GEOTECHNICAL DESIGN AND MATERIALS REPORT

SAN FRANCISCO BAY TRAIL AT POINT MOLATE
(ALONG FORMER RICHMOND BELT RAILROAD TRACKS,
FROM RICHMOND-SAN RAFAEL BRIDGE TO
INTERSECTION OF STENMARK DRIVE AND PETROLITE STREET)
RICHMOND, CALIFORNIA

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1.0 INTRODUCTION

The San Francisco Bay Trail at Point Molate is a planned 2.4 mile long multi-use trail to be constructed along the San Pablo Peninsula on the eastern shore of the San Francisco Bay in Richmond, Contra Costa County, California (Figure 1). The completed trail will become part of the San Francisco Bay Trail system which, when complete, will encircle San Francisco and San Pablo Bays with a continuous, 500-mile network of bicycling and hiking trails connecting the shorelines of all nine Bay Area counties, linking 47 cities, and crossing the major toll bridges in the region. The planned Point Molate segment will provide a link between existing trail segments and improved access to Point Molate Beach Park. The trail segment will eventually be owned, operated, and maintained by the East Bay Regional Park District (EBRPD).

This Geotechnical Design and Materials Report (GDMR) was prepared for NCE, Inc. to support the design of the planned trail being designed by NCE on behalf of the EBRPD. Cal Engineering & Geology is a sub-consultant of NCE for this project. The GDMR follows the general format and guidance presented in the Caltrans Guidelines for Preparing Geotechnical Design Reports, Version 1.3, dated December 2006. Information and recommendations presented in this report were developed based on:

- Review of published data and information relevant to the project and project area;
- Review of available unpublished information relevant to the project and project area;
- Site reconnaissance and geologic mapping;
- Subsurface exploration including soil borings along the trail;
- Laboratory testing of samples recovered from the site borings; and
- Geologic and Engineering evaluations.

The purpose of the GDMR is to document subsurface geotechnical conditions, provide analyses of anticipated site conditions as they pertain to the project described herein, and to recommend geotechnical design and construction recommendations for the project. This report also establishes a geotechnical baseline that may be used to assess changed conditions that may be encountered during construction. This report was prepared by Professional Geotechnical Engineers and Certified Engineering Geologists licensed to practice in the State of California. The GDMR is intended for use by NCE project design engineers, bidders, contractors, and EBRPD design and maintenance personnel. Project stationing referenced in this report was established by NCE in June 2016. The stationing is based on 35 percent plans which have been
included in Appendix A. All elevations in this report correspond to the North American Vertical Datum of 1988 (NAVD88).
2.0 EXISTING FACILITIES AND PLANNED IMPROVEMENTS

2.1 EXISTING FACILITIES

The 2.4 mile long trail will be located along the abandoned Richmond Belt Railroad corridor. The southern portion of the trail (Segment A) will traverse through 0.9 miles of Chevron property from Stenmark Drive at the Richmond-San Rafael Bridge to the City of Richmond’s Point Molate Beach Park property. The northern portion of the trail (Segment B) will traverse through 1.4 miles of City of Richmond property from Point Molate Beach Park to the north end of the former Naval Fuel Supply Depot at Point Molate.

The abandoned Richmond Belt Railroad corridor is a single track railroad that was constructed in the early 1900’s, along Richmond’s western waterfront and around Point San Pablo. The railroad was originally constructed to connect the dozens of factories and docks in the area that existed at that time including the Standard Oil Long Wharf, a whale oil processing plant, an oil can factory, a brick factory, two rock quarries, the former Winehaven winery, the Point San Pablo ship terminal, and the Richmond-San Rafael Ferry (Bastin, 2003).

Segment A is 0.9 mile long and extends from Stenmark Drive to the southern edge of Point Molate Beach Park (Station 10+00 to 56+73). The southern portion of this segment has been improved with a gravel road that provides access from Stenmark Drive to a Caltrans staging area (Station 10+00 to 19+00) and a privately owned parcel at Point Castro (Station 38+00). The gravel road is located adjacent to a bedrock cut slope between the Caltrans staging area and Point Castro (Station 19+00 to 44+00). Between Point Castro and Point Molate Beach Park, the railroad tracks have either been removed or left in place and covered with a thin layer of earth fill. Several wetlands were identified along this segment by NCE’s environmental consultant (Stations 31+00, 49+00, 51+00, and 52+00).

Segment B is 1.5 miles long and extends from the southern edge of Point Molate Beach Park to the north end of the former Naval Fuel Supply Depot at Point Molate (Station 56+73 to 135+44). An asphalt concrete paved access road intersects Stenmark Drive just north of Point Molate Beach Park (Station 71+50). The road parallels the abandoned railroad corridor and provides coastal access from Stenmark Drive to Point Molate. North of Point Molate, evidence of the abandoned railroad corridor is non-existent due to a recent environmental cleanup project between Point Molate and the former Winehaven winery (Stations 114+00 to 125+00). The railroad tracks adjacent at the Winehaven winery have been improved with asphalt concrete pavement (Station 125+00 to 129+50). The northern most end of the railroad corridor within Segment B consists of exposed railroad ballast, ties, and tracks that have become overgrown with grasses and mature Eucalyptus trees.
2.2 PLANNED IMPROVEMENTS

The objective of the San Francisco Bay Trail at Point Molate project is to construct a paved multi-use trail along the abandoned Richmond Belt Railroad corridor. Development of the trail will require removal of railroad tracks, construction of asphalt concrete overlays, new pavement structural sections, and boardwalks to cross wetland areas.
3.0 PERTINENT REPORTS AND INVESTIGATIONS

Several pertinent investigation reports were obtained and reviewed in preparation of this report. The investigations and reports were completed on the adjacent property that are currently owned and operated by Chevron. Principal documents that were reviewed included:

- A Geologic Reconnaissance prepared by Dames & Moore (1964) for the Standard Oil Company of California (today known as Chevron) for the Proposed High Hill Tank Field and Former Blake Bros. Quarry.

- A Foundation Investigation prepared by Dames & Moore (1971) for the Standard Oil Company of California (today known as Chevron) for the proposed tank sites, impounding wall and impounding basin.

- A Site Inspection prepared by Dames & Moore (1973) for the Standard Oil Company of California (today known as Chevron) for the Proposed Tank 5 Area.

- A Foundation Investigation prepared by Dames & Moore (1977) for the Standard Oil Company of California (today known as Chevron) for the planned Quarry Tanks Nos. 3108, 3109, 3110 and 3111.

In addition to these documents, other published soils, geologic, and geotechnical data sources were used to support the information, conclusions, and recommendations presented in this report. As applicable, these data sources are referenced throughout this report (a reference list follows the main body of text).
4.0 PHYSICAL SETTING

4.1 CLIMATE

The project is located in an area with a Mediterranean climate characterized by mild to moderately cold and wet winters, and hot, dry summers. Winds in the area are generally controlled by marine circulation into the Central Valley (located east of the area) and may be very strong in the regional area.

Average monthly temperatures typically range between lows of 43 degrees Fahrenheit in January and highs of 74 degrees Fahrenheit in September. Temperature extremes in the area include a low of 24 degrees Fahrenheit in December 1990 and a high of 107 degrees Fahrenheit in September, 1971 (Weather.com, 2016). In general, sub-freezing temperatures occur in short episodes of several days duration. As a result, freeze-thaw conditions are not expected to have a significant influence on the long-term performance of the pavement.

The mean annual precipitation in the area over the past 96 years was 20.0 inches (CCCPWD, 1977).

4.2 TOPOGRAPHY AND DRAINAGE

At the project site, the railroad corridor descends from about the 40 foot elevation at the south end (Station 10+00) to the private access road to about the 20 foot elevation at the end of the Caltrans Staging area. The remainder of the railroad corridor profile varies between the 15 foot and 20 foot elevation. The maximum grade is approximately 3.5 percent.

There are no significant drainage features along the railroad corridor. In general surface water sheet flows toward the San Francisco Bay without the aid of ditches and culverts.

4.3 MAN-MADE AND NATURAL FEATURES OF ENGINEERING AND CONSTRUCTION SIGNIFICANCE

4.3.1 Richmond Belt Railroad Tracks

The railroad tracks, ties, and ballast from the abandoned Richmond Belt Railroad will be encountered during construction. Abandoned Richmond Belt Railroad tracks are visible adjacent to the planned trail alignment from approximately Station 61+75 to 78+30, Station 95+90 to 97+40, and Station 109+00 to 112+40. Abandoned railroad tracks are visible on top of the planned trail alignment from approximately Station 124+40 to 128+75 and Station 131+15 to Station 134+82. Locations of visible railroad tracks can also be found in Table 1 following the text of this report. The railroad ballast varies in thickness from 3 inches to 2 feet 5 inches at
locations where encountered. The presence of the tracks in some areas may not be evident until uncovered during initial grading during construction.

4.4 REGIONAL GEOLOGY AND SEISMICITY

4.4.1 Geologic Setting

The project site is situated within the Coast Ranges Geomorphic Province (Page, 1992). The Coast Ranges Geomorphic Province is comprised of a complex sequence of Mesozoic and Cenozoic age volcanic and sedimentary bedrock materials. The bedrock materials in the greater Richmond area have been folded and faulted as a result of regional tectonic forces. As a consequence, geologic relationships are often complex, and individual bedrock units are locally tightly folded, faulted, sheared, and overturned.

The generalized geology of the Richmond area has been mapped by several geologists (Nilsen, 1975) (Graymer R.W., 2006). Maps by these geologists suggest that the property is underlain by Cretaceous age sedimentary bedrock materials belonging to the Franciscan Complex and artificial fill (Figure 2). A landslide is shown at approximately Station 45+00 by Nielsen.

4.4.2 Seismic Setting

The project site is located within the greater San Francisco Bay Area which is recognized as one of the more seismically active regions of California. The seismic activity of the greater Bay Area results from the complex movements along the transform boundary between the Pacific Plate and the North American Plate. Studies have shown that the Pacific Plate is slowly moving to the northwest relative to the more stable North American Plate at an average rate of about 49 mm/yr (Page, 1992). The differential movements between the two crustal plates caused the formation of a series of active fault systems within the transform boundary. The transform boundary between the two plates extends across a broad zone of the North American Plate within which right lateral strike slip faulting predominates. In this broad zone, the San Andreas Fault accommodates less than half of the average total relative plate motion. Much of the remainder in the greater San Francisco Bay Area is distributed across the Calaveras, Hayward, Greenville, Concord-Green Valley, and Rodgers Creek fault zones.

The California Division of Mines and Geology has not produced an Alquist-Priolo map for the San Quentin quadrangle. However, it should be noted that the Hayward fault system has been mapped approximately 7.5 kilometers east of the project area (CDMG, 1998). Some of the other nearby active fault systems which could induce strong ground shaking at the site include the San Andreas, San Gregorio, and Rodgers Creek faults.
A large magnitude earthquake on any of these fault systems has the potential to cause significant ground shaking at the site. The intensity of ground shaking that is likely to occur at the site will be generally dependent upon the magnitude of the earthquake and the distance to the epicenter. In general, the greater the distance to the epicenter, the lesser the intensity of the ground shaking that is anticipated to occur at the site.

4.5 SOIL SURVEY MAPPING

The surface soils within the project site have been mapped by the USDA National Resources Conservation Service as belonging to the Millsholm loam and Urban Land (NRCS, 2010). Soils of the Millsholm loam are present throughout the majority of the project area.

Soils of the Millsholm loam for 20 to 60 percent slopes classify as a loam, clay loam and silt loam. These soils reportedly have a Liquid Limit ranging from 30 to 40 percent and a Plasticity Index between 15 and 16 percent within the upper 60 inches. These types of soils are generally considered to have a moderate to low expansion potential. Urban Land soils have not been classified or rated. This mapping is consistent with our site observations and the materials encountered in the exploratory borings drilled at the site.
5.0 FIELD EXPLORATION

The field exploration program for the project included geologic mapping and drilling and sampling geotechnical test borings at select locations along the alignment.

Information and data developed from these phases of work are included in the appendices to this report and summary information is presented below.

5.1 GEOLOGIC MAPPING

The published geologic maps for the area were reviewed to assist with the development of a site map. Field mapping of the exposed surface geologic features was completed along a portion of Segment A on 11 February 2016. The purpose of this work was to map geologic conditions exposed in the bedrock cut slope between the Caltrans staging area and Point Castro (Station 19+00 to 44+00) for use in evaluating bedrock cut slope stability.

Geologic mapping of the exposed bedrock revealed Franciscan sandstone and shale that is brown and brown gray, moderately hard to hard and slightly to moderately fractured. The southern section (closer to the bridge) and isolated sections elsewhere had well-defined bedding that dips steeply to the south and southwest. Joint sets were observed that dipped steeply in various directions. A few sections of bedrock were observed where bedrock, especially in the shale, was observed to be folded and the bedrock mass had greater fracturing. The mass was still tight and intact. The sandstone bedrock is locally very hard, but is generally jointed or fractured so that a maximum intact size is less than 12 inches in the longest dimension. The shale fractures into pieces generally less than 6 inches in the longest dimension.

It does not appear as though any large, deep-seated slope failures have developed along the existing cut slope. Failures that have occurred appear to be shallow. Two failures types were observed. Shallow slumps were observed in some areas where the rock was more fractured. The rock may also be shales that were more deeply weathered. The slump areas were located at or near more heavily vegetated areas of slope where obvious bedrock outcrops were not present.

The second and more common surficial failure observed was structure-controlled failures either along a single joint face (planar) or along an intersection of joints and/or a bedding plane. Due to the steepness of the joints and beds in most locations, there are few locations where the bed or joints are daylighted in the cut slope. Slope failure debris presents as cones of talus at the toe of the steep cut slope. Taller cut slopes generally had larger piles of talus at the toe, but there was no evidence of deep-seated slope instability.
5.2 SUBSURFACE EXPLORATION

A total of 95 test borings were advanced and sampled between 8 March and 1 June 2016. The majority of the borings were for NCE’s environmental sampling and testing program. Thirteen of the borings were advanced solely for this Geotechnical Design and Materials Report. The geotechnical borings were drilled to depths ranging between 2.5 and 4.0 feet below existing grade.

The borings and sampling were completed by California Geotech, Inc. of Livermore and Confluence Environmental of Rio Linda, under subcontract to NCE, Inc. Borings were drilled with a truck-mounted Mobile B-24 drill rig equipped with continuous solid flight augers. Supplemental environmental borings completed by Confluence Environmental were dilled with a direct push rig. Upon completion of drilling activities, borings within paved areas were backfilled with grout and capped with asphalt cold patch. Borings in unpaved areas were backfilled to the ground surface with drilling spoils.

All drilling operations were observed in the field by CE&G personnel. Logging, classification, and storage of soil and bedrock samples were completed in general conformance with the guidelines and procedures presented in the ASTM D2488, “Standard Practice for Description and Identification of Soils (Visual-Manual Procedure),” and ASTM D2487, “Standard Practice for Classification of Soils for Engineering Purposes - Unified Soil Classification System (USCS).” Boring logs are included in Appendix B.

Samples were primarily collected with a Standard Penetration Test or Modified California samplers that were driven into the subsurface materials at the bottom of the boring at select intervals using a 140 lb safety hammer with a free-fall of 30 inches. The blow counts required to embed the sampler in intervals of 6 inches (or less) were recorded on the field exploratory test boring logs.
6.0 GEOTECHNICAL TESTING

6.1 IN SITU TESTING

In situ geotechnical testing performed for this study consisted of Standard Penetration Testing (SPT) (ASTM D1586) during soil boring operations. Results of the testing are included on the logs of test borings in Appendix B.

6.2 LABORATORY TESTING

Laboratory tests were performed on selected samples recovered from the borings. Laboratory tests included moisture-density (ASTM D2216), Atterberg limits (ASTM D4318), and R-Values (ASTM D2844). Complete laboratory tests results are presented in Appendix C.

6.2.1 Index Properties

Index tests completed included moisture-density and Atterberg limits evaluations. The artificial fill samples tested had in place dry densities between 107 pcf and 123 pcf and moisture contents between 4 and 16 percent. The bedrock material sampled tested had in place dry densities between 118 pcf and 124 pcf and moisture contents between 11 and 13 percent.

6.2.2 R-Value Testing

R-value tests were performed on four bulk samples obtained from borings B-4, B-15, B-25, and B-27. The test results are summarized below.

<table>
<thead>
<tr>
<th>Boring</th>
<th>Approx. Station</th>
<th>Depth (ft)</th>
<th>R-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-04</td>
<td>19+65</td>
<td>2.0</td>
<td>72</td>
</tr>
<tr>
<td>B-15</td>
<td>64+71</td>
<td>1.5</td>
<td>22</td>
</tr>
<tr>
<td>B-25</td>
<td>104+22</td>
<td>1.0</td>
<td>25</td>
</tr>
<tr>
<td>B-27</td>
<td>109+08</td>
<td>2.0</td>
<td>77</td>
</tr>
</tbody>
</table>
7.0 GEOTECHNICAL CONDITIONS

7.1 SITE GEOLOGY

Geology of the project site is shown on Figure 2. Bedrock exposed along the cut along the southern portion of Segment A includes Franciscan Complex sedimentary rocks consisting mostly of sandstone and shale. Surficial soils consist of primarily of artificial fill over marine and marsh deposits of varying thickness. Lithologic features and quaternary deposits are summarized below.

7.1.1 Lithology

The geologic setting in the vicinity of the trail alignment consist Franciscan Complex sedimentary rock that is Cretaceous in age, which has been uplifted and folded. The bedrock mapped in the exposed cuts consists principally of weathered sandstone that is moderately hard to hard and slightly to moderately fractured with thin interbeds of shale. Where encountered in the exploratory borings, the sandstone was generally severely weathered and matched what was exposed on the cut slopes. Little discernible structure was noted in the exploratory borings. In the borings where bedrock was encountered, the depth to bedrock ranged from 3 inches to 1 foot 7 inches.

7.1.2 Quaternary Deposits

Quaternary deposits consist of artificial fill over marine and marsh deposits. The artificial fill is generally composed of sand and gravel with bedrock fragments and crushed rock ballast that were placed as part of railroad construction. Based on our observations of the material encountered in the exploratory borings, soft sediments were encountered below the existing artificial fill at various locations throughout the project site and should not affect the performance of the trail pavement. The underlying marsh deposits consist of lean and fat clays.

7.2 LANDSLIDES

Geologic mapping completed by Nielson 1975 shows a landslide at approximately Station 45+00 on the east side of the planned trail. However, during field exploration this landslide was not observed and does not present a potential impact to the trail.

Shallow failures were observed along the bedrock cut slope within the trail alignments. The resulting talus cones were only a few feet tall and it is judged that the talus will not affect the performance or maintenance of the trail which will be approximately 20 feet from the toe of the cut slope.
7.3 SOIL CONDITIONS

The subsurface soil conditions vary along the project alignment depending on the underlying bedrock lithology and past and present geologic features. Generally, the exploratory borings encountered predominately granular soils. The soils encountered in the borings were generally moist with dry layers closer to bedrock outcrops and wet layers near Point Molate Beach Park.

The fine-grained soils were predominately clay with varying silt contents. These soils ranged from lean clay (CL) to elastic silt (MH) having low to medium plasticity. The soils varied significantly in consistency with hard layers near the ground surface and soft layers below. Some fine-grained soils were encountered along the southern portion of Segment B in the vicinity of Point Molate Beach Park. Fine-grained sediments were encountered in borings where existing areas of increased sedimentation have occurred. The sediments consist of inter-fingering of the Holocene age Young Bay Mud deposits and the Quaternary age native alluvial deposits generated from the erosion of the surrounding hillsides to the east of the project area. It is likely that these areas consisted of shoreline beaches and marshlands prior to the development and construction of the existing improvements. In our opinion, the sediments have been normally consolidated due to the placement of the artificial fill to produce the desired grades with the existing trail and railroad improvements.

The granular soils encountered during drilling consisted of aggregate base and railroad ballast, mostly from artificial fill used during the construction of the old Richmond Belt Railroad.

The wetland area delineated on the 35 percent plans at approximately Station 51+06 is underlain by silts, clays with gravel, and sandstone bedrock, and the wetland area delineated on the 35 percent plans at approximately Station 57+54 is underlain by silty sands and clay to the depths explored.

Where present along the trail, asphalt concrete thickness ranges between 1 inch and 3 inches, aggregate base (AB) thickness ranges between 3 inches and 1 foot 6 inches, and railroad ballast ranges in thickness from 3 inches to 2 feet 5 inches. Fill material thicknesses are not known due to the limited depths of exploratory borings.

A summary of anticipated subgrade material and consistency/density is provided in Table 1 following the text of this report. Descriptions of the materials encountered in the borings are included on boring logs in Appendix B.
7.4 WATER

7.4.1 Surface Erosion

The surface erosion within the railroad cuts is shallow in nature and consists of raveling of the bedrock. The severity of erosion is primarily dependent upon the weathering profile of the exposed bedrock and the inclination of the cuts. Erosion was primarily observed in the weathered bedrock along the southern portion of Segment A (Station 19+00 to 44+00) in areas of sandy shale to silty sandstone on slopes that were steeper than a 1H:1V (horizontal: vertical). The height of the cut slopes varied, but generally erosion of these slopes was noted up to the top of the excavation.

7.4.2 Ground Water Conditions

A detailed groundwater investigation was beyond the scope of this study. Groundwater was only encountered in boring B-15 at a depth of approximately 2 feet. Groundwater was not encountered during the drilling of the other exploratory borings. It should be noted that groundwater levels can fluctuate seasonally and over a period of years. In addition, elevated groundwater conditions may be encountered in areas in close proximity to San Francisco Bay. Therefore, it is possible that elevated or perched groundwater conditions may be encountered during construction.

7.5 PROJECT SITE SEISMICITY

7.5.1 Design Ground Motions

Deterministic and probabilistic acceleration response spectra (ARS) were generated using Caltrans ARS Online (Caltrans, 2016). The Caltrans ARS Online website describes how this web-based tool calculates spectra based on the criteria provided in Appendix B of Caltrans Seismic Design Criteria:

The deterministic spectrum is determined as the average of median response spectra calculated using the Campbell-Bozorgnia (2008) and Chiou-Youngs (2008) ground motion prediction equations developed under the “Next Generation Attenuation” project coordinated through the PEER-Lifelines program. These equations are applied to all faults considered to be active in the last 750,000 years (late-Quaternary age) that are capable of producing a moment magnitude earthquake of 6.0 or greater. The probabilistic spectrum is obtained from the USGS (2008) National Hazard Map for 5% probability of exceedance in 50 years. Caltrans design spectrum is based on the larger of the deterministic and probabilistic spectral values. Both the deterministic and probabilistic spectra account for soil effects through incorporation of the parameter Vs30, the average shear wave velocity in the upper 30 meters of the soil profile.
Shear wave velocities in the upper 30 meters of the soil profile ($V_{s30}$) were estimated using mapping published by the National Earthquake Hazard Reduction Program (NEHRP). The NEHRP mapping indicates that the trail alignment is underlain by the following two soil types:

- NEHRP A, B (750 m/s) in Bedrock
- NEHRP E (< 250 m/s) in Qaf

The shear wave velocities and site location were then input into the Caltrans ARS Online website to arrive at the controlling deterministic scenario (CDS) and the ground motions for each soil type. Since NEHRP soil type E does not have published values, a seismic shear wave velocity of 225 m/s was assumed. The results of the analyses are summarized in the table below.

<table>
<thead>
<tr>
<th>Controlling Deterministic Scenario and Ground Motions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fault Parameters</td>
</tr>
<tr>
<td>CDS</td>
</tr>
<tr>
<td>Hayward (North)</td>
</tr>
</tbody>
</table>

Probabilistic peak ground accelerations were determined using 2008 USGS Seismic Hazard Map and a 975 year return period. The results of the analyses are summarized in the table below.

<table>
<thead>
<tr>
<th>Probabilistic Ground Motions</th>
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</thead>
<tbody>
<tr>
<td>$V_{s30}$ (m/s)</td>
</tr>
<tr>
<td>760</td>
</tr>
<tr>
<td>225</td>
</tr>
</tbody>
</table>

7.5.2 Ground Rupture

The Hayward Fault is located approximately 6 kilometers to the east of the site. The potential for ground rupture due to primary faulting is considered to be low.
8.0 CONSTRUCTION CONSIDERATIONS

8.1 CONSTRUCTION ADVISORIES

The current investigation at the site revealed that the subgrade conditions in some areas along the trail alignment consist of aggregate base, crushed rock railroad ballast with timber ties and steel rails, and asphalt concrete pavement.

The possible presence of buried railroad ties and rails should be considered in designing the pavement structural section and grading and should be considered during construction when excavations are made or scarifying is completed to prepare the subgrade for the trail.

8.2 CONSTRUCTION CONSIDERATIONS THAT INFLUENCE DESIGN

The crushed rock railroad ballast is an open graded material that contains significant voids that will need to be filled prior to use as subgrade for the pavement structural section. It will be critical to ensure that all of the voids between the rocks are filled to reduce the potential for long term localized settlement of the pavement structural section.

The trail alignment will conflict with several existing railroad tracks adjacent to the Winehaven winery. The railroad tracks from Station 124+50 to 129+50 are located within asphalt concrete pavement. The railroad tracks from Station 131+00 to 134+82 are located on ballast. Reflective cracking through new pavement structural sections and pavement overlays can occur due to the difference in stiffness between the rigid steel rails and adjacent flexible pavement. The potential for reflective cracking should be considered when making decisions regarding the treatment of the rails and existing pavement.

8.3 CONSTRUCTION CONSIDERATIONS THAT INFLUENCE SPECIFICATIONS

Compaction testing of the infilled railroad ballast will be impractical given the relatively large aggregate size of the crushed rock and the high variability of voids. Railroad ballast infilling will require that the specifications incorporate observations by the geotechnical engineer or their representative during construction to confirm that the infilling has reduced the potential for voids to the extent practical.
9.0 RECOMMENDATIONS AND SPECIFICATIONS

9.1 RECOMMENDED SUBGRADE PREPARATION

The planned trail will be constructed on top of the existing ground surface with only minor modifications made to the existing elevations. The existing subgrade material and improvements vary along the alignment of the trail. The subgrade preparation required will depend on the type of material encountered and the nature of improvements. Based on existing and final grades in the 35 percent design plans from NCE and recommended clearing and grubbing depth, the anticipated subgrade material along the trail alignment is summarized in Table 1 following the text of this report. Recommendations for subgrade preparation are as follows.

9.1.1 Clearing and Grubbing

All objectionable material (vegetation, asphalt concrete, concrete, masonry, etc.) within the limits of grading should be cleared and grubbed to a depth of 6 inches for proper subgrade preparation.

9.1.2 Remove Existing Railroad Tracks

All railroad tracks (steel rails) in conflict with the new trail should be removed unless determined to be unfeasible due to environmental considerations. For railroad ties left in place, a minimum 6 inches of compacted Caltrans Class 2 Aggregate base should be placed above the top of remaining railroad ties.

9.1.3 Remove and Replace Unsuitable Subgrade Material

In areas where unsuitable subgrade materials (i.e. wet, soft, and/or expansive soil) are encountered, the material should be removed and replaced with structure backfill.

9.1.4 Infill Existing Railroad Ballast

The remaining railroad ballast should be infilled with well graded sand. Should additional trail width be required, engineered fill consisting of Caltrans Class 2 Aggregate base should be placed and compacted adjacent to the existing railroad ballast.

9.1.5 Scarify Existing Aggregate Base and Engineered Fill

Areas that consist of aggregate base and engineered fill that are free from railroad tracks based on visual observations should be scarified 2 inches, moisture conditioned, and compacted. If it is determined during construction that scarification results in the disturbance of unanticipated buried railroad tracks, the scarification should be omitted in those areas.
9.1.6 Scarify Bedrock

Based on subsurface exploration borings in which bedrock was encountered, the depth to bedrock ranged from 3 inches to 1 foot 7 inches. In areas where excavation for subgrade preparation encounters bedrock, the bedrock should be scarified 2 inches before placement of compacted fill. Areas where bedrock may be encountered and approximate depths are summarized in Table 1 following the text of this report.

9.2 BOARDWALK FOUNDATIONS

The boardwalks from Station 47+80 to 53+40 and Station 54+90 to 58+50 should be founded on cast-in-drilled-hole (CIDH) piles in order to minimize construction footprint in the wetland areas. All CIDH piles should have a minimum diameter of 12 inches and should be embedded in bedrock a minimum of 2 feet. Design parameters are outlined in the following table.

<table>
<thead>
<tr>
<th>Recommended CIDH Pile Design Parameters</th>
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<tbody>
<tr>
<td>Minimum Diameter (in)</td>
</tr>
<tr>
<td>-----------------------</td>
</tr>
<tr>
<td>12</td>
</tr>
</tbody>
</table>

Depending on the depth to bedrock, the piles can range between 4 and 10 feet in depth. The bearing value indicated above is for the total of dead and frequently applied live loads and may be increased by one third for short duration loading, which includes the effects of wind, water, or seismic forces. The weight of the footing should be included for the purposes of bearing capacity calculations.

9.3 SPECIFICATIONS

9.3.1 Earthwork

Earthwork for this project is likely to consist of minor infilling of open graded railroad ballast and minor fills required to establish the required subgrade elevations for the pavement structural section. All earthwork should be completed in accordance with Section 19, “Earthwork” of the Caltrans Standard Specifications, 2010 edition.

9.3.1.1 Fill Materials

Fill material for embankments may be generated from all onsite excavations and shall conform to the provisions of Section 19-2.03D, “Selected Material,” of the Caltrans Standard Specifications, 2010 edition.
It is not anticipated that imported embankment fill will be required for this project, however, should it become necessary, all potential imported fill should conform to the provisions of Section 19-3.02B, “Structure Backfill,” of the Caltrans Standard Specifications, 2010 edition.

Fill material for filling voids within the open graded railroad ballast should consist of sand conforming to the following gradation:

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. 8</td>
<td>100</td>
</tr>
<tr>
<td>No. 16</td>
<td>95-100</td>
</tr>
<tr>
<td>No. 30</td>
<td>90-100</td>
</tr>
<tr>
<td>No. 50</td>
<td>30-80</td>
</tr>
<tr>
<td>No. 100</td>
<td>0-5</td>
</tr>
<tr>
<td>No. 200</td>
<td>0-1</td>
</tr>
</tbody>
</table>

**9.3.1.2 Fill Placement**

All areas of prepared subgrade should be proof-rolled to identify isolated unstable areas. The contractor should furnish a pneumatic-tire roller for this purpose having an average weight per wheel of 2,000 lb. Unstable areas should be excavated and replaced with engineered fill.

The subgrade soils should be treated with a soil sterilant in accordance with the manufacturer’s specifications.

All fill should be placed as engineered fill and compacted to a minimum relative compaction of 90 percent as determined by the Caltrans Test 216 test procedure (or ASTM D1557) at a moisture content of approximately 3 percent above optimum.

Fill within 12 inches below the pavement structural section aggregate base rock should be compacted to a relative compaction of no less than 95 percent as determined by the Caltrans Test 216 test procedure (or ASTM D1557) at a moisture content of approximately 1 percent above optimum.

Aggregate base rock should be compacted to a relative compaction of no less than 95 percent as determined by the Caltrans Test 216 test procedure (or ASTM D1557) at a moisture content of approximately 1 percent above optimum.

Fill materials which do not meet the specified relative compaction shall be ripped, moisture conditioned, and re-compacted until the required relative compaction and moisture content are attained.
9.3.2 Erosion Control

Permanent erosion control measures should consist of appropriate vegetation which requires little if any irrigation. Soil chemistry should be considered in the selection of plants and vegetation. Temporary erosion control should be designed to minimize rutting and rilling of the slope before maturation of the permanent vegetation and plants. The design of all temporary erosion control measures should be based on best management practices.
10.0 LIMITATIONS

The conclusions and recommendations presented in this report are based on the information provided regarding the planned construction, and the results of the geologic mapping, subsurface exploration, and testing, combined with interpolation of the subsurface conditions between boring locations. This information notwithstanding, the nature and extent of subsurface variations between borings may not become evident until construction. It is recommended that Cal Engineering & Geology be retained to observe the earthwork operations to confirm the subsurface conditions between the exploratory borings are as estimated. If variations are encountered during construction, Cal Engineering & Geology should be notified promptly so that conditions can be reviewed and recommendations reconsidered, as appropriate.

This report presents the results of a geotechnical and geologic investigation only and should not be construed as an environmental audit or study. The conclusions and recommendations contained in this report are valid only for the project described in this report. We have employed accepted geotechnical engineering procedures, and our professional opinions and conclusions are made in accordance with generally accepted geotechnical engineering principles and practices. This standard is in lieu of all other warranties, either expressed or implied.

The findings of this report should be considered valid for period of three years unless the conditions of the site change. After a period of three years, we should be contacted to review the site conditions and prepare a letter regarding the applicability of this report.

Cal Engineering & Geology, Inc. should be accorded the opportunity to review the final plans and specifications to determine if the recommendations of this report have been implemented in those documents. The recommendations of this report are contingent upon this stipulation.

It is the owner's responsibility to ensure that the recommendations contained in this report are brought to the attention of the architect, engineers, and contractors working on the project. Furthermore, it is the owner's responsibility to make sure that these recommendations are carried out during the design and construction phases of the project.
11.0 REFERENCES


### Table 1A. Trail Alignment Summary

<table>
<thead>
<tr>
<th>Segment</th>
<th>Approx. Start (Sta)</th>
<th>Approx. End (Sta)</th>
<th>Approx. Interval Length (ft)</th>
<th>Average Excavation Depth(^1) (ft)</th>
<th>Anticipated Material at Excavation Depth(^2)</th>
<th>Consistency/Density</th>
<th>Unit</th>
<th>Average Depth to Bedrock (ft)</th>
<th>Notes</th>
<th>Recommendations [See Section 9.0]</th>
</tr>
</thead>
<tbody>
<tr>
<td>9+98</td>
<td>12+50</td>
<td>257</td>
<td>1.25</td>
<td>Sandy Silt</td>
<td>Loose</td>
<td>Fill</td>
<td>-</td>
<td>Potential encounter of loose soils</td>
<td>Clear and grub</td>
<td></td>
</tr>
<tr>
<td>12+50</td>
<td>15+00</td>
<td>250</td>
<td>1.25</td>
<td>Sandy Silt</td>
<td>Medium Dense</td>
<td>Fill</td>
<td>-</td>
<td>Clear and grub</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15+00</td>
<td>17+50</td>
<td>250</td>
<td>0.75</td>
<td>Sandy Silt</td>
<td>Very Dense</td>
<td>Fill</td>
<td>-</td>
<td>Clear and grub</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17+50</td>
<td>21+50</td>
<td>400</td>
<td>1.0</td>
<td>Sandy Silt</td>
<td>Medium Dense</td>
<td>Fill</td>
<td>-</td>
<td>Clear and grub</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21+50</td>
<td>25+50</td>
<td>400</td>
<td>0.75</td>
<td>Sandstone</td>
<td>-</td>
<td>Bedrock</td>
<td>0.75</td>
<td>Shallow bedrock</td>
<td>Scarify bedrock</td>
<td></td>
</tr>
<tr>
<td>25+50</td>
<td>29+00</td>
<td>350</td>
<td>0.5</td>
<td>Sandstone</td>
<td>-</td>
<td>Bedrock</td>
<td>0.5</td>
<td>Shallow bedrock</td>
<td>Scarify bedrock</td>
<td></td>
</tr>
<tr>
<td>29+00</td>
<td>39+00</td>
<td>1000</td>
<td>0.75</td>
<td>Sandstone</td>
<td>-</td>
<td>Bedrock</td>
<td>0.5</td>
<td>Shallow bedrock</td>
<td>Scarify bedrock</td>
<td></td>
</tr>
<tr>
<td>39+00</td>
<td>47+80</td>
<td>880</td>
<td>0.5</td>
<td>Silty Gravel/Clay</td>
<td>Very Stiff</td>
<td>Fill</td>
<td>-</td>
<td>Potential encounter of railroad ballast</td>
<td>Clear and grub; Infill existing railroad ballast</td>
<td></td>
</tr>
<tr>
<td>47+80</td>
<td>53+40</td>
<td>560</td>
<td>0.5</td>
<td>Piles</td>
<td>Sandstone</td>
<td>-</td>
<td>Bedrock</td>
<td>1.5</td>
<td>Boardwalk over wetland area</td>
<td>CIDH piles</td>
</tr>
<tr>
<td>53+40</td>
<td>54+90</td>
<td>150</td>
<td>0.5</td>
<td>Silty Gravel</td>
<td>Medium Dense</td>
<td>Fill</td>
<td>0.8</td>
<td>Potential encounter of railroad ballast</td>
<td>Clear and grub; Infill existing railroad ballast</td>
<td></td>
</tr>
<tr>
<td>54+90</td>
<td>58+50</td>
<td>360</td>
<td>0.5</td>
<td>Piles</td>
<td>Silt/Clay</td>
<td>Stiff</td>
<td>Fill</td>
<td>-</td>
<td>Boardwalk over wetland area</td>
<td>CIDH piles</td>
</tr>
</tbody>
</table>

\(^1\) Approximated average depth excavated based on 35% plans provided by NCE

\(^2\) Material anticipated at approximated excavation depth, the material may vary within each interval
## Table 1B. Trail Alignment Summary

<table>
<thead>
<tr>
<th>Segment</th>
<th>Approx. Start (Sta)</th>
<th>Approx. End (Sta)</th>
<th>Approx. Interval Length (ft)</th>
<th>Average Excavation Depth 1st (ft)</th>
<th>Anticipated Material at Excavation Depth 2nd</th>
<th>Consistency/Density</th>
<th>Unit</th>
<th>Average Depth to Bedrock (ft)</th>
<th>Notes</th>
<th>Recommendations (See Section 9.0)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B 58+50</td>
<td>62+00</td>
<td>350</td>
<td>0.5</td>
<td>Silty Gravel</td>
<td>Fill</td>
<td>-</td>
<td>Fill</td>
<td>-</td>
<td>Potential encounter of railroad ballast</td>
<td>Clear and grub; Infill existing railroad ballast</td>
</tr>
<tr>
<td>62+00</td>
<td>70+00</td>
<td>800</td>
<td>0.75</td>
<td>Silty Gravel/Fat Clay</td>
<td>Very Stiff</td>
<td>Fill</td>
<td>Fill</td>
<td>-</td>
<td>Potential encounter of railroad ballast; Railroad tracks adjacent to trail</td>
<td>Clear and grub; Infill existing railroad ballast</td>
</tr>
<tr>
<td>70+50</td>
<td>74+50</td>
<td>450</td>
<td>1.75</td>
<td>Silt/Clay</td>
<td>Hard</td>
<td>Fill</td>
<td>Fill</td>
<td>-</td>
<td>Railroad tracks adjacent to trail</td>
<td>Clear and grub; Infill existing railroad ballast</td>
</tr>
<tr>
<td>74+50</td>
<td>79+00</td>
<td>450</td>
<td>0.5</td>
<td>Silt/Clay</td>
<td>Hard</td>
<td>Fill</td>
<td>Fill</td>
<td>-</td>
<td>Railroad tracks adjacent to trail</td>
<td>Clear and grub; Infill existing railroad ballast</td>
</tr>
<tr>
<td>79+00</td>
<td>82+00</td>
<td>300</td>
<td>0.5</td>
<td>Silt/Clay</td>
<td>Hard</td>
<td>Fill</td>
<td>Fill</td>
<td>-</td>
<td>Clear and grub</td>
<td>Clear and grub</td>
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<tr>
<td>82+00</td>
<td>86+20</td>
<td>420</td>
<td>0.75</td>
<td>Silt/Clay</td>
<td>Hard</td>
<td>Fill</td>
<td>Fill</td>
<td>-</td>
<td>Clear and grub</td>
<td>Clear and grub</td>
</tr>
<tr>
<td>86+20</td>
<td>89+70</td>
<td>350</td>
<td>1.5</td>
<td>Silty Gravel/Clay</td>
<td>Hard</td>
<td>Fill</td>
<td>Fill</td>
<td>-</td>
<td>Clear and grub</td>
<td>Clear and grub</td>
</tr>
<tr>
<td>89+70</td>
<td>93+00</td>
<td>330</td>
<td>0.75</td>
<td>Silt/Clay</td>
<td>Hard</td>
<td>Fill</td>
<td>Fill</td>
<td>1.0</td>
<td>Clear and grub</td>
<td>Clear and grub</td>
</tr>
<tr>
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<td>98+00</td>
<td>500</td>
<td>0.75</td>
<td>Silty Gravel</td>
<td>Dense</td>
<td>Fill</td>
<td>Fill</td>
<td>-</td>
<td>Potential encounter of railroad ballast</td>
<td>Clear and grub; Infill existing railroad ballast</td>
</tr>
<tr>
<td>98+00</td>
<td>103+00</td>
<td>500</td>
<td>0.75</td>
<td>Sandstone</td>
<td>-</td>
<td>Bedrock</td>
<td>Fill</td>
<td>0.45</td>
<td>Scarify bedrock</td>
<td>Scarify bedrock</td>
</tr>
<tr>
<td>103+00</td>
<td>105+00</td>
<td>200</td>
<td>0.75</td>
<td>Silty Gravel</td>
<td>Dense</td>
<td>Fill</td>
<td>Fill</td>
<td>-</td>
<td>Potential encounter of railroad ballast</td>
<td>Clear and grub; Infill existing railroad ballast</td>
</tr>
<tr>
<td>105+00</td>
<td>116+00</td>
<td>1100</td>
<td>0.75</td>
<td>Silty Gravel</td>
<td>Medium Dense</td>
<td>Fill</td>
<td>Fill</td>
<td>1.0</td>
<td>Potential encounter of railroad ballast</td>
<td>Clear and grub; Infill existing railroad ballast</td>
</tr>
<tr>
<td>116+00</td>
<td>124+00</td>
<td>800</td>
<td>0.5</td>
<td>Silty Gravel</td>
<td>Medium Dense</td>
<td>Fill</td>
<td>Fill</td>
<td>-</td>
<td>Potential encounter of railroad ballast</td>
<td>Clear and grub; Infill existing railroad ballast</td>
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<td>128+75</td>
<td>475</td>
<td>0.75</td>
<td>Silty Gravel</td>
<td>Medium Dense</td>
<td>Fill</td>
<td>Fill</td>
<td>-</td>
<td>Railroad tracks with AC pavement on trail</td>
<td>Clear and grub; Remove existing railroad tracks; Scarify existing aggregate base</td>
</tr>
<tr>
<td>128+75</td>
<td>131+00</td>
<td>225</td>
<td>1.0</td>
<td>Bedrock</td>
<td>-</td>
<td>Bedrock</td>
<td>Fill</td>
<td>1.0</td>
<td>Railroad tracks on trail</td>
<td>Clear and grub; Remove existing railroad tracks, Infill existing railroad ballast</td>
</tr>
<tr>
<td>131+00</td>
<td>134+82</td>
<td>382</td>
<td>0.75</td>
<td>Clayey Gravel</td>
<td>Medium Dense</td>
<td>Fill</td>
<td>Fill</td>
<td>1.5</td>
<td>Railroad tracks on trail</td>
<td>Clear and grub; Remove existing railroad tracks, Infill existing railroad ballast</td>
</tr>
</tbody>
</table>

1 Approximated average depth excavated based on 35% plans provided by NCE
2 Material anticipated at approximated excavation depth, the material may vary within each interval
3 Assumed consistency/density based on adjacent borings
BASEMAP REFERENCE
1. BASEMAP FROM ESRI, 2016.
2. STREET CENTERLINES FROM CALTRANS GIS DATA, 2016.

LEGEND
A  POINT SAN PABLO
B  POINT ORIENT
C  POINT MOLATE
D  POINT CASTRO
E  CHEVRON LONG WHARF
REGIONAL GEOLOGY FROM E. J. HELLEY AND K. R. LAJOIE, 1979

DESCRIPTION OF MAP UNITS

- Qhac: COARSE-GRAINED ALLUVIUM
- Qham: MEDIUM-GRAINED ALLUVIUM
- Qhaf: FINE-GRAINED ALLUVIUM
- Qhafs: FINE-GRAINED SALT-AFFECTED ALLUVIUM
- Qhbm: BAY MUD
- Qpa: LATE PLEISTOCENE ALLUVIUM

BASEMAP REFERENCE
1. REGIONAL GEOLOGY FROM E. J. HELLEY AND K. R. LAJOIE, 1979
APPENDIX A. 35 PERCENT DESIGN PLANS
EAST BAY REGIONAL PARK DISTRICT
SAN FRANCISCO BAY TRAIL
AT POINT MOLATE
RICHMOND, CALIFORNIA

PROJECT LOCATION

LOCATION MAP

NOT TO SCALE

SAN FRANCISCO BAY TRAIL
AT POINT MOLATE

PROJECT LOCATION

SAN FRANCISCO BAY TRAIL
AT POINT MOLATE

DATE:
JUL 1, 2016

VICINITY MAP

NOT TO SCALE

EAST BAY REGIONAL PARK DISTRICT
SAN FRANCISCO BAY TRAIL
AT POINT MOLATE

PROJECT LOCATION

LOCATION MAP

NOT TO SCALE
FENCING NOTE:
THE FENCING LOCATION, LENGTH AND TYPE SHOWN ON THESE PLANS ARE PRELIMINARY PENDING DISCUSSION BETWEEN CLIENT AND LAND OWNER.
FENCING NOTE: THE FENCING LOCATION, LENGTH AND TYPE SHOWN ON THESE PLANS ARE PRELIMINARY PENDING DISCUSSION BETWEEN CLIENT AND LAND OWNER.
FENCING NOTE:
The fencing location, length and type shown on these plans are preliminary pending discussion between client and land owner.
FENCING NOTE:
The fencing location, length and type shown on these plans are preliminary pending discussion between client and land owner.
SAN FRANCISCO BAY TRAIL AT POINT MOLATE

SAN FRANCISCO BAY TRAIL
AT POINT MOLATE

2950 PERALTA OAKS CT,
OAKLAND, CA 94605

DATE:
JUL 1, 2016

VERTICAL: 1" = 4'
HORIZONTAL: 1" = 20'
SCALE:

FENCING NOTE:
The fencing location, length and type shown on these plans are preliminary pending discussion between client and land owner.
VERTICAL: 1" = 4'
HORIZONTAL: 1" = 20'

FENCING NOTE:
THE FENCING LOCATION, LENGTH AND TYPE
SHOWN ON THESE PLANS ARE PRELIMINARY
PENDING DISCUSSION BETWEEN CLIENT
AND LAND OWNER.
FENCING NOTE:
THE FENCING LOCATION, LENGTH AND TYPE
SHOWN ON THESE PLANS ARE PRELIMINARY
PENDING DISCUSSION BETWEEN CLIENT
AND LAND OWNER.
FENCING NOTE:
The fencing location, length and type shown on these plans are preliminary pending discussion between client and land owner.
SEGMENT B (NORTH SEGMENT)
SEGMENT A (SOUTH SEGMENT)

501 Canal Blvd., Suite I
Richmond, CA 94804

SAN FRANCISCO BAY TRAIL AT POINT MOLATE

SAN FRANCISCO BAY TRAIL

AT

POINT MOLATE

EAST BAY REGIONAL PARK DISTRICT
2950 PERALTA OAKS CT,
OAKLAND, CA 94605

DATE: JUL 1, 2016

VERTICAL: 1" = 4'
HORIZONTAL: 1" = 20'

SCALE:

FENCING NOTE:
THE FENCING LOCATION, LENGTH AND TYPE SHOWN ON THESE PLANS ARE PRELIMINARY PENDING DISCUSSION BETWEEN CLIENT AND LAND OWNER.

IMPROVEMENT PLAN "B" 53+50 TO "B" 58+50
SAN FRANCISCO BAY TRAIL AT POINT MOLATE

IMPROVEMENT PLAN
"B" 103+50 TO "B" 108+50

DATE: JUL 1, 2016

EAST BAY REGIONAL PARK DISTRICT
2950 PERALTA OAKS CT, OAKLAND, CA 94605
SAN FRANCISCO BAY TRAIL AT POINT MOLATE

IMPROVEMENT PLAN
"B" 128+50 TO "B" 133+50
DATE: JUL 1, 2016

VERTICAL: 1" = 4'
HORIZONTAL: 1" = 20'

SAN FRANCISCO BAY TRAIL AT POINT MOLATE

BAY TRAIL

AT

SAN FRANCISCO

BAY TRAIL

AT

POINT MOLATE

EAST BAY REGIONAL PARK DISTRICT
2950 PERALTA OAKS CT, OAKLAND, CA 94605

PROJECT NO.
520-08-00

2950 Peralta Oaks Ct.
Oakland, CA 94605

DATE: 07/01/2016

SCALE:

SAFETY:

PARKING:

COMMUNICATIONS:

C25
FENCING DETAILS

1. CHAIN LINK FENCE AND GATE

ALTHERATE 1

ALTERNATE 2

HALF HEIGHT FENCE

NOTE:

- RECOMMEND WIRE FENCE TO BE FIXED W/ INTEGRATED POSTS AND GALVANIZED FENCE CAPS.

WOODEN SPILT RAIL FENCE (ELEVATION)
APPENDIX B. BORING LOGS
## Field Log of Boring

**Location of Boring:** Segment A

**Project:** EBEPD SF Bay Trail

**Boring No.:** B-1

**Total Depth:** 2 Feet

**Job No.:** 567.04.65

**Logged By:** B. Barsley

**Proj. Mgr.:** R. Shafer

**Edited By:**

**Drilling Contractor:** California Geotech Services, LLC

**Drill Rig Type:** Solid Flight Auger

**Driller's Name:** Chris Van

**Sampling Methods:** Soil, Mud, SPT

**Hammer Wt.:** 140 lbs

**Drop:**

**Started, Time:** 09:31 hours

**Date:** 3/8/16

**Completed, Time:** 10:05 hours

**Date:** 3/9/16

**Casing Depth (ft):**

**Water Depth (ft):**

**Time:**

**Date:**

**Backfilled, Time:**

**Date:**

**Surface Elev.:**

**Datum:**

**Conditions:**

- Asphault (2.9-inches)

- Silty Sand (SM) - Dark grayish brown (10YR 4/2); 60% Fine to medium sand; 25% non-plastic fines; 5% Fine rounded gravel; dense; moist.

- B-1-0.5 was collected at 09:56 hours.

- B-1-1.5 was collected at 10:00 hours.
LOCATION OF BORING: Segment A

1 inch = 1.25 feet

PROJECT: EBRPD SF Bay Trail
BORING NO.: B-2
TOTAL DEPTH: 27 feet (32 inches)

JOB NO.: 567-04.55
LOGGED BY: B. Bardisny
EDITED BY:

PROJ. MGR.: R. Shafer

DRILLING CONTRACTOR: California Feetech Services, LLC

DRILL RIG TYPE: Track Mounted B-34

DRILLER'S NAME: Chris Venni

SAMPLING METHODS: California Modified SPT

HAMMER WT.: 190 lbs
DROP:

STARTED, TIME: 1:12 hours
DATE: 8/8/16

COMPLETED, TIME: 10:41 hours
DATE: 8/8/16

BORING DEPTH (ft.)

CASING DEPTH (ft.)

WATER DEPTH (ft.)

TIME:

DATE:

BACKFILLED, TIME: DATE: BY:

SURFACE ELEV.: DATUM:

CONDITIONS:

SAMPLE DEPTH | SAMPLER TYPE | BLOWS/6-IN. | INCHES DRIVEN | INCHES RECOVERED | SAMPLE CONDITION | DRILLING RATE | DEPTH IN FEET | HYDROFUG/H.E R | SAMPLE RECOVERY | GRAPHIC LOG
--- | --- | --- | --- | --- | --- | --- | --- | --- | --- | ---
42 | 10" | 12" | 0" | 49 | 23 | 12 | 14 | 14" | 12" | 0

Asphalt - 2 inches thick

Silty Sand (Sm) - brown (5.5YR4/2), 70% fine
To medium sand, 25% non-plastic fines,
5% fine rounded gravel, moist.

B-2-0.5 was collected at 10:36 hours.
B-2-1.5 was collected at 10:41 hours.
LOCATION OF BORING:

Segment A

B-3

A Trail Centerline

↑ North

1 inch = 12.5 Feet

PROJECT: EBRPD SF Bay Trail
BORING NO: B-3
TOTAL DEPTH: 24 inches

JOB NO.: 567.04.65
LOGGED BY: B. Bolden

PROJ. MGR.: R. Schamber
EDITED BY:

DRILLING CONTRACTOR: California Geotechnical Services, Inc.
DRILL RIG TYPE: Air Blast Truck Mounted B-24
DRILLER'S NAME: Chris Van

SAMPLING METHODS: Modified

HAMMER WT.: 140 lbs
DROP:

STARTED, TIME: 1100 hours
DATE: 3/8/16
COMPLETED, TIME: 1115 hours
DATE: 3/8/16

BORING DEPTH (ft.)
CASING DEPTH (ft.)
WATER DEPTH (ft.)

TIME:

DATE:
BACKFILLED, TIME: 
DATE: 
BY: 

SURFACE ELEV.: 
DATUM: 

CONDITIONS:

SAMPLE DEPTH
SAMPLER TYPE
BLOWS / 6-IN.
INCHES DRIVEN
INCHES RECOVERED
SAMPLE CONDITION
DRILLING RATE
DEPHT IN FEET
HYDROZOOOTHER
SAMPLE RECOVERY
GRAPHIC LOG

2.9
45°
16°

3.5

35

50
6°
5°

5" 5°

1
2
3
4
5
6
7
8
9
10

1

5°

6°

7°

8°

9°

10°

B-3-0.5 was collected at 1104 hours.
B-3-1.5 was collected at 1112 hours.
### Boring Number B-04

**Date Started:** 3/8/2016  
**Completed:** 3/8/2016  
**Drilling Contractor:** California Geotech

**Coordinates:**  
- **Latitude:** 37.932945  
- **Longitude:** -122.408486

**Drilling Rig/Method:** Mobile B-24/4-in. Solid Flight Auger

**Hammer Type:** 140 lb hammer with 30 in. cathead

**Drilling Rig/Method:** Mobile B-24/4-in. Solid Flight Auger

**Drill Rig/Method:** Mobile B-24/4-in. Solid Flight Auger

**Drill Rig/Method:** Mobile B-24/4-in. Solid Flight Auger

**Hammer Type:** 140 lb hammer with 30 in. cathead

### Material Description

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Material Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>SILTY SAND (SM) to SILTY SAND with GRAVEL (SM), brown, moist, medium dense, some well graded gravel up to 1 in. (ARTIFICIAL FILL)</td>
</tr>
<tr>
<td>1</td>
<td>R-value = 72</td>
</tr>
<tr>
<td>2</td>
<td>Grades to loose</td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bottom of borehole at 4.0 ft. Borehole backfilled with grout.</td>
</tr>
</tbody>
</table>

**Groundwater at Time of Drilling:** not encountered

**Groundwater After Drilling:** N/A

**Groundwater at End of Drilling:** N/A

**ATTERBERG Limits:**

<table>
<thead>
<tr>
<th>Sample Type</th>
<th>Blow Counts (Field Value)</th>
<th>Pocket Pen (t/ft)</th>
<th>Dry Unit Weight (pcf)</th>
<th>Moisture Content (%)</th>
<th>Liquid Limit (%)</th>
<th>Plastic Limit (%)</th>
<th>Plastic Index (%)</th>
<th>Fines Content (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CM</td>
<td>15-11-9</td>
<td>107</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**R-value:** 72

**Client:** Subconsultant to NCE for EBRPD  
**Project Number:** 151190  
**Project Name:** SF Bay Trail at Point Molate  
**Project Location:** Richmond, CA

**Logged By:** R. Briseno  
**Checked By:** D. Burger  
**Datum:** NAVD88  
**Hole Size:** 4 in.
**FIELD LOG OF BORING**

**LOCATION OF BORING:**

Segment A

![Diagram](image)

**PROJECT:** EBRPD SF Bay Trail

**BORING NO.:** B-4

**TOTAL DEPTH:** 64 inches

**JOB NO.:** 567-04-55

**LOGGED BY:** B. Barbadeck

**PROJ. MGR.:** R. Schafer

**EDITED BY:**

**DRILLING CONTRACTOR:** California Geotech Services, LLC

**DRILL RIG TYPE:** Truck Mounted B-24

**DRILLER’S NAME:** Chris Veni

**SAMPLING METHODS:** Cat. Modified

**HAMMER WT.:** 110 pounds

**DROP:**

**STARTED, TIME:** 11:33 hours

**DATE:** 3/9/16

**COMPLETED, TIME:** 12:00 hours

**DATE:** 3/9/16

**BOARING DEPTH (ft.)**

**CASING DEPTH (ft.)**

**WATER DEPTH (ft.)**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWs / 6-IN.</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
<th>DEPTH IN FEET</th>
<th>HYDRO/ONEHOT</th>
<th>SAMPLE RECOVERY</th>
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</thead>
<tbody>
<tr>
<td>14</td>
<td>19&quot; 16&quot;</td>
<td>24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>19&quot; 16&quot;</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GRAPHIC LOG**

**B-4-0.5 was collected at 11:33 hours. B-4-1.5 was collected at 11:33 hours.**

**Silty Sand with Gravel (Sg) - brown (7.5YR 4/2), 60% fine sand, 20% non-plastic fines, 20% fine rounded gravel, dense, moist.**
<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLE TYPE</th>
<th>BLOWs/6-IN.</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
<th>DEPTH IN FEET</th>
<th>HYDRONIC/SAMPLER</th>
<th>GRAPHIC LOG</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>L</td>
<td>18</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>L</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>18</td>
<td>18</td>
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<td>18</td>
<td>18</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
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<td></td>
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<tr>
<td>15</td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**CONDITIONS:**
- **SiT (ML)** - dark brown (7.5YR 3/2); 90% non-plastic to low plastic fines; 10% fine sand; trace fine rounded gravel; stiff; very fine to fine gravel
- **SiT (ML)** - moderately fine sand at about one foot below B-5-0.5 was collected at 12:20 hours
- **SiT (ML)** - predominantly fine grained sand; slightly dry; B-5-1.5 was collected at 12:30 hours.
## Field Log of Boring

**Sheet 1 of 1**

### Project:
- **EBRPD SF Bay Trail**

### Boring Log:
- **Boring No.:** B-6
- **Logged By:** B. Cordero
- **Edited By:**
- **Drilling Contractor:** California Geotech Services, LLC
- **Drill Rig Type:** Truck Mounted B-24
- **Driller's Name:** Chris Yoni
- **Sampling Methods:** Sample was collected from drill cuttings
- **Hammer Wt.:** 140 pounds
- **Drop:**
- **Started, Time:** 1240 hours
- **Completed, Time:** 1300 hours
- **Date:** 3/8/16
- **Date:** 3/8/16
- **Boring Depth (ft.):**
- **Casing Depth (ft.):**
- **Water Depth (ft.):**
- **Time:**
- **Date:**
- **Backfilled, Time:**
- **Date:**
- **By:**
- **Surface Elev.:**
- **Datum:**
- **Conditions:**

### Sample Table

<table>
<thead>
<tr>
<th>Sample Depth</th>
<th>Sampler Type</th>
<th>Blows / 6-in.</th>
<th>Inches Recovered</th>
<th>Sample Condition</th>
<th>Drilling Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-2</td>
<td>50 5/5</td>
<td>2°</td>
<td>2°</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-4</td>
<td>2°</td>
<td>2°</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-8</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>8-10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
- **Bedrock:**
  - 2 inches
  - Bedrock (Base) - Very Pale Brown (60R7/3): Predominantly Fine Sand, Very Dense; Dry
  - Bedrock (Chert) was encountered at about 4 inches below the ground surface.

**B-6-0.4 was collected at 1240 hours.**
**FIELD LOG OF BORING**

**Sheet 1 of 1**

**LOCATION OF BORING**

- **Segment A**
- **EBRPD SF Bay Trail**
- **B-7**
- **B-6**
- Trail Centerline
- NORTH
- 1 inch = 12.5 feet

**PROJECT:**
- **EBRPD SF Bay Trail**

**BORING NO.:** B-7

**TOTAL DEPTH:** 12-inches

**JOB NO.:** 567.04.55

**LOGGED BY:** B. Barstel

**PROJ. MGR.:** R. ShinFei

**EDITED BY:**

**DRILLING CONTRACTOR:** California Geotech Services, Ltd

**DRILL RIG TYPE:** Truck Mounted B-27

**DRILLER'S NAME:** Chris Veni

**SAMPLING METHODS:** Sample was collected from drill cuttings.

**HAMMER WT.:**

**STARTED, TIME:** 13:00 hours

**DATE:** 3/4/16

**COMPLETED, TIME:** 15:20 hours

**DATE:** 3/4/16

**BORING DEPTH (ft.):**

**CASING DEPTH (ft.):**

**WATER DEPTH (ft.):**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

- Asphalt = 3 inches
- Poorly Graded Sand (SP) - Very pale brown (10YR/1.5)
- Predominantly fine sand, very dense, dry
- Bedrock (sandstone) was encountered at a depth of 4 inches below the ground surface.

**B-7-0.4 was collected at 13:11 hours.**
**FIELD LOG OF BORING**

**PROJECT:** EBRPD SF Bay Trail

**BOILING NO.: B-8**

**TOTAL DEPTH:** 24 inches

**JOB NO.: 567. 04. 54**

**LOGGED BY:** B. Bardsley

**PROJ. MGR.: R. Shaffer**

**EDITED BY:**

**DRILLING CONTRACTOR:** California FootTech Services, LLC

**DRILL RIG TYPE:** Truck Mounted B-24

**DRILLER'S NAME:** chris veni

**SAMPLING METHODS:** Sample was collected from drill cuttings.

**HAMMER WT.:**

**DROP:**

**STARTED, TIME:** 1:55 hours

**DATE:** 3/8/16

**COMPLETED, TIME:** 1:50 hours

**DATE:** 3/8/16

**BORING DEPTH (ft.)**

**CASING DEPTH (ft.)**

**WATER DEPTH (ft.)**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

Asphalt = 2.5"  

Bedrock was encountered directly below the asphalt. The bedrock is composed of Silty sand (30%) - brown (7.5YR 5/2); 70% Fine sand; 30% non-plastic fines, 5% silt.

B-8 - 0.12 was collected at 14:04 hours.
**FIELD LOG OF BORING**

**PROJECT:** EB RPD SF Bay Trail

**BORING NO.:** B-9

**TOTA L DEPTH:** 24 inches

**JOB NO.:** 567.04.55

**LOGGED BY:** B. Bardslcy

**PROJ. MGR.:** R. Shafer

**EDITED BY:**

**DRILLING CONTRACTOR:** California Geotech Services, LLC

**DRILL RIG TYPE:** Track Mounted D-24

**DRILLER'S NAME:** Chris Veni

**SAMPLING METHODS:** California Modified

**HAMMER WT.:** 140 pounds

**DROP:**

**STARTED, TIME:** 0829 Hours

**DATE:** 3/10/16

**COMPLETED, TIME:** 0907 Hours

**DATE:** 3/10/16

**BORING DEPTH (ft.)**

**CASING DEPTH (ft.)**

**WATER DEPTH (ft.)**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6- IN.</th>
<th>INCHES DRIVEN</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
<th>DEPTH IN FEET</th>
<th>GRAPHIC LOG</th>
</tr>
</thead>
<tbody>
<tr>
<td>15</td>
<td>18° 12&quot;</td>
<td>12&quot;</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>Asphalt - 2&quot;</td>
</tr>
<tr>
<td>16</td>
<td>12&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Sandstone</td>
</tr>
<tr>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>3° poorly graded sand (SP) - very dark gray (10YR 3/2); predominantly medium sand; trace amounts of coarse sand; medium dense; moist. Sandstone was encountered at approximately 5 inches bgs.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6</td>
<td></td>
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<td></td>
<td>7</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

B-9-0.2 was collected at 0903 hours.
**LOCATION OF BORING:**

Segment A
(Castro Point)

**PROJECT:**
ESRPO SF Bay Trail

**BORING NO.:** B-10
**TOTAL DEPTH:** 24-inches

**JOB NO.:** 567.04.95
**LOGGED DEPTH:**

**PROJ. MGR.:** R. Shafer
**EDITED BY:**

**DRILLING CONTRACTOR:** California Geotech Services, LLC

**DRILL RIG TYPE:** Truck Mounted B-24

**DRILLER'S NAME:** Chris Vinci

**SAMPLING METHODS:** California Modified

**HAMMER WT.:** 160 pounds

**STARTED, TIME:** 09:07 hours
**DATE:** 3/10/16

**COMPLETED, TIME:** 09:30 hours
**DATE:** 3/10/16

**BORING DEPTH (ft.)**

**CASING DEPTH (ft.)**

**WATER DEPTH (ft.)**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6 IN.</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 - 6</td>
<td>18&quot; 94</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 - 12</td>
<td>12</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DEPTH IN FEET**

**HYDROPHONIC/OTHER**

**SAMPLE RECOVERY**

**GRAPHIC LOG**

3** Poorly Graded Gravel (GM) - very dark gray (10YR3/1); predominantly fine, rounded gravel, trace amounts of non-plastic fines.

**Clayey Sand (CL) - brown (7.5YR 3/2); 45% low plastic fines; 15% Fine sand; very stiff moist.**

B-10-0.5 was collected at 09:22 hours.

B-10-1.5 was collected at 09:27 hours.
### Boring Number B-11

**Material Description**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Material Description</th>
<th>Sample Type</th>
<th>Blow Counts (Field Value)</th>
<th>Pocket Pen (ft/sf)</th>
<th>Moisture Content (%)</th>
<th>Plastic Limit (%)</th>
<th>Liquid Limit (%)</th>
<th>Plasticity Index (%)</th>
<th>Atterberg Limits</th>
<th>Fines Content (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>POORLY GRADED GRAVEL (GP) (AGGREGATE BASE)</td>
<td>CM</td>
<td>8-10-13</td>
<td>115</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>LEAN CLAY (CL) with GRAVEL, brown with light brown mottling, moist, hard, some light brown silt, iron stained, trace chert and sandstone rock fragments (ARTIFICIAL FILL)</td>
<td>SPT</td>
<td>13-27-14</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>SILTY SAND with GRAVEL (SM), brown and light brown, dense, friable, gravel up to 1.5 in., fine to medium sand, sandstone rock fragments, decrease gravel with depth</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Bottom of borehole at 4.0 ft. Borehole backfilled with grout.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>
**FIELD LOG OF BORING**

**PROJECT:** EBRPD SF Bay Trail

**BORING NO.:** B-11

**TOTAL DEPTH:** 24'-0" inches

**JOB NO.:** 867.04.55

**LOGGED BY:** E. Bardley

**PROJ. MGR.:** R. Shafer

**EDITED BY:**

**DRILLING CONTRACTOR:** California Geotech Services, LLC

**DRILL RIG TYPE:** Track Mounted B-24

**DRILLER'S NAME:** Chris Veni

**SAMPLING METHODS:** California Modified

**HAMMER WT.:** 140 pounds

**DROP:**

**STARTED, TIME:** 09:30 hours

**DATE:** 3/10/16

**COMPLETED, TIME:** 10:00 hours

**DATE:** 3/10/16

**BORING DEPTH (ft.)**

<table>
<thead>
<tr>
<th>CASING DEPTH (ft.)</th>
<th>WATER DEPTH (ft.)</th>
<th>TIME:</th>
<th>DATE:</th>
</tr>
</thead>
</table>

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

1' Poorly Graded Gravel (Sp) - Very dark gray (10YR3/1); Predominantly fine rounded gravel up to two inches in length; Trace amounts of non-plastic fines and fine sand; Medium dense; wet.

6' Lean Clay with Sand (CL) - Brown (7.5YR 3/2); 85% clay plastic fines; 15% Fine Sand; Very stiff moist.

B-11-0.5 was collected at 0944 hours.

B-11-1.5 was collected at 0944 hours.
**LOCATION OF BORING:**

North

**BORING NO.: B-11A**

**TOTAL DEPTH:** 20 Feet

**JOB NO.:** 567.04, 55

**LOGGED BY:** B. Bardesley

**PROJ. MGR.:** R. Shaffer

**EDITED BY:**

**DRILLING CONTRACTOR:** Confluence Environmental

**DRILL RIG TYPE:** Direct Push

**DRILLER’S NAME:** Jesus Morales

**SAMPLING METHODS:** Continuous Core

**HAMMER WT.:**

**DROP:**

**STARTED, TIME:** 1415 hours

**DATE:** 5/31/16

**COMPLETED, TIME:** 1920 hours

**DATE:** 5/31/16

**BORING DEPTH (ft.):**

**CASING DEPTH (ft.):**

**WATER DEPTH (ft.):**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

(2 inches) Poorly Graded Gravel (6m) - very dark gray (10YR3/1); predominantly fine rounded gravel; trace amount of non-plastic fines; dry, loose sand

Lean Clay (6-12) - brown (7.5YR3/2); 85% low plastic fines; 15% fine sand; very stiff, moist

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6 IN.</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
<th>DEPTH IN FEET</th>
<th>HYDRO/GEOCHEMICAL SAMPLE RECOVERY</th>
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<td>2.5</td>
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<td></td>
</tr>
<tr>
<td>3.0</td>
<td>3.0</td>
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</tr>
<tr>
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<td>10.0</td>
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<td></td>
</tr>
</tbody>
</table>
# FIELD LOG OF BORING

**PROJECT:** EBRPD SF Bay Trail at Point Molate  
**BORING NO.:** B-11B  
**TOTAL DEPTH: 2 feet**  
**JOB NO.:** 567.04.55  
**LOGGED BY:** B. Barsley  
**PROJ. MGR.:** R. Shafer  
**EDITED BY:**  
**DRILLING CONTRACTOR:** Confluence Environmental  
**DRILL RIG TYPE:** Direct Push  
**DRILLER'S NAME:** Jesus Morales  
**SAMPLING METHODS:** Continuous core  

**HAMMER WT.:** DROP:  
**STARTED, TIME:** 7:20 a.m.  
**DATE:** 5/31/16  
**COMPLETED, TIME:** 10:24 a.m.  
**DATE:** 5/31/16  
**BORING DEPTH (ft.):**  
**CASING DEPTH (ft.):**  
**WATER DEPTH (ft.):**  
**TIME:**  
**DATE:**  
**BACKFILLED, TIME:**  
**DATE:**  
**BY:**  
**SURFACE ELEV.:**  
**DATUM:**  
**CONDITIONS:**

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6-IN.</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
<th>DEPTH IN FEET</th>
<th>HYDROPUNCHER</th>
<th>SAMPLER RECOVERY</th>
<th>GRAPHIC LOG</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>19</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
</tr>
</tbody>
</table>

(3-inches) Poorly Graded Gravel (FG) - very dark gray (10YR 3/1); predominantly fine rounded gravel; trace amounts of non-plastic fines; dry.  
Lean clay with sand (CL) - brown (7.5YR 5/1); 85% low plastic fines; 15% fine sand; very stiff, moist.
LOCATION OF BORING: Segment A

1 inch = 12.5 Feet

PROJECT: EBRPO SF Bay Trail
BORING NO.: B-12
TOTAL DEPTH: 24 inches
JOB NO.: 567.04.55
LOGGED BY: B. Bartholomew
PROJ. MGR.: R. Sharfer
EDITED BY:
DRILLING CONTRACTOR: California Geotech Services, LLC
DRILL RIG TYPE: Truck Mounted B-24
DRILLER'S NAME: Chris Veni
SAMPLING METHODS: California Modified
HAMMER WT.: 160 pounds
STARTED, TIME: 10:20 hours
DATE: 3/10/16
COMPLETED, TIME: 11:00 hours
DATE: 3/10/16
BORING DEPTH (ft.)
CASING DEPTH (ft.)
WATER DEPTH (ft.)
TIME:
DATE:
BACKFILLED, TIME:
DATE:
BY:
SURFACE ELEV.: DATUM:
CONDITIONS: Two holes were advanced to 24 inches bgs. No recovery. Gravel extends from ground surface to at least one foot bgs. The gravel ranges from fine to coarse (up to 3-inches) in length.
<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>MATERIAL DESCRIPTION</th>
<th>SAMPLE TYPE</th>
<th>BLOW COUNTS (FIELD VALUE)</th>
<th>POCKET PEN. (tsf)</th>
<th>DRY UNIT WT. (pcf)</th>
<th>LIQUID LIMIT (%)</th>
<th>PLASTIC LIMIT (%)</th>
<th>PLASTICITY INDEX (%)</th>
<th>FINES CONTENT (%)</th>
<th>ATTERBERG LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>POORLY GRADED GRAVEL (GP) (AGGREGATE BASE)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>1</td>
<td>SILTSTONE, yellowish brown, moist, weakly cemented, very severely weathered, iron stained, thinly bedded, grades to sandstone (BEDROCK)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>SILTY SANDSTONE with gray clay interbeds, moderately fractured, tight</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>4</td>
<td>Bottom of borehole at 4.0 ft. Borehole backfilled with grout.</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>
### FIELD LOG OF BORING

**Location of Boring:** Segment A

- **Project:** EBRPD SF Bay Trail
- **Total Depth:** 24 inches
- **Job No.:** 047.041.55
- **Logged By:** B. Cardisley
- **Proj. Mgr.:** R. Shaffer
- **Edited By:**
- **Drilling Contractor:** California Geotech Services, LLC
- **Drill Rig Type:** Superman
- **Driller’s Name:** Chris Veni
- **Sampling Methods:** California Modified
- **Hammer Wt.:** 140 pounds
- **Drop:**
- **Started Time:** 1200 hours
- **Date:** 3/10/16
- **Completed Time:** 1610 hours
- **Date:** 3/10/16
- **Boring Depth:** 10 feet
- **Casing Depth:** Two
- **Water Depth:**
- **Time:**
- **Date:**
- **Backfilled Time:**
- **Date:**
- **Surface Elev.:**
- **Datum:**
- **Conditions:**

#### Sample Depth

<table>
<thead>
<tr>
<th>Depth (ft.)</th>
<th>Sample Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>187 140</td>
<td>8&quot; Bucly Graded gravel: very dark-gray (10%R2/15); predominantly fine rounded gravel; trace amounts of non-plastic fines and fine sand; medium dense, wet.</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Sir Sand (SM) - brownish yellow (10VC5/5); 50% fine sand; 50% non-plastic fines; very loose.</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>Sandstone - 2 feet</td>
</tr>
</tbody>
</table>

**B-13-0.C was collected at 1756 hours. B-13-1.3 was collected at 1400 hours.**
**BORING NUMBER B-14**

**CLIENT**  Subconsultant to NCE for EBRPD

**PROJECT NUMBER**  151190


**DRILLING CONTRACTOR**  California Geotech

**DRILLING RIG/METHOD**  Mobile B-24/4-in. Solid Flight Auger

**LOGGED BY**  R. Briseno  **CHECKED BY**  D. Burger

**HAMMER TYPE**  140 lb hammer with 30 in. cathead

**GROUND ELEVATION**  20 ft  **DATUM**  NAVD88  **HOLE SIZE**  4 in.

**COORDINATES:**  
- **LATITUDE:** 37.940664
- **LONGITUDE:** -122.410108

---

**GROUNDWATER AT TIME OF DRILLING**  --- not encountered

**GROUNDWATER AT END OF DRILLING**  --- N/A

---

**GROUNDWATER AFTER DRILLING**  --- N/A

---

**HOLE SIZE**  **4 in.**

---

**CLIENT**  Subconsultant to NCE for EBRPD

**PROJECT NUMBER**  151190

**PROJECT NAME**  SF Bay Trail at Point Molate

**PROJECT LOCATION**  Richmond, CA

---

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>GRAPHIC LOG</th>
<th>MATERIAL DESCRIPTION</th>
<th>SAMPLE TYPE</th>
<th>BLOW COUNTS (FIELD VALUE)</th>
<th>POCKET PEN. (tsf)</th>
<th>DRY UNIT WT. (pcf)</th>
<th>LIQUID LIMIT (%)</th>
<th>MOISTURE CONTENT (%)</th>
<th>PLASTIC LIMIT (%)</th>
<th>ATTERBERG LIMITS</th>
<th>PLASTICITY INDEX (%)</th>
<th>FINES CONTENT (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>LEAN CLAY (CL), brown, moist, firm, gravel up to 1 in., sparse silt (ARTIFICIAL FILL)</td>
<td>CM</td>
<td>11-11-8</td>
<td></td>
<td></td>
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<td>SPT</td>
<td>5-5-6</td>
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</table>

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Bottom of borehole at 4.0 ft. Borehole backfilled with grout.
## Field Log of Boring

**Location of Boring:** Segment A

**Boring No.:** B-14  
**Total Depth:** 24 inches

**Job No.:** 667.06.89  
**Logged By:** B. Barlow

**Proj. Mgr.:** R. Shaffer  
**Edited By:**

**Drilling Contractor:** California Geotech Services, LLC

**Drill Rig Type:** Track Mounted B-24

**Driller's Name:** Chris Veni

**Sampling Methods:** cut core, SPT

**Hammer Wt.:** 140 pounds  
**Drop:**

**Started, Time:** 1500 hours  
**Completed, Time:** 1520 hours  
**Date:** 3/4/16

**Boring Depth (ft.)**

**Casing Depth (ft.)**

**Water Depth (ft.)**

**Time:**

**Date:**

**Backfilled, Time:**

**By:**

**Surface Elev.:**

**Datum:**

**Conditions:**

<table>
<thead>
<tr>
<th>Sample Depth</th>
<th>Sampler Type</th>
<th>Blows</th>
<th>Inches Driven</th>
<th>Inches Recovered</th>
<th>Sample Condition</th>
<th>Drilling Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>19&quot; 19&quot;</td>
<td>6</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
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<td>7</td>
<td>19&quot; 19&quot;</td>
<td>7</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>18&quot; 18&quot;</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>18&quot; 18&quot;</td>
<td>3</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>18&quot; 18&quot;</td>
<td>1</td>
<td>1</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

**Graphic Log:**

- **1 ft:** Silt sand with gravel (SM) - brown (10YR 5/3); 50% fine sand; 30% non-plastic fines; 20%. Fine rounded gravel; medium dense; wet.
- **2 ft:** Lean clay (CL) - brown (10YR 5/3); predominantly non-plastic to low plasticity fines; stiff, dry.
- **3 ft:** Organic material such as roots were found throughout the sample intervals.

**B-14-0.9 was collected at 1510 hours.**  
**B-14-1.9 was collected at 1515 hours.**
<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>GRAPHIC LOG</th>
<th>MATERIAL DESCRIPTION</th>
<th>SAMPLE TYPE</th>
<th>BLOW COUNTS (FIELD VALUE)</th>
<th>POCKET PEN (tsf)</th>
<th>DRY UNIT WT. (pcf)</th>
<th>LIQUID LIMIT (%)</th>
<th>PLASTIC LIMIT (%)</th>
<th>ATTERBERG LIMITS</th>
<th>PLASTICITY INDEX (%)</th>
<th>FINES CONTENT (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>Crushed rock (RAILROAD BALAST)</td>
<td></td>
<td>CM</td>
<td>12-12-9</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>1</td>
<td></td>
<td>FAT CLAY (CH), mottled black with gray and brown, dry, hard, sandstone and chert rock fragments, iron staining (ARTIFICIAL FILL)</td>
<td></td>
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<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>LEAN CLAY (CH), black, moist to wet, soft, odorous, some iron staining, isolated organic stringers, isolated sandstone rock fragments (NATIVE SOIL)</td>
<td></td>
<td>SPT</td>
<td>12-12-11</td>
<td>112</td>
<td>16</td>
<td>48</td>
<td>26</td>
<td>22</td>
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</tbody>
</table>

Bottom of borehole at 3.5 ft. Borehole backfilled with grout.
LOCATION OF BORING:

Segment B

LOCATION OF BORING:

Segment B

B-15

↑ North

K-Trail Centerline

1 inch = 12.5 Feet

PROJECT:
EBRAD SF Bay Trail

BORING NO.: B-15

TOTAL DEPTH: 24 inches

JOB NO.: 847-04-55

LOGGED BY: R. Bardsley

PROJ. MGR.: D. Shafer

EDITED BY:

DRILLING CONTRACTOR: California Geotech Services, LLC

DRILL RIG TYPE: Truck Mounted B-24

DRILLER'S NAME: Chris Veni

SAMPLING METHODS: Cat Modified

HAMMER WT.: 140 pounds

STARTED, TIME: 1150 hours

DROPPED DATE: 3/8/16

COMPLETED, TIME: 1615 hours

DATE: 3/9/16

BORING DEPTH (ft.)

CASING DEPTH (ft.)

WATER DEPTH (ft.)

TIME:

DATE:

BACKFILLED, TIME: DATE: BY:

SURFACE ELEV.: DATUM:

CONCLUSIONS:

Very dark covered brown

Silty Gravel with sand (Sm) - 50% Fine rounded
gravel, 50% non-plastic fines; 20% fine sand; moist.

Fat Clay (Ch) - very dark brown (10YR 7/2);
Predominantly high plastic fines; very stiff; moist.

B-15-0.8 was collected at 15 hours.
B-15-1.5 was collected at 25 hours.
FIELD LOG OF BORING

LOCATION OF BORING:

PROJECT: EBRPD SF Bay Trail at Point Molate
BORING NO.: B-15A
TOTAL DEPTH: 20 Feet
JOB NO.: 567.04.55
LOGGED BY: B. Barabley
PROJ. MGR.: R. Shafer
EDITED BY:
DRILLING CONTRACTOR: Confluence Environmental
DRILL RIG TYPE: Direct Push
DRILLER'S NAME: Jesus Morales

SAMPLING METHODS: Continuous Core
HAMMER WT.: DROP:

STARTED, TIME: 1239 hours DATE: 5/31/16
COMPLETED, TIME: 1245 hours DATE: 6/31/16
BORING DEPTH (ft.):
CASING DEPTH (ft.):
WATER DEPTH (ft.):
TIME:
DATE:
BACKFILLED, TIME: DATE: BY:
SURFACE ELEV.: DATUM:
CONDITIONS:

24 14

10% Silty Gravel with Sand (60m) - very dark grayish brown (10YR 3/3A); 80% non-plastic fines; 20% fine sand; 50% fine rounded gravel, loose, dry.

Fat clay (9m) - very dark brown (10YR 2.5/1); predominantly high plastic fines, very stiff, moist.
PROJECT: EBRPD SF Bay Trail at Point Molate
BORING NO.: B-15B
TOTAL DEPTH: 2 Feet
JOB NO.: 667.04.55
LOGGED BY: B. Bardsley
PROJ. MGR.: R. Shafer
EDITED BY:
DRILLING CONTRACTOR: Confluence Environmental
DRILL RIG TYPE: Direct Push
DRILLER'S NAME: Jesus Morales
SAMPLING METHODS: Continuous Core
HAMMER WT.: DROP:
STARTED, TIME: 12:30 hours DATE: 5/31/14
COMPLETED, TIME: 12:39 hours DATE: 6/31/14
BORING DEPTH (ft.):
CASING DEPTH (ft.):
WATER DEPTH (ft.):
TIME:
DATE:
BACKFILLED, TIME: DATE: BY:
SURFACE ELEV.: DATUM:
CONDITIONS:

B 63+50 to B 68+50
Drawing C12

Sample Depth

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6-IN</th>
<th>INCHES DRIVEN</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>19</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

5 ft

Silt gravel with sand (56%)
- very dark grayish brown (10R 3/2)
- 30% non-plastic fines
- 20% fine sand
- 50% fine rounded gravel
- loose; dry

3 ft

Fir clay (50%)
- very dark brown (10YR 2/2)
- predominantly high plastic fines
- very stiff; moist

1 ft

Soil (75%)
- grey (10 Y 6/2)
- plasticity moderate
- moderately compacted; semi-firm

1 ft

Soil (75%)
- grey (10 Y 6/2)
- plasticity moderate
- moderately compacted; semi-firm
**Project:** EERPD SF Bay Trail  
**Total Depth:** 24 inches

**JOB NO.:** 567.04.55  
**LOGGED BY:** B. Bardsley

**PROJ. MGR.:** R. SnaFe  
**EDITED BY:**

**DRILLING CONTRACTOR:** California Geotech Services, LLC  
**DRILL RIG TYPE:** Truck Mounted B-24

**DRILLER'S NAME:** Chris Veni  
**SAMPLING METHODS:** California Modified

**HITTER WT.:** 140 pounds  
**DROP:**

<table>
<thead>
<tr>
<th>Started, Time: 1630 hours</th>
<th>Date: 3/8/16</th>
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</thead>
<tbody>
<tr>
<td>Completed, Time: 1700 hours</td>
<td>Date: 3/8/16</td>
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</table>

**BORING DEPTH (ft.):**

<table>
<thead>
<tr>
<th>Casings Depth (ft.)</th>
<th>Water Depth (ft.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</tr>
</tbody>
</table>

**Time:**

**DATE:**  
**Backfilled, Time:**

**BY:**

**Surface ELEV.:**

**Datum:**

**Conditions:**

1. *Silty gravel with sand (GS)* - 75% dark grayish brown (10YR 3/2), 25% non-plastic fines; 20% fine sand; 60% fine rounded gravel; wet.

2. *Fat clay (CH)* - very dark brown (10YR 2/2), predominantly high plastic fines; very stiff; moist.

B-16-03 was collected at 1636 hours.  
D-16-1 was collected at 1640 hours.
FIELD LOG OF BORING
Sheet 1 of 1

LOCATION OF BORING:

North

Segment B SF Bay Trail

B-16B

"B" 68+50 to "B" 73+50

Drawing C13

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6-IN.</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>DRILLING RATE</th>
<th>DEPTH IN FEET</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td>14</td>
</tr>
</tbody>
</table>

GRAPHIC LOG:

1st: Silty Gravel with Sand (SM) - very dark

2nd: Grayish Brown (10R3/3); 30% non-plastic fines

3rd: Fine Sand; 50% fine-rounded gravel; loose; dry.

4th: Gray clay (CH) - very dark brown (10YR2/2);

predominantly high plastic fines; very stiff; moist.
LOCATION OF BORING:

Segment B SF Bay Trail
*B-14A
*B-14B

"B" 64+50 to "B" 73+50
Drawing c13

LOCATION OF BORING:

North

LOCATION OF BORING:

8-16 B

4-16 B

"B" 69+50 to "B" 73+50
Drawing c13

FIELD LOG OF BORING

Sheet 1 of 1

PROJECT: EBFPDO SF Bay Trail at Point Molate
BORING NO.: 8-16 B
TOTAL DEPTH: 2'-Feet

JOB NO.: 567, 09, 55
LOGGED BY: C. Bardsley

PROJ. MGR.: R. Shaffer
EDITED BY:

DRILLING CONTRACTOR: Confluence Environmental
DRILL RIG TYPE: Direct Push

DRILLER'S NAME: Jesus Morales

SAMPLING METHODS: Continuous Core

HAMMER WT.: DROP:

STARTED, TIME: 1209 hours
DATE: 5/31/16

COMPLETED, TIME: 1211 hours
DATE: 5/31/16

BORING DEPTH (ft.)

CASING DEPTH (ft.)

WATER DEPTH (ft.)

TIME:

DATE:

BACKFILLED, TIME:
DATE:
BY:

SURFACE ELEV.: DATUM:

CONDITIONS:

Silty Gravel with Sand (SFH) - Very dark grayish brown (10YR 3/2), 30% non-plastic fines; 20% fine sandy; 50% fine rounded gravel; loose, dry.

Fat clay (CH) - Very dark brown (10YR 2/2), predominantly high plastic fines; very stiff, moist.
<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>GRAPHIC LOG</th>
<th>MATERIAL DESCRIPTION</th>
<th>SAMPLE TYPE</th>
<th>BLOW COUNTS (FIELD VALUE)</th>
<th>POCKET PEN (tf)</th>
<th>DRY UNIT WT. (pcf)</th>
<th>LIQUID LIMIT (%)</th>
<th>PLASTIC LIMIT (%)</th>
<th>PLASTICITY INDEX (%)</th>
<th>FINES CONTENT (%)</th>
<th>ATTERBERG LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>ASPHALT</td>
<td>CM</td>
<td>40-26-22</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>3 in. POORLY GRADED GRAVEL (GP) (AGGREGATE BASE)</td>
<td></td>
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<td>LEAN to FAT CLAY with SILT and GRAVEL (CL-CH), mottled black with brown, moist, hard, angular gravel up to 1 in., siltstone rock fragments, iron stained (ARTIFICIAL FILL)</td>
<td>SPT</td>
<td>11-22-20</td>
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<td>Increased very fine to fine sand, caliche stringers at 2.5 ft.</td>
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<td>3</td>
<td></td>
<td>Bottom of borehole at 3.5 ft. Borehole backfilled with grout.</td>
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<tr>
<td>SAMPLE DEPTH</td>
<td>SAMPLER TYPE</td>
<td>BLOWNS / 6-in.</td>
<td>INCHES RECOVERED</td>
<td>SAMPLE CONDITION</td>
<td>DRILLING RATE</td>
<td>DEPTH IN FEET</td>
<td>HYDRO/PUNCH/HOT</td>
<td>SAMPLE RECOVERY</td>
<td>GRAPHIC LOG</td>
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<td>0.5</td>
<td>Casing</td>
<td>180</td>
<td>145</td>
<td>Very dark granular brown (grayish brown)</td>
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<tr>
<td>0.5</td>
<td>BaseRock</td>
<td>20</td>
<td>20</td>
<td>Fine sand/moist</td>
<td>20</td>
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</tbody>
</table>

**CONDITIONS:**
- **B-17-0.5** was collected at 0834 hours.
- **B-17-1.5** was collected at 0846 hours.
**FIELD LOG OF BORING**

**LOCATION OF BORING:**

![North Arrow]

- Segment B SF Bay Trail
- "B" 69+50 to "B" 75+50
- Drawing C13

**BORING NO.: B-17A**

**TOTAL DEPTH: 2- Feet**

**JOB NO.: 567.04.55**

**LOGGED BY: B. Bardsley**

**PROJ. MGR.: R. Shaffer**

**EDITED BY:**

**DRILLING CONTRACTOR:** Confloence Environmental

**DRILL RIG TYPE:** Direct Push

**DRILLER'S NAME:** Jesus Morales

**SAMPLING METHODS:** Continuous Core

**HAMMER WT.:**

**DROP:**

**STARTED, TIME: 1200 hours**

**DATE: 5/31/16**

**COMPLETED, TIME: 1205 hours**

**DATE: 5/31/16**

**BORING DEPTH (ft.)**

**CASING DEPTH (ft.)**

**WATER DEPTH (ft.)**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

Asphalt (2-inches)

Bare soil (5-inches)

Silty clay with gravel (SCL-ML) - brown (7.5YR6/3), 90% non-plastic to low plastic fines, 20% fine rounded gravel; hard, moist.
**FIELD LOG OF BORING**

**LOCATION OF BORING:**

\[ \text{\text{North}} \]

**PROJECT:**
E BRPD SF Bay Trail at Point Molate

**BORING NO.:** B-17B

**TOTAL DEPTH:** 2' Feet

**JOB NO.:** 507.04.55

**LOGGED BY:** B. Bardsley

**PROJ. MGR.:** R. Shafer

**EDITED BY:**

**DRILLING CONTRACTOR:** Confluence Environmental

**DRILL RIG TYPE:** Direct Push

**DRILLER'S NAME:** Jesus Morales

**SAMPLING METHODS:** Continuous Core

**HAMMER WT.:**

**DROP:**

**STARTED, TIME:** 1156 hours

**DATE:** 5/31/16

**COMPLETED, TIME:** 1200 hours

**DATE:** 5/31/16

**BORING DEPTH (ft.)**

**CASING DEPTH (ft.)**

**WATER DEPTH (ft.)**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

Asphalt (3-inches)

Riprap (1-inches)

Silty clay with gravel (61-Med) - brown

(7,5YR 5/3), 90% non-plastic to low plastic fines; 10% fine rounded gravel, hard, moist.
LOCATION OF BORING: Segment B

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6-IN</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
<th>DEPTH IN FEET</th>
<th>HYDROSEWATER SAMPLE RECOVERY</th>
<th>GRAPHIC LOG</th>
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<tbody>
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<td>14.19</td>
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</tbody>
</table>

B-18-0.5 was collected at 0924 hours.
B-18-1.5 was collected at 0929 hours.

6-18 gravelly clay with gravel (45%-50%); brown (7.5YR 5/1-5/2)
45% low plastic fines; 30% non-plastic fines; 50% fine rounded gravel; hard; wet.

PROJECT: EBRPD SF Bay Trail
BORING NO.: B-18
TOTAL DEPTH: 24-inches
JOB NO.: 967.04.55
LOGGED BY: R. Bardesley
PROJ. MGR.: R. Shafer
EDITED BY:
DRILLING CONTRACTOR: California Geotech Services, LLC
DRILL RIG TYPE: Truck Mounted B-24
DRILLER'S NAME: Chris Veni
SAMPLING METHODS: California Modified
HAMMER WT.: 140 pounds
DROP: 
STARTED, TIME: 0910 hours
DATE: 3/9/16
COMPLETED, TIME: 0930 hours
DATE: 3/9/16
BORING DEPTH (ft.)
CASING DEPTH (ft.)
WATER DEPTH (ft.)
TIME:
DATE:
BACKFILLED, TIME:
DATE:
SURFACE ELEV.:
DATUM:
CONDITIONS:

inch = 125 feet
<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>GRAPHIC LOG</th>
<th>MATERIAL DESCRIPTION</th>
<th>SAMPLE TYPE</th>
<th>BLOW COUNTS (FIELD VALUE)</th>
<th>POCKET PEN (tsf)</th>
<th>DRY UNIT WT. (pcf)</th>
<th>MOISTURE CONTENT (%)</th>
<th>LIQUID LIMIT (%)</th>
<th>PLASTIC LIMIT (%)</th>
<th>PLASTICITY INDEX (%)</th>
<th>FINE CONTENT (%)</th>
<th>ATTERBERG LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>POORLY GRADED GRAVEL (GP) (AGGREGATE BASE)</td>
<td>CM</td>
<td>24-25-24</td>
<td>123</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1</td>
<td></td>
<td>GRAVELLY LEAN CLAY with SAND (CL) and SILTY GRAVEL with SAND (GM), mottled brown with gray, dry to moist, hard and dense, sandstone rock fragments, very fine sand, gravel up to 1/2 in. (ARTIFICIAL FILL)</td>
<td>SPT</td>
<td>9-8-5</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>3</td>
<td></td>
<td>Bottom of borehole at 3.5 ft. Borehole backfilled with grout.</td>
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</tr>
</tbody>
</table>
**FIELD LOG OF BORING**

**LOCATION OF BORING:** Segment B

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6-in.</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Dill</td>
<td>30</td>
<td>15&quot;</td>
<td>15&quot;</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DEPTH IN FEET**

1 inch = 12 5/8 feet

**GRAPHIC LOG**

- Silty Gravel (0'-1') - very dark grayish brown (10YR 3/2); 90% Fine rounded gravel; 10% non-plastic to low plastic fines; hard, wet, 5"
- Silty clay with Gravel (0'-1') - brown (7.5YR 5/3); 60% low plastic fines; 30% non-plastic fines; 10% Fine rounded gravel; hard, moist

- B-19-0.5 was collected at 0456 hours
- B-19-1.5 was collected at 0459 hours

**PROJECT:** EERPD SF Bay Trail

**BORING NO.: B-19**

**TOTAL DEPTH:** 24" inches

**JOB NO.: 567.04.55**

**LOGGED BY:** C. Bardsley

**EDITED BY:**

**DRILLING CONTRACTOR:** California Geotech Services, LLC

**DRILL RIG TYPE:** Stick Mounted B-24

**DRILLER'S NAME:** Chris Veni

**SAMPLING METHODS:** Cal. Mod.

**HAMMER WT.:** 190 pounds

**DROP:**

**STARTED, TIME:** 0934 hours

**DATE:** 3/9/16

**COMPLETED, TIME:** 1000 hours

**DATE:** 3/9/16

**BORING DEPTH (ft.)**

**CASING DEPTH (ft.)**

**WATER DEPTH (ft.)**

**DATE:**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

- Silty Gravel (0'-1') - very dark grayish brown (10YR 3/2); 90% Fine rounded gravel; 10% non-plastic to low plastic fines; hard, wet, 5"
- Silty clay with Gravel (0'-1') - brown (7.5YR 5/3); 60% low plastic fines; 30% non-plastic fines; 10% Fine rounded gravel; hard, moist
### FIELD LOG OF BORING

**LOCATION OF BORING:**

- **Segment B**

**PROJECT:** EBID SF Bay Trail

**BORING NO.: B-20**

**TOTAL DEPTH:** 29 inches

**JOB NO.: 567.04.55**

**LOGGED BY:** B. Barstley

**PROJ. MGR.: R. Shafer**

**EDITED BY:**

**DRILLING CONTRACTOR:** California Geotech Services, LLC

**DRILL RIG TYPE:** Truck Mounted B-24

**DRILLER'S NAME:** Chris Venti

**SAMPLING METHODS:** California Modified

**HAMMER WT.:** 140 pounds

**DROP:**

**STARTED, TIME:** 1000 hours

**DATE:** 3/9/16

**COMPLETED, TIME:** 1030 hours

**DATE:** 3/9/16

**BORING DEPTH (ft.):**

**CASING DEPTH (ft.):**

**WATER DEPTH (ft.):**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

- **Asphalt-3"**
  - **Gravel (G-1/4) - brown (7:5/15:5)**

- **Sandy clay with gravel (G-1/4) - brown (7:5/15:5)**
  - **Gray, low plastic fines, 30% non-plastic fines**
  - **80% fine rounded gravel, hard, moist**

- **Sandstone**
  - **Sandstone was encountered at one foot bgs.**

**B-20-0.3 was collected at 1026 hours.**
LOCATION OF BORING: Segment B

↑ North

B-21 Trail Centerline

B-20

1 inch = 125 feet

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>BLOWs / 6-IN.</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>-</td>
<td>15&quot; 16&quot;</td>
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</tr>
</tbody>
</table>

DEPTH IN FEET

GRAPHIC LOG

- Girty Gravel (Gm) - very dark grayish brown
  (10YR 3/2); 90% fine rounded gravel; 10% non-
  plastic fines; hard; wet. Plant roots observed
  down from ground surface to about six inches.

B-21-0.5 was collected at 10:45 hours.
B-21-1.5 was collected at 10:48 hours.
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Graphic Log</th>
<th>Material Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>Crushed rock (RAILROAD BALAST)</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>SANDSTONE, brown, dry to moist, hard rock, very severely weathered, fine sand, micaceous (BEDROCK)</td>
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<td>2</td>
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<td></td>
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<tr>
<td>3</td>
<td></td>
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</tbody>
</table>

Bottom of borehole at 3.2 ft. Borehole backfilled with grout.
LOCATION OF BORING:

Segment B
( Drum Lot #1 )

1 inch = 12.5 feet

B-22

North

B-23

Trail centerline

B-23

BUILDING

SAMPLE DEPTH
SAMPLE TYPE
BLOWS/6-IN.
INCHES RECOVERED
SAMPLE CONDITION
DRILLING RATE

34
31
18

15°

37

DEPTH IN FEET

GRAPHIC LOG

3

4

5

6

7

8

9

10

HYDROPHONE/SOUND RECOVERY

Silty Gravel (SM) - very dark grayish brown (10VR3/2); soft; Fine rounded gravel; 20%. Non-plastic fines; hard; wet. Sandstone was encountered at a depth of approximately 10 inches bgs.

B-22-0.4 was collected at 1109 hours.
FIELD LOG OF BORING

Segment 8
(Drum Lot #1)

LOCATION OF BORING:

B-24

Pink
Building

Trail
contour line

B-25

B-24

1 inch = 125 feet

NORTH

PROJECT: EBRPD SF Bay Trail
BORING NO.: B-24
TOTAL DEPTH: 24 inches
JOB NO.: 507.04.55
LOGGED BY: B. Bardsley
PROJ. MGR.: R. Shafer
EDITED BY:
DRILLING CONTRACTOR: California Geotech Services, Inc.
DRILL RIG TYPE: Truck Mounted B-24
DRILLER’S NAME: Chris Veni
SAMPLING METHODS: California Modified
HAMMER WT.: 190 pounds
STARTED, TIME: 1411 hours
DATE: 3/9/16
COMPLETED, TIME: 1440 hours
DATE: 3/9/16
BORING DEPTH (ft.)
CASING DEPTH (ft.)
WATER DEPTH (ft.)
TIME:
DATE:
BACKFILLED, TIME: DATE: BY:
SURFACE ELEV.: DATUM:
CONDITIONS:

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6 IN.</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
<th>DEPTH IN FEET</th>
<th>HYDROPLANING</th>
<th>SAMPLE RECOVERY</th>
<th>GRAPHIC LOG</th>
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</table>

Asphalt - 3" thick, poorly graded sand with gravel (SP) - very dense, moist. 
Sandstone was encountered at a depth of approximately 5 inches bgs.

B-24-0.3 was collected at 1429 hours.
<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>MATERIAL DESCRIPTION</th>
<th>SAMPLE TYPE</th>
<th>BLOW COUNTS (FIELD VALUE)</th>
<th>POCKET PEN. (tsf)</th>
<th>DRY UNIT WT. (pcf)</th>
<th>LIQUID LIMIT (%)</th>
<th>PLASTIC LIMIT (%)</th>
<th>ATTERBERG LIMITS</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>CM</td>
<td>117</td>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>R-value = 25</td>
<td>SPT 15-19-18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>WELL GRADED GRAVEL with SAND and SILT (GW-SM), brown, moist, medium dense, very fine sand, sandstone rock fragments, angular gravel up to 3/4 in., iron stained (ARTIFICIAL FILL)</td>
<td>SPT 5-7-8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>WELL GRADED SAND with SILT and GRAVEL (SW-SM), medium dense</td>
<td>SPT 5-7-8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bottom of borehole at 4.0 ft. Borehole backfilled with grout.
**LOCATION OF BORING:**

Segment B
(Drill Lot #1)

1 inch = 125 feet

**FIELD LOG OF BORING**

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6-IN.</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>A</td>
<td>16</td>
<td>13</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>B</td>
<td>19</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GRAPHIC LOG**

- Poorly Graded Gravel with Sand (GP) - very dark gray (10YR5/1); 85%, fine rounded gravel; 15%, fine to medium sand.
- Silt Gravel with Sand (SG) - brown (7.5YR5/3); 50%, fine rounded gravel; 30%, non-plastic fines; 20%, fine sand; dense; wet.

**B-25-0.8 was collected at 1354 hours.**

**B-25-1.5 was collected at 1358 hours.**
LOCATION OF BORING: Segment B (Drum Lot #1)

1 inch = 12.5 feet

SAMPLE DEPTH | SAMPLER TYPE | BLOWS / 6 IN. | INCHES DRIVEN | SAMPLE CONDITION | DRILLING RATE
--- | --- | --- | --- | --- | ---
30 | 50 for 12" | 70

DEPTH IN FEET

GRAPHIC LOG

CONDITIONS:

Sandstone was encountered at a depth of approximately 12-inches bgs.

B-26-0.5 was collected at 1329 hours.
<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>GRAPHIC LOG</th>
<th>MATERIAL DESCRIPTION</th>
<th>SAMPLE TYPE</th>
<th>BLOW COUNTS</th>
<th>POCKET PEN</th>
<th>DRY UNIT WT.</th>
<th>MOISTURE CONTENT (%)</th>
<th>LIQUID LIMIT (%)</th>
<th>PLASTIC LIMIT (%)</th>
<th>PLASTICITY INDEX (%)</th>
<th>ATTERBERG LIMITS</th>
<th>FINES CONTENT (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>WELL GRADED GRAVEL with SAND and SILT (GW-GM), brown, moist, medium dense, very fine sand, sandstone and siltstone rock fragments, rounded gravel, iron stained (ARTIFICIAL FILL)</td>
<td>CM</td>
<td>10-18-17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>R-value = 77</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>CLAYEY GRAVE with SAND (GC)</td>
<td>SPT</td>
<td>9-8-8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bottom of borehole at 4.0 ft. Borehole backfilled with grout.
### FIELD LOG OF BORING

**Segment B**  
(Draw Lot #1)

**PROJECT:**  
EBRPO SF Bay Trail

**BORING NO.:**  
B-27

**TOTAL DEPTH:**  
24 inches

**JOB NO.:**  
567.04. 55

**LOGGED BY:**  
B. Bardsley

**PROJ. MGR.:**  
R. Shaper

**EDITED BY:**

**DRILLING CONTRACTOR:**  
California Geotech Services, LLC

**DRILL RIG TYPE:**  
Truck Mounted B-24

**DRILLER'S NAME:**  
Chris Vani

**SAMPLING METHODS:**  
California Modified

**HAMMER WT.:**  
140 pounds

**DROP:**

**STARTED, TIME:**  
12:42 hours  
DATE: 3/9/16

**COMPLETED, TIME:**  
13:10 hours  
DATE: 3/9/16

**BORING DEPTH (ft.)**

**CASING DEPTH (ft.)**

**WATER DEPTH (ft.)**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**  
DATE:  
BY:

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6 IN.</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
<th>DEPTH IN FEET</th>
<th>HYDROPSYCHOLOG</th>
<th>SAMPLE RECOVERY</th>
<th>GRAPHIC LOG</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>16</td>
<td>15 15 15 15</td>
<td>15</td>
<td>15</td>
<td></td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>14</td>
<td>9</td>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Gravel with Sand (FM)- brown (7.5YR5/3)**  
5% Fine rounded gravel; 20% non-plastic fines;  
20% Fine sand; dense; wet.

- B-27-0.5 was collected at 12:55 hours.  
- B-27-1.5 was collected at 12:58 hours.
### Field Log of Boring

**Segment B**

**Drum Lot #1**

**1 inch = 125 feet**

**B-22**

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / B-IN.</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
<th>GRAPHIC LOG</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>17&quot;</td>
<td>10&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Sample**: Sandstone
- **Depth**: 1 to 10 feet

**Conditions:**
- Very dark grayish brown
- 80% fine rounded gravel; 20% non-plastic fines; hard; wet.
- Sandstone was encountered at a depth of approximately 6 inches below.

**B-28-0.3 was collected at 11:44 hours.**
**FIELD LOG OF BORING**

**LOCATION OF BORING:**

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWNS / 6-IN.</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
<th>DEPTH IN FEET</th>
<th>HYDROGEOCHEMICAL SAMPLE RECOVERY</th>
<th>GRAPHIC LOG</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>14° 14°</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>Sandstone</td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>14° 14°</td>
<td>30</td>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>39</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PROJECT:**

- **BORING NO.: B-29**
- **TOTAL DEPTH:** 39 inches
- **JOB NO.:** 567.04.55
- **LOGGED BY:** B. Bardsley
- **PROJ. MGR.:** R. Shafer
- **EDITED BY:**
- **DRILLING CONTRACTOR:** California Geotech Services, LLC
- **DRILL RIG TYPE:** Truck Mounted B-24
- **DRILLER’S NAME:** ami sveni
- **SAMPLING METHODS:** California Modified
- **HAMMER WT.:** 190 pounds
- **DROP:**
- **STARTED, TIME:** 11:30 hours
- **DATE:** 2/9/16
- **COMPLETED, TIME:** 12:15 hours
- **DATE:** 3/4/16
- **BORING DEPTH (ft.):**
- **CASING DEPTH (ft.):**
- **WATER DEPTH (ft.):**
- **TIME:**
- **DATE:**
- **BACKFILLED, TIME:**
- **DATE:**
- **BY:**
- **SURFACE ELEV.:**
- **DATUM:**
- **CONDITIONS:**

*Sandstone was encountered at a depth of approximately six inches below:* **B-29-o was collected at 13:12 hours.**
**FIELD LOG OF BORING**

**LOCATION OF BORING:**
Segment B
(Drum Lot #1)
B-27
Trail Centerline
B-30

↑ North
1 inch = 125 feet

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / B. IN.</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**DEPTH IN FEET**

1. 6%
2. 6%
3. 6%
4. 6%
5. 6%
6. 6%
7. 6%
8. 6%
9. 6%
10. 6%

**GRAPHIC LOG**

- Silty Gravel (Pm) - brown (7.5YR5/3); 70%
- Fine rounded gravel; 30% non-plastic to low plastic fines; medium dense; wet.

- B-30-0.2 was collected at 1233 hours.
- B-30-1.5 was collected at 1237 hours.

**PROJECT:**
EBRPD SF Bay Trail

**BORING NO.:**
B-30

**TOTAL DEPTH:**
24 inches

**JOB NO.:**
567.04.55

**LOGGED BY:**
B. Bardley

**PROJ. MGR.:**
R. Shafer

**EDITED BY:**

**DRILLING CONTRACTOR:**
California Geotech Services, LLC

**DRILL RIG TYPE:**
Truck Mounted B-24

**DRILLER'S NAME:**
C. Veni

**SAMPLING METHODS:**
California Modified

**HAMMER WT.:**
190 pounds

**DROP:**

**STARTED, TIME:**
218 hours

**DATE:**
3/9/16

**COMPLETED, TIME:**
1240 hours

**DATE:**
3/9/16

**BORING DEPTH (ft.)**

**CASING DEPTH (ft.)**

**WATER DEPTH (ft.)**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

- Silty Gravel (Pm) - brown (7.5YR5/3); 70%
- Fine rounded gravel; 30% non-plastic to low plastic fines; medium dense; wet.
<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS/6-IN.</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
<th>DEPTH IN FEET</th>
<th>HYDROPLANER</th>
<th>SAMPLE Recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>a</td>
<td>50</td>
<td>15&quot;</td>
<td>14&quot;</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>b</td>
<td>30</td>
<td>15&quot;</td>
<td>14&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GRAPHIC LOG**

1. **0-31-0.5**: Silty sand (SM) - very dark gray (10YR3/1); 50% non-plastic fines and organics; 70% fine sand; very dense; wet.
2. **0-31-1.5**: Silty Gravel with sand (SM) - brown (7.5YR5/3); 50% fine rounded gravel; 30% non-plastic fines; 20% fine sand; very dense; wet.

0-31-0.5 was collected at 1514 hours.  
0-31-1.5 was collected at 1530 hours.
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Material Description</th>
<th>Sample Type</th>
<th>B.C. (Field Value)</th>
<th>Pocket Pen (tf)</th>
<th>Moisturer Content (%)</th>
<th>Liquidity Limit (%)</th>
<th>Plasticity Index (%)</th>
<th>Plasticity Limit (%)</th>
<th>Atterberg Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>POORLY GRADED GRAVEL (GP) (AGGREGATE BASE)</td>
<td>CM</td>
<td>9-6-6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>WELL GRADED GRAVEL with SAND (GW), gravel up to 1 in., loose, very fine sand, gravel subangular to angular (ARTIFICIAL FILL)</td>
<td>SPT</td>
<td>3-3-4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

No recovery of sample between 1 ft. and 2.5 ft., loose

Bottom of borehole at 4.0 ft. Borehole backfilled with grout.
<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>12</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLOWS / 6-IN.</td>
<td>180</td>
<td>9</td>
</tr>
<tr>
<td>INCHES DRIVEN</td>
<td>54</td>
<td>9</td>
</tr>
<tr>
<td>SAMPLE CONDITION</td>
<td>Sample 1</td>
<td>Sample 2</td>
</tr>
<tr>
<td>DRILLING RATE</td>
<td></td>
<td></td>
</tr>
<tr>
<td>DEPTH IN FEET</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>HYDROFACINESS</td>
<td>Poorly Graded Gravel with Sand (Gr)- very dark gray (10YR3/1); 80% fine subrounded gravel; 20% fine to medium sand; medium dense; moist.</td>
<td></td>
</tr>
<tr>
<td>SAMPLE RECOVERY</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GRAPHIC LOG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

B-32 - 1.5 was collected at 1540 hours.
# Field Log of Boring

**Location of Boring:** Segment B

**Project:** EBRPD SF Bay Trail
**Boring No.:** B-33
**Total Depth:** 24 inches

**Job No.:** 567.04, 55
**Logged By:** B. Bardislay
**Edited By:**

**Drilling Contractor:** California FootTech Services, LLC
**Drill Rig Type:** Track Mounted B-24
**Driller's Name:** Chris Veni
**Sampling Methods:** Sample collected from drill cuttings

**Hammer Wt.:** N/A
**Drop:**

**Started, Time:** 10:10 hours
**Completed, Time:** 10:30 hours
**Date:** 3/9/16

**Boring Depth (ft.):**
**Casing Depth (ft.):**
**Water Depth (ft.):**

**Time:**
**Date:**
**Backfilled, Time:**
**Date:**
**By:**

**Surface Elev.:**
**Datum:**

**Conditions:**
Sandy silt (ML) - Brown (7.5YR 5/8); Material: 80% non-plastic fines; 20% fine sand; moist.
Asphalt layer encountered at approximately one-foot below.

B-33-0.2 was collected at 10:23 hours.
### Location of Boring:

![North arrow pointing right]

- **B-33A**
- **B-37A**
- **Segment B**
- **EF Bay Trail**
- **B-37B**
- **B-37C**

"B" 128+50 to "B" 133+50

Drawing CAS

### Field Log of Boring

<table>
<thead>
<tr>
<th>Sample Depth</th>
<th>Sampler Type</th>
<th>Bumps / 6-in</th>
<th>Inches Driven</th>
<th>Inches Recovered</th>
<th>Sample Condition</th>
<th>Drilling Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>24</td>
<td>17</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Depth In Feet</th>
<th>Graphic Log</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
<tr>
<td>3</td>
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<td>4</td>
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<td>5</td>
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</tr>
<tr>
<td>8</td>
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</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

- **Hammer Wt.**: Drop:
- **Started, Time**: 10:31 hours  | **Date**: 5/31/16
- **Completed, Time**: 10:49 hours | **Date**: 5/31/16
- **Boring Depth (ft)**
- **Casing Depth (ft)**
- **Water Depth (ft)**
- **Time**: Date:
- **Backfilled, Time**: Date: By:
- **Surface Elevation**: Datum:
- **Conditions**:
  - Asphalt (one inch)
  - Silt with sand (4%): brown (75/25/25); 9%
  - Non-plastic fines; 15% fine sand; 5% fine
  - Rounded gravel; soft to medium stiffness.
LOCATION OF BORING:

B-33A
Segment B
B-37A
B-33B
B-37B
B-37C

"B" 128+50 to "B" 133+60
Drawing ca. 5

PROJECT: EBRPD SF Bay Trail at Point Molate
BORING NO.: B-33B
TOTAL DEPTH: 2 Feet
JOB NO.: 567.04.55
LOGGED BY: B. Bardstle
PROJ. MGR.: R. Shafer
EDITED BY:

DRILLING CONTRACTOR: Confluence Environmental
DRILL RIG TYPE: Direct Push
DRILLER'S NAME: Jesus Morales
SAMPLING METHODS: Continuous Core

HAMMER WT.: DROP:
STARTED, TIME: 10:25 hours DATE: 5/31/16
COMPLETED, TIME: 10:30 hours DATE: 5/31/16

BORING DEPTH (ft.):
CASING DEPTH (ft.):
WATER DEPTH (ft.):
TIME:
DATE:
BACKFILLED, TIME: DATE: BY:

SURFACE ELEV.: DATUM:

CONDITIONS:
Silt with Sand (ML) - brown (7.5YR 5/3);
85% non-plastic fines; 15% fine sands; soft
To medium stiff; dry.
**FIELD LOG OF BORING**

**LOCATION OF BORING:**

![Diagram showing location of boring with North direction indicated.](image)

**PROJECT:** EB PPO 5F Bay Trail  
**BORING NO.:** B-34  
**TOTAL DEPTH:** 12 inches  
**JOB NO.:** 567.04.55  
**PROJ. MGR.:** R. Shafer  
**LOGGED BY:** B. Wandsley  
**EDITED BY:**  
**DRILLING CONTRACTOR:** California Geotech Services, LLC  
**DRILL RIG TYPE:** Truck mounted B-24  
**DRILLER'S NAME:** Chris Veni  
**SAMPLING METHODS:** California Modified  
**HAMMER WT.:** 140 pounds  
**DROP:**  
**STARTED, TIME:** 1321 hours  
**DATE:** 3/8/16  
**COMPLETED, TIME:** 1850 hours  
**DATE:** 3/8/16  
**BORING DEPTH (ft.)**  
**CASING DEPTH (ft.)**  
**WATER DEPTH (ft.)**  
**TIME:**  
**DATE:**  
**BACKFILLED, TIME:**  
**DATE:**  
**SURFACE ELEV.:**  
**DATUM:**  
**CONDITIONS:**

- Asphalt: 2.5"  
- Silty sand: brown (7.5YR 4/1); 70%.  
- Fine sand; 6% non-plastic fines; 5% fine rounded gravel; very dense, moist.  
- Bedrock was encountered at around 10- to 11-inches below the ground surface.  
- B-34-0.5 was collected at 1341 hours.
**MATERIAL DESCRIPTION**

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>GRAPHIC LOG</th>
<th>MATERIAL DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>POORLY GRADED GRAVEL (GP) up to 2 in. (AGGREGATE BASE)</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>SANDY SILT with GRAVEL (ML), olive gray, wet, soft (ARTIFICIAL FILL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SANDSTONE, brown, moist, hard, intensely weathered (BEDROCK)</td>
</tr>
</tbody>
</table>

Bottom of borehole at 1.9 ft. Borehole backfilled with grout.
<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / G-INS.</th>
<th>INCHES Driven</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
<th>DEPTH IN FEET</th>
<th>HYDROPUNCH/HOLDER</th>
<th>SAMPLE RECOVERY</th>
<th>GRAPHIC LOG</th>
</tr>
</thead>
<tbody>
<tr>
<td>15'</td>
<td>14'</td>
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</tbody>
</table>

**CONDITIONS:**

- **Poorly Graded Gravel (GM)** - very dark gray (2YR 3/1); predominantly fine rounded gravel up to two inches in length; trace amounts of non-plastic fines and fine sandy medium dense, wet.

- **Clayey Silt with Sand (ML-CL)** - greyish brown (10YR 4/3); 95% non-plastic fines; 5% low plastic fines; hard; wet.

*Sandstone was encountered at approximately 16-inches bgs.*

**B-35-0.8 was collected at 12:44 hours.**

**B-35-1.5 was collected at 12:49 hours.**
LOCATION OF BORING:

North
B-35 A
Segment A SF Bay Trail

B-35 B

New Boring No.: B-35A

PROJECT: EERPD SF Bay Trail
at Point Molate

BORED NO.: B-35A

TOTAL DEPTH: 15 INCHES

JOB NO.: 567, 04, 55
LOGGED BY: B. Bardsley

PROJ. MGR.: R. Shafer
EDITED BY:

DRILLING CONTRACTOR: Confluence Environmental

DRILL RIG TYPE:

DRILLER'S NAME: Jesus Morales

SAMPLING METHODS: Hand Auger

HAMMER WT.:

STARTED, TIME: 0452 hours
DATE: 6/1/16

COMPLETED, TIME: 1000 hours
DATE: 6/1/16

BORING DEPTH (ft.)

CASING DEPTH (ft.)

WATER DEPTH (ft.)

TIME:

DATE:

BACKFILLED, TIME:
DATE:
BY:

SURFACE ELEV.:

DATUM:

CONDITIONS:

1. Poorly Graded Gravel - Very dark gray (5YR6/2) predominately fine rounded gravel; Trace amounts of non-plastic fines; dry.

2. Lean Clay (CL) - Grayish brown (5YR5/2) predominately low plastic fines; semi-plastic; Bedrock was encountered at approximately 19 inches bgl.
FIELD LOG OF BORING

Sheet 1 of 1

LOCATION OF BORING:

\( \text{Boring No: B-35B} \)

\( \text{Total Depth: 15-inches} \)

\( \text{Job No: 967-04-55} \)

\( \text{Logged By: B. Bardsley} \)

\( \text{Edited By:} \)

\( \text{Drilling Contractor: Confluence Environmental} \)

\( \text{Drill Rig Type:} \)

\( \text{Driving Name: Jesus Morales} \)

\( \text{Sampling Method: Hand Auger} \)

\( \text{Hammer Weight:} \)

\( \text{Drop:} \)

\( \text{Started Time: 08:44} \)

\( \text{Date: 6/1/16} \)

\( \text{Completed Time: 09:51} \)

\( \text{Date: 6/1/16} \)

\( \text{Boring Depth (ft):} \)

\( \text{Casing Depth (ft):} \)

\( \text{Water Depth (ft):} \)

\( \text{Time:} \)

\( \text{Date:} \)

\( \text{Backfilled Time:} \)

\( \text{Date:} \)

\( \text{Surface Elevation:} \)

\( \text{Datum:} \)

\( \text{Conditions:} \)

\( \text{8-inches) Poorly Graded Gravel (SSM): Very Dark Gray (10YR 3/1); Predominantly Fine Sanded Gravel; Trace Amounts of Non-Plastic Fines, Dry.} \)

\( \text{Lean Clay (LC): Grayish Brown (10YR 5/2); Predominantly Low Plastic Fines, Soft, Moist. Bedrock was encountered at approximately 15-inches bgs.} \)
<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>GRAPHIC LOG</th>
<th>MATERIAL DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>ELASTIC SILT (MH), strong brown, moist, firm, some iron stains (ARTIFICIAL FILL)</td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>SANDY SILT with GRAVEL (ML), strong brown mottled with light brown, inconsistent color, moist, medium dense, iron stained, subangular pieces of chert, crushed sandstone with clay</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>SANDSTONE, yellowish brown to tan, dry, friable, very severely weathered, poorly cemented (BEDROCK)</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>Bottom of borehole at 4.0 ft. Borehole backfilled with grout.</td>
</tr>
</tbody>
</table>
LOCATION OF BORING:
Segment B

1 inch = 125 Feet

FIELD LOG OF BORING
Sheet 1 of 1

PROJECT: EBRPD SF Bay Trail
BORING NO. B-36
JOB NO. 501.04.55
LOGGED BY: B. Bardsley
PROJ. MGR.: R. Shaffer
EDITED BY: 
DRILLING CONTRACTOR: California PeTech Services, LLC
DRILL RIG TYPE: Truck mounted B-24
DRILLER'S NAME: chris veni
SAMPLE METHODS: California Modified
HAMMER WT.: 140 pounds
STARTED, TIME: 9:45 hours DATE: 3/9/16
COMPLETED, TIME: 1700 hours DATE: 3/9/16
BORE DEPTH (ft.)

CASING DEPTH (ft.)
WATER DEPTH (ft.)
TIME:
DATE:
BACKFILLED, TIME:
DATE: BY:
SURFACE ELEV.: DATUM:

CONDITIONS:

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6 IN.</th>
<th>INCHES DRIVEN</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>A</td>
<td>18</td>
<td>15'</td>
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<tr>
<td>12</td>
<td>B</td>
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</tbody>
</table>

GRAPHIC LOG

silt Gravel (SC) - brown (7.5YR 3/3); 70% Fine rounded gravel; 30% non-plastic fines; wet
sandstone

3" silt Gravel (SC) - yellowish brown (10YR 3/6); 40% non-plastic fines; 60% fine rounded gravel
medium dense; moist
Sandstone was encountered at approximately 18 inches by
B-36-0.5 was collected at 96 hours.
B-36-1.5 was collected at 53 hours.
**FIELD LOG OF BORING**

**Sheet 1 of 1**

**LOCATION OF BORING:**

North

Segment B of Bay Trail

B-36A

B-36B

"B" 128+50 to "B" 133+50

Drawing 2A5

**PROJECT:**
BBRFD SF Bay Trail at
Point Mointe

**BORING NO.:** B-36A

**TOTAL DEPTH:** 7 Feet

**JOB NO.:** 9670455

**LOGGED BY:** B. Bardesley

**PROJ. MGR.:** R. Shepher

**EDITED BY:**

**DRILLING CONTRACTOR:** Confluence Environmental

**DRILL RIG TYPE:** Direct Push

**DRILLER'S NAME:** Jesus Mornes

**SAMPLING METHODS:** Continuous Core

**HAMMER WT.:**

**DROP:**

**STARTED, TIME:** 0945 hours

**DATE:** 5/31/16

**COMPLETED, TIME:** 0945 hours

**DATE:** 5/31/16

**BORING DEPTH (ft.)**

**CASING DEPTH (ft.)**

**WATER DEPTH (ft.)**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

Silty Gravel (SM) - brown (7.5YR4/3); 30% non-plastic fines; 70% fine rounded gravel; medium dense; Any bedrock was encountered at approximately 19-inches bgs.
**LOCATION OF BORING:**

![North]

Segment B SF Bay Trail

B-30A

B-30B

"B" 128+50 to "B" 133+50

Drawing C25

---

**FIELD LOG OF BORING**

**Sheet 1 of 1**

**PROJECT:**

EBRPD SF Bay Trail Connector

**BORING NO.:** B-30B

**TOTAL DEPTH:** 20 Feet

**JOB NO.:** G27.04-85

**LOGGED BY:** B. Barskley

**PROJ. MGR.:** R. Shaffer

**EDITED BY:**

**DRILLING CONTRACTOR:** Confluence Environmental

**DRILL RIG TYPE:** Direct Push

**DRILLER'S NAME:** Jesus Morales

**SAMPLING METHODS:** Continuous Core

**HAMMER WT.:**

**DROP:**

**STARTED, TIME:** 09:45 hours

**DATE:** 5/31/16

**COMPLETED, TIME:** 09:55 hours

**DATE:** 5/31/16

**BORING DEPTH (ft.):**

**CASING DEPTH (ft.):**

**WATER DEPTH (ft.):**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

Silty Gravel (Gm) - brown (2.5YR 8/3); 70%
Fine rounded gravel; 30% non-plastic fines;
medium dense; dry. Bedrock was encountered
at approximately 18-inches bgs.
## FIELD LOG OF BORING

**LOCATION OF BORING:**

- B-33A
- B-37A
- B-33
- Segment B of Bay Trail
- B-37B
- B-37C

- B" 128+50 to "B" 133+50
  - Drawing C25

### PROJECT:
- EBAPD SF Bay Trail
- At Point Molate

### JOB NO.:
- 567.04.55

### LOGGED BY:
- B. Bardsley

### PROJ. MGR.:
- R. Schaefer

### DRILLING CONTRACTOR:
- Confluence Environmental

### DRILL RIG TYPE:
- Direct Push

### DRILLER'S NAME:
- Jesus Morales

### SAMPLING METHODS:
- Continuous core

### HAMMER WT.:

### DROP:

### STARTED, TIME:
- 1018 hours

### DATE:
- 5/31/16

### COMPLETED, TIME:
- 1024 hours

### DATE:
- 5/31/16

### BORING DEPTH (ft.):

### CASING DEPTH (ft.):

### WATER DEPTH (ft.):

### TIME:

### DATE:

### BACKFILLED, TIME:

### DATE:

### SURFACE ELEV.:

### DATUM:

### CONDITIONS:
- Silty Gravel (5m) - brown (7.5YR6/3); 40% non-plastic fines; 60% fine rounded gravel; medium dense; dry.

### TABLE:

| SAMPLE DEPTH | SAMPLER TYPE | BLOWNS / 6 IN. | INCHES DRIVEN | INCHES RECOVERED | SAMPLE CONDITION | DRILLING RATE | DEPTH IN FEET | HYDRAULIC TEST | SAMPLE RECONCILIATION | GRAPHIC LOG
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</tbody>
</table>
LOCATION OF BORING:

B-33A

Segment B

SF Bay Trail

B-33B

B-37A

B-37B

B-37 C

North

"B" 128+50 to "B" 133+50

Orniging C25

FIELD LOG OF BORING

PROJECT: EBRPD SF Bay Trail at Point Molate

BORING NO.: B-37B

TOTAL DEPTH: 2 Feet

JOB NO.: 567.04, 65

LOGGED BY: B. Barsley

PROJ. MGR.: R. Shafer

EDITED BY:

DRILLING CONTRACTOR: Confinence Environmental

DRILL RIG TYPE: Direct Push

DRILLER'S NAME: Jesus Morales

SAMPLING METHODS: Continuous core

HAMMER WT.: DROP:

STARTED, TIME: 1004 hours

DATE: 5/31/16

COMPLETED, TIME: 1014 hours

DATE: 5/31/16

BORING DEPTH (ft)

CASING DEPTH (ft)

WATER DEPTH (ft)

TIME:

DATE:

BACKFILLED, TIME:

DATE:

BY:

SURFACE ELEV.:

DATUM:

CONDITIONS:

Silt with sand (ml) - brown (7.5YR 5/3);

90% non-plastic fines; 20% fine Sand; medium stiff; dry.
**LOCATION OF BORING:**

North

- **B-35A**
- **B-37A**
- **B-33** segment B
- **B-37B**
- **B-37C**

° 8" 128' 90" to ° 8" 133' 50"

Drawing C25

---

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6-IN</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
</tr>
</thead>
<tbody>
<tr>
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<td>24</td>
<td>24</td>
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---

**PROJECT:** EBRPD SF Bay Trail at Point Molate
**BOARING NO.:** B-37C
**TOTAL DEPTH:** 2 - Feet
**JOB NO.:** 567.04.55
**LOGGED BY:** B. Baroldey
**PROJ. MGR.:** R. Shafer
**EDITED BY:**
**DRILLING CONTRACTOR:** Confluence Environmental

**DRILL RIG TYPE:** Direct Push
**DRILLER'S NAME:** Jesus Moralez

**SAMPLING METHODS:** Continuous Core
**HAMMER WT.:** DROP:
**STARTED, TIME:** 1012 hours, DATE: 5/31/16
**COMPLETED, TIME:** 1018 hours, DATE: 6/31/16
**BORING DEPTH (ft.)**
**CASING DEPTH (ft.)**
**WATER DEPTH (ft.)**
**TIME:**
**DATE:**
**BACKFILLED, TIME:** DATE: BY:
**SURFACE ELEV.:** DATUM:

**CONDITIONS:**
Silt with sand (ML) - brown (7.5YR 5/3); 85% non-plastic fines; 15% fine sand; medium stiff; dry.
**FIELD LOG OF BORING**

**LOCATION OF BORING:**

![Diagram of Boring Location]

- B-38A
- B-38B
- B-38C

**PROJECT:** EBRPD SF Bay Trail
**BOARING NO.:** B-38A
**TOTAL DEPTH:** 2.0 Feet
**JOB NO.:** 567.04.55
**LOGGED BY:** G. Barlow
**PROJ. MGR.:** R. Shafer
**EDITED BY:**
**DRILLING CONTRACTOR:** Confluence Environmental
**DRILL RIG TYPE:** Direct Push
**DRILLER'S NAME:** Jesus Morales

**SAMPLING METHODS:** Continuous Core

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6-IN</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
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<tr>
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</tr>
</tbody>
</table>

**DEPTH IN FEET**

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10

**HYPHOPUNCHER**

- Asphalt (3-inches)
  - Silt with sand (50%)
  - Brown (7.5YR 8/2) ; 50%
  - Non-plastic fines; 20% fine sand; medium stiff; dry.

**GRAPHIC LOG**

- Surface Elevation: 
- Datum: 
- Conditions: 

**CASING DEPTH (fl):**

**WATER DEPTH (ft):**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**STARTED, TIME:** 1100 hours  
**COMPLETED, TIME:** 1110 hours
**DATE:** 5/31/16

**BOARING DEPTH:** 20 feet

8795 Folsom Blvd, Ste 250 Sacramento, CA 95826
P: 916.388.5655  
F: 916.388.5676
### Field Log of Boring

**Location of Boring:**

- B-38A
- B-38B Segment B SF Bay Trail
- B-38C

**North**

**Project:** EBRPD SF Bay Trail at Point Molate

**Boring No.:** B-38B

**Total Depth:** 2 Feet

**Job No.:** 567.09.55

**Logged By:** B. Barstley

**Proj. Mgr.:** R. Shafer

**Edited By:**

**Drilling Contractor:** Confluence Environmental

**Drill Rig Type:** Direct Push

**Driller's Name:** Jesus Morales

**Sampling Methods:** Continuous Core

**Hammer Wt.:** Drop

**Started, Time:** 1055 hours

**Completed, Time:** 1100 hours

**Date:** 5/31/16

**Boring Depth (ft):**

**Casing Depth (ft):**

**Water Depth (ft):**

**Time:**

**Date:**

**Backfilled, Time:**

**Date:**

**By:**

**Surface Elev.:**

**Datum:**

**Conditions:**

Asphalt (one inch)

Silt with sand (SL) - brown (7.5YR 6/3), 40%

non-plastic fines; 20% Fine sand, medium dense stiff, dry.

<table>
<thead>
<tr>
<th>Sample Depth</th>
<th>Sampler Type</th>
<th>Blows / 6-in.</th>
<th>Inches Recovered</th>
<th>Sample Condition</th>
<th>Drilling Rate</th>
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<thead>
<tr>
<th>Depth in Feet</th>
<th>Graphic Log</th>
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<tbody>
<tr>
<td>1</td>
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<td>9</td>
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<td>10</td>
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</tbody>
</table>
### Location of Boring:

- **B-38 A**
- **B-38 B** Segment B 5F Bay Trail
- **D-39 C**

"B" 128+50 to "B" 133+50
Drawing 2A5

### Field Log of Boring

<table>
<thead>
<tr>
<th>Sample Depth</th>
<th>Sampler Type</th>
<th>B/Inches Driven</th>
<th>Sample Recovery</th>
<th>Drilling Rate</th>
<th>Depth in Feet</th>
<th>Hydropuncher</th>
<th>Graphic Log</th>
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<tbody>
<tr>
<td>Sample 1</td>
<td>Type A</td>
<td>24</td>
<td>18</td>
<td></td>
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</tr>
</tbody>
</table>

### Conditions:

- **Asphalt (7 inches thick)**
- **Wood (2 inches thick)**
- **Silt with sand (ML) - Brown (3.5YR 5/3); 80% non-plastic fines; 20% fine sand; soft to medium stiff, dry.**
**FIELD LOG OF BORING**

**LOCATION OF BORING:**

- **B-39A**
- **B-39 B**
- **B-39 c**

**PROJECT:** EBRPD SF Bay Trail at Point Molate
**BORING NO.:** B-39A
**TOTAL Depth:** 20 Feet

**JOB NO.:** 567.04.55
**LOGGED BY:** B. Barstrey

**PROJ. MGR.:** R. SnaFer
**EDITED BY:**

**DRILLING CONTRACTOR:** Confluence Environmental
**DRILL RIG TYPE:** Direct Push
**DRILLER'S NAME:** Jesus Morales
**SAMPLING METHODS:** Continuous core

<table>
<thead>
<tr>
<th>Sample Depth</th>
<th>Sampler Type</th>
<th>Blows / 6 In.</th>
<th>Inches Driven</th>
<th>Inches Recovered</th>
<th>Sample Condition</th>
<th>Drilling Rate</th>
<th>Depth in Feet</th>
<th>Graphic Log</th>
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</table>

**Hammer WT.:** DROP:

**Started, Time:** 1120 Hours **Date:** 5/31/16
**Completed, Time:** 1125 Hours **Date:** 5/31/16

**Boring Depth (ft.):**
**Casing Depth (ft.):**
**Water Depth (ft.):**
**Time:**
**Date:**
**Backfilled, Time:**
**Date:**
**Surface Elev.:**
**Datum:**

**Conditions:**
- *Silty Gravel with sand (SG) - brown (7.5YR 5/3)*
- 50% fine rounded gravel, 20% non-plastic fines, 20% fine sand, dense, dry.
**LOCATION OF BORING:**

```
North
```

**PROJECT:** EBAPD SF Bay Trail at Point Molate

**BORING NO.: B-39B**

**TOTAL DEPTH:** 20 feet

**JOB NO.: 567.04.55**

**LOGGED BY:** B. Bardsey

**PROJ. MGR.: R. Shafer**

**EDITED BY:**

**DRILLING CONTRACTOR:** Confluence Environmental

**DRILL RIG TYPE:** Direct Push

**DRILLER’S NAME:** Jesus Morales

**SAMPLING METHODS:** Continuous Core

**HAMMER WT.:**

**STARTED, TIME:** 1116 hours DATE: 5/31/16

**COMPLETED, TIME:** 1120 hours DATE: 5/31/16

**BORING DEPTH (ft.):**

**CASING DEPTH (ft.):**

**WATER DEPTH (ft.):**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

- Silty Sand (SS) = very dark gray (10YR 3/1);
  50% non-plastic fines, 70% fine sand, dense; dry.
<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
<th>DEPTH IN FEET</th>
<th>HYDROPHONE</th>
<th>SAMPLE Recovery</th>
<th>GRAPHIC LOG</th>
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- **LOCATION OF BORING:**
  - B-39A
  - Segment B SF Bay Trail
  - 0.5' 123+50 to 128+50 Drawing c24

- **PROJECT:** EBRPD SF Bay Trail at Point Morte
- **BORING NO.:** B-39C
- **TOTAL DEPTH:** 2' Feet
- **JOB NO.:** 567.04.55
- **LOGGED BY:** B. Barstley
- **PROJ. MGR.:** R. Schaffer
- **EDITED BY:**
- **DRILLING CONTRACTOR:** Confluence Environmental
- **DRILL RIG TYPE:** Direct Push
- **DRILLER'S NAME:** Jesus Morales
- **SAMPLING METHODS:** Continuous Core
- **HAMMER WT.:**
- **DROP:**
- **STARTED, TIME:** 1110 hours DATE: 5/21/16
- **COMPLETED, TIME:** 1116 hours DATE: 9/31/16
- **BORING DEPTH (ft):**
- **CASING DEPTH (ft):**
- **WATER DEPTH (ft):**
- **DATE:**
- **TIME:**
- **BACKFILLED, TIME:**
- **DATE:**
- **BY:**
- **SURFACE ELEV.:**
- **DATUM:**
- **CONDITIONS:**
  - Silty Sand (SG) - very dark gray (10YR 3/1),
  - 30% non-plastic fines; 70% fine sand; very dense; no dry.
LOCATION OF BORING:

B-40A

B-40B Segment B SF Bay Trail

B-40C

78 0 73.50 to 78 0 73.50
Drawing c14

SAMPLE DEPTH | SAMPLER TYPE | BLOWS / 6 IN. | INCHES RECOVERED | SAMPLE CONDITION | DRILLING RATE | DEPTH IN FEET | HYDRO/PUNCHER | SURFACE ELEV. | GRAPHIC LOG |
<table>
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</tbody>
</table>

CONDITIONS:
- Asphalt (3 inches)
- Basalt (1 inch)
- Silt clay with gravel (close to brown 57.5/58.0)
- Bo. sOv to medium plastic fines, 20% fine rounded gravel, very hard, moist.
**FIELD LOG OF BORING**

**LOCATION OF BORING:**

North

- **B-40A**
  - **8-40B** Segment B SF Bay Trail
  - **8-40C**

"B" 73+50 to "B" 74+50

Drawing cl14

---

**PROJECT:** EBFRD SF Bay Trail at Point Molate

**BORING NO.:** B-40A

**TOTAL DEPTH:** 2 Feet

**JOB NO.:** 567.04.55

**LOGGED BY:** B. Bardsley

**PROJ. MGR.:** R. Shafer

**EDITED BY:**

**DRILLING CONTRACTOR:** Confluence Environmental

**DRILL RIG TYPE:** Direct Push

**DRILLER'S NAME:** Jesus Morales

**SAMPLING METHODS:** Continuous core

**HAMMER WT.:**

**DRILLING RATE:**

**STARTED, TIME:** 1150 hours

**COMPLETED, TIME:** 1155 hours

**DATE:**

**DATE:**

**BOURING DEPTH (ft):**

**CASING DEPTH (ft):**

**WATER DEPTH (ft):**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

- Asphalt (2 inches)
- Basalt (6 inches)
- Silty clay with gravel (silt-mud) - brown (7.5YR 4/3), low to medium plastic fines; 20% fine rounded gravel; hard; moist.
LOCATION OF BORING:

- B-40A
- B-40B Segment IS SF Bay Trail
- B-40C

1/8" 73+50 to "E" 79+50
Drawing 614

FIELD LOG OF BORING
Sheet 1 of 1

PROJECT: EB RPD SF Bay Trail at Point Molate
BORING NO.: B-40B
TOTAL DEPTH: 2 Feet
JOB NO.: 56704.55
LOGGED BY: B. Bardsley
PROJ. MGR.: R. Shofer
EDITED BY:
DRILLING CONTRACTOR: Confluence Environmental
DRILL RIG TYPE: Direct Push
DRILLER'S NAME: Jesus Morales
SAMPLING METHODS: Continuous core
HAMMER WT.: DROP:
STARTED, TIME: 1196 hours DATE: 5/31/16
COMPLETED, TIME: 1150 hours DATE: 5/31/16
BORING DEPTH (ft):
CASING DEPTH (ft):
WATER DEPTH (ft):
TIME:
DATE:
BACKFILLED, TIME: DATE: BY:
SURFACE ELEV.: DATUM:
CONDITIONS:

<table>
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<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / IN.</th>
<th>INCHES DRIVEN</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
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<table>
<thead>
<tr>
<th>DEPTH IN FEET</th>
<th>HYDRO/MORPHOLOGICAL SAMPLE RECOVERY</th>
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<tbody>
<tr>
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</tbody>
</table>

- ASPHALT (2" inches)
- Basal rock (2" inches)
- Silty clay with gravel (CL-MC) - brown (5YR 5/3)
- 50% low to medium plastic fines; 20% fine rounded gravel; hard; moist.
<table>
<thead>
<tr>
<th>BORING NO.: B-41A</th>
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<td>TOTAL DEPTH: 2 Feet</td>
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<tr>
<td>JOB NO.: 567.04.55</td>
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<td>LOGGED BY: B. Bardsey</td>
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<td>PROJ. MGR.: R. Shaffer</td>
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<td>EDITED BY:</td>
</tr>
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<td>DRILLING CONTRACTOR: Confluence Environmental</td>
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<td>DRILL RIG TYPE: Direct Push</td>
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<td>DRILLER'S NAME: Jesus Morales</td>
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<td>SAMPLING METHODS: Continuous core</td>
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**Sample Log**

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<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6 IN.</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
<th>DRILLING RATE</th>
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<table>
<thead>
<tr>
<th>DEPTH IN FEET</th>
<th>GRAPHIC LOG</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>City gravel with sand (66m) - very dark grayish brown (60% fines, 20% fine sand, 15% fine rounded gravel, 10% dry, soft clay)</td>
</tr>
<tr>
<td></td>
<td>Predominantly high plastic fines, very stiff, moist</td>
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</tbody>
</table>

**Notes:**

- Boring started at 1227 hours on 5/31/16 and completed at 1330 hours on 5/31/16.
- No additional details provided for the remaining columns.
**FIELD LOG OF BORING**

**LOCATION OF BORING:**
Segment B SF Bay Trail

**BORING NO.: B-41B**

**PROJECT:** EB&PPD SF Bay Trail at Point Molate

**TOTAL DEPTH:** 26 Feet

**JOB NO.: 567.04.55**

**LOGGED BY:** B. Barsley

**PROJ. MGR.: R. Schaefer**

**EDITED BY:**

**DRILLING CONTRACTOR:** Confluence Environmental

**DRILL RIG TYPE:** Direct Push

**DRILLER’S NAME:** Jesus Morales

**SAMPLING METHODS:** Continuous Core

<table>
<thead>
<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6-IN.</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
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</table>

**GRAPHIC LOG**

19'6"/silt gravel w/sand (50%) - very dark grayish brown (10YR 3/4), 30% non-plastic fines, 20% fine sand, 50% fine rounded gravel, loose, dry.

Fat clay (SCH) - very dark brown (10YR 2/4), predominately high plastic fines, very stiff, moist.

**HAMDERT WTS.:**

**DROPS:**

**STARTED TIME:** 12:22 hours

**DATE:** 5/31/16

**COMPLETED TIME:** 12:27 hours

**DATE:** 5/31/16

**BORING DEPTH (ft.):**

**CASING DEPTH (ft.):**

**WATER DEPTH (ft.):**

**TIME:**

**DATE:**

**BACKFILLED TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**
**FIELD LOG OF BORING**

Sheet 1 of 1

**LOCATION OF BORING:**

North

PROJECT:

EBRAPD SF Bay Trail
at Point Maitre

BORING NO.: B-41C

TOTAL DEPTH: 2.0 Feet

JOB NO.: 567.04.56

LOGGED BY: B. Bardsley

PROJ. MGR.: R. Shafer

EDITED BY:

DRILLING CONTRACTOR: Confinement Environmental

DRILL RIG TYPE: Direct Push

DRILLER'S NAME: Jesus Morales

SAMPLING METHODS: Continuous Core

HAMMER WT.: DROP:

STARTED, TIME: 12:16 hours DATE: 5/31/16

COMPLETED, TIME: 12:22 hours DATE: 5/31/16

BORING DEPTH (ft.)

CASING DEPTH (ft.)

WATER DEPTH (ft.)

TIME:

DATE:

BACKFILLED, TIME: DATE: BY:

SURFACE ELEV.: DATUM:

CONDITIONS:

- 1' 6" Gravel with sand (80%) - very dark greyish brown (10YR 3/2); 30% non-plastic fines; 20% fine sand; 50% fine rounded gravel; loose; dry.
- 2' 0" clay (80%) - very dark brown (10YR 2/2); predominantly high plastic fines; very stiff; moist.

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<tr>
<th>BORE NUMBER</th>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6 IN.</th>
<th>INCHES DRIVEN</th>
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</table>

**GRAPHIC LOG**

- **Depth in Feet**
- **Hydropunch/Other**
- **Sample Recovery**

**PROJECT: B-422**
- **Point:** 947.148, -655.582
- **Total Depth:** 10.96 ft

**DRILL RIG Type:** Direct Push
- **Driller’s Name:** Jesus Morales
- **Contractor:** Direct Push

**Sampling Method:** Continuous core

**Backfilled Time:** 1/3
- **Date:** 1337
- **Hours:** 16
- **Hammer Wt.:** 500 lb

**Casing Depth:** 5 ft
- **Date:** 1/3

**Water Depth:** 12 ft
- **Date:** 1/3

**Sample Depth:** 5.9 to 7.2 ft
- **Date:** 1/3

**Surface Elev.:**
- **Datum:**
- **By:**

**Notes:**
- The soil is predominantly high plastic fines, very soft, and brown (Som) with sand (SNS) 50% non-plastic fines. Very soft.
- The sand contains very dark brown (SOM) to black (SNS) fines. Very soft.
## FIELD LOG OF BORING

**Sheet 1 of 1**

**LOCATION OF BORING:**

\[ \text{North} \]

- Segment B
- SP Bay Trail
- B-92-A
- B-92-B
- B-92-C

"B" 58+50 to "B" 63+50

Drawing c11

### PROJECT:
- 6BKP & SP Bay Trail
- At Point Molate

### BORING NO.:
- B-92 B

### TOTAL DEPTH:
- 20 Feet

### JOB NO.:
- 567.04.55

### LOGGED BY:
- B. Barsley

### PROJ. MGR.:
- R. Snafer

### DRILLING CONTRACTOR:
- Confluence Environmental

### DRILL RIG TYPE:
- Direct Push

### DRILLER’S NAME:
- Jesus Morales

### SAMPLING METHODS:
- Continuous Core

### HAMMER WT.:
- DROP:

### STARTED, TIME:
- 1337 hours

### DATE:
- 5/31/16

### COMPLETED, TIME:
- 1340 hours

### DATE:
- 5/31/16

### BORING DEPTH (ft.):

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<tr>
<th>SAMPLE DEPTH</th>
<th>SAMPLER TYPE</th>
<th>BLOWS / 6-IN</th>
<th>INCHES DRIVEN</th>
<th>INCHES RECOVERED</th>
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### GRAPHIC LOG:

- Silty gravel with sand (50%) - very dark greyish brown (10YR3/4); 30% non-plastic fines; 20% fine sand, 50% fine rounded gravel; loose, dry
- Gray clay (50%) - very dark brown (10YR2/2); predominantly high plastic fines; very stiff, moist.
**LOCATION OF BORING:**

North

Segment B
Bay Trail
- B-42A
- B-42B
- B-42C

"B" 58+50 to "B" 63+50

"Drawing c11"

**PROJECT:** EBRPD SF Bay Trail at Point Magazine

**BORING NO.:** B-42C

**TOTAL DEPTH:** 2 Feet

**JOB NO.:** 567.04.85

**LOGGED BY:** B. Bardsey

**PROJ. MGR.:** R. Shafer

**EDITED BY:**

**DRILL RIG CONTRACTOR:** Confluence Environmental

**DRILL RIG TYPE:** Direct Push

**DRILLER'S NAME:** Jesus Morales

**SAMPLING METHODS:** Continuous Core

**HAMMER WT.:** DROP

**STARTED, TIME:** 1340 hours

**DATE:** 5/31/16

**COMPLETED, TIME:** 1345 hours

**DATE:** 5/31/16

**BORING DEPTH (ft):**

**CASING DEPTH (ft):**

**WATER DEPTH (ft):**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

- Sandy gravel with sand (50%)- very dark grayish brown (IORR3/2); 30% non-plastic fines; 20% fine sand; 50% fine rounded gravel; loose, dry.
- Fat clay (SCH)- very dark brown (IORR3A); predominantly high plastic fines; very stiff, moist.
## Location of Boring:

- **North**
- **Segment B, SF Bay Trail**
- **"B" 53+50 to "B" 59+50**
- **Drawing C10**

### Field Log of Boring

<table>
<thead>
<tr>
<th>Sample Depth</th>
<th>Sampler Type</th>
<th>Blows / B-In</th>
<th>Inches Recovered</th>
<th>Sample Condition</th>
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</table>

### Conditions:

- **60% gravel with sand (pm) - very dark grayish brown (10YR 3/2): 70% non-plastic fines, 20% fine sand, 10% fine rounded gravel; loose, dry**
- **Fat clay (ch) - very dark brown (10YR 2/2): predominantly high plastic fines; very stiff, moist.**

### Technical Details:

- **Project:** EBRPD SF Bay Trail at Point Molate
- **Boring No.: B-43A**
- **Total Depth:** 2.0 Feet
- **Job No.: 569.04-55**
- **Logged By:** E. Bardsey
- **Proj. Mgr.: R. Shaffer**
- **Edited By:**
- **Drilling Contractor:** Confluence Environmental
- **Drill Rig Type:** Direct Push
- **Driller's Name:** Jesus Morales
- **Sampling Methods:** Continuous Core
- **Hammer WT.:**
- **Drop:**
- **Started, Time:** 1518 hours
- **Completed, Time:** 1348 hours
- **Date:** 5/31/16
- **Boring Depth (ft):**
- **Casing Depth:**
- **Water Depth (ft):**
- **Time:**
- **Date:**
- **Backfilled, Time:**
- **Date:**
- **By:**
- **Surface Elevation:**
- **Datum:**
- **Conditions:**
LOCATION OF BORING:

FIELD LOG OF BORING

Sheet 1 of 1

PROJECT:
EBRPD SF Bay Trail
at Point Molate

BORING NO.: B-43B

TOTAL DEPTH: 25 Feet

JOB NO.: 567.04.55

LOGGED BY: B. Bardsley

PROJ. MGR.: R. Shafer

EDITED BY:

DRILLING CONTRACTOR: Confluence Environmental

DRILL RIG TYPE: Direct Push

DRILLER'S NAME: Jesus Morales

SAMPLING METHODS: Continuous Core

HAMMER WT.:

DROP:

STARTED, TIME: 13.18 hours

DATE: 5/31/16

COMPLETED, TIME: 13.23 hours

DATE: 5/31/16

BORING DEPTH (ft):

CASING DEPTH (ft):

WATER DEPTH (ft):

TIME:

DATE:

BACKFILLED, TIME: DATE: BY:

SURFACE ELEV.:

DATUM:

CONDITIONS:

1st 2' gravel with sand (6M) - very dark grayish brown (10YR 3/3); 50% non-plastic fines, 20% fine sand; 30% fine rounded gravel, loose; dry

2nd 8' clay (6H) - very dark brown (10YR 3/2), predominantly high plastic fines; very soft, moist.
LOCATION OF BORING:

FIELD LOG OF BORING

Sheet 1 of 1

PROJECT: EBRPD SF Bay Trail at Point Maitre
BORING NO.: B-43C
TOTAL DEPTH: 2- Feet
JOB NO.: 567.04.55
LOGGED BY: B. Bardsley
PROJ. MGR.: R. Shaffer
EDITED BY:
DRILLING CONTRACTOR: Confluence Environmental
DRILL RIG TYPE: Direct Push
DRILLER'S NAME: Jesus Morales
SAMPLING METHODS: Continuous Core
HAMMER WT.: DROP:
STARTED, TIME: 1/27 hours
COMPLETED, TIME: 1/27 hours
DATE: 5/31/16
DATE: 5/31/16
BORING DEPTH (ft):
CASING DEPTH (ft):
WATER DEPTH (ft):
TIME:
DATE:
BACKFILLED, TIME:
DATE:
BY:
SURFACE ELEV.:
DATUM:
CONDITIONS:

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Silty Gravel with Sand (S-1) - very dark grayish brown (10YR 3/2); 20% non-plastic fines; 20% fine sand; 50% fine rounded gravel; loose; dry.
Fat Clay (CH) - very dark brown (10YR 2/2); predominantly high plastic fines; very stiff, moist.
**FIELD LOG OF BORING**

**LOCATION OF BORING:**

- **North**
- **B-44A**
- **B-44B**
- **B-44C**
- **Segment A SF Bay Trail**
- **"B" 45+50 To "B" 53+50 Drawing c9**

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<th>BLOWS/6IN</th>
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- **PROJECT:** EBRPD SF Bay Trail at Point Molate
- **BORING NO.: B-44A**
- **TOTAL DEPTH:**
- **JOB NO.: 567.04.35**
- **LOGGED BY:** B. Bardsley
- **PROJ. MGR.: R. Shafer**
- **EDITED BY:**
- **DRILLING CONTRACTOR:** Confluence Environmental
- **DRILL RIG TYPE:**
- **DRILLER’S NAME:** Jesus Morales
- **SAMPLING METHODS:** Hand Auger
- **HAMMER WT.:**
- **DROP:**
- **STARTED, TIME:** 0911 hours
- **DATE:** 6/1/16
- **COMPLETED, TIME:** 0935 hours
- **DATE:** 6/1/16
- **BORING DEPTH (ft.)**
- **CASING DEPTH (ft.)**
- **WATER DEPTH (ft.)**
- **TIME:**
- **DATE:**
- **BACKFILLED, TIME:**
- **DATE:**
- **BY:**
- **SURFACE ELEV.:**
- **DATUM:**
- **CONDITIONS:**

**Sampling Notes:**
- Poorly Graded Gravel - very dark gray (10YR 3/1); predominantly fine rounded gravel; trace amounts of non-plastic fines; dry.
- Silted Gravel (SG1) - very dark gray (10YR 3/1); 40% non-plastic fines; 60% fine rounded gravel; loose; dry.
- Bedrock was encountered at approximately 10-inches below.
LOCATION OF BORING:

North

B-44A
Segment A SF Bay Trail
B-44B
B-44C

"B' 49+50 to "B" 53+50
Drawing C9

FIELD LOG OF BORING

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GRAPHIC LOG

Boaring Graded Gravel - very dark gray (10R3/1), predominantly fine rounded gravel, trace amounts of non-plastic fines, dry.

Stony Gravel (6M) - very dark gray (10R3/1), 40% non-plastic fines, 60% fine rounded gravel; loose; dry.

Bedrock was encountered at approximately 16-inches Deep.
**FIELD LOG OF BORING**

**Sheet 1 of 1**

**LOCATION OF BORING:**

- North

**BORING NO.: B-44C**

**TOTAL DEPTH:** 19 ft. inches

**JOB NO.: 567.04.55**

**LOGGED BY:** B. Bardsey

**PROJ. MGR.: R. Shafer**

**EDITED BY:**

**DRILLING CONTRACTOR:** Confluence Environmental

**DRILL RIG TYPE:**

**DRILLER'S NAME:** Jesus Morales

**SAMPLING METHODS:** Hand Auger

**HAMMER WT.:**

**DROP:**

**STARTED, TIME:** 0937 hours  DATE: 6/1/16

**COMPLETED, TIME:** 0943 hours  DATE: 6/1/16

**BORING DEPTH (ft.)**

**CASING DEPTH (ft.)**

**WATER DEPTH (ft.)**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

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- *Silty gravel (Gn) - very dark gray (10VRS1); 40% non-plastic fines; 60% fine rounded gravel; loose; dry.*
FIELD LOG OF BORING
Sheet 1 of 1

LOCATION OF BORING:

PROJECT: EBPWD SF Bay Trail at Point Molate
BORING NO.: B-45A
TOTAL DEPTH: 20 Feet
JOB NO.: 667.04.58
PROJ. MGR.: R. Snuffer
DRILLING CONTRACTOR: Confluence Environmental
LOGGED BY: B. Barrows
DRILL TYPE: Direct Push
EDITED BY:
DRILLER'S NAME: Jesus Morales
SAMPLING METHODS: Continuous core

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Hammer wt.: DROP:

STARTED, TIME: 1453 hours
DATE: 5/31/1b
COMPLETED, TIME: 1900 hours
DATE: 5/31/16

BORING DEPTH (ft.):
CASING DEPTH (ft.):
WATER DEPTH (ft.):
TIME:
DATE:
BACKFILLED, TIME:
DATE:

SURFACE ELEV.:

DATUM:

CONDITIONS:

1. (A-inches) Poorly Graded Gravel (6m) - very dark gray (10YR 3/1); predominantly fine rounded gravel; trace amounts of non-plastic fines, dry.

2. Lean clay with sand (6d) - brown (7.5YR 3/2); 45% low plastic fines, 15% fine sand, very stiff/moist.
LOCATION OF BORING:

- **B-46A**
- **B-46B**
- **B-46C**

Segment A

SF Bay Trail

"B" 43+50 to "B" 43+80

Drawing CB

PROJECT: MSRPO SF Bay Trail at Point Molate

BORING NO.: B-45B

TOTAL DEPTH: 2 - Feet

JOB NO.: 567.04.55

LOGGED BY: 

PROJ. MGR.: R. Shaffar

EDITED BY: 

DRILLING CONTRACTOR: Confluence Environmental

DRILL RIG TYPE: Direct Push

DRILLER'S NAME: Jesus Morales

SAMPLING METHODS: continuous core

HAMMER WT.: DROP:

STARTED, TIME: 1448 hours

DATE: 5/31/16

COMPLETED, TIME: 1453 hours

DATE: 5/31/16

BORING DEPTH (ft.)

CASING DEPTH (ft.)

WATER DEPTH (ft.)

TIME:

DATE:

BACKFILLED, TIME:

DATE:

BY:

SURFACE ELEV.: DATUM:

CONDITIONS:

- Loam (southern) Poorly Graded Gravel (FM) - very dark gray (0YR 3/1); predominantly fine rounded gravel; trace amount of non-plastic fines; dry.
- Lean Clay with Sand (CL) - brown (7.5YR 3/2); 15% low plastic fines; 15% fine sand; very stiff; moist.

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**FIELD LOG OF BORING**

Sheet 1 of 1

**LOCATION OF BORING:**

B-46A

B-46B

B-46C

**SF Bay Trail**

B-45A

B-45B

B-45C

North

"B" 43+50 To "B" 49+50

Drawing CB

**PROJECT:** EBRPD SF Bay Trail at Point Molate

**BORING NO.:** B-45C

**TOTAL DEPTH:** 20 Feet

**JOB NO.:** 867.04.55

**LOGGED BY:** B. Bardsley

**PROJ. MGR.:** R. Shaffer

**EDITED BY:**

**DRILLING CONTRACTOR:** Confluence Environmental

**DRILL RIG TYPE:** Direct Push

**DRILLER'S NAME:** Jesus Morales

**SAMPLING METHODS:** Continuous Core

**HAMMER WT.:**

**STARTED, TIME:** 1942 hours

**DATE:** 5/31/16

**COMPLETED, TIME:** 1448 hours

**DATE:** 5/31/16

**BORING DEPTH (ft.)**

**CASING DEPTH (ft.)**

**WATER DEPTH (ft.)**

**TIME:**

**DATE:**

**BACKFILLED, TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

(1-inch) Poorly Graded Gravel (SM) - very dark gray (10YR3/1); predominantly fine rounded gravel; trace amounts of non-plastic fines; dry.

Lean Clay with Sand (SC) - brown (10YR3/3); 45% low plastic fines; 15% fine sand; very stiff, moist.

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**DEPTH IN FEET**

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**GRAPHIC LOG**

24

B-45C
**FIELD LOG OF BORING**

**LOCATION OF BORING:**

- B-44A
- B-44B
- B-44C

"B" 43+50 to "B" 48+50

**PROJECT:**
EBRPD SF Bay Trail

**BORING NO.:** B-46 A

**TOTAL DEPTH:** 2 Feet

**JOB NO.:** 467.04.55

**LOGGED BY:** B. Barsley

**PROJ. MGR.:** R. Shaffer

**EDITED BY:**

**DRILLING CONTRACTOR:** Confluence Environmental

**DRILL RIG TYPE:** Direct Push

**DRILLER'S NAME:** Jesus Morales

**SAMPLING METHODS:** Continuous Core

**HAMMER WT.:**

**DROP:**

**STARTED TIME:** 19.24 hours

**DATE:** 5/31/16

**COMPLETED TIME:** 19.29 hours

**DATE:** 5/31/16

**BORING DEPTH (ft):**

**CASING DEPTH (ft):**

**WATER DEPTH (ft):**

**TIME:**

**DATE:**

**BACKFILLED TIME:**

**DATE:**

**BY:**

**SURFACE ELEV.:**

**DATUM:**

**CONDITIONS:**

- (inches) Poorly Graded Gravel (PM) - very dark gray (10YR 3/1); predominantly fine rounded gravel; trace amounts of non-plastic fines; dry
- (inches) Lean Clay with Sand (CL) - brown (7.5YR 4/2)
- (inches) Low Plastic Fines; 15% Fine Sand; Very stiff; moist.
LOCATION OF BORING:

B-46 A  B-45 A  B-46 C  B-45 B  B-49 B  B-49 C

* B-44 B

SF Bay Trail  B-49 C

* B-44 C

North

"8" 43+50 To "B" 93+50
Drawing C8

FIELD LOG OF BORING
Sheet 1 of 1

PROJECT: EBRPD SF Bay Trail at Point Molate

BORING NO.: B-46 B  TOTAL DEPTH: 2 Feet

JOB NO.: 567-04-955  LOGGED BY: B. Bardsley

PROJ. MGR.: R. Shawer  EDITED BY:

DRILLING CONTRACTOR: Confluence Environmental

DRILL RIG TYPE: Direct Push

DRILLER'S NAME: Jesus Morales

SAMPLING METHODS: Continuous Core

HAMMER WT.: DROP:

STARTED, TIME: 1929 hours  DATE: 5/31/16

COMPLETED, TIME: 1936 hours  DATE: 5/31/16

BORING DEPTH (ft.):

CASING DEPTH (ft.):

WATER DEPTH (ft.):

TIME:

DATE:

BACKFILLED, TIME:  DATE:  BY:

SURFACE ELEV.:

DATUM:

CONDITIONS:

2'- 3' inches) Poorly Graded Gravel (50%) - very dark gray (10YR 3/1). Predominantly fine rounded gravel; trace amount of non-plastic fines; dry.

Lean clay with Sand (50%) - brown (7.5YR 3/3); 85% low plastic fines; 15% fine sand; very stiff, moist.
LOCATION OF BORING:

B-46A
B-46B
B-46C

North

Segment A
SF Bay Trail

B-45A
B-45B
B-45C

19B" 43'-50" to 19B" 48'-50"
Drawing C8

PROJECT:
EERPD SF Bay Trail at Point Molate

BORING NO.: B-46C
TOTAL DEPTH: 2 Feet

JOB NO.: 647.04.55
LOGGED BY: B. Bardisley

PROJ. MGR.: R. Shafer
EDITED BY:

DRILLING CONTRACTOR: Confluence Environmental

DRILL RIG TYPE: Direct Push

DRILLER'S NAME: Jesus Morales

SAMPLE METHODS: Continuous Core

HAMMER WT.: DROP:

STARTED, TIME: 1436 hours DATE: 5/31/16
COMPLETED, TIME: 1442 hours DATE: 5/31/16

BORING DEPTH (ft.):

CASING DEPTH (ft.):

WATER DEPTH (ft.):

TIME:

DATE:

BACKFILLED, TIME: DATE: BY:

SURFACE ELEV.:

DATUM:

CONDITIONS:

2-3' (3-inches) Peatly Graded Gravel (GM) - very dark gray (10YR 3/1) predominately fine rounded gravel; trace amounts of non-plastic fines; dry.

Lean clay with sand (CE) - brown (7.5YR 5/2), low plastic fines; stiff; fine sand; very stiff; moist.

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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>10</td>
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<td></td>
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</tr>
</tbody>
</table>
**LOCATION OF BORING:**

- B-47A
- B-47B Segment A
- B-47C SF Bay Trail
- B-11A
- B-11B

"B" 43 + 50 to "B" 43 + 50
Drawing c & 8

---

**FIELD LOG OF BORING**

<table>
<thead>
<tr>
<th>BORING NO.</th>
<th>B-47A</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROJECT:</td>
<td>EBRPD SF Bay Trail at Point Molate</td>
</tr>
<tr>
<td>TOTAL DEPTH</td>
<td>2 Feet</td>
</tr>
<tr>
<td>JOB NO.:</td>
<td>567.04.55</td>
</tr>
<tr>
<td>LOGGED BY:</td>
<td>B. Bardsey</td>
</tr>
<tr>
<td>PROJ. MGR.:</td>
<td>R. Shafer</td>
</tr>
<tr>
<td>DRILLING CONTRACTOR:</td>
<td>Confluence Environmental</td>
</tr>
<tr>
<td>DRILL RIG TYPE:</td>
<td>Direct Push</td>
</tr>
<tr>
<td>DRILLER'S NAME:</td>
<td>Jesus Morales</td>
</tr>
<tr>
<td>SAMPLING METHODS:</td>
<td>Continuous Core</td>
</tr>
<tr>
<td>HAMMER WT.:</td>
<td>DROP:</td>
</tr>
<tr>
<td>STARTED, TIME:</td>
<td>1905 hours</td>
</tr>
<tr>
<td>DATE:</td>
<td>5/31/16</td>
</tr>
<tr>
<td>COMPLETED, TIME:</td>
<td>1915 hours</td>
</tr>
<tr>
<td>DATE:</td>
<td>5/31/16</td>
</tr>
<tr>
<td>BORING DEPTH (ft.):</td>
<td></td>
</tr>
<tr>
<td>CASING DEPTH (ft.):</td>
<td></td>
</tr>
<tr>
<td>WATER DEPTH (ft.):</td>
<td></td>
</tr>
<tr>
<td>TIME:</td>
<td></td>
</tr>
<tr>
<td>DATE:</td>
<td></td>
</tr>
<tr>
<td>BACKFILLED, TIME:</td>
<td>DATE:</td>
</tr>
<tr>
<td>SURFACE ELEV.:</td>
<td>DATUM:</td>
</tr>
<tr>
<td>CONDITIONS:</td>
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**SAMPLE DEPTH**

<table>
<thead>
<tr>
<th>SAMPLE TYPE</th>
<th>BLOWS / 6-IN.</th>
<th>INCHES RECOVERED</th>
<th>SAMPLE CONDITION</th>
<th>DRILLING RATE</th>
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<tbody>
<tr>
<td>24</td>
<td>24</td>
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<td></td>
</tr>
</tbody>
</table>

**DEPTH IN FEET**

1
2
3
4
5
6
7
8
9
10

**GRAPHIC LOG**

- (3-inches) slightly Graded Gravel (Spn) - very dark gray (10YR 3/1); predominantly fine rounded gravel; trace amounts of non-plastic fines; sand
- (1-inch) brown (7.5YR 3); 95% low plastic fines; 15% fine sand; very stiff moist.
FIELD LOG OF BORING
Sheet 1 of 1

LOCATION OF BORING:

B-47A
B-47B Segment A
B-47C SF Bay Trail

NORTH

PROJECT:
EBRAPD SF Bay Trail
at Point Molate

BORING NO.: B-47B
TOTAL DEPTH: 2 ft.

JOB NO.: GE7-04.55
LOGGED BY: B. Bardsey

PROJ. MGR.: R. Shafer
EDITED BY:

DRILLING CONTRACTOR: Confluence Environmental

DRILL RIG TYPE: Direct Push

DRILLER'S NAME: Jesus Morales

SAMPLING METHODS: Continuous Core

HAMMER WT.: DROP:

STARTED, TIME: 1:05 PM DATE: 5/31/16
COMPLETED, TIME: 4:05 PM DATE: 5/31/16

BORING DEPTH (ft.)

CASING DEPTH (ft.)

WATER DEPTH (ft.)

TIME:

DATE:

BACKFILLED, TIME: DATE: BY:

SURFACE ELEV.: DATUM:

CONDITIONS:

24 19

INCHES RECOVERED

SAMPLE CONDITION

DRILLING RATE

SAMPLE RECOVERY

DEPTH IN FEET

GRAPHIC LOG

Hydrogeologic

(3-inches) Poorly Graded Gravel (6m) - very dark gray (10YR 3/1); predominantly fine rounded gravel; trace amounts of non-plastic fines; dry; lean clay (6c) - brown (7.5YR 3); 85% low plastic fines; 15% fine sand, very stiff; moist,
# FIELD LOG OF BORING

**LOCATION OF BORING:**

- B-47A
- B-47B (Segment A)
- B-47C (SF Bay Trail)
- B-11A
- B-11B

**B-47C to B-47A**

- "B" 43+50 to "B" 44+50

**Drawing C8**

## PROJECT: EBRPD SF Bay Trail at Point Molate
**BORING NO.: B-47C**
**TOTAL DEPTH: 2.0 Feet**

**JOB NO.: 567.04.55**
**LOGGED BY: B. Banksley**

**PROJ. MGR.: P. Shenkar**
**EDITED BY:**

**DRILLING CONTRACTOR:** Confidence Environmental

**DRILL RIG TYPE:** Direct Push

**DRILLER'S NAME:** Jesus Morales

**SAMPLING METHODS:** Continuous Core

**Hammertime:**

**Drop:**

**STARTED, TIME:** 1901 hours
**DATE:** 5/31/16

**COMPLETED, TIME:** 1405 hours
**DATE:** 5/31/16

**BORING DEPTH (ft.)**

**Casing Depth (ft.)**

**Water Depth (ft.)**

**Time:**

**Date:**

**Backfilled Time:**

**Date:**

**By:**

**Surface Elevation:**

**Datum:**

**Conditions:**

- (2-inches) Poorly Graded Gravel (PM) - very dark gray (10YR 3/1), predominantly fine rounded gravel, trace amounts of non-plastic fines, dry;
- Lean clay with sand (CL) - brown (5YR 3/2);
- 55%, low plastic fines; 15% fine sand, very stiff, moist,
APPENDIX C. LABORATORY DATA
<table>
<thead>
<tr>
<th>Borehole</th>
<th>Depth</th>
<th>Date Tested</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
<th>Plasticity Index</th>
<th>Maximum Screen Size (mm)</th>
<th>%&lt;#200 Sieve</th>
<th>Classification</th>
<th>Water Content (%)</th>
<th>Dry Density (pcf)</th>
<th>Saturated (%)</th>
<th>Void Ratio</th>
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<tbody>
<tr>
<td>B-04</td>
<td>2.0</td>
<td>3/22/2016</td>
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<td>106.8</td>
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<td>B-11</td>
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<td>14.3</td>
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<td>114.8</td>
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<td>B-13</td>
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<td>3/22/2016</td>
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<tr>
<td>B-14</td>
<td>1.5</td>
<td>3/22/2016</td>
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<td>4.6</td>
<td></td>
<td>107.8</td>
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<td></td>
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<tr>
<td>B-14</td>
<td>2.5</td>
<td>3/25/2016</td>
<td>28</td>
<td>18</td>
<td>10</td>
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<td>112.3</td>
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<td>B-15</td>
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<td>10.0</td>
<td></td>
<td>118.0</td>
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<tr>
<td>B-15</td>
<td>2.5</td>
<td>3/25/2016</td>
<td>48</td>
<td>26</td>
<td>22</td>
<td></td>
<td>10.5</td>
<td></td>
<td>122.8</td>
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<td>7.0</td>
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<td>116.9</td>
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<td>7.5</td>
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<td>115.2</td>
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<td>B-25</td>
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<td>123.9</td>
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<td>14.2</td>
<td></td>
<td>112.6</td>
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<td>3/22/2016</td>
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<td>14.2</td>
<td></td>
<td>112.6</td>
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</table>
### Atterberg Limits Results

**Client:** Subconsultant to NCE for EBRPD  
**Project Number:** 151190  
**Project Name:** SF Bay Trail at Point Molate  
**Project Location:** Richmond, CA

#### Test Results

<table>
<thead>
<tr>
<th>Borehole</th>
<th>Depth</th>
<th>LL</th>
<th>PL</th>
<th>PI</th>
<th>Fines</th>
<th>Classification</th>
<th>Date Tested</th>
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<tbody>
<tr>
<td>B-14</td>
<td>2.5</td>
<td>28</td>
<td>18</td>
<td>10</td>
<td>Brown Lean Clay</td>
<td>3/25/2016</td>
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</tr>
<tr>
<td>B-15</td>
<td>2.5</td>
<td>48</td>
<td>26</td>
<td>22</td>
<td>Black Lean Clay</td>
<td>3/25/2016</td>
<td></td>
</tr>
</tbody>
</table>
R-value Test Report (Caltrans 301)

Job No.: 471-148  Date: 03/29/16  Initial Moisture, 2.4%
Client: Cal Engineering & Geology  Tested MD
Project: 151190  Reduced RU
Sample R-1 at B4  Checked DC
Soil Type: Dark Olive Brown Silty SAND w/ Gravel

<table>
<thead>
<tr>
<th>Specimen Number</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exudation Pressure, psi</td>
<td>207</td>
<td>730</td>
<td>402</td>
<td>118</td>
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<tr>
<td>Prepared Weight, grams</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
<td>1300</td>
</tr>
<tr>
<td>Final Water Added, grams/cc</td>
<td>84</td>
<td>75</td>
<td>79</td>
<td>90</td>
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<tr>
<td>Weight of Soil &amp; Mold, grams</td>
<td>3256</td>
<td>3227</td>
<td>3184</td>
<td>3268</td>
</tr>
<tr>
<td>Weight of Mold, grams</td>
<td>2106</td>
<td>2098</td>
<td>2064</td>
<td>2098</td>
</tr>
<tr>
<td>Height After Compaction, in.</td>
<td>2.49</td>
<td>2.41</td>
<td>2.39</td>
<td>2.51</td>
</tr>
<tr>
<td>Moisture Content, %</td>
<td>9.0</td>
<td>8.3</td>
<td>8.6</td>
<td>9.5</td>
</tr>
<tr>
<td>Dry Density, pcf</td>
<td>128.3</td>
<td>131.0</td>
<td>130.6</td>
<td>128.9</td>
</tr>
<tr>
<td>Expansion Pressure, psf</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
</tr>
<tr>
<td>Stabilometer @ 1000</td>
<td>56</td>
<td>23</td>
<td>28</td>
<td>69</td>
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<td>Stabilometer @ 2000</td>
<td>2.78</td>
<td>3</td>
<td>3.15</td>
<td>3.25</td>
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<tr>
<td>Turns Displacement</td>
<td>63</td>
<td>82</td>
<td>77</td>
<td>50</td>
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<tr>
<td>R-value</td>
<td>63</td>
<td>82</td>
<td>77</td>
<td>50</td>
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</tbody>
</table>

Remarks:
R-1 at B4

Graph: R-value vs. Exudation Pressure, psi
### R-value Test Report (Caltrans 301)

**Job No.:** 471-148  
**Date:** 03/30/16  
**Initial Moisture:** 5.8%  
**R-value by Stabilometer:** 22  
**Expansion Pressure:** 5 psf

**Client:** Cal Engineering & Geology  
**Project:** 151190  
**Sample:** R-2 at B15  
**Soil Type:** Yellowish Brown Clayey SAND w/ Gravel

<table>
<thead>
<tr>
<th>Specimen Number</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
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</thead>
<tbody>
<tr>
<td>Exudation Pressure, psi</td>
<td>123</td>
<td>559</td>
<td>245</td>
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<td>Prepared Weight, grams</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
<td></td>
</tr>
<tr>
<td>Final Water Added, grams/cc</td>
<td>82</td>
<td>51</td>
<td>64</td>
<td></td>
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<tr>
<td>Weight of Soil &amp; Mold, grams</td>
<td>3241</td>
<td>3190</td>
<td>3212</td>
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</tr>
<tr>
<td>Weight of Mold, grams</td>
<td>2106</td>
<td>2094</td>
<td>2116</td>
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<tr>
<td>Height After Compaction, in.</td>
<td>2.56</td>
<td>2.34</td>
<td>2.4</td>
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</tr>
<tr>
<td>Moisture Content, %</td>
<td>13.1</td>
<td>10.3</td>
<td>11.5</td>
<td></td>
</tr>
<tr>
<td>Dry Density, pcf</td>
<td>118.8</td>
<td>128.6</td>
<td>124.1</td>
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<tr>
<td>Expansion Pressure, psf</td>
<td>43.0</td>
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</table>

**Remarks:** R-2 at B15

---

**Graph:**

- **R-value** vs. **Exudation Pressure, psi**
- **Expansion Pressure, psf** vs. **Exudation Pressure, psi**

---

**Graph Details:**

- **X-axis:** Exudation Pressure, psi
- **Y-axis:** R-value
- **Legend:**
  - R-value
  - Expansion Pressure, psf
R-value Test Report (Caltrans 301)

Job No.: 471-148 Date: 03/29/16  Initial Moisture: 3.6%
Client: Cal Engineering & Geology  R-value by Stabilometer: 77
Project: 151190  Reduced RU
Sample: R-3 at B27  Checked DC
Soil Type: Dark Olive Brown Silty SAND w/ Gravel

<table>
<thead>
<tr>
<th>Specimen Number</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Remarks:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exudation Pressure, psi</td>
<td>588</td>
<td>135</td>
<td>455</td>
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<td>Prepared Weight, grams</td>
<td>1200</td>
<td>1200</td>
<td>1200</td>
<td></td>
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</tr>
<tr>
<td>Final Water Added, grams/cc</td>
<td>77</td>
<td>90</td>
<td>86</td>
<td></td>
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<tr>
<td>Weight of Soil &amp; Mold, grams</td>
<td>3224</td>
<td>3188</td>
<td>3214</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight of Mold, grams</td>
<td>2116</td>
<td>2085</td>
<td>2105</td>
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<tr>
<td>Height After Compaction, in.</td>
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<td>2.48</td>
<td>2.47</td>
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<tr>
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<td>11.0</td>
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<td>Dry Density, pcf</td>
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<tr>
<td>Stabilometer @ 1000</td>
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<tr>
<td>Stabilometer @ 2000</td>
<td>18</td>
<td>36</td>
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</tr>
<tr>
<td>Turns Displacement</td>
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<td>3.12</td>
<td>3.25</td>
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<tr>
<td>R-value</td>
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<td>73</td>
<td>81</td>
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</tr>
</tbody>
</table>

Graph:
- **R-value**: The R-value test results are shown as a line graph with R-value on the y-axis and Exudation Pressure, psi on the x-axis. The graph shows a linear relationship between the two variables.
- **Expansion Pressure, psf**: The expansion pressure values are plotted as markers on the graph, indicating points of interest such as 0 psf.
## R-value Test Report (Caltrans 301)

**Job No.:** 471-148  
**Date:** 03/25/16  
**Initial Moisture:** 5.5%  
**Client:** Cal Engineering & Geology  
**Tested:** MD  
**Project:** 151190  
**Reduced:** RU  
**Sample:** R-4 at B25  
**Checked:** DC  

### Soil Type: Yellowish Brown Clayey SAND w/ Gravel

<table>
<thead>
<tr>
<th>Specimen Number</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>Remarks:</th>
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<tbody>
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<tr>
<td>Final Water Added, grams/cc</td>
<td>39</td>
<td>71</td>
<td>53</td>
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<td></td>
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<tr>
<td>Weight of Soil &amp; Mold, grams</td>
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<td>3250</td>
<td>3242</td>
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<td>Weight of Mold, grams</td>
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<td>2098</td>
<td>2102</td>
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<td>Moisture Content, %</td>
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<td>11.7</td>
<td>10.1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dry Density, pcf</td>
<td>130.1</td>
<td>124.9</td>
<td>126.9</td>
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<td></td>
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<tr>
<td>Expansion Pressure, psf</td>
<td>0.0</td>
<td>0.0</td>
<td>0.0</td>
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</tr>
<tr>
<td>Stabilometer @ 1000</td>
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<tr>
<td>Stabilometer @ 2000</td>
<td>100</td>
<td>140</td>
<td>128</td>
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<tr>
<td>Turns Displacement</td>
<td>2.4</td>
<td>3.28</td>
<td>2.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R-value</td>
<td>37</td>
<td>10</td>
<td>18</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Graphs

- **R-value vs. Exudation Pressure:**
  - **R-value**
  - **Expansion Pressure, psf**

- **Exudation Pressure, psi**
  - **R-value**
  - **Expansion Pressure, psf**