June 27, 2011
A3GEO Project No. 1106-1A

Marin Community College District
Attn.: Ms. Elizabeth Bornstein, Senior Program Field Administrator
835 College Avenue
Kentfield, CA 94904

RE: Geotechnical Investigation
PE Track Renovation Project
College of Marin, Kentfield Campus

Dear Ms. Bornstein,

This report presents the results of our geotechnical investigation for the PE Track Replacement Project at the College of Marin in Kentfield, California. We obtained information regarding the proposed project primarily through discussions with Swinerton Management & Consulting (the District’s Construction Manager) and the project Landscape Architect, Verde Design. A3GEO’s services during this phase were authorized by the Marin Community College District’s Agreement for Professional Services dated May 9, 2011, which references our April 29, 2011 proposal.

INTRODUCTION

Purpose and Scope

The purpose of our investigation was to evaluate geotechnical conditions at the proposed site and develop geotechnical conclusions and recommendations for the proposed work. Our scope of services included reviewing existing information, drilling four exploratory borings, performing geotechnical laboratory tests, developing conclusions and recommendations pertaining to the geotechnical aspects of the project, and preparing this report.

Our proposed approach focused on collecting site-specific data necessary to develop the geotechnical engineering recommendations for replacing the track. Please note that our scope of services did not include: 1) a geologic or seismic hazard evaluation, or 2) an environmental assessment of the site for the presence of toxic material in the soil, groundwater, or air.

Project Description

As shown on the Vicinity Map, Figure 1, the project site is located at the south end of campus (southeast of the PE Complex) near the western shoreline of Corte Madera Creek, a tributary creek flowing into San Francisco Bay.

The PE Track Renovation Project includes replacement of the current track and demolition of the existing bleachers. The existing, 9-lane track is approximately 33.5 feet wide and is surfaced with a synthetic rubber material over asphalt concrete. During our site investigation, the inner two lanes of the track were fenced off and closed due to surface damage. Multiple depressed areas with ponding water and peeling track were observed within the fenced-off area. The edges of the track are currently buffered from the adjacent exterior asphalt concrete and interior athletic field by a narrow wooden curb.
METHODS OF INVESTIGATION

Review of Existing Information

We reviewed the following geotechnical reports previously prepared for the site:

- “Baseline Geologic Hazard Study, College of Marin, Kentfield Campus, Kentfield, Marin County, California” by Fugro West, Inc. (Fugro) dated December 2005.

Fugro's 2005 report includes a site plan and geologic map for the Kentfield Campus that shows the locations of: 1) borings drilled throughout the campus by Fugro and others (including HMLA); and 2) surficial geology (descriptions of geologic units present at or near the ground surface). The site plan and geologic map shows the locations of one Fugro boring and six HMLA borings drilled in the direct vicinity of the subject PE track. HMLA’s 1968 report includes the logs of these six borings, describes the conditions present at the site in 1968, and provides geotechnical engineering recommendations for the development of the athletic field facility that includes the PE track.

Fugro’s closest boring was drilled near the east end of Parking Lot 11 and extended to a depth of about 5 feet. The log of this boring shows an estimated ground surface elevation at that location of 8.5 feet ± 0.5 feet, mean sea level (MSL) datum. The six borings that HMLA drilled at the site extended about 30 to 60 feet below the 1968 ground surface. The logs of these borings show 1968 ground surface elevations ranging from +3.2 feet to +7.6 feet (datum not specified).

Borings B1 through B4

On May 17, 2011, we drilled four additional borings (B1 through B4) at the approximate locations shown on the attached Site Plan (Figure 2). Boring 1 was drilled within a localized depressed area of the track; the other three borings were drilled in undamaged areas of the track. The purpose of our investigation was to explore near-surface conditions relevant to the design of the proposed PE track; our borings extended to depths between 9.5 and 16.5 feet.

Clear Heart Drilling, Inc. of Santa Rosa, California drilled the test borings using a truck-mounted drill rig equipped with hollow stem and solid stem flight augers. Ms. Dona Mann, G.E., of A3GEO logged the borings, directed the drilling, and obtained samples at frequent intervals. Soil samples were obtained using a 3-inch O.D. California Modified sampler with liners, and a 2-inch outside diameter (O.D.) Standard Penetration Test (SPT) sampler without liners. The samplers were driven with an automatic 140-pound hammer falling 30 inches. The hammer blows required to drive the sampler the final 12 inches of each 18-inch drive were recorded. During and after drilling, the boreholes were checked for free groundwater and the depth to groundwater was measured, when observed. Following the field operations, the borings were backfilled with lean cement grout.

Logs of Borings B1 through B4 are attached together with the Key to Exploratory Boring Logs. Soils were classified in general accordance with ASTM D 2488, which is based on the Unified Soil Classification System (USCS). The USCS is described on the Key to Exploratory Boring Logs. Sampler blow counts are presented on the logs as adjusted N-values. Where the SPT sampler was used, no adjustment was necessary and the blow counts presented are field values. Blow counts shown for the Modified California sampler have been multiplied by a factor of approximately 0.63 to adjust for its larger end area.

The attached logs and related information are intended to depict our interpretation of subsurface conditions only at the approximate locations shown on the Site Plan (Figure 2) on the particular date designated on the logs; the passage of time may result in changes in the subsurface conditions. The boring locations indicated on the attached materials were determined by measuring from fences and other site features and should be considered approximate.
Geotechnical Laboratory Tests

Samples were reviewed in our laboratory to check field classifications and to select samples for laboratory analyses. The following geotechnical laboratory tests were performed to evaluate the physical properties of the subsurface materials:

- Moisture and Density per ASTM D2937;
- Atterberg Limits per ASTM D4318;
- Percent minus #200 sieve per ASTM D1140;
- Particle Size Analyses per ASTM D422; and
- R-Value per Cal Test 301.

The results of the tests are presented on the boring logs at the corresponding sample depths.

SITE CONDITIONS

Surface Conditions and Development History

The PE track, athletic field and adjacent driveways and parking lots are nearly level; based on the data available, these areas appear to be near Elevation +10 feet, MSL datum. HMLA’s 1968 report indicates that at that time, the site was a “marshland area which has been partially reclaimed by filling.” The geotechnical discussion by HMLA (1968) indicates that the development envisioned at the time would include “filling to raise grades high enough to protect against flooding even after long term settlement has occurred.” Although we did not have the opportunity to review plans or construction records for the filling and surcharging work that was performed, it generally appears that the PE track and athletic field have performed reasonably well from an overall long-term ground surface settlement perspective.

The distressed areas of track that we observed were mostly along its inside perimeter, as were the locations at which ponding of water was observed. These conditions generally appeared interrelated, both having more to do with conditions in the near-surface material, rather than geotechnical conditions at depth.

Subsurface Conditions

The borings drilled at the site by HMLA in 1968 generally encountered natural soils consisting of soft clays and loose sand locally overlain by up to about 5 feet of fill. Sandstone bedrock was encountered along the western side of the track at a depth of about 35 feet. The other five borings drilled by HMLA encountered layered soil deposits that extended to the depths explored (up to 60 feet on the eastern side of the PE track).

We drilled four borings within the area of the PE track (Figure 2; Logs attached). Each boring encountered a layer of synthetic rubber material (approximately 3/8-inch thick) over 3 to 4-inches of asphalt concrete (AC). Beneath the AC, 5 to 7 feet of artificial fill was encountered over apparently natural marsh deposits. The fill was highly variable and appeared to include soils derived from the natural local materials. The natural materials encountered appeared generally consistent with the materials anticipated based on published geologic maps and previously drilled borings. The artificial fill and marsh deposits are described in more detail below; the two-letter soil classifications (in parentheses) are based on the Unified Soil Classification System (USCS).
Artificial Fill – The fill materials varied in each boring and included clays, sands, and gravels of varying consistency. Blow counts (N-values) obtained in the fill were between 3 and 9. The fill in each boring is described below:

- **Boring B1:** The fill extended to 5.5 feet and consisted of very loose to loose, clayey SAND with gravel (SC). Atterberg Limits determinations performed at 1.5 and 3 feet both produced Plasticity Indices (PI’s) of 23 (soils with a PI greater than 15 are commonly considered expansive). N-values of 6 were obtained within the upper 3 feet of the fill. An R-value of 41 was obtained from the soil between 1.5 and 3.5 feet. Particle size analyses from the sample at 2.5 feet resulted in 28% gravel, 33% sand, and 39% silt and/or clay.

- **Boring B2:** The fill extended to 6.5 feet and consisted of layers of very soft to stiff SILT and CLAY (ML, CL, CH) with varying amounts of sand and gravel. An N-value of 9 was obtained in the upper 2.5 feet of the fill.

- **Boring B3:** The fill extended to 7.5 feet and consisted of layers of loose to medium dense, clayey GRAVEL (GC), firm sandy SILT (ML), stiff sandy CLAY with gravel (CL), soft, gravelly elastic SILT (MH), and firm, gravelly fat CLAY (CH). The sample at 2 feet (in the ML) produced a PI of 6 and contained 59% clay and/or silt. An N-value of 6 was obtained in the upper 2.5 feet of the fill.

- **Boring B4:** The fill extended to 6.75 feet and consisted of medium dense, clayey GRAVEL (GC) over firm, gravelly fat CLAY (CH). The sample at 2.5 feet (in the CH) contained 69% clay. An N-value of 5 was obtained in the upper 3.5 feet of the fill.

**Marsh Deposits** – The marsh deposits consisted of bluish gray, very soft to soft, wet, fat CLAY (CH) with a high organic content. Blow counts (N-values) ranged from 1 to 6.

Groundwater was measured in Boring 4 at a depth of 9.5 feet below the ground surface 10 minutes after drilling was complete. Groundwater was not encountered in any other borings at the time of drilling; however, the borings were grouted closed immediately upon completion. The borings may not have been left open for a sufficient period of time to establish equilibrium groundwater conditions. Fluctuations in the groundwater level likely occur due to seasonal variations in rainfall and other factors. Based on the site geology and site development history, we believe that it would be reasonable to assume the groundwater level may be at or near the top of the marsh deposits throughout much of the year.

**CONCLUSIONS AND DISCUSSIONS**

Based on the results of our subsurface investigation and geotechnical laboratory testing, we conclude that the envisioned project is feasible from a geotechnical engineering standpoint. Geotechnical considerations for the design and construction of the project include the following.

**Subgrade Support**

The existing PE track and athletic field were developed by placing fill within a former marsh area. The available information indicates that at least two episodes of filling were involved (i.e. before and after 1968). There are no records that document that the fill that underlies the PE track was placed and compacted under engineering controls and the data from our borings generally suggest that it was not. The fill materials encountered in our borings, which were drilled within the PE track area, included soils that were loose, soft, and wet and contained varying amounts of organic matter. Some near-surface fill materials were found to be moderately expansive (a PI of 23 was obtained in near-surface samples from Boring B1), and it is considered likely that soils with a higher potential for expansion may exist in areas

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1 In our experience, soils with a sufficient amount of fines and a PI greater than about 18-20 typically have an R-Value of 10 or less; therefore, we have not relied on this test result in developing our recommendations.
that were not investigated by borings. Expansive soils shrink and swell with changes in moisture and have the potential to damage improvements that are supported upon them unless appropriately mitigated.

For stability, and to help mitigate the effects of expansive soils, we are recommending placing an engineered, non-expansive, fill layer beneath the track. This layer can be achieved by either processing the on-site soils (e.g., treating with lime and/or cement) or by removing and replacing the on-site soils. The resulting track pavement section will be a substantial improvement over the existing PE track section and should deliver reasonable performance over the long term.

Surface Drainage

During our investigation, we observed ponded water at multiple locations around the inside track perimeter, and the near-surface materials encountered in our borings included soils that were wetter than optimum. The existing 3-inch AC pavement section was found to be underlain by highly variable fill soils that include expansive materials that will shrink and swell in response to changes in moisture. The existing track appears not to be underlain by a continuous engineered granular base layer, nor did we observe surface drainage facilities such as catch basins or trench/channel drains along the inside track perimeter. In general, it appeared to us that the combination of poor drainage, expansive soils, and weak subgrade conditions may have all contributed to the pavement distress that we observed.

The ponding of water adjacent to the track is something to be avoided, especially where expansive soils are present. In this report, we provide recommendations for surface drainage that includes gently sloping the track to drain to a perimeter channel drain at the inside track perimeter. The intent of these recommendations is to reduce the potential for ponding in the vicinity of the track edge which should increase the likelihood of satisfactory long-term track performance.

Construction Considerations

During our investigation, groundwater was measured at about 9 feet below the existing ground surface in Boring B4 shortly after drilling was complete. We caution that this may not represent a stabilized groundwater level and that water levels at the site likely vary as a result of tidal fluctuations, rainfall and other factors. There is anecdotal evidence of water being observed in relatively shallow excavations in areas that are close to the site, and the presence of clayey soils within the fill layer suggest that localized ponding and/or perched groundwater conditions could be encountered during construction. The control of groundwater during construction, including any dewatering needed to accomplish the work, is the responsibility of the contractor.

The materials encountered in our borings include soils that were wet of optimum (i.e. relative to optimum moisture per ASTM D1557) and soils that were expansive. The contractor should anticipate, depending upon the selected subgrade alternative, that: 1) the onsite materials may need to be moisture conditioned (e.g. by air drying) or treated (e.g. with cement and/or lime) in order to achieve recommended/specifed levels of compaction; 2) the existing fill materials present at design subgrade depth are likely to be highly variable, and may include soils that are soft and will require remediation in order to produce a stable subgrade; and 3) the materials excavated to construct the design pavement section and any necessary subgrade remediation (if this option is selected) will likely include expansive soils not suitable for re-use as non-expansive engineered fill.

Although it is possible for construction to proceed during or immediately following the wet winter months, a number of geotechnical problems may occur which may increase costs and cause project delays. If excavations are left open during winter rains, the subgrade soils will become saturated and soft. If excavations fill with water during construction, or if saturated materials are encountered at the bottom of the excavation, the excavations may need to be dewatered and remedial work may be needed to provide an appropriate subgrade for non-expansive fill materials. In general, we note that it has also been our experience that increased clean-up costs may be incurred, and greater safety hazards may exist, if the work proceeds during the wet winter months.
RECOMMENDATIONS

Clearing and Site Preparation

Prior to the start of work, the contractor should locate and mark all active subsurface utilities in the general vicinity of the track site. The contractor should protect all utilities that are to remain in and surrounding the track during onsite excavation and construction activities. The site should then be cleared of the existing track, asphalt concrete, and abandoned utilities. These materials should be removed from the site or stockpiled for reuse if approved by the owner in consultation with our firm.

Track Subgrade

We are providing two possible alternatives for the track subgrade. Both alternatives include a layer of asphalt concrete (AC) beneath the synthetic rubber track surface, and both alternatives include underlying the AC with a layer of non-expansive material. Alternative 1 includes treating the existing on-site soils with lime and/or cement to create the non-expansive layer. Alternative 2 includes removing some of the existing on-site soil and replacing it with non-expansive material. The two alternatives are illustrated below:

Alternative 1

![Alternative 1 Diagram]

Alternative 2

![Alternative 2 Diagram]
Non-Expansive Layer

We recommend that the non-expansive layer (fill or treated soil) extend at least 18 inches beyond the inside and outside perimeter of the track and to the depths specified in the preceding illustrations.

If Alternative 2 is selected, the bottom 6 inches of the excavated areas should be scarified and re-compacted to create a firm, non-yielding and stable subgrade. We recommend that a representative of our firm (A3GEO) observe during excavation and subgrade preparation to approve the subgrade before any fill placement operations begin. Locally soft, yielding or otherwise unsuitable subgrade soils may need to be over-excavated or remediated in order to construct a stable subgrade. High tensile, geotextile fabric (such as Mirafi 500x, or approved equivalent) can be used to bridge soft subgrade soils.

Lime and/or Cement Treatment (Alternative 1)

We recommend lime and/or cement treatment be performed by a qualified specialty contractor with demonstrated experience in the use of lime and/or cement-treated soils. The lime and/or cement treatment work should be performed in general accordance with Caltrans Standard Specification, Section 24. The amount of lime and/or cement to be added to the soil should be sufficient to provide a laboratory R-value of at least 40 and a Plasticity Index (PI) of 15 or less.

The specified lime and/or cement content will be based on laboratory test results; however, for planning purposes we anticipate that the required amount of lime and/or cement will range from 3% to 5% by dry weight. Considering the variation between the different onsite materials, there could be sufficient differences in the onsite soil to warrant revisions to the amount of lime and/or cement as the work is progressing. Therefore, periodic laboratory testing should also be performed during construction.

Lime and/or cement/soil mixing should be performed in two steps using a rotary pulverizer that is specially designed for soil mixing. The depth of mixing depends on the pulverizing equipment, but typically mixing depths up to 18 inches can be obtained in one lift. The initial mix is performed immediately after the lime and/or cement is spread onto the soil. After the initial mix, the soil should be lightly rolled and allowed to cure for at least 24 hours. Moisture conditioning should be performed as needed. After the minimum 24-hour cure, the treated soil should be mixed a second time and then compacted to at least 95 percent relative compaction (ASTM D-1557).

Material for Fill (Alternative 2)

All proposed fill materials should be approved by our firm prior to their use. The different types of fill material are described below:

- **General Fill** – General fill is on-site material that has an organic content of less than 3 percent by volume and does not contain rocks or lumps larger than 6 inches in greatest dimension. General fill can be used anywhere except for areas that require non-expansive fill.

- **Non-Expansive Fill** – Non-expansive fill should conform to the requirements for general fill, have a Plasticity Index (PI) no greater than 15, and have a liquid limit (LL) no greater than 40. A layer of non-expansive fill is required beneath the track.

- **Imported Fill** – Imported material should conform to the requirements for non-expansive fill and should be evaluated by our firm prior to its importation to the site.

- **Aggregate Base (AB)** – AB should conform to Caltrans Standard Specification for Class 2 Aggregate Base.

Some of the materials cleared or excavated from the site may be suitable for re-use as general fill or non-expansive fill, from a geotechnical standpoint, if they can be processed to meet the above requirements. Material that cannot be mixed or processed to meet specification requirements should be disposed of...
offsite or stockpiled for other uses at the discretion of the owner. If the re-use of aggregate base or crushed asphalt is to be considered, it must first be approved by the owner in consultation with our firm.

**Fill Placement and Subgrade Preparation (Alternative 2)**

All fill beneath the track should be spread in lifts not exceeding 8 inches in uncompacted thickness, moisture conditioned, as necessary, and compacted to at least 95 percent relative compaction based on the ASTM D-1557 test method (latest version). A3GEO should observe proofrolling of track subgrades to confirm that they are firm and non-yielding. Aggregate base underneath AC should also be compacted to at least 95 percent relative compaction.

It is possible that fill and/or subgrade soils may be excessively wet or dry depending on the moisture content at the time of construction. If the fill soils are too wet, they may be dried by aeration or by mixing with drier materials.

**Curbing and Surface Drainage**

A concrete curb should be constructed on the inside and outside perimeter of the track and should be at least 6 inches wide and extend at least 12 inches below the track surface.

A continuous interior collection drain, that drains to a suitable outlet, should be installed around the inside perimeter of the track. This drain can also serve as the interior curb between the track and the field. The surface of the track should be sloped 1 percent down toward the interior drain. Ponding of surface water should not be allowed in any areas adjacent to the track.

**Plan Review**

We recommend our firm be provided the opportunity for a general review of the geotechnical aspects of the final plans and specifications for this project in order to ensure that the geotechnical recommendations were properly interpreted and implemented. If our firm is not accorded the privilege of making the recommended review, we can assume no responsibility for misinterpretation of our recommendations.

**Construction-Phase Services**

The analyses and recommendations submitted in this report are based in part upon the data obtained from the four soil borings. The nature and extent of variations across the site may not become evident until construction. If variations then become apparent, it will be necessary to re-examine the recommendations of this report.

A3GEO should review all submittals from the contractors that are geotechnical in nature, before geotechnical materials are delivered or equipment is mobilized to the site.

We recommend our firm be retained to provide geotechnical engineering services during the construction of the proposed project. This is to observe compliance with the design concepts, specifications, and recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction. During construction, A3GEO should observe the following:

- Soil conditions exposed by site excavations,
- Subgrade preparation,
- Lime and/or cement treatment (if selected),
- Fill placement and compaction, and
- Drainage installation.

We request that the client or the client's representative (the contractor) contact our firm at least two working days prior to the commencement of any geotechnical related operation.
LIMITATIONS

This report has been prepared for the exclusive use of you and your consultants in accordance with generally accepted geotechnical engineering practices for specific application to the construction of the PE Track Replacement project at the College of Marin, Kentfield Campus. No other warranty, either expressed or implied, is made. In the event the nature, design, or location of the improvements differs significantly from what has been noted above, the conclusions and recommendations contained in this report should not be considered valid unless the changes are reviewed and the conclusions of this report are modified or verified in writing.

The findings of this report are valid as of the present date. However, the passing of time will likely change the conditions of the existing property due to natural processes or the works of man. In addition, due to legislation or the broadening of knowledge, changes in applicable or appropriate standards may occur. Accordingly, the findings of this report may be invalidated, wholly or partly, by changes beyond our control. Therefore, this report should not be relied upon after three years without being reviewed by this office.

If you have any questions concerning this report, please feel free to call us.

Very truly yours,

Dona K. Mann, P.E., G.E.
Principal Engineer
(415) 425-0247

Wayne Magnusen, P.E., G.E.
Principal Engineer
(510) 325-5724

Copies:  Addressee (3 hard copies, 1 electronic copy)
          Verde Design, Landscape Architect, Attn: Rico Lardizabal, (1 via email)
A3GEO, Inc.
PROJECT No. 1106-1A
PE TRACK REPLACEMENT
COLLEGE OF MARIN
KENTFIELD, CALIFORNIA

FIGURE 1
VICINITY MAP
**UNIFIED SOIL CLASSIFICATION CHART**

**MAJOR DIVISIONS**

**COARSE GRAINED SOILS:**
- GRAVELS:
  - 50% or more of coarse fraction retained on No. 4 sieve
  - CLEAN GRAVELS
  - GW: Well graded gravels and gravel-sand mixtures, little or no fines
  - GP: Poorly graded gravels and gravel-sand mixtures, little or no fines
  - GM: Silty gravels and gravel-sand-silt mixtures
  - GC: Clayey gravels and gravel-sand-clay mixtures

- SANDS:
  - more than 50% of coarse fraction passes through No. 4 sieve
  - CLEAN SANDS
  - SW: Well graded sands and gravelly sand, little or no fines
  - SP: Poorly graded sands and gravelly sand, little or no fines
  - SM: Silty sands, sand-silt mixtures
  - SC: Clayey sands, sand-silt mixtures

**FINE-GRAINED SOILS:**
- 50% or more passes No. 200 sieve
  - SILTS AND CLAYS:
    - Liquid Limit 50% or less
      - ML: Inorganic silts, very fine sands, rock flour, silty or clayey fine sands
      - CL: Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
      - OL: Organic silts and organic silty clays of low plasticity
    - Liquid Limit greater than 50%
      - MH: Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic clays
      - CH: Inorganic clays of high plasticity, fat clays
      - OH: Organic clays of medium to high plasticity

**HIGHLY ORGANIC SOILS**
- PT: Peat, muck and other highly organic soils

**BOUNDARY CLASSIFICATION AND GRAIN SIZES**

<table>
<thead>
<tr>
<th>SILT OR CLAY</th>
<th>FINES</th>
<th>MEDIUM</th>
<th>COARSE</th>
<th>GRAVEL FINE</th>
<th>COARSE</th>
<th>COBBLES</th>
<th>BOULDERS</th>
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<tr>
<td>U.S. STANDARD SIEVE SIZES</td>
<td>No. 200</td>
<td>No. 40</td>
<td>No. 10</td>
<td>No. 4</td>
<td>3/4&quot;</td>
<td>3&quot;</td>
<td>12&quot;</td>
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**KEY TO LOGS**

<table>
<thead>
<tr>
<th>SAMPLE TYPE</th>
<th>DESCRIPTION</th>
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<tr>
<td>Modified California Sampler (3&quot; O.D.):</td>
<td>Blowcount is equivalent SPT N value (converted by multiplying field blowcounts by 0.63)</td>
</tr>
<tr>
<td>Standard Penetration Test (2&quot; O.D.):</td>
<td></td>
</tr>
<tr>
<td>Thin-walled tube using Pitcher Barrel</td>
<td></td>
</tr>
<tr>
<td>Shelby Tube, pushed or used Osterberg Sampler</td>
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</tr>
<tr>
<td>Disturbed Sample</td>
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*NOTE: RECORDED BLOW COUNTS HAVE NOT BEEN ADJUSTED FOR HAMMER ENERGY*
<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>MATERIAL DESCRIPTION</th>
<th>SAMPLE TYPE</th>
<th>ADJUSTED BLLOW COUNTS (N VALUE)</th>
<th>POCKET PEN (tsf)</th>
<th>DRY UNIT WT. (pcf)</th>
<th>MOISTURE CONTENT (%)</th>
<th>ROCK RECOVERY % (RQD)</th>
<th>OTHER LAB TESTS / NOTES</th>
</tr>
</thead>
</table>
| 0          | 3/8" Rubber Track over 4" Asphalt Concrete  
CLAYEY SAND WITH GRAVEL, (SC) Brown, very loose to loose, fine to coarse gravel and fine to coarse sand, moderately plastic fines, well graded coarse-grained material, trace asphalt chunks, moist to wet - FILL  
Reddish brown below 3.5' | MC          | 6                  | 2.5              | 119                | 17                   |                       |                       | LL = 46%; PI = 23%  
R-Value (Drill spoils between 1.5'-3.5') = 41.0 (see report text)  
% Gravel = 28%; % Sand = 33%; %<#200 = 39% |
| 5          | FAT CLAY, (CH) Bluish gray, soft, marsh deposits with organics, roots, bark, wet | SPT         | 6                  | 19               |                    |                      |                       |                       |
| 10         | @ 10.0' - Very soft, strong organic odor, high organic content | MC          | 3                  | 0                |                    |                      |                       |                       |
| 15         | @ 14.5' - Soft, slight increase in stiffness and decrease in organics | MC          | 4                  | 0                |                    |                      |                       |                       |

Bottom of borehole at 16.5 feet.
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Material Description</th>
<th>Sample Type</th>
<th>Adjusted Blown Counts</th>
<th>Pocket Pen (tsf)</th>
<th>Dry Unit Wt. (pcf)</th>
<th>Moisture Content (%)</th>
<th>Rock Recovery % (RQD)</th>
<th>Other Lab Tests / Notes</th>
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<tr>
<td>0</td>
<td>3/8&quot; Rubber Track over 3&quot; Asphalt Concrete</td>
<td>MC</td>
<td>9</td>
<td>&gt; 4.5</td>
<td>106</td>
<td>13</td>
<td></td>
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<tr>
<td></td>
<td>Sandy Silt with Gravel, (ML) Greenish gray, very soft, wet - Fill</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lost sample - hole cleaned out, added sand catcher in sample - disturbed sample</td>
</tr>
<tr>
<td></td>
<td>Sandy Lean Clay with Gravel, (CL) Dark brown, stiff, some coarse sand and organics, moist - Fill</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>@ 2.5' - shoe full of organics (dark brown branches, leaves, sticks, bark)</td>
<td>MC</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Sandy Fat Clay with Gravel, (CH) Reddish brown, firm, mottled, highly variable, wet - Fill</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>@ 4.5' - Reddish and Yellowish Brown</td>
<td>MC</td>
<td>4</td>
<td>0.75</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Fat Clay, (CH) Buish gray, soft, marsh deposits, high organic content (roots, bark), strong organic odor</td>
<td>MC</td>
<td>3</td>
<td>0</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>SPT</td>
<td>4</td>
<td></td>
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</tbody>
</table>

Bottom of borehole at 10.0 feet.
**BORING NUMBER B3**

**CLIENT**: Marin Community College District  
**PROJECT NAME**: PE Track Replacement  
**PROJECT NUMBER**: 1106-1A  
**DATE STARTED**: 5/17/11  
**COMPLETED**: 5/17/11  
**DRILLING CONTRACTOR**: Clearheart Drilling  
**LOGGED BY**: DKM  
**CHECKED BY**: WM  
**NOTES**: No groundwater encountered

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>GRAPHIC LOG</th>
<th>MATERIAL DESCRIPTION</th>
<th>SAMPLE TYPE</th>
<th>ADJUSTED BLOW COUNTS (N VALUE)</th>
<th>POCKET PEN (tsf)</th>
<th>DRY UNIT WT. (pcf)</th>
<th>MOISTURE CONTENT (%)</th>
<th>ROCK RECOVERY % (RQD)</th>
<th>OTHER LAB TESTS / NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td></td>
<td>3/8&quot; Rubber Track over 3&quot; Asphalt Concrete</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>CLAYEY GRAVEL, (GC) Light brown, loose to medium dense, dry</td>
<td>MC</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LL = 24%; PI = 6%; %&lt;#200 = 59%</td>
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<tr>
<td></td>
<td></td>
<td>SANDY SILT, (ML) Greenish gray, firm, with fine gravel, medium to coarse sand, moist to wet (material similar to sample B2 @ 1.0')</td>
<td>MC</td>
<td>9</td>
<td></td>
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<tr>
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<td>SANDY LEAN CLAY WITH GRAVEL, (CL) Dark brown, stiff, moderately plastic, moist (similar to B2 @ 2.0')</td>
<td>MC</td>
<td>6</td>
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<tr>
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<td></td>
<td>GRAVELLY ELASTIC SILT, (MH) Greenish gray, soft, sandy, moist</td>
<td>MC</td>
<td>9</td>
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<tr>
<td></td>
<td></td>
<td>GRAVELLY FAT CLAY, (CH) Dark brown, firm, sandy, moist</td>
<td>MC</td>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>FAT CLAY, (CH) Bluish gray, soft, marsh deposits, high organic content, wet</td>
<td>MC</td>
<td>3</td>
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Bottom of borehole at 9.5 feet.
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Material Description</th>
<th>SAMPLE</th>
<th>ADJUSTED BL</th>
<th>POCKET PEN</th>
<th>DRY UNIT WT</th>
<th>MOISTURE CONTENT</th>
<th>ROCK RECOVERY %</th>
<th>OTHER LAB TESTS / NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3/8&quot; Rubber Track over 3&quot; Asphalt Concrete</td>
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<tr>
<td></td>
<td>CLAYEY GRAVEL, (GC) Brown, medium dense, with plastic clay - FILL</td>
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<tr>
<td></td>
<td>@ 1' - Light brown</td>
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</tr>
<tr>
<td>5</td>
<td>GRAVELLY FAT CLAY, (CH) Bluish gray, firm - FILL</td>
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<tr>
<td></td>
<td>GRAVELLY FAT CLAY WITH SAND @ 5' - Sandy, with a piece of brick - FILL</td>
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</tr>
<tr>
<td>9.0</td>
<td>FAT CLAY, (CH) Bluish gray, soft, marsh deposit, high organic content, strong organic odor</td>
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</tr>
<tr>
<td>10</td>
<td>@ 9.0' to 9.4' - Sand lens</td>
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</tbody>
</table>

Bottom of borehole at 10.0 feet.