conditions

Based on the 2011 investigation for the adjacent retaining wall, the subsurface soils consist of 6 feet of dune sands underlain by sandstone.

Groundwater

The 2011 subsurface investigation located groundwater at a depth of 9 feet below surface grade approximately 300 feet from the proposed retaining wall. The same groundwater depth is assumed for the project site.

Seismicity

Ground Motion Parameters

The retaining wall site may be subject to strong ground motions from nearby earthquake sources during the design life of the wall. Based on available subsurface information and SPT correlations for determining shear wave velocity, the time-average shear wave velocity (Vs30) for the upper 100 feet of soil/rock is estimated to be 560 m/s (about 1,835 ft/s).

The Horizontal Peak Ground Acceleration (HPGA) is the ground motion at the site with a 5% probability of exceedance in 50 years (return period of 975 years). The USGS's 2014 NSHM is used as the basis to determine the ground motion. Adjustments for near-fault and/or basin effects were implemented, when applicable, per Appendix B of the SDC v2.0.

Caltrans web-based tool ARS Online v3.0 was utilized to determine the design ground motion parameters for the subject site. Based on the ARS Online v3.0 tool, the design peak ground acceleration (PGA) at the site is 0.65g. The de-aggregated mean earthquake moment magnitude for PGA, M is 7.6, and the mean site-to-fault source distance can be taken as about 12.9 miles (20.8 km) for 1 second period.

Fault Rupture

The project site is not located within any Alquist Priolo Earthquake Fault Zone as established by the California Geological Survey and is not located within 1,000 feet of a fault that is Holocene or younger in age. The nearest active fault is the offshore section of the San Andreas about 5.8 miles west. There are a series of folds in the marine terraces and one of the folds has been mapped as a compressional fault between Hare Creek and the Noyo River near PM 60.1. This is not an active fault, but rather a mapped remnant of previous tectonic activity. The potential for surface fault rupture does not exist.

Liquefaction Potential

Based on the depth of groundwater and the presence of shallow bedrock in the 2011 subsurface investigation, there is no potential for liquefaction**.**

Standard Plan Retaining Wall

The proposed wall is a Standard Plan Retaining Wall, Type 6A (Case 2), with a maximum height of 6 feet. The backfill slope angle should not exceed those shown on the Standard Plans.

The footings will be generally founded in medium dense to dense sands. The factored bearing resistance of the soil will exceed the minimum bearing stresses shown on Standard Plan B3-7B.

Overall slope stability analyses were performed for Service and Extreme Event Limit States. A horizontal seismic acceleration coefficient of 1/3HPGA (0.22g) was used for the extreme event. Two-dimensional slope stability analyses were performed using the program Slide2 by Rocscience. The factors of safety exceed 1.3 (resistance factor = 0.75) and 1.1 (resistance factor = 0.9) for service and extreme events, respectively.

Standard Plan Earth Retaining Systems (ERS) are designed based on a horizontal seismic acceleration coefficient of 0.2g, corresponding to a HPGA of 0.6g. A Standard Plan ERS can be used in areas with a HPGA greater than 0.6g if the resulting permanent displacement is acceptable for the project. Since the site HPGA is greater than 0.6g, permanent seismic displacement analyses were performed. The Bray et al. (2010) and Bray and Travasarou (2009) method was used. Based on the analyses, a permanent seismic displacement of 6 inches was estimated.

A Standard Plan Retaining Wall, Type 6A, is acceptable from a geotechnical standpoint if the Designer verifies that 6 inches of permanent seismic displacement is acceptable for the project. In addition, Structure Design should verify the adequacy of the wall design for this site.

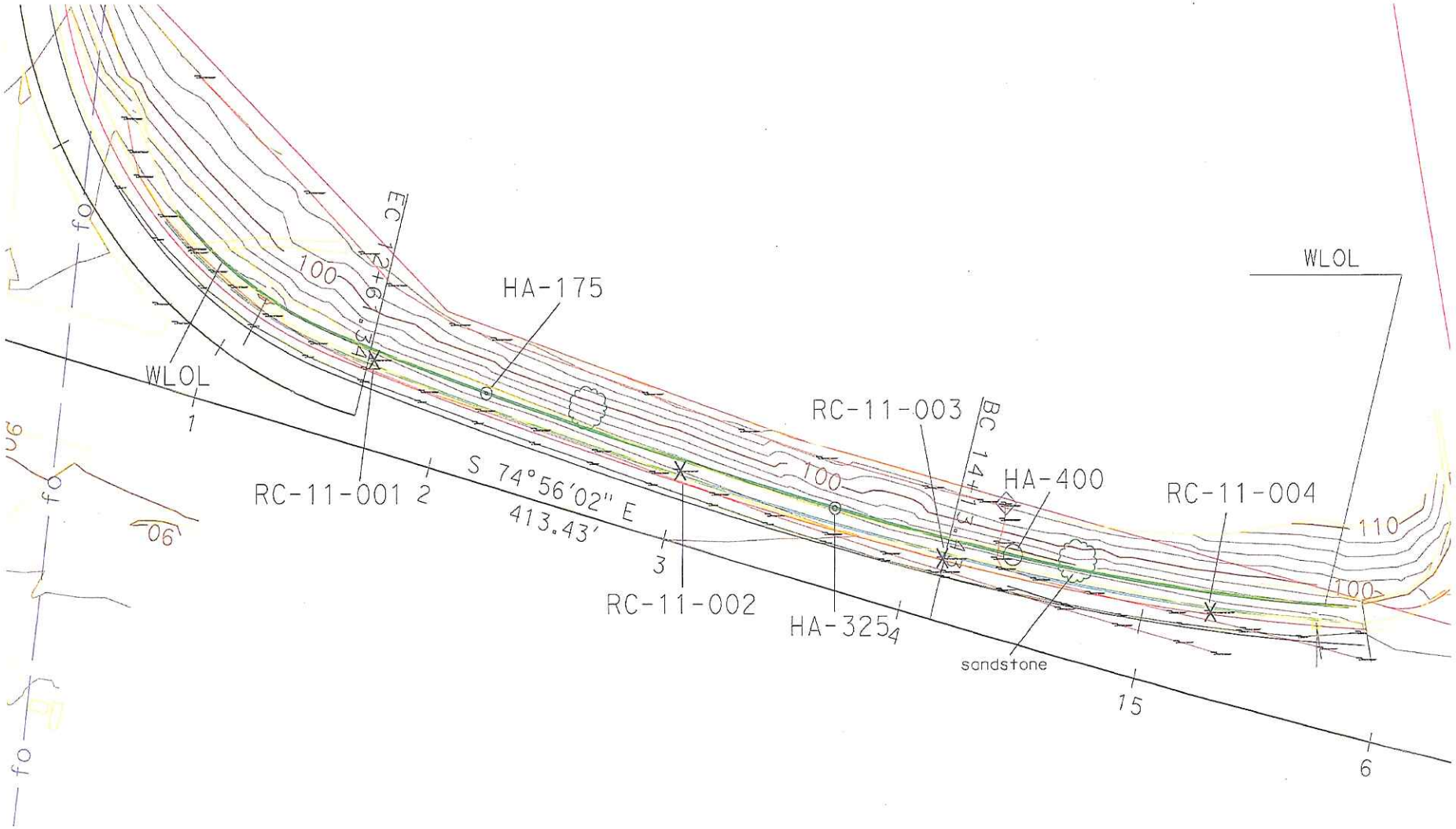
The geotechnical recommendations presented in this memorandum are based on the subsurface conditions encountered at discrete locations during a geotechnical investigation. However, during construction, these recommendations may need to be modified based on actual subsurface conditions. Should the subsurface conditions observed during construction be different from those shown in the boring logs included in the referenced memorandum, they should be brought to the attention of this Office immediately for review and appropriate modifications, if necessary, to the

above recommendations.

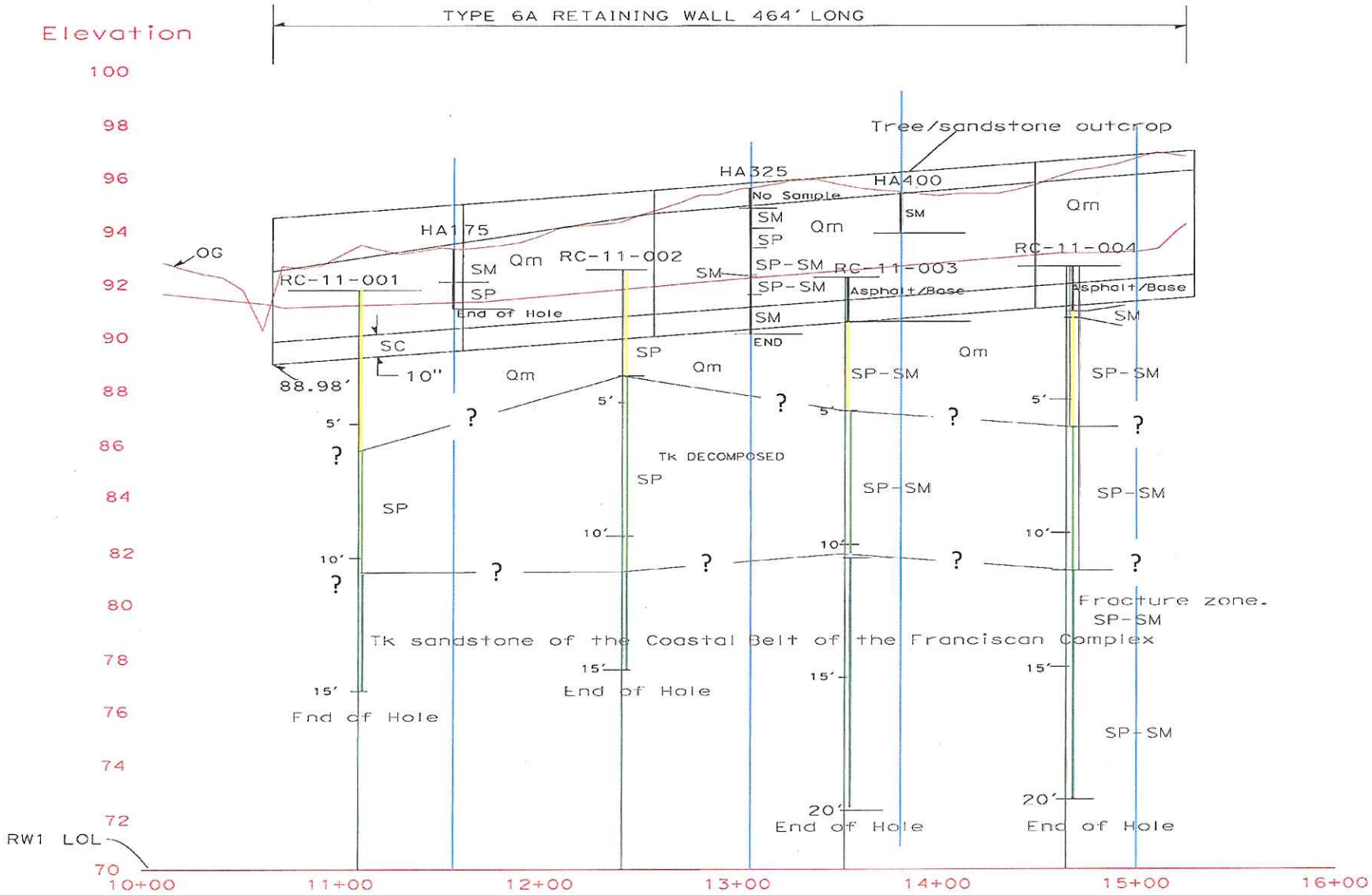
If you have any questions or require further information, please contact OGDW, Nick Briffa, at (510) 286-5050 or John Moore at (510) 622-8742.

c: Robert King, Jony Tji, Geotechnical Archive

Appendix A Subsurface Investigation for Adjacent Retaining Wall Site



DEPARTMENT OF TRANSPORTATION Division of Engineering Services Geotechnical Services Office of Geotechncial Design - North (OGDN)	EA/EFIS:	01-0A2301 0100020	**Forg Bragg ADA**
	DATE:	10/27/2011	
	Boring Location Plan		Figure 6



DEPARTMENT OF TRANSPORTATION **Division of Engineering Services** **Geotechnical Services** **Office of Geotechncial Design - North (OGDN)**	EA/EFIS:	01-0A2301 0100020	**Forg Bragg ADA**
	DATE:	10/27/2011	
	Estimated Subsurface Profile		Figure 7

ROTARY FIELD NOTES

TL-1271a (REV. 01/31/00)

BORING NUMBER	DATE
HA-175	08/25/2011

DIST.	CO.	RTE.	P.M. (K.P.)	BRIDGE #
01	MEN	20	R0.0/R0.1	

LOCATION (STA/OFFSET or NORTHING/EASTING)
Wall Station: 11+57

BRIDGE OR PROJECT NAME
Fort Bragg ADA

EA NUMBER
EA 01-0A2310//EFIS 0100020260

TOP HOLE ELEVATION
92.84'

NOTES

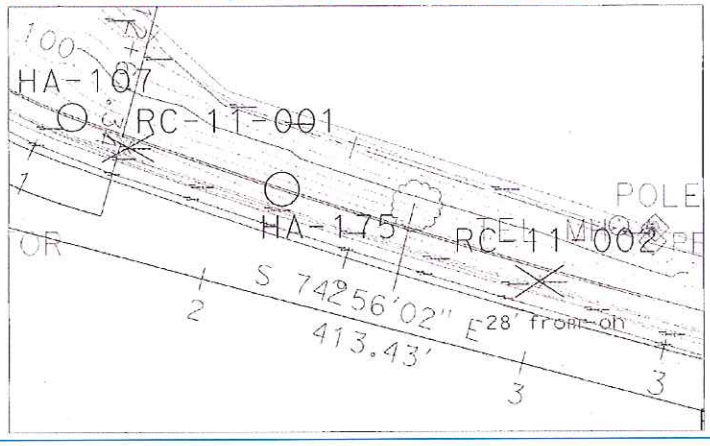
EQUIPTMENT

CHC NUMBER

BOTTOM HOLE ELEVATION

SUMMARY

SITE LOCATION MAP (Inc. North Arrow & Benchmark Datum)



LOGGER	
D. McGuire	
GW	DATE
GWS	DATE
CASING SIZE	CASING DEPTH
CASING SIZE	CASING DEPTH
SLURRY TYPE	

SURFACE CONDITIONS (Slope, Water, Vegetation, etc)
Sunny, dry hillslope

REMARKS (Tool Sizes/Type - Rods & Bits, etc) (Hole Condition – Caving, Squeezing, Loss of Circulation, etc. Drill Rig reactions – slowing, chattering, skipping, blocking off)	FIELD TESTING: SAMPLE #	BLOWS PER 6"	SPT (N)	Recovery %	DEPTH (inches)	GRAPHIC LOG	DESCRIPTION (Soil Classification (group name, group symbol, consistency/relative density, color, moisture, particle size, gradation, plasticity, structure, cementation, organics, fill, q_u, s_u, Other characteristics) Rock Classification (rock name, color, degree of weathering, relative hardness, bedding, discontinuity characteristics, voids, slaking, odor, other characteristics))
Hole advanced with a 3.25" sand auger					1–14		Silty SAND (SM); dusky red; dry to moist; mostly fine SAND; little to some fines; few fine GRAVEL, angular to subangular; weak cementation; roots 0-9"
					9–12		trace coarse to fine GRAVEL, angular; beach/dune sand present
					13–14		beach/dune sand present
					15–21		Poorly graded SAND (SP); dry to moist; light brownish gray; mostly fine SAND (dune sand); weak cementation

ROTARY FIELD NOTES

TL-1271b (REV. 01/31/00)

BORING NUMBER	DATE	DIST.	CO.	RTE.	P.M. (K.P.)
HA-175	08/25/2011	01	MEN	20	R0.0/R0.1

LOCATION (STA/OFFSET or NORTHING/EASTING)	TOP HOLE ELEVATION	BRIDGE #	EA NUMBER
92.84'	92.84'		EA 01-0A2310//EFIS 0100020260

REMARKS (Tool Sizes/Type - Rods & Bits, etc) (Hole Condition – Caving, Squeezing, Loss of Circulation, etc. Drill Rig reactions – slowing, chattering, skipping, blocking off)	FIELD TESTING: SAMPLE #	BLOWS PER 6"	SPT (N)	Recovery %	DEPTH	GRAPHIC LOG	DESCRIPTION
					22		Poorly graded SAND with GRAVEL (SP); reddish brown; moist; mostly SAND, fine to coarse, subangular; little to some GRAVEL, from coarse to fine, includes igneous rocks, subangular; weak cementation.
					23		
					24		
					25		
					26		
					27		
					28		
					29		
					30		
					31		
					32		
					33		
					34		
					35		
					36		
					37		
					38		
					39		
					40		
					41		
					42		
					43		
					44		
					45		
					46		
					47		
					48		
					49		
					50		
					51		
					52		
					53		
					54		

DESCRIPTION

Soil Classification *(group name, group symbol, consistency/relative density, color, moisture, particle size, gradation, plasticity, structure, cementation, organics, fill, q_u, s_u, Other characteristics)*

Rock Classification *(rock name, color, degree of weathering, relative hardness, bedding, discontinuity characteristics, voids, slaking, odor, other characteristics)*

ROTARY FIELD NOTES

TL-1271a (REV. 01/31/00)

AUGER HOLE NUMBER	DATE
HA-325	08/24/25/2011

DIST.	CO.	RTE.	P.M. (K.P.)	BRIDGE #
01	MEN	20	R0.0/R0.1	

LOCATION (STA/OFFSET or NORTHING/EASTING)
Wall Station: 13+6.28

BRIDGE OR PROJECT NAME: Fort Bragg ADA

EA NUMBER: EA 01-0A2310//EFIS 0100020260

TOP HOLE ELEVATION
95.6'

CREW

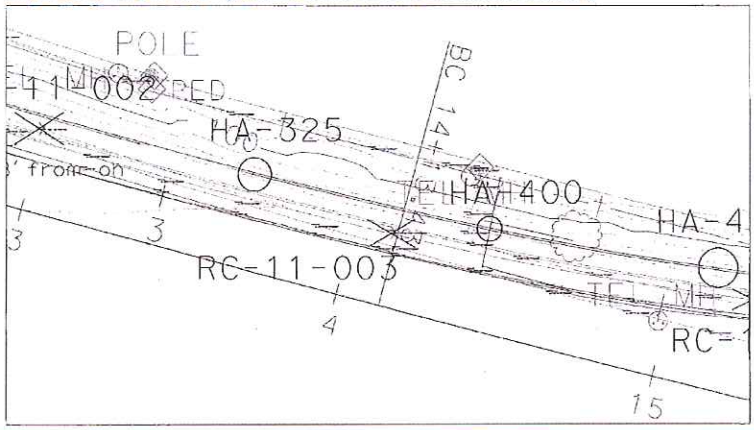
EQUIPTMENT: Beach/dune sand 91' – 93' elevation

CHC NUMBER

BOTTOM HOLE ELEVATION
90.1'

SUMMARY: Beach/dune sand 2.25-4 ft depth; igneous clasts in 48"-60"

SITE LOCATION MAP (Inc. North Arrow & Benchmark Datum)



LOGGER
D. McGuire

GW	DATE
GWS	DATE
CASING SIZE	CASING DEPTH
CASING SIZE	CASING DEPTH
SLURRY TYPE	

SURFACE CONDITIONS (Slope, Water, Vegetation, etc)
Sunny, dry hillslope

REMARKS (Tool Sizes/Type - Rods & Bits, etc) (Hole Condition – Caving, Squeezing, Loss of Circulation, etc. Drill Rig reactions – slowing, chattering, skipping, blocking off)	FIELD TESTING: SAMPLE #	BLOWS PER 6"	ELEVATION	DEPTH (feet)	DEPTH (inches)	GRAPHIC LOG	DESCRIPTION (Soil Classification *(group name, group symbol, consistency/relative density, color, moisture, particle size, gradation, plasticity, structure, cementation, organics, fill, q_u, s_u, Other characteristics)* Rock Classification *(rock name, color, degree of weathering, relative hardness, bedding, discontinuity characteristics, voids, slaking, odor, other characteristics)*)
Hole advanced with a					1		0-9" No Samples
3.25' sand auger					2		
					3		
					4		
					5		
					6		
					7		
					8		
					9		
					10		Silty SAND (SM); pinkish gray; dry; mostly SAND, fine; little to few fines; little to few GRAVEL, fine, subangular; weak cementation.
					11		
94.6' at bottom of this cell			94	1	12		
					13		
					14		
				1.25	15		
					16		
					17		
94.1' at bottom of this cell			93.5	1.5	18		
					19		Poorly graded SAND (SP)
					20		
				1.25	21		

ROTARY FIELD NOTES

TL-1271b (REV. 01/31/00)

BORING NUMBER	DATE	DIST.	CO.	RTE.	P.M. (K.P.)
HA-325	08/24/25/2011	01	MEN	20	R0.0/R0.1

LOCATION (STA/OFFSET or NORTHING/EASTING)	TOP HOLE ELEVATION	BRIDGE #	EA NUMBER
Wall Station: 13+6.28	95.6'		EA 01-0A2310//EFIS 0100020260

REMARKS (Tool Sizes/Type - Rods & Bits, etc) (Hole Condition – Caving, Squeezing, Loss of Circulation, etc. Drill Rig reactions – slowing, chattering, skipping, blocking off)	FIELD TESTING: SAMPLE #	FIELD TESTING: BLOWS PER 6"	FIELD TESTING: ELEVATION	FIELD TESTING: DEPTH (feet)	DEPTH (inches)	GRAPHIC LOG	DESCRIPTION
					22		
					23		
93.6' at bottom of this cell			93	2	24		Poorly graded SAND (SP); reddish brown; dry; mostly SAND, fine; few GRAVEL, fine, angular to subangular; weak cementation
					25		
					26		
				2.25	27		
					28		Poorly graded SAND with SILT (SP-SM); dark reddish brown; moist; mostly SAND, coarse to fine (beach/dune sand included), subrounded to subangular; few to little GRAVEL, coarse to fine; subangular to angular; weak cementation.
					29		
93.1' at bottom of this cell			92.5	2.5	30		
					31		
					32		beach/dune sand
				2.75	33		
					34		
					35		
93.1' at bottom of this cell			92	3	36		
					37		
					38		
				3.25	39		
					40		Silty SAND with GRAVEL (SM); reddish brown; moist; mostly SAND, from coarse to fine, angular; little fines; little GRAVEL, coarse to fine, angular, intensely weathered rock; weak cementation.
					41		
92.1' at bottom of this cell			91.5	3.5	42		
					43		
					44		Poorly graded SAND with SILT (SP-SM); very pale brown; moist; mostly SAND, fine, rounded quartz beach/dune sand; few to little fines; trace Gravel, fine (soft clumps of silty sand); weak cementation
				3.75	45		
					46		
					47		
91.6' at bottom of this cell			91	4	48		
					49		
					50		
				4.25	51		Silty SAND (SM); brownish yellow to reddish brown (redder below 48"); moist; mostly SAND, from coarse to fine; little to some fines, includes coarse white fragments of igneous rocks; few-trace GRAVEL, fine, subangular (including hard igneous rocks); weak cementation
					52		
					53		
91.1' at bottom of this cell			90.5	4.5	54		

ROTARY FIELD NOTES

TL-1271b (REV. 01/31/00)

BORING NUMBER	DATE	DIST.	CO.	RTE.	P.M. (K.P.)
HA-325	08/24/25/2011	01	MEN	20	R0.0/R0.1

LOCATION (STA/OFFSET or NORTHING/EASTING)	TOP HOLE ELEVATION	BRIDGE #	EA NUMBER
Wall Station: 13+6.28	95.6'		EA 01-0A2310//EFIS 0100020260

REMARKS (Tool Sizes/Type - Rods & Bits, etc) (Hole Condition – Caving, Squeezing, Loss of Circulation, etc. Drill Rig reactions – slowing, chattering, skipping, blocking off)	FIELD TESTING: SAMPLE #	FIELD TESTING: BLOWS PER 6"	FIELD TESTING: ELEVATION	FIELD TESTING: DEPTH (feet)	DEPTH (inches)	GRAPHIC LOG	DESCRIPTION Soil Classification *(group name, group symbol, consistency/relative density, color, moisture, particle size, gradation, plasticity, structure, cementation, organics, fill, q_u, s_u, Other characteristics)* Rock Classification *(rock name, color, degree of weathering, relative hardness, bedding, discontinuity characteristics, voids, slaking, odor, other characteristics)*
					55		
					56		
				4.75	57		
					58		
					59		
90.6' at bottom of this cell			90	5	60		few GRAVEL, coarse to fine, angular (very soft sandstone clasts-weathered bedrock?)
					61		
					62		
				5.25	63		
					64		increase in fines to "some fines"
					65		
90.1' at bottom of this cell			89.5	5.5	66		
					67		*End of auger hole at 66"*
					68		
					69		
					70		
					71		
					72		
					73		
					74		
					75		
					76		
					77		
					78		
					79		
					80		
					81		
					82		
					83		
					84		
					85		
					86		
					87		

ROTARY FIELD NOTES

TL-1271a (REV. 01/31/00)

BORING NUMBER	DATE
HA-400	08/24/2011

DIST.	CO.	RTE.	P.M. (K.P.)	BRIDGE #
01	MEN	20	R0.0/R0.1	

LOCATION (STA/OFFSET or NORTHING/EASTING)
Wall Station: 13+82

BRIDGE OR PROJECT NAME
Fort Bragg ADA

EA NUMBER
EA 01-0A2310//EFIS 0100020

TOP HOLE ELEVATION
95.43

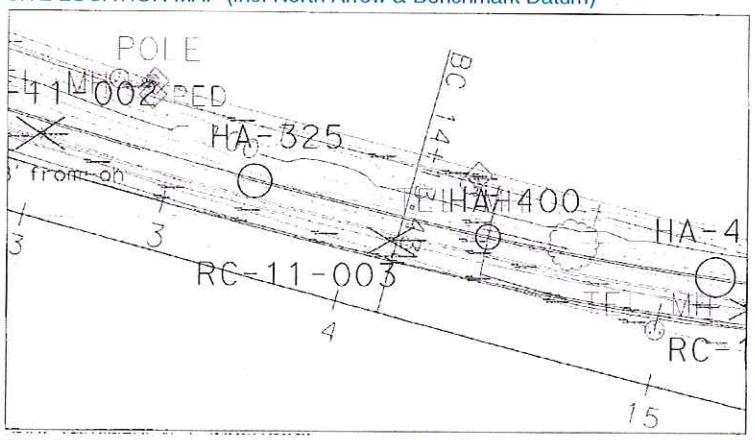
CREW

EQUIPTMENT

CHC NUMBER

HAMMER ID#

SITE LOCATION MAP (Inc. North Arrow & Benchmark Datum)



LOGGER
D. McGuire

GW	DATE
GWS	DATE
CASING SIZE	CASING DEPTH
CASING SIZE	CASING DEPTH
SLURRY TYPE	

SURFACE CONDITIONS (Slope, Water, Vegetation, etc)
Sunny, dry hillslope

REMARKS (Tool Sizes/Type - Rods & Bits, etc) (Hole Condition – Caving, Squeezing, Loss of Circulation, etc. Drill Rig reactions – slowing, chattering, skipping, blocking off)	FIELD TESTING: SAMPLE #	BLOWS PER 6"	SPT (N)	Recovery %	DEPTH	GRAPHIC LOG	DESCRIPTION
Hole advanced with a					1		Silty SAND with GRAVEL (SM); loose; brownish yellow; moist; mostly SAND, fine; little fines; little fine to coarse GRAVEL; subangular. Gravel consists of soft fragments of intensely weathered fine sandstone.
3.25" sand auger					2		
					3		
					4		
					5		
					6		
					7		
					8		
					9		
					10		
					11		
					12		
					13		
					14		
					15		
					16		
					17		
					18		
					19		
					20		
					21		

DESCRIPTION
Soil Classification *(group name, group symbol, consistency/relative density, color, moisture, particle size, gradation, plasticity, structure, cementation, organics, fill, q_u, s_u, Other characteristics)*
Rock Classification *(rock name, color, degree of weathering, relative hardness, bedding, discontinuity characteristics, voids, slaking, odor, other characteristics)*

ROTARY FIELD NOTES

TL-1271a (REV. 01/31/00)

BORING NUMBER	DATE
RC-11-001	09/07/2011

DIST.	CO.	RTE.	P.M. (K.P.)
01	MEN	20	R0.0/R0.1

LOCATION (STA/OFFSET or NORTHING/EASTING)
Roadway Station: 11+67, 31 L

PROJECT
Fort Bragg ADA

EA NUMBER
EA 01-0A2310//EFIS 0100020260

TOP HOLE ELEVATION
91.78

CREW
Eureka Drill Crew

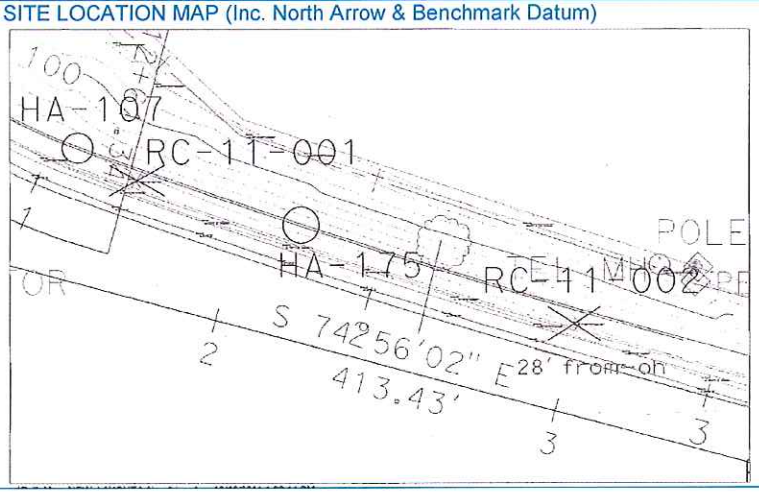
EQUIPTMENT
Acker

CHC NUMBER
1974

BOTTOM HOLE ELEVATION
76.78'

HAMMER
Automatic, ER=80% (Calibrated 04/19/2011)

SITE LOCATION MAP (Inc. North Arrow & Benchmark Datum)



LOGGER
D. McGuire

GW	DATE
GW	DATE
CASING SIZE: 94 mm	CASING DEPTH: 10'
CASING SIZE	CASING DEPTH
SLURRY TYPE: None	Drilled with Water

SURFACE CONDITIONS (Slope, Water, Vegetation, etc)
Foggy; intermittent sun in later morning; dry; drilled into soil at edge of pavement

REMARKS (Tool Sizes/Type - Rods & Bits, etc) (Hole Condition – Caving, Squeezing, Loss of Circulation, etc. Drill Rig reactions – slowing, chattering, skipping, blocking off)	SAMPLE #	BLOWS PER 6"	SPT (N)	Recovery %	DEPTH	GRAPHIC LOG	DESCRIPTION
Mud rotary punch core, 4.75" finger bit		4			1		Clayey SAND (SC); medium dense; reddish brown; moist; mostly SAND, fine; little fines; weak cementation to 3". [Qm]
to 10.6'. Drilled dry to 2'.		5			2		
Corrected N: 13 x 1.33=17.3, medium dense		8	13		3		moderate cementation from 3'to 5'
					4		brownish yellow from 3' to 7'.
					5		
Corrected N: 22 x 1.33=29, medium dense		18			6		fewer fines; weak cementation; becoming decomposed sandstone
		9			7		SEDIMENTARY ROCK (Sandstone); brownish yellow; intensely weathered to decomposed; (Poorly graded SAND (SP); medium dense; moist; mostly SAND, from coarse to fine; little fines; few GRAVEL, from coarse to fine, angular; weak cementation). [DECOMPOSED BEDROCK, Tk]
		13	22		8		
					9		
					10		
Refusal at 10.6' 81.1' elevation)		41			11		SEDIMENTARY ROCK (Sandstone); massive; yellowish brown; intensely weathered; moderately hard; very intensely fractured. [BEDROCK, Tk]
3 ¾"diamond core bit from 10.6' to 15'.		65/1.5	R		12		
	4				13		
					14		
End of hole at 15' (Elevation 76.78').					15		
Perforated 0- 10'. Bentonite below 10'.					16		
One bag of sand. .					17		
					18		
					19		
					20		
					21		

DESCRIPTION
Soil Classification *(group name, group symbol, consistency/relative density, color, moisture, particle size, gradation, plasticity, structure, cementation, organics, fill, q_u, s_u, Other characteristics)*
Rock Classification *(rock name, color, degree of weathering, relative hardness, bedding, discontinuity characteristics, voids, slaking, odor, other characteristics)*

ROTARY FIELD NOTES

TL-1271a (REV. 01/31/00)

BORING NUMBER	DATE
RC-11-002	09/07/2011

DIST.	CO.	RTE.	P.M. (K.P.)
01	MEN	20	R0.0/R0.1

LOCATION (STA/OFFSET or NORTHING/EASTING)
Roadway Station: 13+00, 25.3 L

PROJECT
Fort Bragg ADA

EA NUMBER
EA 01-0A2310//EFIS 0100020260

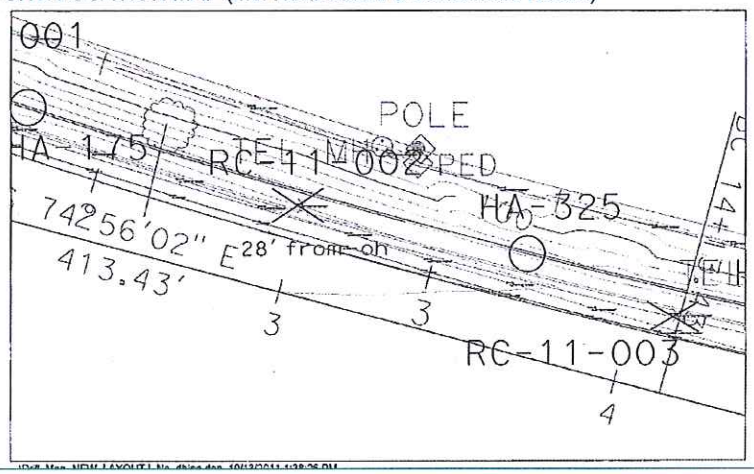
TOP HOLE ELEVATION
92.54'

CREW	EQUIPTMENT	CHC NUMBER
Eureka Drill Crew	Acker	1974

BOTTOM HOLE ELEVATION
77.54'

HAMMER
Automatic, ER=80% (Calibrated 04/19/2011)

SITE LOCATION MAP (Inc. North Arrow & Benchmark Datum)



N

LOGGER
D. McGuire

GW	DATE
9.3' bgs	9/8/2011
GW	DATE
CASING SIZE	CASING DEPTH
94 mm	15'
CASING SIZE	CASING DEPTH
SLURRY TYPE	
None	Drilled with Water

SURFACE CONDITIONS (Slope, Water, Vegetation, etc)
Sunny side of a fog bank, surface dry, drilled into soil adjacent to adjacent to edge of pavement,

REMARKS (Tool Sizes/Type - Rods & Bits, etc) (Hole Condition – Caving, Squeezing, Loss of Circulation, etc. Drill Rig reactions – slowing, chattering, skipping, blocking off)	SAMPLE #	BLOWS PER 6"	SPT (N)	Recovery %	DEPTH	GRAPHIC LOG	DESCRIPTION Soil Classification *(group name, group symbol, consistency/relative density, color, moisture, particle size, gradation, plasticity, structure, cementation, organics, fill, q_u, s_u, Other characteristics)* Rock Classification *(rock name, color, degree of weathering, relative hardness, bedding, discontinuity characteristics, voids, slaking, odor, other characteristics)*
Mud rotary punch core, 4.5" finger bit to		4			1		Poorly graded SAND (SP); dense; reddish brown; moist; mostly SAND, fine to coarse; little fines; weak cementation to (0" to 6"). [Qm]
10.75'. Drilled dry to 2'.		6			2		Brownish yellow; trace to few GRAVEL, coarse; subangular (6" to 1.5').
Corrected N: 27x 1.33=36 (dense due to		21	27		3		
a fragment of coarse gravel)					4		
					5		Poorly graded SAND with SILT and GRAVEL (SP-SM); dense to medium dense; brownish yellow; moist; mostly SAND, from coarse to fine; little GRAVEL, fine, from angular to subrounded; cementation from weak to moderate (1.5'-5').
Corrected N: 19x 1.33=25.3 (medium		13			6		
dense)		7			7		
		12	19		8		
					9		SEDIMENTARY ROCK (Sandstone); brownish yellow; intensely weathered to decomposed; (Poorly graded SAND (SP); medium dense; moist; mostly SAND, fine; little fines; moderate cementation). [DECOMPOSED BEDROCK, Tk]
					10		
Refusal at 11.3' (81.24')		14			11		
3 ¾"diamond core bit from 11.3' to 15'.		50/5.5			12		SEDIMENTARY ROCK (Sandstone); massive; dark grayish brown; intensely weathered; moderately hard; very intensely fractured. [BEDROCK, Tk]
		50/3.5	100/9		13		
					14		
End of hole at 15' (77.54' elevation).					15		
Casing perforated 5' to 15'.					16		
Two bags of sand and bentonite.					17		
					18		
					19		
					20		
					21		

ROTARY FIELD NOTES

TL-1271a (REV. 01/31/00)

BORING NUMBER	DATE
RC-11-003	09/08/2011

DIST.	CO.	RTE.	P.M. (K.P.)
01	MEN	20	R0.0/R0.1

LOCATION (STA/OFFSET or NORTHING/EASTING)
Roadway Station: 14+13, 23 L;

PROJECT
Fort Bragg ADA

EA NUMBER
EA 01-0A2310//EFIS 0100020260

TOP HOLE ELEVATION
92.24'

CREW
Eureka Drill Crew

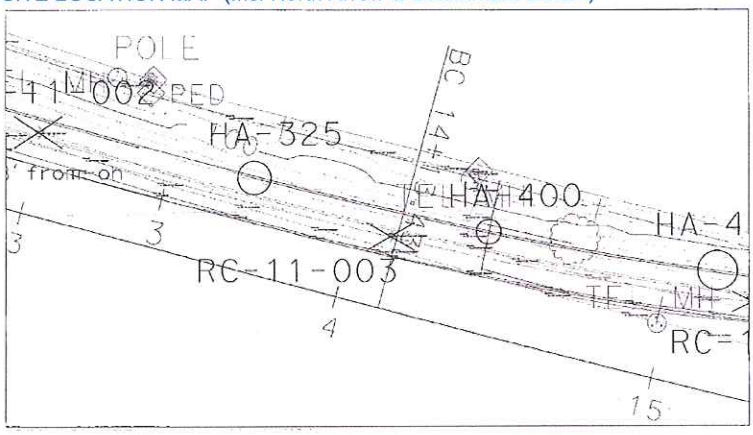
EQUIPTMENT
Acker

CHC NUMBER
1974

BOTTOM HOLE ELEVATION
72.24'

HAMMER
Automatic, ER=80% (Calibrated on 04/19/2011)

SITE LOCATION MAP (Inc. North Arrow & Benchmark Datum)



N

LOGGER
D. McGuire

GW	DATE
GW	DATE
CASING SIZE: 94 mm	CASING DEPTH: 20'
CASING SIZE	CASING DEPTH
SLURRY TYPE: None	Drilled with Water

SURFACE CONDITIONS (Slope, Water, Vegetation, etc)
Foggy, air moist, pavement dry, drilled at edge of pavement. Became sunny by 10:30 am.

REMARKS (Tool Sizes/Type - Rods & Bits, etc) (Hole Condition – Caving, Squeezing, Loss of Circulation, etc. Drill Rig reactions – slowing, chattering, skipping, blocking off)	FIELD TESTING: SAMPLE #	BLOWS PER 6"	SPT (N)	Recovery %	DEPTH	GRAPHIC LOG	DESCRIPTION: Soil Classification (group name, group symbol, consistency/relative density, color, moisture, particle size, gradation, plasticity, structure, cementation, organics, fill, q_u, s_u, Other characteristics) Rock Classification (rock name, color, degree of weathering, relative hardness, bedding, discontinuity characteristics, voids, slaking, odor, other characteristics)
Mud rotary punch core, 4 ¾" finger bit					1		ASPHALT and road base .
to 10.5'. Dry SPT 0-1.5'.					2		
		12			3		Poorly graded SAND with SILT (SP-SM); very dense; brownish yellow to yellowish red; moist; mostly SAND, fine; few to little fines; from moderate to weak cementation. [Qm]
		27			4		
18"-36" very dense, N>50		31	58		5		
		33			6		SEDIMENTARY ROCK (Sandstone); brownish yellow; very intensely weathered to decomposed; (Poorly graded SAND with SILT and GRAVEL (SP-SM); very dense; moist; mostly SAND, fine; few to little fines; from moderate to weak cementation.). [DECOMPOSED BEDROCK, Tk]
Very dense, N>50		60/6			7		
		29	89/12		8		
					9		
					10		
Refusal at 10.5' (81.74' elevation).		50/5.5	R		11		
3 ¾"diamond core bit from 10.5' to 20'.					12		SEDIMENTARY ROCK (fine-grained Sandstone); massive; reddish brown; intensely weathered; moderately soft; very intensely fractured; fracture zone. [BEDROCK, Tk]
					13		
					14		
					15		
					16		
					17		
End of hole at 20' (elevation 72.24')					18		
Casing perforated 10' to 20'.					19		
Two bags of sand; bentonite to seal hole.					20		

ROTARY FIELD NOTES

TL-1271a (REV. 01/31/00)

BORING NUMBER	DATE
RC-11-004	09/08/2011

DIST.	CO.	RTE.	P.M. (K.P.)
01	MEN	20	R0.0/R0.1

LOCATION (STA/OFFSET or NORTHING/EASTING)
Roadway Station: 15+25, 31.3 L

PROJECT
Fort Bragg ADA

EA NUMBER
EA 01-0A2310//EFIS 0100020260

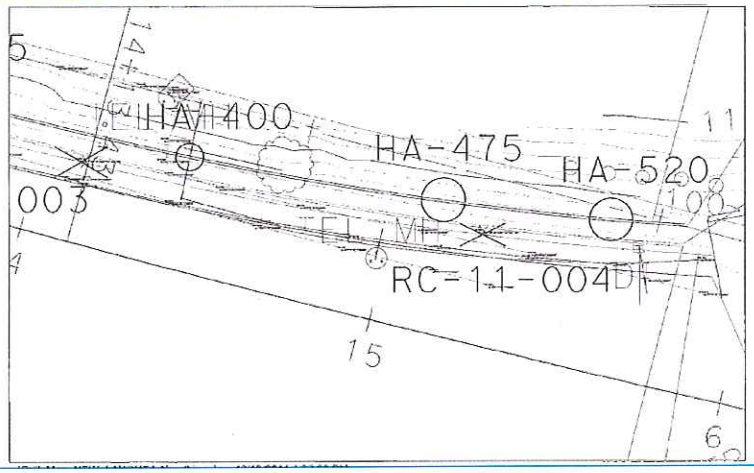
TOP HOLE ELEVATION
92.64

CREW	EQUIPTMENT	CHC NUMBER
Eureka Drill Crew	Acker	1974

BOTTOM HOLE ELEVATION
72.64

HAMMER
Automatic, ER=80% (Calibrated 04/19/2011)

SITE LOCATION MAP (Inc. North Arrow & Benchmark Datum)



N

LOGGER
D. McGuire

GW	DATE
GW	DATE
CASING SIZE: 94 mm	CASING DEPTH: 20'
CASING SIZE	CASING DEPTH
SLURRY TYPE: None	Drilled with Water

SURFACE CONDITIONS (Slope, Water, Vegetation, etc)
Sunny, dry pavement

REMARKS (Tool Sizes/Type - Rods & Bits, etc) (Hole Condition – Caving, Squeezing, Loss of Circulation, etc. Drill Rig reactions – slowing, chattering, skipping, blocking off)	SAMPLE #	BLOWS PER 6"	SPT (N)	Recovery %	DEPTH	GRAPHIC LOG	DESCRIPTION Soil Classification *(group name, group symbol, consistency/relative density, color, moisture, particle size, gradation, plasticity, structure, cementation, organics, fill, q_u, s_u, Other characteristics)* Rock Classification *(rock name, color, degree of weathering, relative hardness, bedding, discontinuity characteristics, voids, slaking, odor, other characteristics)*
Mud rotary punch core; 4 ¾" finger bit.					1		ASPHALT and road base.
		10			2		Poorly graded SAND with SILT (SP-SM); medium dense; reddish brown; moist; mostly SAND, fine; few to little fines; moderate cementation (1.7'-4.3') [Qm}
Corrected N (20"-38"): 15x 1.33=20		7			3		
Medium dense		8	15		4		very dense; brownish yellow; few to little GRAVEL, from coarse to fine; (4.3'-5.3'). [Qm]
					5		
		13			6		
Very dense, N>50		20			7		SEDIMENTARY ROCK (Sandstone); reddish brown; intensely weathered to decomposed; (Poorly graded SAND with SILT (SP-SM); very dense; moist; mostly SAND, fine; few to little fines; moderate cementation. (5.3'-11.4'). [DECOMPOSED BEDROCK, Tk]
		37	57		8		
					9		
					10		
Refusal at 11.4' (81.2' elevation)		22			11		
3 ¾"diamond core bit from 11.4' to 20'.		37			12		SEDIMENTARY ROCK (Sandstone); reddish brown; intensely weathered to decomposed; (Poorly graded SAND with SILT (SP-SM); very dense; moist; mostly SAND, mostly fine but includes coarse; few to little fines; moderate cementation) [BEDROCK, Tk].
		60/5	97/11		13		
					14		
					15		
18' drill rate increased through soft material					16		
and black organic film appeared in mud pit.					17		fracture zone 18'-20'.
End of hole at 20'(elevation 72.64).					18		
Casing perforated 10' to 20'.					19		gray at 19'-20'.
Two bags of sand; bentonite plug).					20		

From: Karam, Elias@DOT
To: Ranu Aggarwal; Walker, Liza M@DOT
Cc: O"Neal, Chantell
Subject: RE: 01-0B220 (Geotech Memo)
Date: Thursday, April 8, 2021 8:28:21 AM
Attachments: RE 01-0B220 - Geotech Memo Coastal Development Permit and Structures input on Type 6A Wall.msg

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Hi Ranu,

To the first question, the memo is good for both walls in the project.

To your second question, I discussed this statement with Geotech as well. They mentioned that in a worst case scenario, the entire system would slide or rotate up to 6 inches but would not fail (example: slide 3" and/or rotate 3"). We can imagine that this would mean that the entire system would slide as one unit, not that the wall itself would fail. The standard plan wall is acceptable to use and would hold up the slope. Structures Design was engaged in the discussion anyway.

Per the attached email, Structures Design stated, "Structure Design, Branch 1 was involved with this project in the early part of last year. At the time, we studied the Type 6A wall for the higher-than-standard k_h value of 0.22g. That appears to match the information provided on the attached geotechnical recommendations. We found that the Standard Plan design given for the Retaining Wall Type 6A is sufficient to support the higher value."

Please let me know if you have any further questions.

Thank you,

Elias Karam, PE
Senior Transportation Engineer, Office of Design, (Msvl) B
NRPD Design M14 – Caltrans
703 B Street, Marysville, CA 95901
Telework Status: M-F 7:00 AM - 4:30 PM | Schedule: 9/80A (Friday)
Office: (530) 741-5423 | Cell: (209) 481-6857
Elias' WebEx Link

From: Ranu Aggarwal <RAggarwal@m-group.us>
Sent: Wednesday, April 7, 2021 3:44 PM
To: Walker, Liza M@DOT <liza.walker@dot.ca.gov>
Cc: O'Neal, Chantell <COneal@fortbragg.com>; Karam, Elias@DOT <Elias.Karam@dot.ca.gov>
Subject: RE: 01-0B220 (Geotech Memo)

plan wall is acceptable to use. Please forward this as a response to the concerns regarding the CD Permit. Let me know if there are any additional questions.

Thank you,

Elias Karam, PE

Senior Transportation Engineer, Office of Design, (Msvl) B
NRPD Design M14 – Caltrans
703 B Street, Marysville, CA 95901
Telework Status: M-F 7:00 AM - 4:30 PM | Schedule: 9/80A (Friday)
Office: (530) 741-5423 | Cell: (209) 481-6857
Elias' WebEx Link

From:	Stillmunkes, Keith P@DOT
To:	Karam, Elias@DOT
Cc:	Sessions, Daniel S@DOT; Adams, Dan T@DOT; Tollison, Ron W@DOT
Subject:	RE: 01-0B220 - Geotech Memo, Coastal Development Permit, and Structures input on Type 6A Wall
Date:	Thursday, April 8, 2021 7:55:26 AM
Attachments:	image002.png

Good morning Elias,

Structure Design, Branch 1 was involved with this project in the early part of last year. At the time, we studied the Type 6A wall for the higher-than-standard k_h value of 0.22g. That appears to match the information provided on the attached geotechnical recommendations. We found that the Standard Plan design given for the Retaining Wall Type 6A is sufficient to support the higher value.

Please let me know if you have any questions.

Thank you,

Telework: (916) 204-7533