

June 22, 2023

Crawford File No. 19-574.4

To: Tony Seghetti, PE, Deputy Director
Humboldt County Department of Public Works (HCDPW), Engineering Division

Subject: **GEOTECHNICAL MEMORANDUM**
Alderpoint Road (F6B165) PM 42.00, 42.10, 42.25-42.30, Humboldt County, California
Task Order DPW2019-002-T04
Federal Project No. ER-32LO(124) PR
County Project No. 217213, 217214, 217408

Crawford & Associates, Inc. (Crawford) prepared this Geotechnical Memorandum (memo) in the evaluation of six (6) discrete storm damage sites along Alderpoint Road (F6B165) between Postmiles (PM) 42.00 and PM 42.30. This work was completed in accordance with Task Order 04, authorized on January 13, 2021, under the On-Call Professional Geotechnical Engineering Services Agreement No. DPW2019-002, dated March 03, 2020. This memo summarizes the results of the field investigation, assesses the cause(s) of the road failures, evaluates practical/feasible repair options, and provides geotechnical design recommendations to repair the road to maintain service.

To prepare this memo, Crawford:

- Discussed the project goals and objectives with representatives of the HCDPW and GHD, Inc. (Design Engineer);
- Reviewed the project's Federal Highway Administration (FHWA) Damage Assessment Form (KCB-HUMCO-078-0), approved December 28, 2018;
- Reviewed the As-Built "Project Plans for Construction of Storm Damage Repairs on Alderpoint Road (F6B165) at PM 42.00-42.46", prepared by the HCDPW and dated October 26, 2016;
- Reviewed published topographic, geologic, geomorphic/landslide, and seismic mapping of the project vicinity;
- Reviewed the aerial topographic survey provided by HCDPW, received July 14, 2021;
- Performed geologic reconnaissance of the site and immediate vicinity on March 16-23, 2021;
- Drilled and sampled 11 road-level borings on March 16-23, 2021, and installed a 1-inch slotted-PVC pipe piezometer within one of the completed borings for groundwater monitoring;
- Completed one road-level dynamic cone penetrometer (DCP) on March 17, 2021;
- Drilled and sampled four downslope borings on March 15-18, 2021, and installed 1-inch slotted-PVC pipe piezometers within three of the completed borings for groundwater monitoring;
- Completed 11 downslope DCPs on March 23-25, 2021;
- Provided a Draft Memorandum, dated November 24, 2021; and
- Performed laboratory testing and geotechnical engineering analysis in support of the conclusions and recommendations contained herein.

PROJECT LOCATION AND UNDERSTANDING

The project sites are located along Alderpoint Road at PM 42.00, 42.10, and 42.25-42.30, about 5 miles (travel distance) south-southeast of its intersection with State Route 36 at Bridgeville, an unincorporated community in the southeastern portion of Humboldt County, CA. The project site

consists of three separate areas located¹ at PM 42.00 (Area 1, latitude 40.4174°N and longitude 123.7612°W), PM 42.10 (Area 2, latitude 40.4192°N and longitude 123.7631°), and PM 42.25-42.30 (latitude 40.4210 and longitude -123.7640°.) Road elevations at the project sites vary from approximately 1,750 feet at the southern end (PM 42.00) to 1,630 feet at the northern end (PM 42.30); elevations were obtained from the topographic survey, NAVD88 datum. See the attached Figure 1 for the Vicinity Map; the topographic survey is used as the base map for project plan view figures.

Alderpoint Road along this segment consists of paved and unpaved (base rock surface), two-lane sections, approximately 24 feet wide, with a generally northwest-southeast alignment and relatively flat profile grades. It traverses along northwest to west-facing slopes. The topography is relatively gentle and irregular (i.e., “hummocky”), with the vegetation cover varying between areas of moderately dense trees to areas of mostly grass with scattered trees. Slopes below the road at PM 42.00 and PM 42.10 form the headwaters of Cold Creek, an intermittent stream, which appears to be (at least partially) fed by a spring mapped immediately upslope of PM 42.00 (per USGS topographic mapping of the area, see Figure 1 and 3A). Overhead telephone lines mounted on wooden poles run along the project alignment. The telephone lines go underground north and south of the project site along the eastern side of Alderpoint Road.

This segment of Alderpoint Road experienced damage due to storm events in January and February 2017. The FHWA Damage Assessment Form (DAF) identifies three specific failure areas, located at PM 42.00, PM 42.10, and PM 42.25-42.30. PM 42.00 and PM 42.10 were temporarily restored with base rock fill after failure to maintain two lanes of traffic.

This project includes six (6) discrete failure areas, which are identified as follows:

1. PM 42.00 (Area 1) – three discrete failure areas
2. PM 42.10 (Area 2) – one discrete failure area
3. PM 42.25-42.30 (Area 3) – two discrete failure areas

Each of the individual sites is discussed in more detail in the following section.

SITE DESCRIPTIONS

PM 42.00 (AREA 1)

This area (refer to Figure 5-1) includes three (3) discrete failure areas (per the DAF documentation), with measured lengths of about 143, 131², and 297 feet. Based on conversations with HCDPW personnel and a review of the As-Built plans, each of these failures coincides with a reconstructed road section with a stabilization trench, completed in 2016. Based on the As-Built plans, the bases of the stabilization trenches were located directly below the roadway. The depth of the stabilization trenches varied between about 10 to 20 feet below the road surface. Per the HCDPW, the road failures began shortly after construction was completed, and consisted of cracking and settlement of the road surface, requiring temporary repair/re-grading with base rock fill. Additional roadway cracking was observed along the outer shoulder at the time of Crawford’s initial site visit with HCDPW in July 2019.

This area appeared to have the potential for high groundwater (at least seasonally), based on the observed vegetation and the aforementioned mapped spring above the road. Water was observed

¹ Approximate site locations (latitude/longitude) based on data from Google Earth.

² Crawford’s geologic reconnaissance/mapping indicates that this failure is about 195 feet long (along the widest section).

seeping from the slope immediately along the inboard side of the road during Crawford’s March 2021 reconnaissance. Two 24-inch diameter cross-culvert at separate locations were observed transporting surface water under Alderpoint Road and onto energy dissipaters downslope/below the road.



Photo 1 – Looking North at PM 42.00 (July 2019)



Photo 2 – Looking Southeast at PM 42.00 (July 2019)

PM 42.10 (AREA 2)

Based on the DAF, this failure (refer to Figure 5-2) is about 183 feet in length and affected most of the road width. Per HCDPW As-Built plans, this area was also previously reconstructed with a stabilization trench (about 14 feet deep) in 2016. Similar to Area 1, the site started to fail following the completion of construction, with settlement and cracking of the road surface. The section was temporarily restored/re-graded with base rock fill. Some weathered rock outcrops were observed in the cut-slope immediately northwest of the failure. This area showed no surficial signs of high groundwater that was observed in Area 1. Similar to Area 1, water was observed seeping from the slope immediately along the inboard side of the road during Crawford’s March 2021 reconnaissance. A 12-inch diameter corrugated plastic pipe drain outlet was observed about 10 to 12 feet below the road at the eastern limits of the failure (approximate STA 29+00, offset 55 feet) and is presumed to be part of the sub-drainage system installed within the stabilization trench repair in 2016.



Photo 3 – Looking Northwest at PM 42.10 (July 2019)



Photo 4 – Looking Southeast at PM 42.10 (July 2019)

PM 42.25-42.30 (AREA 3)

Based on the DAF, this area (refer to Figure 5-3) includes two separate failures, with estimated lengths of 90³ feet (PM 42.25) and 47⁴ feet (PM 42.30). As opposed to the other areas, this area did not require any repair in 2016 and the road surface was still paved (including recent hot mix asphalt (HMA) patches). The road failure consisted of an undulating surface, with cracking and settlement of various degrees. The vegetation observed in this area suggests the potential for (at least seasonally) high groundwater. No rock outcrops or springs were observed in this area.

³ Crawford’s geologic reconnaissance/mapping indicates that this failure is about 165 feet long (along the widest section).

⁴ Crawford’s geologic reconnaissance/mapping indicates that this failure is about 70 feet long (along the widest section).



Photo 5 – Looking Northeast at PM 42.25 (July 2019)



Photo 6 – Looking North at PM 42.30 (July 2019)

GEOLOGIC SETTING

REGIONAL GEOLOGY

The project road interval lies within the Coast Ranges Geomorphic Province, which is characterized by a series of northwest-trending mountain ranges with intermountain valleys and sub-parallel to the active San Andreas Fault. The Coast Ranges is composed of thick Cenozoic sedimentary and volcanic strata overlying Mesozoic metamorphic rock. The northern Coast Ranges are dominated by the irregular, knobby, landslide-topography of the Franciscan Complex.

Published regional geologic mapping⁵ (Figure 2) shows the sites within the Central Belt of the Franciscan Complex (early Tertiary to Late Cretaceous-age). Specifically, the site areas are mapped as Mélange (cm1), which is described as predominantly sheared, locally tuffaceous, scaly meta-argillite, and less abundant blocks of metasandstone, which exhibits rounded, poorly incised, lumpy and irregular topography. Figure 2 indicates that Holocene and Pleistocene-age landslide deposits (Qls) are present at the PM 42.00 and PM 42.25-42.30 sites. The landslide deposits are described as unsorted clay- to boulder-size debris and broken rock masses that have moved downslope in debris flows, earth flows, and as more-or-less intact rotational or translational blocks.

LOCAL GEOLOGY

Based on Crawford's geologic site reconnaissance, PM 42.00 and PM 42.25-42.30 areas were both consistent with landslide deposits. The terrain around these areas was "hummocky, with no observable evidence of rock outcroppings. Outside of the areas mapped as landslide deposits (i.e., PM 42.10), intact outcrops of sedimentary rock (argillite, very dark gray, fine-grained, hard, fresh to slightly weathered, moderately to intensely fractured, massively bedded) were observed on the inboard (eastern) side of the road. Jointing of this exposed rock was measured at N21°W, dipping 83°E; N25°W, dipping 53°E; N57°W, dipping 65°E, and N41°E, dipping 80°W. Based on the reconnaissance, the sites are generally consistent with the mapped geology.

LANDSLIDING

Published landslide mapping⁶ (Figure 3A, see Figure 3B for legend) shows the road segment at PM 42.00 passing through a large (about 4,500 feet long) dormant translational/rotational landslide feature that begins about 2,000 feet east of Alderpoint Road and extends westward down the Cold Creek drainage. The smaller active road failures along PM 42.00 are superimposed on top of this larger, dormant landslide mass. Based on Crawford's geologic reconnaissance in March 2021, the active failures extend about 50 to 100 feet downslope. Evidence of previous earth movement was observed upslope of PM 42.00, including 70 to 90 degree (vertical) scarps about 3 to 5 feet high; these scarps appeared dormant at the time of the reconnaissance, being overgrown or covered in thick leaf litter.

⁵ McLaughlin, R.J., Ellen, S.D., Blake, M.C., Jr., Jayko, A.S., Irwin, W.P., Aalto, K.R., Carver, G.A., and Clarke, S.H., Jr., 2000, Geology of the Cape Mendocino, Eureka, Garberville, and southwestern part of the Hayfork 30 X 60 Minute Quadrangles and adjacent offshore area, northern California: USGS Miscellaneous Field Studies MF-2336, Sheet 3: Garberville Quadrangle, scale 1:100,000.

⁶ Spittler, T.E., 1983, Geology and geomorphic features related to landsliding, Bridgeville 7.5' Quadrangle, Humboldt County, California: California Division of Mines and Geology, Open-File Report OFR 83-23 SF, scale 1:24,000.

In the open meadow area upslope from PM 42.10, the ground was saturated and appeared hummocky, but failure scarps were not observed. Visual indications of failure were not observed upslope from PM 42.25-42.30.

FAULTS AND SEISMIC ACTIVITY

Based on the United States Geologic Survey (USGS) fault mapping (Figure 4), the project sites are situated between two fault traces, the Quaternary-age Russ Fault Zone located about 7 miles southwest, and the Quaternary-age Eaton Roughs Fault located approximately 8 miles northeast. Additionally, California Geologic Survey (CGS) fault mapping⁷ shows an unnamed Pre-Quaternary-age fault trace located about 1-mile west-southwest of the project sites. None of these faults are considered “active” per CGS criteria (defined as surface displacement within the last 11,700 years). The nearest potentially “active” faults are the Holocene-age Little Salmon Fault Zone, located about 13 miles northwest, and the Historic-age San Andreas Fault Zone located 27 miles southwest.

FIELD EXPLORATION

Crawford completed 11 road-level borings, four downslope borings, and 11 downslope DCPs in March 2021. Geo-Ex Subsurface Exploration (Geo-Ex) was subcontracted to complete the road level borings, Clear Heart Drilling, Inc. (CHD) was subcontracted to complete the downslope borings and one downslope DCP boring, and Crawford personnel completed all other DCPs. All work by the subcontractors was completed under the supervision of a Crawford field engineer/geologist. A summary of the explorations is provided below in Table 1. See Appendices A, B, and C for exploration logs.

⁷ California Geologic Survey, 2010 Fault Activity Map of California, GIS data

Table 1: Summary of Subsurface Explorations

PM (Area)	Driller	Boring I.D.	Completion Date	Surface Elevation (feet)	Boring Depth (feet)	Drill Rig	Hammer Type	Hammer Efficiency Ratio	Drilling Equipment
42.00 (Area 1)	Geo-Ex	A-21-001	03/16/2021	1716.9	31.3	CME 55 (Truck)	CME Auto	89.3%	4-inch Solid-stem Auger (SSA)
		A-21-002	03/20/2022	1713.2	31.3				
		A-21-003	03/15/2021	1709.4	51.5				
		A-21-004	03/19/2021	1690.8	40.0				
		A-21-005	03/19/2021	1687.2	51.5				
		A-21-006	03/21/2021	1686.4	30.8				
	CHD	A-21-007	03/15/2021	1707.2	20.4	Remote Access	Cathead, Drop	~60%	4-inch SSA
		A-21-008	03/16/2021	1703.6	29.8	DR8K (Track)	CME Auto	80.5%	
		A-21-009	03/17/2021	1678.7	35.7				
		D-21-026	03/17/2021	1691.8	14.0				2-inch O.D. solid cone tip (SCT)
	Crawford	D-21-010	03/25/2021	1703.0	9.3	"Wildcat" DCP	Manual Drop	N/A	1.4-inch O.D. SCT
		D-21-011	03/25/2021	1699.7	17.7				
		D-21-012	03/25/2021	1695.9	20.0				
		D-21-013	03/25/2021	1698.0	16.3				
		D-21-014	03/24/2021	1679.8	19.7				
D-21-015		03/24/2021	1668.3	17.3					
42.10 (Area 2)	Geo-Ex	A-21-016	03/22/2021	1682.0	31.5	CME 55 (Truck)	CME Auto	89.3%	4-inch SSA
		A-21-017	03/23/2021	1679.6	51.5				
		A-21-018	03/22/2021	1678.2	30.8				
	CHD	A-21-019	03/18/2021	1662.0	21.0	Remote Access	Cathead, Drop	~60%	4-inch SSA
	Crawford	D-21-020	03/24/2021	1665.8	22.3	"Wildcat" DCP	Manual Drop	N/A	1.4-inch O.D. SCT
		D-21-021	03/23/2021	1663.1	21.3				
42.25-42.30 (Area 3)	Geo-Ex	A-21-022	03/20/2021	1653.8	31.5	CME 55 (Truck)	CME Auto	89.3%	4-inch SSA
		A-21-023	03/22/2021	1636.6	31.5				
	Crawford	D-21-024	03/23/2021	1646.9	9.3	"Wildcat" DCP	Manual Drop	N/A	1.4-inch O.D. SCT
		D-21-025	03/23/2021	1631.3	11.3				

Geo-Ex utilized a CME-55 truck-mounted drill rig to complete the road-level borings. A hammer energy calibration test was not performed specifically for this project/site; however, previous hammer energy testing results provided by the driller found the hammer to have an energy efficiency of 89.3%. Auger drill refusal was reached within A-21-001 at a depth of about 31 feet.

Clear Heart Drilling utilized a Deeprock DR8K track-mounted drill rig to complete the Boring A-21-009 and DCP D-21-026. No hammer energy calibration testing was performed specifically for this project/site; however, previous hammer energy testing results provided by the driller found the

hammer to have an energy efficiency of 80.5%. Clear Heart Drilling also utilized a hand-portable remote access drill (hydraulically powered by a road-level drill rig) to complete the downslope borings. No hammer energy calibration testing was completed/available; therefore, energy efficiency of 60% was assumed (typical value for a cathead drop-hammer system).

Soil and weathered rock samples were recovered from the borings by means of a 2.0-inch O.D. Standard Penetration Test split-spoon sampler (ASTM D1586) with 1.4-inch I.D. stainless steel liners, and a 3.0-inch O.D. “Modified California” split-spoon sampler (ASTM D3550) with 2.4-inch I.D. stainless steel liners. The samplers were advanced with the standard 350 ft-lb striking force using a 140-lbs hammer and a drop height of 30 inches. At each test interval, the sampler was driven 18 inches (or until the sampler refusal criterion was met), and the blows required to advance the sampler each 6 inches of penetration were recorded. The sampler refusal criterion is defined as 50 or more blows with less than 6 inches of sampler advancement. The field blow counts (N) were recorded as the number of hammer blows required to drive the sampler the final 12 inches of the 18-inch total sample interval unless refusal was met. Sampler penetration resistance provides a field measure of relative densities and can be correlated to soil (or weathered rock) strength and bearing characteristics. The field-recorded (uncorrected) blow counts are shown on the boring logs provided in Appendix A. Energy-corrected (N_{60}) blow counts are provided in the summary table within Appendix A, B, and C.

The downslope DCPs were completed using a hand-operated tool called a “Wildcat DCP.” The test consists of continuously driving a 1.4-inch O.D. steel cone tip attached to a metal rod until either refusal (typically 50 blows, or greater, per 4 inches of advancement) or the termination depth is reached. The rods are advanced using a hand-actuated, 35-lbs manual drop hammer falling 15 inches. The DCP test, in general, provides an approximate quantification of a material’s apparent density or stiffness. The DCPs were all driven to refusal at their respective termination depths listed in Table 1.

A Crawford field engineer/geologist logged the explorations consistent with the Unified Soil Classification System and the Caltrans 2010 Logging Manual. Selected portions of recovered soil and weathered rock drive samples were retained in sealed containers for laboratory testing and reference. Groundwater observations were recorded during drilling operations when/if encountered and when the drilling method allowed. At completion, the borings and DCPs were closed per the Humboldt County Division of Environmental Health requirements; a 1-inch I.D. slotted-PVC pipe piezometer was installed in Borings A-21-007, A-21-009, A-21-019, and A-21-022 for groundwater monitoring.

LABORATORY TESTING

The following laboratory tests were completed on representative soil and weathered rock samples obtained from the borings and generally adhere to the standards specified by ASTM International (ASTM) or California Test Methods (CTM):

- Moisture Content and Unit Weight (ASTM D2216, D7263)
- Particle-Size Sieve Analysis (ASTM D6913)
- Material Finer than #200 Sieve (ASTM D1140)
- Liquid Limit, Plastic Limit, and Plasticity Index (ASTM D4318)
- Unconfined Compression Strength (ASTM D2166)
- pH and Minimum Resistivity (CTM 643)
- Sulfate Content and Chloride Content (CTM 417, 422m)

See Appendices A, B, and C for a complete summary of laboratory test results at each site.

SUBSURFACE CONDITIONS

EARTH MATERIALS

Based on the exploration data, the subsurface materials throughout this road segment are divided into two general units. Tables 2 through 4, below, summarize the encountered units at each site. Refer to the exploration logs in Appendix A, B, and C for more specific material descriptions and exploration details.

Table 2: Subsurface Profile (PM 42.00, Area 1)

Unit	Location	Depth (ft)	Comments
1	A-21-001	23.0	Unit 1 (Fill and Landslide Deposits): gray to brown, very loose to very dense sand with varying amounts of clay and gravel (SP/SC) and gravel with varying amounts of sand and clay (GP/GP-GC/GC) and very stiff to hard sandy fat clay (CH) and lean clay with sand (CL). This unit also consists of weak sedimentary rock (argillite) considered susceptible to future movement. SPT “N” blow counts range from about 0 blows per foot (bpf) to refusal, with an average of 13 bpf. Pocket Penetrometer test results are generally 1.25 to +4.5 tsf. This unit is interpreted as weak fill and underlying residual soils involved in active and older sliding/failure.
	A-21-002	23.3	
	A-21-003	43.0	
	A-21-004	26.3	
	A-21-005	28.3	
	A-21-006	28.5	
	A-21-007	18.5	
	A-21-008	27.5	
	A-21-009	35.5	
	D-21-010	8.0	
	D-21-011	17.7	
	D-21-012	16.0	
	D-21-013	16.0	
	D-21-014	+19.7	
	D-21-015	17.3	
D-21-026	8.5		
2	A-21-001	+31.3	Unit 2 (“Intact” Material): gray to black, decomposed to intensely weathered argillite and sandstone. This unit was encountered to the maximum depth of exploration (51.5 feet). SPT “N” blow counts typically range from 12 bpf to refusal, with an average of 49 bpf. Pocket Penetrometer test results generally >4.5 tsf. These materials are interpreted as “intact” and not associated with recent movements.
	A-21-002	+31.3	
	A-21-003	+51.5	
	A-21-004	+40.0	
	A-21-005	+51.5	
	A-21-006	+30.8	
	A-21-007	+20.4	
	A-21-008	+29.8	
	A-21-009	+35.7	
	D-21-010	+31.5	
	D-21-011	+51.5	
	D-21-012	+30.8	
	D-21-013	+21.0	
	D-21-014	+31.5	
	D-21-015	+31.5	
D-21-026	+13.5		

Table 3: Subsurface Profile (PM 42.10, Area 2)

Unit	Location	Depth (ft)	Comments
1	A-21-016	13.3	Unit 1 (Fill and Landslide Deposits): gray to brown to black, very loose to medium dense, silty sand with varying amounts of gravel (SM), sand with varying amounts of clay and gravel (SP/SP-SC/SC), gravel with varying amounts of clay and sand (GP-GC/GC). Approximately 2 feet of asphalt was encountered at about 4.5 feet below ground surface in Boring A-18-021. SPT “N” blow counts range from about 0 bpf to refusal, with an average of 10 bpf. This unit is interpreted as weak fill and underlying residual soils involved in active movement/failure.
	A-21-017	12.0	
	A-21-018	14.5	
	A-21-019	13.3	
	D-21-020	20.0	
	D-21-021	17.3	
2	A-21-016	+31.5	Unit 2 (“Intact” Material): gray to black, decomposed to moderately weathered argillite and graywacke sandstone. This unit was encountered to the maximum depth of exploration (51.5 feet). SPT “N” blow counts range from about 19 to 104 bpf, with an average of 56 bpf. Pocket Penetrometer test results are generally 2.5 to >4.5 tsf. These materials are interpreted as “intact” and not associated with recent movements.
	A-21-017	+51.5	
	A-21-018	+30.8	
	A-21-019	+21.0	
	D-21-020	+22.3	
	D-21-021	+21.3	

Table 4: Subsurface Profile (PM 42.25-42.30, Area 3)

Unit	Location	Depth (ft)	Comments
1	A-21-022	14.5	Unit 1 (Fill and Landslide Deposits): gray to brown to black, very loose to medium dense, clayey sand with varying amounts of gravel (SC) and medium stiff to hard, lean clay with varying amounts of sand and gravel (CL). SPT “N” blow counts range from about 7 bpf to refusal, with an average of 18 bpf. Pocket Penetrometer test results are generally 0.75 to >4.5 tsf. This unit is interpreted as weak fill and underlying residual soils involved in active and older movement/failure.
	A-21-023	8.5	
	D-21-024	9.3	
	D-21-025	4.0	
2	A-21-022	+31.5	Unit 2 (“Intact” Material): gray to black, decomposed to intensely weathered argillite and graywacke sandstone. This unit was encountered to the maximum depth of exploration (31.5 feet). SPT “N” blow counts range from about 28 to 91 bpf, with an average of 52 bpf. Penetrometer test results are generally 3.5 to >4.5 tsf. These materials are interpreted as “intact” and not associated with recent movements.
	A-21-023	+31.5	
	D-21-024	+9.3	
	D-21-025	+11.3	

GROUNDWATER

Table 5 below summarizes the encountered groundwater depths during the field investigation and subsequent readings from the 1-inch slotted-PVC pipe piezometers installed within select borings.

Table 5: Groundwater Observations

PM (Area)	Boring I.D.	Date	Surface Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)	Comments	
42.00 (Area 1)	A-21-001	03/16/2021	1,716.9	Not Encountered		Measured during drilling	
	A-21-002	03/20/2021	1,713.2	Not Encountered			
	A-21-003	03/15/2021	1,709.4	Not Encountered			
	A-21-004	03/19/2021	1,690.8	Not Encountered			
	A-21-005	03/19/2021	1,687.2	Not Encountered			
	A-21-006	03/21/2021	1,686.4	Not Encountered			
	A-21-007	03/15/2021	1,707.2	15.9	1,691.3	Measured during drilling	
				14.7	1,692.5	After ten minutes	
				13.0	1,694.2	After completion of drilling	
		05/20/2021		13.9	1,693.3	Measured from piezometer	
		09/17/2021	13.9	1,693.3	Measured from piezometer		
	A-21-008	03/16/2021	1,703.6	12.9	1,690.7	Measured during drilling	
	A-21-009	03/17/2021	1,678.7	Not Encountered		Measured during drilling	
		05/20/2021		14.4	1,664.3		Measured from piezometer
		09/17/2021		15.9	1,662.8		
42.10 (Area 2)	A-21-016	03/22/2021	1,682.0	Not Encountered		Measured during drilling	
	A-21-017	03/23/2021	1,679.6	Not Encountered			
	A-21-018	03/22/2021	1,678.2	8.1	1,670.1	Measured during drilling	
				7.7	1,670.5	After ten minutes	
	A-21-019	03/18/2021	1,662.0	4.0	1,658.0	Measured during drilling	
		05/20/2021		6.4	1,655.6	Measured from piezometer	
		09/17/2021		7.1	1,654.9		
42.25-42.30 (Area 3)	A-21-022	03/20/2021	1,653.8	Not Encountered		Measured during drilling	
		05/20/2021		28.1	1,625.7	Measured from piezometer	
		09/17/2021		21.3	1,632.5		
	A-21-023	03/22/2021	1,636.6	Not Encountered		Measured during drilling	

1. Groundwater was not encountered within any of the DCP explorations.

Continued groundwater monitoring can be completed to gain a better understanding of seasonal fluctuations.

Groundwater is expected to “perch” above the “intact” materials at variable depths during the wet season. Site reconnaissance observations (as discussed above) indicate the potential for (at least seasonally) high groundwater. Within the “intact” material, groundwater is likely discontinuous and controlled by fracture/shear zones. Groundwater levels, in general, fluctuate due to the amount of

precipitation, seasonal changes, surface/subsurface drainage characteristics, and other site-specific factors.

CORROSION EVALUATION

According to *Caltrans Corrosion Guidelines*⁸, a site is considered to be potentially corrosive to structural foundation elements (concrete/steel) if one or more of the following conditions exist:

- pH is 5.5 or less
- Chloride concentration is 500 parts per million (ppm) or greater
- Sulfate concentration is 1,500 ppm or greater

Table 6 summarizes the results of the corrosivity testing completed on select samples obtained from the borings.

Table 6: Corrosion Test Summary

Boring I.D. – Sample No.	Sample Depth (feet)	pH	Minimum Resistivity (ohm-cm)	Chloride Content (ppm)	Sulfate Content (ppm)
A-21-002-03	8.5-9.0	7.15	2,680	3.2	32.9
A-21-002-08	25.5-26.0	8.03	1,050	7.4	72.3
A-21-005-03	8.5-9.0	7.16	2,950	2.7	39.3
A-21-006-05	13.5-14.0	7.14	720	7.2	104.1
A-21-008-04	11.0-11.5	7.11	3,480	2.6	12.4
A-21-009-06	20.5-21.0	7.16	860	2.0	186.5
A-21-017-02	6.0-6.5	6.92	3,020	1.1	62.8
A-21-019-04	10.5-11.0	6.87	1,930	1.7	16.9
A-21-022-05	13.5-14.0	7.15	480	3.5	2,702
A-21-023-01	3.5-4.0	6.06	3,290	6.3	8.6

Per Caltrans guidelines, with the exception of MSE wall design, minimum resistivity is not included as a parameter to define a corrosive environment for structures. Resistivity can serve as an indicator parameter of the possible presence of soluble salts (chlorides and sulfates), with a minimum resistivity value of 1,100 ohm-cm or less indicating the potential presence of high quantities of soluble salts (higher propensity for corrosion), and thus requiring additional testing.

Based on the test results summarized above and current Caltrans guidelines, test results indicate the fine-grained (i.e., “clayey”) soils (Unit 1) in Boring A-21-022 (PM 42.25-42.30) are potentially **corrosive** based on high sulfate content result (higher than 1,500 ppm). Test results from the other borings indicate Unit 1 soils are generally “**not corrosive**” to structural concrete/steel foundation elements. These tests are only an indicator of soil corrosion potential; the Design Engineer should consult with a corrosion engineer (or specific product manufacturer) if these values are considered significant. Section 7, 10, and 12 of the *Caltrans Corrosion Guidelines* provides information regarding corrosion mitigation

⁸ California Department of Transportation, Division of Engineering Services, Materials Engineering and Testing Services, Corrosion Branch, Corrosion Guidelines, Version 3.0, May 2021.

measures for structural elements and culverts (and lists additional Caltrans guideline documents regarding corrosion mitigation) if deemed appropriate by the Design Engineer.

CONCLUSIONS

Based on the data developed for this study, this segment of Alderpoint Road traverses an area of generally widespread landsliding. At PM 42.00, dormant failure planes (from large landslide features) appear to extend above and below the road. Shallow groundwater is evident at many locations and is considered a significant contributor to the overall instability in this area. The active movement at each site is generally relatively shallow (typically less than 20 feet deep) and confined to the “weak” Unit 1 materials, although at PM 42.00, landslide deposits extend to depths of up to about 43 feet. At PM 42.00 and 42.10, it appears that the previously installed stabilization (i.e., “stab”) trenches were not “keyed” fully into “intact” Unit 2 materials and relied on weak Unit 1 materials for support, particularly along the downslope side of the road.

The primary causes of the recent road failures within the project road segment appear to be the inherent weakness/thickness of the Unit 1 materials and high seasonal stormwater infiltration. In addition, the upslope drainage features may have been overwhelmed during the 2017 storm events, which would have allowed stormwater runoff to sheet flow across and infiltrate/saturate the material beneath and on the outboard slope of the road.

RECOMMENDATIONS

It is understood that the general goal of the repair efforts at these locations is essentially to restore the road to an acceptable alignment/grade and provide year-round service to a level consistent with other portions of Alderpoint Road in this area with acceptance of some seasonal maintenance.

Implicit within the above goals is the realization that the deeper landslide movement at PM 42.00, should it occur within the larger landslide complex identified/known at this site, may disrupt any overlying slope repair and require future effort to restore road service. This study does not include evaluation of the larger landslide complex, except to recognize that regional landsliding is extensive and largely beyond typical control measures for this type of project.

The DAF proposed repair at each site was a 6-foot-deep reconstructed, reinforced roadway section. However, based on the field exploration and analysis, reconstructed reinforced roadway sections would be susceptible to future movement/failure as this repair would not embed into “intact” Unit 2 materials or provide sufficient subdrainage elements. Subdrainage is an important element to any repair option selected for these sites.

PM 42.00 (Area 1) - In general, the intact material at this area is deep and varies in depth (from about 20 to 43 feet below road grade) across the site. Due to the depth of “intact” materials and the presence of a much larger landslide complex, it is not considered economically feasible/practical to achieve repair support within the “intact” Unit 2 materials. We previously provided GHD with four feasible road repair options with differing degrees of improvement⁹. It is Crawford’s understanding that the County elected to move forward with a partially reconstructed embankment with a trenched underdrain (for subdrainage). This option does not engage stable “intact” material, relying solely on deep subdrainage elements to help improve slope stability by reducing impacts associated with high seasonal

⁹ “Alderpoint Road PM 42.00-42.30 - Typical Sections_20210825” was provided to GHD on August 25, 2021

groundwater. This approach is intended to reduce the magnitude and frequency of future movement and provide a serviceable/maintainable road in the event of future movement.

PM 42.10 (Area 2) and PM 42.25-42.30 (Area 3) - At the other two areas, road repair with a fully reconstructed embankment with subdrainage appears feasible. This option involves “keying” an embankment into stable “intact” Unit 2 materials for long-term functionality and reconstructing the embankment at a slope of 2H:1V (or 1.5H:1V with reinforcement), or flatter. The embankment may be constructed from compacted native materials.

At PM 42.00, retaining wall solutions, including Mechanically Stabilized Earth (MSE) or soldier pile walls, are not considered suitable at this site due to the depth to “intact” Unit 2 materials, as discussed above. At PM 42.10 and PM 42.25-42.30, a gravity wall solution, including an MSE wall, would be approximately 18 to 20 feet high and likely require temporary shoring (e.g., soil nails) to maintain through traffic during construction. A soldier pile wall is also considered feasible at these sites; however, it would have a height of up to about 16 feet, likely require tiebacks for lateral support, and may be less economical compared to a reconstructed embankment alternative.

REINFORCED, RECONSTRUCTED EMBANKMENT – PM 42.00 (SITE 1) / PM 42.10 (SITE 2)

The following is recommended for partially and fully reconstructed embankments (with reinforcement) at PM 42.00 and PM 42.10, respectively. Figures 6-1 and 6-2 (typical sections) illustrate the recommendations presented below.

1. The reinforced embankment sections should be constructed the full length of the distressed areas:
 - a. **PM 42.00:** Approximately 143, 195, and 297 feet for the three discrete failures; and
 - b. **PM 42.10:** Approximately 183 feet.
2. Establish the base of the reconstructed embankments:
 - a. **PM 42.00 (Figure 6-1, Section A):** The base should be established approximately 15 feet below the existing road grade within the limits of the road failure. The base can transition up at each end, as needed, to conform to the existing slopes/road. The toe of the reconstructed embankment should maintain at least 5 feet horizontal distance from the existing slope face. A minimum 15-foot-wide keyway should be constructed at the base, sloping at least 2% towards the heel of the excavation (and into the subdrain trench). The reconstruction should extend a minimum of 5 feet beyond the failure limits at each end to bench into the native materials.

Along the heel of the excavation, a longitudinal, trenched underdrain (per *Caltrans Standard Plan*¹⁰ D102) should be constructed a minimum of 2 feet wide and 10 feet deep. Place a perforated pipe along the bottom of the underdrain trench, and gravity drain to a solid drainpipe outlet, discharging downslope onto an RSP energy dissipater. Backfill the trenches with Caltrans Class 1/3 Permeable Material (per *Caltrans Standard Specification*¹¹ 68-2.02F) wrapped in Class C filter fabric (per *Caltrans Standard Specification* 96-1.02B) or Class 2 Permeable Material (without filter fabric). The installation of “cleanout” risers (per *Caltrans Standard Plan* D102 details) is

¹⁰ California Department of Transportation, Standard Plans, 2022

¹¹ California Department of Transportation, Standard Specifications, 2022

recommended for drain maintenance; however, Crawford understands that the HCDPW has chosen to omit cleanouts for this project.

- b. **PM 42.10 (Figure 6-2, Section B):** The toe of the base should be established by extending a 1H:1V “control line” downward from the restored outer hinge-line to 3 feet below the estimated “intact” Unit 2 material line (shown on Figure 6-2). The base can transition up at each end, as needed, to conform to the existing slopes/road. The toe of the reconstructed embankment should maintain at least 5 feet horizontal distance from the existing slope face. A minimum 12-foot-wide keyway should be constructed at the base, sloping at least 2% towards the perforated subdrainage pipe (see item 4 below). The keyway can be benched as shown in Figure 6-2, if desired, assuming it maintains at least 3 feet of embedment below the “intact” material along the entire width. The reconstruction should extend a minimum of 5 feet beyond the failure limits at each end to bench into the native materials.
3. A temporary construction backslope, extended from the heel of the keyway, at 1H:1V (or flatter) is expected to be appropriately stable during dry season construction although may require supplemental treatment to control local sloughing. The contractor is ultimately responsible for the design, construction, and safety of all excavations and shoring in accordance with CalOSHA requirements.
4. Provide embankment subdrainage with a minimum 2-foot thick drainage “blanket” placed along the base of the keyway and extending up the backslope to within 2 feet, at PM 42.00, and 5 feet, at PM 42.10, of finished road subgrade. Construct the drainage “blanket” by wrapping permeable material in filter fabric (Class C). For permeable material, use either Class 1/3 Permeable Material with filter fabric or Class 2 Permeable Material without filter fabric. At PM 42.00, the blanket drain can drain into the trenched underdrain discussed above in item 1. At PM 42.10, place a perforated pipe along the heel of the keyway excavation to collect water from the “blanket” and gravity drain to a solid drainpipe outlet at the lowest point, discharging downslope onto an RSP energy dissipater. The installation of “cleanout” risers (per *Caltrans Standard Plan D102* details) is recommended for drain maintenance; however, Crawford understands that the HCDPW has chosen to omit cleanouts for this project.
5. Where new fill is to be placed onto existing fill/natural slopes outside the limits of the drainage “blanket,” it should be fully bonded into the existing slope by placing on discrete horizontal benches cut fully into the slope and below any loose/soft or otherwise unsuitable materials.
6. The road embankment can be reconstructed with the excavated native materials compacted to at least a 90% relative compaction (RC), per CTM 216, increasing to a 95% RC within 30-inches of the finished grade.

The reconstructed road embankment should be reinforced as follows:

- a. *Primary Reinforcement* – Place uniaxial geogrid reinforcement (e.g., *Caltrans Standard Specification 96-1.02D*) the full-width of the reconstructed section with a 2-foot vertical spacing. The geogrid should have a minimum long-term design strength (LTDS) of 1,450 lbs/ft.
- b. *Secondary Reinforcement* – Place biaxial geogrid reinforcement (e.g., *Caltrans Standard Specification 96-1.02P*) along the outer 4 feet of the reconstructed embankment, between the primary reinforcement layers for surficial reinforcement. The secondary reinforcement is only required for finished slopes steeper than 2H:1V (maximum of 1.5H:1V).

7. Exterior finished grade (FG) reinforced slopes should be constructed no steeper than a 1.5H:1V. The outer slope should be overbuilt a minimum of 2 feet and then trimmed back to the final design slope. Track walking the slope is not an adequate method of compaction on the slope face. Appropriate erosion protection measures should be applied to all FG slopes.
8. **PM 42.10:** A longitudinal trenched underdrain (2-foot thick, per *Caltrans Standard Plan D102*) should be constructed along the inner road area to intercept seepage and shallow groundwater. The underdrain should be constructed to 5 feet below finished road subgrade and backfilled with permeable material enclosed in filter fabric (see item 2-a above for details). Low permeability soil (e.g., compacted cohesive native soil) should be placed within the uppermost 12 inches of the trench to prevent surface water from entering the underdrain. Provide a solid drainpipe outlet to discharge water from the underdrain downslope (onto an RSP energy dissipater).
9. The road structural section should be reconstructed based on typical standards (e.g., HCDPW Road Standards). An unpaved road surface at PM 42.00 could be considered to allow for easier maintenance in the case of future movement. The finished roadway surface should be constructed and maintained such that surface water run-off is diverted away from the reconstructed embankment slope to prevent erosion (e.g., with an outboard berm/dike or inboard-sloping road cross slope). An appropriately-sized inboard ditch should be constructed along the road and drain to cross culvert(s), as needed. All culverts should discharge onto appropriately-sized RSP energy dissipaters.

Excavation, subdrainage installation, geogrid placement, and exposed foundation materials should be observed and/or verified by Crawford during construction.

RECONSTRUCTED EMBANKMENT – PM 42.25-42.30 (AREA 3)

The following is recommended for a fully reconstructed embankment repair at PM 42.25-42.30. Figure 6-3 (typical section) illustrates the recommendations presented below.

1. The reconstructed embankment section should be constructed the full length (approximately 165 and 70 feet for the two discrete failures) of the distressed area.
2. The toe of the base should be established by extending a 1.5H:1V “control line” downward from the restored outer hinge-line to 3 feet below the estimated “intact” Unit 2 material line (shown in Figure 6-3). The base can transition up at each end, as needed, to conform to the existing slopes/road. The toe of the reconstructed embankment should maintain at least 5 feet horizontal distance from the existing slope face. A minimum 12-foot-wide keyway should be constructed at the base, sloping at least 2% towards the perforated subdrainage pipe (see item 4 below). The keyway can be benched as shown in Figure 6-3, if desired, assuming a minimum of an 8-foot bench is maintained at least 3 feet below the “intact” material line along the entire width; the remaining 4-foot-wide bench section should be maintained at/or below the “intact” material line along the entire width. The reconstruction should extend a minimum of 5 feet beyond the failure limits at each end to bench into the native materials.
3. A temporary construction backslope, extended from the heel of the keyway, at 1.5H:1V (or flatter) is expected to be appropriately stable during dry season construction although may require supplemental treatment to control local sloughing. The contractor is ultimately

responsible for the design, construction, and safety of all excavations and shoring in accordance with CalOSHA requirements.

4. Provide embankment subdrainage with a minimum 2-foot thick drainage “blanket” placed along the base of the keyway and extending up the backslope to within 5 feet of finished road subgrade. Construct the drainage “blanket” by wrapping permeable material in filter fabric (Class C). For permeable material, use either Class 1/3 Permeable Material with filter fabric or Class 2 without filter fabric. Place a perforated pipe along the heel of the keyway excavation to collect water from the “blanket” and gravity drain to a solid drainpipe outlet at the lowest point, discharging downslope onto an RSP energy dissipater. The installation of “cleanout” risers (per *Caltrans Standard Plan D102* details) is recommended for drain maintenance; however, Crawford understands that the HCDPW has chosen to omit cleanouts for this project.
5. Where new fill is to be placed onto existing fill/natural slopes outside the limits of the drainage “blanket,” it should be fully bonded into the existing slope by placing on discrete horizontal benches cut fully into the slope and below any loose/soft or otherwise unsuitable materials.
6. The road embankment can be reconstructed with the excavated native materials compacted to at least a 90% relative compaction (RC), per CTM 216, increasing to a 95% RC within 30-inches of the finished grade. Exterior finished grade (FG) slopes should be constructed no steeper than a 2H:1V. The outer slope should be overbuilt a minimum of 2 feet and then trimmed back to the final design slope. Track walking the slope is not an adequate method of compaction on the slope face. Appropriate erosion protection measures should be applied to all FG slopes.
7. A longitudinal trenched underdrain (2-foot wide, per *Caltrans Standard Plan D102*) should be constructed along the inner road area to intercept seepage and shallow groundwater. The underdrain should be constructed to 5 feet below finished road subgrade and backfilled with permeable material enclosed in filter fabric (see item 2-a above for details). Low permeability soil (compacted cohesive native soil) should be placed within the uppermost 12 inches of the trench to prevent surface water from entering the underdrain. Provide a solid drainpipe outlet to discharge water from the underdrain downslope (onto an RSP energy dissipater).
8. The road structural section should be reconstructed based on typical standards (e.g., HCDPW Road Standards). The finished roadway surface should be constructed and maintained such that surface water run-off is diverted away from the reconstructed embankment slope to prevent erosion (e.g., with an outboard berm/dike or inboard-sloping road cross slope). An appropriately-sized inboard ditch should be constructed along the road and drain to cross culvert(s), as needed. All culverts should discharge onto appropriately-sized RSP energy dissipaters.

Excavation, subdrainage installation, and exposed foundation materials should be observed and/or verified by Crawford during construction.

RISK MANAGEMENT

Our experience and that of our profession indicate that the risks of costly design, construction, and maintenance problems can be significantly lowered by retaining the Geotechnical Engineer of Record to provide additional services during design and construction.

For this project, Crawford should be retained as the Geotechnical Engineer of Record to:

- Review and provide comments on the final plans and specifications, insofar as they rely upon this report, prior to construction bidding to verify consistency with the recommendations contained herein.
- Monitor construction to check and document our report assumptions. At a minimum, Crawford should monitor the embankment/keyway excavations and the installation of the subdrainage and reinforcement elements.
- Update this report if design changes occur, two (2) years or more lapse between this report and construction, or site conditions have changed.

Should there be any change in the project or should subsurface conditions differ from those described in this report be encountered during construction, this office should be contacted/notified for evaluation and supplemental recommendations, as needed.

Crawford is not responsible for any other parties’ interpretation of our report and recommendations contained herein, as well as subsequent addendums, letters, and discussions. If others perform the construction observation, they should review this report and either accept the conclusions and recommendations herein as their own or provide alternative recommendations.

LIMITATIONS

Crawford performed services in accordance with generally accepted geotechnical engineering principles and practices currently used in this area. Where referenced, ASTM or Caltrans standards are used as a general (not strict) guideline only. We do not warranty our services.

This memo is based on the current site and project conditions and should only be used for the evaluation and design of repair alternatives for the Alderpoint Road PM 42.00, 42.10, 42.25-42.30 project. It is assumed the soil/rock and groundwater conditions interpreted/encountered within the explorations (see logs provided in Appendix A, B, and C) are representative of the subsurface conditions at the site. Actual conditions between explorations will vary along the project alignment. The interface shown between soil/rock materials on the exploration logs is approximate; the transition between material types may be abrupt or gradual. The recommendations are based on the final exploration logs, which represent our interpretation of the field logs and general knowledge of the site and geological conditions.

Modern design and construction are complex, with many regulatory sources/restrictions, involved parties, and construction alternatives. It is common to experience changes and delays. The owner should set aside a reasonable contingency fund based on project complexities and cost estimates to cover changes and delays.


CLOSING


Thank you for the opportunity to provide geotechnical services and design input for this project. Please contact us if you have any questions regarding the above recommendations or require additional information.

Sincerely,


Crawford & Associates, Inc.

Reviewed By:


Reynicole Gilbert, MS, EIT
Project Engineer


W. Eric Nichols, PE, CEG
Principal




Ryan Houghton, PE
Senior Engineer

MAP FIGURES

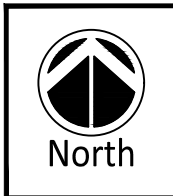
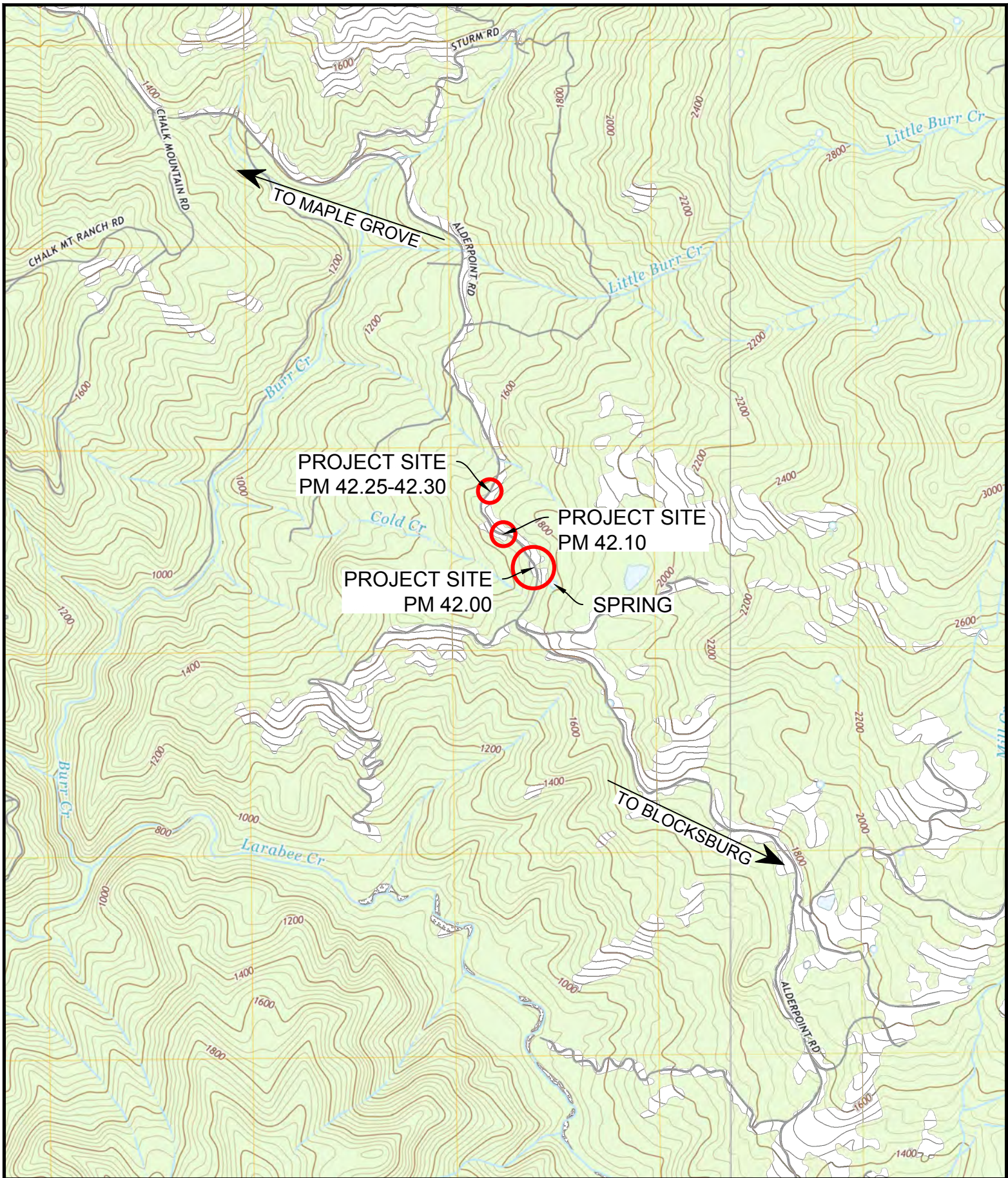
FIGURE 1: VICINITY MAP

FIGURE 2: GEOLOGIC MAP

FIGURE 3A: LANDSLIDE MAP

FIGURE 3B: LANDSLIDE MAP LEGEND

FIGURE 4: FAULT MAP



Source:
 USGS 7.5' Topographic Maps, Bridgeville, Humboldt
 County, California, 2018, Scale: 1:24,000.
 USGS 7.5' Topographic Maps, Larabee Valley,
 Humboldt County, California, 2018, Scale: 1:24,000.

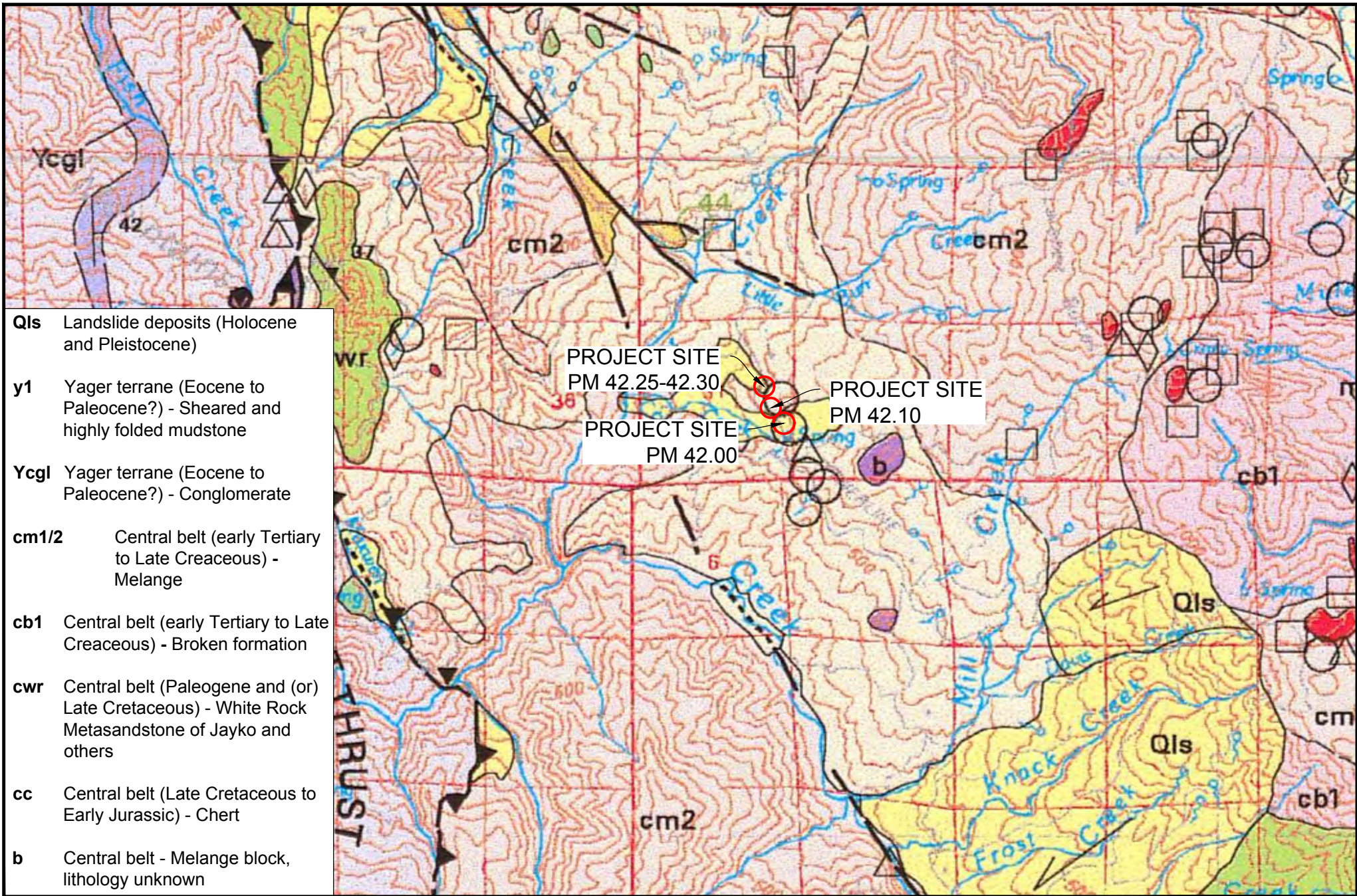
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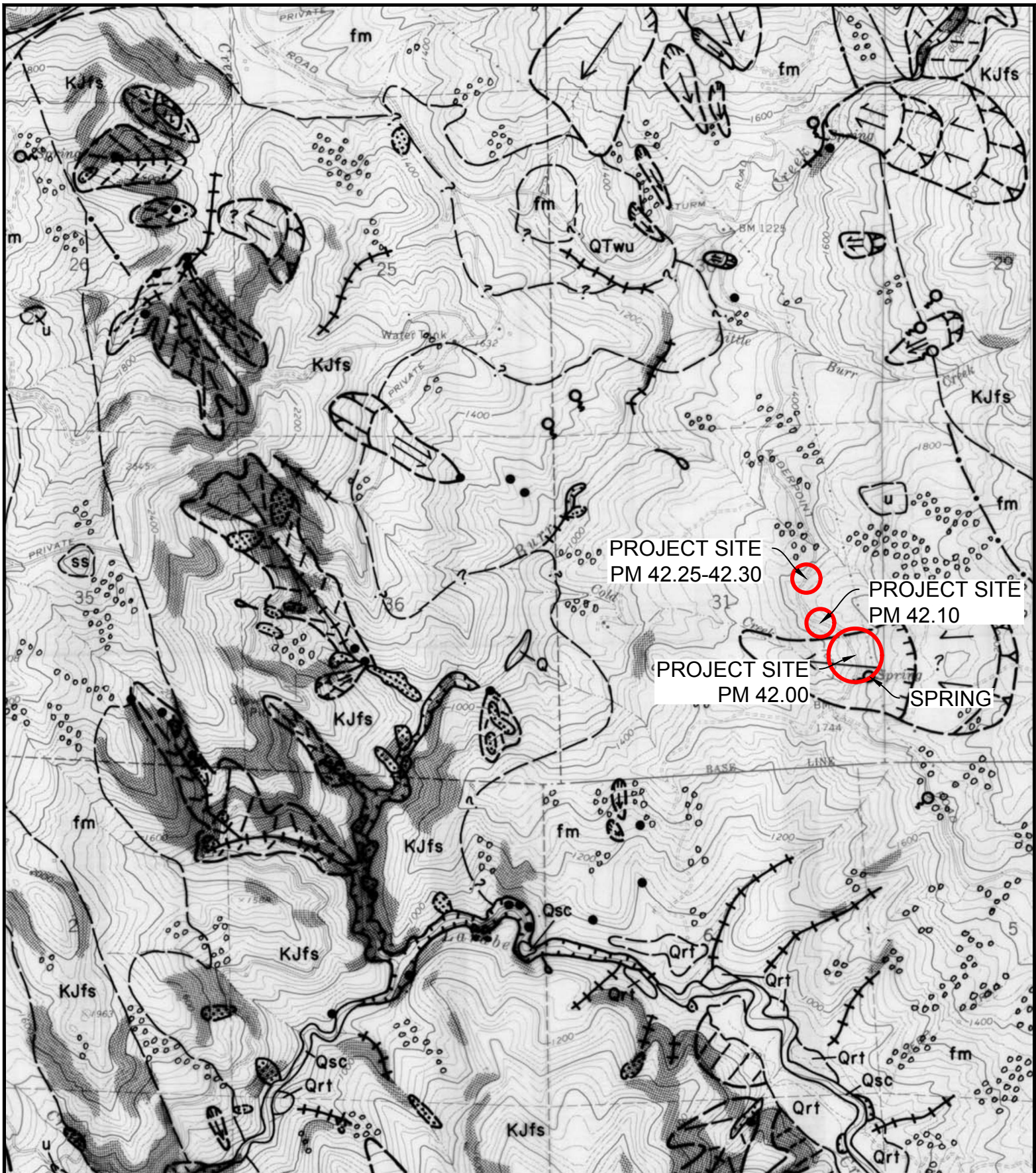
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 Suite 230
 Sacramento, CA 95831
 (916) 455-4225

ALDERPOINT ROAD
PM 42.00 - 42.30
HUMBOLDT COUNTY, CA

Figure 1
 Vicinity Map

Proj. No: 19-574.4
 Scale: 1" = 2,000'
 Date: 12/15/21





PROJECT SITE
PM 42.25-42.30

PROJECT SITE
PM 42.10

PROJECT SITE
PM 42.00

SPRING

SEE FIGURE 3B FOR LEGEND



North

Source:
Spittler, T.E., Geology and geomorphic features
related to landsliding, Bridgeville 7.5' Quadrangle,
Humboldt County, California, Open-File Report 83-23,
Scale: 1:24,000, California Geologic Survey, 1983.

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PM 42.00 - 42.30

HUMBOLDT COUNTY, CA

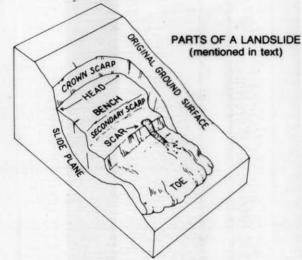
Figure 3A
Landslide Map

Proj. No: 19-574.4
Scale: 1" = 2,000'
Date: 12/15/21

EXPLANATION

- TRANSLATIONAL/ROTATIONAL SLIDE:** ↖ indicates scarp, ↗ indicates direction of movement; solid where active, dashed where dormant, queried where uncertain.
- EARTHFLOW:** ↖ indicates scarp, ← indicates general direction of movement; solid where active, dashed where dormant.
- DEBRIS SLIDE:** includes scarp and slide deposits; solid where active, dashed where dormant.
- DEBRIS FLOW/TORRENT TRACK:** solid where active, dashed where dormant.
- DEBRIS SLIDE AMPHITHEATER/SLOPE**
- INNER GORGE:** +++ where too narrow to delineate at this scale.
- **ACTIVE SLIDE:** too small to delineate at this scale.
- DISRUPTED GROUND:** irregular ground surface caused by complex landsliding processes resulting in features that are indistinguishable or too small to delineate individually at this scale; also may include areas affected by downslope creep, expansive soils, and/or erosion; boundaries usually are indistinct.
- Qsc STREAM/RIVER CHANNEL DEPOSITS (Holocene):** dominantly sand and gravel with minor silt and clay in active stream channel along major streams and rivers; characteristically unvegetated.
- Q ALLUVIUM (Holocene):** dominantly sand and gravel with minor amounts of silt and clay deposited by streams above active channel; characteristically vegetated.
- Qf ALLUVIAL FAN DEPOSITS (Holocene):** alluvial sand and gravel deposited in characteristic fan-cone shape at the mouths of eroding stream canyons.
- Qrt RIVER TERRACE DEPOSITS (Holocene-Pleistocene):** dominantly sand and gravel with minor amounts of silt and clay deposited during higher stands of major streams and rivers.
- Qort OLDER RIVER TERRACES (Pleistocene?):** flat-lying elevated surfaces along major streams and rivers, generally capped by sand and gravel.
- QTWu UNDIFFERENTIATED WILDCAT GROUP (Pleistocene-Miocene):** fine-grained, massive sandstone with minor amounts of siltstone, mudstone, and pebbly conglomerate; occurs as discrete blocks within shear zones in Franciscan melange terrain.
- TKy YAGER FORMATION (Tertiary/Cretaceous):** well-consolidated silt-shale, siltstone, sandstone, mudstone, and conglomerate; highly sheared in places; silt-shale and mudstone often disaggregate by slaking when wetted.

- KJfs FRANCISCAN CENTRAL BELT SANDSTONE (Cretaceous-Jurassic):** sandstone with interbedded siltstone, shale, and conglomerate; sandstone generally well-consolidated and gray-green; sheared in places.
- fm FRANCISCAN MELANGE (Cretaceous-Jurassic):** pervasively sheared argillaceous matrix containing pebble-sized to individually mappable blocks of the following:
 - ss graywacke sandstone
 - gs greenstone
 - ch chert
 - bs blue schist
 - sp serpentine
 - u lithology undetermined
- LITHOLOGIC CONTACT:** dashed where approximately located, queried where uncertain.
- FAULT:** dashed where approximately located, dotted where projected or inferred, queried where uncertain.
- LINEAMENT:** linear feature of unknown origin observed on aerial photographs.
- STRIKE AND DIP OF BEDDING:** symbols appearing in Q or Qsc refer to underlying bedrock units.
- STRIKE OF VERTICAL BEDDING**
- SPRING**
- SLOPES > 70 PERCENT:** determined from map contours, aerial photo interpretation, and field reconnaissance.



REFERENCES

California Department of Forestry, 1981, Cal Aero photos: Photos CDF-ALL-RE; Flight 7-13-81; Frames 7-20 to 7-26; 8-21 to 8-27, and 9-22 to 9-28; black and white, nominal scale 1:24,000.

California Division of Mines and Geology, 1976-1982, Geologic review of Timber Harvesting Plans: Unpublished field studies conducted for the California Department of Forestry.

Dibblee, T. W., Jr., 1950, Reconnaissance geologic map of the Weott 15-minute quadrangle: Unpublished, scale 1:62,500.

Kelsey, H. M., and Allwardt, A. O., 1974, Geologic map of the Van Duzen River Basin, Humboldt and Trinity Counties, California: in California Department of Water Resources, 1975, Van Duzen River Basin Environmental Atlas, Plate 8, scale 1:36,000.

Ristau, D., 1979, Weott 15-minute quadrangle: California Department of Forestry, Title II Geologic Data Compilation Project, unpublished, scale 1:62,500.

GEOLOGIC SOURCE INDEX

Geomorphology and Quaternary surficial geology by Thomas E. Spittler. Bedrock geology modified from sources listed below:

1. Kelsey and Allwardt (1974).
2. Dibblee (1950).



Slopes greater than 70 percent interpreted by Peter H. Griffith.

RATES OF LANDSLIDE MOVEMENT*

10 ft/sec or more	= extremely rapid
1 ft/min-10 ft/min	= very rapid
5 ft/day-1 ft/min	= rapid
5 ft/mo-5 ft/day	= moderate
5 ft/yr-5 ft/mo	= slow
1 ft/5yr-5 ft/yr	= very slow
1 ft/5yr or less	= extremely slow

*Modified from: Varnes, D.J., 1978, Slope movement types and processes in Landslides: Analysis and Control, Transportation Research Board, National Academy of Sciences, Washington, D.C., Special Report 176, Figure 2.1.

ACTIVITY OF LANDSLIDES

Active or probably active - presently moving or recently moved. Distinct topographic slide features present i.e., sharp barren scarps, cracks, jackstrawed trees. Major revegetation has not occurred.

Dormant - little evidence of recent movement. Slide features modified by weathering and erosion. Vegetation generally well established. Some mass movements may have developed under climatic conditions different from today. Causes of failure may remain and movement could be renewed.

SEE FIGURE 3A FOR MAP

Source:
Spittler, T.E., Geology and geomorphic features related to landsliding, Bridgeville 7.5' Quadrangle, Humboldt County, California, Open-File Report 83-23, Scale: 1:24,000, California Geologic Survey, 1983.

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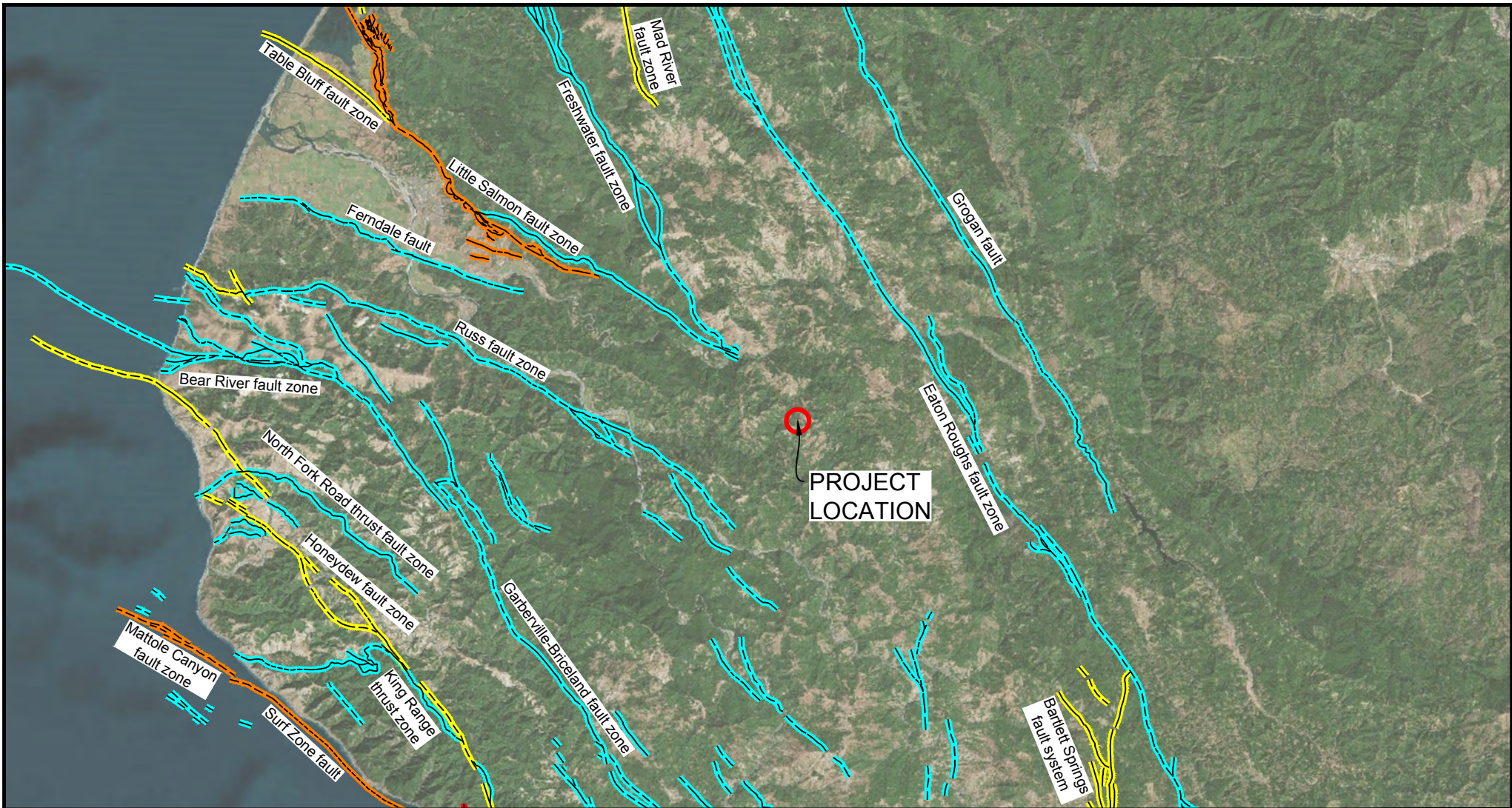
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ALDERPOINT ROAD
PM 42.00 - 42.30

HUMBOLDT COUNTY, CA

Figure 3B
Landslide Map
Legend

Proj. No: 19-574.4
Scale: N/A
Date: 12/15/21



LEGEND

Quaternary Fault (Age)

- <150 years
- <15,000 years
- <130,000 years

Quaternary Fault (Age)

- <750,000 years
- <1.6 million years

Location

- Well Constrained
- Moderately Constrained
- Inferred



Source:
 Basemap: AutoCAD Civil3D Geolocation Tool, using Bing Maps
 Fault Data: USGS GIS Data



ALDERPOINT ROAD PM 42.00 - 42.30
 HUMBOLDT COUNTY, CA

Figure 4
 Fault Map

Proj. No: 19-574.4
 Scale: 1" = 40,000'
 Date: 12/15/21

FIGURE 5-1 – EXPLORATION MAP

FIGURE 6-1 – TYPICAL SECTION (PM 42.00)






BORING LOGS LEGEND

BORING LOGS

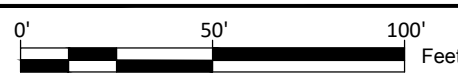
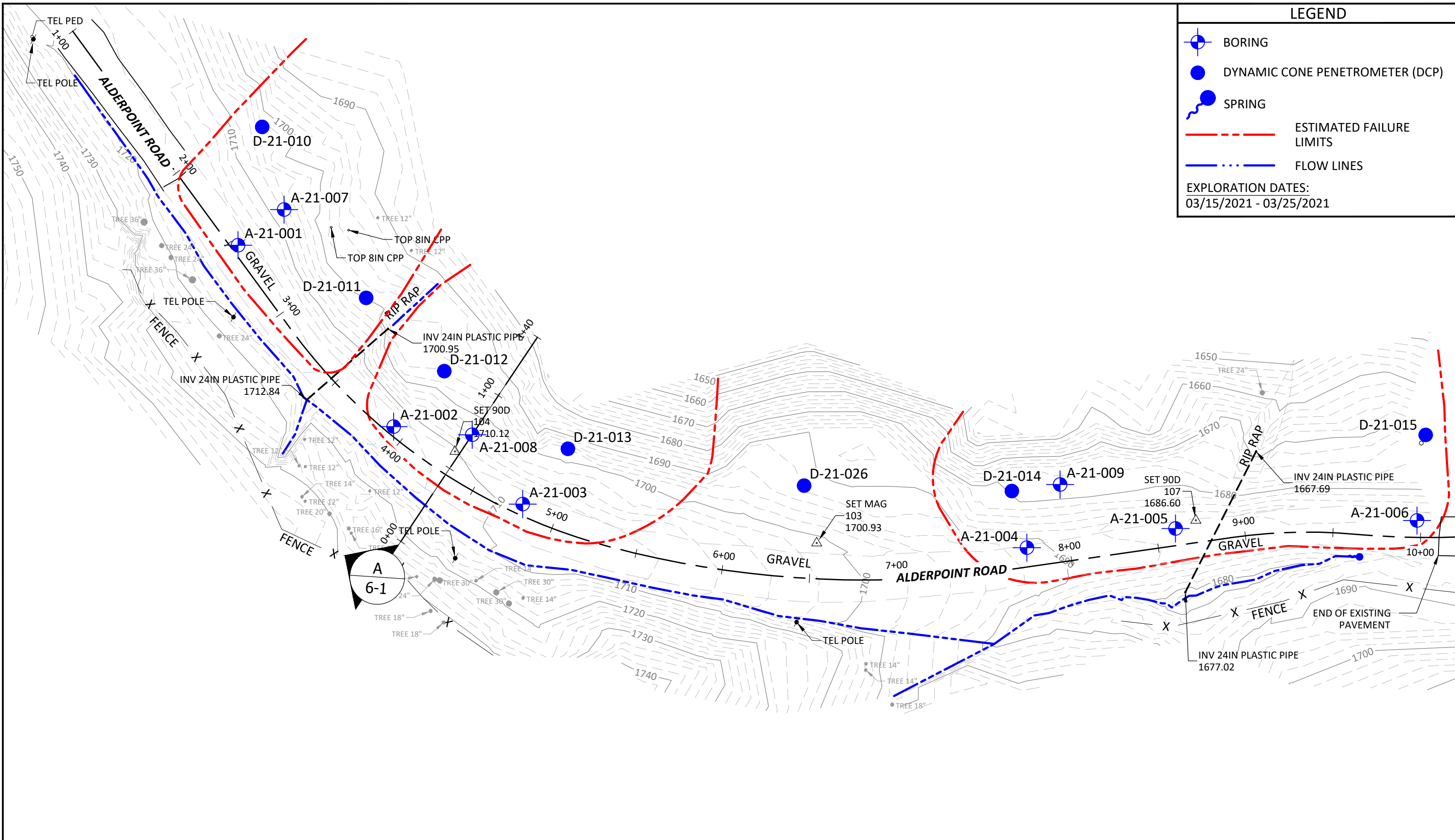
DYNAMIC CONE PENETROMETER (DCP) LOGS

LABORATORY TEST RESULTS

LEGEND

-  BORING
-  DYNAMIC CONE PENETROMETER (DCP)
-  SPRING
-  ESTIMATED FAILURE LIMITS
-  FLOW LINES

EXPLORATION DATES:
03/15/2021 - 03/25/2021



Map and Data Sources:
-Topographic survey map provided by GHD on 07/12/2021.

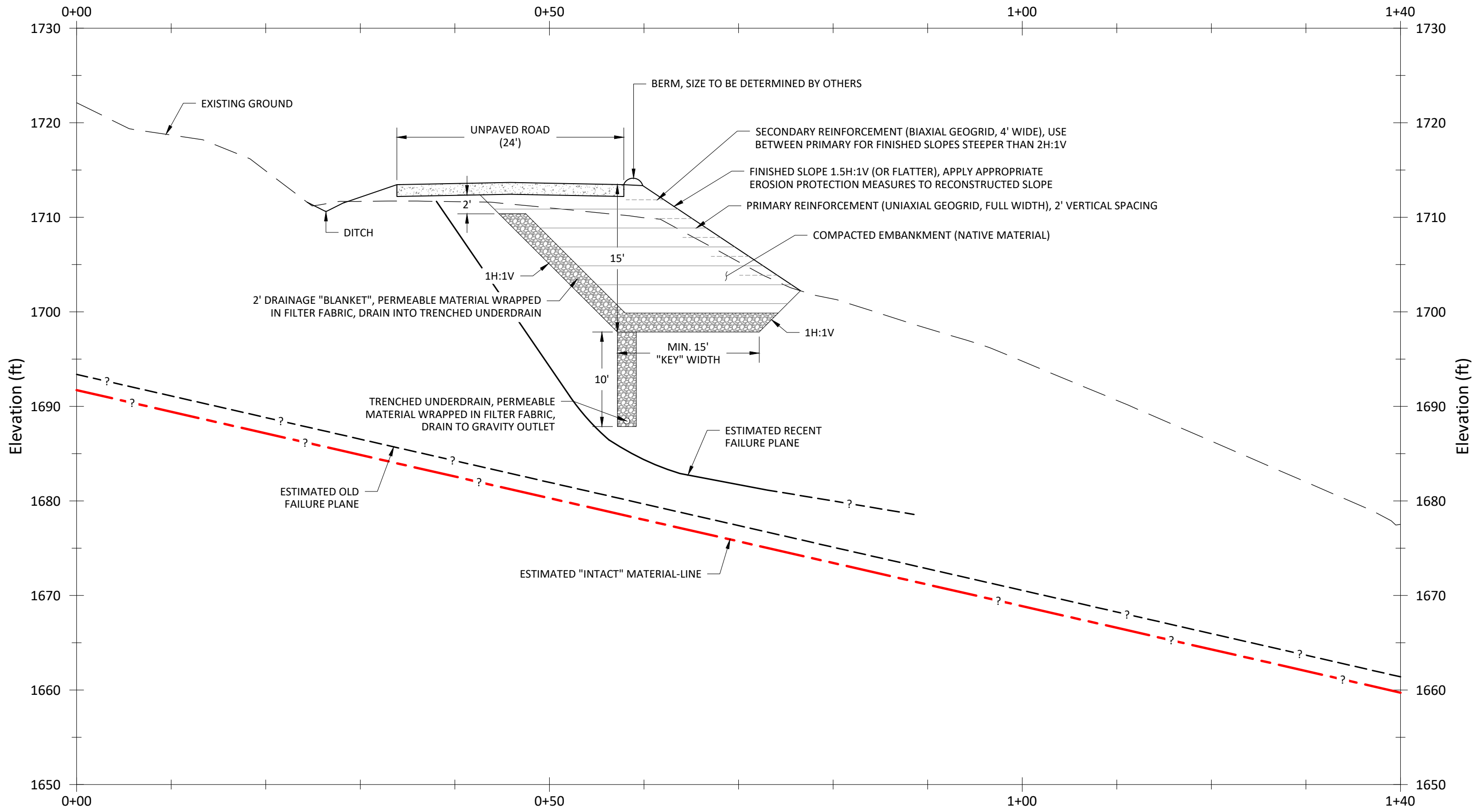
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Taber Since 1954
1100 Corporate Way Suite 230
Sacramento, CA 95831
(916) 455-4225

DPW2019-002 TASK ORDER 04
ALDERPOINT ROAD
PM 42.00, 42.10, & 42.25-42.30

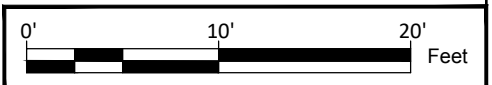
HUMBOLDT COUNTY, CA

Figure 5-1
Exploration Map
(PM 42.00)
Area 1
Prj. No: 19-574.4
Scale: 1" = 50'
Date: 10/25/2021

Station



Section A - Partially Reconstructed Embankment with Reinforcement



Data Sources:
 -Topographic survey map provided by GHD on 07/12/2021.

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 PM 42.00, 42.10, & 42.25-42.30

HUMBOLDT COUNTY, CA

Figure 6-1
 Typical Section (PM 42.00)
 Area 1

Prj. No: 19-574.4
 Scale: 1" = 10'
 Date: 06/22/2023

GROUP SYMBOLS AND NAMES

Graphic / Symbol	Group Names	Graphic / Symbol	Group Names
	GW Well-graded GRAVEL Well-graded GRAVEL with SAND		CL Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
	GP Poorly graded GRAVEL Poorly graded GRAVEL with SAND		
	GW-GM Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND		CL-ML SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
	GW-GC Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
	GP-GM Poorly graded GRAVEL with SILT Poorly graded GRAVEL with SILT and SAND		ML SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
	GP-GC Poorly graded GRAVEL with CLAY (or SILTY CLAY) Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
	GM SILTY GRAVEL SILTY GRAVEL with SAND		OL ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
	GC CLAYEY GRAVEL CLAYEY GRAVEL with SAND		
	GC-GM SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND		OL ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
	SW Well-graded SAND Well-graded SAND with GRAVEL		
	SP Poorly graded SAND Poorly graded SAND with GRAVEL		CH Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
	SW-SM Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL		
	SW-SC Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		MH Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
	SP-SM Poorly graded SAND with SILT Poorly graded SAND with SILT and GRAVEL		
	SP-SC Poorly graded SAND with CLAY (or SILTY CLAY) Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		OH ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
	SM SILTY SAND SILTY SAND with GRAVEL		
	SC CLAYEY SAND CLAYEY SAND with GRAVEL		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY elastic ELASTIC SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	SC-SM SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL		
	PT PEAT		OL/OH ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND
	COBBLES COBBLES and BOULDERS BOULDERS		

FIELD AND LABORATORY TESTS

- C** Consolidation
- CL** Collapse Potential
- CP** Compaction Curve
- CR** Corrosion, Sulfates, Chlorides
- CU** Consolidated Undrained Triaxial
- DR** Drained Residual Shear Strength
- DS** Direct Shear
- EI** Expansion Index
- M** Moisture Content
- OC** Organic Content
- P** Permeability
- PA** Particle Size Analysis
- PI** Liquid Limit, Plastic Limit, Plasticity Index
- PL** Point Load Index
- PM** Pressure Meter
- PP** Pocket Penetrometer
- R** R-Value
- SE** Sand Equivalent
- SG** Specific Gravity
- SW** Swell Potential
- TV** Pocket Torvane
- UC** Unconfined Compression - Soil
Unconfined Compression - Rock
- UU** Unconsolidated Undrained Triaxial
- UW** Unit Weight

SAMPLER GRAPHIC SYMBOLS

- Standard Penetration Test (SPT)
- Standard California Sampler (ID 2.0 in.)
- Modified California Sampler (ID 2.5 in.)
- Shelby Tube
- Piston Sampler
- NX Rock Core
- HQ Rock Core
- Bulk Sample
- Other (see remarks)

DRILLING METHOD SYMBOLS

- Auger Drilling
- Rotary Drilling
- Dynamic Cone or Hand Driven
- Diamond Core

WATER LEVEL SYMBOLS

- First Water Level Reading (during drilling)
- Static Water Level Reading (short-term)
- Static Water Level Reading (long-term)

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010) with Errata Sheet (2015).

CONSISTENCY OF COHESIVE SOILS

Descriptor	Unconfined Compressive Strength (tsf)	Pocket Penetrometer (tsf)	Torvane (tsf)	Field Approximation
Very Soft	< 0.25	< 0.25	< 0.12	Easily penetrated several inches by fist
Soft	0.25 - 0.50	0.25 - 0.50	0.12 - 0.25	Easily penetrated several inches by thumb
Medium Stiff	0.50 - 1.0	0.50 - 1.0	0.25 - 0.50	Can be penetrated several inches by thumb with moderate effort
Stiff	1.0 - 2.0	1.0 - 2.0	0.50 - 1.0	Readily indented by thumb but penetrated only with great effort
Very Stiff	2.0 - 4.0	2.0 - 4.0	1.0 - 2.0	Readily indented by thumbnail
Hard	> 4.0	> 4.0	> 2.0	Indented by thumbnail with difficulty

APPARENT DENSITY OF COHESIONLESS SOILS

Descriptor	SPT N ₆₀ (blows / 12 inches)
Very Loose	0 - 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

MOISTURE

Descriptor	Criteria
Dry	No discernable moisture
Moist	Moisture present, but no free water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS

Descriptor	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

SOIL PARTICLE SIZE

Descriptor	Size	
Boulder	> 12 inches	
Cobble	3 to 12 inches	
Gravel	Coarse	3/4 inch to 3 inches
	Fine	No. 4 Sieve to 3/4 inch
Sand	Coarse	No. 10 Sieve to No. 4 Sieve
	Medium	No. 40 Sieve to No. 10 Sieve
	Fine	No. 200 Sieve to No. 40 Sieve
Silt and Clay	Passing No. 200 Sieve	

PLASTICITY OF FINE-GRAINED SOILS

Descriptor	Criteria
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

CEMENTATION

Descriptor	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010).



Boring Record Legend

Soil Legend

Sheet 2 of 2

ROCK GRAPHIC SYMBOLS	
	IGNEOUS ROCK
	SEDIMENTARY ROCK
	METAMORPHIC ROCK

BEDDING SPACING	
Descriptor	Thickness or Spacing
Massive	> 10 ft
Very thickly bedded	3 ft - 10 ft
Thickly bedded	1 ft - 3 ft
Moderately bedded	4 in - 1 ft
Thinly bedded	1 in - 4 in
Very thinly bedded	1/4 in - 1 in
Laminated	< 1/4 in

WEATHERING DESCRIPTORS FOR INTACT ROCK						
Descriptor	Diagnostic Features					General Characteristics
	Chemical Weathering-Discoloration-Oxidation		Mechanical Weathering and Grain Boundary Conditions	Texture and Solutioning		
	Body of Rock	Fracture Surfaces		Texture	Solutioning	
Fresh	No discoloration, not oxidized	No discoloration or oxidation	No separation, intact (tight)	No change	No solutioning	Hammer rings when crystalline rocks are struck.
Slightly Weathered	Discoloration or oxidation is limited to surface of, or short distance from, fractures; some feldspar crystals are dull	Minor to complete discoloration or oxidation of most surfaces	No visible separation, intact (tight)	Preserved	Minor leaching of some soluble minerals may be noted	Hammer rings when crystalline rocks are struck. Body of rock not weakened.
Moderately Weathered	Discoloration or oxidation extends from fractures usually throughout; Fe-Mg minerals are "rusty"; feldspar crystals are "cloudy"	All fracture surfaces are discolored or oxidized	Partial separation of boundaries visible	Generally preserved	Soluble minerals may be mostly leached	Hammer does not ring when rock is struck. Body of rock is slightly weakened.
Intensely Weathered	Discoloration or oxidation throughout; all feldspars and Fe-Mg minerals are altered to clay to some extent; or chemical alteration produces in situ disaggregation (refer to grain boundary conditions)	All fracture surfaces are discolored or oxidized; surfaces are friable	Partial separation, rock is friable; in semi-arid conditions, granitics are disaggregated	Altered by chemical disintegration such as via hydration or argillation	Leaching of soluble minerals may be complete	Dull sound when struck with hammer; usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness such as incipient or hairline fractures or veinlets. Rock is significantly weakened.
Decomposed	Discolored or oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspars and Fe-Mg minerals are completely altered to clay		Complete separation of grain boundaries (disaggregated)	Resembles a soil; partial or complete remnant rock structure may be preserved; leaching of soluble minerals usually complete		Can be granulated by hand. Resistant minerals such as quartz may be present as "stringers" or "dikes".

Note: Combination descriptors (such as "slightly weathered to fresh") are used where equal distribution of both weathering characteristics is present over significant intervals or where characteristics present are "in between" the diagnostic feature. However, combination descriptors should not be used where significant identifiable zones can be delineated. Only two adjacent descriptors shall be combined. "Very intensely weathered" is the combination descriptor for "decomposed to intensely weathered".

PERCENT CORE RECOVERY (REC)

$$\frac{\sum \text{Length of the recovered core pieces (in.)}}{\text{Total length of core run (in.)}} \times 100$$

ROCK QUALITY DESIGNATION (RQD)

$$\frac{\sum \text{Length of intact core pieces} > 4 \text{ in.}}{\text{Total length of core run (in.)}} \times 100$$

Note: RQD* indicates soundness criteria not met

ROCK HARDNESS	
Descriptor	Criteria
Extremely Hard	Specimen cannot be scratched with pocket knife or sharp pick; can only be chipped with repeated heavy hammer blows
Very hard	Specimen cannot be scratched with pocket knife or sharp pick; breaks with repeated heavy hammer blows
Hard	Specimen can be scratched with pocket knife or sharp pick with heavy pressure; heavy hammer blows required to break specimen
Moderately Hard	Specimen can be scratched with pocket knife or sharp pick with light or moderate pressure; breaks with moderate hammer blows
Moderately Soft	Specimen can be grooved 1/16 in. with pocket knife or sharp pick with moderate or heavy pressure; breaks with light hammer blow or heavy hand pressure
Soft	Specimen can be grooved or gouged with pocket knife or sharp pick with light pressure, breaks with light to moderate hand pressure
Very Soft	Specimen can be readily indented, grooved, or gouged with fingernail, or carved with pocket knife; breaks with light manual pressure.

FRACTURE DENSITY	
Descriptor	Criteria
Unfractured	No fractures
Very Slightly Fractured	Core lengths greater than 3 ft.
Slightly Fractured	Core lengths mostly from 1 ft. to 3 ft.
Moderately Fractured	Core lengths mostly from 4 in. to 1 ft.
Intensely Fractured	Core lengths mostly from 1 in. to 4 in.
Very Intensely Fractured	Mostly chips and fragments.

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010).



LOG OF BORING A-21-001

PROJECT NO: 19-574.4	BEGIN DATE: 03/16/2021	DRILLING CONTRACTOR: Geo-Ex Subsurface Exploration
PROJECT: Alderpoint Road PM 42.00-42.30	COMPLETION DATE: 03/16/2021	DRILLING METHOD: CME 55 Truck
LOCATION: Bridgeville, CA	SURFACE ELEVATION: 1716.9 (ft)	DRILL RIG: Solid-Stem Auger
COUNTY: Humboldt	SURFACE CONDITION: Fill	HAMMER TYPE: Automatic; 140 lbs; 30 in. drop
CLIENT: HCDPW	WATER DEPTH: Not Encountered	SAMPLER TYPE & SIZE: MCAL (2.4" ID), SPT (1.4" ID)
LOGGED BY: KBH	READING TAKEN: N/A	BOREHOLE DIAMETER: 4.5 in.
DEPTH OF BORING: 31.30 (ft)	HAMMER EFFICIENCY: 89.3 (%)	BACKFILL METHOD: Neat Cement Grout

FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS	
ELEVATION (ft)	DEPTH (ft)	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE				
1716	1						CLAYEY SAND with GRAVEL (SC); medium dense; grayish brown; dry to moist; mostly coarse to fine SAND; little fine, subangular to subrounded GRAVEL; little fines; [FILL].											
1715	2																	
1714	3	1	11	31														
1713	4		16															
1712	5	2	9															
1711	6		11	19				Brown; moist; some fines.				10.1	93.7					
1710	7																	
1709	8	3	6															
1708	9		13	27								18	38					Grinding observed from 8-8.5'
1707	10		14															
1706	11	4	7					Brown mottled with orange; subrounded GRAVEL.										
1705	12		15	35								10.3	124.5	33				
1704	13	5	11					Poorly-graded GRAVEL with CLAY (GP-GC); medium dense; gray; dry to moist; mostly fine subrounded GRAVEL; few fine SAND; few fines; [FILL].										
1703	14		11	22														
1702	15	6	5															
1701	16		6	16				Brown and gray; moist; coarse to fine subrounded GRAVEL; some coarse to fine SAND.										
1700	17		10															
1699	18																	
1698	19							CLAYEY SAND with GRAVEL (SC); loose; reddish brown; wet; mostly coarse to fine SAND; some coarse to fine subangular to subrounded GRAVEL; little fines.										
1697	20	7	0															
1696	21		1	6	0.50			SEDIMENTARY ROCK (Argillite); gray; decomposed; very soft; (Lean CLAY with SAND (CL); medium stiff; moist; mostly medium plasticity, medium toughness fines; little fine SAND).				14.3	120.9	21				
1695	22		5									16.4	118.1					Perched water 19-20'; hole caved to 13.5' UC @ 21'; Strength=1310 psf Strain at 15% Torvane = 0.75 tsf Grinding observed from 22-23'
1694	23																	
1693	24																	



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PROJECT NO: 19-574.4
 PROJECT: Alderpoint Road PM 42.00-42.30
 BORING: A-21-001
 ENTRY BY: MNA
 CHECKED BY: KBH

ELEVATION (ft)	DEPTH (ft)	FIELD					DESCRIPTION	RECOVERY (%)	LABORATORY						REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)			GRAPHIC LOG	RQD (%)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)		% PASSING 200 SIEVE	DRILL METHOD	CASING DEPTH
1691	25	X	8	23 41 46	87		SEDIMENTARY ROCK (Argillite); (continued) Grayish black; intensely weathered; soft.	78				8.3	126.3				
1690	27																Grinding and hard drilling from 27-28'
1689	28																Softer drilling from 28-30'
1688	29						Moderately weathered; soft to moderately soft.										Harder drilling from 30-31'
1687	30	X	9	50/4	REF			100									
1686	31	X	10	50/3	REF			0									Driller notes auger refusal at 31'
1685	32						Bottom of borehole at 31.3 ft bgs										
1684	33																
1683	34																
1682	35																
1681	36																
1680	37																
1679	38																
1678	39																
1677	40																
1676	41																
1675	42																
1674	43																
1673	44																
1672	45																
1671	46																
1670	47																
1669	48																
1668	49																
1667	50																
1666	51																
1665	52																
1664	53																
1663	54																

LOG OF BORING A-21-002

PROJECT NO: 19-574.4	BEGIN DATE: 03/20/2021	DRILLING CONTRACTOR: Geo-Ex Subsurface Exploration
PROJECT: Alderpoint Road PM 42.00-42.30	COMPLETION DATE: 03/20/2021	DRILLING METHOD: CME 55 Truck
LOCATION: Bridgeville, CA	SURFACE ELEVATION: 1713.2 (ft)	DRILL RIG: Soild-Stem Auger
COUNTY: Humboldt	SURFACE CONDITION: Fill	HAMMER TYPE: Automatic; 140 lbs; 30 in. drop
CLIENT: HCDPW	WATER DEPTH: Not Encountered	SAMPLER TYPE & SIZE: Bulk, MCAL (2.4" ID), SPT (1.4" ID)
LOGGED BY: KBH	READING TAKEN: N/A	BOREHOLE DIAMETER: 4.0 in.
DEPTH OF BORING: 31.30 (ft)	HAMMER EFFICIENCY: 89.3 (%)	BACKFILL METHOD: Neat Cement Grout

FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
ELEVATION (ft)	DEPTH (ft)	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE			
1712	1	Bulk					CLAYEY SAND with GRAVEL (SC); medium dense; gray; dry to moist; mostly coarse to fine SAND; some coarse to fine subangular to subrounded GRAVEL; little fines; [FILL].	100									
1711	2																
1710	3	1	6	33			Brown; moist; some medium plasticity, fines.	56									
1709	4		17														
1708	5	2	9	24				50									
1707	6		11						19	33	8.7	104.0				Difficult to clean out hole; lots of gravels in cuttings from 6-7.5'	
1706	7		13														
1705	8	3	11	21			Brown mottled with orange and black.	22									
1704	9		10										23			Chemical Analysis @ 8': ph= 7.15 Min. Res. = 2,680 ohm-cm	
1703	10	4	8	29				39								Chloride = 3.2 ppm Sulfate = 32.9 ppm Soft drilling from 10-15'	
1702	11		14								9.7	118.4					
1701	12		15														
1700	13	5	7	12			Poorly-graded GRAVEL with CLAY and SAND (GP-GC); loose; gray and brown; moist; mostly fine, subrounded GRAVEL; little coarse to fine SAND; few fines; [FILL].	0									
1699	14		7														
1698	15	6	4	10				72								Interbedded softer and harder layers from 15-20'	
1697	16		5								4.8	106.2	38				
1696	17		5				CLAYEY SAND (SC); loose; gray; moist; mostly coarse to fine SAND; little fines; few fine, subangular GRAVEL.										
1695	18																
1694	19																
1693	20	7	9	14				39									
1692	21		7				Gray with mottled with blue; fine sand; some fines; trace coarse to fine GRAVEL.		15	30	12.6	132.9	39			UC @ 21': Strength=950 psf Strain at 15% Torvane = 1.25 tsf Harder drilling from 22-24'	
1691	22		7														
1690	23						SEDIMENTARY ROCK (Argillite); gray; intensely weathered; soft; (CLAYEY SAND with GRAVEL (SC); very dense; moist; mostly coarse to fine SAND; some fine, subangular GRAVEL; little fines).										
1689	24															Slightly softer drilling from 24-25'	



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PROJECT NO: 19-574.4
PROJECT: Alderpoint Road PM 42.00-42.30
BORING: A-21-002
ENTRY BY: MNA
CHECKED BY: KBH
SHEET # 1 of 2

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE			
1688	25	X	8	23 36 50/5	86/11			SEDIMENTARY ROCK (Argillite); (continued)	100									Hard drilling and chatter from 25-30' Sampler rebounding Chemical Analysis @ 26': pH = 8.03 Min. Res. = 1,050 ohm-cm Chloride = 7.4 ppm Sulfate = 72.3 ppm
1687	26											8.9						
1686	27																	
1685	28																	
1684	29																	
1683	30	X	9	27 37 50/4	87/10			Intensely to moderately weathered; soft to moderately soft.	100									
1682	31							Bottom of borehole at 31.3 ft bgs										
1681	32																	
1680	33																	
1679	34																	
1678	35																	
1677	36																	
1676	37																	
1675	38																	
1674	39																	
1673	40																	
1672	41																	
1671	42																	
1670	43																	
1669	44																	
1668	45																	
1667	46																	
1666	47																	
1665	48																	
1664	49																	
1663	50																	
1662	51																	
1661	52																	
1660	53																	
1659	54																	



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PROJECT NO: 19-574.4
PROJECT: Alderpoint Road PM 42.00-42.30
BORING: A-21-002
ENTRY BY: MNA
CHECKED BY: KBH

LOG OF BORING A-21-003

PROJECT NO: 19-574.4

BEGIN DATE: 03/15/2021

DRILLING CONTRACTOR: Geo-EX Subsurface Explorations

PROJECT: Alderpoint Road PM 42.00-42.30

COMPLETION DATE: 03/15/2021

DRILLING METHOD: CME 55 Truck

LOCATION: Bridgeville, CA

SURFACE ELEVATION: 1709.4 (ft)

DRILL RIG: Solid-Stem Auger

COUNTY: Humboldt

SURFACE CONDITION: Gravel/Fill

HAMMER TYPE: Automatic; 140 lbs; 30 in. drop

CLIENT: HCDPW

WATER DEPTH: Not Encountered

SAMPLER TYPE & SIZE: MCAL (2.4" ID), SPT (1.4" ID)

LOGGED BY: KBH

READING TAKEN: N/A

BOREHOLE DIAMETER: 4.5 in.

DEPTH OF BORING: 51.50 (ft)

HAMMER EFFICIENCY: 89.3 (%)

BACKFILL METHOD: Neat Cement Grout

FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS			
ELEVATION (ft)	DEPTH (ft)	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE						
1709	1						CLAYEY SAND with GRAVEL (SC); very dense; grayish brown; dry to moist; mostly coarse to fine SAND; some fines; little fine, subangular to subrounded GRAVEL; [FILL].										Driller notes easy drilling from 0-15'			
1708	2																			
1707	3	1	28	50/6																
1706	4																			
1705	5																			
1704	6	2	6	22				Medium dense; brown.	72											
1703	7		11									8.9	103.1							
1702	8		11																	
1701	9	3	7	24				Moist.	56											
1700	10		7								17	40								
1699	11		17																	
1698	12	4	8	32																
1697	13		14																	
1696	14		18									8.5	124.6	25						
1695	15		10																	
1694	16		14																	
1693	17		17																	
1692	18		10	31				Poorly-graded GRAVEL (GP); medium dense; gray; dry; mostly fine subrounded GRAVEL; few fine SAND; [FILL].												Existing drainage blanket
1691	19		14																	
1690	20		17					Poorly-graded GRAVEL with CLAY and SAND (GP-GC); medium dense; gray; dry to moist; mostly fine, subrounded GRAVEL; little fine SAND; few fines; [FILL].												
1689	21	7	12	39					89											
1688	22		17																	
1687	23		22																	
1686	24																			
1685	25							CLAYEY SAND with GRAVEL (SC); dense; brown mottled with red; moist; mostly coarse to fine SAND; some medium plasticity fines; little fine subangular to subrounded GRAVEL.												
1684	26	8	13	40					22											
1683	27		15									10.0	137.3	38						Hole caved approximately 2'; re-drilled
1682	28		25																	
1681																				



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PROJECT NO: 19-574.4
 PROJECT: Alderpoint Road PM 42.00-42.30
 BORING: A-21-003
 ENTRY BY: MNA
 CHECKED BY: KBH

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE			
1680	30						CLAYEY SAND with GRAVEL (SC); (continued)									Very soft drilling from 30-40'		
1679	31	9	24	29	56	27		Dense; purple brown; moist to wet; coarse to fine, subangular GRAVEL.	61									
1677	32						Loose; brown; moist; fine subangular GRAVEL.									Slightly stiffer drilling from 43-45'		
1676	33																	
1675	34						CLAYEY GRAVEL with SAND (GC); very loose; gray; moist to wet; mostly coarse to fine, subangular GRAVEL; little coarse to fine SAND; little fines.									Slow and hard drilling from 45-50'		
1674	35	10	5	6	13	7			67	31	79							
1673	36						SEDIMENTARY ROCK (Argillite); gray; moderately weathered; moderately soft; (dry).									Bottom of borehole at 51.5 ft bgs		
1672	37																	
1671	38						Intensely weathered to moderately weathered; grayish black; soft to moderately soft.									Bottom of borehole at 51.5 ft bgs		
1670	39																	
1669	40						Intensely weathered to moderately weathered; grayish black; soft to moderately soft.									Bottom of borehole at 51.5 ft bgs		
1668	41	11	0	0	0	0			33			11.2	123.7	16				
1667	42						Intensely weathered to moderately weathered; grayish black; soft to moderately soft.									Bottom of borehole at 51.5 ft bgs		
1666	43																	
1665	44						Intensely weathered to moderately weathered; grayish black; soft to moderately soft.									Bottom of borehole at 51.5 ft bgs		
1664	45	12	50/3	REF					100			21.6	112.7					
1663	46						Intensely weathered to moderately weathered; grayish black; soft to moderately soft.									Bottom of borehole at 51.5 ft bgs		
1662	47																	
1661	48						Intensely weathered to moderately weathered; grayish black; soft to moderately soft.									Bottom of borehole at 51.5 ft bgs		
1660	49																	
1659	50						Intensely weathered to moderately weathered; grayish black; soft to moderately soft.									Bottom of borehole at 51.5 ft bgs		
1658	51	13	13	14	40	26			50									
1657	52						Intensely weathered to moderately weathered; grayish black; soft to moderately soft.									Bottom of borehole at 51.5 ft bgs		
1656	53																	
1655	54						Intensely weathered to moderately weathered; grayish black; soft to moderately soft.									Bottom of borehole at 51.5 ft bgs		
1654	55																	
1653	56						Intensely weathered to moderately weathered; grayish black; soft to moderately soft.									Bottom of borehole at 51.5 ft bgs		
1652	57																	
1651	58						Intensely weathered to moderately weathered; grayish black; soft to moderately soft.									Bottom of borehole at 51.5 ft bgs		
1650	59																	
1649	60						Intensely weathered to moderately weathered; grayish black; soft to moderately soft.									Bottom of borehole at 51.5 ft bgs		
1648	61																	
1647	62						Intensely weathered to moderately weathered; grayish black; soft to moderately soft.									Bottom of borehole at 51.5 ft bgs		
1646	63																	

LOG OF BORING A-21-004

PROJECT NO: 19-574.4	BEGIN DATE: 03/16/2021	DRILLING CONTRACTOR: Geo-Ex Subsurface Exploration
PROJECT: Alderpoint Road PM 42.00-42.30	COMPLETION DATE: 03/19/2021	DRILLING METHOD: CME 55 Truck
LOCATION: Bridgeville, CA	SURFACE ELEVATION: 1690.8 (ft)	DRILL RIG: Solid-Stem Auger
COUNTY: Humboldt	SURFACE CONDITION: Fill	HAMMER TYPE: Automatic; 140 lbs; 30 in. drop
CLIENT: HCDPW	WATER DEPTH: Not Encountered	SAMPLER TYPE & SIZE: Bulk, MCAL (2.4" ID)
LOGGED BY: KBH	READING TAKEN: N/A	BOREHOLE DIAMETER: 4.5 in.
DEPTH OF BORING: 40.00 (ft)	HAMMER EFFICIENCY: 89.3 (%)	BACKFILL METHOD: Neat Cement Grout

FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
ELEVATION (ft)	DEPTH (ft)	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE			
1690	1	Bulk 1					CLAYEY SAND with GRAVEL (SC); medium dense; gray to brown; dry to moist; mostly coarse to fine SAND; some coarse to fine, subangular to subrounded GRAVEL; little fines; [FILL].	100									
1689	2																
1688	3	1	4	20			Brown; fine subrounded GRAVEL.	100									Bulk 2 sample obtained at 2.5' to 4'
1687	4		10														
1686	5																
1685	6	2	5	15			Loose; moist; coarse to fine, subangular to subrounded GRAVEL.	50			9.0	116.1	25				
1684	7		6														
1683	8		9				CLAYEY SAND (SC); medium dense; brown; moist; mostly medium to fine SAND; some medium plasticity fines; few fine subrounded GRAVEL; [FILL].	61		16	38	9.7	110.5	34			
1682	9		7	16													
1681	10		9														
1680	11	4	5	12			Loose.	50									
1679	12		6														
1678	13		4				CLAYEY SAND with GRAVEL (SC); loose; brown; moist; mostly coarse to fine SAND; little coarse to fine, subangular to subrounded GRAVEL; little fines; [FILL].	50									
1677	14		4	8													
1676	15		4														
1675	16	6	6	14			Grayish brown; some fines.	50			11.1	125.1	22				
1674	17		8														
1673	18																
1672	19																
1671	20																
1670	21	7	4	13			Fine subrounded GRAVEL.	78									
1669	22		7				Poorly-graded GRAVEL with CLAY and SAND (GP-GC); loose; brown and gray; dry to moist; mostly fine subrounded GRAVEL; little medium to fine SAND; few fines; [FILL].										
1668	23		6														Driller notes harder drilling at 23'
1667	24						CLAYEY GRAVEL with SAND (GC); dense; gray; wet; mostly coarse to fine, subangular GRAVEL; little coarse to fine SAND; some fines.										
1666	25																
1665	26	8	9	46													Hard drilling and grinding from 25 to 30'
1664	27		21								9.3	136.1					
1663	28		25				SEDIMENTARY ROCK (Argillite); blackish gray; intensely to moderately weathered; moderately soft.										



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PROJECT NO: 19-574.4
 PROJECT: Alderpoint Road PM 42.00-42.30
 BORING: A-21-004
 ENTRY BY: MNA
 CHECKED BY: KBH

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					DRILL METHOD CASING DEPTH	REMARKS	
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	RQD (%)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)			D. DENSITY (PCF)	% PASSING 200 SIEVE
1661	30		9	9			SEDIMENTARY ROCK (Argillite); (continued)	39								Driller notes soft drilling from 30 to 35'; straight drill to 40', driller notes interbedded softer and harder layers
1660	31			10	20		Decomposed; soft to very soft; (CLAYEY SAND with GRAVEL (SC); medium dense; gray; moist to wet; mostly coarse to fine SAND; some fines; little fine, subangular GRAVEL)				11.9	127.2				
1659	32															Driller unable to clean out hole for sample due to formation caving in
1658	33															
1657	34															
1656	35															
1655	36															
1654	37															
1653	38															
1652	39															
1651	40						Bottom of borehole at 40.0 ft bgs									
1650	41															
1649	42															
1648	43															
1647	44															
1646	45															
1645	46															
1644	47															
1643	48															
1642	49															
1641	50															
1640	51															
1639	52															
1638	53															
1637	54															
1636	55															
1635	56															
1634	57															
1633	58															
1632	59															
1631	60															
1630	61															
1629	62															
1628	63															



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PROJECT NO: 19-574.4
 PROJECT: Alderpoint Road PM 42.00-42.30
 BORING: A-21-004
 ENTRY BY: MNA
 CHECKED BY: KBH

LOG OF BORING A-21-005

PROJECT NO: 19-574.4	BEGIN DATE: 03/19/2021	DRILLING CONTRACTOR: Geo-Ex Subsurface Exploration
PROJECT: Alderpoint Road PM 42.00-42.30	COMPLETION DATE: 03/19/2021	DRILLING METHOD: CME 55 Truck
LOCATION: Bridgeville, CA	SURFACE ELEVATION: 1687.2 (ft)	DRILL RIG: Solid-Stem Auger
COUNTY: Humboldt	SURFACE CONDITION: Fill	HAMMER TYPE: Automatic; 140 lbs; 30 in. drop
CLIENT: HCDPW	WATER DEPTH: Not Encountered	SAMPLER TYPE & SIZE: MCAL (2.4" ID), SPT (1.4" ID)
LOGGED BY: KBH	READING TAKEN: N/A	BOREHOLE DIAMETER: 4.5 in.
DEPTH OF BORING: 51.50 (ft)	HAMMER EFFICIENCY: 89.3 (%)	BACKFILL METHOD: Neat Cement Grout

FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS	
ELEVATION (ft)	DEPTH (ft)	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE				
1686	1						CLAYEY SAND with GRAVEL (SC); medium dense; brown; dry to moist; mostly coarse to fine SAND; little coarse to fine, subangular to subrounded GRAVEL; little fines; [FILL].											
1685	2																	
1684	3	1	2	22														
1683	4		9															
1682	5	2	3	9				Gravels oxidized.										
1681	6		4					Loose; brown mottled with orange; moist; some fines coarse; subangular GRAVEL.				6.6	101.9					
1680	7		5															
1679	8	3	6	16				Medium dense; coarse to fine, subangular to subrounded GRAVEL.										
1678	9		7															
1677	10	4	4	15				CLAYEY GRAVEL with SAND (GC); loose; gray; moist; mostly coarse to fine, subangular GRAVEL; little coarse to fine SAND; little fines; [FILL].										
1676	11		7															
1675	12		8					CLAYEY SAND (SC); medium dense; brown; moist; mostly coarse to fine SAND; some fines; few fine, subangular GRAVEL; [FILL].										
1674	13	5	9	29														
1673	14		10					Brown mottled with orange and gray; subangular GRAVEL.				10.8	125.7					
1672	15	6	11	38														
1671	16		17					Subangular to subrounded GRAVEL.										
1670	17		21															
1669	18																	
1668	19							CLAYEY GRAVEL (GC); medium dense; brown mottled with orange; moist; some coarse to fine, subangular to subrounded GRAVEL; some coarse to fine SAND; little fines;; [FILL].										
1667	20	7	13	24														
1666	21		12									16	33	7.6	121.7	26		
1665	22		12															
1664	23																	
1663	24							CLAYEY SAND (SC); medium dense; gray; moist; mostly coarse to fine SAND; some fines.										
1662	25	8	5	18														Driller notes harder drilling at 25'
1661	26		8															
1660	27		10															
1659	28							SEDIMENTARY ROCK (Argillite); grayish black; decomposed; very soft to soft; (CLAYEY SAND (SC)); hard; moist; mostly fines; some fine SAND).										

Chem. Analysis @ 8.50'.
pH=7.16
Min. Res.=2,950 ohm-cm
Chloride=2.7 ppm
Sulfate=39.3 ppm

Driller notes harder drilling at 25'

Driller notes harder drilling at 29'



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PROJECT NO: 19-574.4
PROJECT: Alderpoint Road PM 42.00-42.30
BORING: A-21-005
ENTRY BY: MNA
CHECKED BY: KBH
SHEET # 1 of 2

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE			
1657	30	X	9	5			SEDIMENTARY ROCK (Argillite); (continued)	94							A			
1656	31			10 17	27	+4.5						13.2	126.0					
1655	32																	
1654	33						Intensely weathered; soft.	89						A				
1653	34																	
1652	35	X	10	13 24 19	43	+4.5												
1651	36						Dark gray mottled with greenish blue.	83						A				
1650	37																	
1649	38																	
1648	39						Moderately weathered; soft to moderately soft.	100						A				
1647	40	X	11	6 11 17	28	+4.5												
1646	41																	
1645	42						Bottom of borehole at 51.5 ft bgs							A				
1644	43																	
1643	44																	
1642	45	X	12	14 19 19	38	+4.5								A				
1641	46																	
1640	47																	
1639	48													A				
1638	49																	
1637	50	X	13	9 13 25	38													
1636	51													A				
1635	52																	
1634	53																	
1633	54													A				
1632	55																	
1631	56																	
1630	57													A				
1629	58																	
1628	59																	
1627	60													A				
1626	61																	
1625	62																	
1624	63													A				



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PROJECT NO: 19-574.4
 PROJECT: Alderpoint Road PM 42.00-42.30
 BORING: A-21-005
 ENTRY BY: MNA
 CHECKED BY: KBH

LOG OF BORING A-21-006

PROJECT NO: 19-574.4	BEGIN DATE: 03/20/2021	DRILLING CONTRACTOR: Geo-Ex Subsurface Exploration
PROJECT: Alderpoint Road PM 42.00-42.30	COMPLETION DATE: 03/21/2021	DRILLING METHOD: CME 55 Truck
LOCATION: Bridgeville, CA	SURFACE ELEVATION: 1686.4 (ft)	DRILL RIG: Solid-Stem Auger
COUNTY: Humboldt	SURFACE CONDITION: Fill	HAMMER TYPE: Automatic; 140 lbs; 30 in. drop
CLIENT: HCDPW	WATER DEPTH: Not Encountered	SAMPLER TYPE & SIZE: MCAL (2.4" ID)
LOGGED BY: KBH	READING TAKEN: N/A	BOREHOLE DIAMETER: 4.5 in.
DEPTH OF BORING: 30.80 (ft)	HAMMER EFFICIENCY: 89.3 (%)	BACKFILL METHOD: Neat Cement Grout

FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS	
ELEVATION (ft)	DEPTH (ft)	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE				
1686	1						CLAYEY SAND with GRAVEL (SC); medium dense; grayish brown; moist; mostly coarse to fine SAND; some fines; little subangular, subrounded GRAVEL; [FILL].											
1685	2																	
1684	3	1	4	10														
1683	4		4															
1682	5		6															
1681	6	2	5	7				Very loose. Brown; subangular GRAVEL.	50				7.9	100.3				
1680	7		3															
1679	8		4															
1678	9	3	2	5				CLAYEY GRAVEL with SAND (GC); loose; brown mottled with gray and orange; mostly coarse to fine GRAVEL; some coarse to fine SAND; little fines.	44		17	32			21			
1677	10		2															
1676	11	4	4	11				CLAYEY SAND with GRAVEL (SC); loose; reddish brown; mostly coarse to fine SAND; some fines; little subangular GRAVEL.	50				13.5	119.9				
1675	12		5															
1674	13	5	3	18	1.25			Lean CLAY with SAND (CL); stiff; brown mottled with green; moist; mostly medium plasticity, medium toughness fines; little fine SAND.	56				27.1	95.0				Torvane = 0.65 tsf
1673	14		6															
1672	15		12															
1671	16	6	6	25	+4.5			SANDY fat CLAY (CH); hard; multicolored dark brown and light brown; moist; mostly high plasticity, high toughness fines; some fine SAND.	50		23	55	19.7	104.3	61			UC @ 13.5': Strength=2,376 psf Strain at Failure = 3.5% Chemical Analysis @ 14': pH=7.14 Min. Res. = 720 ohm-cm Chloride = 7.2 ppm Sulfate = 104.1 ppm
1670	17		10															
1669	18		15															
1668	19																	
1667	20							Lean CLAY with SAND (CL); very stiff; brown mottled with orange; moist; mostly medium plasticity, medium toughness fines.; little fine SAND.										
1666	21	7	7	31	3.00				61									Torvane = 1.63 tsf
1665	22		12															
1664	23		19										17.8	114.1				
1663	24																	
1662																		



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PROJECT NO: 19-574.4
PROJECT: Alderpoint Road PM 42.00-42.30
BORING: A-21-006
ENTRY BY: MNA
CHECKED BY: KBH

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
		SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE			
1661	25	8	11	41	3.50	[Hatched pattern]	Lean CLAY with SAND (CL); <i>(continued)</i>	78							[Hatched pattern]	Torvane = 1.25 tsf	
1660	26		21				20										Grayish brown; few coarse to fine, subangular to subrounded GRAVEL.
1659	27					[Hatched pattern]	SEDIMENTARY ROCK (Argillite); gray; moderately weathered; moderately soft; (dry).								[Hatched pattern]	Driller notes harder drilling from 25 to 30'	
1658	28																
1657	29															Sampler rebounding	
1656	30	9	10	50/4	50/4			30									
1655	31						Bottom of borehole at 30.8 ft bgs										
1654	32																
1653	33																
1652	34																
1651	35																
1650	36																
1649	37																
1648	38																
1647	39																
1646	40																
1645	41																
1644	42																
1643	43																
1642	44																
1641	45																
1640	46																
1639	47																
1638	48																
1637	49																
1636	50																
1635	51																
1634	52																
1633	53																
1632	54																



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PROJECT NO: 19-574.4
 PROJECT: Alderpoint Road PM 42.00-42.30
 BORING: A-21-006
 ENTRY BY: MNA
 CHECKED BY: KBH

LOG OF BORING A-21-007

PROJECT NO: 19-574.4

BEGIN DATE: 03/15/2021

DRILLING CONTRACTOR: Clear Heart Drilling

PROJECT: Alderpoint Road PM 42.00-42.30

COMPLETION DATE: 03/15/2021

DRILLING METHOD: Portable Rig

LOCATION: Bridgeville, CA

SURFACE ELEVATION: 1707.2 (ft)

DRILL RIG: Solid-Stem Auger

COUNTY: Humboldt

SURFACE CONDITION: Fill

HAMMER TYPE: Automatic; 140 lbs; 30 in. drop

CLIENT: HCDPW

WATER DEPTH: 15.9 ft

SAMPLER TYPE & SIZE: MCAL (2.4" ID), SPT (1.4" ID)

LOGGED BY: YYG

READING TAKEN: 03/15/21

BOREHOLE DIAMETER: 4.0 in.

DEPTH OF BORING: 20.42 (ft)

HAMMER EFFICIENCY: 60 (%)

BACKFILL METHOD: Monitoring Well Constructed

FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
ELEVATION (ft)	DEPTH (ft)	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE			
1706	1															Easy Drilling from 0-5'	
1705	2						Poorly-graded GRAVEL (GP); very loose; gray; moist; mostly GRAVEL; few medium to coarse SAND; trace fines; [FILL].										
1704	3	1	3	7				78									
1703	4		3														
1702	5	2	5														
1701	6		6	11													
1700	7		5									9.4	112.7	15			Easy drilling from 5-10'
1699	8	3	8	20													
1698	9		11														
1697	10		9														
1696	11	4	7	30													
1695	12		12														
1694	13		18														
1693	14																
1692	15	5	5														
1691	16		7	15													
1690	17		8									17	34	10.8	124.2	17	
1689	18																
1688	19																
1687	20	6	50/5	REF													
1686	21							80			14.1	122.8				hard drilling at 20'	
1685	22																
1684	23																
1683	24																
1682	25																
1681	26																
1680	27																
1679	28																

Piezometer Details:
 - "Stove Pipe" well box at surface (elev.: 1707.17)
 - 1" blank PVC pipe (+2.86'-6')
 - 1" screened PVC pipe (6'-21')
 - Backfill: cement grout (0.5'-3'), bentonite chips (3'-4'), sand (4'-21')



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PROJECT NO: 19-574.4
 PROJECT: Alderpoint Road PM 42.00-42.30
 BORING: A-21-007
 ENTRY BY: MNA
 CHECKED BY: KBH
 SHEET # 1 of 1

LOG OF BORING A-21-008

PROJECT NO: 19-574.4

BEGIN DATE: 03/16/2021

DRILLING CONTRACTOR: Clear Heart Drilling

PROJECT: Alderpoint Road PM 42.00-42.30

COMPLETION DATE: 03/16/2021

DRILLING METHOD: Portable Rig

LOCATION: Bridgeville, CA

SURFACE ELEVATION: 1703.6 (ft)

DRILL RIG: Soild-Stem Auger

COUNTY: Humboldt

SURFACE CONDITION: Soil

HAMMER TYPE: Automatic; 140 lbs; 30 in. drop

CLIENT: HCDPW

WATER DEPTH: 12.9 ft

SAMPLER TYPE & SIZE: MCAL (2.4" ID), SPT (1.4" ID)

LOGGED BY: YYG

READING TAKEN: 03/16/21

BOREHOLE DIAMETER: 4.0 in.

DEPTH OF BORING: 29.75 (ft)

HAMMER EFFICIENCY: 60 (%)

BACKFILL METHOD: Neat Cement Grout

FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
ELEVATION (ft)	DEPTH (ft)	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE			
1703	1					CLAYEY SAND with GRAVEL (SC); loose; gray; moist; mostly coarse to fine SAND; some fines; some fine GRAVEL.									Easy drilling from 0-5'		
1702	2																
1701	3	1	4	12		Poorly-graded SAND with CLAY and GRAVEL (SP-SC); loose; dark gray; mostly coarse to fine SAND; little GRAVEL; few fines.	89								28		
1700	4		5														
1699	5		7			Poorly-graded GRAVEL with CLAY and SAND (GP-GC); loose; grayish brown; moist; mostly coarse to fine GRAVEL; some SAND; few fines.	67										
1698	6	2	3	9													
1697	7		6			CLAYEY SAND with GRAVEL (SC); medium dense; gray; moist; mostly coarse to fine SAND; some fines; some coarse to fine GRAVEL.											
1696	8	3	7	23			56										
1695	9		9			Dry to moist.									Hard drilling at 9'		
1694	10		14														
1693	11	4	7	18		Wet. Moist.	67								Chem Analysis @ 11.50': pH=7.11 Min.Res.=3,480 ohm-cm Chloride=2.6 ppm Sulfate=12.4 ppm Hard drilling at 12.5'		
1692	12		9														
1691	13		9			Easy drilling from 15-20'											
1690	14																
1689	15					Easy drilling from 15-20'											
1688	16	5	8	21			33										
1687	17		9			Wet. Moist.											
1686	18		12					17	33								
1685	19					Wet. Moist.											
1684	20																
1683	21	6	18	25		Wet. Moist.	33										
1682	22		14														
1681	23		11			Wet. Moist.											
1680	24																



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PROJECT NO: 19-574.4
PROJECT: Alderpoint Road PM 42.00-42.30
BORING: A-21-008
ENTRY BY: MNA
CHECKED BY: KBH
SHEET # 1 of 2

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE			
1678	25	7	8	22	51		CLAYEY SAND with GRAVEL (SC); <i>(continued)</i>	56										
1677	26			29			Dense; wet; fine SAND.											
1676	27																	
1675	28						SEDIMENTARY ROCK (Sandstone); gray; moderately weathered; moderately hard;											
1674	29						(Excavates as: CLAYEY GRAVEL with SAND (GC); very dense; wet; mostly coarse to fine GRAVEL; some fines; little SAND).											Hard drilling at 29'
1673	30	8	50/3	REF			Bottom of borehole at 29.8 ft bgs	100										
1672	31																	
1671	32																	
1670	33																	
1669	34																	
1668	35																	
1667	36																	
1666	37																	
1665	38																	
1664	39																	
1663	40																	
1662	41																	
1661	42																	
1660	43																	
1659	44																	
1658	45																	
1657	46																	
1656	47																	
1655	48																	
1654	49																	
1653	50																	
1652	51																	
1651	52																	
1650	53																	
	54																	



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PROJECT NO: 19-574.4
 PROJECT: Alderpoint Road PM 42.00-42.30
 BORING: A-21-008
 ENTRY BY: MNA
 CHECKED BY: KBH

LOG OF BORING A-21-009

PROJECT NO: 19-574.4

BEGIN DATE: 03/17/2021

DRILLING CONTRACTOR: Clear Heart Drilling

PROJECT: Alderpoint Road PM 42.00-42.30

COMPLETION DATE: 03/17/2021

DRILLING METHOD: DR8K Track

LOCATION: Bridgeville, CA

SURFACE ELEVATION: 1678.7 (ft)

DRILL RIG: Solid-Stem Auger

COUNTY: Humboldt

SURFACE CONDITION: Soil

HAMMER TYPE: Automatic; 140 lbs; 30 in. drop

CLIENT: HCDPW

WATER DEPTH: Not Encountered

SAMPLER TYPE & SIZE: MCAL (2.4" ID)

LOGGED BY: YYG

READING TAKEN: N/A

BOREHOLE DIAMETER: 4.0 in.

DEPTH OF BORING: 35.70 (ft)

HAMMER EFFICIENCY: 80.5 (%)

BACKFILL METHOD: Monitoring Well Constructed

FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS		
ELEVATION (ft)	DEPTH (ft)	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE					
1678	1						CLAYEY SAND with GRAVEL (SC); loose; gray; moist; mostly coarse to fine SAND; some fines; little GRAVEL.										Easy drilling from 0-10'		
1677	2																		
1676	3	1	6	13															
1675	4		8																
1674	5		5																
1673	6	2	4	11															
1672	7		6										8.0	16					
1671	8		5																
1670	9	3	11	19				Medium dense.										Rock pieces in sample	
1669	10		11																
1668	11	4	9	17				CLAYEY GRAVEL with SAND (GC); loose; gray and brown; moist; mostly medium to fine GRAVEL; some fines; some SAND.	67				9.5						
1667	12		8																
1666	13		9																
1665	14							CLAYEY SAND (SC); loose; gray and yellowish brown; moist; mostly coarse to fine SAND; some fines; trace GRAVEL.											Easy drilling from 15-35'
1664	15	5	5	15															
1663	16		6										16.6	118.1	36				
1662	17		9																
1661	18																		
1660	19																		
1659	20																		
1658	21	6	8	25				Medium dense; medium to fine SAND.	100										Chem. Analysis @ 20.5': pH=7.16 Min. Res.=860 ohm-cm Chloride=2.0 ppm Sulfate=186.5 ppm UC @ 21': Strength=1,339 psf Strain at failure=1.9%
1657	22		11										17	33	13.7			120.8	41
1656	23		14																
1655	24																		
1654	25																		
1653	26	7	6	23				Wet.	56										
1652	27		11					Poorly-graded SAND with GRAVEL (SP); medium dense; blueish gray; wet; mostly coarse to fine SAND; little gravel; trace fines.					16.2	115.5					
1651	28		12																
1650	29																		



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PROJECT NO: 19-574.4
PROJECT: Alderpoint Road PM 42.00-42.30
BORING: A-21-009
ENTRY BY: MNA
CHECKED BY: KBH
SHEET # 1 of 2

ELEVATION (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY(%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
		SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				RQD (%)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)				% PASSING 200 SIEVE
1649	30	8	10			Poorly-graded SAND with GRAVEL (SP); <i>(continued)</i> Gray.	22									
1648	31		16	40												
1647	32		24													
1646	33															
1645	34															
1644	35	9	37	50/3		SEDIMENTARY ROCK (Sandstone); gray; moderately weathered; moderately hard; intensely fractured; (Poorly-graded SAND with GRAVEL (SP); very dense; mostly coarse to fine SAND; little GRAVEL; trace fines.).	59			11.4	127.4					Boring caved after sampling
1643	36		50/3			Bottom of borehole at 35.7 ft bgs										
1642	37															
1641	38															
1640	39					Piezometer Details: - "Stove Pipe" well box at surface (elev.:1678.73) - 1" blank PVC pipe (+2.55'-12.5') - 1" screened PVC pipe (12.5'-32.5') - Backfill: cement grout (0.5'-8'), bentonite chips (8'-10'), sand (10'-32.5')										
1639	40															
1638	41															
1637	42															
1636	43															
1635	44															
1634	45															
1633	46															
1632	47															
1631	48															
1630	49															
1629	50															
1628	51															
1627	52															
1626	53															
1625	54															
1624	55															
1623	56															
1622	57															
1621	58															
1620	59															
1619	60															
1618	61															
1617	62															
1616	63															
1615																



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PROJECT NO: 19-574.4
 PROJECT: Alderpoint Road PM 42.00-42.30
 BORING: A-21-009
 ENTRY BY: MNA
 CHECKED BY: KBH

WILDCAT DYNAMIC CONE LOG

Crawford and Associates, Inc
 1100 Corporate Way, Suite 230
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PROJECT NUMBER: 19-574.4
 DATE STARTED: 03-25-2021
 DATE COMPLETED: 03-25-2021

HOLE #: D-21-010
 CREW: MNA/OMR
 PROJECT: Alderpoint Road PM 42.00-42.30
 ADDRESS: _____
 LOCATION: Bridgeville, CA

SURFACE ELEVATION: 1,703.0 ft
 WATER ON COMPLETION: N/A
 HAMMER WEIGHT: 35 lbs.
 CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		NON-COHESIVE	COHESIVE
-	1	4.4	.				1	VERY LOOSE	VERY SOFT
-	5	22.2	.....				6	LOOSE	MEDIUM STIFF
- 1 ft	7	31.1	.....				8	LOOSE	MEDIUM STIFF
-	4	17.8	.....				5	LOOSE	MEDIUM STIFF
-	4	17.8	.....				5	LOOSE	MEDIUM STIFF
- 2 ft	3	13.3	...				3	VERY LOOSE	SOFT
-	4	17.8	.....				5	LOOSE	MEDIUM STIFF
-	4	17.8	.....				5	LOOSE	MEDIUM STIFF
- 3 ft	6	26.6	.....				7	LOOSE	MEDIUM STIFF
- 1 m	6	26.6	.....				7	LOOSE	MEDIUM STIFF
-	5	19.3	.....				5	LOOSE	MEDIUM STIFF
- 4 ft	6	23.2	.....				6	LOOSE	MEDIUM STIFF
-	9	34.7	.....				9	LOOSE	STIFF
-	9	34.7	.....				9	LOOSE	STIFF
- 5 ft	12	46.3	.....				13	MEDIUM DENSE	STIFF
-	10	38.6	.....				11	MEDIUM DENSE	STIFF
-	9	34.7	.....				9	LOOSE	STIFF
- 6 ft	8	30.9	.....				8	LOOSE	MEDIUM STIFF
-	8	30.9	.....				8	LOOSE	MEDIUM STIFF
- 2 m	5	19.3	.....				5	LOOSE	MEDIUM STIFF
- 7 ft	4	13.7	...				3	VERY LOOSE	SOFT
-	3	10.3	..				2	VERY LOOSE	SOFT
-	4	13.7	...				3	VERY LOOSE	SOFT
- 8 ft	21	71.8	.....				20	MEDIUM DENSE	VERY STIFF
-	40	136.8	.....				25+	DENSE	HARD
-	44	150.5	.....				25+	DENSE	HARD
- 9 ft	100	342.0	.....				25+	VERY DENSE	HARD
-	50	171.0	.....				25+	DENSE	HARD
- 3 m	10 ft								
-	11 ft								
-	12 ft								
- 4 m	13 ft								

WILDCAT DYNAMIC CONE LOG

Crawford and Associates, Inc
 1100 Corporate Way, Suite 230
 Sacramento, CA, 95831

PROJECT NUMBER: 19-574.4
 DATE STARTED: 03-25-2021
 DATE COMPLETED: 03-25-2021

HOLE #: D-21-012
 CREW: MNA/OMR
 PROJECT: Alderpoint Road PM 42.00-42.30
 ADDRESS: _____
 LOCATION: Bridgeville, CA

SURFACE ELEVATION: 1,695.9 ft
 WATER ON COMPLETION: N/A
 HAMMER WEIGHT: 35 lbs.
 CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		NON-COHESIVE	COHESIVE
-	1	4.4	•				1	VERY LOOSE	VERY SOFT
-	1	4.4	•				1	VERY LOOSE	VERY SOFT
-	1 ft	4.4	•				1	VERY LOOSE	VERY SOFT
-	2	8.9	••				2	VERY LOOSE	SOFT
-	2	8.9	••				2	VERY LOOSE	SOFT
-	2 ft	17.8	••••				5	LOOSE	MEDIUM STIFF
-	6	26.6	•••••				7	LOOSE	MEDIUM STIFF
-	4	17.8	••••				5	LOOSE	MEDIUM STIFF
-	3 ft	17.8	••••				5	LOOSE	MEDIUM STIFF
-	1 m	17.8	••••				5	LOOSE	MEDIUM STIFF
-	6	23.2	•••••				6	LOOSE	MEDIUM STIFF
-	4 ft	15.4	••••				4	VERY LOOSE	SOFT
-	4	15.4	••••				4	VERY LOOSE	SOFT
-	5 ft	19.3	••••				5	LOOSE	MEDIUM STIFF
-	4	15.4	••••				4	VERY LOOSE	SOFT
-	10	38.6	••••••••				11	MEDIUM DENSE	STIFF
-	9	34.7	•••••••				9	LOOSE	STIFF
-	6 ft	30.9	••••••				8	LOOSE	MEDIUM STIFF
-	7	27.0	••••••				7	LOOSE	MEDIUM STIFF
-	2 m	27.0	••••••				7	LOOSE	MEDIUM STIFF
-	7 ft	41.0	••••••••				11	MEDIUM DENSE	STIFF
-	10	34.2	•••••••				9	LOOSE	STIFF
-	6	20.5	••••				5	LOOSE	MEDIUM STIFF
-	8 ft	20.5	••••				5	LOOSE	MEDIUM STIFF
-	4	13.7	•••				3	VERY LOOSE	SOFT
-	8	27.4	••••••				7	LOOSE	MEDIUM STIFF
-	9 ft	17.1	••••				4	VERY LOOSE	SOFT
-	3	10.3	••				2	VERY LOOSE	SOFT
-	4	13.7	•••				3	VERY LOOSE	SOFT
-	3 m	10.3	••				2	VERY LOOSE	SOFT
-	5	15.3	••••				4	VERY LOOSE	SOFT
-	6	18.4	••••				5	LOOSE	MEDIUM STIFF
-	11 ft	21.4	•••••				6	LOOSE	MEDIUM STIFF
-	16	49.0	••••••••••				13	MEDIUM DENSE	STIFF
-	18	55.1	••••••••••				15	MEDIUM DENSE	STIFF
-	12 ft	104.0	••••••••••••••••••••				25+	MEDIUM DENSE	VERY STIFF
-	31	94.9	••••••••••••••••				25+	MEDIUM DENSE	VERY STIFF
-	16	49.0	••••••••				13	MEDIUM DENSE	STIFF
-	13 ft	36.7	•••••••				10	LOOSE	STIFF
-	4 m	39.8	•••••••				11	MEDIUM DENSE	STIFF
-	16	44.3	•••••••				12	MEDIUM DENSE	STIFF

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		NON-COHESIVE	COHESIVE
- 14 ft	13	36.0	.....				10	LOOSE	STIFF
-	14	38.8	.....				11	MEDIUM DENSE	STIFF
-	16	44.3	.....				12	MEDIUM DENSE	STIFF
- 15 ft	17	47.1	.....				13	MEDIUM DENSE	STIFF
-	17	47.1	.....				13	MEDIUM DENSE	STIFF
-	20	55.4	.....				15	MEDIUM DENSE	STIFF
- 16 ft	34	94.2	.....				25+	MEDIUM DENSE	VERY STIFF
-	48	133.0	.....				25+	DENSE	HARD
- 5 m	88	243.8	.....				25+	VERY DENSE	HARD
- 17 ft	58	147.3	.....				25+	DENSE	HARD
-	52	132.1	.....				25+	DENSE	HARD
-	39	99.1	.....				25+	MEDIUM DENSE	VERY STIFF
- 18 ft	24	61.0	.....				17	MEDIUM DENSE	VERY STIFF
-	26	66.0	.....				18	MEDIUM DENSE	VERY STIFF
-	47	119.4	.....				25+	DENSE	HARD
- 19 ft	61	154.9	.....				25+	DENSE	HARD
-	70	177.8	.....				25+	DENSE	HARD
-	55	139.7	.....				25+	DENSE	HARD
- 6 m	20 ft	50	.....				25+	DENSE	HARD
-	21 ft								
-	22 ft								
-	23 ft								
- 7 m									
-	24 ft								
-	25 ft								
-	26 ft								
- 8 m									
-	27 ft								
-	28 ft								
-	29 ft								
- 9 m	30 ft								

WILDCAT DYNAMIC CONE LOG

Crawford and Associates, Inc
 1100 Corporate Way, Suite 230
 Sacramento, CA, 95831

PROJECT NUMBER: 19-574.4
 DATE STARTED: 03-25-2021
 DATE COMPLETED: 03-25-2021

HOLE #: D-21-013
 CREW: MNA/OMR
 PROJECT: Alderpoint Road PM 42.00-42.30
 ADDRESS: _____
 LOCATION: Bridgeville, CA

SURFACE ELEVATION: 1,698.0 ft
 WATER ON COMPLETION: N/A
 HAMMER WEIGHT: 35 lbs.
 CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		NON-COHESIVE	COHESIVE
-	2	8.9	••				2	VERY LOOSE	SOFT
-	1	4.4	•				1	VERY LOOSE	VERY SOFT
- 1 ft	4	17.8	••••				5	LOOSE	MEDIUM STIFF
-	5	22.2	•••••				6	LOOSE	MEDIUM STIFF
-	6	26.6	••••••				7	LOOSE	MEDIUM STIFF
- 2 ft	11	48.8	••••••••••				13	MEDIUM DENSE	STIFF
-	5	22.2	•••••				6	LOOSE	MEDIUM STIFF
-	4	17.8	••••				5	LOOSE	MEDIUM STIFF
- 3 ft	4	17.8	••••				5	LOOSE	MEDIUM STIFF
- 1 m	8	35.5	•••••••				10	LOOSE	STIFF
-	8	30.9	••••••				8	LOOSE	MEDIUM STIFF
- 4 ft	21	81.1	••••••••••••••				23	MEDIUM DENSE	VERY STIFF
-	18	69.5	••••••••••••				19	MEDIUM DENSE	VERY STIFF
-	16	61.8	•••••••••••				17	MEDIUM DENSE	VERY STIFF
- 5 ft	34	131.2	••••••••••••••••••••				25+	DENSE	HARD
-	27	104.2	••••••••••••••••				25+	MEDIUM DENSE	VERY STIFF
-	19	73.3	••••••••••••••				20	MEDIUM DENSE	VERY STIFF
- 6 ft	13	50.2	••••••••••				14	MEDIUM DENSE	STIFF
-	8	30.9	••••••				8	LOOSE	MEDIUM STIFF
- 2 m	7	27.0	•••••				7	LOOSE	MEDIUM STIFF
- 7 ft	10	34.2	••••••				9	LOOSE	STIFF
-	10	34.2	••••••				9	LOOSE	STIFF
-	9	30.8	•••••				8	LOOSE	MEDIUM STIFF
- 8 ft	12	41.0	•••••••				11	MEDIUM DENSE	STIFF
-	15	51.3	••••••••				14	MEDIUM DENSE	STIFF
-	15	51.3	••••••••				14	MEDIUM DENSE	STIFF
- 9 ft	61	208.6	••••••••••••••••••••				25+	VERY DENSE	HARD
-	158	540.4	••••••••••~••••••••••				25+	VERY DENSE	HARD
-	37	126.5	••••~••••••••••••••••				25+	DENSE	HARD
- 3 m	10 ft	24	82.1	••••••••••••••			23	MEDIUM DENSE	VERY STIFF
-	25	76.5	••••~••••••••••••••				21	MEDIUM DENSE	VERY STIFF
-	17	52.0	••••~••••••••••				14	MEDIUM DENSE	STIFF
- 11 ft	17	52.0	••••~••••~••••~••••				14	MEDIUM DENSE	STIFF
-	24	73.4	••••~••••~••••~••••				20	MEDIUM DENSE	VERY STIFF
-	22	67.3	••••~••••~••••~••••				19	MEDIUM DENSE	VERY STIFF
- 12 ft	17	52.0	••••~••••~••••~••••				14	MEDIUM DENSE	STIFF
-	19	58.1	••••~••••~••••~••••				16	MEDIUM DENSE	VERY STIFF
-	19	58.1	••••~••••~••~•~••~•				16	MEDIUM DENSE	VERY STIFF
- 13 ft	20	61.2	••••~••••~••~•~••~•				17	MEDIUM DENSE	VERY STIFF
- 4 m	22	67.3	••••~••••~••~•~••~•				19	MEDIUM DENSE	VERY STIFF
-	29	80.3	••••~••••~••~•~••~•				22	MEDIUM DENSE	VERY STIFF

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY	
					NON-COHESIVE	COHESIVE
- 14 ft	18	49.9	.....	14	MEDIUM DENSE	STIFF
-	17	47.1	.....	13	MEDIUM DENSE	STIFF
-	17	47.1	.....	13	MEDIUM DENSE	STIFF
- 15 ft	20	55.4	.....	15	MEDIUM DENSE	STIFF
-	23	63.7	.....	18	MEDIUM DENSE	VERY STIFF
-	21	58.2	.....	16	MEDIUM DENSE	VERY STIFF
- 16 ft	129	357.3	.....	25+	VERY DENSE	HARD
-	50	138.5	.....	25+	DENSE	HARD
- 5 m						
- 17 ft						
-						
- 18 ft						
-						
- 19 ft						
-						
- 6 m						
- 20 ft						
-						
- 21 ft						
-						
- 22 ft						
-						
- 23 ft						
- 7 m						
- 24 ft						
-						
- 25 ft						
-						
- 26 ft						
- 8 m						
- 27 ft						
-						
- 28 ft						
-						
- 29 ft						
-						
- 9 m						
- 30 ft						

WILDCAT DYNAMIC CONE LOG

Crawford and Associates, Inc
 1100 Corporate Way, Suite 230
 Sacramento, CA, 95831

PROJECT NUMBER: 19-574.4
 DATE STARTED: 03-24-2021
 DATE COMPLETED: 03-24-2021

HOLE #: D-21-014
 CREW: MNA/OMR
 PROJECT: Alderpoint Road PM 42.00-42.30
 ADDRESS: _____
 LOCATION: Bridgeville, CA

SURFACE ELEVATION: 1,679.8 ft
 WATER ON COMPLETION: N/A
 HAMMER WEIGHT: 35 lbs.
 CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		NON-COHESIVE	COHESIVE
-	2	8.9	••				2	VERY LOOSE	SOFT
-	2	8.9	••				2	VERY LOOSE	SOFT
- 1 ft	1	4.4	•				1	VERY LOOSE	VERY SOFT
-	2	8.9	••				2	VERY LOOSE	SOFT
-	3	13.3	•••				3	VERY LOOSE	SOFT
- 2 ft	2	8.9	••				2	VERY LOOSE	SOFT
-	4	17.8	••••				5	LOOSE	MEDIUM STIFF
-	3	13.3	•••				3	VERY LOOSE	SOFT
- 3 ft	3	13.3	•••				3	VERY LOOSE	SOFT
- 1 m	3	13.3	•••				3	VERY LOOSE	SOFT
-	5	19.3	••••				5	LOOSE	MEDIUM STIFF
- 4 ft	6	23.2	•••••				6	LOOSE	MEDIUM STIFF
-	6	23.2	•••••				6	LOOSE	MEDIUM STIFF
-	6	23.2	•••••				6	LOOSE	MEDIUM STIFF
- 5 ft	8	30.9	••••••				8	LOOSE	MEDIUM STIFF
-	5	19.3	••••				5	LOOSE	MEDIUM STIFF
-	4	15.4	••••				4	VERY LOOSE	SOFT
- 6 ft	5	19.3	••••				5	LOOSE	MEDIUM STIFF
-	6	23.2	•••••				6	LOOSE	MEDIUM STIFF
- 2 m	5	19.3	••••				5	LOOSE	MEDIUM STIFF
- 7 ft	5	17.1	••••				4	VERY LOOSE	SOFT
-	6	20.5	••••				5	LOOSE	MEDIUM STIFF
-	5	17.1	••••				4	VERY LOOSE	SOFT
- 8 ft	5	17.1	••••				4	VERY LOOSE	SOFT
-	7	23.9	•••••				6	LOOSE	MEDIUM STIFF
-	8	27.4	••••••				7	LOOSE	MEDIUM STIFF
- 9 ft	7	23.9	•••••				6	LOOSE	MEDIUM STIFF
-	5	17.1	••••				4	VERY LOOSE	SOFT
-	5	17.1	••••				4	VERY LOOSE	SOFT
- 3 m 10 ft	6	20.5	••••				5	LOOSE	MEDIUM STIFF
-	5	15.3	••••				4	VERY LOOSE	SOFT
-	10	30.6	••••••				8	LOOSE	MEDIUM STIFF
- 11 ft	11	33.7	•••••••				9	LOOSE	STIFF
-	7	21.4	•••••				6	LOOSE	MEDIUM STIFF
-	6	18.4	••••				5	LOOSE	MEDIUM STIFF
- 12 ft	9	27.5	•••••				7	LOOSE	MEDIUM STIFF
-	14	42.8	••••••••				12	MEDIUM DENSE	STIFF
-	10	30.6	•••••				8	LOOSE	MEDIUM STIFF
- 13 ft	10	30.6	•••••				8	LOOSE	MEDIUM STIFF
- 4 m	8	24.5	•••••				6	LOOSE	MEDIUM STIFF
-	9	24.9	•••••				7	LOOSE	MEDIUM STIFF

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		NON-COHESIVE	COHESIVE
- 14 ft	9	24.9	.....				7	LOOSE	MEDIUM STIFF
-	13	36.0	.....				10	LOOSE	STIFF
-	17	47.1	.....				13	MEDIUM DENSE	STIFF
- 15 ft	16	44.3	.....				12	MEDIUM DENSE	STIFF
-	14	38.8	.....				11	MEDIUM DENSE	STIFF
-	23	63.7	.....				18	MEDIUM DENSE	VERY STIFF
- 16 ft	18	49.9	.....				14	MEDIUM DENSE	STIFF
-	12	33.2	.....				9	LOOSE	STIFF
- 5 m	11	30.5	.....				8	LOOSE	MEDIUM STIFF
- 17 ft	11	27.9	.....				7	LOOSE	MEDIUM STIFF
-	13	33.0	.....				9	LOOSE	STIFF
-	18	45.7	.....				13	MEDIUM DENSE	STIFF
- 18 ft	20	50.8	.....				14	MEDIUM DENSE	STIFF
-	20	50.8	.....				14	MEDIUM DENSE	STIFF
-	18	45.7	.....				13	MEDIUM DENSE	STIFF
- 19 ft	31	78.7	.....				22	MEDIUM DENSE	VERY STIFF
-	82	208.3	.....				25+	VERY DENSE	HARD
- 6 m	120	304.8	.....				25+	VERY DENSE	HARD
- 20 ft									
- 21 ft									
- 22 ft									
- 23 ft									
- 7 m									
- 24 ft									
- 25 ft									
- 26 ft									
- 8 m									
- 27 ft									
- 28 ft									
- 29 ft									
- 9 m									
- 30 ft									

WILDCAT DYNAMIC CONE LOG

Crawford and Associates, Inc
 1100 Corporate Way, Suite 230
 Sacramento, CA, 95831

PROJECT NUMBER: 19-574.4
 DATE STARTED: 03-24-2021
 DATE COMPLETED: 03-24-2021

HOLE #: D-21-015
 CREW: MNA/OMR
 PROJECT: Alderpoint Road PM 42.00-42.30
 ADDRESS: _____
 LOCATION: Bridgeville, CA

SURFACE ELEVATION: 1,668.3 ft
 WATER ON COMPLETION: N/A
 HAMMER WEIGHT: 35 lbs.
 CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		NON-COHESIVE	COHESIVE
-	1	4.4	•				1	VERY LOOSE	VERY SOFT
-	1	4.4	•				1	VERY LOOSE	VERY SOFT
-	1 ft	4.4	•				1	VERY LOOSE	VERY SOFT
-	2	8.9	••				2	VERY LOOSE	SOFT
-	1	4.4	•				1	VERY LOOSE	VERY SOFT
-	2 ft	4.4	•				1	VERY LOOSE	VERY SOFT
-	1	4.4	•				1	VERY LOOSE	VERY SOFT
-	3	13.3	•••				3	VERY LOOSE	SOFT
-	3 ft	22.2	•••••				6	LOOSE	MEDIUM STIFF
-	1 m	17.8	•••••				5	LOOSE	MEDIUM STIFF
-	3	11.6	•••				3	VERY LOOSE	SOFT
-	4 ft	19.3	•••••				5	LOOSE	MEDIUM STIFF
-	6	23.2	•••••				6	LOOSE	MEDIUM STIFF
-	5 ft	30.9	•••••••				8	LOOSE	MEDIUM STIFF
-	8	30.9	•••••••				8	LOOSE	MEDIUM STIFF
-	4	15.4	••••				4	VERY LOOSE	SOFT
-	4	15.4	••••				4	VERY LOOSE	SOFT
-	6 ft	27.0	•••••••				7	LOOSE	MEDIUM STIFF
-	8	30.9	•••••••				8	LOOSE	MEDIUM STIFF
-	2 m	46.3	••••••••••				13	MEDIUM DENSE	STIFF
-	7 ft	17.1	••••				4	VERY LOOSE	SOFT
-	4	13.7	•••				3	VERY LOOSE	SOFT
-	6	20.5	•••••				5	LOOSE	MEDIUM STIFF
-	8 ft	17.1	••••				4	VERY LOOSE	SOFT
-	3	10.3	••				2	VERY LOOSE	SOFT
-	4	13.7	•••				3	VERY LOOSE	SOFT
-	9 ft	23.9	•••••				6	LOOSE	MEDIUM STIFF
-	10	34.2	•••••••				9	LOOSE	STIFF
-	10	34.2	•••••••				9	LOOSE	STIFF
-	3 m	44.5	••••••••••				12	MEDIUM DENSE	STIFF
-	11	33.7	•••••••				9	LOOSE	STIFF
-	12	36.7	•••••••				10	LOOSE	STIFF
-	11 ft	33.7	•••••••				9	LOOSE	STIFF
-	21	64.3	••••••••••••				18	MEDIUM DENSE	VERY STIFF
-	36	110.2	••••••••••••••••				25+	DENSE	HARD
-	12 ft	76.5	••••••••••••••				21	MEDIUM DENSE	VERY STIFF
-	25	76.5	••••••••••~				21	MEDIUM DENSE	VERY STIFF
-	57	174.4	••••••••••••••••••••				25+	DENSE	HARD
-	13 ft	165.2	••••••~				25+	DENSE	HARD
-	4 m	113.2	••••••~				25+	DENSE	HARD
-	22	60.9	••••••••••				17	MEDIUM DENSE	VERY STIFF

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		NON-COHESIVE	COHESIVE
- 14 ft	27	74.8	.....				21	MEDIUM DENSE	VERY STIFF
-	28	77.6	.....				22	MEDIUM DENSE	VERY STIFF
-	38	105.3	.....				25+	MEDIUM DENSE	VERY STIFF
- 15 ft	28	77.6	.....				22	MEDIUM DENSE	VERY STIFF
-	26	72.0	.....				20	MEDIUM DENSE	VERY STIFF
-	19	52.6	.....				15	MEDIUM DENSE	STIFF
- 16 ft	21	58.2	.....				16	MEDIUM DENSE	VERY STIFF
-	15	41.6	.....				11	MEDIUM DENSE	STIFF
- 5 m	16	44.3	.....				12	MEDIUM DENSE	STIFF
- 17 ft	23	58.4	.....				16	MEDIUM DENSE	VERY STIFF
-	100	254.0	.....				25+	VERY DENSE	HARD
-									
- 18 ft									
-									
- 19 ft									
-									
- 6 m	20 ft								
-									
-	21 ft								
-									
-	22 ft								
-									
-	23 ft								
- 7 m									
-	24 ft								
-									
-	25 ft								
-									
-	26 ft								
-									
- 8 m	27 ft								
-									
-	28 ft								
-									
-	29 ft								
-									
- 9 m	30 ft								

LOG OF BORING D-21-026

PROJECT NO: 19-574.4	BEGIN DATE: 3/17/2021	DRILLING CONTRACTOR: Clear Heart Drilling
PROJECT: Alderpoint Rd PM 42.00-42.30	COMPLETION DATE: 3/17/2021	DRILLING METHOD: Dynamic Cone Penetrometer
LOCATION: Bridgeville, CA	SURFACE ELEVATION: 1691.8 (ft)*	DRILL RIG: DR8K
CITY/COUNTY: Humboldt	SURFACE CONDITION: Soil	HAMMER TYPE: Automatic; 140 lbs; 30 in. drop
CLIENT: HCDPW	WATER DEPTH: Not Encountered Due to Method	SAMPLER TYPE & SIZE: N/A
LOGGED BY: YGG	READING TAKEN: N/A	BOREHOLE DIAMETER: 1.75"
DEPTH OF BORING: 14.0 (ft)	HAMMER EFFICIENCY: 81.5 (%)	BACKFILL METHOD: Cuttings

ELEV (ft)	DEPTH (ft)	FIELD				GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY						REMARKS		
		SAMPLE	SAMPLE NO	BLOWS PER 6 INCH	BLOWS PER FOOT				POCKET PEN. (TSF)	RQD (%)	LIQUID LIMIT	PLASTIC LIMIT	MOISTURE (%)	D. DENSITY (PCF)		% PASSING 200 SIEVE	DRILL METHOD	CASING DEPTH
1690	0																
1688	4				2	20 40 60 80											
1686	6				3												
1684	8				3												
1682	10				23												
1680	12				37												
1678	14				41												
	13				56												
	14				169												
	15																
1676	16																
1674	18																
1672	20																
1670	22																
1668	24																
	25																



Crawford & Associates, Inc.
 Geotechnical Engineering, Design and Construction Services

Crawford & Associates, Inc.
 1100 Corporate Way, Suite 230
 Sacramento, CA 95831
 (916) 455-4225

PROJECT NUMBER: 19-574.4
 PROJECT: Alderpoint Rd PM 42.00-42.30
 BORING: D-21-026
 ENTRY BY: MNA
 CHECKED BY: RRR SHEET 1 of 1

Project Name: Alderpoit Road PM 42.00
 Project No: 19-574.4
 Date: 11/22/21



Laboratory and Field Test Summary

Boring I.D.	Sample I.D.	Sample Type (inch)	Sampled Depth (ft)	Retained Sample Depth (ft)	USCS	Field Blows N (bpf)	SPT Blows N ₆₀ (bpf)	Moisture/Density			Classification				Strength		Chemical Analysis								
								Dry Density (pcf)	Moist. Content (%)	In-Situ Density (pcf)	Atterberg Limits			Gravel (%)	Sand (%)	Fines (%)	Pocket Pent. (tsf)	Uncon. Comp. (psf)	pH	Minimum Resistivity (ohm-cm)	Chloride Content (ppm)	Sulfate Content (ppm)			
											Liquid Limit	Plastic Limit	Plasticity Index												
A-21-001	1A	CAL (2.5)	2.5 - 4.0	3.5 - 4.0	SC	31	19																		
A-21-001	2A	CAL (2.5)	5.0 - 6.5	6.0 - 6.5	SC	19	12	93.7	10.1	103.2															
A-21-001	3A	CAL (2.5)	7.5 - 9.0	8.5 - 9.0	SC	27	16				38	18	20												
A-21-001	4B	CAL (2.5)	10.0 - 11.5	10.5 - 11.0	SC																				
A-21-001	4A	CAL (2.5)	10.0 - 11.5	11.0 - 11.5	SC	35	21	124.5	20.3	149.8				24	43	33									
A-21-001	5A	CAL (2.5)	12.5 - 14.0	13.5 - 14.0	GP-GC	22	13																		
A-21-001	6A	CAL (2.5)	15.0 - 16.5	16.0 - 16.5	GP-GC	16	10							49	45	6									
A-21-001	7B	CAL (2.5)	20.0 - 21.5	20.5 - 21.0	D. Rock			120.9	14.3	138.2															
A-21-001	7A	CAL (2.5)	20.0 - 21.5	21.0 - 21.5	D. Rock	6	6	118.1	16.4	137.5							0.50	1,310							
A-21-001	8B	CAL (2.5)	25.0 - 26.5	25.5 - 26.0	D. Rock	87	84																		
A-21-001	8A	CAL (2.5)	25.0 - 26.5	26.0 - 26.5	D. Rock			126.3	8.3	136.8															
A-21-001	9A	SPT (1.4)	30.0 - 30.3	30.0 - 30.3	D. Rock	REF.	REF.																		
A-21-001	10A	SPT (1.4)	31.0 - 31.3	---	D. Rock	REF.	REF.																		
A-21-002	BULK	BULK	1.0 - 4.0	1.0 - 4.0	SC	-	-																		
A-21-002	1A	CAL (2.5)	2.5 - 4.0	3.5 - 4.0	SC	33	20																		
A-21-002	2A	CAL (2.5)	5.0 - 6.5	6.0 - 6.5	SC	24	15	104.0	8.7	113.0	33	19	14												
A-21-002	3A	CAL (2.5)	7.5 - 9.0	8.5 - 9.0	SC	21	13							33	44	23			7.15	2,680	3.2	32.9			
A-21-002	4A	CAL (2.5)	10.0 - 11.5	11.0 - 11.5	SC	29	18	118.4	9.7	129.9				35	40	25									
A-21-002	5A	CAL (2.5)	12.5 - 14.0	13.5 - 14.0	GP-GC	12	7																		
A-21-002	6A	CAL (2.5)	15.0 - 16.5	16.0 - 16.5	GP-GC/SC	10	6	106.2	4.8	111.3						38									
A-21-002	7A	CAL (2.5)	20.0 - 21.5	21.0 - 21.5	SC	14	9	132.9	12.6	149.6	30	15	15			39		950							
A-21-002	8B	SPT (1.4)	25.0 - 26.5	25.5 - 26.0	D. Rock	REF.	REF.																		
A-21-002	8A	SPT (1.4)	25.0 - 26.5	26.0 - 26.5	D. Rock	REF.	REF.		8.9										8.03	1,050	7.4	72.3			
A-21-002	9B	SPT (1.4)	30.0 - 31.5	30.5 - 31.0	D. Rock	REF.	REF.																		
A-21-002	9A	SPT (1.4)	30.0 - 31.5	31.0 - 31.5	D. Rock	REF.	REF.																		
A-21-003	1B	CAL (2.5)	2.5 - 3.5	3.0 - 3.5																					
A-21-003	1A	CAL (2.5)	2.5 - 3.5	3.5 - 4.0	SC	REF.	REF.																		
A-21-003	2B	CAL (2.5)	5.0 - 6.5	5.5 - 6.0																					
A-21-003	2A	CAL (2.5)	5.0 - 6.5	6.0 - 6.5	SC	22	13	103.1	8.9	112.3															
A-21-003	3A	CAL (2.5)	7.5 - 9.0	8.5 - 9.0	SC	24	15				40	17	23												
A-21-003	4A	CAL (2.5)	10.0 - 11.5	11.0 - 11.5	SC	32	20	124.6	8.5	135.2						25									
A-21-003	5A	CAL (2.5)	12.5 - 14.0	13.5 - 14.0	SC	31	19																		
A-21-003	6A	CAL (2.5)	15.0 - 16.5	16.0 - 16.5	SC/GP	21	13																		
A-21-003	7A	CAL (2.5)	20.0 - 21.5	21.0 - 21.5	GP-GC	39	24																		
A-21-003	8A	CAL (2.5)	25.0 - 26.5	26.0 - 26.5	SC	40	24	137.3	10.0	151.0						38									
A-21-003	9B	CAL (2.5)	30.0 - 31.0	30.5 - 31.0																					
A-21-003	9A	CAL (2.5)	30.0 - 31.0	31.0 - 31.5	SC	56	34																		
A-21-003	10B	CAL (2.5)	35.0 - 36.5	35.5 - 36.0																					
A-21-003	10A	CAL (2.5)	35.0 - 36.5	36.0 - 36.5	SC	13	8				79	31	48												
A-21-003	11A	CAL (2.5)	40.0 - 41.5	41.0 - 41.5	GC	0	0	123.7	11.2	137.6				42	42	16									
A-21-003	12A	CAL (2.5)	45.0 - 45.5	45.0 - 45.5	D. Rock	REF.	REF.	112.7	21.6	137.0															
A-21-003	13A	SPT (1.4)	50.0 - 51.5	51.0 - 51.5	D. Rock	40	60																		
A-21-004	BULK 1	BULK	0.0 - 2.5	0.0 - 2.5	SC	-	-																		
A-21-004	1A	CAL (2.5)	2.5 - 4.0	3.5 - 4.0	SC	20	12																		
A-21-004	BULK 2	BULK	2.5 - 4.0	2.5 - 4.0	SC	-	-																		
A-21-004	2A	CAL (2.5)	5.0 - 6.5	6.0 - 6.5	SC	15	9	116.1	9.0	126.5						25									
A-21-004	3B	CAL (2.5)	7.5 - 9	8.0 - 8.5																					
A-21-004	3A	CAL (2.5)	7.5 - 9	8.5 - 9.0	SC	16	10	110.5	9.7	121.2	38	16	22	22	44	34									
A-21-004	4A	CAL (2.5)	10.0 - 11.5	11.0 - 11.5	SC	12	7																		
A-21-004	5A	CAL (2.5)	12.5 - 14.0	13.5 - 14.0	SC	8	5																		
A-21-004	6A	CAL (2.5)	15.0 - 16.5	16.0 - 16.5	SC	14	9	125.1	11.1	139.0						22									
A-21-004	7A	CAL (2.5)	20.0 - 21.5	21.0 - 21.5	GP-GC	13	8																		
A-21-004	8A	CAL (2.5)	25.0 - 26.5	26.0 - 26.5	SC/D. Rock	46	28	136.1	9.3	148.8															
A-21-004	9A	CAL (2.5)	30.0 - 31.5	31.0 - 31.5	D. Rock	20	12	127.2	11.9	142.3															

Road-level Borings



Project Name: Alderpoint Road PM 42.00
 CAInc File No: 19-574.4
 Date: 5/18/21
 Technician: LAD/OMR

MOISTURE-DENSITY TESTS - D2216/D7263

	1	2	3	4	5
Sample No.	A-21-001-2A	A-21-001-4A	A-21-001-7B	A-21-001-7A	A-21-001-8A
USCS Symbol	SC	SC	SC	SC	D.ROCK
Depth (ft.)	6	11	20.5	21	26
Sample Length (in.)	3.294	4.733	5.498	5.389	5.167
Diameter (in.)	2.399	2.394	2.378	2.386	2.396
Sample Volume (ft ³)	0.00861	0.01233	0.01413	0.01394	0.01348
Total Mass Soil+Tube (g)	682.5	1043.0	1181.0	1145.7	1111.7
Mass of Tube (g)	279.3	275.2	295.2	276.3	275.3
Tare No.	G18	2003	2023	F7	B1
Tare (g)	13.7	120.5	125.6	13.8	13.9
Wet Soil + Tare (g)	64.0	396.6	430.3	73.5	74.3
Dry Soil + Tare (g)	59.3	370.9	392.2	65.0	69.7
Dry Soil (g)	45.7	250.4	266.6	51.3	55.8
Water (g)	4.6	25.7	38.1	8.4	4.6
Moisture (%)	10.1	10.3	14.3	16.4	8.3
Dry Density (pcf)	93.7	124.5	120.9	118.1	126.3

Notes:



Project Name: Alderpoint Road PM 42.00
 CAInc File No: 19-574.4
 Date: 5/25/21
 Technician: BWD/OMR/LAD

MOISTURE-DENSITY TESTS - D2216/D7263

	1	2	3	4	5
Sample No.	A-21-002-2A	A-21-002-4A	A-21-002-6A	A-21-002-7A	A-21-002-8A
USCS Symbol	SC	SC	SC	SC	ROCK
Depth (ft.)	6	11	16	21	26
Sample Length (in.)	5.205	4.195	5.075	5.255	-
Diameter (in.)	2.392	2.384	2.392	2.394	-
Sample Volume (ft ³)	0.01354	0.01084	0.01320	0.01369	-
Total Mass Soil+Tube (g)	971.9	917.3	944.5	1209.0	-
Mass of Tube (g)	277.8	279.0	277.7	279.7	-
Tare No.	122	111	A8	2525	138
Tare (g)	14.2	14.1	13.6	129.2	14.0
Wet Soil + Tare (g)	72.3	87.8	71.3	331.5	93.2
Dry Soil + Tare (g)	67.6	81.3	68.7	308.8	86.7
Dry Soil (g)	53.4	67.2	55.0	179.6	72.7
Water (g)	4.6	6.5	2.7	22.7	6.5
Moisture (%)	8.7	9.7	4.8	12.6	8.9
Dry Density (pcf)	104.0	118.4	106.2	132.9	-

Notes:



Project Name: Alderpoint Road PM 42.00
 CAInc File No: 19-574.4
 Date: 5/25/21
 Technician: BWD/LAD

MOISTURE-DENSITY TESTS - D2216/D7263

	1	2	3	4
Sample No.	A-21-003-2A	A-21-003-4A	A-21-003-8A	A-21-003-11A
USCS Symbol	SC	SC	SC	GC
Depth (ft.)	6	11	26	41
Sample Length (in.)	3.832	5.485	1.435	2.339
Diameter (in.)	2.379	2.388	2.379	2.402
Sample Volume (ft ³)	0.00985	0.01422	0.00369	0.00613
Total Mass Soil+Tube (g)	781.8	1151.0	532.8	658.5
Mass of Tube (g)	279.8	278.7	280.0	275.8
Tare No.	D4	1006	3020	2008
Tare (g)	13.7	125.2	122.1	122.6
Wet Soil + Tare (g)	93.9	435.0	374.4	453.3
Dry Soil + Tare (g)	87.4	410.7	351.5	420.1
Dry Soil (g)	73.7	285.5	229.4	297.5
Water (g)	6.6	24.3	22.9	33.2
Moisture (%)	8.9	8.5	10.0	11.2
Dry Density (pcf)	103.1	124.6	137.3	123.7

Notes:



Project Name: Alderpoint Road PM 42.00
 CAInc File No: 19-574.4
 Date: 5/27/21
 Technician: LAD/BWD

MOISTURE-DENSITY TESTS - D2216/D7263

	1	2	3	4	5
Sample No.	A-21-003-12A	A-21-004-2A	A-21-004-3A	A-21-004-6A	A-21-004-8A
USCS Symbol	GC	SC	SC	GC	GC
Depth (ft.)	45	6	8.5	16	26
Sample Length (in.)	5.136	5.184	5.423	5.337	4.583
Diameter (in.)	2.382	2.365	2.393	2.397	2.396
Sample Volume (ft ³)	0.01324	0.01317	0.01411	0.01394	0.01196
Total Mass Soil+Tube (g)	1105.1	1035.2	1054.0	1151.2	1086.4
Mass of Tube (g)	281.8	278.6	278.0	272.7	279.8
Tare No.	A6	1020	X2	2033	H2
Tare (g)	13.7	126.8	152.3	127.5	13.5
Wet Soil + Tare (g)	80.2	605.3	438.3	434.9	79.2
Dry Soil + Tare (g)	68.4	565.7	413.0	404.3	73.6
Dry Soil (g)	54.7	438.9	260.7	276.8	60.1
Water (g)	11.8	39.6	25.3	30.6	5.6
Moisture (%)	21.6	9.0	9.7	11.1	9.3
Dry Density (pcf)	112.7	116.1	110.5	125.1	136.1

Notes:



Project Name: Alderpoint Road PM 42.00
 CAInc File No: 19-574.4
 Date: 5/27/21
 Technician: BWD/LAD/MCC

MOISTURE-DENSITY TESTS - D2216/D7263

	1	2	3	4	5
Sample No.	A-21-004-9A	A-21-005-2A	A-21-005-5A	A-21-005-7A	A-21-005-8A
USCS Symbol	SC	SC	SC	GC	CL
Depth (ft.)	31	6	13.5	21	26
Sample Length (in.)	5.100	4.749	5.976	5.361	4.130
Diameter (in.)	1.412	2.384	2.389	2.388	1.406
Sample Volume (ft ³)	0.00462	0.01226	0.01550	0.01390	0.00371
Total Mass Soil+Tube (g)	430.7	882.3	1259.7	1104.2	359.9
Mass of Tube (g)	132.5	278.0	280.1	278.9	131.2
Tare No.	A13	115	C12	X3	2001
Tare (g)	13.8	14.2	13.9	151.2	125.8
Wet Soil + Tare (g)	100.7	77.5	96.8	519.7	327.8
Dry Soil + Tare (g)	91.4	73.6	88.7	493.6	305.3
Dry Soil (g)	77.7	59.4	74.8	342.4	179.5
Water (g)	9.2	3.9	8.1	26.1	22.5
Moisture (%)	11.9	6.6	10.8	7.6	12.5
Dry Density (pcf)	127.2	101.9	125.7	121.7	120.8

Notes:



Project Name: Alderpoint Road PM 42.00
 CAInc File No: 19-574.4
 Date: 5/27/21
 Technician: BWD/LAD/MCC

MOISTURE-DENSITY TESTS - D2216/D7263

	1	2	3	4	5
Sample No.	A-21-005-9A	A-21-005-10A	A-21-006-2A	A-21-006-4A	A-21-006-5A
USCS Symbol	SC	ROCK	SC	SC	CL
Depth (ft.)	31	36	6	11	13.5
Sample Length (in.)	5.978	5.830	3.971	4.720	5.123
Diameter (in.)	1.419	1.412	2.395	2.392	2.390
Sample Volume (ft ³)	0.00547	0.00528	0.01035	0.01227	0.01330
Total Mass Soil+Tube (g)	474.2	481.1	786.2	1036.3	728.3
Mass of Tube (g)	120.4	133.6	278.1	278.7	0.0
Tare No.	104	159	128	148	D12
Tare (g)	14.2	14.0	14.0	14.0	13.6
Wet Soil + Tare (g)	74.0	74.0	73.1	82.8	64.4
Dry Soil + Tare (g)	67.0	70.4	68.8	74.6	53.6
Dry Soil (g)	52.9	56.4	54.8	60.7	40.0
Water (g)	7.0	3.6	4.3	8.2	10.8
Moisture (%)	13.2	6.5	7.9	13.5	27.1
Dry Density (pcf)	126.0	136.2	100.3	119.9	95.0

Notes:



Project Name: Alderpoint Road PM 42.00
 CAInc File No: 19-574.4
 Date: 6/1/21
 Technician: MCC/OMR/LAD

MOISTURE-DENSITY TESTS - D2216/D7263

	1	2	3	4	5
Sample No.	A-21-006-6A	A-21-006-7A	A-21-007-2A	A-21-007-5A	A-21-007-6A
USCS Symbol	CH	CL	SC	GC	ROCK
Depth (ft.)	16	21	6	16	20
Sample Length (in.)	5.982	5.982	4.934	5.712	3.499
Diameter (in.)	2.406	2.386	2.394	2.391	1.411
Sample Volume (ft ³)	0.01574	0.01548	0.01285	0.01484	0.00317
Total Mass Soil+Tube (g)	1170.0	1218.3	995.1	1202.1	319.3
Mass of Tube (g)	278.7	274.3	276.3	276.1	118.1
Tare No.	X1	D18	2006	X4	G17
Tare (g)	152.4	13.7	122.7	151.3	13.6
Wet Soil + Tare (g)	465.9	73.7	410.1	438.4	72.0
Dry Soil + Tare (g)	414.2	64.7	385.4	410.5	64.8
Dry Soil (g)	261.8	51.0	262.7	259.2	51.1
Water (g)	51.7	9.1	24.7	27.9	7.2
Moisture (%)	19.7	17.8	9.4	10.8	14.1
Dry Density (pcf)	104.3	114.1	112.7	124.2	122.8

Notes:



Project Name: Alderpoint Road PM 42.00
 CAInc File No: 19-574.4
 Date: 6/2/21
 Technician: BWD/LAD

MOISTURE-DENSITY TESTS - D2216/D7263

	1	2	3	4	5
Sample No.	A-21-008-4A	A-21-008-6A	A-21-009-2A	A-21-009-4A	A-21-009-5A
USCS Symbol	SC	SC	SC	GC	SC
Depth (ft.)	11	21	6	11	16
Sample Length (in.)	5.235	5.496	-	-	5.107
Diameter (in.)	2.361	2.396	-	-	2.396
Sample Volume (ft ³)	0.01326	0.01434	-	-	0.01333
Total Mass Soil+Tube (g)	1128.7	1199.2	-	-	1110.4
Mass of Tube (g)	275.3	278.6	-	-	278.0
Tare No.	1009	F9	1010	B20	2020
Tare (g)	126.1	13.7	125.9	13.7	124.3
Wet Soil + Tare (g)	483.9	70.5	373.9	65.3	409.1
Dry Soil + Tare (g)	450.5	63.3	355.6	60.8	368.6
Dry Soil (g)	324.4	49.6	229.7	47.1	244.3
Water (g)	33.4	7.2	18.3	4.5	40.5
Moisture (%)	10.3	14.4	8.0	9.5	16.6
Dry Density (pcf)	128.7	123.7	-	-	118.1

Notes:



Project Name: Alderpoint Road PM 42.00
 CAInc File No: 19-574.4
 Date: 5/28/21
 Technician: LAD

MOISTURE-DENSITY TESTS - D2216/D7263

	1	2	3	4	5
Sample No.	A-21-009-6A	A-21-009-7A	A-21-009-9A		
USCS Symbol	SC	CL	ROCK		
Depth (ft.)	21	26	35.5		
Sample Length (in.)	5.578	5.995	4.228		
Diameter (in.)	2.386	2.366	2.382		
Sample Volume (ft ³)	0.01443	0.01525	0.01090		
Total Mass Soil+Tube (g)	1179.1	928.9	976.0		
Mass of Tube (g)	280.5	0.0	274.1		
Tare No.	1016	G18	G25		
Tare (g)	126.7	13.7	13.5		
Wet Soil + Tare (g)	352.9	73.0	68.7		
Dry Soil + Tare (g)	325.7	64.7	63.0		
Dry Soil (g)	199.0	51.0	49.6		
Water (g)	27.2	8.3	5.6		
Moisture (%)	13.7	16.2	11.4		
Dry Density (pcf)	120.8	115.5	127.4		

Notes:

Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

Date: 6/9/21

Technician: BWD/LAD

200 Wash - ASTM D1140

Method A

Max Particle Size (100% Passing)	Standard Sieve Size	Recommended Min Mass of Test Specimens
2 mm or less	No. 10	20 g
4.75 mm	No. 4	100 g
9.5 mm	3/8 "	500 g
19.0 mm	3/4 "	2.5 kg
37.5 mm	1 1/2 "	10 kg
75.0 mm	3 "	50 kg

Table from 6.2 of ASTM D1140

Sample No.	A-21-001-7B	A-21-002-6A	A-21-002-7A	A-21-003-8A
USCS Symbol	SC	SC	SC	SC
Depth (ft.)	20.5	16	21	26
Tare No.	2023	1014	2525	3020
Tare (g)	125.6	126	129.2	122.1
Dry Soil + Tare (g)	392.2	315.3	308.8	351.5
Dry Mass before (g)	266.6	189.3	179.6	229.4
Dry Mass after (g)	211.3	117.4	110.1	141.7
Percent Fines (%)	21	38	39	38

Notes:

Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

Date: 6/9/21

Technician: BWD/LAD

200 Wash - ASTM D1140

Method A

Max Particle Size (100% Passing)	Standard Sieve Size	Recommended Min Mass of Test Specimens
2 mm or less	No. 10	20 g
4.75 mm	No. 4	100 g
9.5 mm	3/8 "	500 g
19.0 mm	3/4 "	2.5 kg
37.5 mm	1 1/2 "	10 kg
75.0 mm	3 "	50 kg

Table from 6.2 of ASTM D1140

Sample No.	A-21-004-2A	A-21-004-6A	A-21-005-8A	A-21-006-6A	A-21-008-1B
USCS Symbol	SC	GC	CL	CH	SC
Depth (ft.)	6	16	26	16	3
Tare No.	1020	2033	2001	X1	2014
Tare (g)	126.8	127.5	125.8	152.4	123.3
Dry Soil + Tare (g)	565.7	404.3	305.3	414.2	369.3
Dry Mass before (g)	438.9	276.8	179.5	261.8	246.0
Dry Mass after (g)	328.0	214.7	50.7	102.3	177.6
Percent Fines (%)	25	22	72	61	28

Notes:



Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

Date: 6/9/21

Technician: BWD,LAD

200 Wash - ASTM D1140

Method A

Max Particle Size (100% Passing)	Standard Sieve Size	Recommended Min Mass of Test Specimens
2 mm or less	No. 10	20 g
4.75 mm	No. 4	100 g
9.5 mm	3/8 "	500 g
19.0 mm	3/4 "	2.5 kg
37.5 mm	1 1/2 "	10 kg
75.0 mm	3 "	50 kg

Table from 6.2 of ASTM D1140

Sample No.	A-21-009-2A	A-21-009-5A	A-21-009-6A		
USCS Symbol	SC	SC	SC		
Depth (ft.)	6	16	21		
Tare No.	1010	2020	1016		
Tare (g)	125.9	124.3	126.7		
Dry Soil + Tare (g)	355.6	368.6	325.7		
Dry Mass before (g)	229.7	244.3	199.0		
Dry Mass after (g)	192.2	155.5	117.4		
Percent Fines (%)	16	36	41		

Notes:

Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

Date: 5/26/21

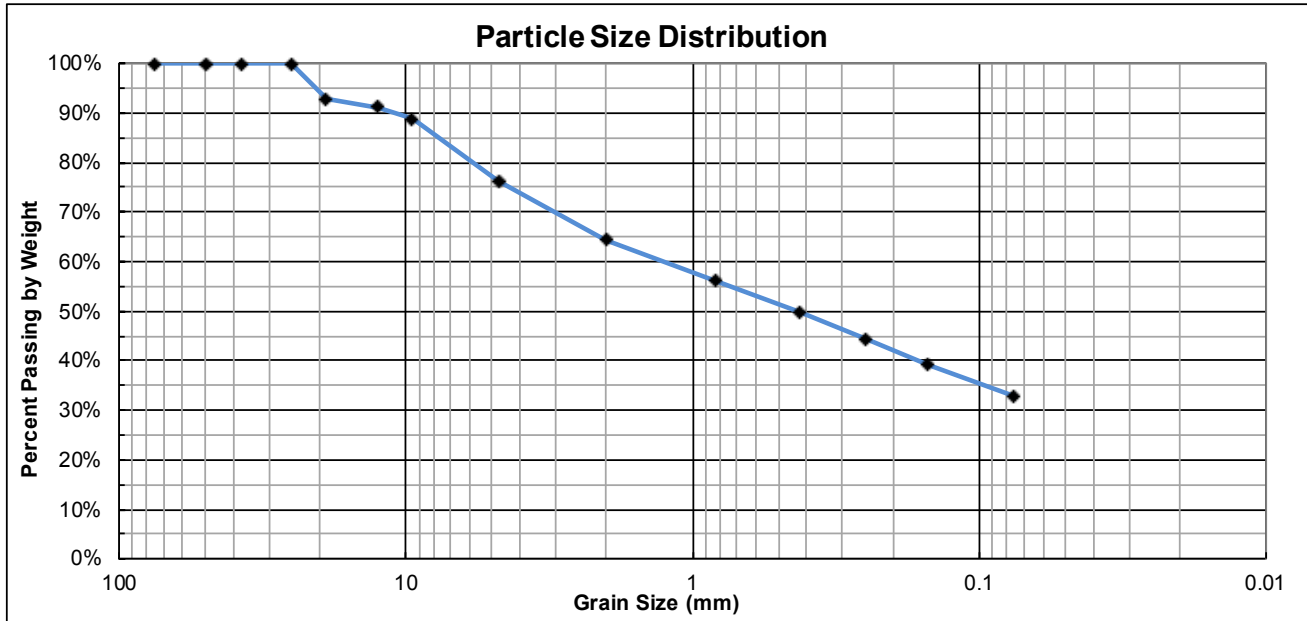
Technician: BWD

Sample ID: A-21-001-4A

Depth (ft): 11

USCS Classification: CLAYEY SAND with GRAVEL (SC)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	7	17	12	14	17	33
0	24		43			33

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing
Cobbles		3"	75	0.0	100%
Gravel	Coarse	2"	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	18.3	93%
	Fine	1/2"	12.5	22.3	91%
		3/8"	9.50	28.3	89%
Sand	Coarse	#4	4.75	59.7	76%
		#10	2.00	89.0	64%
	Medium	#20	0.825	109.8	56%
		#40	0.425	125.5	50%
	Fine	#60	0.250	139.4	44%
		#100	0.150	152.4	39%
		#200	0.075	168.3	33%

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

Date: 5/12/21

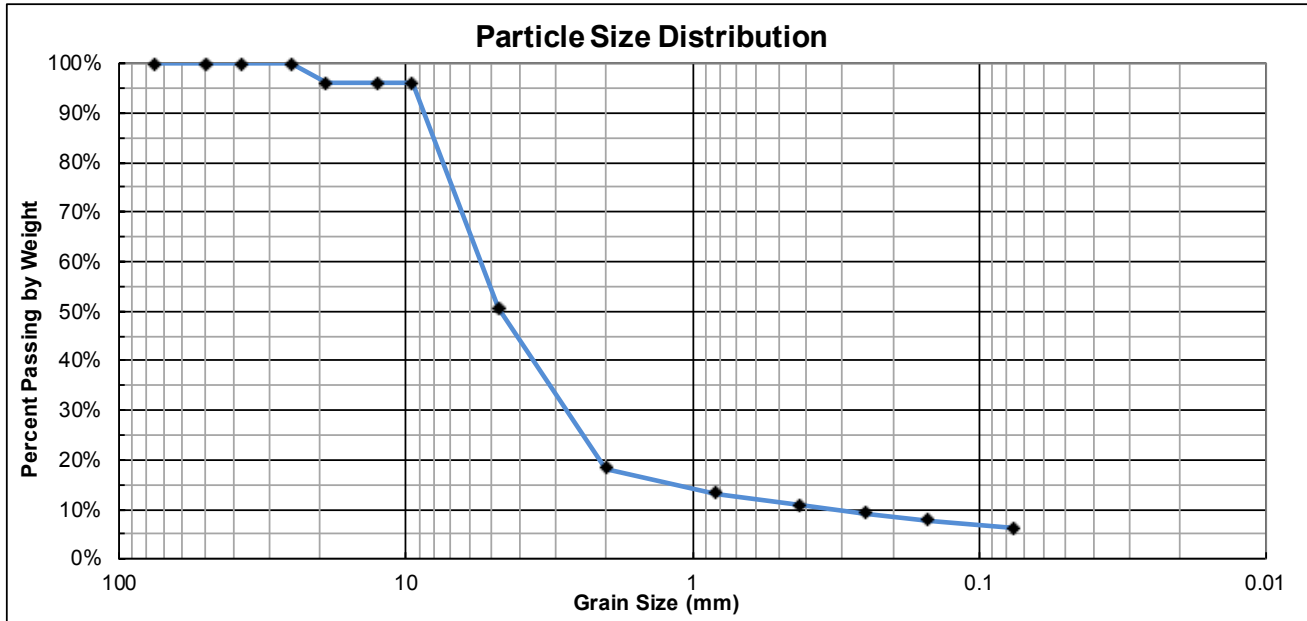
Technician: BWD

Sample ID: A-21-001-6A

Depth (ft): 16

USCS Classification: Poorly Graded GRAVEL with CLAY and SAND (GP-GC)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	4	45	33	7	5	6
0	49		45			6

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing
Cobbles		3"	75	0.0	100%
Gravel	Coarse	2"	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	10.1	96%
	Fine	1/2"	12.5	10.1	96%
		3/8"	9.50	10.1	96%
Sand	Coarse	#4	4.75	123.0	51%
		#10	2.00	203.4	18%
	Medium	#20	0.825	216.0	13%
		#40	0.425	221.8	11%
	Fine	#60	0.250	225.6	9%
		#100	0.150	229.1	8%
		#200	0.075	233.1	6%

Coefficient of Uniformity	Coefficient of Curvature
Cu = 17.1	Cc = 4.7

Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

Date: 5/25/21

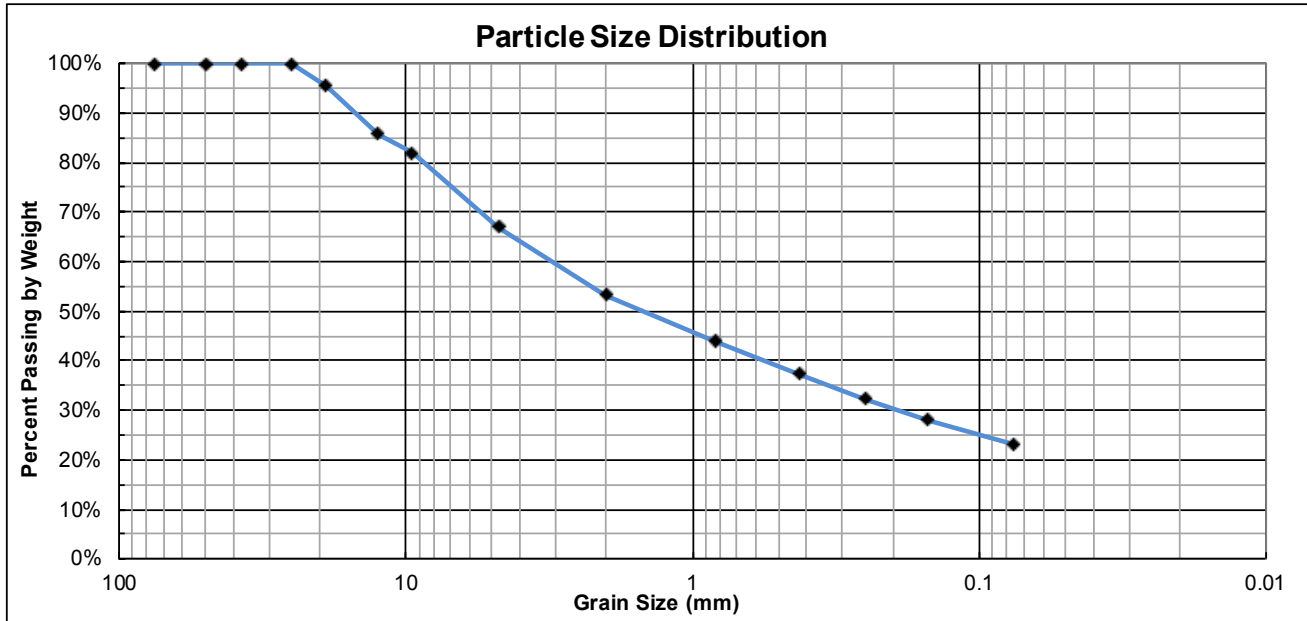
Technician: BWD

Sample ID: A-21-002-3A

Depth (ft): 8.5

USCS Classification: CLAYEY SAND with GRAVEL (SC)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	5	28	14	16	14	23
0	33		44			23

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing
Cobbles		3"	75	0.0	100%
Gravel	Coarse	2"	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	11.5	95%
	Fine	1/2"	12.5	35.9	86%
		3/8"	9.50	45.6	82%
Sand	Coarse	#4	4.75	83.1	67%
		#10	2.00	117.1	53%
	Medium	#20	0.825	141.0	44%
		#40	0.425	157.2	37%
	Fine	#60	0.250	169.8	32%
		#100	0.150	180.5	28%
		#200	0.075	193.0	23%

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

Date: 6/1/21

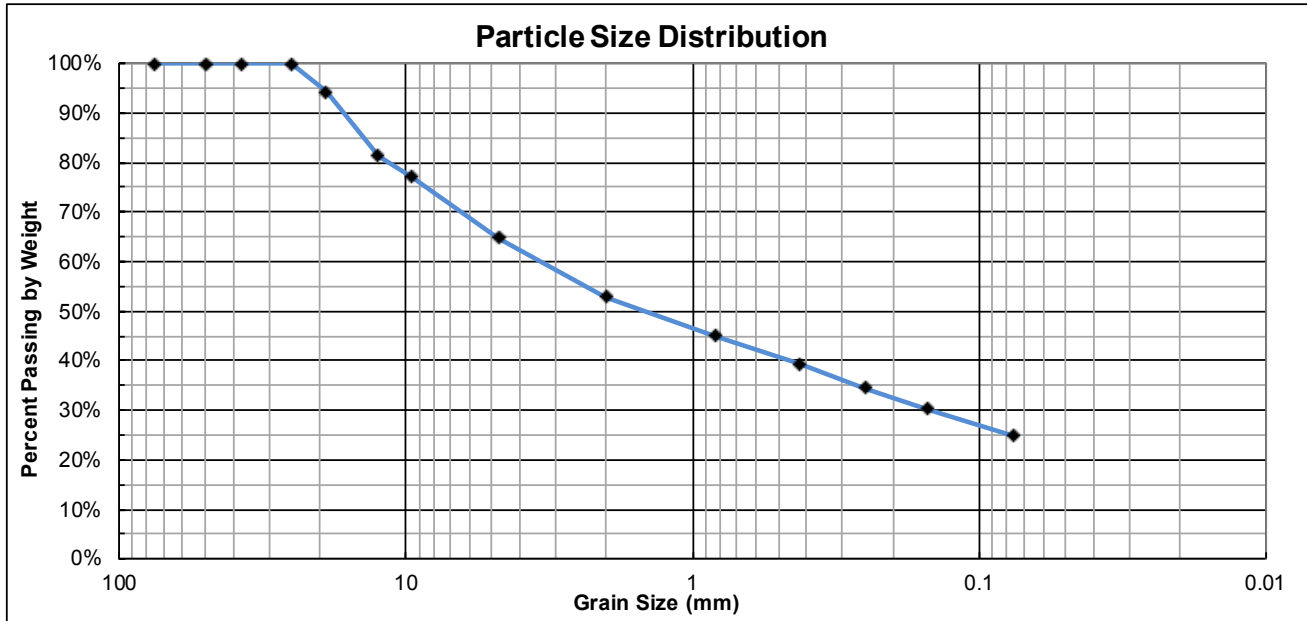
Technician: BWD

Sample ID: A-21-003-4A

Depth (ft): 11

USCS Classification: CLAYEY SAND with GRAVEL (SC)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	6	29	12	14	14	25
0	35		40			25

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing
Cobbles		3"	75	0.0	100%
Gravel	Coarse	2"	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	16.8	94%
	Fine	1/2"	12.5	53.4	81%
		3/8"	9.50	65.8	77%
Sand	Coarse	#4	4.75	100.6	65%
		#10	2.00	134.4	53%
	Medium	#20	0.825	157.3	45%
		#40	0.425	173.1	39%
	Fine	#60	0.250	187.0	35%
		#100	0.150	199.6	30%
		#200	0.075	214.9	25%

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

Date: 6/1/21

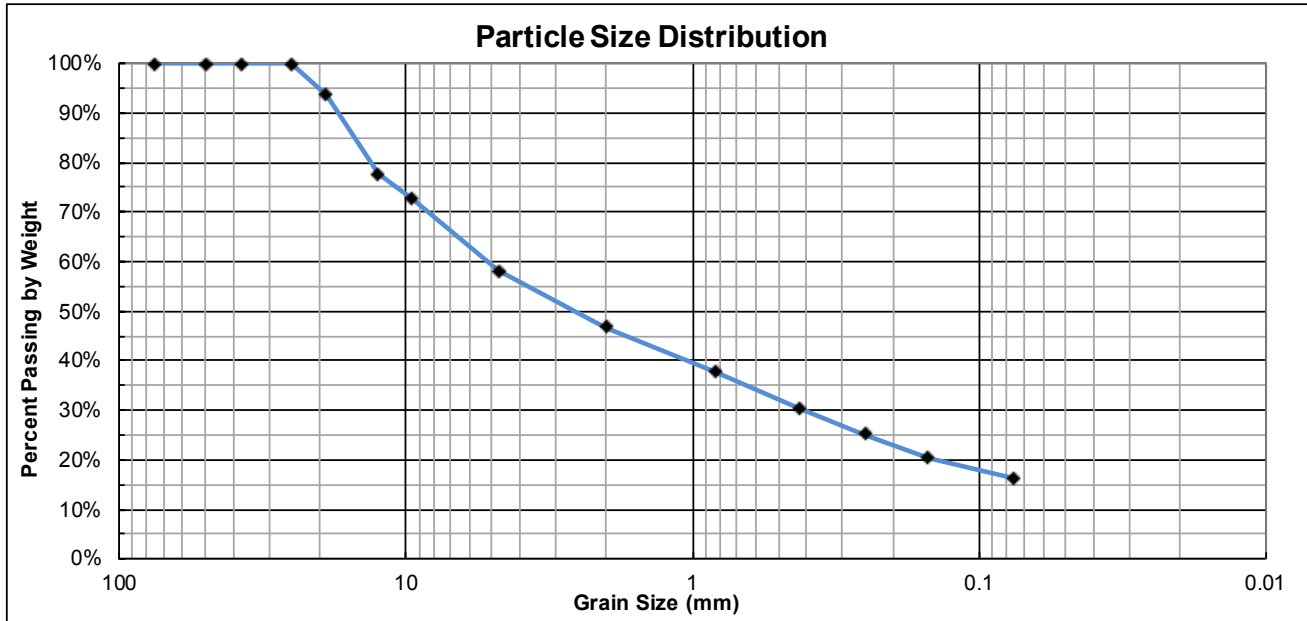
Technician: BWD

Sample ID: A-21-003-11A

Depth (ft): 40

USCS Classification: CLAYEY GRAVEL with SAND (GC)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	6	36	11	17	14	16
	42		42			

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing
Cobbles		3"	75	0.0	100%
Gravel	Coarse	2"	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	18.8	94%
	Fine	1/2"	12.5	66.8	78%
		3/8"	9.50	81.4	73%
Sand	Coarse	#4	4.75	124.7	58%
		#10	2.00	158.1	47%
	Medium	#20	0.825	185.4	38%
		#40	0.425	206.9	30%
	Fine	#60	0.250	222.9	25%
		#100	0.150	236.8	20%
		#200	0.075	249.1	16%

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

Date: 5/28/21

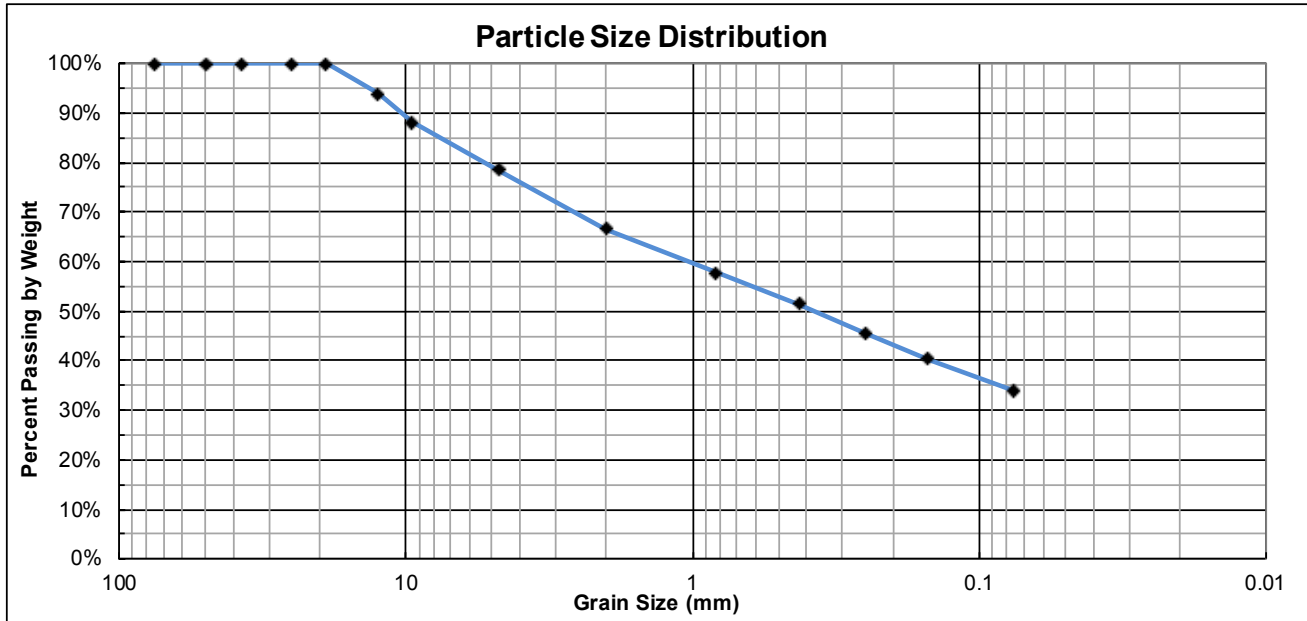
Technician: MCC

Sample ID: A-21-004-3A

Depth (ft): 8.5

USCS Classification: CLAYEY SAND with GRAVEL (SC)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	0	22	11	16	17	
0	22		44			34

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing
Cobbles		3"	75	0.0	100%
Gravel	Coarse	2"	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	0.0	100%
	Fine	1/2"	12.5	16.2	94%
		3/8"	9.50	31.0	88%
Sand	Coarse	#4	4.75	56.2	78%
		#10	2.00	87.1	67%
	Medium	#20	0.825	110.4	58%
		#40	0.425	126.6	51%
	Fine	#60	0.250	142.3	45%
		#100	0.150	155.8	40%
		#200	0.075	172.4	34%

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

Date: 5/28/21

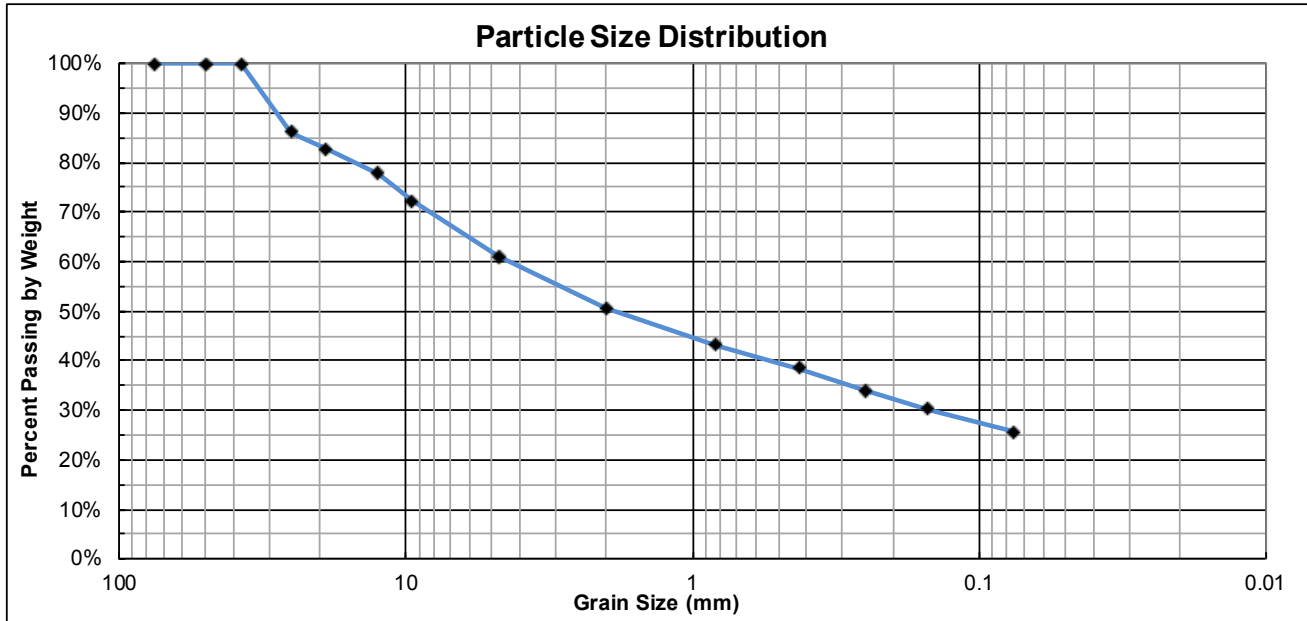
Technician: MCC

Sample ID: A-21-005-7A

Depth (ft): 21

USCS Classification: CLAYEY GRAVEL with SAND (GC)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	17	22	11	12	12	26
0	39		35			26

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing
Cobbles		3"	75	0.0	100%
Gravel	Coarse	2"	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	47.8	86%
	Fine	3/4"	19.0	59.6	83%
		1/2"	12.5	76.1	78%
		3/8"	9.50	95.0	72%
Sand	Coarse	#4	4.75	133.5	61%
		#10	2.00	169.7	50%
	Medium	#20	0.825	194.5	43%
		#40	0.425	211.1	38%
	Fine	#60	0.250	226.0	34%
#100	0.150	239.0	30%		
#200	0.075	254.6	26%		

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

Date: 5/28/21

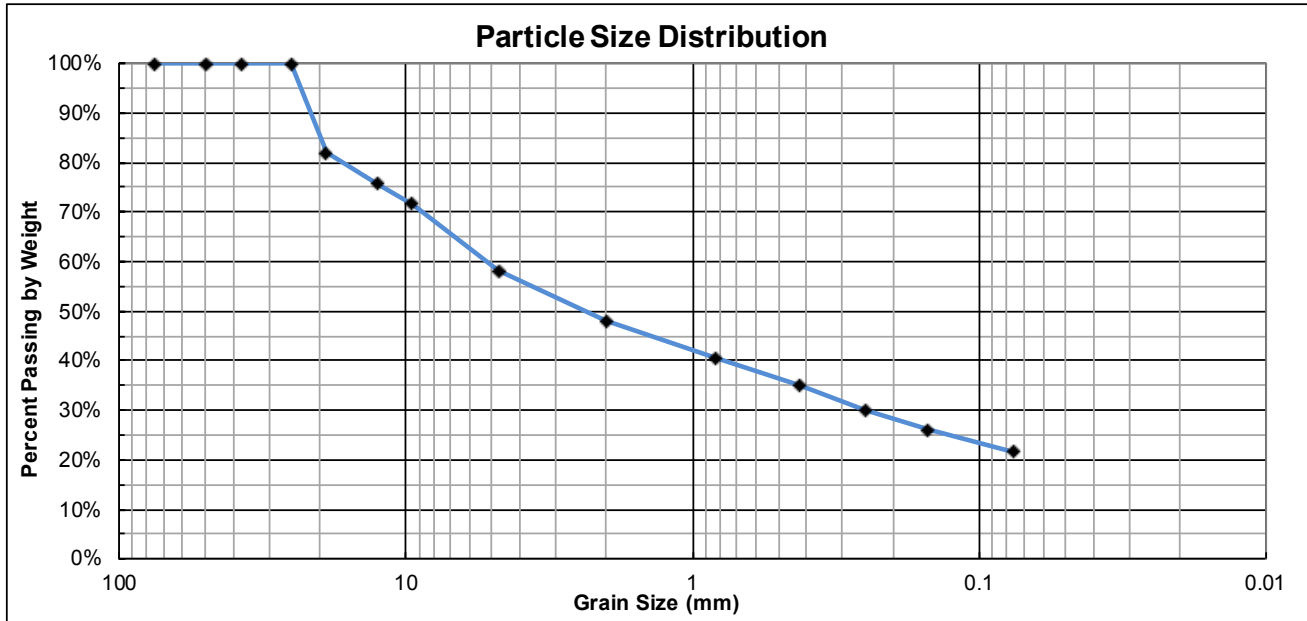
Technician: MCC

Sample ID: A-21-006-3A

Depth (ft): 8.5

USCS Classification: CLAYEY GRAVEL with SAND (GC)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	18	24	10	13	14	21
0	42		37			21

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing
Cobbles		3"	75	0.0	100%
Gravel	Coarse	2"	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	53.0	82%
	Fine	1/2"	12.5	71.3	76%
		3/8"	9.50	82.9	72%
Sand	#4	#4	4.75	122.3	58%
		#10	2.00	152.0	48%
	Medium	#20	0.825	174.1	40%
		#40	0.425	189.9	35%
	Fine	#60	0.250	204.2	30%
		#100	0.150	215.8	26%
#200	0.075	229.1	21%		

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

Date: 6/3/21

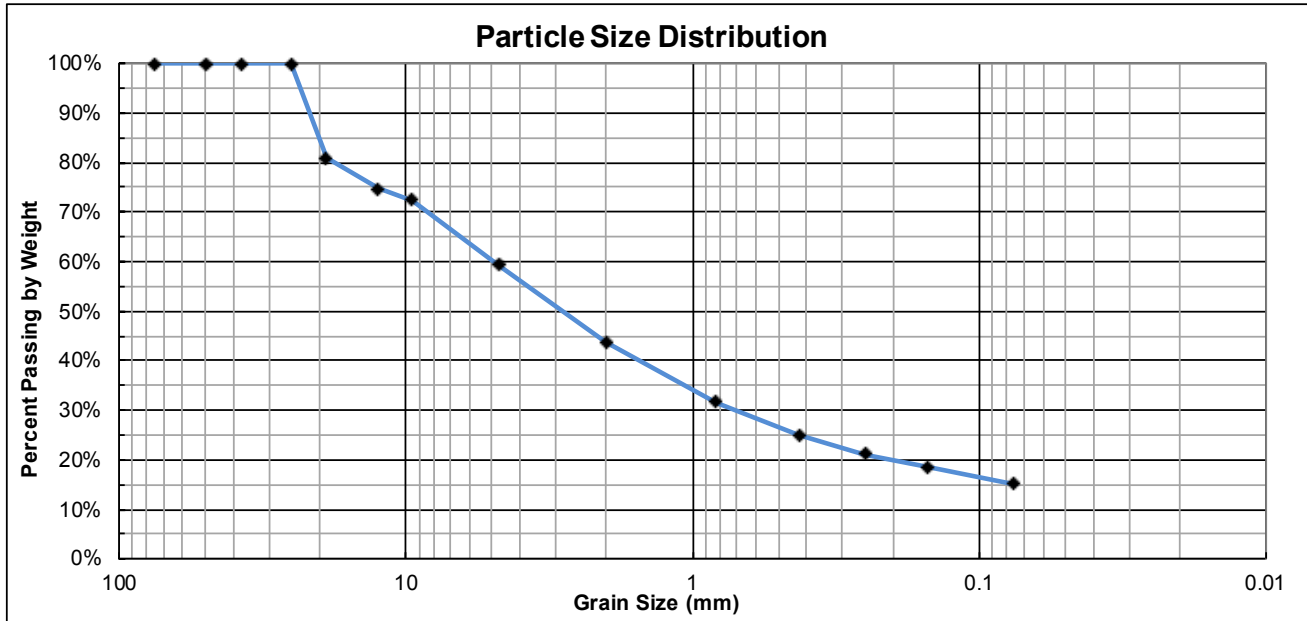
Technician: OMR

Sample ID: A-21-007-2A

Depth (ft): 6

USCS Classification: CLAYEY SAND with GRAVEL (SC)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	19	22	15	19	10	15
0	41		44			15

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing
Cobbles		3"	75	0.0	100%
Gravel	Coarse	2"	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	50.5	81%
	Fine	1/2"	12.5	66.4	75%
		3/8"	9.50	72.8	72%
Sand	#4	4.75	106.8	59%	
		#10	2.00	148.1	44%
	Medium	#20	0.825	179.7	32%
		#40	0.425	197.1	25%
	Fine	#60	0.250	207.0	21%
		#100	0.150	214.5	18%
#200	0.075	223.2	15%		

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

Date: 5/28/21

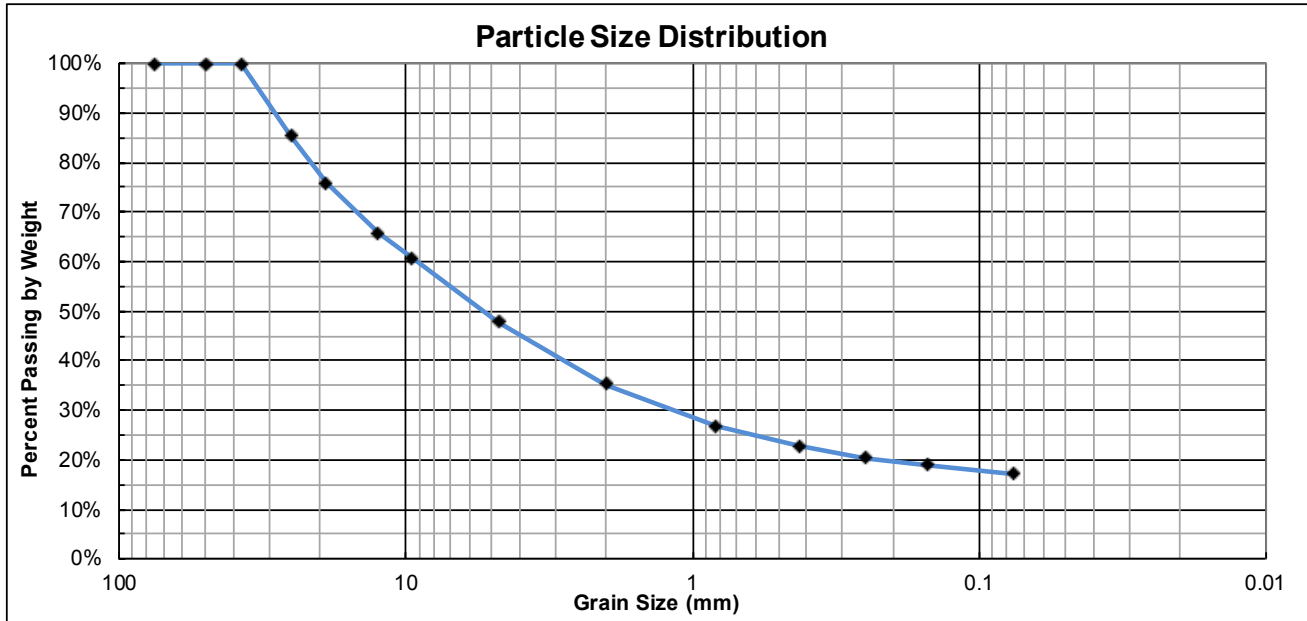
Technician: MCC

Sample ID: A-21-007-5A

Depth (ft): 16

USCS Classification: CLAYEY GRAVEL with SAND (GC)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	24	28	13	12	6	17
0	52		31			17

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing
Cobbles		3"	75	0.0	100%
Gravel	Coarse	2"	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	38.2	85%
		3/4"	19.0	62.8	76%
	Fine	1/2"	12.5	88.9	66%
		3/8"	9.50	101.9	61%
Sand	Coarse	#4	4.75	135.2	48%
		#10	2.00	167.9	35%
	Medium	#20	0.825	189.9	27%
		#40	0.425	200.3	23%
	Fine	#60	0.250	206.5	20%
		#100	0.150	210.3	19%
		#200	0.075	214.9	17%

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

Date: 5/26/21

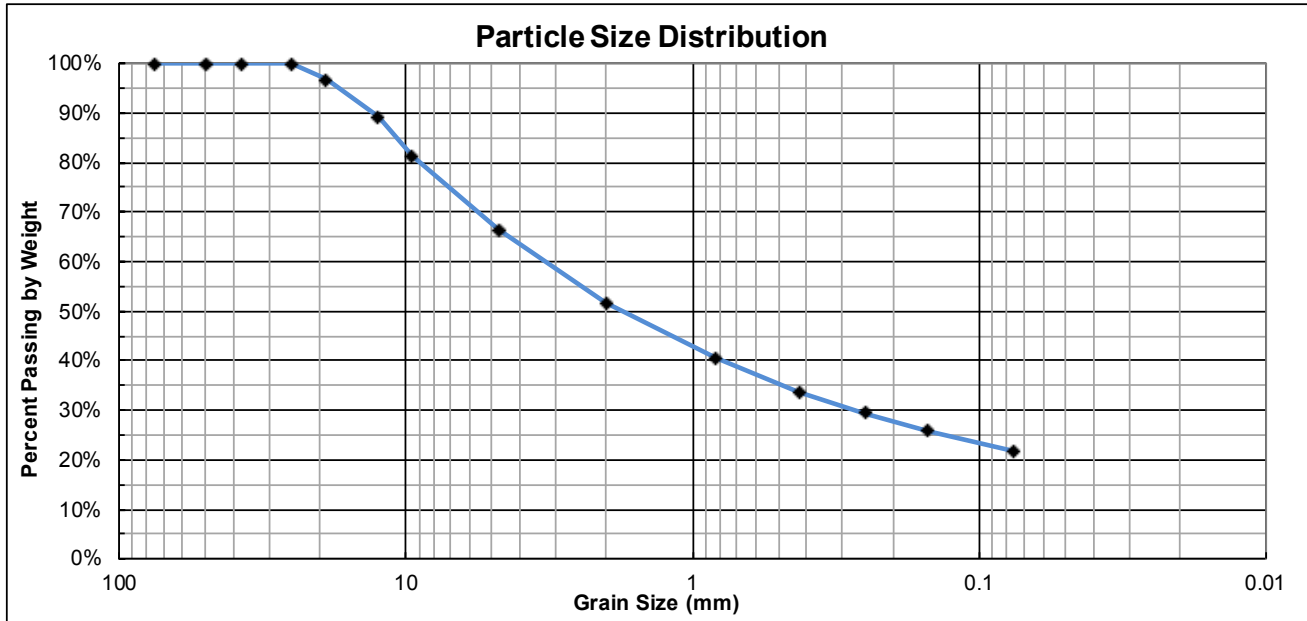
Technician: BWD

Sample ID: A-21-008-4A

Depth (ft): 11

USCS Classification: CLAYEY SAND with GRAVEL (SC)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	3	31	14	18	12	22
0	34		44			22

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing
Cobbles		3"	75	0.0	100%
Gravel	Coarse	2"	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	10.6	97%
	Fine	1/2"	12.5	35.5	89%
		3/8"	9.50	60.8	81%
Sand	Coarse	#4	4.75	108.8	66%
		#10	2.00	157.1	52%
	Medium	#20	0.825	193.5	40%
		#40	0.425	215.3	34%
	Fine	#60	0.250	229.2	29%
		#100	0.150	240.7	26%
		#200	0.075	254.0	22%

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Project Name: Alderpoint Road PM 42.00

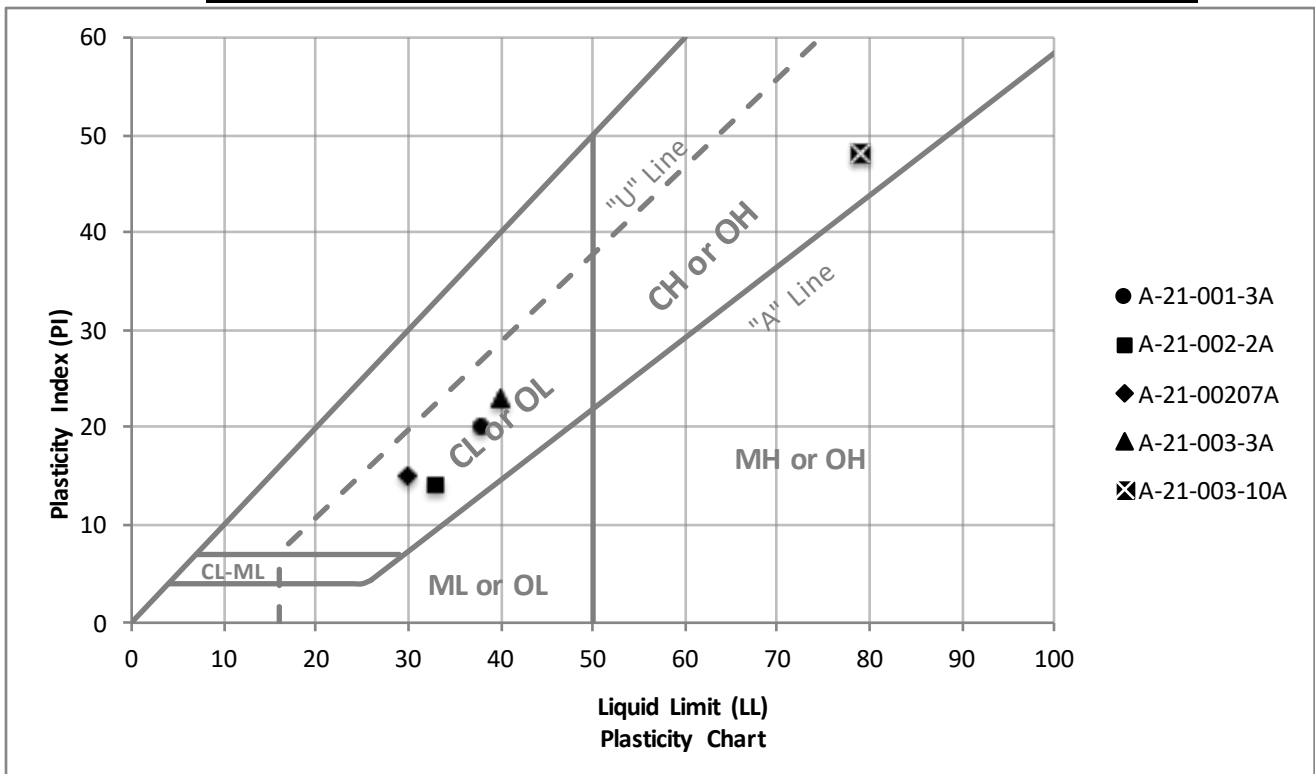
CAInc File No: 19-574.4

Date: 6/9/21

Technician: MNA/LAD/CAP/OMR

Plastic Index - ASTM D4318

Sample ID	Depth (ft)	Liquid Limit	Plastic Limit	PI
A-21-001-3A	8.5	38	18	20
A-21-002-2A	6	33	19	14
A-21-002-7A	21	30	15	15
A-21-003-3A	8.5	40	17	23
A-21-003-10A	36	79	31	48



Project Name: Alderpoint Road PM 42.00

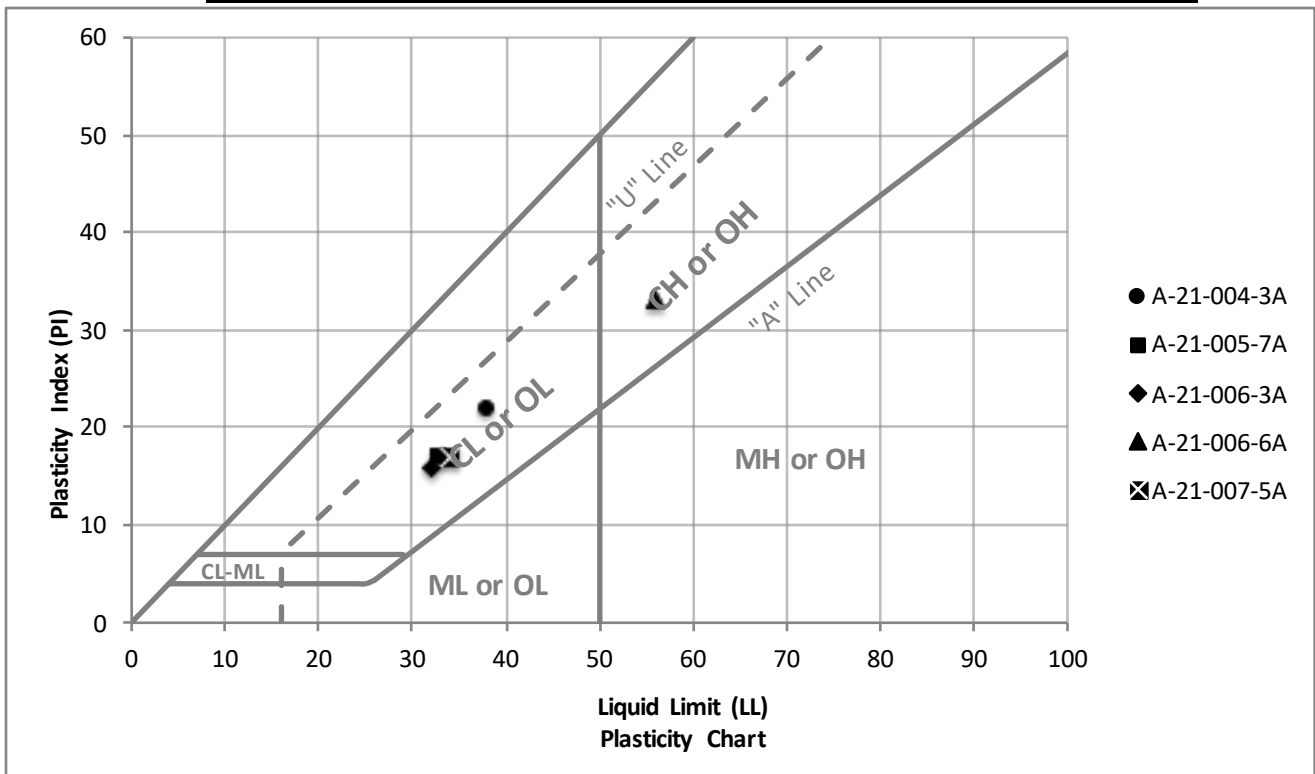
CAInc File No: 19-574.4

Date: 6/9/21

Technician: MCC

Plastic Index - ASTM D4318

Sample ID	Depth (ft)	Liquid Limit	Plastic Limit	PI
A-21-004-3A	8.5	38	16	22
A-21-005-7A	21.0	33	16	17
A-21-006-3A	8.5	32	16	16
A-21-006-6A	16	56	23	33
A-21-007-5A	16	34	17	17



Project Name: Alderpoint Road PM 42.00

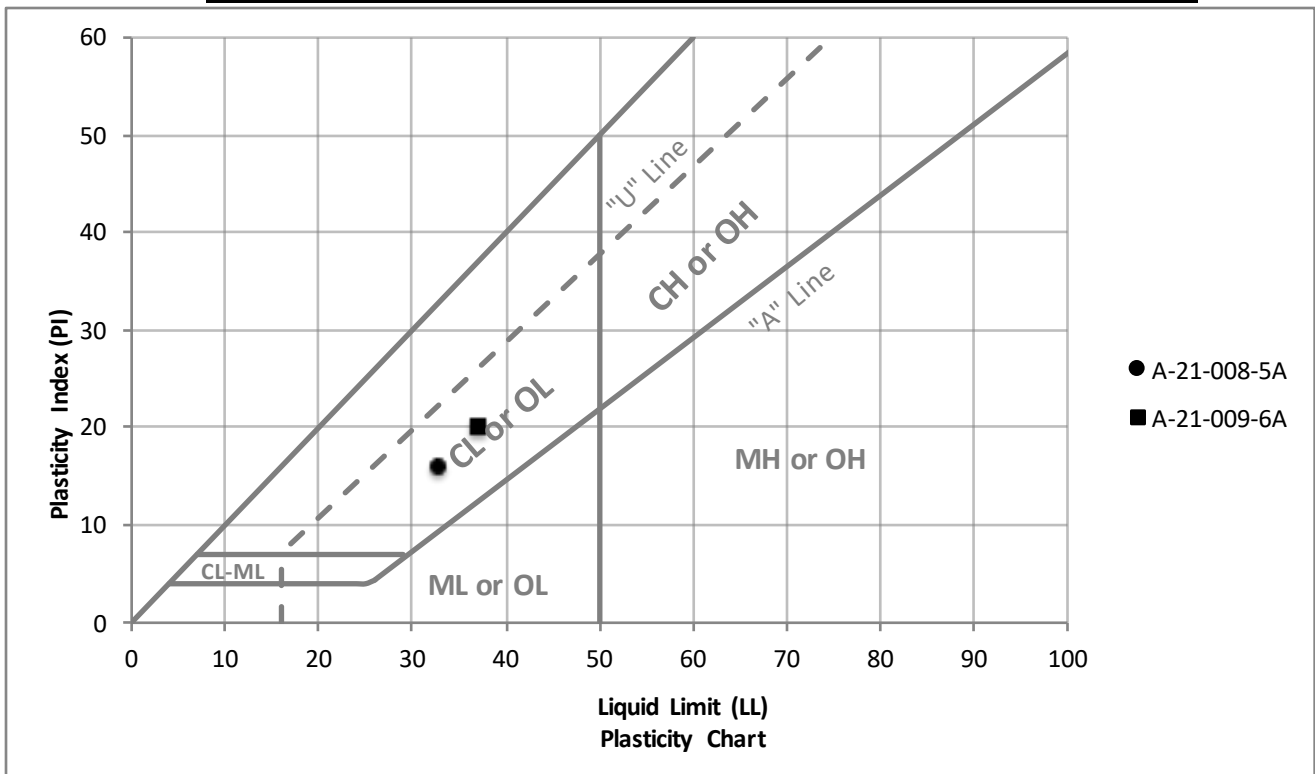
CAInc File No: 19-574.4

Date: 6/9/21

Technician: MCC/MNA

Plastic Index - ASTM D4318

Sample ID	Depth (ft)	Liquid Limit	Plastic Limit	PI
A-21-008-5A	16	33	17	16
A-21-009-6A	21	37	17	20



Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

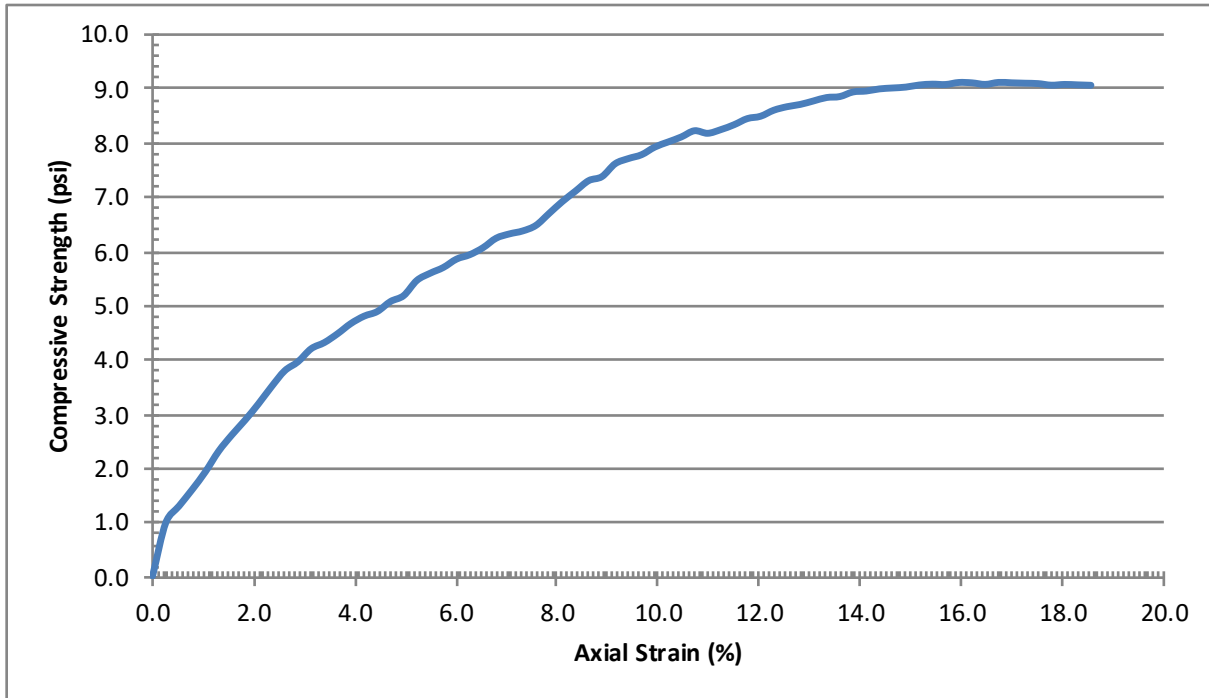
Date: 5/25/21

Technician: LAD

Sample ID: A-21-001-7A Depth (ft): 21.0

USCS Classification: CL

UNCONFINED COMPRESSION TEST - D2166



Dry Density (pcf)	118.1
Water Content (%)	16.4
Unconfined Compressive Strength (psi)	9.1
Unconfined Compressive Strength (psf)	1310
Average Height (in)	5.389
Average Diameter (in)	2.386
Rate of strain (%)	1.4
Strain at 15%	



Notes:



Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

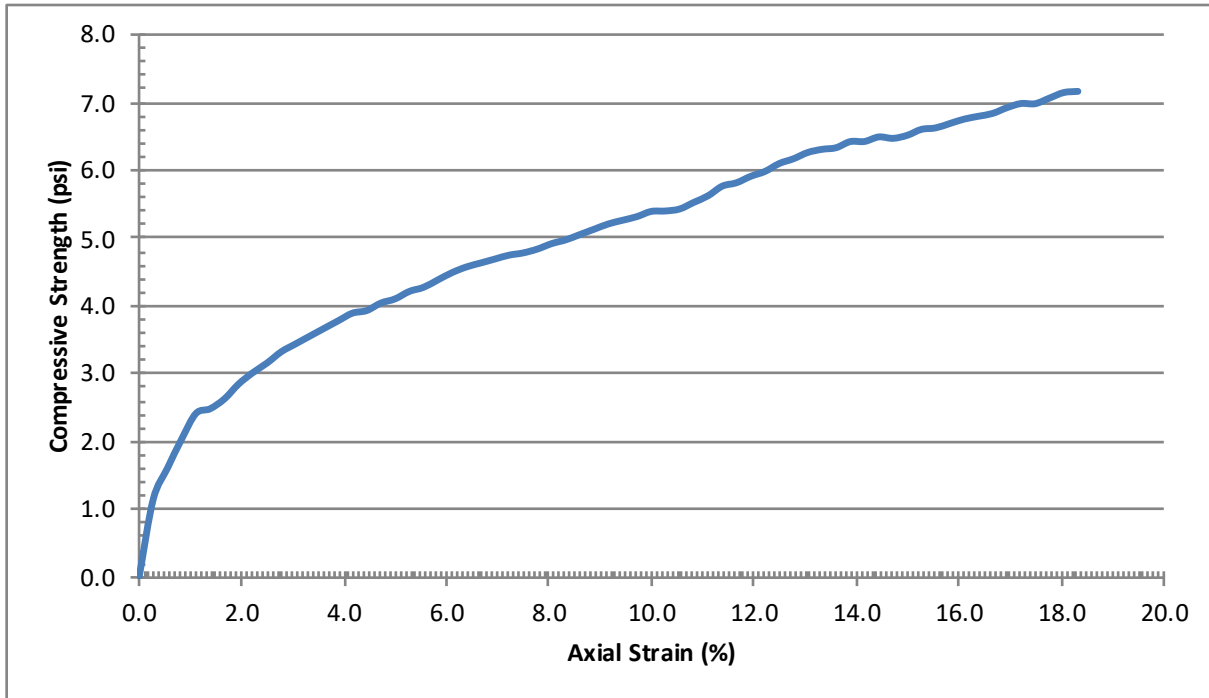
Date: 5/27/21

Technician: LAD

Sample ID: A-21-002-7A Depth (ft): 21.0

USCS Classification: SC

UNCONFINED COMPRESSION TEST - D2166



Dry Density (pcf) 132.9

Water Content (%) 12.6

Unconfined Compressive Strength (psi) 6.6

Unconfined Compressive Strength (psf) 950

Average Height (in) 5.255

Average Diameter (in) 2.394

Rate of strain (%) 1.5

Strain at 15 %

Notes:

Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

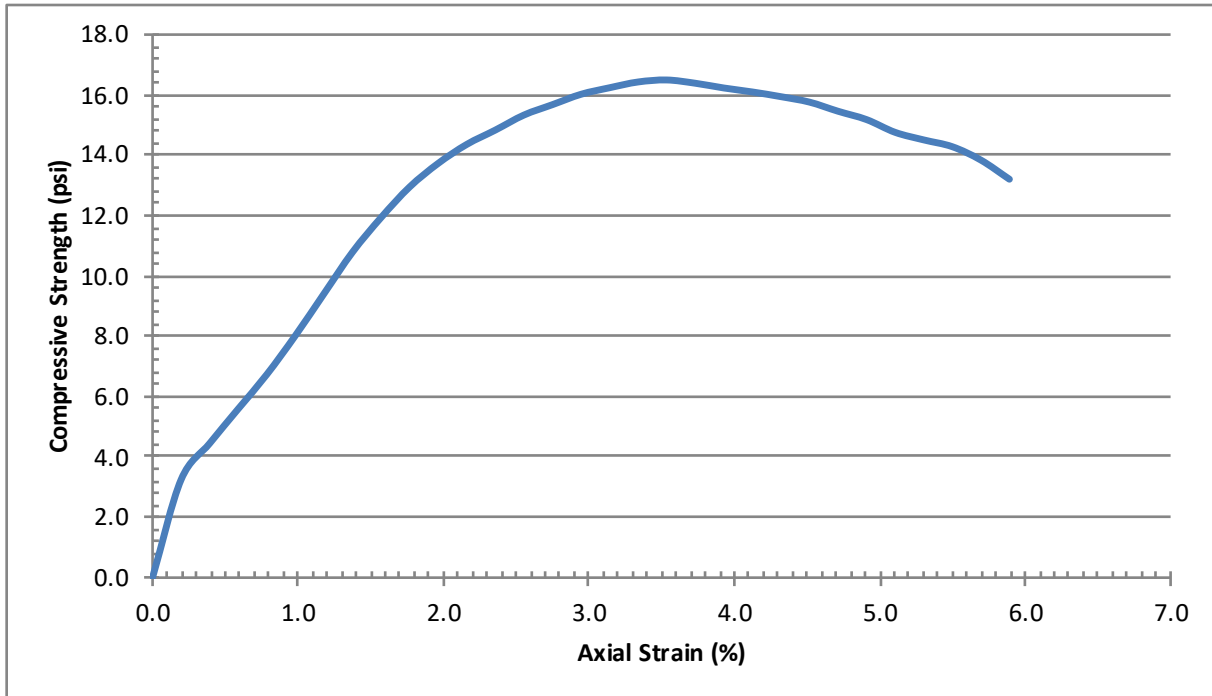
Date: 5/12/21

Technician: OMR/CAP

Sample ID: A-21-006-5A Depth (ft): 13.5

USCS Classification: CL

UNCONFINED COMPRESSION TEST - D2166



Dry Density (pcf) 95.0

Water Content (%) 27.1

Unconfined Compressive Strength (psi) 16.5

Unconfined Compressive Strength (psf) 2376

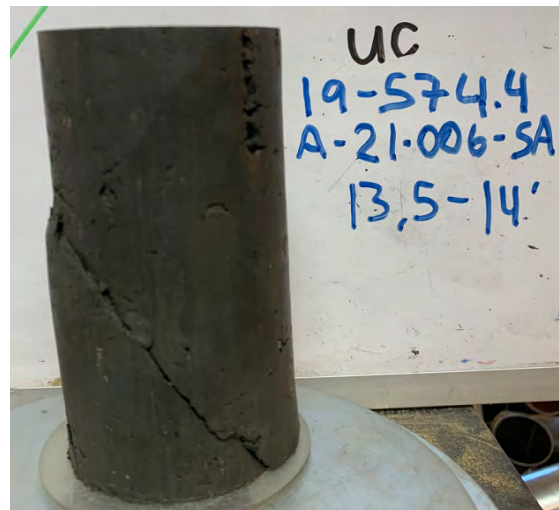
Average Height (in) 5.123

Average Diameter (in) 2.390

Rate of strain (%) 1.0

Strain at Failure (%) 3.5

Notes:



Project Name: Alderpoint Road PM 42.00

CAInc File No: 19-574.4

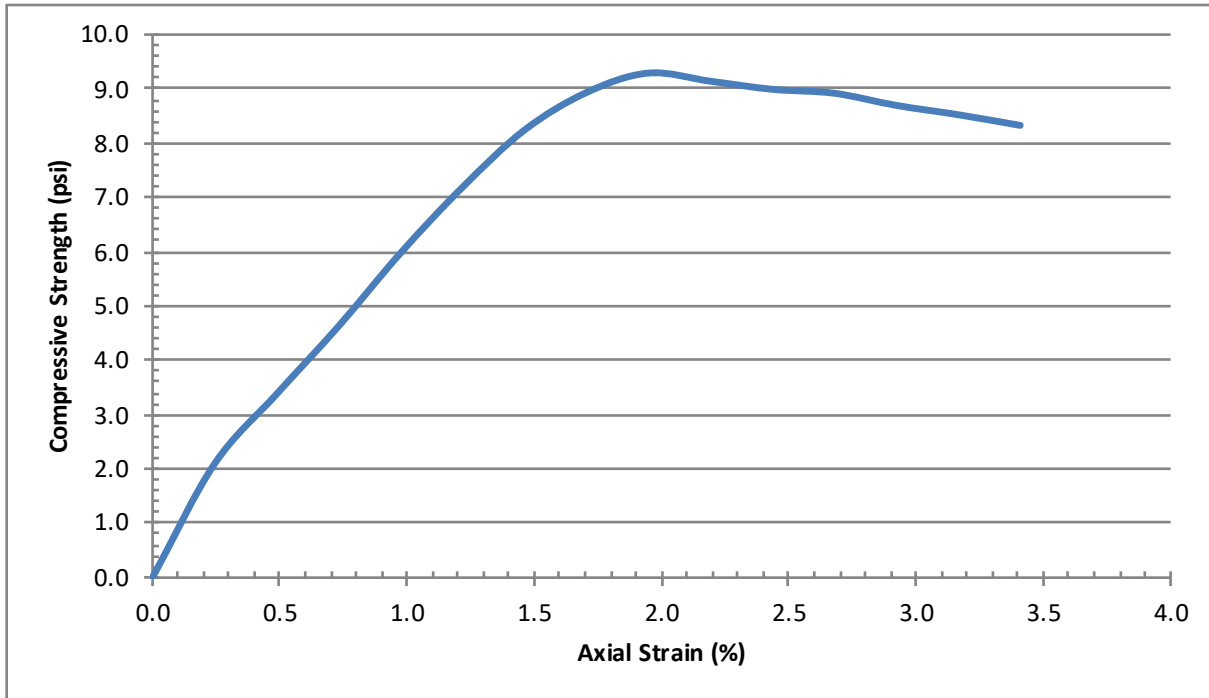
Date: 6/1/21

Technician: LAD

Sample ID: A-21-009-6A Depth (ft): 21.0

USCS Classification: SC

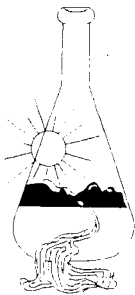
UNCONFINED COMPRESSION TEST - D2166



Dry Density (pcf)	120.8
Water Content (%)	13.7
Unconfined Compressive Strength (psi)	9.3
Unconfined Compressive Strength (psf)	1339
Average Height (in)	5.578
Average Diameter (in)	2.386
Rate of strain (%)	1.4
Strain at Failure (%)	1.9



Notes:



Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 05/28/2021
Date Submitted 05/24/2021

To: Carmelo Pagan
Crawford & Associates, Inc.
1100 Corporate Way Suite 230
Sacramento, CA 95831

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 19-574.4 ALDER POINT Site ID : A21-002-3A,9.0.
Thank you for your business.

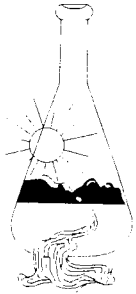
* For future reference to this analysis please use SUN # 84909-176995.

EVALUATION FOR SOIL CORROSION

Soil pH	7.15		
Minimum Resistivity	2.68	ohm-cm (x1000)	
Chloride	3.2	ppm	00.00032 %
Sulfate	32.9	ppm	00.00329 %

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m



Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 05/28/2021
Date Submitted 05/24/2021

To: Carmelo Pagan
Crawford & Associates, Inc.
1100 Corporate Way Suite 230
Sacramento, CA 95831

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager *RA*

The reported analysis was requested for the following location:
Location : 19-574.4 ALDER POINT Site ID : A21-002-8B,26.0.
Thank you for your business.

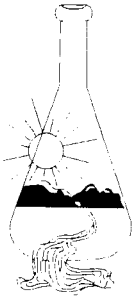
* For future reference to this analysis please use SUN # 84909-176994.

EVALUATION FOR SOIL CORROSION

Soil pH	8.03		
Minimum Resistivity	1.05	ohm-cm (x1000)	
Chloride	7.4	ppm	00.00074 %
Sulfate	72.3	ppm	00.00723 %

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m



Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 05/28/2021
Date Submitted 05/24/2021

To: Carmelo Pagan
Crawford & Associates, Inc.
1100 Corporate Way Suite 230
Sacramento, CA 95831

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 19-574.4 ALDER POINT Site ID : A21-005-3A,8.5.
Thank you for your business.

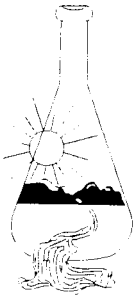
* For future reference to this analysis please use SUN # 84909-176998.

EVALUATION FOR SOIL CORROSION

Soil pH	7.16		
Minimum Resistivity	2.95	ohm-cm (x1000)	
Chloride	2.7	ppm	00.00027 %
Sulfate	39.3	ppm	00.00393 %

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m



Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 05/28/2021
Date Submitted 05/24/2021

To: Carmelo Pagan
Crawford & Associates, Inc.
1100 Corporate Way Suite 230
Sacramento, CA 95831

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager *RA*

The reported analysis was requested for the following location:
Location : 19-574.4 ALDER POINT Site ID : A21-006-5A,14.0.
Thank you for your business.

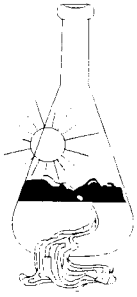
* For future reference to this analysis please use SUN # 84909-176996.

EVALUATION FOR SOIL CORROSION

Soil pH	7.14		
Minimum Resistivity	0.72	ohm-cm (x1000)	
Chloride	7.2	ppm	00.00072 %
Sulfate	104.1	ppm	00.01041 %

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m



Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 05/28/2021
Date Submitted 05/24/2021

To: Carmelo Pagan
Crawford & Associates, Inc.
1100 Corporate Way Suite 230
Sacramento, CA 95831

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager *RA*

The reported analysis was requested for the following location:
Location : 19-574.4 ALDER POINT Site ID : A21-008-4A,11.5.
Thank you for your business.

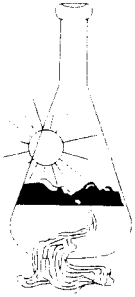
* For future reference to this analysis please use SUN # 84909-176993.

EVALUATION FOR SOIL CORROSION

Soil pH	7.11		
Minimum Resistivity	3.48	ohm-cm (x1000)	
Chloride	2.6 ppm	00.00026	%
Sulfate	12.4 ppm	00.00124	%

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m



Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 05/28/2021
Date Submitted 05/24/2021

To: Carmelo Pagan
Crawford & Associates, Inc.
1100 Corporate Way Suite 230
Sacramento, CA 95831

From: Gene Oliphant, Ph.D. \ Randy Horney *RA*
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 19-574.4 ALDER POINT Site ID : A21-009-6B,20.5.
Thank you for your business.

* For future reference to this analysis please use SUN # 84909-176989.

EVALUATION FOR SOIL CORROSION

Soil pH	7.16		
Minimum Resistivity	0.86	ohm-cm (x1000)	
Chloride	2.0 ppm	00.00020	%
Sulfate	186.5 ppm	00.01865	%

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

APPENDIX B – PM 42.10

FIGURE 5-2 – EXPLORATION MAP

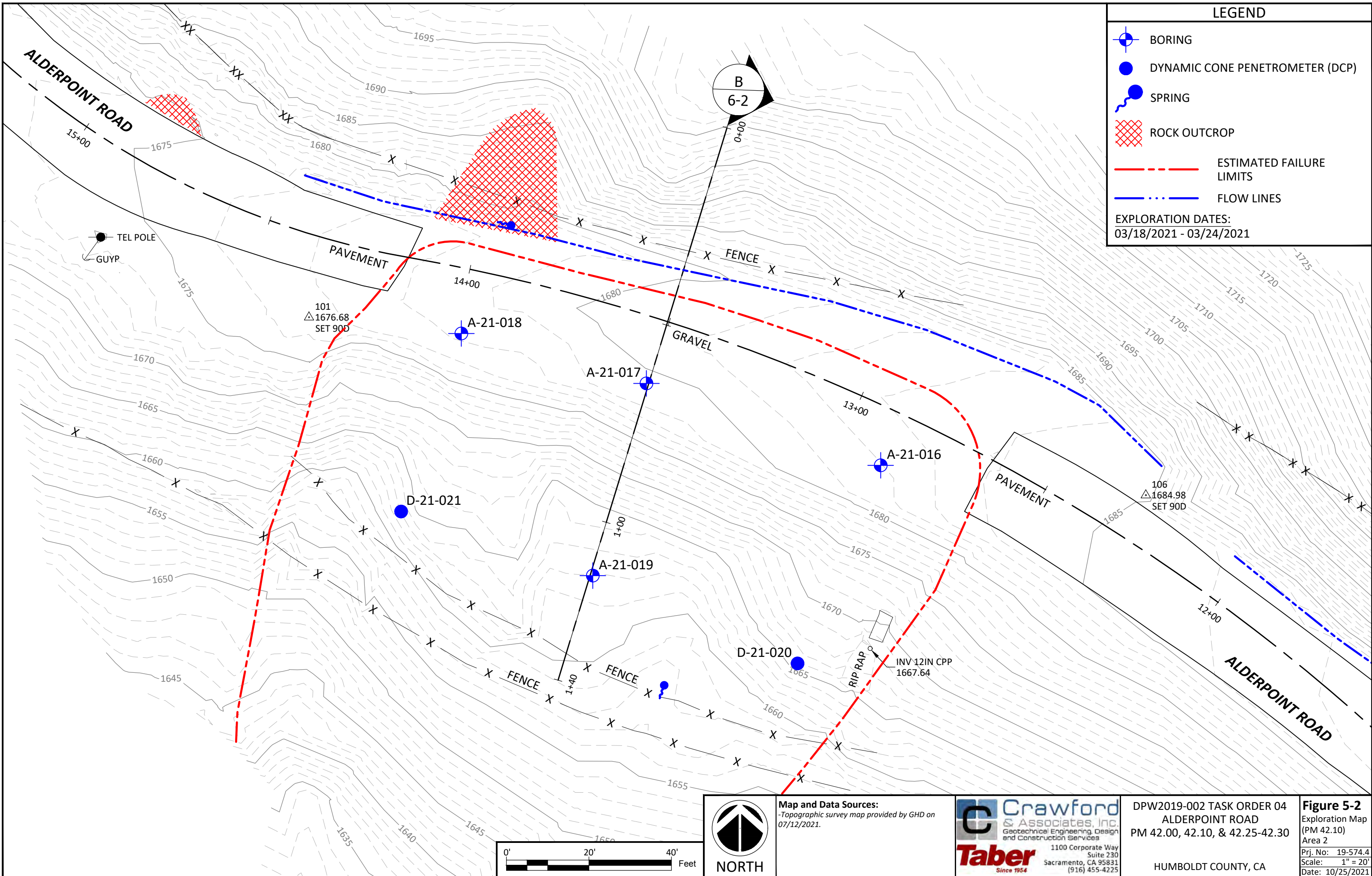
FIGURE 6-2 – TYPICAL SECTION (PM 42.10)

BORING LOGS LEGEND

BORING LOGS

DYNAMIC CONE PENETROMETER (DCP) LOGS

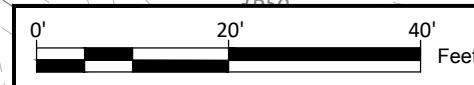
LABORATORY TEST RESULTS



LEGEND

- BORING
- DYNAMIC CONE PENETROMETER (DCP)
- SPRING
- ROCK OUTCROP
- ESTIMATED FAILURE LIMITS
- FLOW LINES

EXPLORATION DATES:
03/18/2021 - 03/24/2021



Map and Data Sources:
-Topographic survey map provided by GHD on 07/12/2021.

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DPW2019-002 TASK ORDER 04
ALDERPOINT ROAD
PM 42.00, 42.10, & 42.25-42.30
HUMBOLDT COUNTY, CA

Figure 5-2
Exploration Map (PM 42.10) Area 2
Prj. No: 19-574.4
Scale: 1" = 20'
Date: 10/25/2021

GROUP SYMBOLS AND NAMES

Graphic / Symbol	Group Names	Graphic / Symbol	Group Names
	GW Well-graded GRAVEL Well-graded GRAVEL with SAND		CL Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
	GP Poorly graded GRAVEL Poorly graded GRAVEL with SAND		
	GW-GM Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND		CL-ML SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
	GW-GC Well-graded GRAVEL with CLAY (or SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
	GP-GM Poorly graded GRAVEL with SILT Poorly graded GRAVEL with SILT and SAND		ML SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
	GP-GC Poorly graded GRAVEL with CLAY (or SILTY CLAY) Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
	GM SILTY GRAVEL SILTY GRAVEL with SAND		OL ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
	GC CLAYEY GRAVEL CLAYEY GRAVEL with SAND		
	GC-GM SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND		OL ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
	SW Well-graded SAND Well-graded SAND with GRAVEL		
	SP Poorly graded SAND Poorly graded SAND with GRAVEL		CH Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
	SW-SM Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL		
	SW-SC Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		MH Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
	SP-SM Poorly graded SAND with SILT Poorly graded SAND with SILT and GRAVEL		
	SP-SC Poorly graded SAND with CLAY (or SILTY CLAY) Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		OH ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
	SM SILTY SAND SILTY SAND with GRAVEL		
	SC CLAYEY SAND CLAYEY SAND with GRAVEL		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY elastic ELASTIC SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	SC-SM SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL		
	PT PEAT		OL/OH ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND
	COBBLES COBBLES and BOULDERS BOULDERS		

FIELD AND LABORATORY TESTS

- C** Consolidation
- CL** Collapse Potential
- CP** Compaction Curve
- CR** Corrosion, Sulfates, Chlorides
- CU** Consolidated Undrained Triaxial
- DR** Drained Residual Shear Strength
- DS** Direct Shear
- EI** Expansion Index
- M** Moisture Content
- OC** Organic Content
- P** Permeability
- PA** Particle Size Analysis
- PI** Liquid Limit, Plastic Limit, Plasticity Index
- PL** Point Load Index
- PM** Pressure Meter
- PP** Pocket Penetrometer
- R** R-Value
- SE** Sand Equivalent
- SG** Specific Gravity
- SW** Swell Potential
- TV** Pocket Torvane
- UC** Unconfined Compression - Soil
Unconfined Compression - Rock
- UU** Unconsolidated Undrained Triaxial
- UW** Unit Weight

SAMPLER GRAPHIC SYMBOLS

- Standard Penetration Test (SPT)
- Standard California Sampler (ID 2.0 in.)
- Modified California Sampler (ID 2.5 in.)
- Shelby Tube
- Piston Sampler
- NX Rock Core
- HQ Rock Core
- Bulk Sample
- Other (see remarks)

DRILLING METHOD SYMBOLS

- Auger Drilling
- Rotary Drilling
- Dynamic Cone or Hand Driven
- Diamond Core

WATER LEVEL SYMBOLS

- First Water Level Reading (during drilling)
- Static Water Level Reading (short-term)
- Static Water Level Reading (long-term)

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010) with Errata Sheet (2015).

CONSISTENCY OF COHESIVE SOILS

Descriptor	Unconfined Compressive Strength (tsf)	Pocket Penetrometer (tsf)	Torvane (tsf)	Field Approximation
Very Soft	< 0.25	< 0.25	< 0.12	Easily penetrated several inches by fist
Soft	0.25 - 0.50	0.25 - 0.50	0.12 - 0.25	Easily penetrated several inches by thumb
Medium Stiff	0.50 - 1.0	0.50 - 1.0	0.25 - 0.50	Can be penetrated several inches by thumb with moderate effort
Stiff	1.0 - 2.0	1.0 - 2.0	0.50 - 1.0	Readily indented by thumb but penetrated only with great effort
Very Stiff	2.0 - 4.0	2.0 - 4.0	1.0 - 2.0	Readily indented by thumbnail
Hard	> 4.0	> 4.0	> 2.0	Indented by thumbnail with difficulty

APPARENT DENSITY OF COHESIONLESS SOILS

Descriptor	SPT N ₆₀ (blows / 12 inches)
Very Loose	0 - 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

MOISTURE

Descriptor	Criteria
Dry	No discernable moisture
Moist	Moisture present, but no free water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS

Descriptor	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

SOIL PARTICLE SIZE

Descriptor	Size	
Boulder	> 12 inches	
Cobble	3 to 12 inches	
Gravel	Coarse	3/4 inch to 3 inches
	Fine	No. 4 Sieve to 3/4 inch
Sand	Coarse	No. 10 Sieve to No. 4 Sieve
	Medium	No. 40 Sieve to No. 10 Sieve
	Fine	No. 200 Sieve to No. 40 Sieve
Silt and Clay	Passing No. 200 Sieve	

PLASTICITY OF FINE-GRAINED SOILS

Descriptor	Criteria
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

CEMENTATION

Descriptor	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010).



Boring Record Legend

Soil Legend

Sheet 2 of 2

ROCK GRAPHIC SYMBOLS	
	IGNEOUS ROCK
	SEDIMENTARY ROCK
	METAMORPHIC ROCK

BEDDING SPACING	
Descriptor	Thickness or Spacing
Massive	> 10 ft
Very thickly bedded	3 ft - 10 ft
Thickly bedded	1 ft - 3 ft
Moderately bedded	4 in - 1 ft
Thinly bedded	1 in - 4 in
Very thinly bedded	1/4 in - 1 in
Laminated	< 1/4 in

WEATHERING DESCRIPTORS FOR INTACT ROCK						
Descriptor	Diagnostic Features					General Characteristics
	Chemical Weathering-Discoloration-Oxidation		Mechanical Weathering and Grain Boundary Conditions	Texture and Solutioning		
	Body of Rock	Fracture Surfaces		Texture	Solutioning	
Fresh	No discoloration, not oxidized	No discoloration or oxidation	No separation, intact (tight)	No change	No solutioning	Hammer rings when crystalline rocks are struck.
Slightly Weathered	Discoloration or oxidation is limited to surface of, or short distance from, fractures; some feldspar crystals are dull	Minor to complete discoloration or oxidation of most surfaces	No visible separation, intact (tight)	Preserved	Minor leaching of some soluble minerals may be noted	Hammer rings when crystalline rocks are struck. Body of rock not weakened.
Moderately Weathered	Discoloration or oxidation extends from fractures usually throughout; Fe-Mg minerals are "rusty"; feldspar crystals are "cloudy"	All fracture surfaces are discolored or oxidized	Partial separation of boundaries visible	Generally preserved	Soluble minerals may be mostly leached	Hammer does not ring when rock is struck. Body of rock is slightly weakened.
Intensely Weathered	Discoloration or oxidation throughout; all feldspars and Fe-Mg minerals are altered to clay to some extent; or chemical alteration produces in situ disaggregation (refer to grain boundary conditions)	All fracture surfaces are discolored or oxidized; surfaces are friable	Partial separation, rock is friable; in semi-arid conditions, granitics are disaggregated	Altered by chemical disintegration such as via hydration or argillation	Leaching of soluble minerals may be complete	Dull sound when struck with hammer; usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness such as incipient or hairline fractures or veinlets. Rock is significantly weakened.
Decomposed	Discolored or oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspars and Fe-Mg minerals are completely altered to clay		Complete separation of grain boundaries (disaggregated)	Resembles a soil; partial or complete remnant rock structure may be preserved; leaching of soluble minerals usually complete		Can be granulated by hand. Resistant minerals such as quartz may be present as "stringers" or "dikes".

Note: Combination descriptors (such as "slightly weathered to fresh") are used where equal distribution of both weathering characteristics is present over significant intervals or where characteristics present are "in between" the diagnostic feature. However, combination descriptors should not be used where significant identifiable zones can be delineated. Only two adjacent descriptors shall be combined. "Very intensely weathered" is the combination descriptor for "decomposed to intensely weathered".

PERCENT CORE RECOVERY (REC)
$\frac{\sum \text{Length of the recovered core pieces (in.)}}{\text{Total length of core run (in.)}} \times 100$

ROCK QUALITY DESIGNATION (RQD)
$\frac{\sum \text{Length of intact core pieces} > 4 \text{ in.}}{\text{Total length of core run (in.)}} \times 100$

Note: RQD* indicates soundness criteria not met

ROCK HARDNESS	
Descriptor	Criteria
Extremely Hard	Specimen cannot be scratched with pocket knife or sharp pick; can only be chipped with repeated heavy hammer blows
Very hard	Specimen cannot be scratched with pocket knife or sharp pick; breaks with repeated heavy hammer blows
Hard	Specimen can be scratched with pocket knife or sharp pick with heavy pressure; heavy hammer blows required to break specimen
Moderately Hard	Specimen can be scratched with pocket knife or sharp pick with light or moderate pressure; breaks with moderate hammer blows
Moderately Soft	Specimen can be grooved 1/16 in. with pocket knife or sharp pick with moderate or heavy pressure; breaks with light hammer blow or heavy hand pressure
Soft	Specimen can be grooved or gouged with pocket knife or sharp pick with light pressure, breaks with light to moderate hand pressure
Very Soft	Specimen can be readily indented, grooved, or gouged with fingernail, or carved with pocket knife; breaks with light manual pressure.

FRACTURE DENSITY	
Descriptor	Criteria
Unfractured	No fractures
Very Slightly Fractured	Core lengths greater than 3 ft.
Slightly Fractured	Core lengths mostly from 1 ft. to 3 ft.
Moderately Fractured	Core lengths mostly from 4 in. to 1 ft.
Intensely Fractured	Core lengths mostly from 1 in. to 4 in.
Very Intensely Fractured	Mostly chips and fragments.

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010).



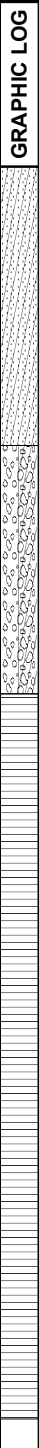
Boring Record Legend

Rock Legend

Sheet 1 of 1

LOG OF BORING A-21-016

PROJECT NO: 19-574.4	BEGIN DATE: 03/22/2021	DRILLING CONTRACTOR: Geo-Ex Subsurface Exploration
PROJECT: Alderpoint Road PM 42.00-42.30	COMPLETION DATE: 03/22/2021	DRILLING METHOD: CME 55 Truck
LOCATION: Bridgeville, CA	SURFACE ELEVATION: 1682.0 (ft)	DRILL RIG: Solid-Stem Auger
COUNTY: Humboldt	SURFACE CONDITION: Fill	HAMMER TYPE: Automatic; 140 lbs; 30 in. drop
CLIENT: HCDPW	WATER DEPTH: Not Encountered	SAMPLER TYPE & SIZE: MCAL (2.4" ID), SPT (1.4" ID)
LOGGED BY: KBH	READING TAKEN: N/A	BOREHOLE DIAMETER: 4.5 in.
DEPTH OF BORING: 31.50 (ft)	HAMMER EFFICIENCY: 89.3 (%)	BACKFILL METHOD: Neat Cement Grout

FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS	
ELEVATION (ft)	DEPTH (ft)	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)				RQD (%)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)				% PASSING 200 SIEVE
1681	1																
1680	2																
1679	3	1	7	15			50										
1678	4		9														
1677	5	2	5				50										
1676	6		6	12						9.2	104.4	18					
1675	7																
1674	8	3	4	4			50										Existing drainage blanket
1673	9		2														
1672	10	4	8				100										
1671	11		11	21						2.4	106.8						
1670	12		10														
1669	13																
1668	14																
1667	15	5	9				83										Sampler wet; sample dry to moist
1666	16		14	31	+4.5					13.8	121.2						
1665	17		17														
1664	18																Harder drilling from 15-20'
1663	19																
1662	20	6	4				50										
1661	21		5	13	+4.5												
1660	22		8														
1659	23																
1658	24																
1657	25	7	6				50										
1656	26		12	30	+4.5					6.0	130.0						
1655	27		18														
1654	28																
1653	29																
1652	30	8	6				39										Hard drilling and grinding from 27-30'
1651	31		11	25	+4.5												
1650	32		14														



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PROJECT NO: 19-574.4
 PROJECT: Alderpoint Road PM 42.00-42.30
 BORING: A-21-016
 ENTRY BY: MNA
 CHECKED BY: KBH

ELEVATION (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	LABORATORY						REMARKS
	DEPTH (ft)	SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT				POCKET PEN. (TSF)	RQD (%)	PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)		% PASSING 200 SIEVE	DRILL METHOD	CASING DEPTH
1654	25	X	8	7	24		SEDIMENTARY ROCK (Argillite); (continued) (Dry to moist.)	39			11.9	123.4			
1649	30	X	9	11	25		Black with blueish veins; (moist.)	67							
1644	35	X	10	5	28			67							
1639	40	X	11	10	36		Black; very soft.	61							
1634	45	X	12	50/6	REF			17							
1629	50	X	13	19	64		Intensely to moderated weathered; moderately soft to soft.	50							
	51			22			Bottom of borehole at 51.5 ft bgs								

Driller notes hard drilling at 37'. Grinding observed

Driller notes hard drilling from 43-45'



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PROJECT NO: 19-574.4
PROJECT: Alderpoint Road PM 42.00-42.30
BORING: A-21-017
ENTRY BY: MNA
CHECKED BY: KBH

LOG OF BORING A-21-018

PROJECT NO: 19-574.4	BEGIN DATE: 03/22/2021	DRILLING CONTRACTOR: Geo-Ex Subsurface Exploration
PROJECT: Alderpoint Road PM 42.00-42.30	COMPLETION DATE: 03/22/2021	DRILLING METHOD: CME 55 Truck
LOCATION: Bridgeville, CA	SURFACE ELEVATION: 1678.2 (ft)	DRILL RIG: Solid-Stem Auger
COUNTY: Humboldt	SURFACE CONDITION: Fill	HAMMER TYPE: Automatic; 140 lbs; 30 in. drop
CLIENT: HCDPW	WATER DEPTH: 8.1 ft	SAMPLER TYPE & SIZE: MCAL (2.4" ID), SPT (1.4" ID)
LOGGED BY: KBH	READING TAKEN: 03/22/21	BOREHOLE DIAMETER: 4.5 in.
DEPTH OF BORING: 30.83 (ft)	HAMMER EFFICIENCY: 89.3 (%)	BACKFILL METHOD: Neat Cement Grout

FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS				
ELEVATION (ft)	DEPTH (ft)	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE							
1677	1						CLAYEY SAND with GRAVEL (SC); very dense; brown; moist; mostly coarse to fine SAND; little fine, subangular GRAVEL; little fines; [FILL].										Driller notes harder drilling from 0-7.5'				
1676	2																				
1675	3	1	23 31 50/5	81/11																	
1674	4							CLAYEY SAND (SC); very dense; gray; moist; mostly medium to fine SAND; little fines; few fine, subangular GRAVEL; [FILL].													
1673	5	2	45 50/3	50/3				ASPHALT CONCRETE(24")													
1672	6																				
1671	7							CLAYEY SAND with GRAVEL (SC); dense; brown; moist; mostly coarse to fine SAND; little fine GRAVEL; little fines.													Driller notes softer drilling from 7.5-10'
1670	8	3	14 21 46	67								5.6	127.7								
1669	9																				
1668	10	4	2 2 2	4				CLAYEY SAND (SC); very loose; brown; wet; mostly coarse to fine SAND; some fines.													
1667	11																				
1666	12																				
1665	13	5	0 0 0	0				Poorly-graded SAND (SP); loose; brown; wet; mostly coarse to fine SAND; trace fines.													Very soft drilling from 13.5-14.5'
1664	14																				
1663	15	6	17 32 38	70				SEDIMENTARY ROCK (Argillite); grayish black; intensely weathered; soft; (moist).													
1662	16																				
1661	17																				
1660	18																				Driller notes very hard drilling from 18-20'
1659	19																				
1658	20	7	50/1	REF																	
1657	21							Greenish gray; moderately weathered; soft to moderately soft; inclusions/presence of calcite.													Sampler rebounding Interbedded harder and softer layers from 20-30'
1656	22																				
1655	23																				
1654	24																				
1653	25	8	16 33 35	68				Blueish green; intensely to moderately weathered; soft.													
1652	26																				
1651	27																				
1650	28																				
1649	29																				
1648	30	9	10 50/4	50/4				Gray mottled with green and white; moderately soft.													
1647	31																				
	32							Bottom of borehole at 30.8 ft bgs													



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PROJECT NO: 19-574.4
 PROJECT: Alderpoint Road PM 42.00-42.30
 BORING: A-21-018
 ENTRY BY: MNA
 CHECKED BY: KBH

LOG OF BORING A-21-019

PROJECT NO: 19-574.4

BEGIN DATE: 03/18/2021

DRILLING CONTRACTOR: Clear Heart Drilling

PROJECT: Alderpoint Road PM 42.00-42.30

COMPLETION DATE: 03/18/2021

DRILLING METHOD: Portable Rig

LOCATION: Bridgeville, CA

SURFACE ELEVATION: 1662.0 (ft)

DRILL RIG: Solid-Stem Auger

COUNTY: Humboldt

SURFACE CONDITION: Soil

HAMMER TYPE: Automatic; 140 lbs; 30 in. drop

CLIENT: HCDPW

WATER DEPTH: 4.0 ft

SAMPLER TYPE & SIZE: MCAL (2.4" ID), SPT (1.4" ID)

LOGGED BY: YYG

READING TAKEN: 03/18/21

BOREHOLE DIAMETER: 4.0 in.

DEPTH OF BORING: 21.00 (ft)

HAMMER EFFICIENCY: 60 (%)

BACKFILL METHOD: Monitoring Well Constructed

FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
ELEVATION (ft)	DEPTH (ft)	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE			
1661	1					CLAYEY SAND (SC); loose; brown; moist; mostly coarse to fine SAND; some fines; few subangular GRAVEL.									Easy drilling from 0-5'		
1660	2																
1659	3	1	5	17		CLAYEY GRAVEL with SAND (GC); loose; brown; moist; mostly coarse to fine, subangular GRAVEL; some fines; little medium to fine SAND.	94				13.3	116.4	32				
1658	4		10	7													
1657	5	2	7	14		Wet. CLAYEY SAND (SC); medium dense; gray; moist; mostly medium to fine SAND; some medium to high plasticity fines; trace GRAVEL.	89				13.3	119.6					
1656	6		6	8													
1655	7						33										
1654	8	3	9	23													
1653	9		11	12													
1652	10	4	6	22	2.00			67									
1651	11		7	15		SEDIMENTARY ROCK (Argillite); gray; intensely weathered; soft; (Poorly-graded GRAVEL with SAND (GP); very dense; gray; dry; mostly coarse to fine, subangular GRAVEL; little medium to fine SAND; trace fines).											
1650	12		15														
1649	13																
1648	14																
1647	15	5	50/3	REF		Moderately soft to soft; (CLAYEY SAND with GRAVEL (SC); mostly coarse to fine SAND; some fines; little subangular GRAVEL). Bottom of borehole at 21.0 ft bgs	100										
1646	16																
1645	17					Piezometer Details: - Stove Pipe" well box at surface (elev. :1661.96) - 1" blank PVC pipe (+2.74'-5') - 1" screened PVC pipe (5'-20') - Backfill: cement grout (0.5'-1'), bentonite chips (1'-3'), sand (3'-20')											
1644	18																
1643	19																
1642	20	6	30	90/12				72				8.5	138.0				
1641	21		40	50/6													
1640	22																
1639	23																
1638	24																
1637	25																
1636	26																
1635	27																



Crawford & Associates, Inc.
1100 Corporate Way, Suite 230
Sacramento, CA 95831
(916) 455-4225

PROJECT NO: 19-574.4
PROJECT: Alderpoint Road PM 42.00-42.30
BORING: A-21-019
ENTRY BY: MNA
CHECKED BY: KBH

WILDCAT DYNAMIC CONE LOG

Crawford and Associates, Inc
 1100 Corporate Way, Suite 230
 Sacramento, CA, 95831

PROJECT NUMBER: 19-574.4
 DATE STARTED: 03-24-2021
 DATE COMPLETED: 03-24-2021

HOLE #: D-21-020
 CREW: MNA/OMR
 PROJECT: Alderpoint Road PM 42.00-42.30
 ADDRESS: _____
 LOCATION: Bridgeville, CA

SURFACE ELEVATION: 1,665.8 ft
 WATER ON COMPLETION: N/A
 HAMMER WEIGHT: 35 lbs.
 CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		NON-COHESIVE	COHESIVE
-									
-									
-	1 ft	3	13.3	...			3	VERY LOOSE	SOFT
-		2	8.9	..			2	VERY LOOSE	SOFT
-		3	13.3	...			3	VERY LOOSE	SOFT
-	2 ft	5	22.2	.....			6	LOOSE	MEDIUM STIFF
-		4	17.8	.....			5	LOOSE	MEDIUM STIFF
-		6	26.6	.....			7	LOOSE	MEDIUM STIFF
-	3 ft	6	26.6	.....			7	LOOSE	MEDIUM STIFF
-	1 m	10	44.4	.....			12	MEDIUM DENSE	STIFF
-		10	38.6	.....			11	MEDIUM DENSE	STIFF
-	4 ft	10	38.6	.....			11	MEDIUM DENSE	STIFF
-		8	30.9	.....			8	LOOSE	MEDIUM STIFF
-		5	19.3	.....			5	LOOSE	MEDIUM STIFF
-	5 ft	6	23.2	.....			6	LOOSE	MEDIUM STIFF
-		8	30.9	.....			8	LOOSE	MEDIUM STIFF
-		8	30.9	.....			8	LOOSE	MEDIUM STIFF
-	6 ft	7	27.0	.....			7	LOOSE	MEDIUM STIFF
-		7	27.0	.....			7	LOOSE	MEDIUM STIFF
-	2 m	5	19.3	.....			5	LOOSE	MEDIUM STIFF
-	7 ft	4	13.7	...			3	VERY LOOSE	SOFT
-		7	23.9	.....			6	LOOSE	MEDIUM STIFF
-		12	41.0	.....			11	MEDIUM DENSE	STIFF
-	8 ft	13	44.5	.....			12	MEDIUM DENSE	STIFF
-		24	82.1	.....			23	MEDIUM DENSE	VERY STIFF
-		19	65.0	.....			18	MEDIUM DENSE	VERY STIFF
-	9 ft	15	51.3	.....			14	MEDIUM DENSE	STIFF
-		17	58.1	.....			16	MEDIUM DENSE	VERY STIFF
-		20	68.4	.....			19	MEDIUM DENSE	VERY STIFF
-	3 m	10 ft	13	44.5	.....		12	MEDIUM DENSE	STIFF
-		12	36.7	.....			10	LOOSE	STIFF
-		16	49.0	.....			13	MEDIUM DENSE	STIFF
-	11 ft	23	70.4	.....			20	MEDIUM DENSE	VERY STIFF
-		43	131.6	.....			25+	DENSE	HARD
-		30	91.8	.....			25+	MEDIUM DENSE	VERY STIFF
-	12 ft	21	64.3	.....			18	MEDIUM DENSE	VERY STIFF
-		18	55.1	.....			15	MEDIUM DENSE	STIFF
-		19	58.1	.....			16	MEDIUM DENSE	VERY STIFF
-	13 ft	16	49.0	.....			13	MEDIUM DENSE	STIFF
-	4 m	21	64.3	.....			18	MEDIUM DENSE	VERY STIFF
-		17	47.1	.....			13	MEDIUM DENSE	STIFF

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		NON-COHESIVE	COHESIVE
- 14 ft	18	49.9	.....				14	MEDIUM DENSE	STIFF
-	56	155.1	.....				25+	DENSE	HARD
-	63	174.5	.....				25+	DENSE	HARD
- 15 ft	77	213.3	.....				25+	VERY DENSE	HARD
-	23	63.7	.....				18	MEDIUM DENSE	VERY STIFF
-	19	52.6	.....				15	MEDIUM DENSE	STIFF
- 16 ft	17	47.1	.....				13	MEDIUM DENSE	STIFF
-	15	41.6	.....				11	MEDIUM DENSE	STIFF
- 5 m	16	44.3	.....				12	MEDIUM DENSE	STIFF
- 17 ft	15	38.1	.....				10	LOOSE	STIFF
-	18	45.7	.....				13	MEDIUM DENSE	STIFF
-	24	61.0	.....				17	MEDIUM DENSE	VERY STIFF
- 18 ft	25	63.5	.....				18	MEDIUM DENSE	VERY STIFF
-	23	58.4	.....				16	MEDIUM DENSE	VERY STIFF
-	23	58.4	.....				16	MEDIUM DENSE	VERY STIFF
- 19 ft	22	55.9	.....				15	MEDIUM DENSE	STIFF
-	20	50.8	.....				14	MEDIUM DENSE	STIFF
-	21	53.3	.....				15	MEDIUM DENSE	STIFF
- 6 m	20 ft	34	.....				24	MEDIUM DENSE	VERY STIFF
-	37	86.2	.....				24	MEDIUM DENSE	VERY STIFF
-	51	118.8	.....				25+	DENSE	HARD
- 21 ft	54	125.8	.....				25+	DENSE	HARD
-	25	58.3	.....				16	MEDIUM DENSE	VERY STIFF
-	28	65.2	.....				18	MEDIUM DENSE	VERY STIFF
- 22 ft	45	104.9	.....				25+	MEDIUM DENSE	VERY STIFF
-	100	233.0	.....				25+	VERY DENSE	HARD
- 23 ft									
- 7 m									
- 24 ft									
- 25 ft									
- 26 ft									
- 8 m									
- 27 ft									
- 28 ft									
- 29 ft									
- 9 m	30 ft								

WILDCAT DYNAMIC CONE LOG

Crawford and Associates, Inc
 1100 Corporate Way, Suite 230
 Sacramento, CA, 95831

PROJECT NUMBER: 19-574.4
 DATE STARTED: 03-23-2021
 DATE COMPLETED: 03-23-2021

HOLE #: D-21-021
 CREW: MNA/OMR
 PROJECT: Alderpoint Road PM 42.00-42.30
 ADDRESS: _____
 LOCATION: Bridgeville, CA

SURFACE ELEVATION: 1,663.1 ft
 WATER ON COMPLETION: N/A
 HAMMER WEIGHT: 35 lbs.
 CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		NON-COHESIVE	COHESIVE
-									
-									
-	1 ft	3	13.3	•••			3	VERY LOOSE	SOFT
-		4	17.8	••••			5	LOOSE	MEDIUM STIFF
-		3	13.3	•••			3	VERY LOOSE	SOFT
-	2 ft	4	17.8	••••			5	LOOSE	MEDIUM STIFF
-		5	22.2	•••••			6	LOOSE	MEDIUM STIFF
-		5	22.2	•••••			6	LOOSE	MEDIUM STIFF
-	3 ft	5	22.2	•••••			6	LOOSE	MEDIUM STIFF
-	1 m	10	44.4	••••••••••			12	MEDIUM DENSE	STIFF
-		7	27.0	•••••			7	LOOSE	MEDIUM STIFF
-	4 ft	9	34.7	•••••••			9	LOOSE	STIFF
-		7	27.0	•••••			7	LOOSE	MEDIUM STIFF
-		7	27.0	•••••			7	LOOSE	MEDIUM STIFF
-	5 ft	7	27.0	•••••			7	LOOSE	MEDIUM STIFF
-		7	27.0	•••••			7	LOOSE	MEDIUM STIFF
-		5	19.3	••••			5	LOOSE	MEDIUM STIFF
-	6 ft	7	27.0	•••••			7	LOOSE	MEDIUM STIFF
-		5	19.3	••••			5	LOOSE	MEDIUM STIFF
-	2 m	2	7.7	••			2	VERY LOOSE	SOFT
-	7 ft	3	10.3	••			2	VERY LOOSE	SOFT
-		4	13.7	•••			3	VERY LOOSE	SOFT
-		7	23.9	•••••			6	LOOSE	MEDIUM STIFF
-	8 ft	10	34.2	•••••••			9	LOOSE	STIFF
-		13	44.5	••••••••••			12	MEDIUM DENSE	STIFF
-		20	68.4	••••••••••••••••			19	MEDIUM DENSE	VERY STIFF
-	9 ft	15	51.3	••••••••••			14	MEDIUM DENSE	STIFF
-		12	41.0	••••••••••			11	MEDIUM DENSE	STIFF
-		12	41.0	••••••••••			11	MEDIUM DENSE	STIFF
-	3 m	10 ft	30.8	•••••••			8	LOOSE	MEDIUM STIFF
-		8	24.5	•••••			6	LOOSE	MEDIUM STIFF
-		10	30.6	•••••••			8	LOOSE	MEDIUM STIFF
-	11 ft	10	30.6	•••••••			8	LOOSE	MEDIUM STIFF
-		11	33.7	•••••••			9	LOOSE	STIFF
-		10	30.6	•••••			8	LOOSE	MEDIUM STIFF
-	12 ft	13	39.8	••••••••••			11	MEDIUM DENSE	STIFF
-		14	42.8	••••••••••			12	MEDIUM DENSE	STIFF
-		13	39.8	•••••••			11	MEDIUM DENSE	STIFF
-	13 ft	13	39.8	•••••••			11	MEDIUM DENSE	STIFF
-	4 m	22	67.3	••••••••••••••••			19	MEDIUM DENSE	VERY STIFF
-		29	80.3	••••••••••••••••••••			22	MEDIUM DENSE	VERY STIFF

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE 0 50 100 150	N'	TESTED CONSISTENCY		
					NON-COHESIVE	COHESIVE	
- 14 ft	16	44.3	.....	12	MEDIUM DENSE	STIFF
-	18	49.9	.....	14	MEDIUM DENSE	STIFF
-	19	52.6	.....	15	MEDIUM DENSE	STIFF
- 15 ft	14	38.8	.....	11	MEDIUM DENSE	STIFF
-	14	38.8	.....	11	MEDIUM DENSE	STIFF
-	19	52.6	.....	15	MEDIUM DENSE	STIFF
- 16 ft	21	58.2	.....	16	MEDIUM DENSE	VERY STIFF
-	22	60.9	.....	17	MEDIUM DENSE	VERY STIFF
- 5 m	16	44.3	.....	12	MEDIUM DENSE	STIFF
- 17 ft	18	45.7	.....	13	MEDIUM DENSE	STIFF
-	28	71.1	.....	20	MEDIUM DENSE	VERY STIFF
-	36	91.4	.....	25+	MEDIUM DENSE	VERY STIFF
- 18 ft	30	76.2	.....	21	MEDIUM DENSE	VERY STIFF
-	17	43.2	.....	12	MEDIUM DENSE	STIFF
-	36	91.4	.....	25+	MEDIUM DENSE	VERY STIFF
- 19 ft	40	101.6	.....	25+	MEDIUM DENSE	VERY STIFF
-	33	83.8	.....	23	MEDIUM DENSE	VERY STIFF
-	35	88.9	.....	25	MEDIUM DENSE	VERY STIFF
- 6 m	20 ft	36	91.4	25+	MEDIUM DENSE	VERY STIFF
-	22	51.3	.....	14	MEDIUM DENSE	STIFF
-	28	65.2	.....	18	MEDIUM DENSE	VERY STIFF
- 21 ft	23	53.6	.....	15	MEDIUM DENSE	STIFF
-	100	233.0	.....	25+	VERY DENSE	HARD
- 22 ft							
-							
- 23 ft							
- 7 m							
- 24 ft							
-							
- 25 ft							
-							
- 26 ft							
- 8 m							
- 27 ft							
-							
- 28 ft							
-							
- 29 ft							
- 9 m	30 ft						



Project Name: Alderpoint Road PM 42.10
 CAInc File No: 19-574.4
 Date: 6/3/21
 Technician: LAD/OMR/BWD

MOISTURE-DENSITY TESTS - D2216/D7263

	1	2	3	4	5
Sample No.	A-21-016-2A	A-21-016-4A	A-21-016-5A	A-21-016-7A	A-21-017-3B
USCS Symbol	SC	GP-GC	ROCK	ROCK	SP-SC
Depth (ft.)	6	11	16	26	8
Sample Length (in.)	4.715	4.964	4.312	5.195	5.143
Diameter (in.)	2.401	2.395	2.428	1.422	2.428
Sample Volume (ft ³)	0.01235	0.01294	0.01155	0.00477	0.01378
Total Mass Soil+Tube (g)	913.8	926.5	929.5	414.2	991.4
Mass of Tube (g)	274.7	284.5	206.8	115.8	211.8
Tare No.	2002	158	G20	114	2012
Tare (g)	122.6	14.1	13.6	13.8	122.2
Wet Soil + Tare (g)	378.3	72.7	52.6	93.9	398.9
Dry Soil + Tare (g)	356.7	71.4	47.9	89.3	385.1
Dry Soil (g)	234.1	57.3	34.3	75.5	262.9
Water (g)	21.6	1.4	4.7	4.5	13.8
Moisture (%)	9.2	2.4	13.8	6.0	5.2
Dry Density (pcf)	104.4	106.8	121.2	130.0	118.5

Notes:



Project Name: Alderpoint Road PM 42.10
 CAInc File No: 19-574.4
 Date: 5/28/21
 Technician: BWD/LAD/OMR

MOISTURE-DENSITY TESTS - D2216/D7263

	1	2	3	4	5
Sample No.	A-21-017-4A	A-21-017-6A	A-21-017-8A	A-21-018-3A	A-21-018-5A
USCS Symbol	SC	CL	CL	SC	SP
Depth (ft.)	11	16	26	8.5	13.5
Sample Length (in.)	5.414	4.706	3.401	5.197	-
Diameter (in.)	1.433	1.418	1.408	1.418	-
Sample Volume (ft ³)	0.00505	0.00430	0.00306	0.00475	-
Total Mass Soil+Tube (g)	361.6	381.9	312.8	423.7	-
Mass of Tube (g)	122.3	119.3	120.8	133.1	-
Tare No.	X7	105	134	G8	2011
Tare (g)	147.8	14.0	13.9	13.2	122.9
Wet Soil + Tare (g)	390.0	92.6	85.3	94.5	318.8
Dry Soil + Tare (g)	378.8	85.1	77.7	90.2	292.9
Dry Soil (g)	231.0	71.1	63.8	77.0	170.0
Water (g)	11.2	7.6	7.6	4.3	25.9
Moisture (%)	4.8	10.6	11.9	5.6	15.2
Dry Density (pcf)	99.6	121.7	123.4	127.7	-

Notes:



Project Name: Alderpoint Road PM 42.10
 CAInc File No: 19-574.4
 Date: 6/7/21
 Technician: OMR/LAD

MOISTURE-DENSITY TESTS - D2216/D7263

	1	2	3	4	5
Sample No.	A-21-018-6A	A-21-019-1A	A-21-019-2A	A-21-019-4A	A-21-019-6A
USCS Symbol	D.ROCK	SC	GC	CL	ROCK
Depth (ft.)	16	3.5	6	11	20.5
Sample Length (in.)	2.354	4.736	5.588	5.742	4.728
Diameter (in.)	2.386	2.437	2.395	2.386	1.417
Sample Volume (ft ³)	0.00609	0.01278	0.01457	0.01485	0.00431
Total Mass Soil+Tube (g)	677.2	974.8	1174.3	1217.9	410.1
Mass of Tube (g)	275.4	210.3	278.8	279.3	117.3
Tare No.	G5	3010	D20	121	D17
Tare (g)	13.6	127.0	13.9	14.3	13.7
Wet Soil + Tare (g)	61.6	419.9	69.0	63.9	65.5
Dry Soil + Tare (g)	57.1	385.5	62.5	59.2	61.5
Dry Soil (g)	43.5	258.5	48.6	44.9	47.8
Water (g)	4.5	34.4	6.5	4.7	4.0
Moisture (%)	10.4	13.3	13.3	10.5	8.5
Dry Density (pcf)	131.8	116.4	119.6	126.1	138.0

Notes:

Project Name: Alderpoint Road PM 42.10

CAInc File No: 19-574.4

Date: 6/9/21

Technician: BWD,LAD,MCC

200 Wash - ASTM D1140

Method A

Max Particle Size (100% Passing)	Standard Sieve Size	Recommended Min Mass of Test Specimens
2 mm or less	No. 10	20 g
4.75 mm	No. 4	100 g
9.5 mm	3/8 "	500 g
19.0 mm	3/4 "	2.5 kg
37.5 mm	1 1/2 "	10 kg
75.0 mm	3 "	50 kg

Table from 6.2 of ASTM D1140

Sample No.	A-21-017-4A	A-21-018-1A	A-21-018-5A	A-21-019-1A	A-21-019-4B
USCS Symbol	SC	SC	SP	SC	SC
Depth (ft.)	11	3.5	13.5	3.5	10.5
Tare No.	X7	2036	2011	3010	1011
Tare (g)	147.8	124.4	122.9	127	126.8
Dry Soil + Tare (g)	378.8	393.1	292.9	385.5	307.8
Dry Mass before (g)	231.0	268.7	170.0	258.5	181.0
Dry Mass after (g)	196.1	231.4	162.0	176.3	99.5
Percent Fines (%)	15	14	5	32	45

Notes:

Project Name: Alderpoint Road PM 42.10

CAInc File No: 19-574.4

Date: 5/26/21

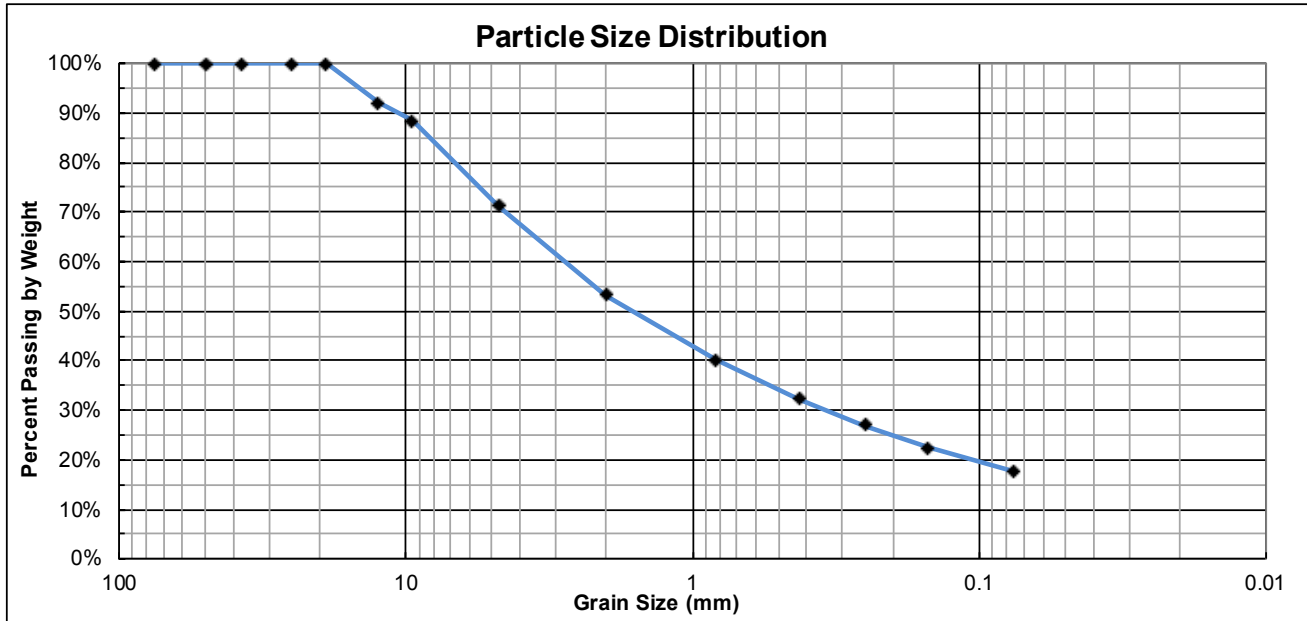
Technician: OMR

Sample ID: A-21-016-2A

Depth (ft): 6

USCS Classification: CLAYEY SAND with GRAVEL (SC)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	0	29	18	21	14	
0	29		53			18

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing
Cobbles		3"	75	0.0	100%
Gravel	Coarse	2"	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	0.0	100%
	Fine	1/2"	12.5	18.9	92%
		3/8"	9.50	27.3	88%
Sand	Coarse	#4	4.75	67.1	71%
		#10	2.00	109.5	53%
	Medium	#20	0.825	140.3	40%
		#40	0.425	158.3	32%
	Fine	#60	0.250	171.2	27%
		#100	0.150	181.7	22%
		#200	0.075	192.9	18%

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Project Name: Alderpoint Road PM 42.10

CAInc File No: 19-574.4

Date: 6/14/21

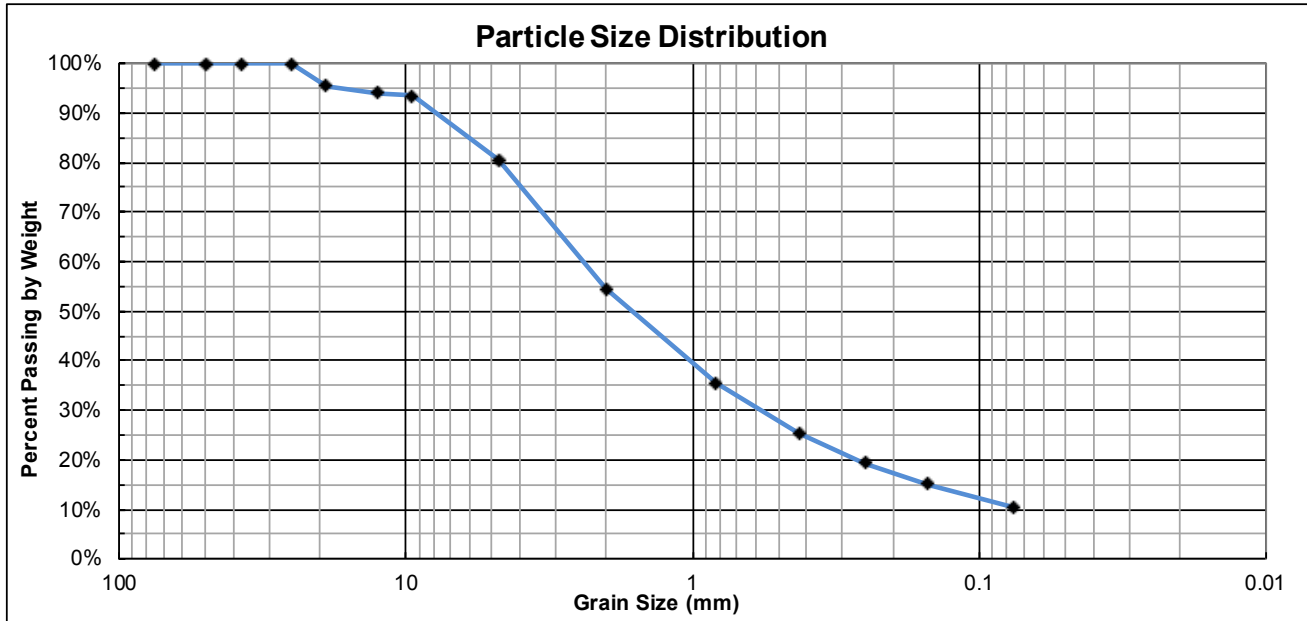
Technician: BWD

Sample ID: A-21-017-3B

Depth (ft): 8

USCS Classification: Poorly-graded SAND with CLAY and GRAVEL (SP-SC)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	5	15	26	29	15	10
0	20		70			10

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing
Cobbles		3"	75	0.0	100%
Gravel	Coarse	2"	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	0.0	100%
		3/4"	19.0	11.9	95%
	Fine	1/2"	12.5	15.7	94%
		3/8"	9.50	17.2	93%
Sand	Coarse	#4	4.75	51.5	80%
		#10	2.00	119.7	54%
	Medium	#20	0.825	169.7	35%
		#40	0.425	196.4	25%
	Fine	#60	0.250	212.3	19%
		#100	0.150	223.7	15%
		#200	0.075	235.7	10%

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Project Name: Alderpoint Road PM 42.10

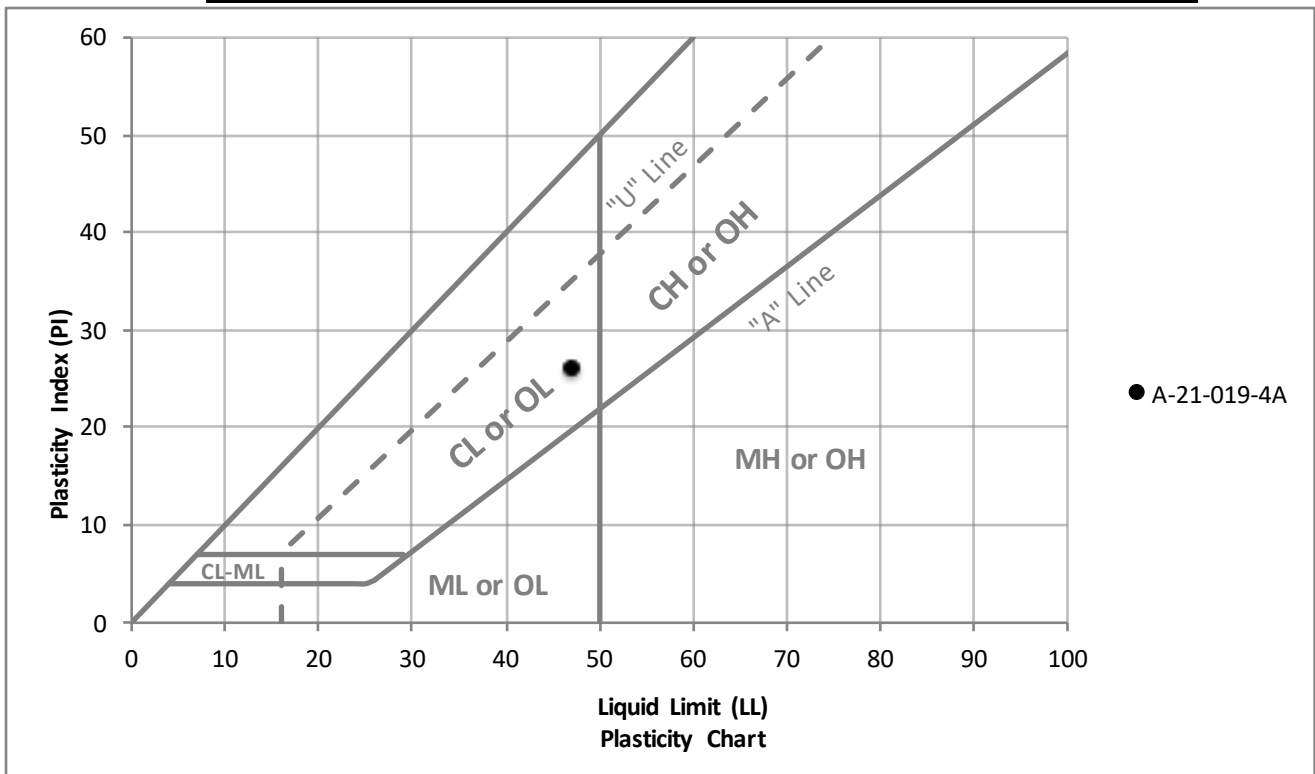
CAInc File No: 19-574.4

Date: 6/9/21

Technician: MNA/LAD/CAP/OMR

Plastic Index - ASTM D4318

Sample ID	Depth (ft)	Liquid Limit	Plastic Limit	PI
A-21-019-4A	11	47	21	26



Project Name: Alderpoint Road PM 42.10

CAInc File No: 19-574.4

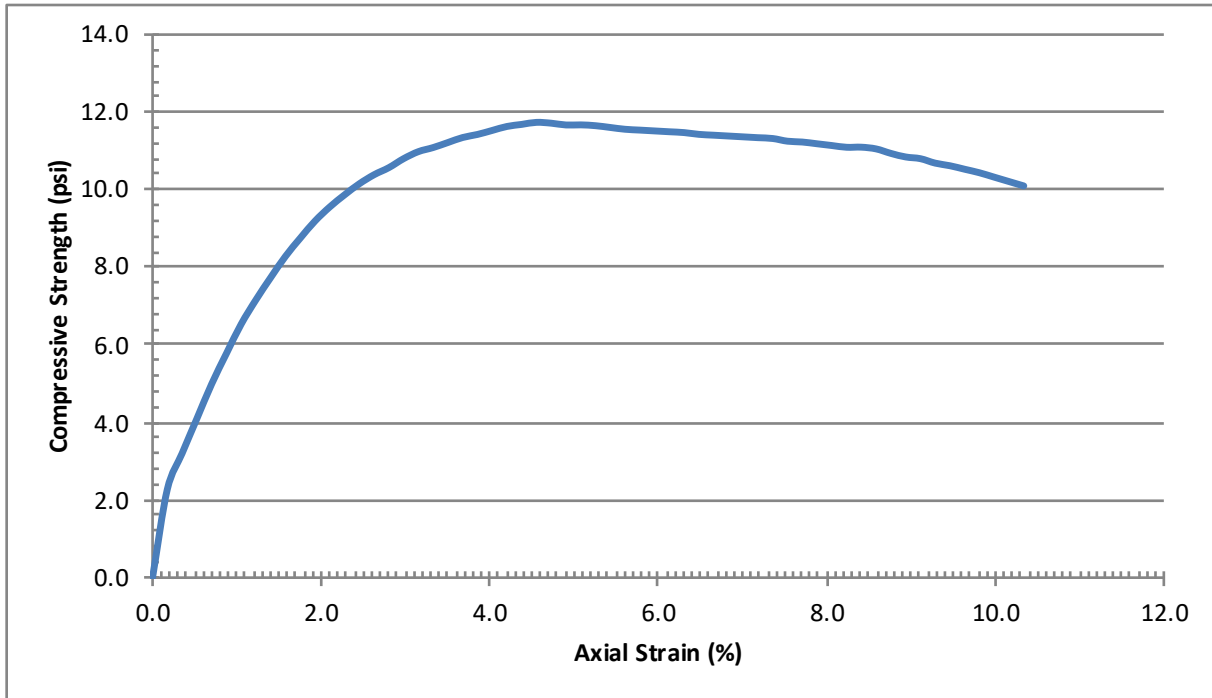
Date: 6/4/21

Technician: LAD

Sample ID: A-21-019-4A Depth (ft): 11.0

USCS Classification: CL

UNCONFINED COMPRESSION TEST - D2166



Dry Density (pcf) 126.1

Water Content (%) 10.5

Unconfined Compressive Strength (psi) 11.7

Unconfined Compressive Strength (psf) 1685

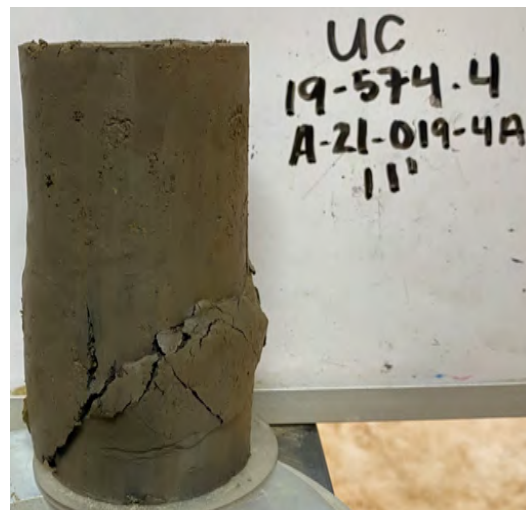
Average Height (in) 5.742

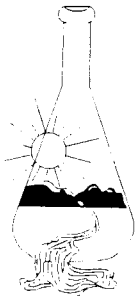
Average Diameter (in) 2.386

Rate of strain (%) 1.0

Strain at Failure (%) 4.6

Notes:





Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 05/28/2021
Date Submitted 05/24/2021

To: Carmelo Pagan
Crawford & Associates, Inc.
1100 Corporate Way Suite 230
Sacramento, CA 95831

From: Gene Oliphant, Ph.D. \ Randy Horney *RA*
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 19-574.4 ALDER POINT Site ID : A21-017-2A,6.0.
Thank you for your business.

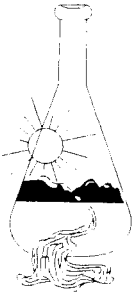
* For future reference to this analysis please use SUN # 84909-176990.

EVALUATION FOR SOIL CORROSION

Soil pH	6.92		
Minimum Resistivity	3.02	ohm-cm (x1000)	
Chloride	1.1 ppm	00.00011	%
Sulfate	62.8 ppm	00.00628	%

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m



Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
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Crawford & Associates, Inc.
1100 Corporate Way Suite 230
Sacramento, CA 95831

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager *RA*

The reported analysis was requested for the following location:
Location : 19-574.4 ALDER POINT Site ID : A21-019-4B,10.5.
Thank you for your business.

* For future reference to this analysis please use SUN # 84909-176992.

EVALUATION FOR SOIL CORROSION

Soil pH	6.87		
Minimum Resistivity	1.93	ohm-cm (x1000)	
Chloride	1.7 ppm	00.00017	%
Sulfate	16.9 ppm	00.00169	%

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m

APPENDIX C – PM 42.25 - 42.30

FIGURE 5-3 – EXPLORATION MAP

FIGURE 6-3 – TYPICAL SECTION (PM 42.25-42.30)





BORING LOGS LEGEND

BORING LOGS

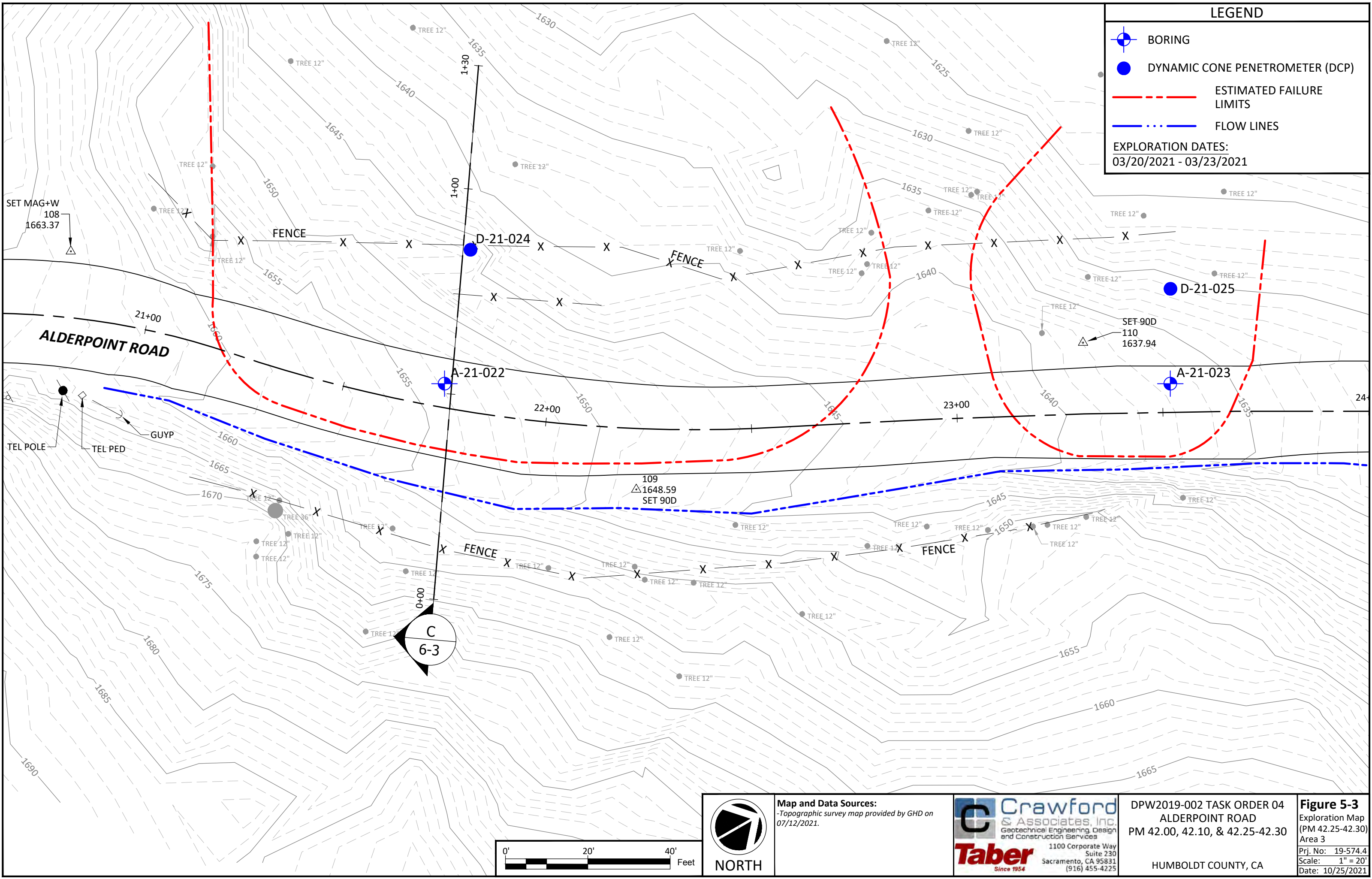
DYNAMIC CONE PENETROMETER (DCP) LOGS

LABORATORY TEST RESULTS

LEGEND

-  BORING
-  DYNAMIC CONE PENETROMETER (DCP)
-  ESTIMATED FAILURE LIMITS
-  FLOW LINES

EXPLORATION DATES:
03/20/2021 - 03/23/2021



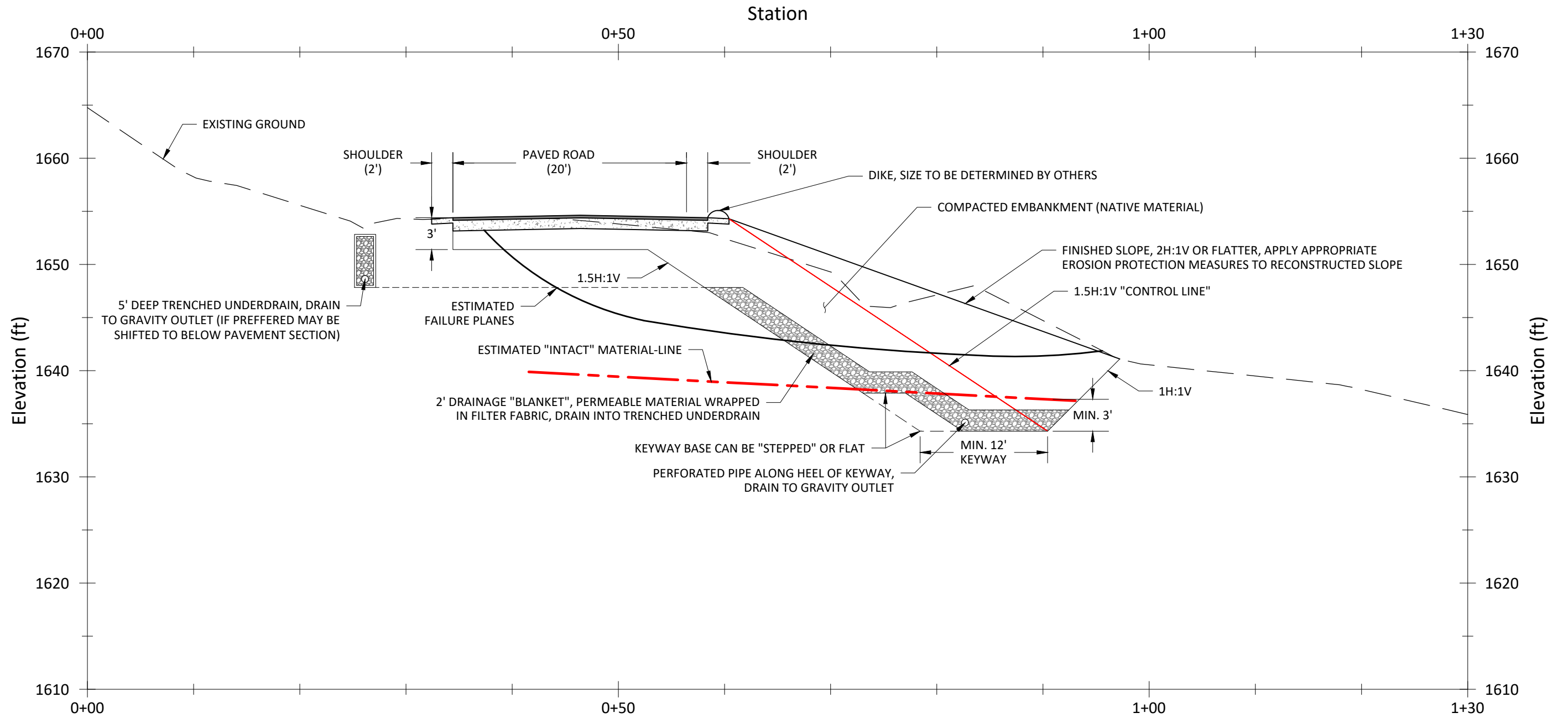
Map and Data Sources:
-Topographic survey map provided by GHD on 07/12/2021.



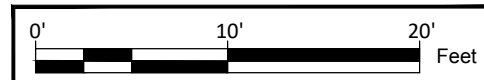
Crawford & Associates, Inc.
Geotechnical Engineering, Design and Construction Services
Taber
Since 1954
1100 Corporate Way
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(916) 455-4225

DPW2019-002 TASK ORDER 04
ALDERPOINT ROAD
PM 42.00, 42.10, & 42.25-42.30
HUMBOLDT COUNTY, CA

Figure 5-3
Exploration Map
(PM 42.25-42.30)
Area 3
Prj. No: 19-574.4
Scale: 1" = 20'
Date: 10/25/2021



Section C - Reconstructed Embankment



Data Sources:
 -Topographic survey map provided by GHD on 07/12/2021.

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DPW2019-002 TASK ORDER 04
 ALDERPOINT ROAD
 PM 42.00, 42.10, & 42.25-42.30
 HUMBOLDT COUNTY, CA

Figure 6-3
 Typical Section (PM 42.25-42.30) Area 3
 Prj. No: 19-574.4
 Scale: 1" = 10'
 Date: 06/22/2023

GROUP SYMBOLS AND NAMES

Graphic / Symbol	Group Names	Graphic / Symbol	Group Names
	Well-graded GRAVEL		CL Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
	Well-graded GRAVEL with SAND		
	Poorly graded GRAVEL		CL-ML SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
	Poorly graded GRAVEL with SAND		
	Well-graded GRAVEL with SILT		ML SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
	Well-graded GRAVEL with SILT and SAND		
	Well-graded GRAVEL with CLAY (or SILTY CLAY)		OL ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
	Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
	Poorly graded GRAVEL with SILT		OL ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
	Poorly graded GRAVEL with SILT and SAND		
	Poorly graded GRAVEL with CLAY (or SILTY CLAY)		OL ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
	Poorly graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)		
	SILTY GRAVEL		OL ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
	SILTY GRAVEL with SAND		
	CLAYEY GRAVEL		OL ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
	CLAYEY GRAVEL with SAND		
	SILTY, CLAYEY GRAVEL		OL ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
	SILTY, CLAYEY GRAVEL with SAND		
	Well-graded SAND		CH Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY GRAVELLY fat CLAY with SAND
	Well-graded SAND with GRAVEL		
	Poorly graded SAND		MH Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT GRAVELLY elastic SILT with SAND
	Poorly graded SAND with GRAVEL		
	Well-graded SAND with SILT		OH ORGANIC fat CLAY ORGANIC fat CLAY with SAND ORGANIC fat CLAY with GRAVEL SANDY ORGANIC fat CLAY SANDY ORGANIC fat CLAY with GRAVEL GRAVELLY ORGANIC fat CLAY GRAVELLY ORGANIC fat CLAY with SAND
	Well-graded SAND with SILT and GRAVEL		
	Well-graded SAND with CLAY (or SILTY CLAY)		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY elastic ELASTIC SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	Well-graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		
	Poorly graded SAND with SILT		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY elastic ELASTIC SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	Poorly graded SAND with SILT and GRAVEL		
	Poorly graded SAND with CLAY (or SILTY CLAY)		OH ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY elastic ELASTIC SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
	Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY and GRAVEL)		
	SILTY SAND		OL/OH ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND
	SILTY SAND with GRAVEL		
	CLAYEY SAND		OL/OH ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND
	CLAYEY SAND with GRAVEL		
	SILTY, CLAYEY SAND		OL/OH ORGANIC SOIL ORGANIC SOIL with SAND ORGANIC SOIL with GRAVEL SANDY ORGANIC SOIL SANDY ORGANIC SOIL with GRAVEL GRAVELLY ORGANIC SOIL GRAVELLY ORGANIC SOIL with SAND
	SILTY, CLAYEY SAND with GRAVEL		
	PEAT		
	COBBLES COBBLES and BOULDERS BOULDERS		

FIELD AND LABORATORY TESTS

- C** Consolidation
- CL** Collapse Potential
- CP** Compaction Curve
- CR** Corrosion, Sulfates, Chlorides
- CU** Consolidated Undrained Triaxial
- DR** Drained Residual Shear Strength
- DS** Direct Shear
- EI** Expansion Index
- M** Moisture Content
- OC** Organic Content
- P** Permeability
- PA** Particle Size Analysis
- PI** Liquid Limit, Plastic Limit, Plasticity Index
- PL** Point Load Index
- PM** Pressure Meter
- PP** Pocket Penetrometer
- R** R-Value
- SE** Sand Equivalent
- SG** Specific Gravity
- SW** Swell Potential
- TV** Pocket Torvane
- UC** Unconfined Compression - Soil
Unconfined Compression - Rock
- UU** Unconsolidated Undrained Triaxial
- UW** Unit Weight

SAMPLER GRAPHIC SYMBOLS

- Standard Penetration Test (SPT)
- Standard California Sampler (ID 2.0 in.)
- Modified California Sampler (ID 2.5 in.)
- Shelby Tube
- Piston Sampler
- NX Rock Core
- HQ Rock Core
- Bulk Sample
- Other (see remarks)

DRILLING METHOD SYMBOLS

- Auger Drilling
- Rotary Drilling
- Dynamic Cone or Hand Driven
- Diamond Core

WATER LEVEL SYMBOLS

- First Water Level Reading (during drilling)
- Static Water Level Reading (short-term)
- Static Water Level Reading (long-term)

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010) with Errata Sheet (2015).

CONSISTENCY OF COHESIVE SOILS

Descriptor	Unconfined Compressive Strength (tsf)	Pocket Penetrometer (tsf)	Torvane (tsf)	Field Approximation
Very Soft	< 0.25	< 0.25	< 0.12	Easily penetrated several inches by fist
Soft	0.25 - 0.50	0.25 - 0.50	0.12 - 0.25	Easily penetrated several inches by thumb
Medium Stiff	0.50 - 1.0	0.50 - 1.0	0.25 - 0.50	Can be penetrated several inches by thumb with moderate effort
Stiff	1.0 - 2.0	1.0 - 2.0	0.50 - 1.0	Readily indented by thumb but penetrated only with great effort
Very Stiff	2.0 - 4.0	2.0 - 4.0	1.0 - 2.0	Readily indented by thumbnail
Hard	> 4.0	> 4.0	> 2.0	Indented by thumbnail with difficulty

APPARENT DENSITY OF COHESIONLESS SOILS

Descriptor	SPT N ₆₀ (blows / 12 inches)
Very Loose	0 - 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	> 50

MOISTURE

Descriptor	Criteria
Dry	No discernable moisture
Moist	Moisture present, but no free water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS

Descriptor	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5 to 10%
Little	15 to 25%
Some	30 to 45%
Mostly	50 to 100%

SOIL PARTICLE SIZE

Descriptor	Size	
Boulder	> 12 inches	
Cobble	3 to 12 inches	
Gravel	Coarse	3/4 inch to 3 inches
	Fine	No. 4 Sieve to 3/4 inch
Sand	Coarse	No. 10 Sieve to No. 4 Sieve
	Medium	No. 40 Sieve to No. 10 Sieve
	Fine	No. 200 Sieve to No. 40 Sieve
Silt and Clay	Passing No. 200 Sieve	

PLASTICITY OF FINE-GRAINED SOILS

Descriptor	Criteria
Nonplastic	A 1/8-inch thread cannot be rolled at any water content.
Low	The thread can barely be rolled, and the lump cannot be formed when drier than the plastic limit.
Medium	The thread is easy to roll, and not much time is required to reach the plastic limit; it cannot be rerolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit.
High	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit.

CEMENTATION

Descriptor	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010).

ROCK GRAPHIC SYMBOLS



IGNEOUS ROCK



SEDIMENTARY ROCK



METAMORPHIC ROCK

BEDDING SPACING

Descriptor	Thickness or Spacing
Massive	> 10 ft
Very thickly bedded	3 ft - 10 ft
Thickly bedded	1 ft - 3 ft
Moderately bedded	4 in - 1 ft
Thinly bedded	1 in - 4 in
Very thinly bedded	1/4 in - 1 in
Laminated	< 1/4 in

WEATHERING DESCRIPTORS FOR INTACT ROCK

Descriptor	Diagnostic Features					General Characteristics
	Chemical Weathering-Discoloration-Oxidation		Mechanical Weathering and Grain Boundary Conditions	Texture and Solutioning		
	Body of Rock	Fracture Surfaces		Texture	Solutioning	
Fresh	No discoloration, not oxidized	No discoloration or oxidation	No separation, intact (tight)	No change	No solutioning	Hammer rings when crystalline rocks are struck.
Slightly Weathered	Discoloration or oxidation is limited to surface of, or short distance from, fractures; some feldspar crystals are dull	Minor to complete discoloration or oxidation of most surfaces	No visible separation, intact (tight)	Preserved	Minor leaching of some soluble minerals may be noted	Hammer rings when crystalline rocks are struck. Body of rock not weakened.
Moderately Weathered	Discoloration or oxidation extends from fractures usually throughout; Fe-Mg minerals are "rusty"; feldspar crystals are "cloudy"	All fracture surfaces are discolored or oxidized	Partial separation of boundaries visible	Generally preserved	Soluble minerals may be mostly leached	Hammer does not ring when rock is struck. Body of rock is slightly weakened.
Intensely Weathered	Discoloration or oxidation throughout; all feldspars and Fe-Mg minerals are altered to clay to some extent; or chemical alteration produces in situ disaggregation (refer to grain boundary conditions)	All fracture surfaces are discolored or oxidized; surfaces are friable	Partial separation, rock is friable; in semi-arid conditions, granitics are disaggregated	Altered by chemical disintegration such as via hydration or argillation	Leaching of soluble minerals may be complete	Dull sound when struck with hammer; usually can be broken with moderate to heavy manual pressure or by light hammer blow without reference to planes of weakness such as incipient or hairline fractures or veinlets. Rock is significantly weakened.
Decomposed	Discolored or oxidized throughout, but resistant minerals such as quartz may be unaltered; all feldspars and Fe-Mg minerals are completely altered to clay		Complete separation of grain boundaries (disaggregated)	Resembles a soil; partial or complete remnant rock structure may be preserved; leaching of soluble minerals usually complete		Can be granulated by hand. Resistant minerals such as quartz may be present as "stringers" or "dikes".

Note: Combination descriptors (such as "slightly weathered to fresh") are used where equal distribution of both weathering characteristics is present over significant intervals or where characteristics present are "in between" the diagnostic feature. However, combination descriptors should not be used where significant identifiable zones can be delineated. Only two adjacent descriptors shall be combined. "Very intensely weathered" is the combination descriptor for "decomposed to intensely weathered".

PERCENT CORE RECOVERY (REC)

$$\frac{\sum \text{Length of the recovered core pieces (in.)}}{\text{Total length of core run (in.)}} \times 100$$

ROCK QUALITY DESIGNATION (RQD)

$$\frac{\sum \text{Length of intact core pieces} > 4 \text{ in.}}{\text{Total length of core run (in.)}} \times 100$$

Note: RQD* indicates soundness criteria not met

ROCK HARDNESS

Descriptor	Criteria
Extremely Hard	Specimen cannot be scratched with pocket knife or sharp pick; can only be chipped with repeated heavy hammer blows
Very hard	Specimen cannot be scratched with pocket knife or sharp pick; breaks with repeated heavy hammer blows
Hard	Specimen can be scratched with pocket knife or sharp pick with heavy pressure; heavy hammer blows required to break specimen
Moderately Hard	Specimen can be scratched with pocket knife or sharp pick with light or moderate pressure; breaks with moderate hammer blows
Moderately Soft	Specimen can be grooved 1/16 in. with pocket knife or sharp pick with moderate or heavy pressure; breaks with light hammer blow or heavy hand pressure
Soft	Specimen can be grooved or gouged with pocket knife or sharp pick with light pressure, breaks with light to moderate hand pressure
Very Soft	Specimen can be readily indented, grooved, or gouged with fingernail, or carved with pocket knife; breaks with light manual pressure.

FRACTURE DENSITY

Descriptor	Criteria
Unfractured	No fractures
Very Slightly Fractured	Core lengths greater than 3 ft.
Slightly Fractured	Core lengths mostly from 1 ft. to 3 ft.
Moderately Fractured	Core lengths mostly from 4 in. to 1 ft.
Intensely Fractured	Core lengths mostly from 1 in. to 4 in.
Very Intensely Fractured	Mostly chips and fragments.

REFERENCE: Caltrans Soil and Rock Logging, Classification, and Presentation Manual (2010).



Boring Record Legend

Rock Legend

Sheet 1 of 1

LOG OF BORING A-21-022

PROJECT NO: 19-574.4	BEGIN DATE: 03/20/2021	DRILLING CONTRACTOR: Geo-Ex Subsurface Exploration
PROJECT: Alderpoint Road PM 42.00-42.30	COMPLETION DATE: 03/20/2021	DRILLING METHOD: CME 55 Truck
LOCATION: Bridgeville, CA	SURFACE ELEVATION: 1653.8 (ft)	DRILL RIG: Solid-Stem Auger
COUNTY: Humboldt	SURFACE CONDITION: Asphalt	HAMMER TYPE: Automatic; 140 lbs; 30 in. drop
CLIENT: HCDPW	WATER DEPTH: Not Encountered	SAMPLER TYPE & SIZE: MCAL (2.4" ID), SPT (1.4" ID)
LOGGED BY: KBH	READING TAKEN: N/A	BOREHOLE DIAMETER: 4.5 in.
DEPTH OF BORING: 31.50 (ft)	HAMMER EFFICIENCY: 89.3 (%)	BACKFILL METHOD: Monitoring Well Constructed

FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
ELEVATION (ft)	DEPTH (ft)	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE			
1653	1					ASPHALT CONCRETE(2") AGGREGATE BASE(2")										AC = 1.5" AB = 2.0"	
1652	2					CLAYEY SAND with GRAVEL (SC); medium dense; grayish brown; moist; mostly coarse to fine SAND; some fines; little coarse to fine, subangular GRAVEL; [FILL].	56										
1651	3	1	3	7	16												
1650	4		9														
1649	5																
1648	6	2	4	5	11	Loose; brown mottled with orange; subangular to subrounded GRAVEL.	56			17.3	108.0	41					
1647	7															Soft drilling	
1646	8					CLAYEY SAND (SC); medium dense; brown mottled with orange and gray; moist; mostly medium to fine SAND; some fines.	78									Torvane = 0.6 tsf	
1645	9				0.75								60				
1644	10					Lean CLAY with SAND (CL); medium stiff; gray; moist; mostly fines; little fine SAND. Lean CLAY with SAND and GRAVEL (CL); stiff; gray; moist; mostly fines; little coarse, subrounded GRAVEL; little fine SAND.	56									Soft drilling from 10-12.5'	
1643	11	4	6	10	22			18	59	15.1	117.5					UC @ 11': Strength=2,506 psf Strain at Failure=6.8%	
1642	12															Harder drilling from 12.5-15'	
1641	13					SANDY lean CLAY (CL); hard; dark gray; moist; mostly fines; some medium to fine SAND; few fine, subrounded GRAVEL.	67									Chem. Analysis @ 13.5': pH=7.15 Min. Res.=480 ohm-cm Chloride=3.5 ppm Sulfate=2702.0 ppm	
1640	14	5	8	16	41					13.3	117.7						
1639	15					SEDIMENTARY ROCK (Argillite); dark gray; intensely weathered; soft; (moist).	67										
1638	16	6	12	42	92					5.3	133.4						
1637	17																
1636	18																
1635	19																
1634	20																
1633	21	7	8	11	25	Gray mottled with blue; decomposed; very soft to soft; (Lean CLAY with SAND (CL); hard; moist; mostly fines; little fine SAND)	83										
1632	22																
1631	23																
1630	24																



Crawford & Associates, Inc.
1100 Corporate Way, Suite 230
Sacramento, CA 95831
(916) 455-4225

PROJECT NO: 19-574.4
PROJECT: Alderpoint Road PM 42.00-42.30
BORING: A-21-022
ENTRY BY: MNA
CHECKED BY: KBH
SHEET # 1 of 2

ELEVATION (ft)	DEPTH (ft)	FIELD					GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
		SAMPLE	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE			
1628	25	X	8	8	22		SEDIMENTARY ROCK (Argillite); (continued)	33										
1627	26			8														
1626	27			14														
1625	28																	
1624	29																	
1623	30	X	9	5	40		Very intensely weathered; soft.	72										
1622	31			14														
1621	32			26			Bottom of borehole at 31.5 ft bgs											
1620	33																	
1619	34																	
1618	35																	
1617	36																	
1616	37																	
1615	38																	
1614	39																	
1613	40																	
1612	41																	
1611	42																	
1610	43																	
1609	44																	
1608	45																	
1607	46																	
1606	47																	
1605	48																	
1604	49																	
1603	50																	
1602	51																	
1601	52																	
1600	53																	
	54																	



Crawford & Associates, Inc.
1100 Corporate Way, Suite 230
Sacramento, CA 95831
(916) 455-4225

PROJECT NO: 19-574.4
PROJECT: Alderpoint Road PM 42.00-42.30
BORING: A-21-022
ENTRY BY: MNA
CHECKED BY: KBH

LOG OF BORING A-21-023

PROJECT NO: 19-574.4	BEGIN DATE: 03/22/2021	DRILLING CONTRACTOR: Geo-Ex Subsurface Exploration
PROJECT: Alderpoint Road PM 42.00-42.30	COMPLETION DATE: 03/22/2021	DRILLING METHOD: CME 55 Truck
LOCATION: Bridgeville, CA	SURFACE ELEVATION: 1636.6 (ft)	DRILL RIG: Solid-Stem Auger
COUNTY: Humboldt	SURFACE CONDITION: Asphalt	HAMMER TYPE: Automatic; 140 lbs; 30 in. drop
CLIENT: HCDPW	WATER DEPTH: Not Encountered	SAMPLER TYPE & SIZE: MCAL (2.4" ID), SPT (1.4" ID)
LOGGED BY: KBH	READING TAKEN: N/A	BOREHOLE DIAMETER: 4.5 in.
DEPTH OF BORING: 31.50 (ft)	HAMMER EFFICIENCY: 89.3 (%)	BACKFILL METHOD: Neat Cement Grout

FIELD						GRAPHIC LOG	DESCRIPTION	RECOVERY (%)	RQD (%)	LABORATORY					DRILL METHOD	CASING DEPTH	REMARKS
ELEVATION (ft)	DEPTH (ft)	SAMPLE NO	BLOWS PER 6 IN.	BLOWS PER FOOT	POCKET PEN. (TSF)					PLASTIC LIMIT	LIQUID LIMIT	MOISTURE (%)	D. DENSITY (PCF)	% PASSING 200 SIEVE			
1636	1					ASPHALT CONCRETE(2") AGGREGATE BASE(2")										AC = 1.5" AB = 2.0"	
1635	2					CLAYEY SAND with GRAVEL (SC); medium dense; brown; dry to moist; mostly medium to fine SAND; little coarse to fine, subangular GRAVEL; little fines; [FILL].	56										
1634	3	1	17	21													Chem. Analysis @ 3.5': pH=6.06 Min. Res.=3,290 ohm-cm Chloride=6.3 ppm Sulfate=8.6 ppm Hard drilling from 5.5-7.0'
1633	4		11														
1632	5		10			CLAYEY SAND (SC); very dense; brown; dry to moist; mostly coarse to fine SAND; little fines [FILL].	82										
1631	6	2	23	50/5	50/5												
1630	7																
1629	8		10			Medium dense; few fine, subangular GRAVEL [End of Fill].	61										
1628	9		17	36		SEDIMENTARY ROCK (Argillite); grayish brown; intensely weathered; soft; (SANDY lean CLAY (CL); very stiff; gray; dry to moist; mostly medium plasticity fines; some fine SAND; trace fine GRAVEL). (Dry to moist)		20	48	13.1	114.4	51					Driller notes easy drilling from 7-10' Driller notes hard drilling from 10-15'
1627	10		18														
1626	11		19	38													
1625	12		19														
1624	13		5			Decomposed; very soft; (moist).	56										
1623	14		39	85													
1622	15		46														
1621	16		3														Driller notes softer drilling from 15-18'
1620	17		4	14	3.50												
1619	18		10														
1618	19		12			Intensely weathered; soft.											
1617	20		16	28													
1616	21		16														
1615	22																
1614	23																
1613	24																
1612	25																
1611	26		18			Soft to very soft; (moist).	61										
1610	27		28	61													
1609	28		33														
1608	29																
1607	30																
1606	31		6														
1605	32		12	27													
			15			Bottom of borehole at 31.5 ft bgs	50										



Crawford & Associates, Inc.
1100 Corporate Way, Suite 230
Sacramento, CA 95831
(916) 455-4225

PROJECT NO: 19-574.4
PROJECT: Alderpoint Road PM 42.00-42.30
BORING: A-21-023
ENTRY BY: MNA
CHECKED BY: KBH
SHEET # 1 of 1

WILDCAT DYNAMIC CONE LOG

Crawford and Associates, Inc
 1100 Corporate Way, Suite 230
 Sacramento, CA, 95831

PROJECT NUMBER: 19-574.4
 DATE STARTED: 03-23-2021
 DATE COMPLETED: 03-23-2021

HOLE #: D-21-024
 CREW: MNA/OMR
 PROJECT: Alderpoint Road PM 42.00-42.30
 ADDRESS: _____
 LOCATION: Bridgeville, CA

SURFACE ELEVATION: 1,646.9 ft
 WATER ON COMPLETION: N/A
 HAMMER WEIGHT: 35 lbs.
 CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		NON-COHESIVE	COHESIVE
-	1	4.4	.				1	VERY LOOSE	VERY SOFT
-	3	13.3	...				3	VERY LOOSE	SOFT
- 1 ft	3	13.3	...				3	VERY LOOSE	SOFT
-	5	22.2	.....				6	LOOSE	MEDIUM STIFF
-	5	22.2	.....				6	LOOSE	MEDIUM STIFF
- 2 ft	4	17.8	.....				5	LOOSE	MEDIUM STIFF
-	7	31.1	.....				8	LOOSE	MEDIUM STIFF
-	5	22.2	.....				6	LOOSE	MEDIUM STIFF
- 3 ft	5	22.2	.....				6	LOOSE	MEDIUM STIFF
- 1 m	6	26.6	.....				7	LOOSE	MEDIUM STIFF
-	25	96.5	.....				25+	MEDIUM DENSE	VERY STIFF
- 4 ft	7	27.0	.....				7	LOOSE	MEDIUM STIFF
-	6	23.2	.....				6	LOOSE	MEDIUM STIFF
-	6	23.2	.....				6	LOOSE	MEDIUM STIFF
- 5 ft	6	23.2	.....				6	LOOSE	MEDIUM STIFF
-	8	30.9	.....				8	LOOSE	MEDIUM STIFF
-	8	30.9	.....				8	LOOSE	MEDIUM STIFF
- 6 ft	10	38.6	.....				11	MEDIUM DENSE	STIFF
-	11	42.5	.....				12	MEDIUM DENSE	STIFF
- 2 m	14	54.0	.....				15	MEDIUM DENSE	STIFF
- 7 ft	26	88.9	.....				25	MEDIUM DENSE	VERY STIFF
-	16	54.7	.....				15	MEDIUM DENSE	STIFF
-	17	58.1	.....				16	MEDIUM DENSE	VERY STIFF
- 8 ft	17	58.1	.....				16	MEDIUM DENSE	VERY STIFF
-	15	51.3	.....				14	MEDIUM DENSE	STIFF
-	17	58.1	.....				16	MEDIUM DENSE	VERY STIFF
- 9 ft	19	65.0	.....				18	MEDIUM DENSE	VERY STIFF
-	100	342.0	.....				25+	VERY DENSE	HARD
- 3 m	10 ft								
-	11 ft								
-	12 ft								
- 4 m	13 ft								

WILDCAT DYNAMIC CONE LOG

Crawford and Associates, Inc
 1100 Corporate Way, Suite 230
 Sacramento, CA, 95831

PROJECT NUMBER: 19-574.4
 DATE STARTED: 03-23-2021
 DATE COMPLETED: 03-23-2021

HOLE #: D-21-025
 CREW: MNA/OMR
 PROJECT: Alderpoint Road PM 42.00-42.30
 ADDRESS: _____
 LOCATION: Bridgeville, CA

SURFACE ELEVATION: 1,631.3 ft
 WATER ON COMPLETION: N/A
 HAMMER WEIGHT: 35 lbs.
 CONE AREA: 10 sq. cm

DEPTH	BLOWS PER 10 cm	RESISTANCE Kg/cm ²	GRAPH OF CONE RESISTANCE				N'	TESTED CONSISTENCY	
			0	50	100	150		NON-COHESIVE	COHESIVE
-	1	4.4	.				1	VERY LOOSE	VERY SOFT
-	2	8.9	..				2	VERY LOOSE	SOFT
- 1 ft	2	8.9	..				2	VERY LOOSE	SOFT
-	4	17.8	....				5	LOOSE	MEDIUM STIFF
-	9	40.0	.....				11	MEDIUM DENSE	STIFF
- 2 ft	8	35.5	.....				10	LOOSE	STIFF
-	10	44.4	.....				12	MEDIUM DENSE	STIFF
-	14	62.2	.....				17	MEDIUM DENSE	VERY STIFF
- 3 ft	11	48.8	.....				13	MEDIUM DENSE	STIFF
- 1 m	10	44.4	.....				12	MEDIUM DENSE	STIFF
-	12	46.3	.....				13	MEDIUM DENSE	STIFF
- 4 ft	30	115.8	.....				25+	DENSE	HARD
-	49	189.1	.....				25+	VERY DENSE	HARD
-	17	65.6	.....				18	MEDIUM DENSE	VERY STIFF
- 5 ft	20	77.2	.....				22	MEDIUM DENSE	VERY STIFF
-	38	146.7	.....				25+	DENSE	HARD
-	39	150.5	.....				25+	DENSE	HARD
- 6 ft	26	100.4	.....				25+	MEDIUM DENSE	VERY STIFF
-	17	65.6	.....				18	MEDIUM DENSE	VERY STIFF
- 2 m	43	166.0	.....				25+	DENSE	HARD
- 7 ft	35	119.7	.....				25+	DENSE	HARD
-	21	71.8	.....				20	MEDIUM DENSE	VERY STIFF
-	23	78.7	.....				22	MEDIUM DENSE	VERY STIFF
- 8 ft	58	198.4	.....				25+	VERY DENSE	HARD
-	37	126.5	.....				25+	DENSE	HARD
-	25	85.5	.....				24	MEDIUM DENSE	VERY STIFF
- 9 ft	22	75.2	.....				21	MEDIUM DENSE	VERY STIFF
-	21	71.8	.....				20	MEDIUM DENSE	VERY STIFF
-	22	75.2	.....				21	MEDIUM DENSE	VERY STIFF
- 3 m	10 ft	17	58.1	.....			16	MEDIUM DENSE	VERY STIFF
-	19	58.1	.....				16	MEDIUM DENSE	VERY STIFF
-	43	131.6	.....				25+	DENSE	HARD
- 11 ft	60	183.6	.....				25+	VERY DENSE	HARD
-	100	306.0	.....				25+	VERY DENSE	HARD
-	12 ft								
-	13 ft								
- 4 m									



Project Name: Alderpoint Road PM 42.25 - 42.30
 CAlnc File No: 19-574.4
 Date: 6/7/21
 Technician: OMR/LAD/BWD

MOISTURE-DENSITY TESTS - D2216/D7263

	1	2	3	4	5
Sample No.	A-21-022-2A	A-21-022-4A	A-21-022-5A	A-21-022-6A	A-21-023-3A
USCS Symbol	SC	CL	CL	ROCK	CL
Depth (ft.)	6	11	13.5	16	8.5
Sample Length (in.)	3.691	4.879	5.607	4.598	5.565
Diameter (in.)	2.399	2.401	2.379	2.374	2.388
Sample Volume (ft ³)	0.00966	0.01278	0.01442	0.01178	0.01442
Total Mass Soil+Tube (g)	831.9	1058.1	1150.3	1030.6	1121.8
Mass of Tube (g)	277.4	274.1	278.2	280.5	275.7
Tare No.	2035	127	G11	D19	X9
Tare (g)	128.1	14.2	13.4	13.7	151.0
Wet Soil + Tare (g)	392.5	69.1	72.7	94.7	418.3
Dry Soil + Tare (g)	353.6	61.9	65.7	90.7	387.4
Dry Soil (g)	225.5	47.7	52.3	77.0	236.4
Water (g)	38.9	7.2	6.9	4.1	30.9
Moisture (%)	17.3	15.1	13.3	5.3	13.1
Dry Density (pcf)	108.0	117.5	117.7	133.4	114.4

Notes:



Project Name: Alderpoint Road PM 42.25 - 42.30
 CAlnc File No: 19-574.4
 Date: 6/7/21
 Technician: BWD/LAD

MOISTURE-DENSITY TESTS - D2216/D7263

	1	2	3	4	5
Sample No.	A-21-023-4A	A-21-023-6A			
USCS Symbol	ROCK	ROCK			
Depth (ft.)	11	16			
Sample Length (in.)	3.695	4.427			
Diameter (in.)	2.377	1.408			
Sample Volume (ft ³)	0.00949	0.00399			
Total Mass Soil+Tube (g)	866.2	365.9			
Mass of Tube (g)	280.1	121.3			
Tare No.	A20	149			
Tare (g)	13.6	14.1			
Wet Soil + Tare (g)	93.0	64.8			
Dry Soil + Tare (g)	87.7	59.6			
Dry Soil (g)	74.0	45.5			
Water (g)	5.3	5.2			
Moisture (%)	7.2	11.4			
Dry Density (pcf)	127.0	121.4			

Notes:



Project Name: Alderpoint Road PM 42.25-42.30

CAInc File No: 19-574.4

Date: 6/9/21

Technician: BWD,MCC

200 Wash - ASTM D1140

Method A

Max Particle Size (100% Passing)	Standard Sieve Size	Recommended Min Mass of Test Specimens
2 mm or less	No. 10	20 g
4.75 mm	No. 4	100 g
9.5 mm	3/8 "	500 g
19.0 mm	3/4 "	2.5 kg
37.5 mm	1 1/2 "	10 kg
75.0 mm	3 "	50 kg

Table from 6.2 of ASTM D1140

Sample No.	A-21-022-3A	A-21-023-3A			
USCS Symbol	CL	CL			
Depth (ft.)	8.5	8.5			
Tare No.	P2	X9			
Tare (g)	126.7	151			
Dry Soil + Tare (g)	352.9	387.4			
Dry Mass before (g)	226.2	236.4			
Dry Mass after (g)	91.1	116.9			
Percent Fines (%)	60	51			

Notes:



Project Name: Alderpoint Road 42.25-42.30

CAInc File No: 19-574.4

Date: 6/14/21

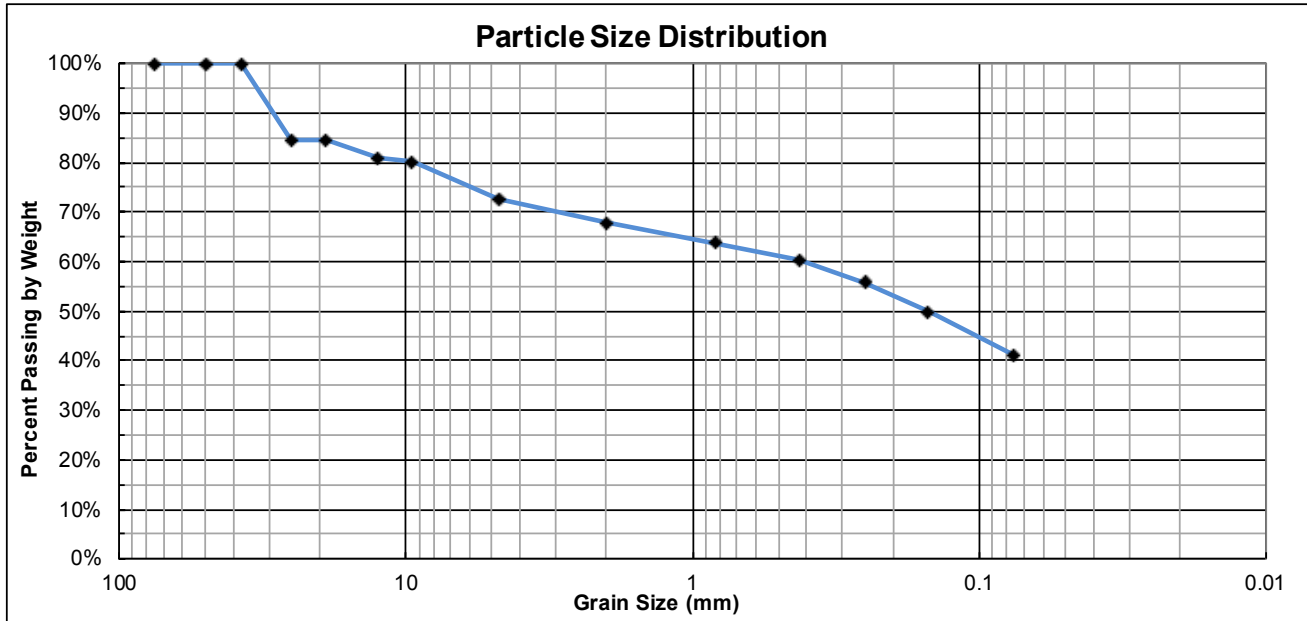
Technician: BWD

Sample ID: A-21-022-2A

Depth (ft): 6

USCS Classification: CLAYEY SAND with GRAVEL (SC)

ASTM 6913 - Method A



% Cobble	% Gravel		% Sand			% Fines
	Coarse	Fine	Coarse	Medium	Fine	Silt/Clay
0	16	11	5	8	19	41
0	27		32			41

		Sieve #	Opening mm	Cummulative Mass Retained (g)	% Passing
Cobbles		3"	75	0.0	100%
Gravel	Coarse	2"	50	0.0	100%
		1-1/2"	37.5	0.0	100%
		1"	25.0	35.0	84%
	Fine	3/4"	19.0	35.0	84%
		1/2"	12.5	43.3	81%
		3/8"	9.50	45.0	80%
Sand	Coarse	#4	4.75	62.0	73%
		#10	2.00	72.6	68%
	Medium	#20	0.825	82.0	64%
		#40	0.425	89.8	60%
		Fine	#60	0.250	99.9	56%
#100	0.150		113.3	50%	
		#200	0.075	133.0	41%

Coefficient of Uniformity	Coefficient of Curvature
Cu = NA	Cc = NA

Project Name: Alderpoint Road PM 42.25-42.30

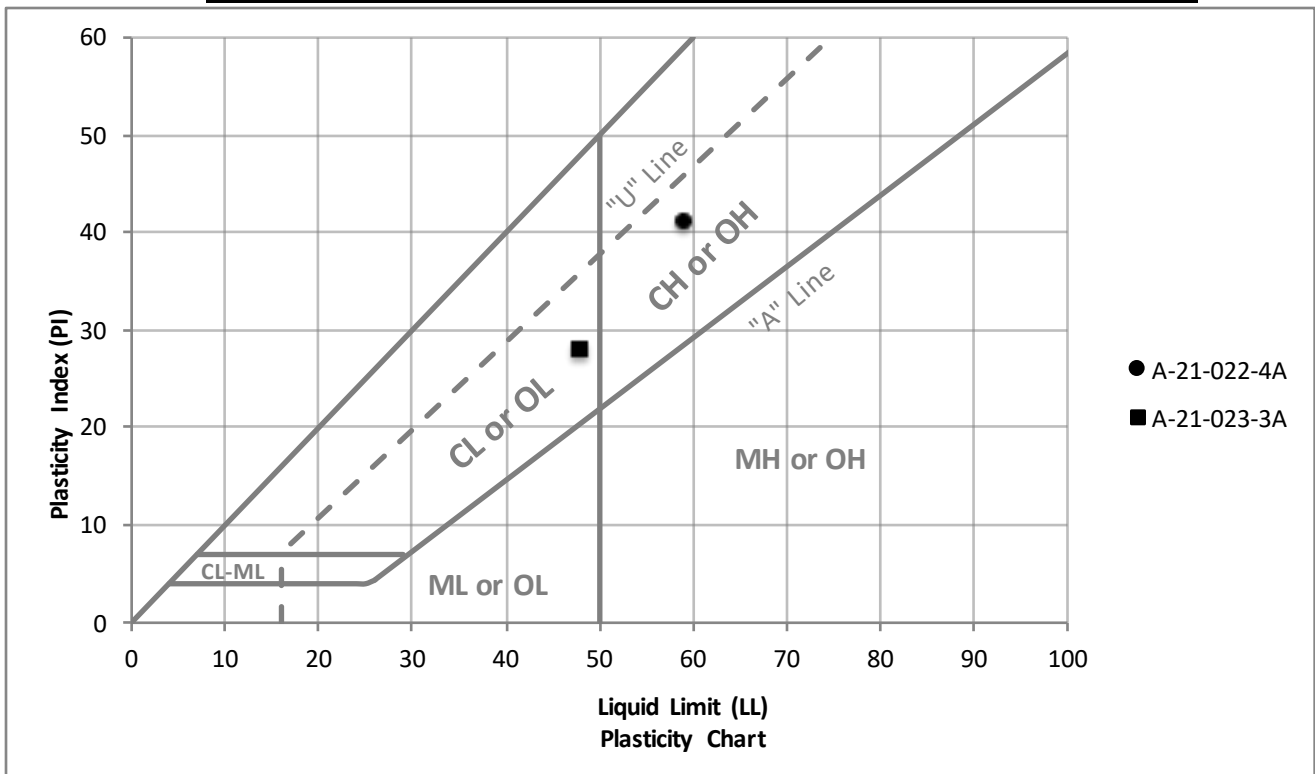
CAInc File No: 19-574.4

Date: 6/9/21

Technician: LAD/MCC

Plastic Index - ASTM D4318

Sample ID	Depth (ft)	Liquid Limit	Plastic Limit	PI
A-21-022-4A	11	59	18	41
A-21-023-3A	8.5	48	20	28



Project Name: Alderpoint Road PM 42.25-42.30

CAInc File No: 19-574.4

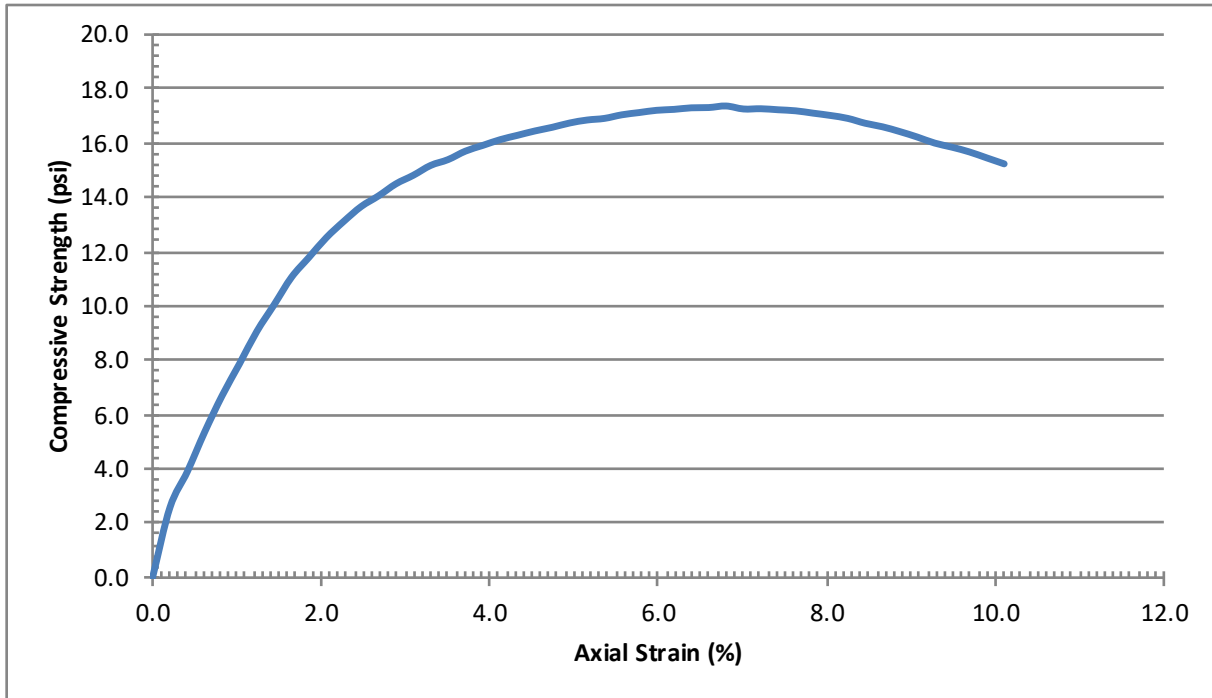
Date: 6/4/21

Technician: LAD

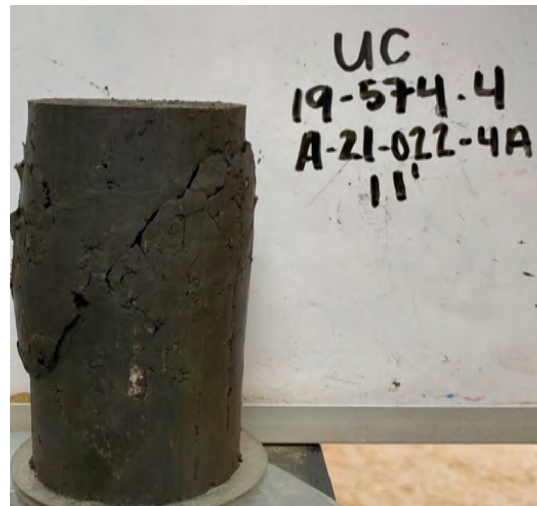
Sample ID: A-21-022-4A Depth (ft): 11.0

USCS Classification: CL

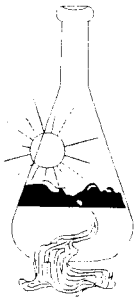
UNCONFINED COMPRESSION TEST - D2166



Dry Density (pcf)	117.6
Water Content (%)	15.1
Unconfined Compressive Strength (psi)	17.4
Unconfined Compressive Strength (psf)	2506
Average Height (in)	4.879
Average Diameter (in)	2.401
Rate of strain (%)	1.0
Strain at Failure (%)	6.8



Notes:



Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
(916) 852-8557

Date Reported 05/28/2021
Date Submitted 05/24/2021

To: Carmelo Pagan
Crawford & Associates, Inc.
1100 Corporate Way Suite 230
Sacramento, CA 95831

From: Gene Oliphant, Ph.D. \ Randy Horney
General Manager \ Lab Manager *RO*

The reported analysis was requested for the following location:
Location : 19-574.4 ALDER POINT Site ID : A21-022-5A,13.5.
Thank you for your business.

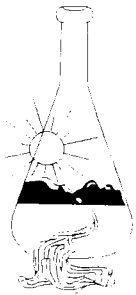
* For future reference to this analysis please use SUN # 84909-176997.

EVALUATION FOR SOIL CORROSION

Soil pH	7.15		
Minimum Resistivity	0.48	ohm-cm (x1000)	
Chloride	3.5	ppm	00.00035 %
Sulfate	2702.0	ppm	00.27020 %

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m



Sunland Analytical

11419 Sunrise Gold Circle, #10
Rancho Cordova, CA 95742
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To: Carmelo Pagan
Crawford & Associates, Inc.
1100 Corporate Way Suite 230
Sacramento, CA 95831

From: Gene Oliphant, Ph.D. \ Randy Horney *RA*
General Manager \ Lab Manager

The reported analysis was requested for the following location:
Location : 19-574.4 ALDER POINT Site ID : A21-023-1A,3.5.
Thank you for your business.

* For future reference to this analysis please use SUN # 84909-176991.

EVALUATION FOR SOIL CORROSION

Soil pH	6.06		
Minimum Resistivity	3.29	ohm-cm (x1000)	
Chloride	6.3 ppm	00.00063	%
Sulfate	8.6 ppm	00.00086	%

METHODS

pH and Min.Resistivity CA DOT Test #643
Sulfate CA DOT Test #417, Chloride CA DOT Test #422m