GEOTECHNICAL INVESTIGATION REPORT
Dewitt Avenue “S-Curve” Roadway Realignment Project
Spring Road to Origlia Avenue
Santa Clara County, California

Santa Clara County
Roads and Airports Department
Owner
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2012-0138-2
37121-A6:410N:102W

October 1, 2014
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1 INTRODUCTION

1.1 Purpose

A limited study of subsurface conditions has been completed at the above site in accordance with the agreement between the County of Santa Clara and Taber Consultants. The purpose of this report is to provide earth materials criteria for use in design of the proposed roadway realignment. This report supersedes our draft report for this project dated September 15, 2014.

1.2 Geotechnical Services

To prepare this report, Taber Consultants:

- discussed the project with Ms. Bernardine Caceres at Santa Clara County (County);
- reviewed published geologic maps and literature pertaining to the site;
- reviewed various maps of the project area provided by the County;
- completed a site review and performed seismic refraction profiles on July 29, 2014;
- completed subsurface exploration at the site on August 7, 2014;
- completed laboratory testing on soil samples obtained during the subsurface exploration;
- reviewed undated project details provided on plan sheets by Deenscorp Engineering and Management Consultants (Deenscorp); and
- performed engineering evaluation and analysis.

Limitations of this study are discussed in the attached “General Conditions.”

2 PROJECT LOCATION

The project site is located approximately 1.9 miles west-southwest of Highway 101, about 1.3 miles south-southwest of the City of Morgan Hill and 3.4 miles northwest of the City of San Martin, California. The site coordinates are approximately latitude 37.113378° N and longitude 121.661302° W. We show the site location on Figure-1.
3 SITE DESCRIPTION

The existing Dewitt Avenue is aligned essentially north-south with an “S” curve between small hills approximately midway between Spring Road and Origlia Avenue. Dewitt Avenue carries two lanes of traffic at the project location with minimal shoulders. Drainage ditches are located on both sides of the road. The land is generally rural with open fields to the east and widely spaced single family homes to the west in the vicinity of the proposed realignment.

The terrain adjacent to the roadway consists of low hills that cross the alignment and rise approximately 30 to 40 ft above the roadway. These natural hillsides are generally gentle with average slopes of 5H:1V (horizontal:vertical) or flatter. Minor cut slopes (up to 6-8 feet in height) immediately adjacent to the existing road along the inboard (Photo 1) are in-place at slopes of approximately 2H:1V (or steeper).

Photo 1: Existing cut slope on the east side of the existing roadway. Proposed roadway alignment is through the existing hillside on the left side of the photo. Photo is looking south, taken on July 29, 2014.
Known utilities within the project area are limited to overhead utility lines and a buried water line. A high-tension (115KV) overhead power line crosses the alignment at the northern end of the existing “S” curve and runs from the northeast to the southwest. A lower voltage (21KV) overhead power line runs along the eastern shoulder of the road north of the “S” curve crossing to the western shoulder at the southern end of the “S” curve. A lateral 12KV overhead power line extends from the 21KV line at the southern end of the “S” curve and extends to the west. Other overhead lateral power lines were also observed north and south of the “S” curve. An additional overhead utility runs along the western shoulder of the roadway and appears to consist of two communication lines. A 10 inch water main is indicated to be below the eastern shoulder of the existing roadway.

4 AS-BUILT FOUNDATION DATA
No as-built plans have been provided for this project.

5 PROJECT DESCRIPTION
Undated project plans by Deenscorp provided to us by the County of Santa Clara include the following sheets:

- Roadway Plan and Profile,
- Proposed Improvements, and

The purpose of the project is to straighten out the “S” curve in the road and improve sight distances. The above plan sheets indicate that the widened and realigned 1,700±feet of roadway (“D” Line STA. 0+50.0± to STA. 17+55.0±, north to south) will result in a cut slope about 20± feet high (at the highest point along the proposed roadway alignment, near STA. 8+25). The proposed roadway appears to be at/near existing grade or in a through-cut, with the largest cut to be located between STA. 6+25 and STA. 10+75. This will be accomplished by cutting into the slope of the hill east of the existing roadway, with the proposed roadway on the order of 10 feet below the existing roadway elevation.
The realigned roadway is shown to consist of two 12 foot wide travel lanes and 4 foot wide paved shoulders. An additional 6-foot wide unpaved shoulder is shown on both sides of the roadway, bordered by 10 feet of "open drainage" (unlined ditch and banks). New cut slopes are planned with 1.5H:1V (horizontal:vertical) slopes back to existing site grades at the limits of the proposed 64 foot wide right of way.

No retaining walls or new embankments are proposed as part of this project. Based on project plans, it appears that the project will result in excess cut materials. It is unknown where excess cut materials are anticipated to be disposed.

Our scope of services expressly excluded generation of new pavement design sections. We understand that the results of our study will be used by others for pavement section design.

6 FIELD EXPLORATION AND TESTING

6.1 Seismic Refraction Survey

Two 115-foot long seismic refraction profiles were completed at the project site on July 29, 2014. The data was recorded with a 24 channel ES-3000 seismometer. The locations of the seismic refraction surveys are shown on Figure-2. Ray Downes and Alex Taber were the field personnel for the seismic refraction survey field study.

The energy source for the profiles was a 12 lb. sledge hammer striking a steel plate. The profiles were performed with separate hammer blows performed at multiple stations along the geophone strings. Data returns were “stacked” to improve the signal to noise ratio. The data was analyzed using refraction data analysis. The results of this seismic refraction survey provide a generalized 2D profile of the soils along the length of the geophone line as primary wave (compression wave) velocity of the soil versus depth. The seismic refraction 2D velocity profiles are attached as Figure-4.

A summary of the seismic lines, primary wave velocities, and interpreted materials are shown below.
Table 1: Interpreted Seismic Refraction Profile

<table>
<thead>
<tr>
<th>Seismic Line</th>
<th>Approximate Depth to Bottom of Layer from Ground Surface (feet)</th>
<th>Approximate Layer Velocity, fps (feet per second)</th>
<th>Interpreted Materials Description *</th>
</tr>
</thead>
<tbody>
<tr>
<td>S-1</td>
<td>3-10</td>
<td>2770</td>
<td>Soil</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>4270</td>
<td>Weathered Rock</td>
</tr>
<tr>
<td>S-2</td>
<td>2-5</td>
<td>1720</td>
<td>Soil</td>
</tr>
<tr>
<td></td>
<td>--</td>
<td>3620</td>
<td>Weathered Rock</td>
</tr>
</tbody>
</table>

*Material descriptions are interpreted and approximate.

6.2 Exploratory Borings

Information on the nature and distribution of subsurface materials and conditions along the project alignment was obtained by means of five drilled, sampled, and logged test borings (B-1 through B-5) with locations selected by Deenscorp. Two borings (B-2 and B-3) were located east of the existing roadway where the proposed roadway alignment would require a cut into the existing hillside. Three shorter borings (B-1, B-4, and B-5) were completed to 7 foot depth in evaluation of roadway subgrade characteristics. The borings were drilled with a CME-55 truck-mounted drill rig equipped with an autohammer. The maximum depth of exploration was 37.4 feet in Boring B-2 and the lowest elevation reached was elev. 513.2 ft in boring B-5.

The hillside borings (B-2 and B-3) were advanced using combinations of auger and diamond bit rock coring methods. The roadway borings (B-1, B-4, and B-5) were advanced using 6-inch diameter solid auger. Soil samples were recovered by means of a 2.0-inch O.D. “Standard Penetration” (per ASTM D1586) split-spoon sampler advanced with standard 350 ft-lb striking force using the autohammer. At the time of our field exploration, the last energy calibration performed on the hammer was on January 6, 2014, and indicates an average efficiency of 76%. Sampler penetration resistance was recorded to provide a field measure of soil consistency and can be correlated to soils strength and bearing characteristics. The N-values shown on the Test Boring Logs are uncorrected “field” blow-count values.

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The above roadway borings were supplemented with hand augered borings in the adjacent ditches. The hand augers were performed at the same stationing as the roadway borings (B-1, B-4, and B-5) and numbered to match the adjacent roadway boring (HA-1, HA-4, and HA-5). The hand augers were intended to verify if the subgrade materials identified in the roadway borings were also encountered near-surface in the ditch areas where the proposed roadway would be located. These were performed using a 4-inch diameter hand auger and bulk samples were taken of the encountered materials for laboratory testing.

The borings were logged and earth materials field-classified by a field geologist as to consistency, color, texture and gradation on the bases of penetration resistance, examination of samples, and observation of drill cuttings. Groundwater observations were made in the borings during drilling and at the completion of drilling operations. The test borings were backfilled with cement grout at the completion of the field study; hand augers were backfilled with cuttings.

Selected portions of recovered soil samples were retained in sealed containers for laboratory testing and reference. Bulk soil samples were also recovered from the borings for laboratory testing and reference.

The boring locations were located in the field with respect to existing site features and then referenced to project stationing. The boring elevations are referenced to project datum provided by the County of Santa Clara. The details and/or locations of test borings are shown on Figure-2 and the Test Boring Logs (Figure-3). Amanda Kahn, G.I.T., was the field geologist for this study.

7 LABORATORY TESTING

The following laboratory tests were completed on representative soil samples obtained from the exploratory borings:
• Moisture Content - Dry Density (ASTM D2216 / D2937)
• Unconfined Compressive Strength (ASTM D2166)
• Gradation (ASTM D422)
• Atterberg Limits (ASTM D4318)
• Expansion Index (ASTM D4829)
• R-value (CTM 301)
• Point Load (ASTM D5731)

Laboratory test results are shown on the Test Boring Logs (Figure-3), and/or provided in Appendix A.

8 SITE GEOLOGY AND SUBSURFACE CONDITIONS

8.1 Site Geology

The site is located within Santa Clara Valley which is within the Coast Ranges geomorphic province of California. Published geologic mapping\(^1\) shows the site underlain by two geologic units. The northern and southern most portions of the alignment are underlain by Quaternary age alluvial gravel, sand and clay of valley areas, which includes alluvial fan deposits near hill areas. The central portion of the alignment (and likely the entire alignment at depth) is mapped as underlain by the greenstone facies of the Jurassic and Cretaceous age Franciscan Assemblage. No fault traces are mapped passing through or adjacent to the project alignment and the site is not in an Alquist-Priolo Seismic Hazard Zone\(^2\).


\(^2\) California Division of Mines and Geology (CDMG), 1976, Revised official map of Alquist-Priolo Earthquake Fault Hazard Zones, Mt. Madonna Quadrangle: CDMG, scale 1:24,000.
8.2 Exploratory Test Borings

The soils encountered in the test borings completed for this study and materials interpreted from the seismic refraction profile are considered consistent with the published mapping. Earth materials encountered in the borings can be separated into two units considered significant to the proposed project.

**Upper Unit**

Upper unit materials were encountered in all borings and were fully penetrated in borings B-2 and B-3 (both in the proposed hillside cut location) from ground surface to a depth of about 8.5± feet (elev. 550.2± in B-2 and elev. 541.2± in B-3). Materials of this unit consist of very soft to soft clay with sand and compact to dense clayey sand with gravel. Borings B-1, B-4, and B-5 were advanced through the roadway surface and encountered asphalt concrete and aggregate base above native soils (asphalt concrete and aggregate thickness summarized in Table 2).

<table>
<thead>
<tr>
<th>Boring No.</th>
<th>Approximate Station</th>
<th>Approximate Asphalt Concrete Thickness (ft)</th>
<th>Approximate Aggregate Base Thickness (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-1</td>
<td>STA. 2+48</td>
<td>0.5</td>
<td>1.3</td>
</tr>
<tr>
<td>B-4</td>
<td>STA. 12+01</td>
<td>0.5</td>
<td>1.3</td>
</tr>
<tr>
<td>B-5</td>
<td>STA. 15+01</td>
<td>0.3</td>
<td>0.8</td>
</tr>
</tbody>
</table>

**Lower Unit**

Lower unit materials were penetrated below upper unit soils in borings B-2 and B-3 to the maximum depth explored (37.5± feet; elev. 513.2±) and consist of decomposed to intensely weathered metamorphic rock (Photos 2 and 3).
Photo 2: Rock cores from boring B-2. Photo taken on October 1, 2014.

Photo 3: Rock cores from boring B-3. Photo taken on October 1, 2014.
8.3 Groundwater

At the time of our field exploration (August 2014) no free groundwater was observed. It should be noted that our field exploration was conducted during the dry season during a year of historically low rainfall. Groundwater levels can be expected to be higher during years with average or above average precipitation.

Soils below groundwater are expected to be capable of transmitting limited seepage to open excavations due to the generally clayey nature of subsurface soils. Groundwater levels can fluctuate due to changes in precipitation, irrigation, and other factors.

9 LABORATORY TEST RESULTS

9.1 R-Value Tests

We completed an R-value test (CTM 301) on four bulk samples of anticipated subgrade soils. The test results indicated by Stabilometer are summarized in Table 3.

<table>
<thead>
<tr>
<th>Boring / Sample No.</th>
<th>Approximate Depth (ft)</th>
<th>Approximate Station</th>
<th>R-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HA-1 / Bulk E</td>
<td>0.0 - 2.0</td>
<td>STA. 2+46</td>
<td>8</td>
</tr>
<tr>
<td>B-4 / Bulk C</td>
<td>1.3 - 5.0</td>
<td>STA. 12+01</td>
<td>7</td>
</tr>
<tr>
<td>HA-4 / Bulk F</td>
<td>0.0 - 2.0</td>
<td>STA. 12+01</td>
<td>15</td>
</tr>
<tr>
<td>B-5 / Bulk B</td>
<td>0.8 - 5.0</td>
<td>STA. 15+01</td>
<td>9</td>
</tr>
</tbody>
</table>

9.2 Expansion Index Tests

We completed an Expansion Index test (ASTM D4829) on four bulk samples of anticipated subgrade soils. The test results (EI = 24 to 49) indicate the soils have low to borderline medium expansion potential. The highest test result was at the location of HA-1 (north end of the project). Results of Expansion Index tests are included with Appendix-A.
9.3 Point Load Tests

Point load tests were performed on two core samples from boring B-3 in evaluation of rock compressive strength. The rock cores were broken using a basic diametral test procedure in which the core axis is oriented perpendicular to the applied load. Point load tensile-strength index values were used to estimate uniaxial compressive strength values. Samples tested yielded ultimate compressive strength values of 4,300 and 4,520 psi. Results of point-load tests are included with Appendix-A.

Very limited intact core lengths were recovered that would be suitable for point load testing. Samples suitable for testing were only recovered below anticipated excavation depths. The test results are applicable to intact rock samples that appear to be predominantly located below the proposed depth of excavation for this project; however some zones of less weathered/fractured rock may also be encountered above the location of these samples.

10 DISCUSSION AND CONCLUSIONS

No over-riding geologic hazards (e.g., faulting, landslides, severe erosion, subsidence, etc.), are identified at this site. The ground appears adequately stable and capable of providing support for the proposed roadway improvements.

Testing on samples of soil north and south of the proposed hillside cut location indicated relatively low R-Value test results (R-Values ranging from 7 to 15) and a low to borderline medium expansion potential. There does not appear to be a significant difference in the soils encountered in the roadway borings and the adjacent hand augers in ditch areas.

The project is predominately at/near existing grade or founded within cut. Proposed cuts slope geometry is considered generally acceptable. Excavation for the roadway in the hillside cut area is expected to expose soil as well as decomposed to weathered rock at roadway subgrade elevation. In areas where weathered rock is exposed in roadway subgrade areas a higher R-Value can be used for pavement design.
11 RECOMMENDATIONS

No over-riding geologic hazards (e.g., faulting, landslides, severe erosion, subsidence, etc.), are identified at this site. The ground appears adequately stable and capable of providing support for the proposed roadway improvements.

11.1 Design R-Values for Pavement Sections

R-Value tests on soils from north and south of the proposed hillside cut area resulted in R-Values of between 7 and 15. We recommend a design R-Value of 7 for areas not exposing weathered rock at subgrade elevation. For locations with weathered rock exposed in the proposed roadway subgrade, we recommend the use of an R-Value of 50. Determination of the limits of these areas will need to be performed during project earthwork based on subgrade exposures.

11.2 Earthwork

All earthwork should be performed in accordance with Standard Details, Specifications, and Documents published by the Santa Clara County Department of Roads and Airports. The areas to be graded should be stripped of all debris, vegetation, and other organic material. Where woody vegetation is removed, all substantial roots (1-inch diameter or larger) should be excavated and removed. Debris, organic material, and otherwise unsuitable materials should be disposed to an approved location.

Soil surfaces to receive fill should be scarified to 6-inch depth, moisture conditioned to at least optimum-moisture content, and compacted to at least 90% relative compaction (per CTM 216). Inability to achieve the required compaction on the scarified materials may be used as a field criterion to identify areas requiring additional removal and/or compaction (locally soft/loose soils).

Native soils – less debris, organic material and particles over 4-inches greatest dimension – are generally considered suitable for use as compacted fill. Fill should be placed in

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shallow (less than 6 inch) lifts and compacted to at least 90% relative compaction at or above optimum moisture per CTM 216.

Soil expansion potential should be considered during pavement section design. Removal and replacement or stabilization of clayey subgrade soils may be considered if the pavement section thickness/design is not sufficient to limit the potential adverse effects of expansive soil movement on pavement performance. Consideration can also be given to using a subgrade enhancement geotextile. Additional discussion regarding these approaches is provided in the Caltrans “Highway Design Manual” Sections 614.4 and 614.5.

11.3 Cuts and Excavations

Cut areas for this project are anticipated to penetrate/expose soil, residual soil (decomposed rock) and weathered rock materials. Cuts for roadway construction may result in up to 10± feet of weathered rock excavation.

11.3.1 Cut Slope Geometry and Stability

Cuts will expose surficial soils and underlying rock. Near-surface soils are generally granular with significant fines content and have a compact to dense consistency. These materials are considered to be potentially susceptible to erosion, slope creep, and slipouts. They may also exhibit expansion/contraction with moisture content changes. Rock slope stability is commonly controlled by failure along discontinuities (planes of potential weakness) within the rock mass, with possible popouts or raveling even with non-adverse joint/fracture orientations.

New cuts at 1.5H:1V or flatter are expected to be appropriately stable. Cuts should be specifically reviewed by this office during construction. Both Upper Unit and Lower Unit soils are considered at least locally susceptible to erosion and provisions for erosion control (such as planting, erosion control mats, etc.) are recommended. Local sloughing (e.g., within soil and/or weaker rock zones) is expected to be controllable by typical maintenance procedures. It is
recommended that the cut be laid back to 2H:1V or flatter if the increased potential for erosion and associated slope maintenance is not desired by the County.

11.3.2 Rippability

Based on the subsurface conditions observed and tested, and our experience with similar conditions, we expect that typical, heavy-duty, excavation equipment is sufficient to excavate native soil and weathered rock to anticipated roadway excavation depths.

The 2014 Caterpillar Performance Handbook (Edition 44) indicates rock with a seismic velocity up to about 7,000 fps is rippable with a Caterpillar D9. Based on our borings we expect the decomposed to moderately weathered rock will be rippable with a large dozer or excavator equipped with a single shank ripper.

Locally, blocks of less weathered/fractured rock would not be unexpected in rock otherwise interpreted as weathered/fractured. While ripping might be generally feasible in such areas, the need for alternative excavation techniques through isolated resistant blocks cannot be precluded. Oversize materials (e.g., boulders) would also be expected to require similar consideration to facilitate handling during construction.

Based on the results of our seismic refraction survey, we present an estimate of material rippability in Table 4.

<table>
<thead>
<tr>
<th>Seismic Velocity, fps</th>
<th>Material Type *</th>
<th>Estimated Rippability</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 3,000</td>
<td>Colluvium and decomposed to intensely weathered rock</td>
<td>Rippable with heavy-duty construction equipment</td>
</tr>
<tr>
<td>3,000 to 4,500</td>
<td>Intensely to moderately weathered rock, with local less weathered blocks</td>
<td>Rippable, with local resistant blocks that may require alternative excavation methods</td>
</tr>
</tbody>
</table>

*Material descriptions are interpreted and approximate.*
11.4 Pavement Subgrade Preparation

Pavement sections are being designed by others and are not a part of our scope of services. Pavement section design should address adverse effects of potentially expansive pavement subgrade soils as discussed in Section 11.2.

All soils within 30-inches of finished pavement grade, or to 8-inches below structural section subgrade (whichever is lower) should be removed/replaced and/or reprocessed as engineered fill to at least 95% relative compaction (per CTM 216) in accordance with Standard Details, Specifications, and Documents published by the Santa Clara County Department of Roads and Airports. If/as approved by the engineer, subexcavation of soils within this zone for preparation of structural section subgrade may be reduced or eliminated where bedrock is encountered.

If “hard” (weathered, but not decomposed) rock is encountered less than 30 inches below finished grade, the pavement section could be established on a 4-6 inch subbase section to provide a compatible flexible pavement section within the remainder of roadway. In sections of “hard” rock, the rock surface (which may be highly irregular at subgrade level) should be scored to 2-4 inches below subgrade prior to placing aggregate base. Areas of “soft” (decomposed) rock which are not irregular should be trimmed to a firm, intact surface and probed/visually affirmed to be considered suitable for fill placement.

Subgrade soils and rock should be field reviewed with respect to uniformity and suitability by the soils engineer. Inability to achieve the required compaction on scarified soils may be used as a field criterion to identify areas requiring additional removal and/or recompaction. Any unsuitable material, including loose or disturbed soils, should be removed to full depth and replaced with native soil or Class 2 Aggregate Base compacted to at least 90% relative compaction (per CTM 216). “Voids” or low areas in bedrock should be filled with aggregate base compacted to at least 95% relative compaction (per CTM 216).
11.5 Drainage / Subdrainage / Erosion

11.5.1 Pavement Section

Surface drainage should be controlled and directed away from the roadbed and not allowed to pond along adjacent areas. No difficulty is anticipated in excluding surface runoff from the roadway structural section and no specific subdrainage requirements (e.g., edge drains, cross drains, etc.) are foreseen for this project. Locally, however, seasonal seepage may be present in areas of thoroughly decomposed rock and along the soil/rock interface. Subdrainage may be necessary based on observations of cuts and subgrade exposures at the time of construction, especially where the soil/rock interface is positioned at/near the new structural section.

Protection along drainage areas where gradient exceeds 5% is recommended (e.g., rock-armoring). Regular maintenance should be provided along inner-roadway ditch lines to keep these areas clear of debris from any cut-slope sloughing – especially within the first few seasons after construction.

11.5.1 Cut Slopes

The proposed cut slope is considered susceptible to erosion from concentrated storm water flow and it is recommended that a lined “V” ditch (crown ditch) be placed along the top of the proposed cut slope to divert storm water flow from the slope face. This ditch should outlet into an appropriate drainage that has sufficient erosion control features to prevent potential loss of material during significant flows.

Completed cutslopes should be protected from erosion prior to the beginning of the rainy season. Suitable erosion control efforts include erosion control mats and seeding and/or planting with drought resistant plants.
12 CONSTRUCTION CONSIDERATIONS

12.1 Existing Utilities

Multiple buried and overhead utilities were observed or are noted on documents provided for this project to cross and/or exist adjacent to the project site. These include, at a minimum, overhead electric and phone lines and buried water lines. All of these utilities create potential conflicts for excavation and fill placement. Existing underground and overhead utilities will likely need to be moved or protected to allow construction of the proposed roadway.

12.2 Excavation

Existing soils overlying lower unit weathered rock are anticipated to be consistent with Cal OSHA Type B soil classification. The contractor is responsible for design and construction of excavation sloping in accordance with Cal OSHA requirements. Temporary construction backslopes should be reviewed by a competent person during construction in evaluation of stability and for possible supplemental support (e.g., local shoring in areas of soft/weak materials).

Based on our review of existing site data and observations, we expect excavation of Upper Unit soils can be achieved with typical construction equipment (see Section 11.2.2). Excavation into very dense Lower Unit weathered rock within cut-slope significant depths is expected to be locally difficult, but generally achievable by use of typical heavy construction equipment and/or utilizing air tools without the need for blasting.

12.3 Pavement Subgrade Evaluation

Determination of the limits of high (R=50) and low (R=7) R-Value areas will need to be performed during project earthwork based on subgrade exposures. Please see Section 11.1 for additional discussion on design pavement section R-Value limit determination.
13 **SUPPLEMENTAL GEOTECHNICAL SERVICES**

Within our profession it is recognized that the risks of design, construction, and maintenance-related problems associated with civil engineering works are typically higher and result in increased overall project cost when the geotechnical engineer of record is not retained to provide supplemental services. For this project, Taber Consultants should provide the following supplemental geotechnical services:

- review and provide written comments on the final plans and specifications, insofar as they rely upon this report, prior to construction bidding to verify consistency with the recommendations contained herein; and,
- review exposed cut slopes and roadway subgrade during construction in order to provide additional or alternate geotechnical recommendations (if necessary) based on exposed rock and soil conditions, including drainage.

Should there be significant change in the project or should soils conditions different from those described in this report be encountered during construction, this office should be contacted/notified for evaluation and supplemental recommendations as necessary or appropriate.

Taber Consultants cannot be responsible for interpretations made by others regarding our report and the recommendations contained herein. If construction observation is performed by others, they should review this report and either accept the conclusions and recommendations herein as their own or provide alternative recommendations.

**TABER CONSULTANTS**

Ronald E. Loutzenhiser
G.E. 2865

October 1, 2014
REL/DAK/WEN

David A. Kitzmann
C.E.G. 2412
P.E. 81410
GENERAL CONDITIONS

The conclusions and recommendations of this study are professional opinion based upon the indicated project criteria and the limited data described herein. It is recognized there is potential for variation in subsurface conditions and modification of conclusions and recommendations might emerge from further, more detailed study.

This report is intended only for the purpose, site location and project description indicated and construction in accordance with Caltrans and local agency practice.

As changes in appropriate standards, site conditions and technical knowledge cannot be adequately predicted, review of recommendations by this office for use after a period of two years is a condition of this report.

A review by this office of any foundation and/or grading plans and specifications or other work product insofar as they rely upon or implement the content of this report, together with the opportunity to make supplemental recommendations as indicated therefrom is considered an integral part of this study and a condition of recommendations.

Subsequently defined construction observation procedures and/or agencies are an element of work, which may affect supplementary recommendations.

Should there be significant change in the project or should soils conditions different from those described in this report be encountered during construction, this office should be notified for evaluation and supplemental recommendations as necessary or appropriate.

Opinions and recommendations apply to current site conditions and those reasonably foreseeable for the described development—which includes appropriate operation and maintenance thereof. They cannot apply to site changes occurring, made, or induced, of which this office is not aware and has not had opportunity to evaluate.

The scope of this study specifically excluded sampling and/or testing for, or evaluation of the occurrence and distribution of, hazardous substances. No opinion is intended regarding the presence or distribution of any hazardous substances at this or nearby sites.
APPENDIX A

Laboratory Test Results
Since 1954

County of Santa Clara Roads & Airports Department
Dewitt Avenue "S-Curve" Roadway Realignment Project
Santa Clara County, California

Vicinity Map

2012-0138-2

Figure - 1
Since 1958

County of Santa Clara Roads & Airports Department
Dewitt Avenue "S-Curve" Roadway Realignment Project
Santa Clara County, California

Location of Field Tests
2012-0138-2 Figure - 2

NOTE: All locations are approximate and are referenced from existing site features.
**TEST BORING LOG**

**STATION:** 2+48, 7 feet right  
**SURFACE ELEVATION:** 507.6

**BORING NO. B-1**

<table>
<thead>
<tr>
<th>DEPTH (ft)</th>
<th>MATERIAL SYMBOL</th>
<th>MATERIAL DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.3</td>
<td>CL</td>
<td>Soft, gray brown and black brown, CLAY with fine to coarse SAND, moist</td>
</tr>
<tr>
<td>104</td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
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<tr>
<td>1.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Bottom of hole at 7.0 feet.**

Backfilled with soil cuttings and patched with sealant and cold patch asphalt.

No groundwater surface encountered.

---

**Figures and Pages:**

- **FIGURE 3**
- **PAGE 1 OF 8**
**TEST BORING LOG**

**STATION:** 7+96, 59 feet left  
**SURFACE ELEVATION:** 558.7

**Type:** 4-INCH AUGER, HQ CORE

---

<table>
<thead>
<tr>
<th>Depth (Ft)</th>
<th>Sample No.</th>
<th>Sample Size (inches)</th>
<th>Density</th>
<th>Material Symbol</th>
<th>Material Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>127</td>
<td>13</td>
<td>20% / 0%</td>
<td>D</td>
<td>METAMORPHIC ROCK: Fine to medium grained, light and dark green, very intensely weathered, very soft, very intensely fractured, thick brown clay filled fractures, moist to wet.</td>
</tr>
<tr>
<td>0.9</td>
<td>120</td>
<td>50/0.3</td>
<td>1.4</td>
<td>A</td>
<td>Compact to dense, gray brown and yellowish brown, CLAYEY fine to coarse SAND with fine to coarse GRAVEL, dry.</td>
</tr>
<tr>
<td>1.9</td>
<td>130</td>
<td>50/0.5*</td>
<td>1.4</td>
<td>A</td>
<td>Very dense, gray brown, CLAYEY angular fine to coarse GRAVEL, dry (decomposed rock)</td>
</tr>
<tr>
<td>5.5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>10.5</td>
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<tr>
<td>17.8</td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>37.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Bottom of hole at 37.4 feet. Backfilled with neat cement grout and topped with soil cuttings to existing grade. No groundwater surface encountered during auger drilled interval. Boring advanced with 4-inch solid flight auger to 17.0 feet then HQ core barrel to total depth.</td>
</tr>
</tbody>
</table>

---

**THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.**

**LOGGED BY:** ABK  
**DATE:** 08-07-2014
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Density (%)</th>
<th>Material / Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 5</td>
<td>100% / 0%</td>
<td>Massive CROSS, Dense, medium brown and dark brown, CLAYEY fine to coarse SAND with angular fine to coarse GRAVEL, dry to moist</td>
</tr>
<tr>
<td>6 - 10</td>
<td>50% / 0%</td>
<td>Very dense, gray brown, Silt with fine to coarse SAND, dry (decomposed rock)</td>
</tr>
<tr>
<td>11 - 15</td>
<td>0% / 0%</td>
<td>METAMORPHIC ROCK: fine to medium, light to dark green, very intensely weathered, very soft, very intensely fractured, very closely and closely spaced, thick brown clay filled fractures, moist, contains calcite pods (~0.1&quot;)</td>
</tr>
<tr>
<td>16 - 20</td>
<td>65% / 0%</td>
<td>METAMORPHIC ROCK: fine to medium grained, dark green, slightly to moderately weathered, moderately hard, intensely to moderately fractured (45 to 70 degrees), slightly open to tight, white (non-reactive to HCL) fully healed fractures</td>
</tr>
<tr>
<td>21 - 25</td>
<td>100% / 30%</td>
<td>Backfilled with neat cement grout and topped with soil cuttings to existing grade.</td>
</tr>
<tr>
<td>26 - 30</td>
<td>48% / 26%</td>
<td>No groundwater surface encountered during auger drilled interval.</td>
</tr>
<tr>
<td>31 - 35</td>
<td>24%</td>
<td>Boring advanced with 4-inch solid flight auger to 15.3 feet then HQ core barrel to total depth.</td>
</tr>
<tr>
<td>36 - 40</td>
<td></td>
<td>Bottom of hole at 36.5 feet.</td>
</tr>
</tbody>
</table>

Bottom of hole at 36.5 feet.
Backfilled with neat cement grout and topped with soil cuttings to existing grade.
No groundwater surface encountered during auger drilled interval.
Boring advanced with 4-inch solid flight auger to 15.3 feet then HQ core barrel to total depth.

THE BORING LOGS SHOW SUBSURFACE CONDITIONS AT THE DATES AND LOCATIONS INDICATED AND IT IS NOT WARRANTED THAT THEY ARE REPRESENTATIVE OF SUBSURFACE CONDITIONS AT OTHER LOCATIONS AND TIMES.
<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Bulk</th>
<th>C</th>
<th>Material</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.9</td>
<td></td>
<td></td>
<td>Asphalt Concrete (6&quot;)</td>
<td>0.5</td>
</tr>
<tr>
<td>11.1</td>
<td></td>
<td></td>
<td>Aggregate Base (8&quot;)</td>
<td>1.3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Soft, dark gray brown, CLAY with fine to coarse SAND with fine GRAVEL, moist</td>
<td></td>
</tr>
</tbody>
</table>

Bottom of hole at 7.0 feet.
Backfilled with soil cuttings and patched with sealant and cold patch asphalt
No groundwater surface encountered.
## TEST BORING LOG

**Station:** 15+01, 1 feet right  
**Surface Elevation:** 503.4

### Boring No. B-5

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Material Symbol</th>
<th>Material Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.3</td>
<td>CL</td>
<td>Asphalt Concrete (3&quot;)</td>
</tr>
<tr>
<td>0.8</td>
<td></td>
<td>Aggregate Base (6&quot;)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Very soft, dark brown CLAY with fine to coarse SAND and trace fine GRAVEL, moist</td>
</tr>
</tbody>
</table>

**E, R**  
**Bulk B**

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Mass (lbs)</th>
<th>Moisture (%)</th>
<th>Blows per Foot</th>
<th>Sample Size (inches)</th>
<th>Sample No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.3</td>
<td>117</td>
<td>7</td>
<td>4</td>
<td>1.4</td>
<td>1</td>
</tr>
</tbody>
</table>

**Bottom of hole at 7.0 feet.**

Backfilled with soil cuttings and patched with sealant and cold patch asphalt.

No groundwater surface encountered.

---

**Logged by:** ABK  | **Date:** 08-07-2014
<table>
<thead>
<tr>
<th>E, R</th>
<th>Bulk</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Soft), dark grayish brown, fine to coarse SANDY CLAY with fine to coarse GRAVEL, moist

Bottom of hole at 2.0 feet.
Backfilled with soil cuttings to existing grade.
No groundwater surface encountered.

The boring logs show subsurface conditions at the dates and locations indicated and it is not warranted that they are representative of subsurface conditions at other locations and times.

Logged by: ABK  Date: 08-07-2014
### TEST BORING LOG

**STATION:** 12+01, 1 feet left  
**SURFACE ELEVATION:** 519.8

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Material Description</th>
</tr>
</thead>
</table>
| 2.0        | Bottom of hole at 2.0 feet.  
Backfilled with soil cuttings to existing grade. |

**SOIL CLASSIFICATION**

- (Soft), brown, CLAY with fine to coarse SAND and fine GRAVEL, moist

---

**LOGGED BY:** ABK  
**DATE:** 08-11-2014
<table>
<thead>
<tr>
<th>SAMPLE NO.</th>
<th>DEPTH (ft.)</th>
<th>DRY DENSITY (lbs/cu. ft.)</th>
<th>MOISTURE (%)</th>
<th>OTHER TESTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>20</td>
<td>15-0</td>
<td>10</td>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

**Materials:**
- **SAND and angular fine GRAVEL:**
- **CLAY:**
- **GRAVEL:**
- **SOIL:**
- **BULK:**

**Soil Classification:**
- **CL:**
- **A:**

**Surface Elevation:** 50.0
**Station:** 14+36.36 Rear
**Job No.:** 2012-0136-2

**UMN Soil Project:**
- **Depth:** 20 ft.
- **Sample Size:**
  - No. 1
  - No. 2

**Other Tests:**
- **Pocket Penetrometer (ipn):**
- **Undrained Compressive:**
- **Log of Boring (DSL):**
  - 2012-0136-2

**Apparatus:**
- **Type:** 4-HOCH HAND AUGER
- **Soil:** dark grey brown, clay with fine to course

**Notes:**
- Elevation: 50.0
- Depth: 20 ft.
- Sample Size: No. 1, No. 2
- Soil Classification: CL, A, GRAVEL, SOIL

**Sample Numbers:**
- 20
- 15-0
- 10
- 5
UNIFIED SOIL CLASSIFICATION SUMMARY

<table>
<thead>
<tr>
<th>Pt</th>
<th>OH</th>
<th>CH</th>
<th>MH</th>
<th>OL</th>
<th>CL</th>
<th>ML</th>
<th>SC</th>
<th>SM</th>
<th>SP</th>
<th>SW</th>
<th>GC</th>
<th>GM</th>
<th>GP</th>
<th>GW</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highly organic soils</td>
<td>Silts and clays Liquid limit 50 or more</td>
<td>Silts and clays Liquid limit less than 50</td>
<td>Sands with fines &gt; 12% fines</td>
<td>Clean sands &lt; 5% fines</td>
<td>Gravels with fines &gt; 12% fines</td>
<td>Clean gravels &lt; 5% fines</td>
<td>Sands &gt; 50% of more of coarse fraction is smaller than No 4 Sieve</td>
<td>Gravels &gt; 50% more of coarse fraction is larger than No 4 sieve</td>
<td>Fine grained soils (50% or more is smaller than No 200 sieve)</td>
<td>Coarse grained soils (More than 50% is larger than No 200 sieve)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LABORATORY CLASSIFICATION CRITERIA

GW and SW - Cu > 4 for GW and 6 FOR SW; 1 < Cc < 3
GM and SM - Atterberg limits of fines below "A" line or P.I. less than 4.
GC and SC - Atterberg limits of fines above "A" line with P.I. greater than 7.

Classification of earth materials shown on the test boring logs is based on field observation and should not be construed to imply laboratory analysis unless so stated.

CONSISTENCY CLASSIFICATION FOR SOILS

<table>
<thead>
<tr>
<th>Fines (silt or clay)</th>
<th>Sand</th>
<th>Gravel</th>
<th>Cobbles</th>
<th>Boulders</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sieve sizes</td>
<td>200</td>
<td>40</td>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>3/4&quot;</td>
<td>3&quot;</td>
<td>10&quot;</td>
<td></td>
</tr>
</tbody>
</table>

KEY TO "OTHER TESTS" LABORATORY

A - Atterberg Limits
C - Consolidation
CR - Corrosivity
E - Expansion Index
G - Gradation
H - Hydrometer
M - Maximum Dry Density
O - Organic Content
P - Permeability
PL - Point Load
R - Resistance Value
S - Direct Shear
SE - Sand Equivalent
SG - Specific Gravity
T - Triaxial Shear

* According to the Standard Penetration Test (ASTM D 1586)
Blow count of 50/0.5 indicates 50 blows for 1/2 foot.
Where standard penetration test has not been performed, consistencies shown (in parenthesis) on logs are estimated.

LEGEND OF BORING

- Bulk Sample
- Drive Sample
- Casing Set
- Conformable material change
- Approximate material change
- Unconformable material change
- Bottom of boring

LEGEND OF PENETRATION TEST

- Graphic representation of drilling rate
- Groundwater surface
- Groundwater during
- Blows per foot (using a 14D-B hammer with a 30" drop) 15
- First encountered groundwater

BORING LEGEND

Taber Consultants
Engineers and Geologists
3911 West Capital Avenue
West Sacramento, CA 95691-2116
916-371-1890 Fax 916-371-7095
www.taberconsultants.com

Taber
Since 1954
# SUMMARY OF LABORATORY RESULTS

**CLIENT**  
Santa Clara Roads and Airports Dept.

**PROJECT NUMBER**  
2012-0138-2

**PROJECT NAME**  
Dewitt Avenue Roadway Realignment

**PROJECT LOCATION**  
Morgan Hill, California

<table>
<thead>
<tr>
<th>Borehole/ Sample</th>
<th>Depth</th>
<th>Liquid Limit</th>
<th>Plastic Limit</th>
<th>Plasticity Index</th>
<th>Maximum Size (mm)</th>
<th>%&lt;3&quot; Sieve</th>
<th>%&lt;#4 Sieve</th>
<th>Class-ification</th>
<th>Direct Shear phi</th>
<th>Direct Shear c</th>
<th>Water Content (%)</th>
<th>Dry Density (pcf)</th>
<th>Wet Density (pcf)</th>
<th>QU (TSP)</th>
<th>QU Strain at Failure (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-1/D</td>
<td>1.3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>24.2</td>
<td>103.9</td>
<td>129.1</td>
<td>2.3</td>
<td>7.4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-1/1</td>
<td>5.0</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>13.5</td>
<td>117.9</td>
<td>133.8</td>
<td>3.9</td>
<td>5.3</td>
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</tr>
<tr>
<td>B-2/1</td>
<td>2.0</td>
<td>30</td>
<td>18</td>
<td>12</td>
<td>19 100</td>
<td>32</td>
<td>SC</td>
<td></td>
<td>7.1</td>
<td>122.1</td>
<td>130.8</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>B-2/2</td>
<td>5.0</td>
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<td></td>
<td></td>
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<td></td>
<td>4.2</td>
<td>130.4</td>
<td>135.9</td>
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<td>B-2/3</td>
<td>10.0</td>
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<td>B-2/5</td>
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</tr>
<tr>
<td>B-2/A</td>
<td>17.3</td>
<td></td>
<td></td>
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<td>B-2/B</td>
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</tr>
<tr>
<td>B-2/C</td>
<td>24.5</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>B-2/D</td>
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<tr>
<td>B-2/6</td>
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<td></td>
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</tr>
<tr>
<td>B-2/E</td>
<td>32.4</td>
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<td>91.2</td>
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</tr>
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<td>83.1</td>
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<td>6.4</td>
<td>120.7</td>
<td>128.4</td>
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<tr>
<td>B-3/4</td>
<td>15.0</td>
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<td>4.5</td>
<td>110.3</td>
<td>115.2</td>
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<tr>
<td>B-3/A</td>
<td>15.3</td>
<td></td>
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<td>LL</td>
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<td>PI</td>
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<td>30</td>
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<td>12</td>
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### U.S. Sieveopening in Inches

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<td>1/23/8 3 4 6</td>
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<td>8 10 14 16 20 30 40 50 60</td>
<td>100-140 200</td>
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### Percent Finer by Weight

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<td>100</td>
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<tr>
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<td>10</td>
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### Grain Size Distribution

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<tr>
<th>COBBLES</th>
<th>GRAVEL</th>
<th>SAND</th>
<th>SILT OR CLAY</th>
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<tbody>
<tr>
<td>coarse</td>
<td>fine</td>
<td>coarse</td>
<td>medium</td>
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#### Boring/Sample

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<th>LL</th>
<th>PL</th>
<th>PI</th>
<th>Cc</th>
<th>Cu</th>
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</thead>
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<td>12</td>
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#### Boring/Sample

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<th>Depth</th>
<th>D100</th>
<th>D60</th>
<th>D50</th>
<th>D30</th>
<th>D10</th>
<th>%Gravel</th>
<th>%Sand</th>
<th>%Silt</th>
<th>%Clay</th>
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<td>14.5</td>
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<td>32.2</td>
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**ASTM D422/D6913**

**Taber Consultants**

Engineers and Geologists
3011 West Capital Avenue
West Sacramento, CA 95691-2115
916-371-4088 Fax: 916-371-7265
www.taberconsultants.com

**Grain Size Distribution**

Santa Clara Roads and Airports Dept.
Dewitt Avenue Roadway Realignment
Morgan Hill, California

**APPENDIX A**

Project No.
2012-0138-2
LABORATORY TEST RESULTS

EXPANSION INDEX TEST - ASTM D4829
4" dia x 1" thick remolded specimen, 144 psf surcharge, 24 hr. saturation

<table>
<thead>
<tr>
<th>Boring/ Sample #</th>
<th>Dry Density (pcf)</th>
<th>Initial Moisture Content (%)</th>
<th>Final Moisture Content (%)</th>
<th>Expansion Index</th>
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<tbody>
<tr>
<td>B4/C</td>
<td>111.2</td>
<td>10.4</td>
<td>23.8</td>
<td>36</td>
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<tr>
<td>HA-1/E</td>
<td>94.9</td>
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<td>28.1</td>
<td>49</td>
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<td>HA-4/F</td>
<td>99.6</td>
<td>10.6</td>
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<tr>
<td>B5/B</td>
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<td>12.7</td>
<td>26.7</td>
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Appendix A
# R-VALUE TEST REPORT

## Resistance R-value and Expansion Pressure - Cal Test 301

<table>
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<tbody>
<tr>
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<td>117.5</td>
<td>16.6</td>
<td>0.52</td>
<td>120</td>
<td>2.37</td>
<td>650</td>
<td>22</td>
<td>20</td>
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<tr>
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<td>105.4</td>
<td>21.3</td>
<td>0.33</td>
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<td>175</td>
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<td>6</td>
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## Test Results

R-Value at 300 psi exudation pressure = **8**

## Material Description

reddish brown sandy silty clay (visual)

---

**Project No.:** 2012-0138-2  
**Project:** Dewitt Avenue Roadway Realignment  
**Location:** Morgan Hill, California  
**Sample Number:** HA-1/E  
**Depth:** 0  
**Date:** 8/23/2014  
**Tested by:** AST  
**Checked by:** RWD  
**Remarks:**

---

**Taber Consultants**  
**R-VALUE TEST REPORT**

Appendix A
Resistance R-Value and Expansion Pressure - Cal Test 301

<table>
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<tbody>
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<td>0.18</td>
<td>122</td>
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<td>440</td>
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<td>218.9</td>
<td>14.0</td>
<td>0.00</td>
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<td>2.54</td>
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<tr>
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<td>229.2</td>
<td>12.7</td>
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<td>130</td>
<td>2.47</td>
<td>390</td>
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<td>13</td>
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Test Results

R-Value at 300 psi exudation pressure = 7

Material Description

brown clay with sand and gravel (visual)

Project No.: 2012-0138-2  
Project: Dewitt Avenue Roadway Realignment  
Location: Morgan Hill, California  
Sample Number: B4/C  
Depth: 1.3

Date: 8/27/2014

Tested by: AST  
Checked by: RWD

Remarks:

Appendix A
**Resistance R-Value and Expansion Pressure - Cal Test 301**

<table>
<thead>
<tr>
<th>No.</th>
<th>Compact Pressure psi</th>
<th>Density pcf</th>
<th>Moist. %</th>
<th>Expansion Pressure psi</th>
<th>Horizontal Press. psi @ 160 psi</th>
<th>Sample Height in.</th>
<th>Exud. Pressure psi</th>
<th>R Value</th>
<th>R Value Corr.</th>
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<td>94</td>
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<td>650</td>
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<td>125.0</td>
<td>116.4</td>
<td>16.1</td>
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<td>2.52</td>
<td>175</td>
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<td>325</td>
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**Test Results**

R-Value at 300 psi exudation pressure = 15

**Material Description**

brown clay with sand and gravel (visual)

**Project No.:** 2012-0138-2  
**Project:** Dewitt Avenue Roadway Realignment  
**Location:** Morgan Hill, California  
**Sample Number:** HA-4/F  
**Depth:** 0  
**Date:** 8/27/2014  
**Tested by:** AST  
**Checked by:** RWD  
**Remarks:**

**Taber Consultants**

Appendix A
# Resistance R-Value and Expansion Pressure - Cal Test 301

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<td>12.8</td>
<td>0.15</td>
<td>130</td>
<td>2.51</td>
<td>350</td>
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<tr>
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<td>100.0</td>
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<td>0.24</td>
<td>143</td>
<td>2.49</td>
<td>275</td>
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<tr>
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<td>120</td>
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**Test Results**

R-Value at 300 psi exudation pressure = 9

**Material Description**

Very soft, dark brown CLAY with fine to coarse SAND and trace fine GRAVEL, moist

---

**Project No.:** 2012-0138-2  
**Project:** Dewitt Avenue Roadway Realignment  
**Location:** Morgan Hill, California  
**Sample Number:** B5/B  
**Date:** 9/13/2014

**Tested by:** AST  
**Checked by:**

**Remarks:**

---

**Taber Consultants**  
**R-VALUE TEST REPORT**

Appendix A
### POINT LOAD TEST RESULTS

**Job #**: 2012-0138-2  
**Job Name**: Dewitt Avenue Roadway Realignment

<table>
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<tr>
<th>Boring</th>
<th>Top Hole Elev. (feet)</th>
<th>Core Run</th>
<th>Depth (feet)</th>
<th>Elev. (feet)</th>
<th>Core Diameter (inches)</th>
<th>Failure Load (lbf)</th>
<th>Point Load Index (P)</th>
<th>Uniaxial Compressive Strength (psi)</th>
<th>Remarks/Notes</th>
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<tbody>
<tr>
<td>3</td>
<td>F</td>
<td>31.5</td>
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<td>2.39</td>
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<td>184</td>
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<td>1000</td>
<td>175</td>
<td>4300</td>
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Uniaxial compressive strength values based on point load test data and correlations derived from Bieniawski (1975); "Rock Mechanics for Underground Mining", Brady & Brown, 1985 (page 98-99).

**Equation to determine Uniaxial Compressive Strength**:

Uniaxial Compressive Strength = \( \sigma_c = (14 + 0.175D)I_s \)

Point Load Index = \( I_s = \frac{P}{D^2} \)

---

Appendix A