GEOTECHNICAL INVESTIGATION REPORT

MOUNTAIN VIEW CORRIDOR PHASE I

SEGMENT 1

Salt Lake County, Utah

UDOT Project No. MP-0182(6)

Prepared for:
HDR Engineering, Inc.

October 2009

RB&G ENGINEERING, INC.

200901-200

RB&G
ENGINEERING, INC.

December 31, 2009

Douglas Jackson, Project Manager
HDR Engineering, Inc.
3949 South 700 East, Suite 500
Salt Lake City, UT 84107-2594

Re: Mountain View Corridor – Phase I, Salt Lake County
Segment 1
UDOT Project No. MP-0182(6)
Geotechnical Investigation Report
ADDENDUM NO. 1

Dear Mr. Jackson:

Included herewith is Addendum No. 1 to the Geotechnical Investigation Report for Segment 1 of the Mountain View Corridor Phase I Project in Salt Lake County, Utah. A list detailing the changes made in Addendum No. 1 is also attached.

We appreciate the opportunity of providing this service for you. If there are any questions relating to the information contained herein, please call.

Sincerely,

RB&G ENGINEERING, INC.

PROFESSIONAL ENGINEER S. ROBERT JOHNSON No. 5148753 12-31-09 STATE OF UTAH

S. Robert Johnson, P.E.

REGISTERED PROFESSIONAL ENGINEER NO.162291 BRADFORD E. PRICE 12/31/09 STATE OF UTAH

Bradford E. Price, P.E.

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MOUNTAIN VIEW CORRIDOR PHASE I
GEOTECHNICAL REPORT
SUMMARY OF CHANGES MADE IN ADDENDUM 1

DESIGN SEGMENT: 1
REPORT DATE: 10/19/09
ADDENDUM DATE: 12/31/09

No.	Section	Description	Design Impact
1	Contents	Updated	None
2	1.1.1	Corrected first sentence	None
3	1.1.2	Corrected second sentence	None
4	1.1.2	Added third and fourth paragraphs. Deleted last paragraph.	Minor
5	4.1	Corrected second sentence	None
6	4.3.1	Corrected second sentence	None
7	4.4	Added third paragraph	None
8	5.1	Added second, third, and fifth paragraphs	Minor
9	5.1	Modified ends of sixth and seventh paragraphs	Minor
10	6.1.1	Added second paragraph	Minor
11	6.1.1.1	Updated description of NB bridge	Minor
12	6.1.1.2	Updated section heading and description of SB bridge	Minor
13	6.1.1.3	(Was mislabeled 6.1.1.2.) Deleted because one SB bridge eliminated	Minor
14	6.1.2.2	Added first paragraph	Minor
15	6.1.2.3	Corrected last sentence in second bulleted item	None
16	6.1.4.1	Modified paragraph based on review comment	Minor
17	6.2.2	Added entire section and subsections 6.2.2.1 thru 6.2.2.5	Significant (Structures)
18	6.2.2	Renumbered section as 6.2.3 to accommodate addition of box culvert in 6.2.2	None
19	6.2.3	Renumbered section and subsections as 6.2.4	None
20	6.2.~~3~~4	Removed second paragraph and modified first and third paragraphs	Minor
21	6.2.~~3~~4.1	Modified last sentence of first paragraph slightly based on review comment	Minor
22	6.2.~~3~~4.1	Replaced second paragraph	Moderate (Settlement)
23	6.2.~~3~~4.1	Modified last paragraph	Significant (Settlement)
24	6.2.~~3~~4.2	Modified first and third paragraphs and deleted last paragraph	Moderate
25	6.2.~~3~~4.3	Revised entire section	Significant (Structures)
26	6.2.~~3~~4.5	Revised entire section	Significant (Monitoring)
27	6.2.~~3~~4.6	Corrected first sentence	None
28	6.2.5	Added entire section	Significant (Drainage)
29	7.5	Modified first paragraph	Moderate (Fill Material)
30	8	Modified section slightly	Minor
31	9	Corrected referenced specification number	Moderate
32	11	Modified last sentence of first paragraph slightly based on review comment	Moderate
33	12	Added Biek (2009) reference	None
34	Figures	Replace Figures 2a-2e to include new test hole locations & revised bridges	Moderate
35	App. A	Replaced OPCC2 drawings with OPCC3 drawings	Moderate
36	App. B	Added boring logs 09-C1-1 and 2 after 09-S1-13	Significant (Structures)
37	App. B	Added 22 wall boring (W1) logs after the C1 logs	Significant (Structures)
38	App. B	Added 21 detention basin (D1) logs after the E1 logs	Significant (Drainage)
39	App. B	Replaced logs for 09-MVC-001 thru 007. Updated South Hills Drive Stationing	Moderate
40	App. B	Added log for test pit 09-MVC-019	Moderate
41	App. B	Replaced log for 09-MVC-026 with minor correction noted in review comment	Moderate
42	App. C	Replaced summary of test data for S1 borings (added sulfate/chloride test)	Moderate
43	App. C	Added summary of test data for C1 and W1 borings after S1 summary	Moderate
44	App. C	Added summary of test data for D1 borings after E1 summary	Moderate
45	App. C	Replaced summary of test data for MVC borings, w/ additions and corrections	Moderate
46	App. C	Added results of 3 direct shear tests on samples from W1 borings	Moderate
47	App. C	Added consolidation test results for 09-W1-24 @ 12'	Moderate
48	App. D	Replaced Drilled Shaft compression resistance sheets (abutment and bent numbers updated, and modified Note 4 on axial resistance summaries).	Significant (Structures)
49	App. D	Replaced Drilled Shaft uplift resistance sheets (updated abut/bent numbers)	Significant (Structures)
50	App. D	Replaced L-PILE and GROUP parameter sheets (updated abut/bent numbers)	Significant (Structures)
51	App. D	Replaced slope stability analysis section	Moderate
52	App. D	Added design parameters for MSE walls	Significant (Structures)
53	App. D	Modified Lateral earth pressures summary with clarifying references	Minor
54	App. D	Added Permeability Summary sheets	Significant (Drainage)

RB&G
ENGINEERING, INC.

October 19, 2009

Douglas Jackson, Project Manager
HDR Engineering, Inc.
3949 South 700 East, Suite 500
Salt Lake City, UT 84107-2594

Re: Mountain View Corridor – Phase I, Salt Lake County
Segment 1
UDOT Project No. MP-0182(6)
Geotechnical Investigation Report

Dear Mr. Jackson:

A Geotechnical Investigation has been completed for Segment 1 of the Mountain View Corridor Phase I Project in Salt Lake County, Utah

We appreciate the opportunity of providing this service for you. If there are any questions relating to the information contained herein, please call.

Sincerely,

RB&G ENGINEERING, INC.

S. Robert Johnson

S. Robert Johnson, P.E.

PROFESSIONAL ENGINEER
S. ROBERT
JOHNSON
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Geotechnical Investigation Report

Mountain View Corridor Phase I

Segment 1

Salt Lake County, Utah

UDOT Project No. MP-0182(6)

Prepared for:
HDR Engineering, Inc.

October 2009

RB&G ENGINEERING, INC.

GEOTECHNICAL INVESTIGATION REPORT

MOUNTAIN VIEW CORRIDOR – PHASE I
SEGMENT 1

UTAH DEPARTMENT OF TRANSPORTATION
PROJECT NO. MP-0182(6)

Contents

RB&G
ENGINEERING, INC.

GEOTECHNICAL INVESTIGATION REPORT

MOUNTAIN VIEW CORRIDOR – PHASE I
SEGMENT 1

UTAH DEPARTMENT OF TRANSPORTATION
PROJECT NO. MP-0182(6)

1 GENERAL

This report presents the results of geotechnical investigations and provides geotechnical recommendations for bridge foundations and embankments proposed for Segment 1 of the Mountain View Corridor Project, in Salt Lake County, Utah.

1.1 PROJECT DESCRIPTION

Segment 1 of the proposed Mountain View Corridor will begin in the Jordan Narrows area, approximately one-half mile west of Redwood Road and about two miles north of Camp Williams (Sta. 845+00, near 15800 South) and trend in a northwesterly direction, terminating in the Juniper Canyon area of Herriman (Sta. 990+00, near 14400 South). An east-west roadway named South Hills Drive will connect the southerly end of Segment 1 with Redwood Road.

1.1.1 GENERAL

Segment 1 of the proposed Mountain View Corridor will traverse hilly terrain along the southwesterly edge of the Salt Lake Valley at the base of the Traverse Mountains. An existing electrical power substation is located immediately north of the proposed South Hills Drive alignment between Redwood Road and the Mountain View Corridor. The South Valley Water Treatment Plant is located immediately west of the Corridor alignment between Sta. 870+00 and 900+00.

Sand and gravel pits exist in the hills to the south and west of Segment 1. The Segment 1 alignment and immediate vicinity are generally undeveloped; however, some portions of the alignment have been used as irrigated farmland.

1.1.2 PROPOSED IMPROVEMENTS

It is our understanding that the current phase of the Project will provide two northbound and two southbound traffic lanes through Segment 1. Bridge structures of one to three spans have been proposed to carry traffic over the Juniper Canyon drainages near the northerly end of Segment 1. The northbound and southbound alignments will be separated by a distance of about 400 feet, and it is anticipated that these roadways will eventually serve as frontage roads for a freeway to be constructed between them in the future.

A new box culvert is proposed to carry Welby Jacobs canal beneath South Hills Drive. New detention basins will be constructed to store drainage from the roadway facilities.

The proposed new roadways incorporate retaining walls at various locations along the alignment to minimize the extents of cut and fill slopes. It is our understanding that the maximum height of retaining structures in Segment 1 will be about 12 feet.

The geotechnical investigations described in this report apply primarily to design and construction of the proposed frontage roads, and we anticipate that additional investigations will be needed in the future to design and construct the freeway, particularly at the locations of bridge structures.

2 PREVIOUS GEOTECHNICAL INVESTIGATIONS AND REPORTS

It is our understanding that this is the first geotechnical investigation conducted within Segment 1 of the proposed Mountain View Corridor alignment. An overview of available geologic studies and maps pertaining to the Project area is provided in Section 4.3 of this report.

3 EXISTING FACILITIES

No highway facilities presently exist within Segment 1 of the proposed Mountain View Corridor alignment. Various unpaved roads and trails traverse the Project area. It is anticipated that South Hills Drive will be constructed to connect the south end of the Segment to Redwood Road, which was reconstructed within the past year in the Jordan Narrows / Camp Williams area.

4 FINDINGS

4.1 SITE CONDITIONS

The general location of the Project is shown on Figure 1. The topography is hilly, and deep drainages/washes exist in the Juniper Canyon area. The overall ground slope is down to the east and north toward the Jordan River.

Vegetation within the proposed Segment 1 alignment generally consists of weeds, native grasses, and small shrubs. Scattered juniper trees are encountered in the drainage/wash areas near the northerly end of Segment 1.

A small pond was observed in the Juniper Canyon drainage, upstream of the proposed bridge site. Cobbles and boulders were observed at the ground surface at various locations across the proposed Segment 1 alignment.

4.2 SURFACE DRAINAGE

Surface water within the project area generally flows locally into canyons and washes, which drain to the north and east toward the Jordan River. It is assumed that the hydrology of the Project will be addressed in detail by others.

Our geotechnical investigations in Segment 1 did not encounter groundwater, and unusual groundwater conditions such as springs are not anticipated.

4.3 GEOLOGY

4.3.1 REGIONAL GEOLOGY

The Salt Lake Valley is located along the Wasatch Front, within the Basin and Range Province. The Wasatch Front consists predominantly of Paleozoic sedimentary rocks that were uplifted and thrusted to the east during the Sevier Orogeny, 66-100 million years ago. These compression forces were later replaced by extensional forces during the late Cretaceous. Extensional forces produced the normal faulting that is typical throughout the Basin and Range Province in Utah and Nevada. During the Tertiary Period, igneous activity generated intrusive rocks in northern Utah, and volcanoes with basalt flows and cinder cones in southwestern Utah. During the Oligocene Epoch, 24 to 28 million years ago, igneous intrusions generated copper and other minerals associated with the Bingham mining district located just west of the Mountain View Corridor Project area.

During the Pleistocene, the climate became much colder and wetter. While periods of glaciation were common to the north in and near Canada, Utah experienced more rain, with glaciers forming in the higher mountains. During this time, Lake Bonneville (the largest of the Pleistocene lakes) began spreading over much of northern and central Utah. The lake passed through many cycles of regression and transgression during a 3,500 year period, before eventually rising to elevation 5090 feet (msl) and breaching into the Snake River Plain in Idaho (Bonneville Phase). The lake stabilized at an elevation of about 4740 feet (Provo Phase) about 14,500 years ago. Various shorelines of Lake Bonneville are marked as carved benches in the surrounding hillsides.

During Lake Bonneville times, thousands of feet of clay, silt, sand and gravel were deposited and interbedded throughout the lake. Changes to a drier, warmer climate eventually resulted in the overall regression of the lake to the current level of the Great Salt Lake.

4.3.2 GEOLOGY OF PROJECT AREA

Segment 1 of the proposed Mountain View Corridor Project begins at Redwood Road just north of the Point of the Mountain, and trends west toward the west Traverse Mountains. The project then trends toward the northwest and north. Much of Segment 1 trends along some of the naturally-formed terraces created by the Provo shoreline of ancient Lake Bonneville.

Geologic maps of the area show the proposed alignment of Segment 1 to be located on Quaternary alluvial deposits consisting of Lake Bonneville silt, clay, sand and gravel, as well as post-Bonneville deposits consisting of sediments laid down as young active stream alluvium, colluvium from slope wash and soil creep, and alluvial fan deposits of varying ages derived from debris flows and debris floods. These post-Bonneville deposits consist of unsorted to moderately sorted clay to boulder size sediments (Biek, 2005, Machette, 1992, Personius and Scott,1992).

Igneous activity during the Tertiary period created intrusions within the west Traverse Mountains and Bingham mine areas. This activity also generated block and ash-flow tuff, volcanic mudflow breccia, minor lava flows, and minor fluvial volcaniclastic deposits. These rocks have been classified as borderline dacite, andesite, and trachyte. Within Segment 1, many of these volcanic rocks are covered by a discontinuous layer or veneer of lacustrine Lake Bonneville sediments (Biek, 2005).

A geologic map of the Jordan Narrows 7.5' Quadrangle was completed in 2005 by Robert Biek with the Utah Geologic Survey. A portion of the map is shown in Figures 3a and 3b. Descriptions of selected mapped geologic units are listed on Figure 3c. The deposits are listed from youngest to oldest. It should be noted that these descriptions are generalized for the Jordan Narrows Quadrangle, and not all aspects apply directly to the study area.

4.3.3 GEOLOGIC HAZARDS

Potential geologic hazards within Segment 1 include ground shaking and subsidence during a seismic event on one of the faults in the area. Seismic hazards are discussed in further detail in Section 4.4 of this report.

Hazards associated with rockfall are not relevant to the Project area, but localized landsliding could occur on slopes. It is assumed that surface drainage and the potential for flooding have been addressed in a separate drainage report for the Project.

4.4 FAULTING AND SEISMICITY

The Wasatch Fault Zone (WFZ) is characterized as an active normal fault with down to the west displacement. The transition between the Provo and Salt Lake City segments of the fault occurs at the Traverse Mountains, about 6.5 miles east of the southerly terminus of Segment 1 of the Mountain View Corridor Project. The proposed Juniper Canyon bridge site is located 8 to 8.5 miles west of the WFZ. A maximum earthquake magnitude of about 7.2 is associated with the Salt Lake City Segment. The Provo Segment of the WFZ is capable of generating earthquake magnitudes in the order of 7.4 to 7.5.

The southerly end of the West Valley Fault Zone is mapped approximately 12 miles north of Segment 1, and is considered capable of generating a maximum earthquake magnitude of 6.5.

The Jordan Narrows fault is mapped as crossing Segment 2 between Sta. 1032+00 and 1036+00. According to Biek (2009), evidence of Quaternary movement is not apparent in the soils overlying the Jordan Narrows fault, and the fault is not considered active.

Earthquake considerations applicable to Segment 1, including AASHTO Site Class, mapped ground acceleration values, and liquefaction hazards, are discussed in Section 6.1.4 of this report.

4.5 SOIL MATERIALS

Based on the geologic studies referenced in this report, the soil materials within Segment 1 are predominantly lacustrine gravel, sand, and silt. In localized drainage areas and canyons, the proposed roadway traverses modern alluvial deposits. Geologic maps of the area indicate that the lacustrine deposits are typically underlain by older alluvial deposits and/or volcanic rocks of the west Traverse Mountains.

4.6 GEOHYDROLOGIC CONDITIONS

Groundwater in the Salt Lake Valley occurs in late Tertiary and Quaternary alluvial and lacustrine basin-fill deposits that range from coarse gravel to clay. Four hydraulically connected aquifers have been identified in the basin sediments: 1) a deep, unconfined aquifer in gravelly deposits along the fronts of the Wasatch Range and Oquirrh Mountains; 2) a deep, confined aquifer in the center of the valley in gravel deposits beneath clay confined beds; 3) a shallow, unconfined aquifer in the center of the valley overlying the confined aquifer; and 4) local perched aquifers located primarily adjacent to mountain fronts.

Groundwater was not encountered within the depths investigated for this report. In general, the hydraulic gradient in the Project area can be expected to slope down with the topography in a northeasterly direction toward the Jordan River and the Great Salt Lake.

4.7 CLIMATIC CONDITIONS

The climate in the Project area is characterized by relatively warm summers and cold winters. The frost depth ranges from 20 to 30 inches, and we recommend that a maximum frost depth of 30 inches be assumed for design purposes. Winter snow requires plowing and de-icing salt and chemicals are commonly deposited on roadways in the winter.

5 FIELD AND LABORATORY TESTING

5.1 SUBSURFACE EXPLORATION

Eight structure borings were initially drilled at Juniper Canyon to provide data for frontage road bridge foundations at this site. The anticipated foundation locations were subsequently revised, and required that five additional borings be drilled at this site. Sampling was typically conducted at depth intervals of five feet in the structure borings, which extended to depths ranging from 75 to 100 feet.

Two borings were drilled at location where Welby Jacobs Canal intersects the proposed South Hills Drive alignment to evaluate subsurface conditions for a box culvert. The first of these borings terminated in very hard material at a depth of 16 feet, and the second extended to a depth of about 31 feet. Sampling was conducted at five-foot intervals in the culvert borings.

A total of 22 borings were drilled specifically to investigate subsurface conditions for retaining walls. The depths of these borings were based primarily upon the anticipated wall heights, and ranged from 11 to 41 feet, with an average depth of about 20 feet.

Seven embankment borings were drilled in Segment 1 at the locations of some of the larger proposed embankment fills along the alignment. These borings ranged from about 20 to 50 feet deep, with an average depth of 33 feet. Sampling was conducted at five-foot intervals in the embankment borings.

Subsurface conditions at the locations of proposed detention basins were investigated with 21 borings that included open-hole, constant-head permeability tests. Each permeability test was conducted after drilling with the rock bit to a depth of three to five feet below the bottom of the casing or auger.

The subsurface explorations described in this report include 37 roadway borings drilled along the proposed alignment. The roadway borings in Segment 1 extended to depths ranging from 5 to 50 feet, with an average depth of about 13 feet. The deeper roadway borings were drilled in deep cut areas where the pavement subgrade is expected to be well below the existing ground surface. As a general rule, roadway borings in cut areas were drilled to a depth of 10 feet below the anticipated roadway profile elevation.

Boring logs and laboratory test results for the subsurface investigations are presented in Appendix B of this report. The test hole logs are numbered with the prefix "09" to indicate the year of the boring. Borings drilled for bridge structures and embankments in Segment 1 are further identified by the prefixes "S1" and "E1," respectively. Roadway borings were numbered consecutively from south to north along the alignment, with the prefix "09-MVC" followed by the boring number. Boring 09-MVC-36 was not drilled, and a test pit was excavated in lieu of Boring 09-MVC-19, due to site access limitations.

The subsurface explorations described in this report were conducted using CME-55 rotary drill rigs. Borings extending deeper than about 20 feet were advanced using a tri-cone rock bit and NW casing, with water used as the drilling fluid. The shallower roadway borings were typically drilled using continuous-flight auger, with hollow-stem auger used on some occasions. The methods and equipment used for each boring are noted at the top of each test hole log.

Sampling in the roadway borings was generally performed at depth intervals of 2.5 feet within the first 5 feet below the anticipated pavement elevation, and at 5-foot intervals at greater depths. Disturbed samples were obtained by driving a 2-inch split spoon sampling tube through a distance of 18 inches using a 140-pound weight dropped from a distance of 30 inches. The energy from the hammer impact was delivered to the sampling spoon through NW drill rods. The energy transferred by the automatic trip sampling hammers is evaluated yearly, and the energy ratios used to correct blow counts for each hammer are listed below:

Drill Rig	Hammer Type	Energy Ratio Used
2008 CME-55	Automatic Trip	80%
1996 CME-55	Automatic Trip	79%
1978 CME-55	Rope and Cathead	60%

The number of hammer blows required to drive the sampling spoon through each 6 inches of penetration is shown on the boring logs. The sum of the last two blow counts, which represents the number of blows required to drive the sampling spoon through 12 inches, is the raw blow count N. The $(N_1)_{60}$ value (standard penetration value corrected for overburden and hammer energy), provides a good indication of the in-place density of sandy material; however, it only provides an indication of the relative stiffness of cohesive material, since the penetration resistance of materials of this type is a function of the moisture content.

Considerable care must be exercised in interpreting the standard penetration value in gravelly-type soils, particularly where the size of granular particles exceeds the inside diameter of the sampling spoon. If the spoon can be driven through the full 18 inches with a reasonable sample recovery, the standard penetration value provides a good indication of the in-place density of gravelly-type material. For materials containing more than 35% gravel size particles, the standard penetration value is less reliable. The density descriptions shown on the boring logs for samples containing at least 35% gravel were approximated based on correlations between relative density and standard penetration value for gravelly soils.

At some locations within the Project it was not possible to drive the sampling spoon through the full 18 inches without excessive hammer blows. Sampling was typically terminated where 6 inches of penetration could not be achieved in about 50 blows, as indicated on the boring logs.

Relatively undisturbed samples were obtained by pushing a 2.62-inch (inside diameter) thin-walled sampling tube into the subsurface material using the hydraulic pressure on the drill rig. The locations at which the undisturbed samples were obtained are shown on the boring logs. Where undisturbed samples appeared to terminate in cohesionless soils, the thin-walled tube sample was typically followed immediately by an SPT sample to allow evaluation of the material's in-place density.

Miniature vane shear (torvane) tests, which provide an indication of the undrained shearing strength of cohesive materials, were performed on samples of the cohesive soils during the field investigations. The results of these tests are shown on the boring logs as the "torvane" values in units of tons per square foot.

Each sample was visually classified when obtained in the field, and the field classifications were reviewed in the laboratory according to the Unified Soil Classification System. The symbols designating soil types according to this system are presented on the boring logs. A description of the Unified Soil Classification System is included with the logs (see Appendix B), and the meaning of the various symbols shown on the logs can be obtained from this figure. Samples subjected to Atterberg Limits and gradation tests in the laboratory were also classified according to the AASHTO Classification System, and the AASHTO classification symbols are also shown on the boring logs.

5.2 LABORATORY TESTING

Laboratory tests performed on samples obtained from the borings include the following:

1) Mechanical Analysis
2) Density
3) Moisture Content
4) Atterberg Limits
5) Direct Shear
6) Unconfined Compressive Strength
7) Unconsolidated Undrained Triaxial Compression
8) One-Dimensional Consolidation
9) Moisture-Density Relationship (Proctor)
10) California Bearing Ratio (CBR)
11) pH, Resistivity, Sulfates, and Chlorides

Consolidation test specimens were one inch thick, with drainage provided at both top and bottom of the samples during testing.

Laboratory testing was conducted in accordance with applicable standards published by ASTM International and/or the American Association of State Highway and Transportation Officials (AASHTO).

The results of laboratory tests performed during this investigation are presented on the boring logs and summarized on tables located in Appendix C of this report. Plots of applicable test data are also included in Appendix C.

6 STRUCTURES

6.1 DESCRIPTION

6.1.1 GENERAL

The proposed bridge structures to be incorporated in Segment 1 of the Project include those described under the following headings. Preliminary drawings of the proposed structures described below are included for reference in Appendix A of this report. It is our understanding that bridge type selection has not yet been completed for the Juniper Canyon site. The structural engineers responsible for design of these bridges have provided a preliminary indication that the Strength I abutment loads will be in the order of 800 to 1400 kips, and the Strength 1 bent foundation loads could vary from about 2500 to 4000 kips, depending upon the selected bridge type(s).

The proposed bridge layouts at Juniper Canyon have changed several times since the commencement of geotechnical investigations at the site. Borings were ultimately drilled for a single-span southbound bridge over the south drainage (SB1), a two-span southbound bridge over the north drainage (SB2), and a three-span northbound bridge (NB). At the time of this report (Addendum 1 – Dec 31, 2009), SB1 bridge is not included in the project, and the NB bridge has been shortened to two spans, as described below.

6.1.1.1 Northbound Frontage Road over Juniper Canyon

The northbound bridge at Juniper canyon is expected to have two spans of about 170 feet each. This structure has a proposed total width of 56 feet, which will accommodate a 40-foot roadway and a sidewalk approximately 13 feet wide.

6.1.1.2 Southbound Frontage Road Bridge over Juniper Canyon

The southbound bridge at Juniper Canyon is expected to have two spans of about 160 feet each. The structure will accommodate a 40-foot roadway plus a 7-foot sidewalk, resulting in a total width of about 50 feet.

6.1.2 SUBSURFACE CONDITIONS

Subsurface conditions specific to each of the proposed structures are described below.

6.1.2.1 MVC Northbound Frontage Road over Juniper Canyon

Borings drilled at this bridge site include (from south to north) 09-S1-9, 10, 11, 12, and 13. Above about elevation 4842 feet, the soil profile consisted of alternating zones of silty sand and gravel, clayey gravel, lean clay, sandy silty clay, and silt. The silty sand in this zone had 19 to 47 percent fines, with the moisture content ranging from about 10 to 32 percent. The clayey gravel encountered in Borings 9 and 12 had liquid limits of 24 to 30, plasticity indices of 8 to 11, moisture contents of 12 to 13 percent, and 29 to 34 percent fines. Lean clay (LL=29-43, PI=11-22, moisture=15-26%, fines=61-85%) was encountered near elevation 4850 feet in Borings 9, 10, and 12. A zone of plastic silt (LL=43, PI=15, moisture=39%, fines=92%) was encountered at about elevation 4853 feet in Boring 10. The sandy silty clay sample at elevation 4843 feet in Boring 10 had a liquid limit of 22, a plasticity index of 4, a moisture content of 20 percent, and 55 percent fines.

Based on the results of torvane tests conducted in the field, the undrained shear strength of the cohesive soils above elevation 4842 feet ranges from about 1,000 to 4,200 pounds per square foot (psf), with an average in the order of 2,000 psf. An unconsolidated-undrained triaxial compression test indicated that the lean clay at a depth of 15 feet in Boring 10 has an undrained shear strength of about 760 psf.

Below elevation 4842 feet, each of the borings at this bridge site encountered very dense silty sand and gravel. The lone exception was a zone of sandy silt between elevations 4842 and 4836 feet in Boring 13, which had 59 percent fines, a liquid limit of 31, and a plasticity index of 5. The cohesionless soil samples tested from this zone contained 13 to 35 percent fines, and the moisture contents varied from about 10 to 25 percent. The sampler encountered refusal very frequently below elevation 4842 feet, indicating the presence of cobbles and possible boulders.

6.1.2.2 MVC Southbound Frontage Road Bridge 1 over Juniper Canyon

As noted previously in this report, the current project plans do not include the SB1 bridge. However, the subsurface conditions described below are important in the design and construction of the bridge approach embankments at Juniper Canyon.

The three borings at this bridge site (09-S1-1, 2, and 3) encountered predominantly cohesionless soils. The materials encountered above elevation 4850 feet included sand with silt, silty sand, sandy silt, and silt with sand. The sand samples contained 11 to 38 percent nonplastic fines and were characterized as medium-dense to very dense, with the exception of one very loose sample near the ground surface in Boring 2. The silt samples in Boring 1 contained 59 to 75 percent nonplastic fines and were described as medium-dense to dense.

In Boring 2, the silt zone at a depth of about 10 feet (approx. elev. 4874 feet) had 71 percent fines, a liquid limit (LL) of 34, and a plasticity index (PI) of 10. In its slightly-moist state, this zone of cohesive soil was relatively stiff to hard, with an undrained shear strength in the order of 3,000 to 4,000 pounds psf based on torvane tests. The moisture contents of soils above elevation 4850 feet ranged from about 6 to 18 percent in the silty sand samples and 12 to 36 percent in the silt samples. The thin-walled tube sample of silt with sand obtained at a depth of 20 feet in Boring 1 had a dry unit weight of about 75 pounds per cubic foot (pcf).

Below elevation 4850 feet, the three borings at the SB1 bridge site encountered dense to very dense sand and gravel to the maximum depth explored (approx. 4803 feet). Samples from this zone that were tested in the laboratory contained 2 to 56 percent gravel-size particles and 8 to 36 percent fines. The tested moisture contents of samples below elevation 4850 feet ranged from about 13 to 20 percent. Many instances of sampler refusal indicate the likely presence of cobbles and perhaps boulders within the soil profile as shallow as elevation 4865 feet.

6.1.2.3 MVC Southbound Frontage Road Bridge 2 over Juniper Canyon

Borings 09-S1-4, 5, 6, 7, and 8 were drilled from south to north along the second southbound bridge site at Juniper Canyon. The soils encountered in these borings were predominantly medium-dense to very dense sand, gravel, and nonplastic silt, with the following notable exceptions:

- In Boring 4, a zone of fat clay was identified between elevations 4872 and 4865 feet. This material had a dry unit weight of about 71 pcf, a moisture content of 26 percent, a liquid limit of 52, a plasticity index of 27, and 97 percent passing the No. 200 sieve.
- Boring 5 encountered separate three to four foot thick deposits of elastic silt at elevations of about 4868 and 4829 feet. The upper deposit had properties very similar to that of the fat clay encountered at the same elevation in Boring 4. The deeper elastic silt zone in Boring 5 has a dry unit weight of only 57 pcf, with a moisture content of 62 percent, liquid limit of 71, plasticity index of 29, and 79 percent fines. The results of unconfined compression tests and torvane tests in these elastic silt zones were very consistent and corresponded to an average undrained shear strength of about 1100 psf.
- Boring 5 also encountered a zone of hard sandy lean clay between the elevations of 4863 and 4853 feet. Laboratory testing of this material indicated a liquid limit of 31, plasticity index of 13, fines content of 65 percent, and moisture content of 20 percent. Torvane tests

suggested an average undrained shear strength of about 3800 psf for this material in its moist state.

- In Boring 5, most of the samples obtained between elevations 4853 and 4835 feet were classified as clayey sand with gravel, having liquid limits of 30 to 33, plasticity indices of 11 to 16, moisture contents of 15 to 18 percent, and 25 to 30 percent fines. The recorded sampling blow counts indicate that this material is in a dense to very dense state.
- In Boring 5, the sample at a depth of 40 feet (approx. elev. 4833 feet) was loose/firm silty clayey sand (LL=21, PI=6) with 39 percent fines and a moisture content of about 19 percent.
- Like Boring 5, Boring 6 encountered a relatively deep deposit of elastic silt at a depth of about 43 to 53 feet. This material contained 27 percent moisture and had a liquid limit of 58, a plasticity index of 5, and 70 percent fines.

The nonplastic soils in the borings at the SB2 bridge site contained anywhere from 7 to 72 percent fines. The moisture content of these materials was generally in the order of 10 to 20 percent; however, moisture contents in the order of 30 to 40 percent were measured in some of the more silty nonplastic soils. Instances of sampler refusal were relatively common below about elevation 4850 feet, and the presence of cobbles and possibly boulders should be anticipated at these depths.

6.1.3 GROUNDWATER

Slotted pipes were temporarily placed in each of the borings upon completion of drilling to allow monitoring of groundwater levels over the subsequent weeks. Evidence of a static groundwater table was not encountered in any of the Segment 1 borings within the depths explored.

Groundwater is not expected to impact construction; however, ponded surface water could create soft conditions in localized depressions, and flowing surface water could erode unprotected slopes.

6.1.4 EARTHQUAKE CONSIDERATIONS

6.1.4.1 Seismic Hazards

Due to the proximity of mapped active faults, the Project area is susceptible to significant seismic ground motions during a moderate to large earthquake in the region. The potential ground motions and their associated effects should be accounted for in design of structures on the Project.

6.1.4.2 Seismic Design Parameters

The 2002 USGS Seismic Hazard Deaggregation feature of the USGS web site was used to determine the mapped probabilistic peak ground acceleration (PGA) and spectral acceleration (SA) values for locations near the northerly and southerly ends of the Segment 1.

MAPPED PROBABILISITIC SEISMIC GROUND MOTIONS			
Location		Intersection of South Hills Drive and MVC	Juniper Canyon Bridge Site
Latitude		40.464 deg N	40.485 deg N
Longitude		111.954 deg W	111.994 deg W
Approx. 2500-year event 2% PE in 50 years (2475 yrs) 3% PE in 75 years (2462 yrs)	PGA	0.47g	0.43g
	0.2 s SA	1.12g	1.05g
	1.0 s SA	0.45g	0.42g
Approx. 1000-year event 5% PE in 50 years (975 yrs) 7% PE in 75 years (1033 yrs)	PGA	0.31g	0.30g
	0.2 s SA	0.75g	0.71g
	1.0 s SA	0.27g	0.26g
Approx. 500-year event 10% PE in 50 years (475 yrs) 15% PE in 75 years (461 yrs)	PGA	0.20g	0.20g
	0.2 s SA	0.48g	0.48g
	1.0 s SA	0.16g	0.16g

Design ground motion values should be estimated by modifying the mapped values to account for site effects. Based on the SPT blow counts within the depths investigated, we recommend that AASHTO Site Class D be used for seismic design of the proposed Juniper Canyon bridge structures.

The *AASHTO LRFD Bridge Design Specifications* require that bridges be designed to meet life safety criteria (low probability of collapse) in the event having a return interval of about 1000 years. UDOT may require that some bridges be designed to a higher performance level (e.g. "repairable," or "operational") and/or a less-frequent design event (e.g. 2500-year return interval). We have computed the design response spectra for the bridge site using the AASHTO general procedure for both the 2500-year and 1000-year seismic events, and the results are presented in Appendix D of this report.

6.1.4.3 Liquefaction and Related Hazards

Due to the apparent lack of groundwater within the depth investigated and the generally dense condition of the cohesionless soils encountered, the potential for liquefaction and lateral spreading is considered negligible within Segment 1.

6.1.5 POTENTIALLY-HAZARDOUS MATERIALS

All soil samples obtained from the borings were examined in both the field and the laboratory, and no unusual conditions indicative of contamination were encountered. Any hazardous materials encountered during further investigations or construction should be reported and mitigated in accordance with applicable laws and regulations.

6.2 RECOMMENDATIONS

6.2.1 BRIDGE STRUCTURES

The shallow to intermediate-depth (upper 20 to 50 feet) soils at the proposed Juniper Canyon Bridge site typically include zones of compressible soils, and are generally unsuitable for supporting heavy bridge loads on shallow foundations. We therefore recommended that the proposed bridges be supported on deep foundations extending to the more competent granular soils encountered at greater depths. Deep foundations at this site will derive substantial axial compressive resistance from both side resistance and toe bearing, and offer benefits with respect to lateral and uplift resistance under seismic conditions.

Drilled shafts and driven piles may be considered as deep foundations for the proposed bridges. In our opinion, the subsurface conditions (soil types, groundwater conditions, and depth to bearing soils) at the Juniper Canyon site are much more conducive to the use of drilled shafts.

The maximum axial compressive resistance for driven piles at this site would typically be limited by pile drivability considerations, including pile section, yield strength, and driving equipment. The apparent presence of cobbles and possibly boulders in the bearing soils prevents reliable prediction of estimated pile toe elevations. The presence of cobbles and boulders could also cause an undesirable situation in which the pile toe elevations vary substantially across a single bridge support and thereby behave in a non-uniform manner under design loads.

In light of the considerations listed above, we recommend that drilled shafts be used to support the proposed Juniper Canyon bridge structures. Detailed geotechnical recommendations for design and construction of drilled shafts are outlined below.

6.2.1.1 Axial Resistance

Estimated geotechnical axial resistance values for drilled shafts supporting the proposed Juniper Canyon bridges are listed in Appendix D of this report. Drilled shafts of larger diameter (6 to 8 feet) will generally be most efficient in terms of axial compressive resistance, due to the large toe resistance often encountered at reasonably shallow depths. Appendix D also contains estimates of LRFD uplift resistance values.

The axial resistance values in Appendix D do not account for potential losses of side resistance due to scour. We can develop modified resistance values accounting for a given scour elevation at specific foundation locations upon request.

If the structural engineer determines that drilled shafts supporting bridges are non-redundant, the estimated resistance values should be reduced 20 percent in accordance with Section 10.5.5.2.4 of the *AASHTO LRFD Bridge Design Specifications*.

6.2.1.2 Lateral Loading Behavior

A summary of recommended parameters for analysis of lateral load response of deep foundations at the Juniper Canyon bridge site is presented in Appendix D of this report. It is good practice to vary the parameters in the upper 30 feet by about 20 percent, in order to evaluate the sensitivity of the computed lateral loading response to these parameters.

6.2.1.3 Group Resistance

The axial compressive resistance of drilled shafts at this site will depend predominantly upon cohesionless soils. Section 10.8.3.6.3 of the *AASHTO LRFD Bridge Design Specifications* requires that a shaft efficiency reduction factor (η) less than 1.0 be applied where shafts are spaced at less than four diameters on centers.

6.2.1.4 Settlement

Appendix D contains normalized plots of load versus settlement for a variety of drilled shaft depths at each proposed bridge support. We recommend that these plots be consulted in selection of design shaft diameters and depths to ensure that loads at both the service and extreme event limit states correspond to tolerable estimated settlements. We can develop detailed plots of load versus settlement for selected drilled shaft locations, diameters, and toe elevations upon request.

Estimated settlements may be reduced (thereby increasing the available Service resistance) if the drilled shaft toes are to be post-grouted. The potential benefits of post-grouting will vary depending upon initial estimates of drilled shaft loads and depths. We can provide a detailed evaluation of the post-grouting option for a preliminary foundation design if needed.

6.2.1.5 Testing of Drilled Shafts

Non-destructive integrity testing such as cross-hole sonic logging should typically be conducted on each shaft used to support bridges. This testing requires that multiple sturdy access tubes be attached to the reinforcing steel extending the full depth of the shaft.

The estimated drilled shaft resistance values discussed above are based on the assumption that no load tests will be conducted to demonstrate the axial resistance of the drilled shafts. Load testing may be considered to better estimate shaft resistance values for design purposes and to justify the use of larger resistance factors. Load testing could be performed using a test shaft or group of shafts prior to installation of production shafts. Alternatively, load tests could be conducted on production shafts if the schedule allows time for the foundation design to be refined based on results of the load tests. It should be noted that the observed variability in the soil profile at the Juniper Canyon site may not permit the results of a given load test to be applied to shafts located at other bridge supports.

If methods such as Statnamic or Osterberg Cell testing are considered, the proposed test procedures, interpretation methods, and resistance factors should be submitted to the UDOT Geotechnical Division. For drilled shafts used to support bridges at Juniper Canyon, we anticipate that the geotechnical resistance factors at the strength limit state could be increased by 20 to 25 percent by conducting a total of 6 to 8 of these tests.

6.2.1.6 Construction Considerations

One or more Special Provisions will be required to specify procedures for construction, inspection, and testing of drilled shafts. The existing UDOT Standard Specification for drilled shaft construction does not adequately address critical items such as non-destructive testing and verification of shaft bottom cleanliness for drilled shafts supporting bridges on this project.

It may be necessary or beneficial to use temporary casing to drill the shafts, due to the generally cohesionless nature of the bearing soils.

The use of properly mixed and maintained drilling fluids may also be beneficial to drilled shaft construction. If mineral slurry is used to maintain open shaft excavations, special care should be taken to prevent the formation of a thick slurry cake on the sides of the shaft.

The use of relatively large shaft diameters (about 6 to 8 feet) may present significant advantages in terms of constructability. The more powerful equipment used for larger shafts will be beneficial in drilling through the very dense soils at the site, and the larger shaft diameters will generally facilitate removal of oversize material such as cobbles and boulders from the shaft excavations.

6.2.2 BOX CULVERTS

Geotechnical design recommendations for the proposed box culvert carrying Welby Jacobs Canal beneath I-15 are provided below.

6.2.2.1 Foundation Design Parameters

The soils underlying the proposed Welby Jacobs canal box culvert were observed to be very dense sands and gravels. This culvert may be designed using a bearing resistance of 6,000 psf at the Strength and Service limit states. A coefficient of subgrade reaction of about 200 to 250 pci should be appropriate for design of the culvert.

6.2.2.2 Lateral Earth Pressures on Box Culverts

Recommendations for estimating lateral earth pressures in Segment 1 are provided in Section 6.2.4.4 of this report.

6.2.2.3 Settlement of Box Culverts

Due to the dense granular nature of the soils within the zone of significant stress beneath the proposed culvert, settlement will occur relatively quickly after load placement. The bearing resistance provided in Section 6.2.2.1 corresponds to approximately one inch of estimated settlement.

6.2.2.4 Corrosion and Deterioration of Box Culvert Materials

Electrochemical characteristics of the soils encountered in the subsurface investigations, including those applicable to potential box culvert locations, are summarized in Section 8 of this report.

6.2.2.5 Construction Considerations

The upper six inches of soil should be stripped from culvert foundation areas to remove excess organic matter. Following foundation excavation, the area should be proof rolled with light ground pressure equipment. Soft areas are not anticipated at the foundation level for the Welby Jacobs culvert. Static groundwater was not encountered in the culvert borings. If soft and/or wet areas are encountered, we should be advised so that appropriate stabilization, dewatering, and design verification may be undertaken.

6.2.3 SIGN FOUNDATIONS

The anticipated locations of major sign structures in Segment 1 are unknown at the time of this report. We can provide foundation investigations and recommendations for sign structures in the future where needed.

6.2.4 EMBANKMENTS AND RETAINING WALLS

Based on our review of available preliminary roadway cross sections, substantial embankment fills will be required at various locations along the alignment in order to traverse the hilly terrain. It appears that the proposed embankment side slopes for the current phase of work (frontage roads only) in Segment 1 are typically 2 horizontal to 1 vertical (2H:1V). It is also anticipated that retaining walls up to about 12 feet high will be used at selected fill and cut locations. Geotechnical investigations and design considerations for sloping embankment fills and earth-retaining structures are provided below.

6.2.4.1 Embankment Settlement

The soils underlying Segment 1 of the proposed Corridor alignment are predominantly granular soils in a relatively dense condition, and these soils are not susceptible to significant settlements under embankment loads. However, we have identified a few locations where cohesive soils were encountered in the borings and present the potential for consolidation settlements beneath embankments. In general, these areas included the upper end of the proposed South Hills Drive alignment nearest the Mountain View Corridor, as well as the area south of and including the Juniper Canyon Crossing between about Sta. 965+00 and 989+00.

The portion of the proposed South Hills Drive alignment that is underlain by compressible soils has a maximum fill height of about five feet. The computed settlement for five feet of fill is less than one inch, and no special settlement mitigation is necessary for this magnitude of settlement.

The proposed frontage road alignments between Sta. 965+00 and Juniper Canyon incorporate embankments as high as about 15 feet. We have estimated consolidation settlements for the northbound frontage road embankment at Sta. 968+00, which appears to be the largest fill section within this area (excluding bridge approach fills). Assuming the embankment fill has a total compacted unit weight of 135 pcf, the estimated primary consolidation settlement under the fill is 1.2 inch. Secondary consolidation settlement over the subsequent 10-year period following construction was estimated to be 0.2 inch. The total estimated 10-year consolidation settlement is therefore less than 1.5 inch, and we do not recommend that special mitigation be performed for this small magnitude of estimated consolidation settlement.

As described previously in this report, the deep borings at Juniper Canyon encountered some deposits of high-plasticity clay and silt. Compression of these soils under 10 to 25 feet of embankment fill could result in 4 to 8 inches of localized consolidation settlement in the southbound roadway area between about Sta. 983+00 and the south bridge abutment. The estimated time period required to complete all but 1.5 inch of this settlement is in the order of 90 to 120 days. The settlement may be mitigated by constructing the embankment in its entirety to subgrade level and allowing at least 120 days for consolidation monitoring before paving the southbound roadway. The minimum consolidation monitoring period may be reduced to 90 days by adding a surcharge of 300 psf above finished pavement elevation over the southbound roadway. It may be possible to reduce the consolidation time to 60 days using a 500-psf surcharge.

6.2.4.2 Overall Stability of Walls and Slopes

It is our understanding that fill and cut slopes of 2H:1V or flatter will be used in Segment 1 for this initial phase of the Mountain View Corridor Project. For long-term, permanent conditions, UDOT requires a minimum factor of safety of 1.3 against instability of slopes adjacent to bridges and critical facilities, and a minimum factor of safety of 1.2 for other slopes. Embankments supported by retaining walls require a minimum factor of safety of 1.5 adjacent to bridges, and 1.3 elsewhere. For the short-term construction condition, the factor of safety of slopes and walls away from bridges can be as low as 1.1.

An "infinite" slope of 2H:1V in granular soil has a factor of safety of at least 1.3 if the friction angle of the soil is 33 degrees or larger. In the same analysis, a soil friction angle of at least 30 degrees provides a factor of safety of 1.2. The medium-dense to very dense sands and gravels that are most common throughout Segment 1 have a friction angle of at least 33 degrees, and slopes of 2H:1V or flatter in this material will satisfy UDOT factor of safety requirements.

In order to assess the impact on slope stability of the clays and plastic silts occasionally encountered within Segment 1, we have conducted limit-equilibrium slope stability analyses for two locations where relatively soft cohesive soils might intercept or underlie proposed cut and fill slopes. A cut slope approximately 25 feet deep was evaluated at Sta. 916+00, and a fill slope about 18 feet high was analyzed at Sta. 968+00. We have also evaluated a 40-foot embankment approach fill slope south of Juniper Canyon, and the larger of the proposed retaining wall configurations within Segment 1. Figures depicting the results of these analyses are included in Appendix D of this report. In each case, the computed factors of safety for 2H:1V slopes meet UDOT requirements during construction and in the long-term.

6.2.4.3 Wall Foundation Design Parameters

Retaining wall systems should be selected, designed, and constructed in accordance with UDOT Special Provision 02831S and the other specifications referenced therein. The special provisions applicable to retaining walls are maintained by the UDOT Geotechnical Division.

Recommended soil parameters for foundation soils supporting MSE retaining walls are provided in Appendix D of this report. These parameters should be included in Special Provision 02831S. It should be noted that the MSE wall foundation parameters in Appendix D are generalized for proposed MSE wall locations in Segment 1, and therefore conservative. If these parameters are determined to control design of the walls, less-conservative site-specific parameters may be justified at some locations.

Lateral earth pressures applicable to design of retaining structures are discussed in the following section of this report. The design parameters used for the reinforced soil zones of MSE walls should be determined by the Contractor and the Wall Designer by conducting laboratory tests on the specific materials to be used, and the selected parameters and applicable test results should be reviewed by the Geotechnical Engineer. We recommend that the internal friction angle of the material used in design be no greater than 34 degrees.

6.2.4.4 Lateral Earth Pressures

Lateral earth pressures can generally be calculated using the equation

$$P = \tfrac{1}{2} \gamma K H^2$$

Where
- P = total lateral force on the wall, per linear foot
- K = earth pressure coefficient
- γ = unit weight of the soil (depends on fill material)
- H =height of the wall

The earth pressure coefficient used in designing the walls will depend upon whether the wall is free to move during backfilling operations, or whether the wall is restrained during backfilling. If the wall is free to move away from the soil during backfilling operations, we recommend that an active earth pressure coefficient be used in the above equation to calculate the lateral earth pressures. If the walls are restrained or braced from movement during backfilling (as is generally the case with box culverts and similar structures), we recommend that an at-rest earth pressure coefficient be used to calculate the lateral earth pressures. A passive earth pressure coefficient should be used to calculate the lateral soil resistance where the wall is pushed toward the soil. It should be recognized that the pressures calculated by the above equation are earth pressures only and do not include hydrostatic pressures. Where hydrostatic pressures may exist behind a retaining structure, we recommend either the wall be designed to resist hydrostatic pressure, or that a drainage system be placed behind the wall to prevent the development of hydrostatic pressures.

Lateral earth pressure coefficients and other recommendations for computing lateral earth pressures are included in Appendix D. A general earth pressure coefficient has been provided for calculation of earth pressures where mechanical compaction equipment is expected to be operated near non-yielding walls less than about 8 feet high. This scenario is anticipated during placement of fill around culverts. The residual pressure from compaction equipment can be reduced by limiting the proximity and weight of compacting equipment near culvert walls.

Recommendations based on the Mononobe-Okabe approach for active and passive seismic lateral earth forces are included in Appendix D. For non-yielding walls, recommended equations for calculating the dynamic thrust and dynamic overturning moment associated with the seismic ground motions are also provided in Appendix D.

6.2.4.5 Instrumentation

We intend to provide sketches of instrumentation locations for incorporation into the project drawings. As a minimum, settlement monitoring instruments should be provided beneath approach fills at each bridge abutment in Segment 1. The large approach fills south of the Juniper Canyon bridges will also require settlement instruments a few hundred feet south of the bridges. We recommend that additional settlement instruments be installed intermittently throughout Segment 1 in the larger fill areas to allow verification that substantial settlements are not ongoing at the time of paving.

6.2.4.6 Construction Considerations

The sloping undeveloped terrain within Segment 1 may make access to various locations difficult, particularly in the winter months. Work in the steeply sloping areas of Juniper Canyon may require initial grading by tracked equipment to develop access routes for other equipment.

In general, the soils within the project area are relatively dense or stiff, and widespread constructability issues related to soft soils are not anticipated. However, soils in localized areas (particularly in low-lying areas saturated by recent precipitation) may be too soft to provide an adequate working surface. Stabilization methods will depend upon conditions encountered. Moderately soft areas can be stabilized by over excavating the foundation footprint to a depth of about 1 foot, placing a geotextile fabric such as Mirafi 500X or equivalent and backfilling with compacted sandy gravel. Very soft areas may be stabilized by tamping cobble rock (preferably angular to subangular) into the subgrade as needed. As a minimum, it is recommended that an 8 inch layer of granular borrow be placed at the bottom of excavations in cohesive soils to provide a working platform.

Temporary excavations on the project should meet OSHA requirements. Slopes of 1H:1V will generally be appropriate for temporary cuts up to 10 feet deep, and slopes of 1.5H:1V or flatter should be used for temporary cuts 10 to 20 feet deep.

6.2.5 DETENTION BASINS

Twenty-one borings were drilled to provide subsurface information for use in the design of detention basins in Segment 1. The areas investigated include the following:

- Pond 205 – South Hills Drive Approx. Sta. 41+00, Approx. Offset 600' RT.
- Pond 210 – MVC Approx. Sta. 870+00, Approx. Offset 260' RT.
- Pond 240 – MVC Approx. Sta. 902+00, Approx. Offset 400' RT.
- Pond near 14400 South – MVC Approx. Sta. 960+00, Approx. Offset 400' RT.

The detention basin borings encountered a variety of soil types ranging from lean clay to gravel with silt and sand. Sandy soils were most common in the first three pond areas, while clays and silts were encountered more frequently in the pond near 14400 South. The permeability values computed from the open-hole, constant-head permeability tests varied widely, ranging from as low as about 30 feet per year in some clayey and silty zones to as large as 50,000 to 100,000 feet per year in some sandy and gravelly soils. A summary of the permeability values recorded in each proposed detention basin area is presented in Appendix D of this report.

7 EARTHWORK

7.1 ROADWAY AND EMBANKMENTS

The findings of the 37 roadway borings completed in Segment 1 are presented on boring logs included in Appendix B of this report. The results of classification tests, moisture-density relationship tests, and California Bearing Ratio (CBR) tests are included in Appendix C. It is our understanding that analysis of this data for pavement design will be conducted by others.

7.2 SITE PREPARATION

Foundation and fill areas should be cleared and grubbed in accordance with the applicable provisions of UDOT Standard Specification 02231. Refer to UDOT Standard Specification 02912 for requirements regarding removal and stockpiling of topsoil.

7.3 FILL PLACEMENT AND COMPACTION

Fill materials should be placed in accordance with UDOT Standard Specification 02056.

7.4 EXCAVATION

Excavation should be conducted in accordance with the applicable requirements of UDOT Standard Specifications 02316, 02317, and 02318.

7.5 RE-USE OF EXCAVATED SOIL MATERIALS

The results of the subsurface investigations indicate that much of the soil encountered near the ground surface within the project area meets AASHTO soil classification A-4 or better and therefore qualifies as Borrow as described in UDOT Standard Specification 02056. Relatively thin zones of Lean Clay (CL), Fat Clay (CH), and Elastic Silt (MH) were encountered intermittently throughout Segment 1. Use of these A-6 materials in embankments should be avoided, except where specifically permitted by UDOT and placed under tightly-controlled conditions. We recommend that excavated A-7 soils not be used in embankment fills.

Soil meeting the requirements for UDOT Granular Borrow (AASHTO classification A-1-a) was encountered occasionally within Segment 1; however, the samples subjected to laboratory testing were typically obtained from borings, which limited the maximum particle size of the samples. The gradations of these small samples from the borings are not likely to be representative of the material excavated in bulk.

7.6 CUT AND FILL SLOPES

Permanent earth slopes should be 2H:1V or flatter per UDOT requirements. Permanent slopes as steep as 1.5H:1V may be used where protected by concrete slope paving meeting UDOT standards. Bare slopes will be susceptible to erosion from runoff, and should therefore be protected from erosion until vegetation is established.

7.7 DEWATERING AND SUBDRAINS

Groundwater was not encountered in any of the Segment 1 test holes, and groundwater is not expected to impact performance of the proposed transportation facilities in Segment 1. Neither dewatering nor subdrains are expected to be necessary to control groundwater impacts. The roadway and drainage systems should be designed to direct surface water off of the pavement and to limit percolation into the soils underlying pavements and other flatwork.

8 CORROSION INVESTIGATIONS

Electrochemical properties commonly used to evaluate the corrosive characteristics of soils were tested for selected samples obtained from the borings, and the results of these tests are presented on the Summaries of Test Data in Appendix C of this report. These test results can be used to evaluate the need for corrosion protection and/or special concrete mixes to limit deterioration within the design life of project features in contact with the soil. The electrochemical test results should be used in selecting the appropriate drainage pipe class for a given location and design life. Type II cement is recommended for concrete in contact with soil.

9 MATERIAL SPECIFICATIONS

Materials used for the project should meet AASHTO requirements and the UDOT Standard Specifications. In particular, embankment fill materials should meet Standard Specification 02056. The UDOT Geotechnical Division maintains special provisions governing the selection, design, and construction of retaining walls, as well as special provisions for lightweight fill materials.

10 CLOSURE

We appreciate the opportunity of conducting this geotechnical investigation, and look forward to working with the project team toward the successful completion of the project. We anticipate that our participation will be requested at various stages during the design and construction process, including refinements of foundation designs, preparation of special provisions, and observation of bridge foundation construction.

11 LIMITATIONS

The conclusions and recommendations presented in this report are based upon the results of the field and laboratory tests. It should be recognized that soil materials are inherently heterogeneous and that conditions may exist throughout this site which were not defined during this investigation. If conditions are encountered which appear to be different than those presented in this report, we should be advised in order that appropriate action may be taken.

The information contained in this report is provided for the specific location and purpose of the client named herein and is not intended or suitable for reuse by any other person or entity, whether for the specified use or for any other use. Any such unauthorized reuse by any other party is at that party's sole risk, and RB&G Engineering, Inc. does not accept any liability or responsibility for its use.

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Figure 1 **VICINITY MAP**

Mountain View Corridor
Salt Lake County, Utah

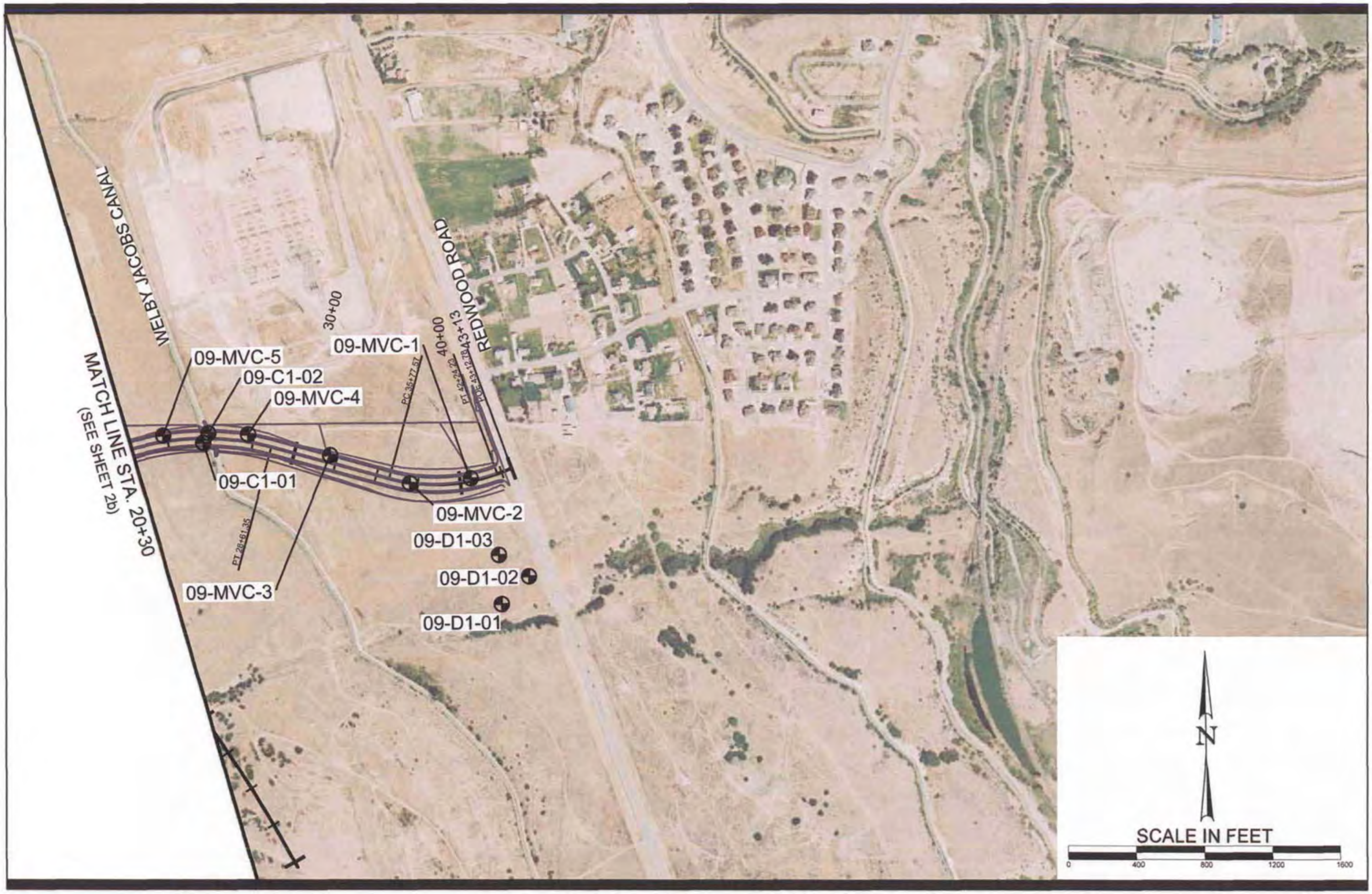

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Figure 2a Site Plan and Test Hole Locations

Segment 1

Mountain View Corridor

ADDENDUM 1 - 12/31/09

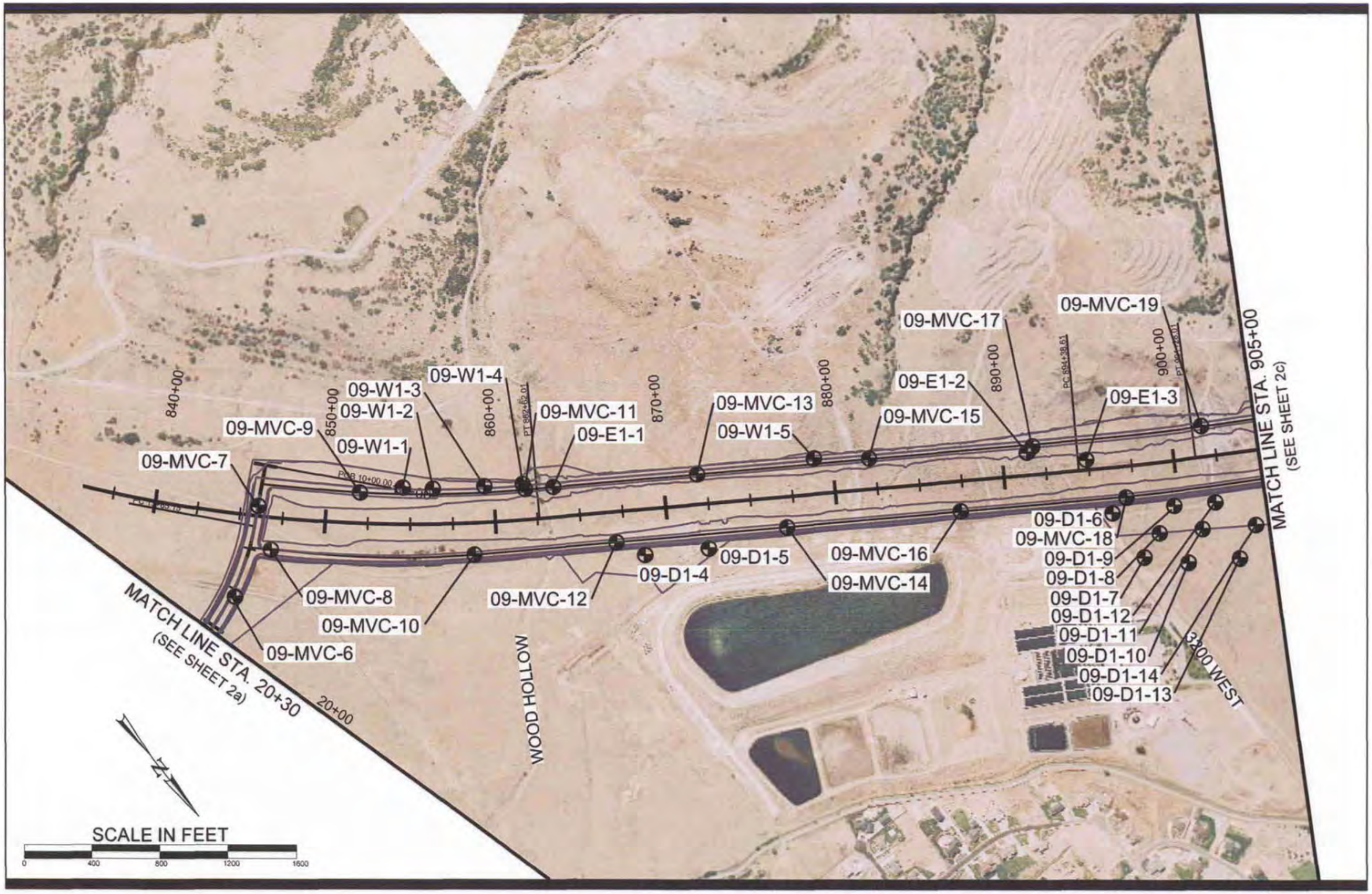

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Figure 2b Site Plan and Test Hole Locations

Segment 1

Mountain View Corridor

ADDENDUM 1 - 12/31/09

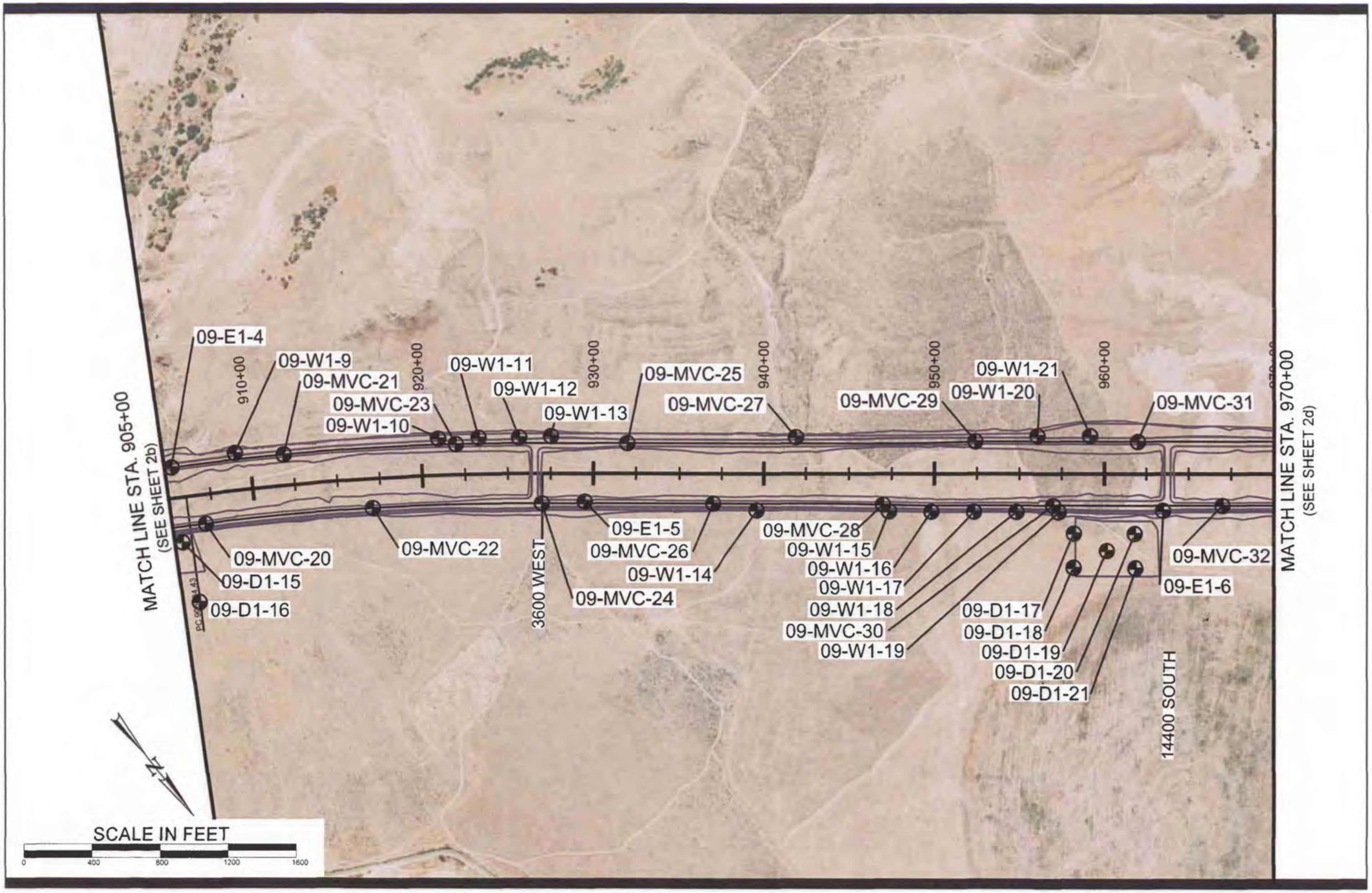

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Figure 2c Site Plan and Test Hole Locations

Segment 1

Mountain View Corridor

ADDENDUM 1 - 12/31/09

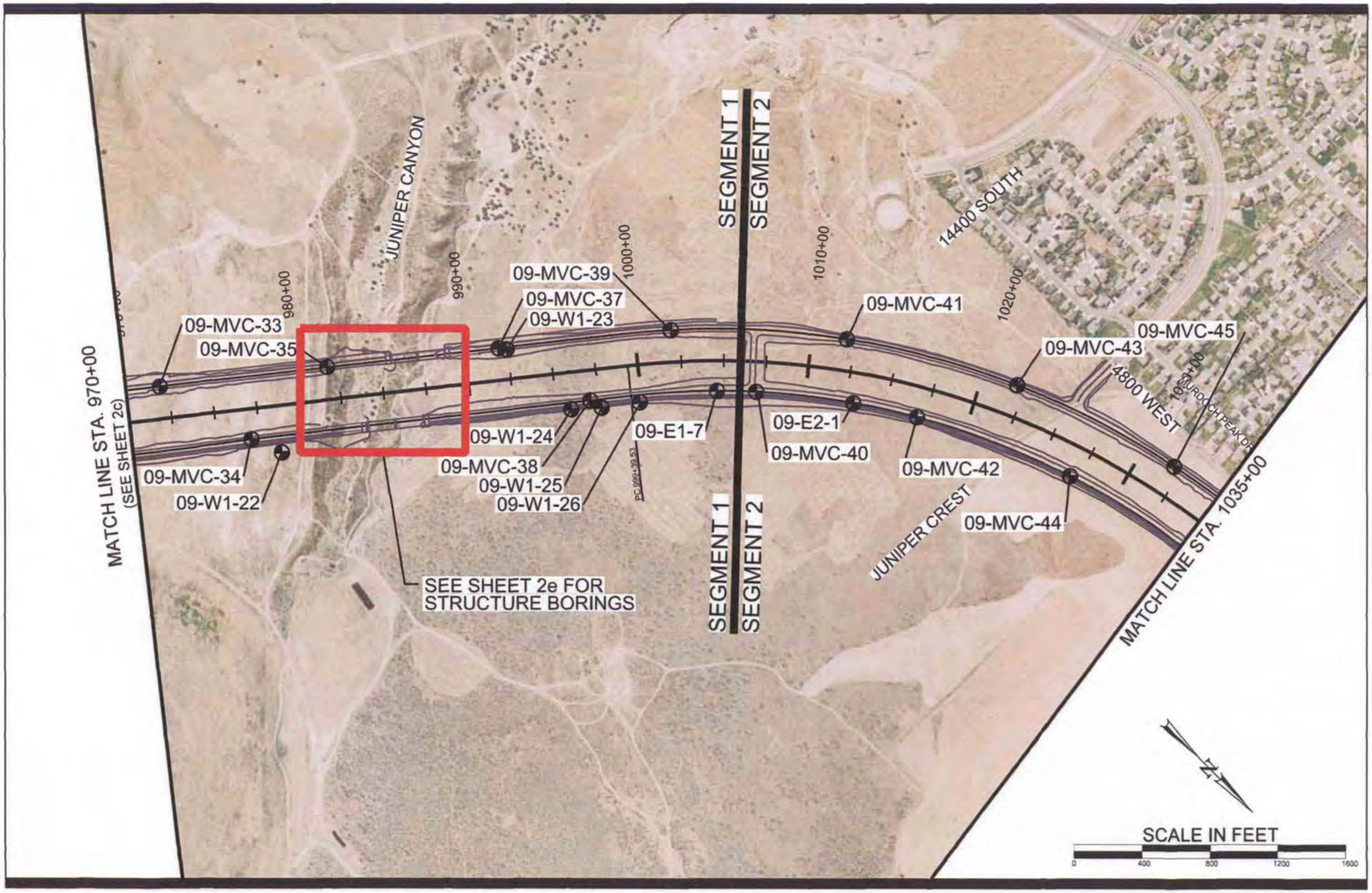

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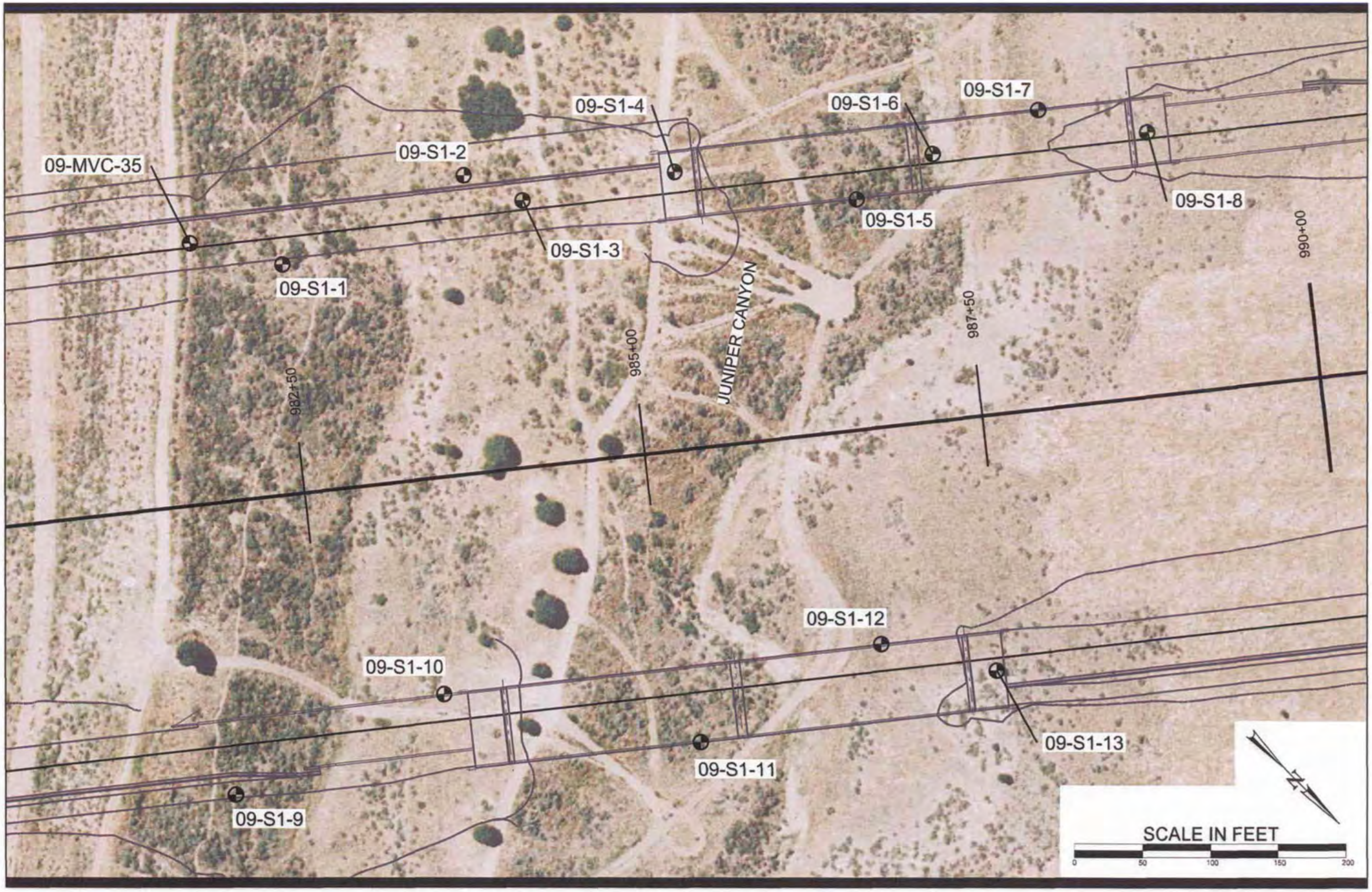
Figure 2d Site Plan and Test Hole Locations

Segment 1

Mountain View Corridor

ADDENDUM 1 - 12/31/09



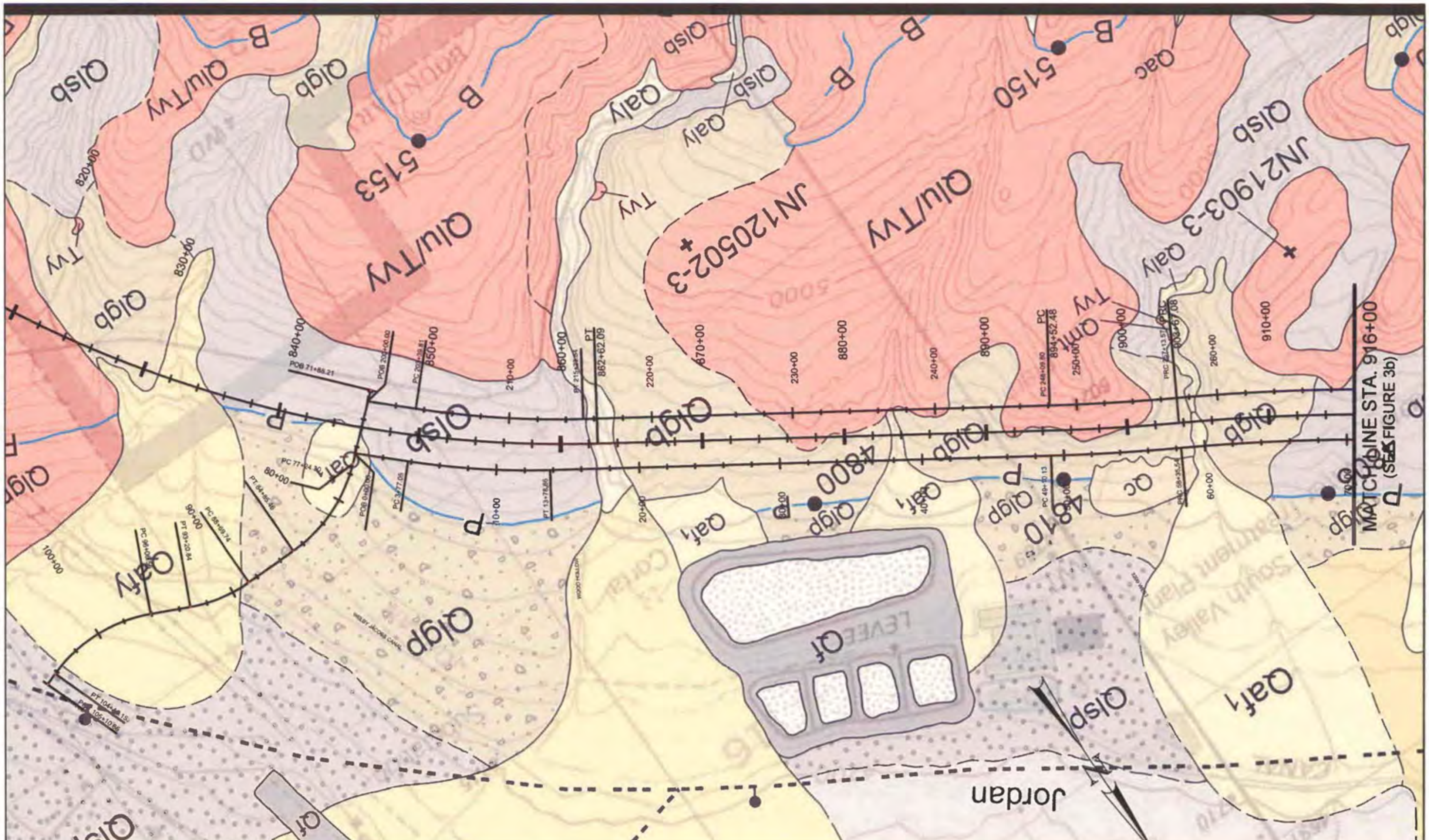
RB&G ENGINEERING, INC.

Figure 2e Site Plan and Test Hole Locations

Segment 1

Mountain View Corridor

ADDENDUM 1 - 12/31/09



Map Shown is portion of "GEOLOGIC MAP OF THE JORDAN NARROWS QUADRANGLE, SALT LAKE AND UTAH COUNTIES, UTAH" By Robert F. Biek 2005

SCALE

0 500 1000 1500 2000

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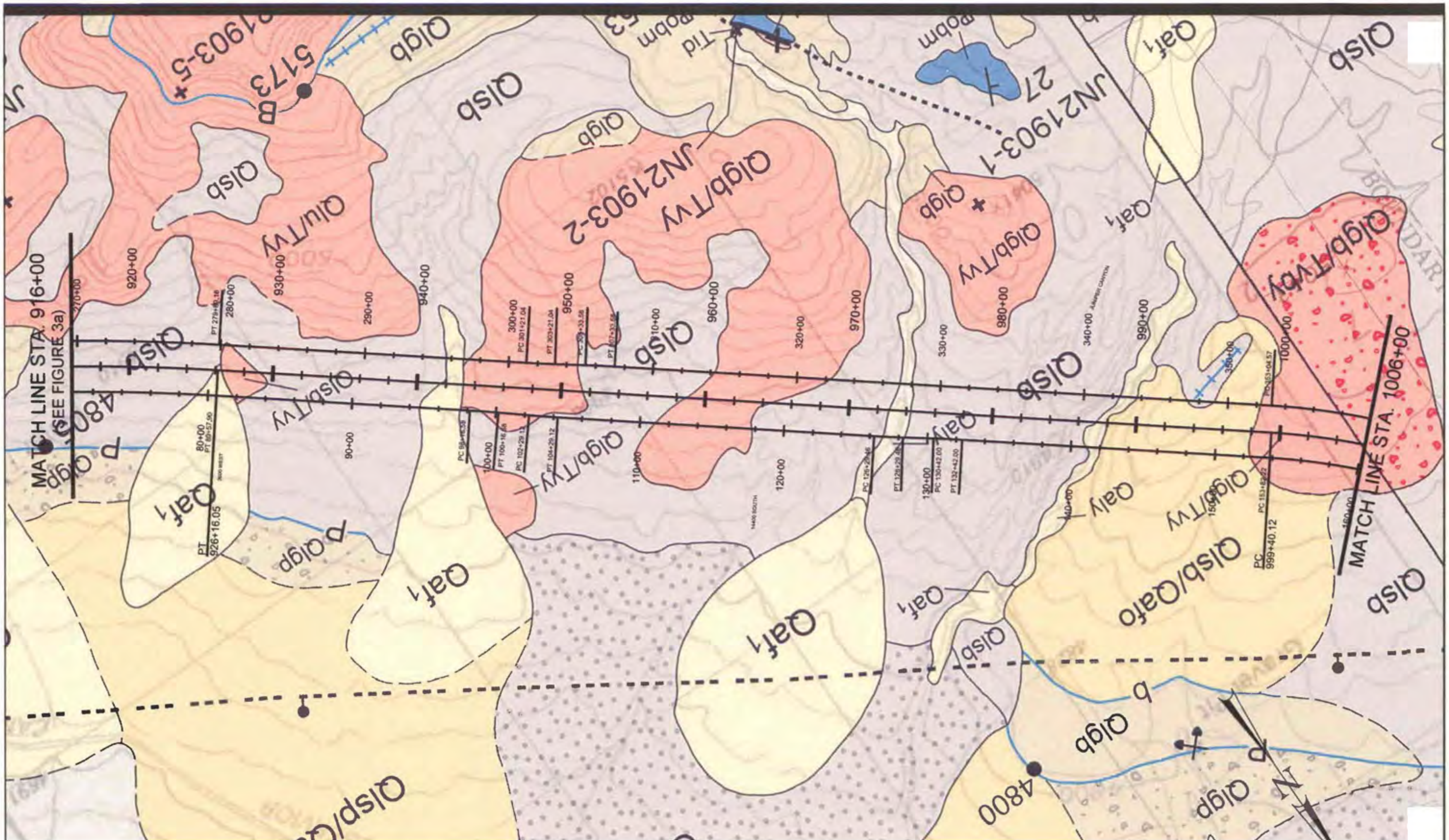
Figure 3a Geologic Map

Segment 1

Mountain View Corridor



Map Shown is portion of "GEOLOGIC MAP OF THE JORDAN NARROWS QUADRANGLE, SALT LAKE AND UTAH COUNTIES, UTAH" & "GEOLOGIC MAP OF THE TICKVILLE SPRING QUADRANGLE, SALT LAKE AND UTAH COUNTIES, UTAH" By Robert F. Biek 2005

RB&G ENGINEERING, INC.

Figure 3b Geologic Map

Segment 1

Mountain View Corridor

Qal_1 = Stream deposits (Holocene) - Moderately to well-sorted sand, silt, clay, and pebble to boulder gravel in river channels and flood plains; locally includes small alluvial-fan and colluvial deposits, and minor terraces up to 10 feet (3 m) above current base level; mapped along the Jordan River north of Jordan Narrows; probably less than 30 feet (9 m) thick.

Qaly = Young alluvial deposits (Holocene to Upper Pleistocene) - Moderately sorted sand, silt, clay, and pebble to boulder gravel deposited in river channels and flood plains; incised by active stream channels, and locally include small alluvial-fan and colluvial deposits; equivalent to modern stream deposits (Qal_1) and older, post-Bonneville stream deposits that are undifferentiated because units are complexly overlapping; probably less than 20 feet (6 m) thick.

Qalb = Alluvial deposits related to the Bonneville (transgressive) phase of the Bonneville lake cycle (upper Pleistocene) – Moderately sorted sand, silt, and pebble to boulder gravel deposited by streams graded to shorelines of the transgressive phase of Lake Bonneville; incised by active streams; mapped east of Clay Hollow and in small, unnamed drainages south of Bingham Creek; about 20 feet (6 m) thick.

$Qat_{1,2}$= Stream-terrace deposits (Holocene to Middle Pleistocene) –. Moderately to well-sorted sand, silt, clay, and pebble to boulder gravel that forms level to gently sloping terraces incised by modern streams; subscript denotes relative height above modern stream channels; level-2 deposits are greater than 30 feet (10 m) above modern drainages and are found between West Canyon and its Left Fork in the southwest part of the quadrangle; level-1 deposits are 10 to 30 feet (3-10 m) above modern drainages and are found along the lower parts of West Canyon Wash and Rose Creek; deposited in stream channels and flood plains; older terraces may include a loess veneer; generally 0 to 20 feet (0-6 m) thick.

Qaf_1 = Modern alluvial-fan deposits (holocene) - Poorly to moderately sorted, weakly to non-stratified, clay- to boulder-size sediment deposited pricipally by debris flos at the mouths of active drainages; upper parts typically characterized by abundant boulders and debris-flow levees that radiate away from the apex of the fan. equivalent to the younger part of Qafy, but differentiated because they form smaller, isolated fans; generally less than 30 feet (9 m) thick.

Qafy = Younger undifferentiated alluvial-fan deposits (Holocene to Upper Pleistocene) - Poorly to moderately sorted, weakly to non-stratified, clay- to boulder-size sediment depostied pricipally by debris flows, debris floods, and streams; equivalent to modern (Qaf_1), level-2 alluvial-fan deposits (Qaf_2), and level-3 alluvial-fan deposits (Qaf_3), but undifferentiated because units are complexly overlapping or too small to show separately; commonly obscures Lake Bonneville shorelines; upper parts of fans are locally deeply incised; thickness unknown, but likely up to several tens of feet.

Qafo = Older alluvial-fan deposits (upper Pleistocene) - Similar to younger undifferentiated alluvial-fan deposits (Qafy), but forms deeply dissected alluvial apron truncated by, and thus predating, the Bonneville shoreline; upper parts of fans locally receive sediment from minor washes; thickness unknown, but likely up to serveral tens of feet.

Qfd = Disturbed land (Historical) - Land disturbed by sand and gravel and aggregate operations; only the larger operations are mapped and their outlines are based on aerial photographs taken in May 2002; land within these areas contains a complex, rapidly changing mix of cuts and fills as well as excellent exposures of Bonneville and pre-Bonneville sdiments and Paleozoic bedrock.

Qc = Colluvial deposits (holocene to Upper Pleistocene) - Poorly to moderately sorted, angular, clay- to boulder-size, locally derived sediment deposited by slope wash and soil creep on moderate slopes and in shallow depressions; locally grades upslope into talus deposits and downslope into mixed alluvial and colluvial deposits; because most bedrock is covered by at least a veneer of colluvium, only the larger, thicker deposits are mapped; 0 to about 20 feet (0-6 m) thick.

Reference: "GEOLOGIC MAP OF THE JORDAN NARROWS QUADRANGLE, SALT LAKE AND UTAH COUNTIES, UTAH" & "GEOLOGIC MAP OF THE TICKVILLE SPRING QUADRANGLE, SALT LAKE AND UTAH COUNTIES, UTAH" By Robert F. Biek 2005

Qlgp = Lacustrine gravel and sand deposits (upper Pleistocene) - Moderately to well-sorted, moderately to
Qlgbp well-rounded, clast-supported, pebble to cobble gravel and pebbly sand; thin to thick bedded; typically
Qlgb interbedded with or laterally gradational to sand and silt facies; gastropods locally common in sandy lenses; locally partly cemented with calcium carbonate; typically forms well-developed wave-cut or wave-built benches, bars, and spits, including the classic spit at Point of the Mountain; elsewhere forms veneer that drapes over pre-existing topogrpahy; some shoreline deposits characterized by abundant subangular boulders derived from nearby slopes; intermediate shorelines are locally well developed on these units; Qlgb deposited at and below highest Bonneville shoreline but above the Provo shoreline, and Qlgp deposited at and below the Provo shoreline; Qlgbp denotes deposits near Jordan Narrows that likely contain both transgressive (Bonneville) and regressive (Provo) lacustrine sand and lesser gravel; Qlgp deposits north of Steep Mountain commonly form a veneer 1 to 10 feet (0.3-3 m) thick over highly fractured orthoquartzite; 0 to about 300 feet (0-90 m) thick.

Qlsp = Lacustrine sand and silt deposits (Upper Pleistocene) - Fine- to coarse-grained lacustrine sand and silt
Qlsbp with minor gravel; typically thick bedded and well sorted; gastropods locally common; grades downslope
Qlsb from sandy nearshore deposits to finer grained offshore deposits; locally concealed by loess veneer; intermediate shorelines typically poorly developed on this facies; Qlsb deposited at and below highest Bonneville shoreline but above the Provo shoreline, and Qlsp deposited at and below the Provo shoreline; Qlsbp denotes deposits north of Jordan Narrows that likely contain both transgressive (Bonneville) and regressive (Provo) sediments; exposed thickness less than 40 feet (12 m).

Qlmp= Lacustrine silt and clay deposits (Upper Pleistocene) - Calcareous silt Marl) with minor clay and fine-
Qlmbp grained sand; typically laminated but weathers to appear thick bedded; locally concealed by loess
Qlmb veneer; Qlmb deposited below Bonnevill shoreline and Qlmp deposited below the Provo shoreline; Qlmbp denotes deposits north of Jordan Narrows that lack shorelines and likely contain both transgressive (Bonneville) and regressive (Provo) sediments; Qlmb is inferred to be exposed in cutbanks along the Jordan River south of Jordan Narrows (see, for example, Machette, 1992); grades upslope into lacustrine sand and silt; exposed thickness less than about 40 feet (12 m).

Qlsb/Qafo= Lacustrine deposits over older alluvial-fan deposits (Upper Pleistocene) - Older alluvial-fan deposits
Qlgb/Qafo, planated by wave action and partly concealed by a discontinuous veneer of lacustrine deposits;
Qlsp/Qafo, where lacustrine deposits are thin or absent, fan surfaces are commonly covered by a lag of
Qlu/Qafo angular to subangular boulders; closely spaced, well-preserved shorelines are common on the upper parts of the fans, but are less well developed lower on the fans where lacustrine deposits tend to be finer grained and thicker; locally, as in sections 18, 27, and 28, T. 4 S., R. 1 W., characterized by lag of subangular boulders of Oquirrh orthoquartzite with minor lacustrine gravel and sand; Qlu denotes lacustrine sediments that grade downslope from coarse-grained to fine-grained deposits.

Qlgb/Tvy= Lacustrine deposits over volcanic rocks of the west Traverse Mountains (Upper Pleistocene/Oligocene) -
Qlsb/Tvy Volcanic rocks of the west Traverse Mountains planated by wave action and partly concealed by a
Qlgp/Tvy deiscontinuous veneer of lacustrine deposits; Qlu denotes lacustrine sediments that grade downslope
Qlu/Tvy from coarse-grained to fine-grained deposits; where lacustrine deposits are thin or absent, fan surfaces
Qlgb/Tvby are commonly covered by a lag of angular to subangular volcanic boulders; closely spaced, well-preserved shorelines are common; surficial deposits are generally a few feet to about 10 feet (1-3 m) thick.

Qlgb/QTaf = Lacustrine gravel and sand related to the Bonneville (transgressive) phase of the Bonneville lake cycle over oldest alluvial-fan deposits (upper Pleistocene) — Oldest alluvial-fan deposits partly concealed by a discontinuous veneer of sediment reworked by Lake Bonneville wave action; closely spaced, well-preserved shorelines are common; mapped on piedmont slopes between drainages from Barneys and Harkers Canyons, where irregular landscape below the Bonneville shoreline reflects buried topography of fan deposits; surficial deposits are generally less than 10 feet (3 m) thick.

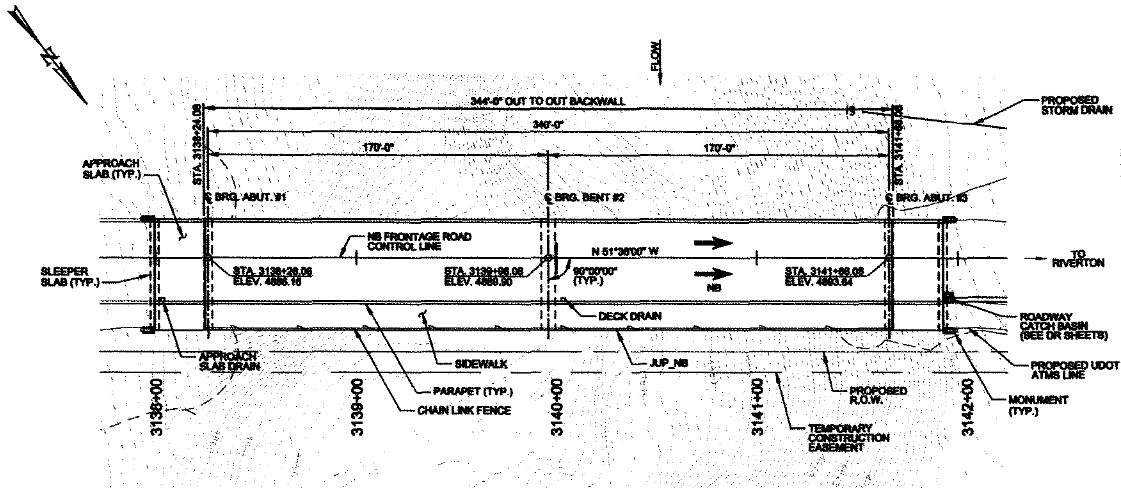
RB&G
ENGINEERING, INC.

Figure 3c Geologic Names of Selected Map Units

Segment 1

Mountain View Corridor

ADDENDUM 1 - 12/31/09

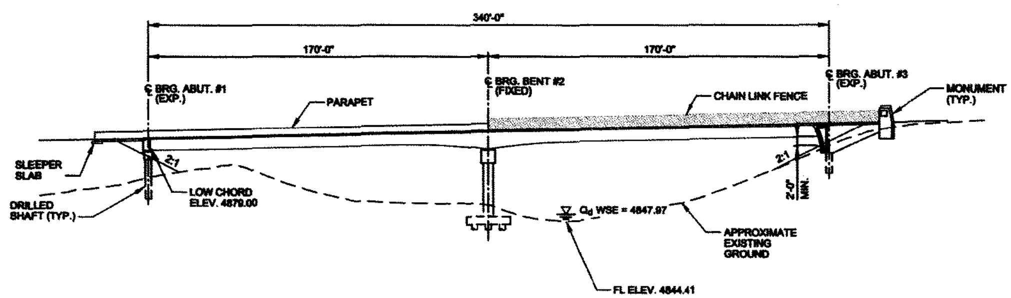


NOTE:
1. ABUTMENTS AND BENT ARE PARALLEL TO S 38°24'00" W.

PLAN

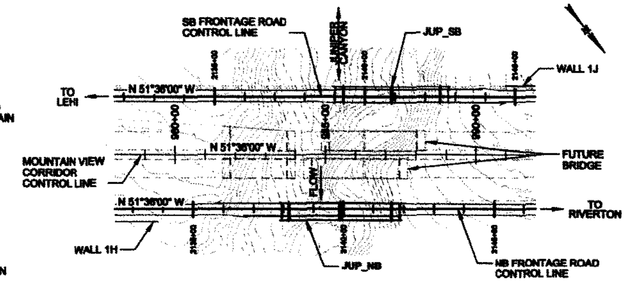
NO KNOWN EXISTING UTILITIES

BRIDGE LOAD RATING		
	HL-93	
	RATING	LOCATION
INV.	X.XX	X.XX' F. SERV III
OPER.	X.XX	X.XX' F. STR I



ELEVATION

(NORMAL TO NB FRONTAGE ROAD CONTROL LINE)



LOCATION PLAN

INDEX OF SHEETS

GENERAL NOTES

1. USE COATED DEFORMED BILLET STEEL BARS CONFORMING TO AASHTO M284 OR M111 AND AASHTO M31 GRADE 60, RESPECTIVELY (EXCEPT WHERE NOTED OTHERWISE).
2. USE STRUCTURAL STEEL CONFORMING TO AASHTO M270 GRADE 50W EXCEPT WHERE NOTED OTHERWISE.
3. CHAMFER ALL EXPOSED CONCRETE CORNERS ¾" EXCEPT WHERE NOTED OTHERWISE.
4. PROVIDE 2" CONCRETE COVER TO REINFORCING STEEL EXCEPT WHERE NOTED OTHERWISE.
5. USE CLASS AA (AE) CAST-IN-PLACE CONCRETE EXCEPT WHERE NOTED OTHERWISE.
6. UTILITY LOCATIONS TO BE VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION, PROTECT EXISTING UTILITIES IN PLACE UNLESS NOTED OTHERWISE.
7. REFER TO AESTHETICS PLANS FOR AESTHETICS DETAILS.

DESIGN DATA

HL-93 IN ACCORDANCE WITH 4th EDITION AASHTO LRFD AND 2009 INTERIM SPECIFICATIONS. SEISMIC DESIGN IN ACCORDANCE WITH AASHTO GUIDE SPECIFICATIONS FOR LRFD SEISMIC BRIDGE DESIGN.

CAST-IN-PLACE CONCRETE: f'c = 4 KSI; CLASS AA (AE) n = 8; fy (REINF.) = 60 KSI

STRUCTURAL STEEL: Fy = 50 KSI (GIRDERS); Fy = 36 KSI (DECK DRAINS, DIAPHRAGMS, & BEARINGS)

PRECAST DECK PANEL CONCRETE: f'c = 6.0 KSI; f'ci = 4.5 KSI; fy (REINF.) = 60 KSI; 0.375" DIA. GRADE 270 LOW RELAXATION STRAND

SACRIFICIAL WEARING SURFACE: ½" CONCRETE

FUTURE WEARING SURFACE: 35 PSF

DESIGN SPEED: 45 MPH Frontage Roads

SEISMIC: 7% in 75 Yr. Design Event; PGA = 0.30g; Ss=0.71g; S1=0.26g; Site Class D; SDC C

TRAFFIC DATA: 2030 ADT = XX,XXX

PARAPET TEST LEVEL: TL-4

QUANTITIES

ITEM	ESTIMATED	UNIT	AS CONST.
GRANULAR BACKFILL BORROW (PLAN QUANTITY)	XXX	CU YD	
DRILLED SHAFTS (36")	XXX	FT	
REINFORCING STEEL - COATED	XXX	LB	
STRUCTURAL CONCRETE (EST. LUMP QTY. XXX CU YD)	1	LUMP	
STRUCTURAL STEEL (EST. LUMP QTY. XXX LB)	1	LUMP	
ELECTRICAL WORK BRIDGES	1	LUMP	
EXPANSION JOINT	XXX	FT	
CHAIN LINK FENCE	XXX	FT	
PRECAST CONCRETE PARTIAL DEPTH DECK PANELS	XXX	SQ FT	
TYPE I POLYMER OVERLAY	XXX	SQ FT	

PRELIMINARY
NOT FOR CONSTRUCTION

DESIGN SBS 09/09 CHECK
DRAWN LM 09/09 CHECK AFY 11/09

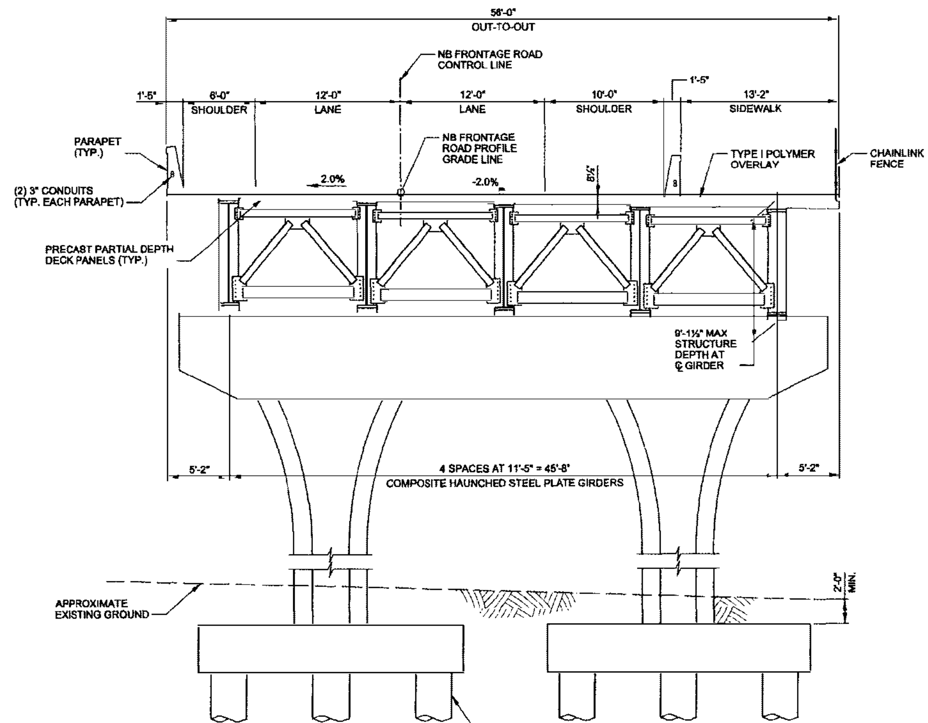
UTAH DEPARTMENT OF TRANSPORTATION
STRUCTURES DIVISION

MOUNTAIN VIEW CORRIDOR, REDWOOD RD TO 9000 SO
NB FRONTAGE ROAD BRIDGE OVER JUNIPER CANYON
SITUATION & LAYOUT 1

PROJECT NUMBER MP-0182(6)
PIN 7703

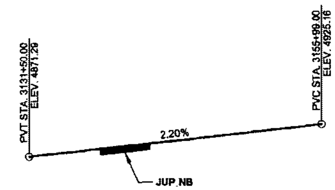
SALT LAKE COUNTY
C-XXX DRG. NO.
SHT. 1 OF 2

ADDENDUM 1 - 12/31/09



SECTION THRU STRUCTURE

(LOOKING AHEAD STATION)



NB FRONTAGE ROAD PROFILE

(AT PROFILE GRADE LINE)

HYDRAULIC DATA

1. DRAINAGE AREA....0.99 SQ. MI.
2. DESIGN FREQUENCY....100 YR.
3. INLET FLOWLINE ELEVATION....4847.41 FT.
4. OUTLET FLOWLINE ELEVATION....4844.41 FT.
5. DESIGN DISCHARGE (Q_d)....55 CFS
6. INLET WATER SURFACE ELEVATION FOR (Q_d)....4847.97 FT.
7. OUTLET WATER SURFACE ELEVATION FOR (Q_d)....4844.97 FT.
8. OUTLET VELOCITY FOR (Q_d)....5.2 FT/S
9. OVERTOPPING DISCHARGE (Q_{500} or Q_{over})....150 CFS
10. FREQUENCY OF (Q_{500} or Q_{over})....500 YR.
11. WATER SURFACE ELEVATION OF (Q_{500} or Q_{over})....4848.61 FT.
12. TOTAL SCOUR DEPTH AT BENT (Q_{100})....5 FT.
13. TOTAL SCOUR DEPTH AT ABUTMENTS (Q_{100})....0 FT.

PRELIMINARY
NOT FOR CONSTRUCTION

DESIGN SBS 10/09 CHECK
DRAWN LM 10/09 CHECK AFY 11/09
QUANT. CHECK

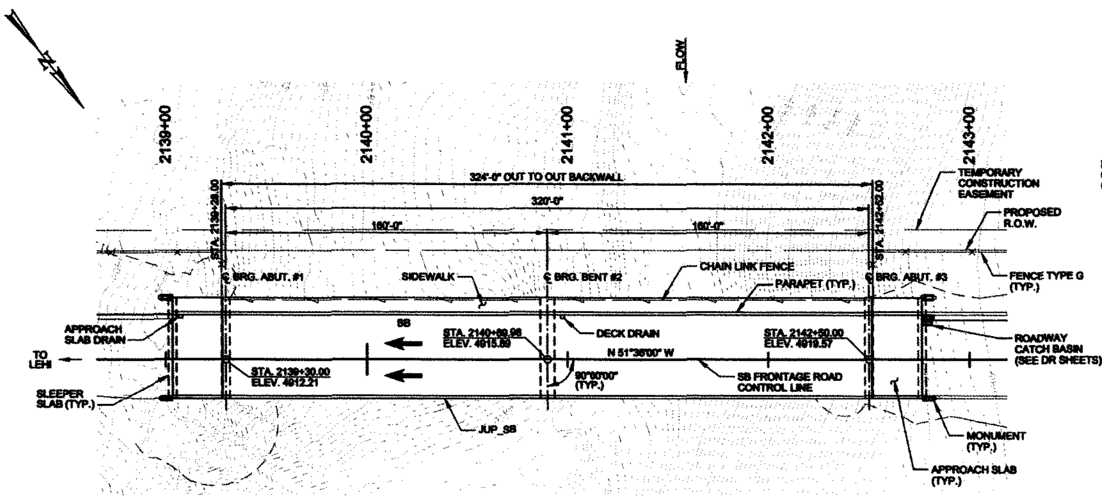
UTAH DEPARTMENT OF TRANSPORTATION
STRUCTURES DIVISION

MOUNTAIN VIEW CORRIDOR, REDWOOD RD TO 9000 SO
NB FRONTAGE ROAD BRIDGE OVER JUNIPER CANYON
SITUATION & LAYOUT 2

PROJECT NUMBER MP-0182(6)
PIN 7703

SALT LAKE
COUNTY
C-XXX
DRG. NO.
SHT. 2 OF 2

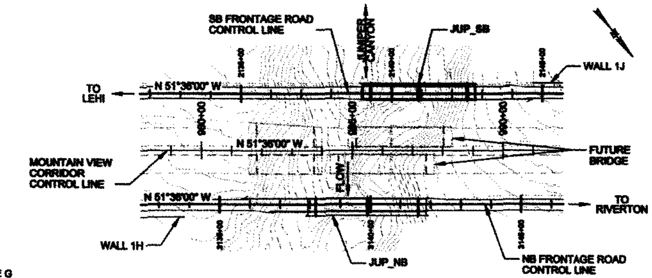
ADDENDUM 1 - 12/31/09



NOTE:
1. ABUTMENTS AND BENT ARE PARALLEL TO S 38°24'00" W.

PLAN

NO KNOWN EXISTING UTILITIES



LOCATION PLAN

INDEX OF SHEETS

1. SITUATION & LAYOUT 1
2. SITUATION & LAYOUT 2

GENERAL NOTES

1. USE COATED DEFORMED BILLET STEEL BARS CONFORMING TO AASHTO M284 OR M111 AND AASHTO M31 GRADE 60, RESPECTIVELY (EXCEPT WHERE NOTED OTHERWISE).
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4. PROVIDE 2" CONCRETE COVER TO REINFORCING STEEL EXCEPT WHERE NOTED OTHERWISE.
5. USE CLASS AA (AE) CAST-IN-PLACE CONCRETE EXCEPT WHERE NOTED OTHERWISE.
6. UTILITY LOCATIONS TO BE VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION, PROTECT EXISTING UTILITIES IN PLACE UNLESS NOTED OTHERWISE.
7. REFER TO AESTHETICS PLANS FOR AESTHETICS DETAILS.

BRIDGE LOAD RATING		
	HL-93	
	RATING	LOCATION
INV.	X.XX	X.XX' F. SERV III
OPER.	X.XX	X.XX' F. STR I

DESIGN DATA

HL-93 IN ACCORDANCE WITH 4th EDITION AASHTO LRFD AND 2009 INTERIM SPECIFICATIONS. SEISMIC DESIGN IN ACCORDANCE WITH AASHTO GUIDE SPECIFICATIONS FOR LRFD SEISMIC BRIDGE DESIGN.

CAST-IN-PLACE CONCRETE: f'c = 4 KSI; CLASS AA (AE) n = 8; fy (REINF.) = 60 KSI

STRUCTURAL STEEL: Fy = 50 KSI (GIRDERS; Fy = 36 KSI (DECK DRAINS, DIAPHRAGMS, & BEARINGS)

PRECAST DECK PANEL CONCRETE: f'c = 6.0 KSI; f'ci = 4.5 KSI; fy (REINF.) = 60 KSI;

SACRIFICIAL WEARING SURFACE: ½" CONCRETE

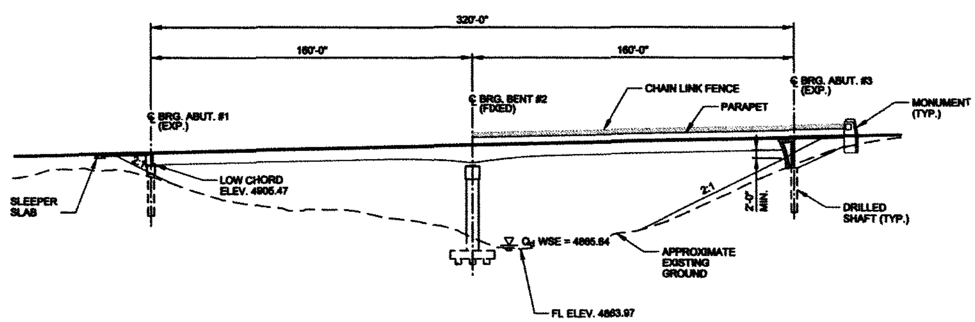
FUTURE WEARING SURFACE: 35 PSF

DESIGN SPEED: 45 MPH Frontage Roads

SEISMIC: 7% in 75 Yr. Design Event; PGA = 0.30g; Ss=0.71g; S1=0.26g; Site Class D; SDC C

TRAFFIC DATA: 2030 ADT = XX,XXX

PARAPET TEST LEVEL: TL-4



ELEVATION

(NORMAL TO SB FRONTAGE ROAD CONTROL LINE)

QUANTITIES

ITEM	ESTIMATED	UNIT	AS CONST.
GRANULAR BACKFILL BORROW (PLAN QUANTITY)	XXX	CU YD	
DRILLED SHAFTS (36")	XXX	FT	
REINFORCING STEEL - COATED	XXX	LB	
STRUCTURAL CONCRETE (EST. LUMP QTY. XXX CU YD)	1	LUMP	
STRUCTURAL STEEL (EST. LUMP QTY. XXX LB)	1	LUMP	
ELECTRICAL WORK BRIDGES	1	LUMP	
EXPANSION JOINT	XXX	FT	
CHAIN LINK FENCE	XXX	FT	
PRECAST CONCRETE PARTIAL DEPTH DECK PANELS	XXX	LUMP	
TYPE I POLYMER OVERLAY	XXX	SQ FT	

PRELIMINARY
NOT FOR CONSTRUCTION

UTAH DEPARTMENT OF TRANSPORTATION
STRUCTURES DIVISION

MOUNTAIN VIEW CORRIDOR, REDWOOD RD TO 9000 SO
SB FRONTAGE ROAD BRIDGE OVER JUNIPER CANYON
SITUATION & LAYOUT 1

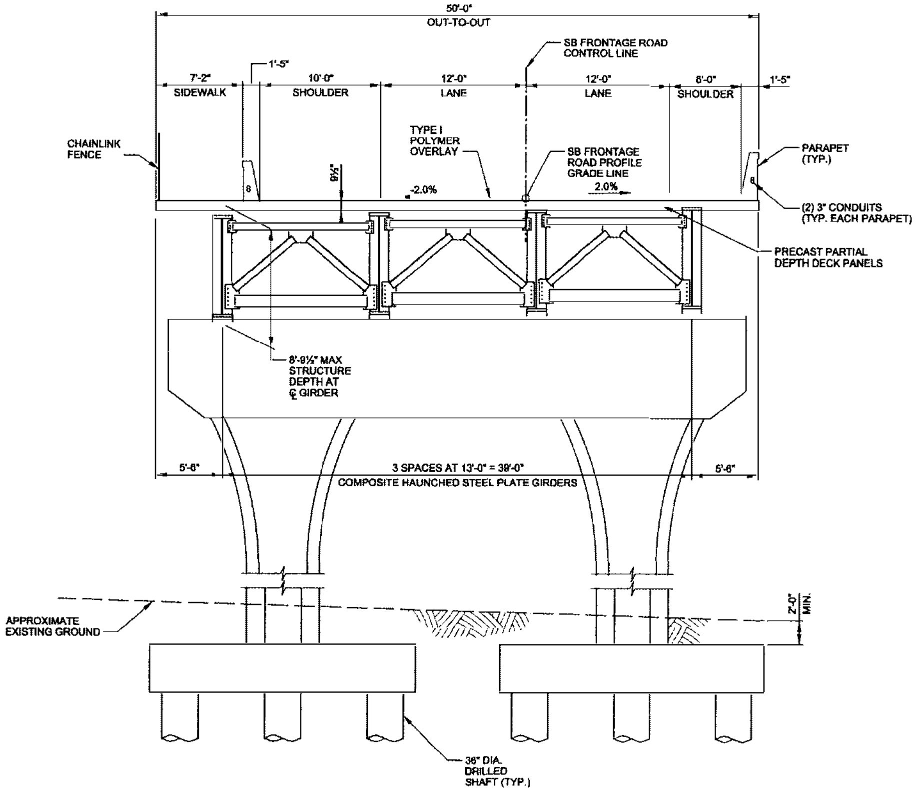
PROJECT NUMBER MP-0182(6)
PIN 7703

SALT LAKE
COUNTY

C-XXX
DRG. NO.

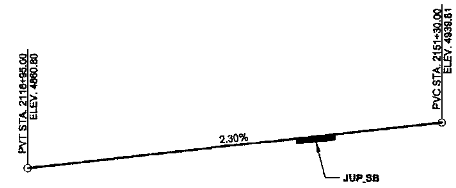
SHT. 1 OF 2

ADDENDUM 1 - 12/31/09



SECTION THRU STRUCTURE

(LOOKING AHEAD STATION)



SB FRONTAGE ROAD PROFILE

(AT PROFILE GRADE LINE)

HYDRAULIC DATA

1. DRAINAGE AREA.......0.99 SQ. MI.
2. DESIGN FREQUENCY.......100 YR.
3. INLET FLOWLINE ELEVATION.......4864.92 FT.
4. OUTLET FLOWLINE ELEVATION.......4863.97 FT.
5. DESIGN DISCHARGE (Q_d).......55 CFS
6. INLET WATER SURFACE ELEVATION FOR (Q_d).......4865.64 FT.
7. OUTLET WATER SURFACE ELEVATION FOR (Q_d).......4864.69 FT.
8. OUTLET VELOCITY FOR (Q_d).......3.9 FT/S
9. OVERTOPPING DISCHARGE (Q_{500} or Q_{over}).......150 CFS
10. FREQUENCY OF (Q_{500} or Q_{over}).......500 YR.
11. WATER SURFACE ELEVATION OF (Q_{500} or Q_{over}).......4866.20 FT.
12. TOTAL SCOUR DEPTH AT BENT (Q_{100}).......5 FT.
13. TOTAL SCOUR DEPTH AT ABUTMENTS (Q_{100}).......0 FT.

PRELIMINARY
NOT FOR CONSTRUCTION

DESIGN SBS 10/09 CHECK
DRAWN LM 10/09 CHECK AFY 11/09
QUANT. CHECK

UTAH DEPARTMENT OF TRANSPORTATION
STRUCTURES DIVISION

MOUNTAIN VIEW CORRIDOR, REDWOOD RD TO 9000 SO
SB FRONTAGE ROAD BRIDGE OVER JUNIPER CANYON
SITUATION & LAYOUT 2

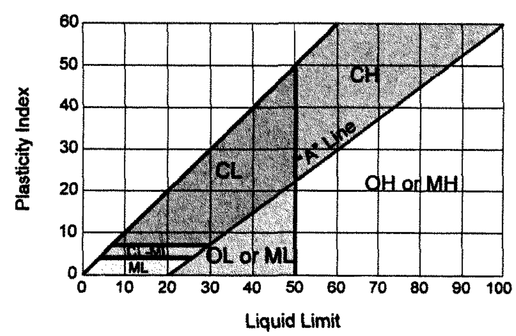
PROJECT NUMBER MP-0182(6)
PIN 7703

SALT LAKE
COUNTY
C-XXX
DRG. NO.
SHT. 2 OF 2

APPENDIX B

Unified Soil Classification System

Major Divisions			Group Symbols		Typical Names	Laboratory Classification Criteria		
COARSE-GRAINED SOILS *more than half of material is larger than No. 200 sieve*	**Gravels** *more than half of coarse fraction is larger than No. 4 sieve size*	**Clean Gravels** *little or no fines*	**GW**		Well graded gravels, gravel-sand mixtures, little or no fines	*For laboratory classification of coarse-grained soils*	$C_u = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
			GP		Poorly graded gravels, gravel-sand mixtures, little or no fines	Determine percentage of gravel and sand from grain-size curve. Depending on percentage of fines (*fraction smaller than No. 200 sieve size*), coarse-grained soils are classified as follows: **Less than 5%** GW, GP, SW, SP **More than 12%** GM, GC, SM, SC **5% to 12%** Borderline cases requiring use of dual symbols**	Not meeting all gradation requirements for GW	
		Gravels With Fines *appreciable amount of fines*	**GM***	**d**	Silty gravels, poorly graded gravel-sand-silt mixtures		Atterberg limits below "A" line, or PI less than 4	Above "A" line with PI between 4 and 7 are borderline cases requiring uses of dual symbols
				u				
			GC		Clayey gravels, poorly graded gravel-sand-clay mixtures		Atterberg limits above "A" line, or PI greater	
	Sands *more than half of coarse fraction is smaller than No. 4 sieve size*	**Clean Sands** *little or no fines*	**SW**		Well graded sands, gravelly sands, little or no fines		$C_u = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
			SP		Poorly graded sands, gravelly sands, little or no fines		Not meeting all gradation requirements for SW	
		Sands with Fines *appreciable amount of fines*	**SM***	**d**	Silty sands, poorly graded sand-silt mixtures		Atterberg limits below "A" line, or PI less than 4	Above "A" line with PI between 4 and 7 are borderline cases requiring uses of dual symbols
				u				
			SC		Clayey sands, poorly graded sand-clay mixtures		Atterberg limits above "A" line, or PI greater	
FINE-GRAINED SOILS *more than half of material is smaller than No. 200 sieve*	**Silts and Clays** *liquid limit is less than 50*		**ML**		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity	*For laboratory classification of fine-grained soils*		
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays			
			OL		Organic silts and organic silt-clays of low plasticity			
	Silts and Clays *liquid limit is greater than 50*		**MH**		Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts			
			CH		Inorganic clays of high plasticity, fat clays			
			OH		Organic clays of medium to high plasticity, organic silts			
HIGHLY ORGANIC SOILS			**Pt**		Peat and other highly organic soils			



Plasticity Chart

*Division of GM and SM groups into subdivisions of d and u for roads and airfields only. Subdivision is based on Atterberg limits; suffix d used when liquid limit is 28 or less and the PI is 6 or less, the suffix u used when liquid limit is greater than 28.

***Borderline classification*: Soils possessing characteristics of two groups are designated by combinations of group symbols. (For example GW-GC, well graded gravel-sand mixture with clay biner.)

DRILL HOLE LOG

BORING NO. 09-S1-1

SHEET 1 OF 2

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 982+53, 169' LT / N:347,327 E:503,499

DRILLING METHOD: 96-CME-55 / N.W. CASING TO 15' / MUD ROTARY

DRILLER: T. KERN

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 7/1/09

DATE COMPLETED: 7/2/09

GROUND ELEVATION: 4885.9'

LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft) scale: 4885, 4880, 4875, 4870, 4865, 4860, 4855, 4850, 4845, 4840

Depth (ft) scale: 5, 10, 15, 20, 25, 30, 35, 40, 45

Depth (ft)	Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
5	Disturbed	13	3,3,4,(15)	SM (A-2-4(0))	brown, slightly moist to very moist, med. dense	SILTY SAND few clay lenses		18.3		NP	0	70	30	Chem.
10	Disturbed	16	9,12,15,(43)	SM (A-4(0))	brown, moist, dense			14.5		NP	0	62	38	DS
15	Disturbed	10	38,50/5.5"	SM (A-1-b(0))	gray-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles		10.5		NP	32	51	17	
20	Undisturbed	10	Pushed	ML (A-4(0))	brown, very moist	SILT W/SAND clay lenses	74.7	32.4		NP	0	25	75	
	Disturbed	17	6,9,11,(24)	ML	brown, very moist, med. dense									Chem.
25	Disturbed	17	14,16,27,(48)	ML (A-4(0))	brown, very moist, dense	SANDY SILT		35 5		NP	0	41	59	
30	Disturbed	17	5,5,7,(12)	ML	brown, very moist, med. dense									
35	Disturbed	16	18,45,50,(84)	SM (A-1-b(0))	gray-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles		14.6		NP	30	55	15	
40	Disturbed	16	42,41,50/5.5"	SM	gray-brown, moist, very dense									
45	Disturbed	16	20,26,27,(41)	SM (A-1-b(0))	gray-brown, moist, dense			14.2		NP	22	65	13	

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RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
- UC = Unconfined Compression
- CT = Consolidation
- DS = Direct Shear
- UU = Unconsolidated, Undrained
- CU = Consolidated, Undrained
- Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-1

SHEET 2 OF 2

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 982+53, 169' LT / N:347,327 E:503,499
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 15' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/1/09
DATE COMPLETED: 7/2/09
GROUND ELEVATION: 4885.9'
LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
4835				10	55,50/4"	SM	gray-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles								
4830	55			11	34,50/5.5"	SM	gray-brown, moist, very dense									
4825	60			9	57,50/3.5"	SM	gray-brown, moist, very dense									
4820	65			15	24,29,33,(40)	SP-SM (A-1-b(0))	gray-brown, moist, dense	SAND W/SILT & GRAVEL possible cobbles		13.8		NP	26	64	10	
4815	70			13	22,50,50/2.5"	SP-SM	gray-brown, moist, dense									
4810	75			12	14,19,31,(30)	GP-GM (A-1-a(0))	gray-brown, moist, med. dense	GRAVEL W/SILT & SAND possible cobbles		12.9		NP	56	36	8	
4805	80			5	60/5.5"	SM	gray-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles								
								BOH								
4800	85															
4795	90															
4790	95															

200901.200 MVC2009_S.GPJ US EVAL.GDT 10/14/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-2

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 983+93, 219' LT. / N:347,375 E:503,359
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 19.3' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 6/25/09
DATE COMPLETED: 6/25/09
GROUND ELEVATION: 4884.4'
LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
			Disturbed	13	1,0,2,(4)	SM (A-2-4(0))	brown, slightly moist, very loose	SILTY SAND		8.2		NP	0	87	13	
4880	5															
			Disturbed	12	5,16,24,(90)	SM	brown, slightly moist									
						SP-SM (A-1-b(0))	gray-brown, slightly moist, very dense	SAND W/SILT & GRAVEL		6.4		NP	29	60	11	
4875	10															
			Undisturbed	9	Pushed *2.03*	ML (A-4(6))	brown, slightly moist, hard	SILT W/SAND plastic, trace gravels		12.2	34	10	3	26	71	
			Disturbed	16	14,19,20,(64) *1.53*	ML	brown, slightly moist, very stiff									
4870	15															
			Disturbed	5	50/5"	GP-GM	gray-brown, slightly moist, very dense	GRAVEL W/SILT & SAND possible cobbles								
4865	20															
			Disturbed	11	32,50/5"	SM (A-2-4(0))	gray-brown, wet, very dense	SILTY SAND W/GRAVEL possible cobbles, boulders		17.1		NP	29	45	26	
4860	25															
			Disturbed	5	60/5"	SM	gray-brown, wet, very dense									
4855	30															
			Disturbed	11	28,50/3"	SM (A-1-b(0))	gray-brown, wet, very dense			17.5		NP	19	57	24	
4850	35															
			Disturbed	6	50/6"	SM	gray-brown, wet, very dense									
4845	40															
			Disturbed	15	36,42,50/5"	SM (A-1-b(0))	gray-brown, wet, very dense			16.7		NP	23	59	18	
4840	45															
			Disturbed	9	50,50/4"	SM	gray-brown, wet, very dense									
4835																

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; *0.45* ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-2

SHEET 2 OF 2

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 983+93, 219' LT. / N:347,375 E:503,359
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 19.3' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ∇ DRY'   **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 6/25/09
DATE COMPLETED: 6/25/09
GROUND ELEVATION: 4884.4'
LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
			■	9	35,50/3"	SM (A-2-4(0))	gray-brown, wet, very dense — SILTY SAND W/GRAVEL possible cobbles, boulders		16.1		NP	20	61	19	
4830	55		■	10	39,50/4"	SM (A-2-4(0))	gray-brown, wet, very dense — SILTY SAND possible cobbles		19.2		NP	2	67	31	
4825	60		■	4	60/4"	SM	gray-brown, wet, very dense								
4820	65		■	3	60/4"	SM	gray-brown, wet, very dense — SILTY SAND W/GRAVEL possible cobbles, boulders								
4815	70		■	5	60/6"	SM	gray-brown, wet, very dense								
4810	75		■	12	53,53,50/3"	SP-SM (A-1-b(0))	gray-brown, wet, very dense — SAND W/SILT & GRAVEL possible cobbles		13.2		NP	31	57	12	
4805	80		■	5	60/4.5"	SP-SM	gray-brown, wet, very dense								
							BOH								
4800	85														
4795	90														
4790	95														
4785															

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LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; (6) ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-3

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 984+34, 196' LT. / N:347,418 E:503,341
DRILLING METHOD: 08-CME-55 / N.W. CASING TO 13.5' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ N.M. **AFTER 24 HOURS:** ▼ DRY'

PROJECT NUMBER: 200901.200
DATE STARTED: 9/23/09
DATE COMPLETED: 9/23/09
GROUND ELEVATION: 4887.9'
LOGGED BY: J.O., J. BOONE

Elev. (ft)	Depth (ft)	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
	0–1.5	Disturbed	16	2,2,3,(11)	SM	lt. brown, slightly moist, med. dense	SILTY SAND								
4885	5–6.5	Disturbed	13	5,5,5,(23)	SM (*A-2-4(0)*)	brown, very moist, med. dense			23.6		NP	0	76	24	
4880	10–11.5	Disturbed	13	8,12,13,(43)	SM	brown, moist, dense									
4875	15–16.5	Undisturbed	7	Pushed *0.52*	CL (*A-4(7)*)	brown, moist, stiff	LEAN CLAY	92.6	21.3	30	8	0	8	92	CT
4870	20–21.5	Disturbed	17	11,15,24,(49)	CL	dk. brown, moist, hard	LEAN CLAY W/SAND								
4865	25–26.5	Disturbed	14	27,23,21,(46)	GM (*A-1-a(0)*)	brown, moist, med. dense	SILTY GRAVEL W/SAND possible cobbles		13.1		NP	43	42	15	
4860	30–31.5	Disturbed	16	28,46,44/4.5"	GM	brown, moist, very dense									
4855	35–36.5	Disturbed	13	38,60/5"	SM (*A-2-4(0)*)	red-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles		21.3		NP	21	46	33	
4850	40	Disturbed	6	60/5"	SM	red-brown, moist, very dense									
4845	45	Disturbed	4	60/3.5"	SM	red-brown, moist, very dense									
4840							SILTY SAND								

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,2,3,(6): Blow Count per 6"; (6): $(N_1)_{60}$ Value; *0.45*: Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED *0.45*: Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-3

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 984+34, 196' LT. / N:347,418 E:503,341

DRILLING METHOD: 08-CME-55 / N.W. CASING TO 13.5' / MUD ROTARY

DRILLER: T. KERN

DEPTH TO WATER - INITIAL: ∇ N.M. **AFTER 24 HOURS:** ▼ DRY'

PROJECT NUMBER: 200901.200

DATE STARTED: 9/23/09

DATE COMPLETED: 9/23/09

GROUND ELEVATION: 4887.9'

LOGGED BY: J.O., J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				0	51/2"	-	no recovery								
4835							SILTY SAND								
	55			10	47,52/3"	SM (A-4(0))	brown, moist, very dense		20.0		NP	6	58	36	
4830															
	60			3	50/3.5"	SM	rust-brown, moist, very dense								
4825															
	65			3	50/3"	SM	rust-brown, moist, very dense								
							SILTY SAND W/GRAVEL possible cobbles								
4820															
	70			2	60/3"	SM	brown, moist, very dense								
4815															
	75			3	60/4.5"	SM	brown, moist, very dense								
							BOH								
4810															
	80														
4805															
	85														
4800															
	90														
4795															
	95														
4790															

200901.200 MVC2009_S.GPJ US EVAL.GDT 10/14/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-4

SHEET 1 OF 2

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 985+46, 204' LT. / N:347,481 E:503,248
DRILLING METHOD: 08-CME-55 / N.W. CASING TO 34' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: DRY' **AFTER 24 HOURS:** DRY'

PROJECT NUMBER: 200901.200
DATE STARTED: 9/21/09
DATE COMPLETED: 9/22/09
GROUND ELEVATION: 4905.2'
LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
			Disturbed	7	4,4,5,(20)	SM	brown, dry, med. dense	SILTY SAND occasional clay lenses								
4900	5		Disturbed	13	5,5,6,(25)	SM (A-2-4(0))	brown, moist, med. dense			20.1		NP	0	75	25	
4895	10		Disturbed	10	5,9,10,(33)	SM	brown, moist, dense									Chem.
4890	15		Disturbed	15	8,11,13,(34)	SM (A-2-4(0))	gray-brown, moist, dense			25.6		NP	0	84	16	
4885	20		Disturbed	14	9,14,15,(36)	SM (A-2-4(0))	gray-brown, moist, dense			25.9		NP	0	88	15	
4880	25		Disturbed	3	60/5"	GP-GM	brown, moist, very dense	GRAVEL W/SILT & SAND possible cobbles								
4875	30		Disturbed	12	17,23,43,(63)	GP-GM (A-1-a(0))	brown, moist, dense			9 7		NP	67	27	6	
4870	35		Undisturbed	7	Pushed 0.73	CH (A-7-6(30))	gray, slightly moist, stiff	FAT CLAY	71.2	26.3	52	27	0	3	97	CT UU
4865	40		Disturbed	5	7,7,7,(12)	SC	lt. gray-brown, moist, med. dense	CLAYEY SAND W/GRAVEL								
4860	45		Disturbed	14	24,32,35,(53)	SP-SM	brown, moist, very dense	SAND W/SILT & GRAVEL possible cobbles								
4855	50		Disturbed	15	20,36,35,(53)	SP-SM (A-1-b(0))	brown, moist, very dense			13.6		NP	28	60	12	
								SILTY SAND W/GRAVEL possible cobbles								

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LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6" ; ← $(N_1)_{60}$ Value ; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-4

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 985+46, 204' LT. / N:347,481 E:503,248

DRILLING METHOD: 08-CME-55 / N.W. CASING TO 34' / MUD ROTARY

DRILLER: T. KERN

DEPTH TO WATER - INITIAL: ▽ DRY' AFTER 24 HOURS: ▼ DRY'

PROJECT NUMBER: 200901.200

DATE STARTED: 9/21/09

DATE COMPLETED: 9/22/09

GROUND ELEVATION: 4905.2'

LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				8	50,60/2"	SM	dk. brown, moist, very dense									
4845	60			16	32,37,33,(48)	SM (A-1-b(0))	gray-brown, moist, dense	SILTY SAND W/GRAVEL possible cobbles		15.0		NP	29	58	13	
4840	65			5	60/5"	SM	gray-brown, moist, very dense									
4835	70			17	32,42,46,(56)	SM (A-2-4(0))	dk. brown, moist, very dense	SILTY SAND		21.3		NP	5	63	32	
4830	75			5	60/4"	SM	rusty, moist, very dense									
4825	80			5	60/5"	SM	brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles								
4820	85			3	60/3"	SM	red-brown, moist, very dense									
4815	90			6	60/5"	SM (A-2-4(0))	red-brown, moist, very dense	SILTY SAND		19.7		NP	5	67	28	
4810	95			5	60/4"	SM	red-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles								
4805	100			3.5	55/4"	SM	brown, moist, very dense	BOH								
4800	105															

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE: 2,3,2,(6) — Blow Count per 6"; (N$_1$)$_{60}$ Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE: PUSHED; 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-5

SHEET 1 OF 2

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 986+76, 169' LT. / N:347,590 E:503,168
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 10' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/6/09
DATE COMPLETED: 7/6/09
GROUND ELEVATION: 4873.1'
LOGGED BY: J.P., C.S., J.B.

Elev. (ft)	Depth (ft)	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
		Disturbed	15	4,10,14,(50)	GP-GM (A-1-a(0))	brown to gray-brown, slightly moist, dense	GRAVEL W/SILT & SAND		4.2		NP	62	31	7	
4870	5	Undisturbed	12	Pushed 0.55	MH (A-7-5(25))	gray-brown, moist, stiff	ELASTIC SILT	70.5	42.8	53	23	0	9	91	CT UC
4865	10	Disturbed	16	16,11,12,(37) 2.00	SM (A-2-4(0))	gray-brown, moist, dense	SILTY SAND W/GRAVEL clay lenses		10.3		NP	26	46	28	
					CL	gray, moist, hard									
4860	15	Disturbed	14	4,6,6,(17) 1.63	CL (A-6(6))	dk. brown, moist, hard	SANDY LEAN CLAY		19.8	31	13	6	29	65	
4855		Disturbed	15	5,9,13,(29) 2.13	CL	gray-brown, moist, hard									Chem.
	20	Disturbed	15	12,21,31,(59)	SC (A-2-6(1))	gray-brown, moist, very dense	CLAYEY SAND W/GRAVEL		15.7	33	16	34	36	30	
4850	25	Disturbed	12	18,14,48,(70)	GM	gray-brown, moist, dense	SILTY GRAVEL W/SAND clay lenses								
4845		Disturbed	14	12,16,19,(35)	SC (A-2-6(0))	gray-brown, moist, dense			15.1	33	13	34	41	25	
	30	Disturbed	11	12,26,26,(49)	SC	gray-brown, moist, dense	CLAYEY SAND W/GRAVEL								
4840	35	Disturbed	16	10,17,17,(30)	SC (A-2-6(0))	gray-brown, moist, dense			18.0	30	11	20	55	25	
4835	40	Disturbed	17	2,4,3,(6) 0.42	SC-SM (A-4(0))	brown, moist, loose	SILTY CLAYEY SAND		18.6	21	6	7	54	39	
4830	45	Undisturbed	12	0.57 Pushed	MH (A-7-5(28))	brown, moist, stiff	ELASTIC SILT W/SAND	56.8	61.8	71	29	0	21	79	
					ML	lt. gray, moist									
4825		Disturbed	17	17,20,24,(36)	ML	lt. gray, moist, dense	SILT W/SAND								

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LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) 0.45 — Blow Count per 6"; $(N_1)_{60}$ Value; Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-5

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 986+76, 169' LT. / N:347,590 E:503,168

DATE STARTED: 7/6/09

DRILLING METHOD: 96-CME-55 / N.W. CASING TO 10' / MUD ROTARY

DATE COMPLETED: 7/6/09

DRILLER: T. KERN

GROUND ELEVATION: 4873.1'

DEPTH TO WATER - INITIAL: ∇ DRY'   **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: J.P., C.S., J.B.

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				18	29,30,37,(53)	ML (*A-4(0)*)	lt. gray, moist, very dense	SILT W/SAND		42.0		NP	0	28	72	
4820	55			18	12,21,34,(41)	ML	brown, moist, dense	SILT								
4815	60			18	32,42,50,(66)	ML (*A-4(0)*)	lt. gray, moist, very dense	SANDY SILT		35.5		NP	0	36	64	
4810	65			18	31,36,38,(51)	ML	lt. gray, moist, very dense									
4805	70			17	25,55,50/3"	SM (*A-4(0)*)	brown, moist, very dense	SILTY SAND		33.6		NP	3	54	43	
4800	75			4	60/4"	SM	gray-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles, boulders								
4795	80			10	47,50/4"	SM (*A-2-4(0)*)	brown, moist, very dense	SILTY SAND		16.7		NP	6	64	30	
4790	85			3	60/3"	GP-GM	gray-brown, moist, very dense	GRAVEL W/SILT & SAND possible cobbles								
4785	90			4	60/4"	SM	gray-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles								
								BOH								
4780	95															
4775																

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE: 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE: PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-6

SHEET 1 OF 2

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 987+36, 195' LT. / N:347,606 E:503,105

DRILLING METHOD: 08-CME-55 / N.W. CASING TO 9' / MUD ROTARY

DRILLER: T. KERN

DEPTH TO WATER - INITIAL: ∇ N.M. **AFTER 24 HOURS:** ▼ DRY'

PROJECT NUMBER: 200901.200

DATE STARTED: 9/24/09

DATE COMPLETED: 9/25/09

GROUND ELEVATION: 4864.7'

LOGGED BY: J.O., J. BOONE

Elev. (ft)	Depth (ft)	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
		14	2,3,9,(26)	SM	dk. brown, dry, med. dense	SILTY SAND W/GRAVEL								Chem.
4860	5	10	27,22,17,(83)	GC-GM (A-1-b(0))	rusty-brown, moist, dense	SILTY CLAYEY GRAVEL W/SAND possible cobbles		11.2	22	4	45	33	22	
4855	10	13	0.90 Pushed	CL (A-6(13))	dk. brown, moist, stiff	LEAN CLAY	99.9	19.0	33	18	4	14	82	CT UU
		16	17,24,30,(84)	CL	brown, moist, hard	SANDY LEAN CLAY W/GRAVEL								
4850	15	16	12,21,20,(55)	SC	red-brown, moist, very dense	CLAYEY SAND W/GRAVEL								
4845	20	18	12,23,35,(68)	SM (A-2-4(0))	gray-brown, moist	SILTY SAND W/GRAVEL		15.3		NP	18	59	23	
				SC (A-2-4(0))	red-brown, moist, very dense	CLAYEY SAND W/GRAVEL		14.3	30	8	16	50	34	
4840	25	12	35,60/0.5"	SM	gray-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles								
4835	30	16	13,26,21,(45)	SM	red-brown, moist, dense									
4830	35	17	27,29,30,(53)	GM (A-1-b(0))	brown, moist, dense	SILTY GRAVEL W/SAND possible cobbles		20.3		NP	45	39	16	
4825	40	18	40,34,42,(63)	SM (A-1-b(0))	brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles		16.8		NP	31	54	15	
4820	45	15	6,11,17,(22) 0.39	MH	brown, moist, firm	SANDY ELASTIC SILT clay lenses								
4815														

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RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; (6) ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-6

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 987+36, 195' LT. / N:347,606 E:503,105

DRILLING METHOD: 08-CME-55 / N.W. CASING TO 9' / MUD ROTARY

DRILLER: T. KERN

DEPTH TO WATER - INITIAL: ∇ N.M. **AFTER 24 HOURS:** ▼ DRY'

PROJECT NUMBER: 200901.200

DATE STARTED: 9/24/09

DATE COMPLETED: 9/25/09

GROUND ELEVATION: 4864.7'

LOGGED BY: J.O., J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
			Undisturbed	11	Pushed *0.20*	MH *(A-5(7))*	brown, moist, soft — SANDY ELASTIC SILT, clay lenses		37.0	58	5	0	30	70	
4810	55						SAND W/SILT & GRAVEL								
			Disturbed			SP-SM	dk. brown, moist								
			Disturbed	18	34,47,41,(63)	SM	brown, moist, very dense								
4805	60		Disturbed	12	35,60/4.5"	SM *(A-4(0))*	brown, moist, very dense — SILTY SAND, possible cobbles		31.0		NP	0	60	40	
4800	65		Disturbed	12	31,60/5"	ML	brown, moist, very dense								
							SANDY SILT, slightly cemented, possible cobbles								
4795	70		Disturbed	11	56,60/3.5"	ML *(A-4(0))*	brown, moist, very dense		34.9		NP	0	33	67	
4790	75		Disturbed	12	45,60/5.5"	SM	gray, moist, very dense								
4785	80		Disturbed	12	55,60/4.5"	SM *(A-2-4(0))*	gray, moist, very dense — SILTY SAND, slightly cemented, possible cobbles, pumice?		19.8		NP	0	68	32	
4780	85		Disturbed	11	44,60/5"	SM	gray, moist, very dense								
4775	90		Disturbed	9	60,60/2.5"	SM *(A-1-b(0))*	red-brown, moist, v. dense — SILTY SAND W/GRAVEL, possible cobbles		15.4		NP	31	50	19	
							BOH								
4770	95														
4765															

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; *0.45* ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-7

SHEET 1 OF 2

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 988+16, 219' LT. / N:347,638 E:503,027
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 13.5' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ N.M. **AFTER 24 HOURS:** ▼ DRY'

PROJECT NUMBER: 200901.200
DATE STARTED: 6/26/09
DATE COMPLETED: 6/29/09
GROUND ELEVATION: 4871.3'
LOGGED BY: C. SANBORN, J. BOONE

Depth (ft)	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Stratum	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
	7	6,10,12,(46)	GM	gray-brown, very moist, med. dense	SILTY GRAVEL W/SAND possible cobbles								Chem.
5	8	8,11,8,(40)	GM (A-1-b(0))	gray-brown, slightly moist, med. dense			9.3		NP	46	33	21	
10	7	13,14,15,(47)	GM	gray-brown, slightly moist, med. dense									
15	11	Pushed	SM (A-4(0))	brown, moist	SILTY SAND	87.9	14.5		NP	1	62	37	DS
	12	10,16,14,(39)	SM (A-2-4(0))	gray-brown, moist, dense			17.4		NP	10	58	32	
20	10	20,50/5.5"	SP-SM	gray-brown, slightly moist, very dense	SAND W/SILT & GRAVEL possible cobbles								Chem.
25	14	32,45,36,(84)	SP-SM (A-1-b(0))	gray-brown, slightly moist, very dense			12.0		NP	31	57	12	
30	8	47,50/2"	SM	gray-brown, slightly moist, very dense	SILTY SAND W/GRAVEL possible cobbles								
35	8	32,48,50/5"	SM	gray-brown, slightly moist, very dense									
40	16	40,49,50/4.5"	SM (A-1-b(0))	gray-brown, slightly moist, very dense			14.6		NP	30	55	15	
45	4	60/4.5"	GM	gray-brown, slightly moist, very dense	SILTY GRAVEL W/SAND possible cobbles, boulders								
50	17	8,18,32,(37)	ML (A-4(0))	lt. gray-brown, slightly moist, dense	SANDY SILT		34.7		NP	0	47	53	
					SILTY SAND possible cobbles, boulders								

Elev. (ft): 4870, 4865, 4860, 4855, 4850, 4845, 4840, 4835, 4830, 4825, 4820

200901.200 MVC2009_S.GPJ US EVAL.GDT 10/14/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE: 2,3,2,(6) ← Blow Count per 6"; $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE: PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-7

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 988+16, 219' LT. / N:347,638 E:503,027

DRILLING METHOD: 96-CME-55 / N.W. CASING TO 13.5' / MUD ROTARY

DRILLER: T. KERN

DEPTH TO WATER - INITIAL: ∇ N.M. **AFTER 24 HOURS:** ▼ DRY'

PROJECT NUMBER: 200901.200

DATE STARTED: 6/26/09

DATE COMPLETED: 6/29/09

GROUND ELEVATION: 4871.3'

LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Sample Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
4815		16	22,44,50/4.5"	SM (A-2-4(0))	lt. gray, slightly moist, very dense	SILTY SAND possible cobbles, boulders		30.7		NP	0	65	35	
4810	60	9	52,50/3"	SM	lt. gray, slightly moist, very dense									
4805	65	10	35,50/5"	SM (A-4(0))	brown, slightly moist, very dense			20.7		NP	7	55	38	
4800	70	10	46,50/5"	SM	gray-brown, slightly moist, very dense									
4795	75	3	60/4"	SM	gray-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles, boulders								
4790	80	3	60/4"	SM	gray-brown, slightly moist, very dense									
4785	85	15	41,53,50/4"	SM (A-1-b(0))	gray-brown, moist, very dense			16.8		NP	27	54	19	
4780	90	1	60/3"	SM	gray-brown, moist, very dense									
4775	95	14	29,44,50/4"	SM (A-1-b(0))	gray-brown, moist, very dense			15.6		NP	22	55	23	
4770	100	10	40,50/5"	SM	gray-brown, moist, very dense									
						BOH								
4765	105													

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6"; (N1)60 Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-8

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 988+93, 193' LT. / N:347,706 E:502,982
DRILLING METHOD: 08-CME-55 / N.W. CASING TO 38.5' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ∇ N.M. **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 9/25/09
DATE COMPLETED: 9/29/09
GROUND ELEVATION: 4910.2'
LOGGED BY: J.O., J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				12	3,5,7,(26)	SM	brown, dry, med. dense	SILTY SAND W/GRAVEL								Chem.
4905	5			0	30,27,32,(99+)	-	no recovery	GRAVEL W/SILT & SAND possible cobbles								
4900	10			12	10,17,14,(50)	GP-GM (*A-1-a(0)*)	rusty-brown, moist, dense			9.0		NP	51	42	7	
4895	15			3	6,20,13,(44)	SM	rusty-brown, moist, dense	SILTY SAND W/GRAVEL								
4890	20			14	7,10,13,(27)	SC (*A-4(1)*)	dk. brown, moist, med. dense	CLAYEY SAND W/GRAVEL		19.6	29	8	19	37	44	
4885	25			18	16,24,31,(58)	CL-ML	brown, moist, hard	SANDY SILTY CLAY								
4880	30			10	10,16,22,(37)	SC (*A-2-4(0)*)	red-brown, moist, dense	CLAYEY SAND W/GRAVEL		13.5	25	8	29	36	35	
4875	35			12	5,13,16,(26) *0.38*	SC	red-brown, moist, med. dense									
4870	40			10	12,15,12,(23)	GC-GM (*A-1-b(0)*)	red-brown, moist, loose	SILTY CLAYEY GRAVEL W/SAND possible cobbles		12.7	22	5	47	30	23	
4865	45			10	35,23,33,(44)	GC-GM	red-brown, moist, med. dense									
								SILTY SAND W/GRAVEL possible cobbles								

200901.200 MVC2009_S.GPJ US EVAL.GDT 10/14/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6"; $(N_1)_{60}$ Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-8

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 988+93, 193' LT. / N:347,706 E:502,982
DRILLING METHOD: 08-CME-55 / N.W. CASING TO 38.5' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ N.M. **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 9/25/09
DATE COMPLETED: 9/29/09
GROUND ELEVATION: 4910.2'
LOGGED BY: J.O., J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
			■	15	48,38,43,(61)	SM (A-1-a(0))	red-brown, moist, very dense — SILTY SAND W/GRAVEL possible cobbles		13.1		NP	37	49	14	
4855	55		■	1	60/2.5"	GP-GM	black, moist, very dense — GRAVEL W/SILT & SAND possible cobbles, boulders								
4850	60		■	5	60/4"	GP-GM	red, moist, very dense								
4845	65		■	3	60/5"	GP-GM	black, moist, very dense								
4840	70		■	9	50/5.5"	GP-GM	dk. brown, moist, v. dense								
							BOH								
4835	75														
4830	80														
4825	85														
4820	90														
4815	95														

200901 200 MVC2009_S GPJ US EVAL GDT 10/14/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE ■ 2,3,2,(6) ← Blow Count per 6"; (N$_1$)$_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE ☒ PUSHED 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-9

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 981+74, 214' RT. / N:347,578 E:503,799
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 30' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 6/30/09
DATE COMPLETED: 7/1/09
GROUND ELEVATION: 4855.5'
LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
4855				15	2,0,3,(6)	SM (A-2-4(0))	brown, moist, loose	SILTY SAND		10.3		NP	2	64	34	
4850	5			11	9,9,12,(44) 0.53	GC (A-2-6(0))	lt. brown, moist, med. dense	CLAYEY GRAVEL W/SAND		13.3	30	11	36	30	34	
4845	10			8	Pushed 2.13	CL (A-7-6(11))	brown, slightly moist, hard, shelby tube flattened on side	SANDY LEAN CLAY W/GRAVEL		14.9	43	22	17	22	61	
4840	15			10	22,60/5"	SM (A-1-b(0))	gray-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles		11.4		NP	37	48	15	
4835	20			11	12,17,50/1"	SM	brown, moist, very dense									Chem.
4830	25			8	21,46,50/2"	GM (A-1-a(0))	gray-brown, moist, very dense	SILTY GRAVEL W/SAND clay lenses, possible cobbles		10.6		NP	61	26	13	
4825	30			12	50,50/3.5"	SM	gray-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles, boulders								
4820	35			0	50/0.5"	-	no recovery									
4815	40			9	50,50/3"	SM (A-1-b(0))	gray-brown, moist, very dense			18.1		NP	16	60	24	
4810	45			10	42,50/4"	SM (A-2-4(0))	gray-brown, moist, very dense			16.6		NP	15	56	29	

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RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE: 2,3,2,(6) ← Blow Count per 6"; (N$_1$)$_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE: PUSHED 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-9

SHEET 2 OF 2

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 981+74, 214' RT. / N:347,578 E:503,799

DRILLING METHOD: 96-CME-55 / N.W. CASING TO 30' / MUD ROTARY

DRILLER: T. KERN

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 6/30/09

DATE COMPLETED: 7/1/09

GROUND ELEVATION: 4855.5'

LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
4805				4	60/5.5"	SM	gray-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles, boulders								
4800	55			8	39,50/3"	SM	gray-brown, moist, very dense									
4795	60			10	33,50/4"	SM (A-2-4(0))	brown, moist, very dense	SILTY SAND possible cobbles		24.8		NP	0	66	34	
4790	65			11	50,50/5.5"	SM	gray-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles								
4785	70			9	50,50/2.5"	SM (A-2-4(0))	gray-brown, moist, very dense	SILTY SAND possible cobbles		16.3		NP	5	78	17	
4780	75			3	60/3"	SM	gray-brown, moist, very dense									
								BOH								
4775	80															
4770	85															
4765	90															
4760	95															

200901.200 MVC2009_S.GPJ US EVAL.GDT 10/14/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE: 2,3,2,(6) — Blow Count per 6", $(N_1)_{60}$ Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE: PUSHED; 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-10

SHEET 1 OF 2

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 983+35, 158' RT. / N:347,634 E:503,638

DATE STARTED: 6/24/09

DRILLING METHOD: 96-CME-55 / N.W. CASING TO 23.5' / MUD ROTARY

DATE COMPLETED: 6/24/09

DRILLER: T. KERN

GROUND ELEVATION: 4862.8'

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
		Disturbed	14	1,0,2,(4)	SM (A-2-4(0))	brown, moist, very loose	SILTY SAND W/GRAVEL		10.7		NP	2	79	19	8% -0.005 mm
4860															
	5	Disturbed	9	9,14,21,(73)	GM	gray-brown, moist, dense	SILTY GRAVEL W/SAND								Chem.
4855															
	10	Disturbed	12	11,8,5,(21) 0.67	GM	gray-brown, wet									
					ML (A-7-6(16))	gray, moist, stiff	SILT plastic		38 9	43	15	0	8	92	
4850															
	15	Undisturbed	14	Pushed 0.74	CL (A-6(8))	gray, moist, stiff	LEAN CLAY W/SAND sand lenses	85.7	25.6	29	11	0	15	85	CT UU
4845															
	20	Disturbed	15	0.23	CL-ML (A-4(0))	gray w/white, moist, soft	SANDY SILTY CLAY		20.0	22	4	1	44	55	
				3,8,23,(38)	GM	brown, moist, med. dense									
4840															
	25	Disturbed	7	60,50/1.5"	GM	gray-brown, moist, very dense	SILTY GRAVEL W/SAND possible cobbles, clay lenses, approx. 6" clay layer at 28' (driller's observation)								
4835															
	30	Disturbed	16	14,30,50/4.5"	SP-SM (A-1-b(0))	gray-brown, moist	SAND W/SILT & GRAVEL		12.0		NP	37	54	9	
					SM (A-2-4(0))	rust-brown, very moist, very dense	SILTY SAND W/GRAVEL possible cobbles		17.4		NP	23	52	25	
4830															
	35	Disturbed	14	23,38,60/5"	SM (A-2-4(0))	rust-brown, very moist, very dense	SILTY SAND possible cobbles		18.3		NP	11	60	29	Chem.
4825															
	40	Disturbed	9	23,50/3.5"	SM	gray-brown, very moist, very dense									
4820															
	45	Disturbed	3	60/5.5"	SM	gray-brown, very moist, very dense	SILTY SAND W/GRAVEL possible cobbles, boulders								
4815															

200901.200 MVC2009 S.GPJ US EVAL.GDT 10/14/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-10

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 983+35, 158' RT. / N:347,634 E:503,638
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 23.5' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 6/24/09
DATE COMPLETED: 6/24/09
GROUND ELEVATION: 4862.8'
LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
			■	9	30,50/4"	SM (A-1-b(0))	gray-brown, very moist, very dense	SILTY SAND W/GRAVEL possible cobbles, boulders		14.8		NP	27	49	24	
4810																
	55		■	4	60/4.5"	SM	gray-brown, very moist, very dense									
4805																
	60		■	4	60/5"	SM	gray-brown, very moist, very dense									
4800																
	65		■	4	60/4"	SM	gray-brown, very moist, very dense									
4795																
	70		■	3	60/3"	GM	gray-brown, wet, very dense	SILTY GRAVEL W/SAND possible cobbles, boulders								
4790																
	75		■	4	60/4"	SM	gray-brown, very moist, very dense	SILTY SAND W/GRAVEL possible cobbles, boulders								
								BOH								
4785																
	80															
4780																
	85															
4775																
	90															
4770																
	95															
4765																

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; (6) ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-11

SHEET 1 OF 2

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 985+17, 214' RT. / N:347,791 E:503,530
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 30' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ∇ N.M. **AFTER 24 HOURS:** ▼ DRY'

PROJECT NUMBER: 200901.200
DATE STARTED: 6/22/09
DATE COMPLETED: 6/23/09
GROUND ELEVATION: 4851.0'
LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
4850		6	0,1,1,(4)	SM (A-2-4(0))	dk. brown, moist, very loose	SILTY SAND		12.4		NP	8	67	25	
4845	5	12	5,3,3,(13)	SM (A-4(0))	lt. brown, moist, med. dense			14.2		NP	3	57	40	DS
4840	10	10	Pushed	SM (A-1-b(0))	lt. brown, moist	SILTY SAND W/GRAVEL possible cobbles	94.2	17.7		NP	35	50	15	Chem.
		14	21,20,19,(64)	SM	lt. brown, moist, dense									
4835	15	15	25,35,45,(99+)	SM (A-1-b(0))	lt. brown, moist, very dense			10.4		NP	34	41	25	
4830	20	7	27,50/3"	SM	lt. gray-brown, moist, very dense									
4825	25	12	21,55,50/2.5"	SM (A-2-4(0))	gray-brown, moist, very dense	SILTY SAND possible cobbles		15.6		NP	11	57	32	
4820	30	5	60/5.5"	SM	gray-brown, moist, very dense									
4815	35	9	30,50/4"	SM (A-1-b(0))	gray-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles		15.5		NP	21	61	18	
4810	40	8	60,50/2"	SM	gray-brown, moist, very dense									
4805	45	9	46,50/3"	SM	gray-brown, moist, very dense									
4800	50	10	50,50/4.5"	SM (A-2-4(0))	gray-brown, moist, very dense	SILTY SAND possible cobbles, boulders		11.8		NP	12	61	27	

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-11

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 985+17, 214' RT. / N:347,791 E:503,530
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 30' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ∇ N.M. **AFTER 24 HOURS:** ▼ DRY'

PROJECT NUMBER: 200901.200
DATE STARTED: 6/22/09
DATE COMPLETED: 6/23/09
GROUND ELEVATION: 4851.0'
LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4795				4	60/4"	SM	gray-brown, moist, very dense	SILTY SAND possible cobbles, boulders								
4790	60			1	50/2.5"	GM	gray, moist, very dense	SILTY GRAVEL W/SAND possible cobbles								
4785	65			7	50,50/2"	SM (A-1-b(0))	gray-brown, moist, very dense			10.6		NP	28	59	13	
4780	70			0	50/1"	-	no recovery									
4775	75			2	60/3"	SM	gray-brown, moist, very dense	SILTY SAND W/GRAVEL posible cobbles, boulders								
4770	80			3	60/3.5"	SM	gray-brown, moist, very dense									
4765	85			4	60/4"	SM	gray-brown, moist, very dense									
4760	90			4	60/4"	SM	gray-brown, moist, very dense									
4755	95			5	60/5.5"	SM (A-2-4(0))	gray-brown, moist, very dense	SILTY SAND possible cobbles, boulders		16.6		NP	2	64	34	
4750	100			5	60/5.5"	SM	gry-brwn, moist, v. dense	BOH								
4745	105															

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE: 2,3,2,(6) — Blow Count per 6", $(N_1)_{60}$ Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE: PUSHED; 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-12

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 986+57, 158' RT. / N:347,834 E:503,385
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 13.5' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ∇ N.M. **AFTER 24 HOURS:** ▼ DRY'

PROJECT NUMBER: 200901.200
DATE STARTED: 6/29/09
DATE COMPLETED: 6/30/09
GROUND ELEVATION: 4860.7'
LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4860				8	2,2,3,(10)	SM (A-2-4(0))	brown, moist, loose	SILTY SAND W/GRAVEL		9.4		NP	30	41	29	
4855	5			9	8,10,14,(50)	GC (A-2-4(0))	brown, moist, med. dense	CLAYEY GRAVEL W/SAND		12.0	24	8	38	33	29	
	10			4	Pushed	CL	brown, moist	SANDY LEAN CLAY	86.1	24.1						
4850				16	25,27,31,(98)	SM (A-1-b(0))	gray-brown, moist, very dense	SILTY SAND W/GRAVEL		13.2		NP	25	55	20	Chem.
4845	15			14	15,25,35,(80)	SM (A-2-4(0))	brown, moist, very dense	SILTY SAND		12.9		NP	11	54	35	DS
4840	20			6	60/5.5"	GM	gray-brown, moist, very dense	SILTY GRAVEL W/SAND possible cobbles								
4835	25			11	26,50/5"	SM (A-2-4(0))	gray-brown, moist, very dense			16.8		NP	15	51	34	Chem.
4830	30			3	60/4"	SM	gray-brown, moist, very dense									
4825	35			10	31,50/4"	SM (A-2-4(0))	gray-brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles, boulders		13.8		NP	18	58	24	
4820	40			6	60/5.5"	SM	gray-brown, moist, very dense									
4815	45			10	58,50/4"	SM (A-1-b(0))	gray-brown, moist, very dense			12.8		NP	31	56	13	

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RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6"; $(N_1)_{60}$ Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-12

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 986+57, 158' RT. / N:347,834 E:503,385
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 13.5' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ N.M. **AFTER 24 HOURS:** ▼ DRY'

PROJECT NUMBER: 200901.200
DATE STARTED: 6/29/09
DATE COMPLETED: 6/30/09
GROUND ELEVATION: 4860.7'
LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
4810				4	60/4"	SM	gray-brown, moist, very dense								
4805	55			9	55,50/3"	SM *(A-1-b(0))*	gray-brown, moist, very dense		12.6		NP	20	64	16	
4800	60			5	60/5.5"	SM	gray-brown, moist, very dense								
							SILTY SAND W/GRAVEL possible cobbles, boulders								
4795	65			0	60/3.5"	-	no recovery								
4790	70			0	60/0.5"	-	no recovery								
4785	75			3	60/5"	SM	gray-brown, moist, very dense								
							BOH								
4780	80														
4775	85														
4770	90														
4765	95														

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RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-13

SHEET 1 OF 2

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 987+40, 187' RT. / N:347,908 E:503,339

DRILLING METHOD: 08-CME-55 / N.W. CASING TO 13.5' / MUD ROTARY

DRILLER: T. KERN

DEPTH TO WATER - INITIAL: ▽ N.M. **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 9/29/09

DATE COMPLETED: 9/30/09

GROUND ELEVATION: 4890.5'

LOGGED BY: J.O., J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4890				18	3,2,2,(9)	SP-SM	lt. brown, dry, loose — SAND W/SILT & GRAVEL								
4885	5			14	11,14,12,(55)	SM (A-4(0))	lt. brown, moist, very dense — SILTY SAND		28.0		NP	0	53	47	
4880	10			14	24,28,52,(99+)	SM	lt. red-brown, moist, very dense								Chem.
4875	15			18	36,40,53,(98)	ML (A-4(0))	gray, slightly moist, very dense		38.7		NP	0	28	72	DS
4870	20			18	16,22,23,(53)	ML	gray, slightly moist, dense — SILT W/SAND pumice?								
4865	25			18	17,20,21,(43)	ML	gray, slightly moist, dense								Chem.
4860	30			17	22,37,41,(75)	SM (A-4(0))	red-brown, very moist, very dense		31.9		NP	1	56	43	
4855	35			6	Pushed	SM	red-brown, very moist								
				18	36,50,56,(94)	SM (A-2-4(0))	red-brown, very moist, very dense — SILTY SAND occasional clay lenses		22.7		NP	5	66	29	
4850	40			18	23,40,46,(72)	SM (A-2-4(0))	brown, very moist, very dense		29.6		NP	1	65	34	
4845	45			12	31,60/4.5"	SM	brown, very moist								
						GP-GM	brown, very moist, very dense — GRAVEL W/SILT & SAND possible cobbles								

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RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6"; $(N_1)_{60}$ Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-S1-13

SHEET 2 OF 2

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 987+40, 187' RT. / N:347,908 E:503,339

DRILLING METHOD: 08-CME-55 / N.W. CASING TO 13.5' / MUD ROTARY

DRILLER: T. KERN

DEPTH TO WATER - INITIAL: ▽ N.M. AFTER 24 HOURS: ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 9/29/09

DATE COMPLETED: 9/30/09

GROUND ELEVATION: 4890.5'

LOGGED BY: J.O., J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
4840				18	15,30,35,(49)	ML (A-4(2))	brown, very moist, hard — SANDY SILT plastic, gravel seams		31.5	31	5	2	39	59	
4835	55			11	44,60/4.5"	SM	brown, very moist, very dense								
4830	60			12	57,60/5"	SM (A-1-b(0))	brown, very moist, very dense		17.2		NP	17	67	16	
4825	65			5	60/5"	SM	brown, very moist, very dense — SILTY SAND W/GRAVEL possible cobbles, boulders								
4820	70			11	40,60/3.5"	SM	dk. brown, very moist, very dense								
4815	75			13	41,60/4.5"	SM	dk. brown, very moist, very dense								
4810	80			18	40,52,50,(61)	SM (A-1-b(0))	SILTY SAND — brown, very moist, very dense		16.6		NP	14	71	15	
							BOH								
4805	85														
4800	90														
4795	95														

200901 200 MVC2009_S GPJ US EVAL GDT 10/14/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-C1-1

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
PROJECT NUMBER: 200901.200
LOCATION: STA. 24+57, 24' RT. (SOUTH HILLS) / N:339,812 E:515,668
DATE STARTED: 10/29/09
DRILLING METHOD: DP-CME-55 / HSA / MUD ROTARY
DATE COMPLETED: 10/29/09
DRILLER: C.D. (DIRECT PUSH SERVICES, LLC)
GROUND ELEVATION: 4721.3'
DEPTH TO WATER - INITIAL: ∇ N.M. **AFTER 24 HOURS:** ▼ DRY'
LOGGED BY: S. CHAFFIN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
						SC-SM	brown, slightly moist	CLAYEY SILTY SAND								
				16	6,28,30,(99+)	GC (A-2-6(0))	gray, moist, very dense			12.1	29	15	42	36	22	
4720								CLAYEY GRAVEL W/SAND possible cobbles								
	5			10	27,32,31,(99+)	SM	brown, moist, very dense	SILTY SAND W/GRAVEL								Chem.
4715																
	10			2	60/5"	GP-GM	brown, very moist, very dense	GRAVEL W/SILT & SAND possible cobbles, boulders								
4710								SILTY SAND								
	15			9	10,60/3"	SM (A-4(0))	lt. brown, very moist, very dense			22.6		NP	6	56	38	
4705								BOH								
								Note: Could not advance boring further. Possible boulders.								

J1 200 MVC2009 C.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-C1-2

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 24+86, 32' LT. (SOUTH HILLS) / N:339,867 E:515,699
DRILLING METHOD: DP-CME-55 / HSA / MUD ROTARY
DRILLER: C.D. (DIRECT PUSH SERVICES, LLC)
DEPTH TO WATER - INITIAL: ∇ N.M. **AFTER 24 HOURS:** ▼ DRY'

PROJECT NUMBER: 200901.200
DATE STARTED: 10/29/09
DATE COMPLETED: 10/29/09
GROUND ELEVATION: 4721.2'
LOGGED BY: S. CHAFFIN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
4720			Disturbed	18	8,7,5,(28)	SM (*A-1-b(0)*)	lt. brown, moist, med. dense	SILTY SAND W/GRAVEL plastic fines		13.8	34	6	32	48	20	
4715	5		Disturbed	7	24,31,17,(99+)	GP-GM	gray, moist, very dense	GRAVEL W/SILT & SAND possible cobbles								
4710	10		Disturbed	8	4,6,5,(20)	SM	brown, moist, med. dense									Chem.
4705	15		Disturbed	12	18,23,21,(65)	SM (*A-2-4(0)*)	brown, very moist, very dense	SILTY SAND		17.4		NP	8	64	28	
4700	20		Disturbed	7	3,14,43,(74)	SM	red-brown, very moist, very dense									
4695	25		Disturbed	9	3,9,16,(29)	SM (*A-2-4(0)*)	brown, very moist, med. dense			23.6		NP	10	65	25	
4690	30		Disturbed	13	5,48,60,(99+)	GP-GM	gray, very moist, very dense	GRAVEL W/SILT & SAND possible cobbles								
								BOH								

200901.200 MVC2009 C.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-01

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 854+57, 216' LT. / N:339,826 E:513,844

DATE STARTED: 10/16/09

DRILLING METHOD: DP-CME-55 / HSA ROTARY

DATE COMPLETED: 10/16/09

DRILLER: C.D. (DIRECT PUSH SERVICES, LLC)

GROUND ELEVATION: 4858.7'

DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: S. CHAFFIN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				18	3,7,11,(38)	SC-SM	brown, slightly moist, dense — SILTY CLAYEY SAND								
4855	5			9	35,50/3"	GM	brown, moist, very dense — SILTY GRAVEL W/SAND possible cobbles								
4850	10					SM (A-2-4(0))	brown, very moist — SILTY SAND		20.4		NP	2	70	28	
				12	13,42,50/4"	GM	brown, moist, very dense — SILTY GRAVEL W/SAND possible cobbles								
4845	15			4	60/5"	GM	brown, moist, very dense								
4840	20					SC (A-4(0))	brown, moist — CLAYEY SAND		20.2	28	8	7	57	36	
				7	29,50/4"	GP-GM	black, moist, very dense — GRAVEL W/SILT & SAND possible cobbles								
4835	25			4	60/4"	SM	brown, moist, very dense — SILTY SAND W/GRAVEL possible cobbles								
4830	30			8	48,50/3"	SM (A-1-b(0))	brown, moist, very dense		14.1		NP	39	46	15	
							BOH								
4825															

200901.200 MVC2009 W.GPJ US EVAL GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6", ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS

UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-02

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 857+02, 214' LT. / N:339,974 E:513,657

DRILLING METHOD: 96-CME-55 / N.W. CASING TO 5' / MUD ROTARY

DRILLER: K. CONLIN

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 10/19/09

DATE COMPLETED: 10/19/09

GROUND ELEVATION: 4857.9'

LOGGED BY: J. OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
			Disturbed	18	8,7,8,(31)	SC (A-2-6(0))	brown, slightly moist, dense		6.3	31	11	17	50	33	
4855							CLAYEY SAND W/GRAVEL								
	5		Disturbed	14	27,41,47,(99+)	SC	rust-brown, moist, very dense								
4850															
	10		Disturbed	17	44,60,60/5"	SM (A-1-b(0))	brown, very moist, very dense		15.2		NP	25	61	14	DS
4845							SILTY SAND W/GRAVEL possible cobbles								
	15		Disturbed	2	60/1.5"	SM	brown, very moist, very dense								
4840															
	20		Disturbed	11	42,60/4.5"	SM (A-1-b(0))	brown, very moist, very dense		13.4		NP	9	74	17	
							SILTY SAND possible cobbles								
4835															
	25		Disturbed	4	60/4"	SM	brown, very moist, very dense								
							BOH								
4830															

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6" / ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

RB&G ENGINEERING, INC.

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-03

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 859+47, 212' LT. / N:340,116 E:513,465
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 5' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/16/09
DATE COMPLETED: 10/16/09
GROUND ELEVATION: 4854.5'
LOGGED BY: J.O., S.C., J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
			■	15	4,3,4,(15)	CL	brown, slightly moist, firm to stiff	SANDY LEAN CLAY W/GRAVEL								
4850	5		■	11	42,60/5"	SP-SM (*A-1-b(0)*)	gray-brown, moist, very dense	SAND W/SILT & GRAVEL possible cobbles		8.5		NP	27	63	10	
4845	10		■	2	60/1.5"	SC-SM	brown, moist, very dense	SILTY CLAYEY SAND possible cobbles								
4840	15		■	9	22,60/4"	SC (*A-6(1)*)	brown, moist	CLAYEY SAND		27.5	35	11	7	54	39	
						GP-GM	black, moist, very dense	GRAVEL W/SILT & SAND possible cobbles								
4835	20		■	5	60/5"	SM (*A-1-b(0)*)	brown, very moist, very dense	SILTY SAND possible cobbles		15.4		NP	13	73	14	
4830	25		■	3	60/4"	GM	dk. gray to black, very moist, very dense	SILTY GRAVEL W/SAND possible cobbles								
4825	30		■	3	60/3"	SM	dk. gray to black, very moist, very dense	SILTY SAND W/GRAVEL possible cobbles								
								BOH								
4820																

200901.200 MVC2009 W GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; *0.45* ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-04

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 861+92, 211' LT. / N:340,253 E:513,270

DRILLING METHOD: 96-CME-55 / N.W. CASING TO 5' / MUD ROTARY

DRILLER: K. CONLIN

DEPTH TO WATER - INITIAL: ▽ DRY' AFTER 24 HOURS: ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 10/17/09

DATE COMPLETED: 10/17/09

GROUND ELEVATION: 4845.9'

LOGGED BY: S. CHAFFIN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS *(AASHTO)*	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4845			Disturbed	13	3,14,50/3"	SC *(A-2-6(1))*	dk. gray-brown, slightly moist, very dense. CLAYEY SAND W/GRAVEL possible cobbles		5.5	30	13	31	35	34	
4840	5		Disturbed	11	16,18,25,(96)	GP-GM	brown, slightly moist, very dense. GRAVEL W/SILT & SAND possible cobbles								
4835	10		Disturbed	18	7,9,16,(43) *0.73*	CL *(A-4(3))*	brown, moist, stiff. SANDY LEAN CLAY		22.3	27	10	1	39	60	Chem.
							GRAVELS (driller's observation)								
4830	15		Undisturbed	0	Pushed	-	no recovery								
						-	no recovery								
			Disturbed	7	1,8,13,(28)	CL	brown, moist, very stiff. SANDY LEAN CLAY W/GRAVEL								
							SILTY CLAYEY SAND W/GRAVEL possible cobbles								
4825	20		Disturbed	13	9,13,31,(54)	SC-SM	brown, moist, dense								
							BOH								

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; (N$_1$)$_{60}$ Value; *0.45* ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-09

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 909+18, 220' LT. / N:342,798 E:509,296
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 5' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/19/09
DATE COMPLETED: 10/19/09
GROUND ELEVATION: 4874.5'
LOGGED BY: J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				16	4,6,7,(27)	SC (A-2-4(0))	dk. brown, dry to slightly moist, med. dense CLAYEY SAND W/GRAVEL		5.6	27	9	31	49	20	
4870	5			11	22,13,12,(56)	SP-SM	brown, slightly moist, very dense								Chem.
4865	10						SAND W/SILT & GRAVEL *possible cobbles*								
				7	40,50/1"	SP-SM (A-1-b(0))	brown, moist, very dense		14.0		NP	27	61	12	
4860	15			0	50/2"	-	no recovery BOH								
4855															

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; (6) ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-10

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 921+00, 215' LT. / N:343,473 E:508,306

DATE STARTED: 10/20/09

DRILLING METHOD: 96-CME-55 / N.W. CASING TO 5' / MUD ROTARY

DATE COMPLETED: 10/20/09

DRILLER: K. CONLIN

GROUND ELEVATION: 4867.7'

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: J. OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
			■	16	1,6,8,(29)	SM (A-2-4(0))	dk. brown, slightly moist, med. dense — SILTY SAND		5.3		NP	11	71	18	
4865															
	5		■	12	15,13,33,(99+)	SM (A-1-b(0))	brown, very moist, very dense — SILTY SAND W/GRAVEL possible cobbles		13.6		NP	17	68	15	
4860															
	10		■	4	60/4"	GP-GM	red-brown, very moist, very dense — GRAVEL W/SILT & SAND possible cobbles								
4855															
	15		■	12	36,60/5.5"	SM (A-2-4(0))	brown, very moist, very dense — SILTY SAND W/GRAVEL slightly plastic, possible cobbles		19.7	31	8	31	48	21	
							BOH								
4850															

200901.200 MVC2009 W.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; (N$_1$)$_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-11

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 923+33, 214' LT. / N:343,615 E:508,117
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 3.5' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/20/09
DATE COMPLETED: 10/20/09
GROUND ELEVATION: 4866.2'
LOGGED BY: J. OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4865			■	18	4,14,19,(69)	SM (*A-2-4(0)*)	SILTY SAND brown, slightly moist, very dense		4.6		NP	5	70	25	
4860	5		■	13	12,9,7,(36)	SP-SM	SAND W/SILT brown, moist, dense								Chem.
4855	10		■	16	12,17,27,(75)	SP-SM (*A-1-b(0)*)	SAND W/SILT & GRAVEL dk. brown, very moist, very dense		13.6		NP	22	69	9	DS
4850	15		■	14	12,27,36,(89)	SM (*A-1-b(0)*)	SILTY SAND W/GRAVEL possible cobbles brown, very moist, very dense		26.5		NP	29	46	25	
4845	20		■	7	27,60/4"	SM	brown, very moist, very dense								
							BOH								

200901.200 MVC2009 W.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; *0.45* ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-12

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 925+66, 212' LT. / N:343,761 E:507,931

DRILLING METHOD: 96-CME-55 / N.W. CASING TO 3.5' / MUD ROTARY

DRILLER: K. CONLIN

DEPTH TO WATER - INITIAL: ▽ DRY' AFTER 24 HOURS: ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 10/20/09

DATE COMPLETED: 10/20/09

GROUND ELEVATION: 4870.2'

LOGGED BY: J. OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4870				18	5,10,12,(46)	SC-SM (*A-2-4(0)*)	brown, slightly moist, dense — SILTY CLAYEY SAND		5.0	25	6	8	66	26	
4865	5			10	8,10,11,(47)	SM (*A-1-b(0)*)	brown, very moist, dense — SILTY SAND		16.7		NP	8	69	23	
4860	10			16	9,8,8,(27)	SM	brown, very moist, med. dense								
4855	15			10	52,60/4.5"	SP-SM (*A-1-a(0)*)	dk. brown, very moist, very dense — SAND W/SILT & GRAVEL possible cobbles		13.1		NP	35	56	9	
4850	20			0	50/2"	-	no recovery								
							BOH								

200901.200 MVC2009 W.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-13

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 927+51, 220' LT. / N:343,870 E:507,779
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 3.5' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/20/09
DATE COMPLETED: 10/20/09
GROUND ELEVATION: 4872.5'
LOGGED BY: J. OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
			■	15	5,10,13,(48)	GC *(A-2-6(0))*	brown, slightly moist, med. dense		5.3	29	12	38	37	25	
4870							CLAYEY GRAVEL W/SAND possible cobbles								
	5		■	15	30,46,60/3.5"	SM	brown, moist, very dense								Chem.
4865															
	10		■	15	39,50,54,(99+)	SM *(A-1-b(0))*	brown, moist, very dense		12.5		NP	37	49	14	
4860							SILTY SAND W/GRAVEL possible cobbles								
	15		■	9	47,60/2.5"	SM	brown, moist, very dense								
4855															
	20		■	3	60/2.5"	SM	brown, moist, very dense								
							BOH								
4850															

200901.200 MVC2009 W.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6", $(N_1)_{60}$ Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-14

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 939+58, 218' RT. / N:344,962 E:507,105

DATE STARTED: 10/21/09

DRILLING METHOD: 96-CME-55 / N.W. CASING TO 3.5' / MUD ROTARY

DATE COMPLETED: 10/21/09

DRILLER: K. CONLIN

GROUND ELEVATION: 4846.2'

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: J. OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
						ML	dk. brown, dry SANDY SILT W/ORGANICS								
4845				18	4,6,7,(27)	SC-SM (A-2-4(0))	brown, dry to slightly moist, med. dense SILTY CLAYEY SAND		5.5	26	7	3	63	34	
4840	5			14	59,58,50/2.5"	SC-SM	brown, moist, very dense SILTY CLAYEY SAND W/GRAVEL possible cobbles								Chem.
4835	10			10	17,20,23,(74)	SM (A-1-b(0))	SILTY SAND W/GRAVEL brown, moist, very dense		14.6		NP	17	63	20	
							BOH								

200901.200 MVC2009 W.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; (6) ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-15

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 947+33, 224' RT. / N:345,449 E:506,502

DATE STARTED: 10/21/09

DRILLING METHOD: 96-CME-55 / N.W. CASING TO 3.5' / MUD ROTARY

DATE COMPLETED: 10/21/09

DRILLER: K. CONLIN

GROUND ELEVATION: 4842.5'

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: J. OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
							Organics in top 6"								
			Disturbed	18	3,4,5,(19)	SC-SM	brown, dry to slightly moist, med. dense								
							SILTY CLAYEY SAND								
4840															
	5														
			Disturbed	17	29,42,33,(99+)	ML (A-4(0))	gray, moist, very dense		39.2		NP	0	15	85	DS
							SILT W/SAND pumice?								
4835															
	10														
			Disturbed	15	31,56,60/5"	ML	gray, moist, very dense								
							BOH								
4830															

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6" ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

RB&G ENGINEERING, INC.

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-16

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
PROJECT NUMBER: 200901.200
LOCATION: STA. 949+83, 225' RT. / N:345,605 E:506,306
DATE STARTED: 10/21/09
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 3.5' / MUD ROTARY
DATE COMPLETED: 10/21/09
DRILLER: K. CONLIN
GROUND ELEVATION: 4837.4'
DEPTH TO WATER - INITIAL: ▽ DRY'
AFTER 24 HOURS: ▼ N.M.
LOGGED BY: J. OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
	0			SC-SM	dk. brown, dry — SILTY CLAYEY SAND W/ORGANICS								
		18	2,2,2,(8)	ML	lt. gray-brown, slightly moist, loose — SANDY SILT slight organics								
4835													
	5	15	23,30,60/3"	SM	lt. brown, moist, very dense — SILTY SAND W/GRAVEL slightly plastic								Chem.
4830													
	10	18	25,16,19,(60)	SM (A-4(0))	lt. brown, moist, very dense		18.9	29	6	17	36	47	
4825													
	15	9	Pushed	ML (A-4(0))	gray, moist — SANDY SILT		21.3		NP	1	44	55	
		13	12,19,22,(56)	ML	gray, moist, very dense — SILT W/SAND pumice?								
4820					BOH								

200901.200 MVC2009 W.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE: 2,3,2,(6) — Blow Count per 6", $(N_1)_{60}$ Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE: PUSHED; 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-17

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 952+33, 226' RT. / N:345,761 E:506,111
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 3.5' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/21/09
DATE COMPLETED: 10/21/09
GROUND ELEVATION: 4833.2'
LOGGED BY: J. OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
			Disturbed	18	2,5,3,(17)	CL	dk. brown, dry to slightly moist, stiff	LEAN CLAY W/SAND slight organics								
4830	5		Undisturbed	17	Pushed	SM (*A-4(0)*)	lt. brown, slightly moist	SILTY SAND		7.3		NP	3	61	36	
4825	10		Disturbed	11	27,36,47,(99+)	SM	brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles								
4820	15		Disturbed	9	50,60/3"	SM (*A-1-b(0)*)	brown, moist, very dense			13.4		NP	33	52	15	
4815	20		Disturbed	16	22,38,60/5"	SM (*A-2-4(0)*)	gray-brown, very moist, very dense	SILTY SAND		19.6		NP	9	68	23	
4810								BOH								

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-18

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 954+83, 227' RT. / N:345,917 E:505,916
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 10' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/21/09
DATE COMPLETED: 10/21/09
GROUND ELEVATION: 4837.5'
LOGGED BY: J. OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				17	3,4,4,(17)	SC-SM (A-4(0))	dk. brown, slightly moist, med. dense		7.1	25	6	7	56	37	
							SILTY CLAYEY SAND								
4835															
	5			15	1,2,4,(13)	SM	brown, moist, med. dense								Chem.
4830							SILTY SAND								
	10			11	8,7,8,(26)	SM (A-2-4(0))	brown, moist, med. dense		13.0		NP	1	66	33	
							BOH								
4825															

200901.200 MVC2009 W.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6"; (6) $(N_1)_{60}$ Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-19

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 957+33, 228' RT. / N:346,073 E:505,720
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 3.5' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/21/09
DATE COMPLETED: 10/21/09
GROUND ELEVATION: 4831.1'
LOGGED BY: J. OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
4830				17	3,8,9,(36)	SM (*A-4(0)*)	brown, slightly moist, dense — SILTY SAND		4.3		NP	10	54	36	
4825	5			10	60,60/4"	GM (*A-1-a(0)*)	brown, moist, very dense — SILTY GRAVEL W/SAND possible cobbles		9.6		NP	49	38	13	
4820	10			15	18,22,60/3"	ML	brown, moist, very dense — SANDY SILT slightly cemented								
4815	15			11	14,17,27,(62)	SM	dk. brown, moist, very dense — SILTY SAND								
							BOH								

200901.200 MVC2009 W.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-20

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 956+06, 222' LT. / N:345,641 E:505,540

DATE STARTED: 10/21/09

DRILLING METHOD: 96-CME-55 / N.W. CASING TO 5' / MUD ROTARY

DATE COMPLETED: 10/21/09

DRILLER: K. CONLIN

GROUND ELEVATION: 4874.3'

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: J. OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				11	4,7,9,(34)	SC	brown, dry to slightly moist, dense — Organics in top 6" CLAYEY SAND W/GRAVEL								
4870	5			15	5,15,60/3" *0.28*	CL-ML *(A-4(2))*	brown, very moist, soft — SANDY SILTY CLAY		24.4	27	6	10	23	67	
4865	10			9	33,60/4.5"	SM	black, moist, very dense — SILTY SAND W/GRAVEL possible cobbles								Chem.
4860	15			13	9,10,11,(30)	SM *(A-1-b(0))*	dk. brown, very moist, med. dense		19.6		NP	26	57	17	
4855	20			7	10,15,18,(41)	SM	dk. brown, very moist, dense — SILTY SAND								
4850	25			10	21,24,19,(48)	SM *(A-1-b(0))*	gray, very moist, dense — SILTY SAND W/GRAVEL		19.1		NP	19	62	19	
							BOH								
4845															

200901.200 MVC2009 W.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) — Blow Count per 6"; $(N_1)_{60}$ Value; *0.45* — Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED *0.45* — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-21

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 959+16, 222' LT. / N:345,834 E:505,298
DRILLING METHOD: 08-CME-55 / N.W. CASING TO 9' / MUD ROTARY
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 11/30/09
DATE COMPLETED: 11/30/09
GROUND ELEVATION: 4887.3'
LOGGED BY: J. OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
			Disturbed	17	4,13,28,(87)	SC (*A-6(4)*)	lt. brown, dry to slightly moist, very dense	CLAYEY SAND boulders & cobbles		7.5	33	17	12	41	47	
4885																
	5		Disturbed	2	60/2.5"	GC	dk. brown, slightly moist, very dense	CLAYEY GRAVEL W/SAND boulders & cobbles								
4880																
	10		Disturbed	14	44,34,32,(99+)	GP-GM (*A-1-a(0)*)	gray-brown, moist, very dense	GRAVEL W/SILT & SAND possible cobbles		10.8		NP	47	42	11	
4875																
	15		Disturbed	15	24,32,28,(81)	GP-GM (*A-1-a(0)*)	gray-brown, moist, very dense			12.6		NP	54	37	9	
4870																
	20		Disturbed	6	60/5.5"	SM	dk. brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles, occasional thin clay layers								
4865																
	25		Disturbed	8	25,60/4"	SM	dk. brown, moist, very dense									
4860																
	30		Disturbed	5	21,60/5.5"	SM	dk. brown, very moist, very dense									
4855																
	35		Disturbed	10	44,60/3.5"	SM (*A-1-b(0)*)	dk. brown, very moist, very dense			18.7		NP	22	60	18	
4850																
	40		Disturbed	7	46,60/1"	SM	dk. brown, very moist, very dense	BOH								
4845																

200901.200 MVC2009 W.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; *0.45* ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-22

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 977+84, 222' RT. / N:347,342 E:504,109

DRILLING METHOD: DP-CME-55 / HSA ROTARY

DRILLER: D.S. (DIRECT PUSH SERVICES, LLC)

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M

PROJECT NUMBER: 200901.200

DATE STARTED: 10/30/09

DATE COMPLETED: 10/30/09

GROUND ELEVATION: 4868.1'

LOGGED BY: S. CHAFFIN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter: Liquid Limit	Atter: Plast Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				15	3,6,11,(39)	CL *(A-4(7))*	lt brown, dry to slightly moist, very stiff — LEAN CLAY W/SAND		7 8	31	10	0	23	77	
4865	5			14	3,5,6,(25)	SM	brown, slightly moist, med dense — SILTY SAND								
4860	10			18	5,6,8,(24)	ML *(A-4(0))*	brown, slightly moist, med dense — SILT		11 3		NP	0	10	90	
4855	15			18	4,5,6,(16)	ML	brown, slightly moist, med dense								
4850							BOH								

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) — Blow Count per 6"; $(N_1)_{60}$ Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

RB&G ENGINEERING, INC.

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-23

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 992+46, 177' LT. / N:347,937 E:502,716
DRILLING METHOD: DP-CME-55 / HSA
DRILLER: C.D (DIRECT PUSH SERVICES, LLC)
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 11/3/09
DATE COMPLETED: 11/3/09
GROUND ELEVATION: 4938.7'
LOGGED BY: S. CHAFFIN, J. BOONE

Elev (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter: Liquid Limit	Atter: Plast Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				11	5,13,17,(71)	GC-GM (A-2-4(0))	brown, slightly moist, dense — SILTY CLAYEY GRAVEL W/SAND		4.4	25	7	47	34	19	
4935	5			11	9,16,22,(89)	SM (A-1-b(0))	gray, moist, very dense — SILTY SAND W/GRAVEL possible cobbles		11.1		NP	19	67	14	
4930	10			5	24,50,60/4"	SM	gray, moist, very dense								
4925	15			4	12,20,27,(70)	SP-SM	brown, moist, dense — SAND W/SILT & GRAVEL								
				8	11,13,26,(55)	SP-SM (A-1-a(0))	brown, moist, dense		8 0		NP	44	46	10	
4920	20			13	36,36,28,(83)	SP (A-1-a(0))	brown, very moist, very dense — SAND W/GRAVEL		10.5		NP	39	59	2	
4915	25			15	30,47,37,(98)	GP-GM	brown-gray, very moist, very dense — GRAVEL W/SILT & SAND possible cobbles								
							BOH								
4910															

200901.200 MVC2009 W.GPJ US EVAL.GDT 12/31/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6" ; ← $(N_1)_{60}$ Value ; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED ; 0 45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-24

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 995+83, 217' RT. / N:348,456 E:502,696
DRILLING METHOD: DP-CME-55 / HSA
DRILLER: C.D. (DIRECT PUSH SERVICES, LLC)
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 11/2/09
DATE COMPLETED: 11/2/09
GROUND ELEVATION: 4907.8'
LOGGED BY: S. CHAFFIN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
			Disturbed	17	3,11,30,(96)	CL	brown, dry — LEAN CLAY W/SAND & ORGANICS								
						GP-GM	gray to red, dry, very dense — GRAVEL W/SILT & SAND possible cobbles								
4905															
	5		Disturbed	13	22,52,52,(99+)	SC (A-4(0))	very lt. gray, slightly moist, very dense — CLAYEY SAND W/GRAVEL		6.7	29	9	28	36	36	
4900															
	10		Disturbed	18	6,8,4,(22)	SC	very lt. gray, moist, med. dense — CLAYEY SAND								
			Undisturbed	10	Pushed	SC (A-6(2))	very lt. gray, moist	72.9	28.3	32	11	0	52	48	CT
4895															
			Disturbed	11	2,8,10,(29)	SC	very lt. gray, moist, med. dense								
							BOH								

200901.200 MVC2009 W.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-25

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA 997+62, 227' RT. / N:348,574 E:502,563
DRILLING METHOD: DP-CME-55 / HSA
DRILLER: C D. (DIRECT PUSH SERVICES, LLC)
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N M.

PROJECT NUMBER: 200901.200
DATE STARTED: 11/2/09
DATE COMPLETED: 11/2/09
GROUND ELEVATION: 4910.7'
LOGGED BY: S. CHAFFIN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter Liquid Limit	Atter Plast Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
						SC-SM (A-4(0))	brown, slightly moist — SILTY CLAYEY SAND		5 9	26	7	3	53	44	
4910				14	3,47,21,(99+)	GM	gray, slightly moist, very dense — SILTY GRAVEL W/SAND possible cobbles								
4905	5			18	16,25,25,(99+)	SM (A-1-b(0))	very lt gray, slightly moist, very dense — SILTY SAND W/GRAVEL		3 5		NP	26	56	18	
4900	10			0	60/2"	-	no recovery — SANDY SILT W/GRAVEL possible cobbles								
4895	15			2	9,23,21,(65)	ML	brown, slightly moist, very dense								
							BOH								

200901.200 MVC2009 W.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6", $(N_1)_{60}$ Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-W1-26

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 999+89, 220' RT. / N:348,709 E:502,382

DRILLING METHOD: DP-CME-55 / HSA

DRILLER: C.D. (DIRECT PUSH SERVICES, LLC)

DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 11/2/09

DATE COMPLETED: 11/2/09

GROUND ELEVATION: 4913 3'

LOGGED BY: S. CHAFFIN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				15	4,5,12,(40)	SC (*A-4(2)*)	brown, slightly moist, dense CLAYEY SAND		6.5	25	10	4	48	48	
4910							SILTY GRAVEL W/SAND possible cobbles								
	5					GM	gray, slightly moist, dense								
				16	30,20,18,(89)	SM (*A-1-b(0)*)	brown, slightly moist, very dense SILTY SAND W/GRAVEL		4 8		NP	19	60	21	
4905							SILTY GRAVEL W/SAND								
	10					GM	brown, slightly moist								
				12	14,22,60/4"	SM	brown, slightly moist, very dense SILTY SAND W/GRAVEL								
							BOH								
4900															

200901.200 MVC2009 W.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-E1-1

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 863+60, 179' LT. / N:340,372 E:513,148
DRILLING METHOD: 96-CME-55 / N. W. CASING TO 28.5' / MUD ROTARY
DRILLER: E. CHRISTENSEN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 9/1/09
DATE COMPLETED: 9/1/09
GROUND ELEVATION: 4826.2'
LOGGED BY: M. HANSEN, J. BOONE

Elev. (ft)	Depth (ft)	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
4825		14	14,14,10,(50)	SM (A-4(0))	gray-brown, slightly moist, dense	Organics in top 6" SILTY SAND		3.6		NP	14	50	36	
4820	5	10	43,45,37,(99+)	SM	gray-brown, slightly moist, very dense	SILTY SAND W/GRAVEL possible cobbles								
4815	10	12	24,42,34,(99+)	SM (A-1-b(0))	gray-brown, moist, very dense			6.5		NP	33	52	15	
4810	15	10	28,51/6"	GM	brown, moist, very dense	SILTY GRAVEL W/SAND possible cobbles								
4805	20	9	30,53/6"	GM (A-1-a(0))	brown, moist, very dense			7.6		NP	54	33	13	
4800	25	8	15,55/6"	GP-GM	brown, moist, very dense	GRAVEL W/SILT & SAND possible cobbles								
4795	30	3	60/4"	GP-GM	brown, moist, very dense									
4790	35	6	35,50/3"	GP-GM	brown, moist, very dense									
4785	40	14	45,60,60/4.5"	SM (A-1-a(0))	brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles		10.9		NP	41	44	15	
						BOH								

200901.200 MVC2009_E.GPJ US EVAL.GDT 10/16/09

RB&G ENGINEERING, INC.

LEGEND:
DISTURBED SAMPLE: 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)
UNDISTURBED SAMPLE: PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-E1-2

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 891+46, 134' LT. / N:341,939 E:510,845
DRILLING METHOD: 96-CME-55 / N. W. CASING TO 5' / MUD ROTARY
DRILLER: E. RICHARDSON
DEPTH TO WATER - INITIAL: ∇ DRY' AFTER 24 HOURS: ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 9/3/09
DATE COMPLETED: 9/3/09
GROUND ELEVATION: 4852.7'
LOGGED BY: M. HANSEN, J. BOONE

Elev. (ft)	Depth (ft)	Sample Rec. (in)	Sample See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
		16	5,8,8,(34)	SM (A-2-4(0))	lt. brown, dry, dense SILTY SAND		2.2		NP	2	81	17	
4850													
	5	4.5	50/4.5"	GM	red-brown, slightly moist, very dense								
4845													
	10	2	50/2"	GM	red-brown, slightly moist, very dense SILTY GRAVEL W/SAND possible cobbles & boulders								
4840													
	15	0	60/1"	-	no recovery								
4835													
	20	0.5	50/2"	GM	red-brown, moist, v. dense BOH								
4830													

200901.200 MVC2009_E.GPJ US EVAL.GDT 10/16/09

RB&G ENGINEERING, INC.

LEGEND:
DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)
UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-E1-3

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 894+89, 60' LT. / N:342,189 E:510,599

DATE STARTED: 9/4/09

DRILLING METHOD: 96-CME-55 / N. W. CASING TO 8' / MUD ROTARY

DATE COMPLETED: 9/4/09

DRILLER: E. RICHARDSON

GROUND ELEVATION: 4845.6'

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: M. HANSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
4845			■	8	5,35/2"	SM (A-2-4(0))	lt. gray-brown, dry, very dense	Organics in top 4" SILTY SAND W/GRAVEL possible cobbles		1.9		NP	24	62	14	
4840	5		■	8	10,27,46,(99+)	GP-GM (A-1-a(0))	gray, moist, very dense	GRAVEL W/SILT & SAND possible cobbles & boulders		7.1		NP	56	38	6	
4835	10		■	0	25/0"	-	no recovery									
4830	15		■	4	60/4"	GP-GM/GM	red-brown & gray, moist, very dense	GRAVEL W/SILT & SAND TO SILTY GRAVEL W/SAND possible cobbles & boulders								
4825	20		■	2	60/2"	GP-GM/GM	red-brown & gray, moist, very dense									
			■	2	60/5"	GP-GM/GM	red-brown, moist, v. dense									
								BOH								

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-E1-4

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 905+42, 179' LT. / N:342,631 E:509,641
DRILLING METHOD: 96-CME-55 / N. W. CASING TO 30' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ▽ 35.0' **AFTER 24 HOURS:** ▼ DRY'

PROJECT NUMBER: 200901.200
DATE STARTED: 9/8/09
DATE COMPLETED: 9/8/09
GROUND ELEVATION: 4836.4'
LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4835			■	14	3,8,9,(36)	SM (A-2-4(0))	brown, dry to slightly moist, dense — SILTY SAND W/GRAVEL slightly plastic		3.4	23	3	29	46	25	
4830	5		■	12	12,29,50,(99+)	GM (A-1-b(0))	gray-brown, moist, very dense — SILTY GRAVEL W/SAND possible cobbles		7.4		NP	43	40	17	
4825	10		■	13	22,20,14,(55)	SM (A-1-b(0))	gray-brown, moist, very dense — SILTY SAND W/GRAVEL possible cobbles		7.9		NP	32	49	19	
4820	15			0	60/2"	-	no recovery — SILTY GRAVEL W/SAND possible cobbles								
4815	20		■	13	35,44,37,(94)	GM (A-1-b(0))	gray-brown, moist, dense		10.3		NP	50	34	16	
4810	25		■	12	21,28,30,(60)	SM (A-1-b(0))	gray-brown, moist, very dense — SILTY SAND W/GRAVEL possible cobbles		12.9		NP	24	56	20	
4805	30		■	4	60/5"	SM	rust-brown, moist, very dense — SILTY SAND slight cementation								
4800	▽ 35			2	60/3"	SM	rust-brown, moist, very dense								
4795	40			2	60/2"	GP-GM	rusty-brown, moist, very dense — GRAVEL W/SILT & SAND possible cobbles & boulders								
4790	45			0	60/1"	-	no recovery								
4785	50			0	60/1.5"	-	no recovery — BOH								

200901.200 MVC2009_E.GPJ US EVAL.GDT 10/16/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-E1-5

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 929+50, 166' RT. / N:344,295 E:507,864

DATE STARTED: 9/9/09

DRILLING METHOD: 96-CME-55 / N. W. CASING TO 5' / MUD ROTARY

DATE COMPLETED: 9/9/09

DRILLER: K. CONLIN

GROUND ELEVATION: 4842.8'

DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
			Disturbed	13	3,5,13,(38)	SC *(A-4(1))*	CLAYEY SAND: brown, dry, dense		4.4	26	10	9	50	41	
4840															
	5		Undisturbed	15	Pushed	SM *(A-4(0))*	SILTY SAND: lt. gray, moist		24.0		NP	0	55	45	
			Disturbed	13	19,23,28,(99+)	SM	lt. gray-brown, moist, very dense								
4835															
	10		Disturbed	18	7,11,11,(38)	ML *(A-4(0))*	SANDY SILT: brown, moist, dense		31.9		NP	0	49	51	
4830															
	15		Disturbed	15	9,20,20,(57)	ML *(A-4(0))*	brown, moist, very dense		33.9		NP	1	49	50	
4825															
	20		Undisturbed	5	Pushed	SM *(A-2-4(0))*	SILTY SAND: brown, moist		23.4		NP	3	63	34	
			Disturbed	16	17,34,50,(96)	SM	brown, moist, very dense								
4820															
	25		Disturbed	16	20,24,32,(58)	SM *(A-2-4(0))*	brown, moist, very dense		19.6		NP	8	61	31	
4815															
	30		Disturbed	16	13,21,44,(62)	ML *(A-4(0))*	SANDY SILT: brown, moist, very dense		29.2		NP	6	44	50	
							BOH								
4810															

200901.200 MVC2009_E.GPJ US EVAL.GDT 10/16/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) / 0.45: Blow Count per 6"; $(N_1)_{60}$ Value; Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED / 0.45: Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-E1-6

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 963+50, 219' RT. / N:346,449 E:505,232
DRILLING METHOD: 96-CME-55 / N. W. CASING TO 9.5' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ▽ DRY' AFTER 24 HOURS: ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 9/9/09
DATE COMPLETED: 9/9/09
GROUND ELEVATION: 4836.9'
LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4835							SANDY SILT								
	5			5	60/5"	ML	brown, dry								
						GM	gray-brown, slightly moist, very dense — SILTY GRAVEL W/SAND								
4830															
	10			17	20,42,50/5"	ML (A-4(1))	brown w/white, moist, hard — SANDY SILT plastic		27.7	33	5	7	40	53	
4825															
	15		Pushed	4	Pushed	SM (A-2-4(0))	brown, moist — SILTY SAND W/GRAVEL plastic		27.7	37	5	24	43	33	
				3	60/3"	SM (A-1-b(0))	brown, moist, very dense — SILTY SAND W/GRAVEL possible cobbles		11.5		NP	32	51	17	
4820															
	20			10	49,60/4"	GM	gray-brown, moist, very dense — SILTY GRAVEL W/SAND possible cobbles								
4815															
	25			10	46,60/4"	SM (A-4(0))	gray-brown, very moist, very dense — SILTY SAND W/GRAVEL possible cobbles		16.0		NP	15	49	36	
4810															
	30			3	60/4.5"	GM	lt. gray-brown, very moist, very dense — SILTY GRAVEL W/SAND possible cobbles								
							BOH								
4805															

200901.200 MVC2009_E.GPJ US EVAL.GDT 10/16/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-E1-7

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 1004+60, 178' RT. / N:348,978 E:502,019
DRILLING METHOD: 96-CME-55 / N. W. CASING TO 9.8' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 9/10/09
DATE COMPLETED: 9/10/09
GROUND ELEVATION: 4905.9'
LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4905				8	12,60/5"	SC (A-4(2))	brown, slightly moist, very dense — CLAYEY SAND possible cobbles		7.8	26	10	2	50	48	
4900	5			15	40,44,49,(99+)	SP-SM	brown, moist, very dense — SAND W/SILT & GRAVEL possible cobbles								
4895	10			13	32,34,30,(99+)	SP-SM (A-1-a(0))	brown, moist, very dense		8.8		NP	46	46	8	
4890	15			11	17,40,26,(88)	GP-GM	brown, moist, very dense — GRAVEL W/SILT & SAND (PULVERIZED ROCK) possible cobbles								
4885	20			8	57,60/3"	GP-GM	brown, moist, very dense								
4880	25			15	26,50,60/4.5"	SP-SM (A-1-a(0))	brown, moist, very dense — SAND W/SILT & GRAVEL possible cobbles		9.9		NP	45	47	8	
4875	30			13	31,42,38,(76)	SP-SM	brown, moist, very dense								
							BOH								

200901.200 MVC2009_E.GPJ US EVAL.GDT 10/16/09

RB&G
ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-D1-01

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 40+82, 741' RT. (SOUTH HILLS) / N:338,838 E:517,406
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 6.5' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/9/09
DATE COMPLETED: 10/9/09
GROUND ELEVATION: 4660.2'
LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
4660			Disturbed	17	9,17,20,(78)	SC	dk. brown, dry to slightly moist, very dense	CLAYEY SAND W/GRAVEL	1,040								
			Disturbed	11	23,17,29,(99+)	GM (A-1-a(0))	dk. gray-brown, slightly moist, very dense	SILTY GRAVEL W/SAND possible cobbles			3.3		NP	58	27	15	
4655	5		Disturbed	12	7,10,11,(47)	SM (A-1-b(0))	gray, moist, dense	SILTY SAND W/GRAVEL	115		14.9		NP	17	60	23	
			Disturbed	14	8,18,9,(53)	SM	gray, moist	SILTY SAND									
						CL	dk. brown, moist, stiff	LEAN CLAY									
4650	10		Undisturbed	8	Pushed 0.50	CL (A-6(9))	dk. brown, moist, stiff			89.6	20.0	31	11	1	13	86	
								BOH									

200901.200 MVC2009 D.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) — Blow Count per 6", $(N_1)_{60}$ Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-02

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 42+03, 630' RT. (SOUTH HILLS) / N:338,997 E:517,570
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 10' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/12/09
DATE COMPLETED: 10/12/09
GROUND ELEVATION: 4648.0'
LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				11	6,14,24,(80)	SC	CLAYEY SAND W/GRAVEL dk. brown, slightly moist, very dense	52,400								Chem.
4645				12	8,9,12,(47)	SC (A-6(0))	brown, slightly moist, dense			7.5	28	11	24	40	36	
	5			6	12,16,45,(99+)	GM	SILTY GRAVEL W/SAND red-brown, moist, very dense	21,300								
4640				9	14,21,23,(86)	GM	very dk. brown, moist, very dense									
	10			13	11,10,15,(43)	SM (A-2-4(0))	SILTY SAND brown, very moist, dense			17.3		NP	0	78	22	
							BOH									
4635																

200901.200 MVC2009 D.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6", $(N_1)_{60}$ Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-03

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 41+15, 460' RT. (SOUTH HILLS) / N:339,124 E:517,394
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 6.5' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ⊻ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/12/09
DATE COMPLETED: 10/12/09
GROUND ELEVATION: 4654.1'
LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				18	7,14,14,(59)	SC	dk. brown, slightly moist, very dense	CLAYEY SAND W/GRAVEL slight organics	311								
				5	7,7,7,(31)	CL	brown, slightly moist, very stiff	LEAN CLAY W/SAND									
4650	5			11	Pushed *0.50*	CL *(A-4(5))*	lt. brown, moist, stiff		519		14.4	27	8	0	19	81	
				18	19,21,29,(98)	SM *(A-1-b(0))*	brown, moist, very dense	SILTY SAND occasional clay lenses			13.8		NP	8	74	18	
4645	10			18	13,35,10,(77)	SM	brown, moist, very dense										Chem.
4640								BOH									

200901.200 MVC2009 D.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; *0.45* ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-04

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 868+59, 266' RT. / N:341,017 E:512,975
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 8.5' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/12/09
DATE COMPLETED: 10/12/09
GROUND ELEVATION: 4800.8'
LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
4800				17	5,7,8,(31)	CL	lt. brown, slightly moist, very stiff	SANDY LEAN CLAY W/GRAVEL	493								Chem.
				16	5,7,9,(36)	SM (A-4(0))	lt. brown, slightly moist, dense	SILTY SAND clayey sand layers			6.7		NP	8	55	37	
4795	5			15	13,25,38,(99+)	SM	brown, moist, very dense		102								Chem.
				11	28,60/4"	SM (A-1-b(0))	brown, slightly moist, very dense	SILTY SAND W/GRAVEL occasional clay lenses, possible cobbles			13.0		NP	29	58	13	
	10			0	60/1"	-	no recovery										
4790								BOH									

200901.200 MVC2009_D.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; (N$_1$)$_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-05

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 872+28, 261' RT. / N:341,216 E:512,664
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 6.5' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ 7.5' **AFTER 24 HOURS:** ▼ DRY'

PROJECT NUMBER: 200901.200
DATE STARTED: 10/12/09
DATE COMPLETED: 10/12/09
GROUND ELEVATION: 4807.7'
LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
		18	9,7,10,(36)	SC (A-2-6(0))	brown, dry to slightly moist, dense — CLAYEY SAND W/GRAVEL	726		4.4	26	11	14	53	33	
4805		9	6,5,5,(22)	SM	brown, slightly moist, med. dense — SILTY SAND									
	5	17	7,8,9,(38)	SM (A-1-b(0))	brown, moist, dense			5.2		NP	8	67	25	
4800		9	8,7,8,(29)	SM (A-1-b(0))	brown, moist, med. dense — SILTY SAND plastic	187		9.2	21	3	9	66	25	
	10	13	5,6,11,(29)	SM	brown, moist, med. dense									
					BOH									
4795														

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6", $(N_1)_{60}$ Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-06

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 896+11, 267' RT. / N:342,530 E:510,673
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 9.5' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/12/09
DATE COMPLETED: 10/12/09
GROUND ELEVATION: 4793.7'
LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				18	14,19,15,(71)	SC-SM (A-2-4(0))	dk. brown, dry to slightly moist, dense	SILTY CLAYEY SAND W/GRAVEL	519		5.0	22	7	17	53	30	
4790				17	14,28,46,(99+)	SC-SM	dk. red-brown, moist, very dense										Chem.
	5			15	29,43,50/3"	SP-SM (A-1-b(0))	dk. gray-brown, moist, very dense	SAND W/SILT & GRAVEL possible cobbles	259		12.7		NP	27	61	12	
4785				10	32,42,51,(99+)	GP-GM	dk. brown, moist, very dense	GRAVEL W/SILT & SAND possible cobbles									
	10			6	28,60/5"	SP-SM	gray, moist, very dense	SAND W/SILT & GRAVEL possible cobbles									
								BOH									
4780																	

200901.200 MVC2009 D.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6", $(N_1)_{60}$ Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-07

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
PROJECT NUMBER: 200901.200
LOCATION: STA. 897+66, 542' RT. / N:342,847 E:510,686
DATE STARTED: 10/13/09
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 9' / MUD ROTARY
DATE COMPLETED: 10/16/09
DRILLER: K. CONLIN
GROUND ELEVATION: 4774.2'
DEPTH TO WATER - INITIAL: ▽ DRY'
AFTER 24 HOURS: ▼ N.M.
LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				18	5,24,28,(99+)	SC	CLAYEY SAND W/GRAVEL: gray-brown, slightly moist, very dense	207								Chem.
				12	9,27,50,(99+)	SC (A-2-4(0))	brown, slightly moist, very dense			8.1	27	8	20	60	20	
4770	5			14	47,45,44,(99+)	SC-SM	SILTY CLAYEY SAND W/GRAVEL: gray-brown, slightly moist, very dense	346								Chem.
				18	29,52,43,(99+)	SM (A-1-b(0))	SILTY SAND W/GRAVEL: gray-brown, slightly moist, very dense			10.0		NP	30	56	14	
4765	10			12	25,42,45,(99+)	SP-SM	SAND W/SILT & GRAVEL: rust-brown, slightly moist, very dense									
							BOH									
4760																

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6", $(N_1)_{60}$ Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; *0.45* Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-08

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 898+67, 412' RT. / N:342,792 E:510,529
DRILLING METHOD: DP-CME-55 / HSA
DRILLER: C.D. (DIRECT PUSH SERVICES, LLC)
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/16/09
DATE COMPLETED: 10/16/09
GROUND ELEVATION: 4784.0'
LOGGED BY: S.CHAFFIN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
						CL	brown, slightly moist	SANDY LEAN CLAY	156								
				15	4,15,20,(82)	SM	lt. brown, slightly moist, very dense										
				12	27,32,50/2"	SM (A-2-4(0))	brown, moist, very dense				16.9		NP	12	53	35	
4780																	
	5			5	50/5"	SM	brown, moist, very dense	SILTY SAND slightly cemented, possible cobbles	46								
				9	37,50/3"	SM (A-2-4(0))	brown, moist, very dense				16.5		NP	3	68	29	
4775																	
	10			3	50/3"	SM	brown, moist, very dense										
								BOH									
4770																	

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE 2,3,2,(6) ← Blow Count per 6" ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE PUSHED 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-09

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 899+69, 262' RT. / N:342,719 E:510,361
DRILLING METHOD: DP-CME-55 / HSA
DRILLER: DIRECT PUSH SERVICES, LLC
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/14/09
DATE COMPLETED: 10/14/09
GROUND ELEVATION: 4796.0'
LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4795				14	5,5,6,(26)	SC	brown, slightly moist, med. dense	CLAYEY SAND W/GRAVEL	683								
				13	3,13,50/5"	SP-SM (A-1-b(0))	gray-brown, very moist, very dense	SAND W/SILT & GRAVEL			17.1		NP	28	61	11	
4790	5			4	50/2"	SM (A-2-4(0))	dk. brown, slightly moist, very dense	SILTY SAND possible cobbles	104*		4.7		NP	9	64	27	
				10	35,50/2"	SP-SM (A-1-a(0))	dk. brown, moist, very dense	SAND W/SILT & GRAVEL possible cobbles			13.5		NP	38	52	10	
4785	10			10	36,50/3"	SP-SM	dk. brown, moist, very dense										
								BOH									

*Auger-Soil Interface Not Sealed. Test May Be Invalid.

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; (N_1)$_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-10

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 900+11, 603' RT. / N:343,033 E:510,502
DRILLING METHOD: DP-CME-55 / HSA
DRILLER: C.D. (DIRECT PUSH SERVICES, LLC)
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/16/09
DATE COMPLETED: 10/16/09
GROUND ELEVATION: 4777.5'
LOGGED BY: S.CHAFFIN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				16	4,6,8,(33)	SM (A-4(0))	brown, slightly moist, dense			6.2		NP	10	51	39	
							SILTY SAND									
4775								207								
				6	5,5,6,(26)	SM	brown, slightly moist, med. dense									
	5															
				11	10,17,25,(99)	SM (A-1-b(0))	brown, moist, very dense SILTY SAND W/GRAVEL			13.7		NP	18	68	14	
							SANDY SILT									
4770						ML	gray, moist	277								
				9	7,30,40,(99+)	SM	brown, moist, very dense									
							SILTY SAND									
	10															
				7	2,20,27,(85)	SM	brown, moist, very dense									
							BOH									
4765																

200901.200 MVC2009_D.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:
DISTURBED SAMPLE 2,3,2,(6) ← Blow Count per 6", (N1)60 Value; 0.45 ← Torvane (tsf)
UNDISTURBED SAMPLE PUSHED 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-11

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 901+13, 419' RT. / N:342,929 E:510,316
DRILLING METHOD: DP-CME-55 / HSA
DRILLER: DIRECT PUSH SERVICES, LLC
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/15/09
DATE COMPLETED: 10/15/09
GROUND ELEVATION: 4790.8'
LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4790				12	9,5,15,(47)	SC-SM (A-4(0))	brown, dry to slightly moist, dense — SILTY CLAYEY SAND	745		6.1	23	6	9	49	42	
				6	7,50/1"	GP-GM	red-brown, very moist, very dense — GRAVEL W/SILT & SAND possible cobbles									
4785	5			3	50/2.5"	SC-SM	dk. brown, moist, very dense — SILTY CLAYEY SAND W/GRAVEL slightly cemented, possible cobbles	218*								
				4	50/5"	SM	dk. brown, moist, very dense — SILTY SAND W/GRAVEL slightly cemented, possible cobbles									
4780	10			3	50/5"	SM	dk. brown, moist, very dense									
							BOH									

*Auger-Soil Interface Not Sealed. Test May Be Invalid.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6"; (N₁)₆₀ Value → $(N_1)_{60}$ Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED 0.45 Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

RB&G ENGINEERING, INC.

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-12

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
PROJECT NUMBER: 200901.200
LOCATION: STA. 902+07, 273' RT. / N:342,852 E:510,161
DATE STARTED: 10/15/09
DRILLING METHOD: DP-CME-55 / HSA
DATE COMPLETED: 10/15/09
DRILLER: DIRECT PUSH SERVICES, LLC
GROUND ELEVATION: 4801.7'
DEPTH TO WATER - INITIAL: ▽ DRY'
AFTER 24 HOURS: ▼ N.M.
LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
		15	16,50/4"	SM (*A-2-4(0)*)	dk. brown, slightly moist, very dense	248		7.1		NP	25	51	24	
4800														
		12	5,15,15,(71)	SM	lt. brown to brown, slightly moist, very dense									
	5				SILTY SAND W/GRAVEL possible cobbles									
		8	15,14,16,(71)	SM	lt. brown, moist, very dense	103								
4795														
		10	7,37,50/4"	SM (*A-1-b(0)*)	brown, very moist, very dense			16.3		NP	34	47	19	
	10				SILTY CLAYEY SAND									
		8	5,49,50,(99+)	SC-SM	brown, very moist, very dense									
4790					BOH									

200901.200 MVC2009 D.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6" / $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-13

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 903+09, 617' RT. / N:343,200 E:510,249
DRILLING METHOD: DP-CME-55 / HSA
DRILLER: DIRECT PUSH SERVICES, LLC
DEPTH TO WATER - INITIAL: DRY' **AFTER 24 HOURS:** N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/15/09
DATE COMPLETED: 10/15/09
GROUND ELEVATION: 4786.6'
LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				16	11,11,12,(54)	SM	dk. brown, dry to slightly moist, very dense — SILTY SAND W/GRAVEL	1,120								Chem.
4785																
				18	4,17,19,(85)	SP-SM (A-1-a(0))	dk. gray-brown, moist, very dense — SAND W/SILT & GRAVEL			11.8		NP	42	52	6	
	5					SP-SM	red-brown, moist									
				12	3,9,5,(33)	SM	brown, moist, dense	337								
4780																
				8	3,5,4,(18)	SM	brown, moist, med. dense — SILTY SAND W/GRAVEL									
	10															
				9	8,9,11,(36)	SM (A-1-b(0))	brown, moist, dense			13.1		NP	34	53	13	
4775							BOH									

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6"; (6) $(N_1)_{60}$ Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-14

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 904+27, 436' RT. / N:343,105 E:510,055

DATE STARTED: 10/15/09

DRILLING METHOD: DP-CME-55 / HSA

DATE COMPLETED: 10/16/09

DRILLER: DIRECT PUSH SERVICES, LLC

GROUND ELEVATION: 4802.5'

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				13	16,27,30,(99+)	GP-GM (*A-1-a(0)*)	gray-brown, dry to slightly moist, very dense	94,300		3.1		NP	69	21	10	
4800				7	17,50/2.5"	GP-GM	red-brown, slightly moist, very dense									
							GRAVEL W/SILT & SAND possible cobbles									
	5			7	6,27,40,(99+)	GP-GM	red-brown, slightly moist, very dense	1,860								
4795				4	12,12,10,(45)	SM	dk. red-brown, moist, dense									
							SILTY SAND W/GRAVEL possible cobbles									
	10			5	40,50/2"	SM (*A-1-b(0)*)	dk. red-brown, moist, very dense			13.1		NP	27	53	20	
							BOH									
4790																

200901.200 MVC2009 D.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) — Blow Count per 6"; $(N_1)_{60}$ Value; *0.45* — Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; *0.45* — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-15

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 905+49, 266' RT. / N:343,021 E:509,863
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 7.5' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ⊻ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/16/09
DATE COMPLETED: 10/16/09
GROUND ELEVATION: 4814.4'
LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				17	5,16,24,(84)	SC (A-2-4(0))	dk. brown, slightly moist, very dense — CLAYEY SAND W/GRAVEL	804		5.7	26	8	23	46	31	
				10	21,25,33,(99+)	SM	brown, slightly moist, very dense — SILTY SAND W/GRAVEL									
4810	5			6	60/5"	SP-SM	dk. gray-brown, moist, very dense — SAND W/SILT & GRAVEL possible cobbles	354								
				13	16,16,15,(61)	SP-SM (A-1-b(0))	gray-brown, moist, very dense			10.0		NP	31	58	11	
4805	10			11	13,13,13,(45)	SP-SM	dk. red-brown, moist, dense									
4800							BOH									

200901.200 MVC2009 D.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-16

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 906+04, 624' RT. / N:343,356 E:510,002
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 10' / MUD ROTARY
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ⊻ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/16/09
DATE COMPLETED: 10/16/09
GROUND ELEVATION: 4796.8'
LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				12	6,9,9,(38)	SC-SM (*A-4(0)*)	brown, slightly moist, dense			6.1	25	6	16	45	39	
4795							SILTY CLAYEY SAND W/GRAVEL	570								
				11	7,5,5,(22)	SC-SM	brown, moist, med. dense									
	5			13	19,25,30,(99+)	GM (*A-1-b(0)*)	brown, moist, very dense			9.8		NP	44	43	13	
4790							SILTY GRAVEL W/SAND possible cobbles	372								
				13	26,38,45,(99+)	GM	brown, moist, very dense									Chem.
	10						SAND W/SILT & GRAVEL									
				13	29,43,52,(99+)	SP-SM	brown, moist, very dense									
4785							BOH									

200901.200 MVC2009 D.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) — Blow Count per 6", $(N_1)_{60}$ Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-17

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 958+24, 354' RT. / N:346,228 E:505,728
DRILLING METHOD: DP-CME-55 / HSA
DRILLER: C.D. (DIRECT PUSH SERVICES, LLC)
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/13/09
DATE COMPLETED: 10/13/09
GROUND ELEVATION: 4820.6'
LOGGED BY: S.CHAFFIN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4820				14	3,8,6,(33)	SC-SM (A-4(0))	brown, dry, dense — SILTY CLAYEY SAND	156		4.3	26	5	7	56	37	
				10	2,3,3,(14)	CL-ML	brown, slightly moist, firm — SANDY SILTY CLAY									Chem.
4815	5			10	2,2,3,(12)	CL-ML (A-4(0))	brown, moist, firm	31		15.2	24	4	5	41	54	
				5	2,3,3,(12)	CL-ML	brown, moist, firm									
4810	10			8	2,3,2,(9)	CL-ML	brown, moist, firm									
							BOH									

200901.200 MVC2009 D.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-18

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 958+23, 555' RT. / N:346,385 E:505,853
DRILLING METHOD: DP-CME-55 / HSA
DRILLER: DIRECT PUSH SERVICES, LLC
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 10/13/09
DATE COMPLETED: 10/13/09
GROUND ELEVATION: 4808.8'
LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				14	4,4,3,(16)	CL-ML	dk. brown, slightly moist, med. dense	SANDY SILTY CLAY	259								
				12	2,2,3,(12)	ML (A-4(0))	dk. brown, moist, med. dense				15.5		NP	6	42	52	
4805								SANDY SILT									
	5			12	2,2,3,(12)	ML	dk. brown, moist, med. dense										Chem.
				13	1,2,1,(6) 0.10	CL-ML (A-4(1))	dk. brown, moist, very soft	SANDY SILTY CLAY	35		19.0	23	4	3	22	75	
4800																	
	10			12	10,23,27,(90)	GM	brown, moist, very dense	SILTY GRAVEL W/SAND possible cobbles									
								BOH									
4795																	

200901.200 MVC2009 D.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-19

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 960+18, 456' RT. / N:346,428 E:505,639

DATE STARTED: 10/13/09

DRILLING METHOD: DP-CME-55 / HSA

DATE COMPLETED: 10/13/09

DRILLER: DIRECT PUSH SERVICES, LLC

GROUND ELEVATION: 4814.3'

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				15	6,10,7,(40)	CL-ML	brown, slightly moist, very stiff	SANDY SILTY CLAY	182								Chem.
				13	3,2,3,(12)	CL-ML (*A-4(0)*)	brown, moist to very moist, firm				22.6	24	5	5	42	53	
4810	5			12	2,3,4,(16)	CL-ML	brown, moist, firm		53								
				12	4,20,24,(90)	GC-GM (*A-1-b(0)*)	brown, moist, very dense	SILTY CLAYEY GRAVEL W/SAND possible cobbles			10.6	21	5	45	31	24	
4805	10			11	3,14,18,(58)	GM	brown, moist, dense	SILTY GRAVEL W/SAND possible cobbles									
								BOH									
4800																	

200901.200 MVC2009 D.GPJ US EVAL.GDT 12/29/09

RB&G
ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-20

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 961+83, 355' RT. / N:346,452 E:505,447

DRILLING METHOD: DP-CME-55 / HSA

DRILLER: DIRECT PUSH SERVICES, LLC

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 10/14/09

DATE COMPLETED: 10/14/09

GROUND ELEVATION: 4825.1'

LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4825				17	5,5,4,(21)	ML	brown, slightly moist, stiff	SANDY SILT	182								
				11	2,2,2,(9)	ML (A-4(0))	brown, moist, soft/loose				14.6		NP	0	35	65	
4820	5			13	2,2,2,(9)	ML	brown, moist, soft/loose		30,200								
				13	2,3,6,(18)	GM (A-2-4(0))	brown, wet, loose	SILTY GRAVEL W/SAND possible cobbles			20.0		NP	40	32	28	
4815	10			15	1,13,26,(70)	SM (A-2-4(0))	brown, wet, very dense	SILTY SAND W/GRAVEL			22.2		NP	29	42	29	
							BOH										

200901.200 MVC2009 D.GPJ US EVAL.GDT 12/29/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE: 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE: PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-D1-21

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 961+88, 558' RT. / N:346,614 E:505,569

DRILLING METHOD: DP-CME-55 / HSA

DRILLER: DIRECT PUSH SERVICES, LLC

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 10/14/09

DATE COMPLETED: 10/14/09

GROUND ELEVATION: 4810.7'

LOGGED BY: J.OLSEN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Permeability (ft/yr)	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4810				12	4,4,3,(16)	SC-SM	brown, slightly moist, med. dense — SILTY CLAYEY SAND	182								
				12	3,4,5,(21)	SC-SM (A-4(0))	brown, moist, med. dense			19.0	23	5	10	49	41	
4805	5			13	3,4,5,(21)	SM (A-2-4(0))	brown, moist, med. dense — SILTY SAND W/GRAVEL	61		17.0		NP	15	51	34	
				9	3,2,3,(10)	ML	brown, moist, firm — SANDY SILT									Chem.
4800	10			7	5,10,13,(41)	SM (A-1-b(0))	dk. brown, moist, dense — SILTY SAND W/GRAVEL			10.0		NP	36	45	19	
							BOH									

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6", $(N_1)_{60}$ Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 Torvane (tsf)

OTHER TESTS

UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-MVC-001

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 102+64, 17' LT. (SOUTH HILLS) / N:339,577 E:517,237
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: D. SAMPSON
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/7/09
DATE COMPLETED: 7/7/09
GROUND ELEVATION: 4654.0'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4650															
	5			16	5,7,10,(27)	SM (*A-4(0)*)	brown, moist, med. dense		12.6		NP	1	55	44	
				12	17,20,19,(54)	SM	lt. brown, slightly moist, very dense SILTY SAND								
4645	10			17	11,15,17,(39)	SM (*A-1-b(0)*)	lt. brown, slightly moist to moist, dense		7.5		NP	1	77	22	
4640				14	26,25,25,(55)	SM (*A-1-b(0)*)	lt. brown, moist, very dense		14.9		NP	8	69	23	
	15			18	16,17,16,(33)	SM	lt. brown, moist, dense								
							BOH								
4635															

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE PUSHED 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-MVC-002

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 99+00, 0' RT. (SOUTH HILLS) / N:339,554 E:516,878

DRILLING METHOD: 78-CME-55 / HSA

DRILLER: D. SAMPSON

DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 7/7/09

DATE COMPLETED: 7/7/09

GROUND ELEVATION: 4674.2'

LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4670	5						SILTY SAND W/GRAVEL								
				6	9,12,21,(53)	SM (A-2-4(0))	brown, moist, very dense		10.0		NP	27	49	24	
4665				18	13,33,60/4"	SM	brown, moist, very dense								
	10					GC-GM	brown, moist, very dense								
				12	11,55,37,(99+)	GC-GM (A-2-4(0))	brown, slightly moist, very dense — SILTY CLAYEY GRAVEL W/SAND possible cobbles		5.2	23	7	43	34	23	
4660	15			13	20,20,54,(77)	SM (A-2-4(0))	lt. brown, moist, very dense		11.1		NP	16	58	26	
				16	11,16,12,(27)	SM	lt. brown, moist, med. dense — SILTY SAND W/GRAVEL								
4655	20			12	10,15,24,(35)	SM	lt. brown, moist, dense								
							BOH								
4650															

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

RB&G ENGINEERING, INC.

ADDENDUM 1 - 12/31/09

200901.200 MVC2009 R.GPJ US EVAL.GDT 10/17/09

DRILL HOLE LOG

BORING NO. 09-MVC-003

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 94+00, 0' RT. (SOUTH HILLS) / N:339,726 E:516,411
DRILLING METHOD: 78-CME-55 / HSA
DRILLER: D. SAMPSON
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/7/09
DATE COMPLETED: 7/7/09
GROUND ELEVATION: 4690.4'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
4690				12	3,3,5,(13) Bulk*	SC-SM (A-4(0))	brown, slightly moist, med. dense	SILTY CLAYEY SAND		18.1	24	5	5	58	37	Proct. CBR
				12	2,3,4,(11)	SM (A-1-b(0))	brown, slightly moist to moist, med. dense	SILTY SAND W/GRAVEL		6.9		NP	16	71	13	
4685	5			13	13,5,6,(18)	SM (A-2-4(0))	brown, slightly moist to moist, med. dense			7.1		NP	5	65	30	
				13	5,8,11,(26)	SM	brown, moist, med. dense	SILTY SAND								
4680	10			16	7,14,55,(84)	SM	lt. brown, moist, very dense									
				4	60/5"	GM	lt. brown, moist, very dense	SILTY GRAVEL W/SAND possible cobbles								
4675	15			0	60/1"	-	no recovery	BOH								

*Note: Bulk sample taken at 0.5'-1.2' for Proctor & CBR tests.

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) Blow Count per 6"; $(N_1)_{60}$ Value; 0.45 Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-MVC-004

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 89+00, 0' RT. (SOUTH HILLS) / N:339,856 E:515,933

DRILLING METHOD: 78-CME-55 / CFA

DRILLER: D. SAMPSON

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 7/8/09

DATE COMPLETED: 7/8/09

GROUND ELEVATION: 4703.5'

LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
			Disturbed	15	3,2,5,(11)	SC-SM	dk. brown, moist, med. dense SILTY CLAYEY SAND								
			Undisturbed	12	Pushed	SC-SM (A-4(0))	dk. brown, slightly moist	106.2	5.7	20	4	5	54	41	
4700						SM	brown, moist SILTY SAND								
	5		Disturbed	17	8,9,11,(32)	SM (A-2-4(0))	brown, moist, dense		7.1		NP	1	77	22	
4695			Disturbed	10	14,23,60/3"	SM	brown, moist, very dense SILTY SAND W/GRAVEL								
			Disturbed	6	20,60/2"	GM	lt. brown, moist, very dense SILTY GRAVEL W/SAND cobbles								
	10						BOH								
4690															
	15														
4685															

200901.200 MVC2009 R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-MVC-005

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 84+01, 1' LT. (SOUTH HILLS) / N:339,856 E:515,434
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: D. SAMPSON
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/8/09
DATE COMPLETED: 7/8/09
GROUND ELEVATION: 4738.8'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				12	3,2,3,(8) Bulk*	SC-SM (A-2-4(0))	brown, moist, loose SILTY CLAYEY SAND		9.7	21	4	0	74	26	
						SM (A-2-4(0))	brown, moist SILTY SAND		10.9		NP	1	76	23	Proct. CBR
4735				15	30,32,25,(91)	GP-GM (A-1-a(0))	lt. brown, moist, very dense GRAVEL W/SILT & SAND cobbles		4.9		NP	45	44	11	
	5			16	55,49,60/5"	GP-GM	lt. brown, moist, very dense								
						SC-SM	brown, slightly moist, very dense SILTY CLAYEY SAND W/GRAVEL possible cobbles								
				0	60/1.5"	-	no recovery								
							BOH								
4730	10						*Note: Bulk sample taken at 0.5'-1.5' for Proctor & CBR tests.								
4725	15														
4720															

200901.200 MVC2009 R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:
DISTURBED SAMPLE 2,3,2,(6) ← Blow Count per 6" ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)
UNDISTURBED SAMPLE PUSHED 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-MVC-006

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 79+49, 15' RT. (SOUTH HILLS) / N:339,715 E:515,011
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: D. SAMPSON
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/8/09
DATE COMPLETED: 7/8/09
GROUND ELEVATION: 4767.3'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				8	6,11,16,(43)	GC (A-2-4(0))	dk. brown, moist, med. dense CLAYEY GRAVEL W/SAND		6.9	31	10	36	34	30	
4765						GC	brown, moist								
				14	9,26,27,(84)	SC-SM	lt. brown, moist, very dense SILTY CLAYEY SAND								
	5					SC-SM	lt. brown, moist								
				16	10,20,20,(64)	SM (A-1-b(0))	lt. brown, moist, very dense SILTY SAND W/GRAVEL		8.5		NP	29	52	19	
4760						GC	brown, slightly moist CLAYEY GRAVEL W/SAND								
				10	20,19,21,(56)	SM	brown, moist, very dense SILTY SAND								
	10					SM	brown, moist								
				18	10,20,31,(62)	CL-ML	brown, moist, stiff SANDY SILTY CLAY								
						CL-ML	brown, moist, stiff SANDY SILTY CLAY W/GRAVEL BOH								
4755															
	15														
4750															

200901.200 MVC2009 R.GPJ US EVAL.GDT 10/17/09

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LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-MVC-007

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 74+00, 0' RT. (SOUTH HILLS) / N:339,384 E:514,577
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: D. SAMPSON
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/8/09
DATE COMPLETED: 7/8/09
GROUND ELEVATION: 4801.3'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
4800								SILTY CLAY (driller's observation)								
	5							GRAVELS (driller's observation)								
4795			Disturbed	16	8,15,20,(54)	CL-ML	lt. brown, moist, very stiff	SILTY CLAY soil crumbles readily								
			Undisturbed	8	Pushed	CL-ML (A-4(5))	lt. brown, moist, very stiff		91.0	18.5	26	7	0	10	90	
4790	10		Disturbed	16	16,20,29,(57)	CL-ML (A-4(4))	lt. brown, moist, very stiff	SILTY CLAY W/SAND soil crumbles readily, sand layers to 1" thick		19.0	25	7	0	20	80	
	15		Disturbed	16	11,16,18,(36)	CL-ML	lt. brown, moist, stiff									
4785						GC-GM	brown, moist	SILTY CLAYEY GRAVEL W/SAND								
			Disturbed	17	10,13,13,(25)	CL-ML	lt. brown, moist, stiff	SILTY CLAY W/SAND								
								BOH								

RB&G ENGINEERING, INC.

LEGEND:
DISTURBED SAMPLE 2,3,2,(6) ← Blow Count per 6" ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)
UNDISTURBED SAMPLE PUSHED 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-MVC-007

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 74+00, 0' RT. (SOUTH HILLS) / N:339,384 E:514,577
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: D. SAMPSON
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/8/09
DATE COMPLETED: 7/8/09
GROUND ELEVATION: 4801.3'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
4800							SILTY CLAY (driller's observation)								
	5						GRAVELS (driller's observation)								
4795				16	8,15,20,(54)	CL-ML	lt. brown, moist, very stiff								
							SILTY CLAY soil crumbles readily								
				8	Pushed	CL-ML (A-4(5))	lt. brown, moist, very stiff	91.0	18.5	26	7	0	10	90	
	10														
4790				16	16,20,29,(57)	CL-ML (A-4(4))	lt. brown, moist, very stiff		19.0	25	7	0	20	80	
							SILTY CLAY W/SAND soil crumbles readily, sand layers to 1" thick								
				16	11,16,18,(36)	CL-ML	lt. brown, moist, stiff								
	15														
						GC-GM	brown, moist SILTY CLAYEY GRAVEL W/SAND								
4785				17	10,13,13,(25)	CL-ML	lt. brown, moist, stiff SILTY CLAY W/SAND								
							BOH								

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE ■ 2,3,2,(6) ← Blow Count per 6" ; ← $(N_1)_{60}$ Value ; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE ☒ PUSHED ; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-008

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 847+00, 188' RT. / N:339,630 E:514,678
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/13/09
DATE COMPLETED: 7/13/09
GROUND ELEVATION: 4793.9'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
	0–6						NOT SAMPLED								
4790	5														
			■		*0.21*	CL	brown, moist, soft — SANDY LEAN CLAY W/GRAVEL								
			■	10	2,16,58,(99+)	SC	lt. brown, moist, very dense — CLAYEY SAND W/GRAVEL								
			■			SC	lt. brown, moist								
4785			■	9	44,60/3.5"	SM (*A-2-4(0)*)	lt. brown, moist, very dense — SILTY SAND		13.6		NP	11	61	28	
	10														
			■	4	43,60/4"	SM (*A-1-b(0)*)	lt. brown, slightly moist, very dense — SILTY SAND W/GRAVEL		7.4		NP	34	51	15	
4780			■			SC-SM (*A-4(0)*)	brown, slightly moist — SILTY CLAYEY SAND		5.6	21	5	1	58	41	
	15		■	8	4,20,34,(55)	ML	brown, slightly moist, very dense — SILT W/SAND								
							BOH								
4775															

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE ■ 2,3,2,(6) ← Blow Count per 6" ; ← $(N_1)_{60}$ Value ; *0.45* ← Torvane (tsf)

UNDISTURBED SAMPLE ☒ PUSHED *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-009

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 852+00, 181' LT. / N:339,693 E:514,060

DRILLING METHOD: 96-CME-55 / N.W. CASING TO 8.5'

DRILLER: E. CHRISTENSEN

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 8/31/09

DATE COMPLETED: 9/1/09

GROUND ELEVATION: 4852.6'

LOGGED BY: M. HANSEN, J. BOONE

Elev. (ft): 4850, 4845, 4840, 4835, 4830, 4825, 4820, 4815, 4810, 4805, 4800

Depth (ft): 5, 10, 15, 20, 25, 30, 35, 40, 45, 50

Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
■	5.5	60/5.5"	SP-SM	brown, slightly moist, very dense									
■	12	39,60/6"	SP-SM (A-1-b(0))	brown, moist, very dense	SAND W/SILT & GRAVEL possible cobbles		12.8		NP	17	72	11	
—	2	60/2"	SP-SM	brown, moist, very dense									
■	6	64/6"	SP-SM	brown, moist, very dense									
■	10	40,60/4.5"	SM (A-2-4(0))	brown, moist, very dense	SILTY SAND		15.1		NP	2	80	18	
■	8	15,61/6"	SP-SM	brown, moist, very dense	SAND W/SILT & GRAVEL possible cobbles								
■	16	25,31,67,(66)	SP-SM	brown, moist, very dense									
■	16	18,26,50,(47)	SM (A-1-b(0))	brown, moist, dense	SILTY SAND W/GRAVEL possible cobbles		15.5		NP	17	66	17	
■	8	33,60/3"	SM (A-1-b(0))	brown, moist, very dense			10.9		NP	36	50	14	
■	14	27,44,52,(56)	SM	brown, moist, very dense									
■	7	38,50/1"	SM	brown, moist, very dense									
					BOH								

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE: 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE: PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-010

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 858+70, 185' RT. / N:340,394 E:513,760
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/14/09
DATE COMPLETED: 7/14/09
GROUND ELEVATION: 4812.8'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
4810							SILTY SAND								
				18	5,7,7,(22)	SM (A-1-b(0))	brown, moist, med. dense		12.9		NP	8	73	19	
	5														
				12	17,30,29,(94)	GM	brown, moist, dense — SILTY GRAVEL W/SAND possible cobbles								
4805															
				11	15,14,15,(39)	SC-SM (A-2-4(0))	lt. brown, moist, dense		8.8	22	6	5	65	30	
	10						SILTY CLAYEY SAND								
						SC-SM	lt. brown, moist								
				12	15,15,20,(40)	CL	red-brown, moist — SANDY LEAN CLAY								
4800						GM	red-brown, moist — SILTY GRAVEL W/SAND								
							BOH								
	15														
4795															

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) 0.45 — Blow Count per 6"; $(N_1)_{60}$ Value; Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-011

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 861+92, 181' LT. / N:340,278 E:513,286

DRILLING METHOD: 78-CME-55 / CFA

DRILLER: K. CONLIN

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 7/13/09

DATE COMPLETED: 7/13/09

GROUND ELEVATION: 4843.0'

LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				14	5,15,50,(99+)	SC-SM (A-2-4(0))	brown, slightly moist, very dense	SILTY CLAYEY SAND W/GRAVEL		4.7	28	7	34	34	32	
4840				2	60/6"	GM	gray-brown, slightly moist, very dense	SILTY GRAVEL W/SAND possible cobbles								
	5			14	3,11,20,(49)	SM (A-2-4(0))	brown, slightly moist, dense	SILTY SAND		5.4	21	3	12	58	30	
						SP	brown, slightly moist	SAND								
4835				14	10,32,40,(95)	SM	lt. brown, slightly moist, dense	SILTY SAND								
						SM	red-brown, slightly moist, very dense	SILTY SAND W/GRAVEL								
	10							BOH								
4830																
	15															
4825																

200901.200 MVC2009 R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) — Blow Count per 6"; $(N_1)_{60}$ Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-012

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 867+00, 178' RT. / N:340,857 E:513,060
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/13/09
DATE COMPLETED: 7/13/09
GROUND ELEVATION: 4803.8'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				15	4,5,5,(16)	SC-SM (A-4(0))	brown, moist, med. dense	SILTY CLAYEY SAND		11.2	23	5	7	53	40	
					Bulk*	CL-ML (A-4(2))	brown, moist	SANDY SILTY CLAY		17.5	27	7	2	38	60	Proct. CBR
				16	5,18,21,(62)	CL-ML (A-4(1))	lt. brown, moist, stiff	SANDY SILTY CLAY W/GRAVEL		14.9	26	7	20	28	52	
4800						GM	lt. brown, moist, dense	SILTY GRAVEL W/SAND possible cobbles								
	5			16	35,58,60,(99+)	GM	brown, moist, very dense									
4795				9	8,38,60/3"	GM	brown, moist, very dense									
	10							BOH								
4790	15															
4785																

*Note: Bulk sample taken at 2.25'-2.75' for Proctor & CBR tests.

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; (N₁)₆₀ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-013

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 872+00, 178' LT. / N:340,834 E:512,447
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/13/09
DATE COMPLETED: 7/13/09
GROUND ELEVATION: 4850.4'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4850				15	10,18,16,(54)	SC (A-2-4(0))	brown, moist, very dense		9.1	24	8	18	49	33	
							CLAYEY SAND W/GRAVEL								
				5	20,60/1"	SC	brown, moist, very dense								
4845	5			8	15,60/6"	SM (A-1-b(0))	brown, moist, very dense		7.1	23	3	17	63	20	
							SILTY SAND W/GRAVEL								
				10	26,60/5"	SM	brown, moist, very dense								
							BOH								
4840	10														
4835	15														

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) — Blow Count per 6"; $(N_1)_{60}$ Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-014

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 877+00, 178' RT. / N:341,406 E:512,224
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/13/09
DATE COMPLETED: 7/13/09
GROUND ELEVATION: 4809.4'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				16	4,3,4,(11)	SM (A-2-4(0))	brown, slightly moist, med. dense SILTY SAND		7.2		NP	8	69	23	
4805	5			14	5,16,45,(97)	SM	brown, slightly moist								
						SM (A-1-b(0))	brown, slightly moist, very dense		7.9		NP	36	42	22	
				10	32,60/5"	SM (A-1-b(0))	lt. brown, slightly moist, very dense SILTY SAND W/GRAVEL possible cobbles		12.0		NP	35	44	21	
4800	10			5	60/5.5"	GM	gray-brown, slightly moist, very dense SILTY GRAVEL W/SAND possible cobbles								
							BOH								
4795	15														
4790															

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE 2,3,2,(6) 0.45 — Blow Count per 6"; $(N_1)_{60}$ Value; Torvane (tsf)

UNDISTURBED SAMPLE PUSHED 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-015

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 882+15, 182' LT. / N:341,388 E:511,596
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/10/09
DATE COMPLETED: 7/10/09
GROUND ELEVATION: 4853.9'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
			Disturbed	15	3,4,4,(13)	SM (A-2-4(0))	brown, slightly moist, med. dense — SILTY SAND W/GRAVEL		5.2		NP	11	73	16	
			Disturbed	12	3,3,3,(10)	SP-SM (A-1-b(0))	brown, slightly moist, loose — SAND W/SILT & GRAVEL		4.6		NP	9	83	8	
4850	5		Disturbed	15	16,55,60/4"	GP-GM	brown, moist, very dense — GRAVEL W/SILT & SAND possible cobbles								
4845			Disturbed	8	5,60/5"	GP-GM	brown, moist, very dense								
	10						BOH								
4840	15														
4835															

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-016

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 887+27, 176' RT. / N:341,968 E:511,365

DRILLING METHOD: 78-CME-55 / CFA

DRILLER: K. CONLIN

DEPTH TO WATER - INITIAL: ∇ DRY' AFTER 24 HOURS: ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 7/10/09

DATE COMPLETED: 7/10/09

GROUND ELEVATION: 4810.0'

LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
		16	4,7,8,(24)	SP-SM (A-1-b(0))	brown, moist, med. dense	SAND W/SILT & GRAVEL		7.0		NP	35	55	10	
			Bulk*	GM (A-1-a(0))	brown, moist			9.1	22	2	49	38	13	Proct. CBR
		14	5,10,14,(38)	GM	brown, moist, med. dense	SILTY GRAVEL W/SAND								
4805	5													
		17	12,13,12,(40)	SM (A-1-b(0))	brown, moist, dense	SILTY SAND W/GRAVEL		7.8		NP	17	69	14	
		18	9,9,10,(24)	SM	brown, moist, dense									
4800	10					BOH								
						*Note: Bulk sample taken at 2.25'-2.5' for Proctor & CBR tests.								
4795	15													

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
- UC = Unconfined Compression
- CT = Consolidation
- DS = Direct Shear
- UU = Unconsolidated, Undrained
- *CU = Consolidated, Undrained*
- Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-017

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 891+80, 168' LT. / N:341,929 E:510,798

DATE STARTED: 7/14/09

DRILLING METHOD: 78-CME-55 / CFA

DATE COMPLETED: 7/14/09

DRILLER: K. CONLIN

GROUND ELEVATION: 4858.5'

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				16	7,8,8,(26)	SP-SM (*A-1-b(0)*)	brown, slightly moist, med. dense		3.5		NP	26	62	12	
							SAND W/SILT & GRAVEL								
4855				18	8,4,8,(19)	SP-SM (*A-1-a(0)*)	red-brown, slightly moist, loose		4.3		NP	29	63	8	
	5			10	12,24,60/1"	GP-GM	red-brown, slightly moist, very dense — GRAVEL W/SILT & SAND possible cobbles								
							BOH								
4850															
	10														
4845															
	15														
4840															

200901.200 MVC2009 R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; (N_1)$_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-018

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 896+99, 182' RT. / N:342,507 E:510,552
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/10/09
DATE COMPLETED: 7/10/09
GROUND ELEVATION: 4803.2'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4800							SILTY SAND W/GRAVEL								
			Disturbed	14	4,3,5,(13)	SM (A-2-4(0))	brown, slightly moist to moist, med. dense		6.2		NP	18	65	17	
	5														
			Disturbed	13	3,5,8,(21)	SM (A-2-4(0))	brown, moist, med. dense SILTY SAND		7.1		NP	14	68	18	
4795				0	60/1"	-	no recovery								
							GRAVEL W/SILT & SAND cobbles								
	10		Disturbed	3	60/3"	GP-GM	lt. gray, slightly moist, very dense								
							BOH								
4790															
	15														
4785															

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

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ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-019

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 901+84, 181' LT. / N:342,451 E:509,948

DRILLING METHOD: CAT 325B TRACKHOE

DRILLER: B. JOHNSON / R.A. JOHNSON EXCAVATING

DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 11/25/09

DATE COMPLETED: 11/25/09

GROUND ELEVATION: 4863.6'

LOGGED BY: J. PRICE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
					Bulk	SP (A-3(0))	SAND W/GRAVEL gray-brown, moist		5.1		NP	35	63	2	
4860	5														
4855					Bulk	GP (A-1-a(0))	GRAVEL W/SAND brown, moist		4.5		NP	57	42	1	
	10						BOH								
4850															

200901.200 MVC2009 TP.GPJ US EVAL.GDT 2/5/10

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) — Blow Count per 6"; (N1)60 Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-MVC-020

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 907+00, 178' RT. / N:343,019 E:509,688

DRILLING METHOD: 78-CME-55 / CFA

DRILLER: K. CONLIN

DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 7/10/09

DATE COMPLETED: 7/10/09

GROUND ELEVATION: 4819.5'

LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
			Disturbed	8	2,16,20,(57)	SM (A-2-4(0))	SILTY SAND W/GRAVEL brown, moist, very dense		8.4		NP	17	53	30	
4815	5		Disturbed	7	16,60/3"	GM	SILTY GRAVEL W/SAND brown, moist, very dense								
			Disturbed	12	7,9,12,(31)	SM (A-2-4(0))	SILTY SAND brown, slightly moist, dense		5.2		NP	12	62	26	
4810	10		Disturbed	14	10,22,52,(90)	SM	brown, slightly moist, dense								
						SP-SM	SAND W/SILT & GRAVEL lt. brown, slightly moist, very dense								
							BOH								
4805	15														
4800															

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) — Blow Count per 6"; (N1)60 Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

RB&G ENGINEERING, INC.

DRILL HOLE LOG

BORING NO. 09-MVC-021

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 912+00, 178' LT. / N:342,982 E:509,075

DRILLING METHOD: 78-CME-55 / CFA

DRILLER: D. SAMPSON

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 7/8/09

DATE COMPLETED: 7/8/09

GROUND ELEVATION: 4869.7'

LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				11	3,3,3,(10)	SC (A-2-6(0))	brown, moist, loose — CLAYEY SAND		9.7	27	12	12	59	29	-
					Bulk*	SC (A-2-6(0))	brown, moist — CLAYEY SAND		12.5	28	11	11	59	30	Proct. CBR
				11	6,5,6,(18)	SP-SM (A-1-a(0))	brown, moist, med. dense — SAND W/SILT & GRAVEL possible cobbles		6.0		NP	34	60	6	
4865	5			17	12,23,34,(91)	SP-SM	brown, moist, very dense								
				18	4,15,17,(45)	SP-SM	brown, moist, dense								
4860	10			10	10,60/5"	SP-SM	brown, moist, very dense								
							BOH								
4855	15														
4850															

*Note: Bulk sample taken at 0.5'-1.5' for Proctor & CBR tests.

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) — Blow Count per 6"; $(N_1)_{60}$ Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-022

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 917+00, 178' RT. / N:343,557 E:508,859

DRILLING METHOD: 78-CME-55 / CFA

DRILLER: K. CONLIN

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 7/10/09

DATE COMPLETED: 7/10/09

GROUND ELEVATION: 4821.0'

LOGGED BY: J. PRICE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4820						CL-ML	SILTY CLAY W/SAND brown, moist								
			Pushed	15	Pushed	SM (A-2-4(0))	SILTY SAND brown, moist		9.3		NP	6	72	22	
4815	5			18	8,10,7,(27)	SM (A-2-4(0))	brown, moist, med. dense		8.7		NP	6	69	25	
				15	10,30,50/4"	SM	brown, moist, very dense								
				0	40,50/6"	-	GRAVELS (driller's observation) no recovery								
							BOH								
4810	10														
4805	15														

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-023

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 922+00, 178' LT. / N:343,561 E:508,245
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/10/09
DATE COMPLETED: 7/10/09
GROUND ELEVATION: 4863.1'
LOGGED BY: J. PRICE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
			Disturbed	18	3,3,4,(11)	SM	brown, slightly moist, med. dense. Organics in top 7"								
4860			Disturbed	18	5,7,12,(30)	SM (A-2-4(0))	brown, very moist, med. dense. SILTY SAND		13.0		NP	4	73	23	
	5		Disturbed	18	7,8,11,(30)	SM (A-2-4(0))	brown, very moist, med. dense		11.9		NP	5	77	18	
4855				0	50/1"	-	GRAVELS (driller's observation); no recovery								
							BOH								
	10														
4850															
	15														
4845															

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE: 2,3,2,(6) — Blow Count per 6"; $(N_1)_{60}$ Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE: PUSHED; 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-024

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 927+00, 178' RT. / N:344,149 E:508,067

DATE STARTED: 7/10/09

DRILLING METHOD: 78-CME-55 / CFA

DATE COMPLETED: 7/10/09

DRILLER: K. CONLIN

GROUND ELEVATION: 4841.4'

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: J. PRICE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
							Organics in top 4"								
				17	4,3,6,(14)	SM	dk. brown, moist, med. dense								
4840															
				18	6,6,10,(26)	SM *(A-2-4(0))*	dk. brown, moist, med. dense		10.0		NP	5	71	24	
	5						SILTY SAND								
				18	9,10,13,(37)	SM *(A-2-4(0))*	dk. brown, moist, dense		10.1		NP	7	73	20	
4835															
				18	5,7,5,(16)	SM	dk. brown, moist, med. dense								
	10						BOH								
4830															
	15														
4825															

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6" ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-025

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 932+00, 178' LT. / N:344,181 E:507,454

DATE STARTED: 7/9/09

DRILLING METHOD: 78-CME-55 / CFA

DATE COMPLETED: 7/9/09

DRILLER: K. CONLIN

GROUND ELEVATION: 4875.9'

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: J. PRICE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4875				15	2,4,5,(14)	SC (A-6(1))	dk. brown, slightly moist to moist, med. dense	CLAYEY SAND organics		11.9	30	12	12	48	40	
					Bulk*	SC (A-6(1))	dk. brown, moist			10.3	28	11	10	50	40	Proct. CBR
						GP-GM	brown, moist, very dense	GRAVEL W/SILT & SAND possible cobbles								
				14	60,55,55,(99+)	SM	brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles								
4870	5			16	39,54,50/2"	SM (A-1-a(0))	brown, very moist, very dense			14.8		NP	40	47	13	
				10	38,60/4"	SM	brown, very moist, very dense									
4865	10			14	32,47,50/2"	SM	brown, very moist, very dense									
								BOH								
4860	15															

*Note: Bulk sample taken at 1.5'-2' for Proctor & CBR tests.

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE PUSHED 0.45 ← Torvane (tsf)

OTHER TESTS
- UC = Unconfined Compression
- CT = Consolidation
- DS = Direct Shear
- UU = Unconsolidated, Undrained
- CU = Consolidated, Undrained
- Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-026

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 937+00, 178' RT. / N:344,770 E:507,283
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/9/09
DATE COMPLETED: 7/9/09
GROUND ELEVATION: 4850.3'
LOGGED BY: J. PRICE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4850								CLAYEY SAND								
				18	3,4,10,(22)	SC (*A-2-4(0)*)	dk. brown, slightly moist to moist, med. dense			11.4	27	10	11	58	31	
				18	14,22,30,(83)	GM (*A-1-b(0)*)	dk. brown, very moist, dense			15.4		NP	43	40	17	
4845	5							SILTY GRAVEL W/SAND possible cobbles								
				8	25,50/2.5"	GM	dk. brown, very moist, very dense									
								GRAVEL W/SILT & SAND possible cobbles								
				15	34,46,50/3"	GP-GM	gray-brown, very moist, very dense									
4840	10					SM	brown, moist, very dense	SILTY SAND slightly cemented								
				12	13,44,50/3"	SM	very lt. brown, moist, very dense									
								BOH								
4835	15															

200901.200 MVC2009_R.GPJ US EVAL.GDT 12/29/09

RB&G
ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ($N_1)_{60}$ Value; *0.45* ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

ADDENDUM 1 - 12/31/09

DRILL HOLE LOG

BORING NO. 09-MVC-027

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 941+92, 214' LT. / N:344,769 E:506,654

DRILLING METHOD: 78-CME-55 / CFA

DRILLER: D. SAMPSON

DEPTH TO WATER - INITIAL: ▽ DRY' AFTER 24 HOURS: ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 7/9/09

DATE COMPLETED: 7/9/09

GROUND ELEVATION: 4875.0'

LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				8	3,8,38,(73)	SM (A-2-4(0))	SILTY SAND W/GRAVEL brown, slightly moist, very dense		6.2		NP	15	60	25	
				14	5,7,8,(24)	SM (A-1-b(0))	brown, moist, med. dense		8.3		NP	22	55	23	
4870	5			3	28,60/3"	GP	GRAVEL W/SAND brown, slightly moist, very dense								
							BOH								
4865	10														
4860	15														

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE 2,3,2,(6) ← Blow Count per 6" ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE PUSHED 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-028

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 947+00, 184' RT. / N:345,396 E:506,504
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: D. SAMPSON
DEPTH TO WATER - INITIAL: ∇ DRY' AFTER 24 HOURS: ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/9/09
DATE COMPLETED: 7/9/09
GROUND ELEVATION: 4846.1'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
4845								SILTY GRAVEL W/SAND slightly cemented								
			Undisturbed	3	Pushed	GM (A-4(0))	very lt. brown, moist			25.3		NP	30	25	45	
			Disturbed	12	20,60/4"	SM (A-2-4(0))	very lt. brown, moist, very dense			27.1		NP	35	35	30	
	5		Disturbed	6	60/6"	SM	very lt. brown, moist, very dense									
4840																
			Disturbed	8	48,50/1"	SM	very lt. brown, moist, very dense	SILTY SAND W/GRAVEL slightly cemented, moisture influenced by drill water								
	10		Disturbed	7	42,50/1"	SM	very lt. brown, moist, very dense									
4835																
			Disturbed	16	34,49,49,(99+)	SM (A-2-4(0))	very lt. brown to white, slightly moist, very dense	SILTY SAND slightly cemented		8.7		NP	0	82	18	
								BOH								
	15															
4830																

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) — Blow Count per 6"; (N$_1$)$_{60}$ Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-029

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 952+40, 190' LT. / N:345,439 E:505,848

DRILLING METHOD: 78-CME-55 / CFA

DRILLER: D. SAMPSON

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 7/9/09

DATE COMPLETED: 7/21/09

GROUND ELEVATION: 4868.3'

LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				16	3,5,33,(61)	SM (A-1-b(0))	dk. brown, slightly moist, very dense — SILTY SAND W/GRAVEL possible cobbles		5.6		NP	26	58	16	
4865				7	28,60/3"	GM	brown, slightly moist, very dense — SILTY GRAVEL W/SAND								
	5			11	1,26,36,(99)	SM	lt. brown, slightly moist, very dense — SILTY SAND W/GRAVEL								
							BOH								
4860															
	10														
4855															
	15														
4850															

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6", ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-030

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 957+00, 189' RT. / N:346,021 E:505,723

DATE STARTED: 7/9/09

DRILLING METHOD: 78-CME-55 / CFA

DATE COMPLETED: 7/9/09

DRILLER: D. SAMPSON

GROUND ELEVATION: 4831.7'

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				14	8,7,6,(21)	SM (A-2-4(0))	dk. brown, moist, med. dense		8.8	-	NP	11	54	35	-
					Bulk*	SM (A-2-4(0))	brown, moist — SILTY SAND		10.6	21	2	11	63	26	Proct, CBR
4830															
				2	60/5"	GM	brown, moist, very dense — SILTY GRAVEL W/SAND cobbles								
	5			0	60/0"	-	no recovery								
							BOH								
4825							*Note: Bulk sample taken at 0.6'-1.2' for Proctor & CBR tests.								
	10														
4820															
	15														
4815															

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-031

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 962+00, 189' LT. / N:346,036 E:505,096
DRILLING METHOD: 96-CME-55 / N.W. CASING TO 8.5'
DRILLER: E. RICHARDSON
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 9/2/09
DATE COMPLETED: 9/3/09
GROUND ELEVATION: 4879.2'
LOGGED BY: C. SANBORN, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
4875	5		■	4	28,50/3"	GP-GM	dk. brown, slightly moist, very dense	GRAVEL W/SILT & SAND possible cobbles & boulders								
4870	10		—	0	20/0"	-	no recovery									
4865	15		■	5	60/5"	GP-GM	brown, slightly moist, very dense									
4860	20		■	5	73/5"	SP-SM (*A-1-b(0)*)	brown, moist, very dense	SAND W/SILT & GRAVEL possible cobbles		14.1		NP	34	54	12	
			■	6	64/6"	SM (*A-1-b(0)*)	brown, moist, very dense	SILTY SAND W/GRAVEL possible cobbles		15.9		NP	21	60	19	
4855	25		■	6	60/6.5"	SM	brown, moist, very dense									
			■	4.5	60/4.5"	SP-SM (*A-1-a(0)*)	brown, moist, very dense	SAND W/SILT & GRAVEL possible cobbles		15.6		NP	38	55	7	
								BOH								
4850																

200901.200 MVC2009 R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; (6) ← $(N_1)_{60}$ Value; *0.45* ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-032

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 967+00, 189' RT. / N:346,642 E:504,939
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/14/09
DATE COMPLETED: 7/14/09
GROUND ELEVATION: 4847.3'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
			Disturbed	16	1,2,2,(6) *0.20*	ML	SILT plastic; lt. brown, slightly moist, loose								
4845			Undisturbed	15	Pushed *0.40*	ML *(A-4(5))*	lt. brown, moist, firm	96.6	11.2	29	6	0	12	88	
	5		Disturbed	15	7,9,12,(33)	ML *(A-4(3))*	SILT W/SAND plastic; lt. brown, moist, dense		15.3	28	4	0	15	85	
4840			Disturbed	13	9,9,12,(28)	ML	lt. brown, moist, med. dense								
	10														
4835															
	15														
4830															

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-033

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 972+00, 189' LT. / N:346,657 E:504,313
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/14/09
DATE COMPLETED: 7/14/09
GROUND ELEVATION: 4876.3'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
4875							SILTY CLAY W/SAND								
			Disturbed	18	3,2,2,(6)	CL-ML	lt. brown, slightly moist, soft								
4870	5		Undisturbed	10	Pushed	ML (A-4(0))	SILT W/SAND sand lenses & layers; lt. brown, moist	92.5	19.7		NP	0	15	85	
						CL-ML	SILTY CLAY W/SAND; lt. brown, moist								
			Disturbed	18	2,5,10,(20)	ML (A-4(0))	SANDY SILT; lt. brown, moist, med. dense		8.0		NP	0	47	53	
4865	10					CL-ML	SILTY CLAY W/SAND; lt. brown, moist								
			Disturbed	16	4,7,7,(16)	SC-SM	SILTY CLAYEY SAND; lt. brown, moist, med. dense								
							BOH								
4860	15														

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-034

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

LOCATION: STA. 977+00, 178' RT. / N:347,255 E:504,149

DRILLING METHOD: 78-CME-55 / CFA

DRILLER: K. CONLIN

DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200

DATE STARTED: 7/14/09

DATE COMPLETED: 7/14/09

GROUND ELEVATION: 4869.9'

LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Sample Rec. (in)	Sample See Legend	Sample USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
		17	3,2,3,(8)	ML	lt. brown, slightly moist, loose	SILT W/SAND plastic								
			Bulk*	ML (A-4(3))	lt. brown, moist			11.1	29	5	0	20	80	Proct. CBR
		12	Pushed	ML (A-4(2))	lt. brown, slightly moist			6.8	30	3	0	21	79	
4865	5													
		18	4,3,2,(8)	ML	lt. brown, slightly moist, loose									
4860	10	18	12,16,28,(55)	ML (A-4(0))	lt. brown, slightly moist, med. dense			6.5	23	2	0	18	82	
				CL-ML (A-4(5))	lt. brown, sl. moist, hard	SILTY CLAY		9.7	26	6	0	5	95	
						BOH								
4855	15													

*Note: Bulk sample taken at 2.5'-3' for Proctor & CBR tests.

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE PUSHED 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-035

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 981+88, 192' LT. / N:347,268 E:503,536
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/14/09
DATE COMPLETED: 7/14/09
GROUND ELEVATION: 4904.3'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
			Disturbed	17	3,4,4,(13)	ML	lt. brown, slightly moist, med. dense	SILT W/SAND plastic								
			Undisturbed	17	Pushed	CL-ML (A-4(2))	lt. brown, slightly moist	SILTY CLAY W/SAND	102.3	5.7	27	7	0	16	84	
4900	5		Disturbed	18	7,12,17,(46)	CL-ML	lt. brown, slightly moist, hard									
4895			Disturbed	18	9,11,15,(34)	CL-ML (A-4(2))	lt. brown, slightly moist, very stiff to hard	SANDY SILTY CLAY		7.7	26	6	0	33	67	
	10							BOH								
4890	15															
4885																

200901.200 MVC2009 R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-037

PROJECT: MOUNTAIN VIEW CORRIDOR

CLIENT: UTAH DEPARTMENT OF TRANSPORTATION

PROJECT NUMBER: 200901.200

LOCATION: STA. 992+00, 189' LT. / N:347,899 E:502,745

DATE STARTED: 7/15/09

DRILLING METHOD: 78-CME-55 / CFA

DATE COMPLETED: 7/15/09

DRILLER: K. CONLIN

GROUND ELEVATION: 4938.5'

DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Rec. (in)	See Legend	USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
			■	12	4,4,15,(30)	GC (A-2-4(0))	brown, moist, med. dense	CLAYEY GRAVEL W/SAND cobbles		6.5	28	9	49	27	24	
4935			■	16	11,55,54,(99+)	GC	brown, moist									
	5					GM	lt. brown, slightly moist, very dense	SILTY GRAVEL W/SAND possible cobbles								
			■	13	24,42,23,(99+)	SM (A-1-b(0))	lt. brown, slightly moist, very dense	SILTY SAND W/GRAVEL possible cobbles		4.9		NP	37	49	14	
4930								SILTY GRAVEL W/SAND possible cobbles								
	10		■	5	51,60/1"	GM	lt. brown, slightly moist, very dense									
								BOH								
4925																
	15															
4920																

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE ■ 2,3,2,(6) ← Blow Count per 6"; ← $(N_1)_{60}$ Value; 0.45 ← Torvane (tsf)

UNDISTURBED SAMPLE ☒ PUSHED 0.45 ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-038

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 997+00, 178' RT. / N:348,497 E:502,581
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ▽ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/16/09
DATE COMPLETED: 7/16/09
GROUND ELEVATION: 4912.6'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Rec. (in)	See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Liquid Limit	Plast. Index	Gravel (%)	Sand (%)	Silt/Clay (%)	Other Tests
		12	5,24,21,(72)	SM (A-2-4(0))	brown, slightly moist SILTY SAND		3.2		NP	6	59	35	
				GP-GM	gray, slightly moist, dense GRAVEL W/SILT & SAND possible cobbles								
4910		7	24,60/4"	SM (A-2-4(0))	lt. brown, moist, very dense SILTY SAND W/GRAVEL plastic, possible cobbles		11.3	28	4	23	43	34	
	5	12	12,46,56,(99+)	SP-SM (A-1-a(0))	lt. brown, slightly moist, very dense SAND W/SILT & GRAVEL possible cobbles		5.6		NP	39	49	12	
4905		13	8,34,46,(99+)	SP-SM	lt. brown, slightly moist, very dense								
	10				BOH								
4900													
	15												
4895													

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE 2,3,2,(6) 0.45 — Blow Count per 6"; $(N_1)_{60}$ Value; Torvane (tsf)

UNDISTURBED SAMPLE PUSHED 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

DRILL HOLE LOG

BORING NO. 09-MVC-039

SHEET 1 OF 1

PROJECT: MOUNTAIN VIEW CORRIDOR
CLIENT: UTAH DEPARTMENT OF TRANSPORTATION
LOCATION: STA. 1002+00, 188' LT. / N:348,533 E:501,959
DRILLING METHOD: 78-CME-55 / CFA
DRILLER: K. CONLIN
DEPTH TO WATER - INITIAL: ∇ DRY' **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200901.200
DATE STARTED: 7/16/09
DATE COMPLETED: 7/16/09
GROUND ELEVATION: 4940.1'
LOGGED BY: G. PEASLEE, J. BOONE

Elev. (ft)	Depth (ft)	Lithology	Sample: Type	Sample: Rec. (in)	Sample: See Legend	Sample: USCS (AASHTO)	Material Description		Dry Density (pcf)	Moisture Content (%)	Atter.: Liquid Limit	Atter.: Plast. Index	Gradation: Gravel (%)	Gradation: Sand (%)	Gradation: Silt/Clay (%)	Other Tests
				13	6,24,35,(94)	SC (A-4(0))	brown, moist, very dense	CLAYEY SAND W/GRAVEL		9.9	24	9	20	42	38	
					Bulk*	GC (A-2-4(0))	brown, moist	CLAYEY GRAVEL W/SAND		8.4	28	9	38	32	30	Proct. CBR
				6	4,60/5"	SP-SM	brown, moist	SAND W/SILT & GRAVEL possible cobbles								
4935	5			0	60/2"	-	no recovery									
								BOH								
								*Note: Bulk sample taken at 1.75'-2' for Proctor & CBR tests.								
4930	10															
4925	15															

200901.200 MVC2009_R.GPJ US EVAL.GDT 10/17/09

RB&G ENGINEERING, INC.

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) — Blow Count per 6", (N_1)$_{60}$ Value; 0.45 — Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; 0.45 — Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
UU = Unconsolidated, Undrained
CU = Consolidated, Undrained
Chem. = pH, Resistivity, Sulfate, Chloride

APPENDIX C

RB&G ENGINEERING, INC.

Table 1

SUMMARY OF TEST DATA

PROJECT	Mountain View Corridor	PROJECT NO.	200901-200
LOCATION	Juniper Canyon	FEATURE	Frontage Road Bridge Foundations

HOLE NO.	DEPTH BELOW GROUND SURFACE (ft)	IN-PLACE		UNCONFINED COMPRESSIVE STRENGTH (psf)	ATTERBERG LIMITS			MECHANICAL ANALYSIS			PERCENT FINER THAN 0.005 mm	UNIFIED SOIL CLASSIFICATION SYSTEM / (AASHTO CLASSIFICATION)
		DRY UNIT WEIGHT (pcf)	MOISTURE (%)		LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PERCENT GRAVEL	PERCENT SAND	PERCENT SILT & CLAY		
09-S1-1	4-5.5		18.3				NP	0	70	30		SM (A-2-4 (0))
	10-11.5		14.5				NP	0	62	38		SM (A-4 (0))
	15-16.5		10.5				NP	32	51	17		SM (A-1-b (0))
	20-21	74.7	32.4				NP	0	25	75		ML (A-4 (0))
	25-26.5		35.5				NP	0	41	59		ML (A-4 (0))
	35-36.5		14.6				NP	30	55	15		SM (A-1-b (0))
	45-46.5		14.2				NP	22	65	13		SM (A-1-b (0))
	65-66.5		13.8				NP	26	64	10		SP-SM (A-1-b (0))
	75-76.5		12.9				NP	56	36	8		GP-GM (A-1-a (0))
09-S1-2	0.5-2		8.2				NP	0	87	13		SM (A-2-4 (0))
	5.5-6.5		6.4				NP	29	60	11		SP-SM (A-1-b (0))
	10-10.8		12.2		34	24	10	3	26	71		ML (A-4 (6))
	20.8-21.5		17.1				NP	29	45	26		SM (A-2-4 (0))
	30.8-31.5		17.5				NP	19	57	24		SM (A-1-b (0))
	40.8-42.3		16.7				NP	23	59	18		SM (A-1-b (0))
	50.8-51.4		16.1				NP	20	61	19		SM (A-2-4 (0))
	55.8-56.5		19.2				NP	2	67	31		SM (A-2-4 (0))
	75.8-77		13.2				NP	31	57	12		SP-SM (A-1-b (0))
09-S1-3	5-6.5		23.6				NP	0	76	24		SM (A-2-4 (0))
	15-16.5	92.6	21.3		30	22	8	0	8	92		CL (A-4 (7))
	25-26.5		13.1				NP	43	42	15		GM (A-1-a (0))
	35-35.9		21.3				NP	21	46	33		SM (A-2-4 (0))
	55-55.8		20.0				NP	6	58	36		SM (A-4 (0))
09-S1-4	5-6.5		20.1				NP	0	75	25		SM (A-2-4 (0))
	15-16.5		25.6				NP	0	84	16		SM (A-2-4 (0))
	20-21.5		25.9				NP	0	85	15		SM (A-2-4 (0))
	30-31.5		9.7				NP	67	27	6		GP-GM (A-1-a (0))
	35-36.5	81.3	13.5	uu 4145	52	25	27	0	3	97		CH (A-7-6 (30))
	50-51.5		13.6				NP	28	60	12		SP-SM (A-1-b (0))
	60-61.5		15.0				NP	29	58	13		SM (A-1-b (0))
	70-71.5		21.3				NP	5	63	32		SM (A-2-4 (0))
	90-91.4		19.7				NP	5	67	28		SM (A-2-4 (0))

NP=Non-Plastic

RB&G ENGINEERING, INC.

Table 1

SUMMARY OF TEST DATA

PROJECT	Mountain View Corridor	PROJECT NO.	200901-200
LOCATION	Juniper Canyon	FEATURE	Frontage Road Bridge Foundations

HOLE NO.	DEPTH BELOW GROUND SURFACE (ft)	IN-PLACE		UNCONFINED COMPRESSIVE STRENGTH (psf)	ATTERBERG LIMITS			MECHANICAL ANALYSIS			PERCENT FINER THAN 0.005 mm	UNIFIED SOIL CLASSIFICATION SYSTEM / (AASHTO CLASSIFICATION)
		DRY UNIT WEIGHT (pcf)	MOISTURE (%)		LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PERCENT GRAVEL	PERCENT SAND	PERCENT SILT & CLAY		
09-S1-5	0-1.5		4.2				NP	62	31	7		GP-GM (A-1-a (0))
	5-6.5	70.5	42.8	uc 2127	53	30	23	0	9	91		MH (A-7-5 (25))
	10-10.8		10.3				NP	26	46	28		SM (A-2-4 (0))
	15-16.5		19.8		31	18	13	6	29	65		CL (A-6 (6))
	21-22.5		15.7		33	17	16	34	36	30		SC (A-2-6 (1))
	27-28.5		15.1		33	20	13	34	41	25		SC (A-2-6 (0))
	35-36.5		18.0		30	19	11	20	55	25		SC (A-2-6 (0))
	40-41.5		18.6		21	15	6	7	54	39		SC-SM (A-4 (0))
	45-46.3	56.8	61.8		71	42	29	0	21	79		MH (A-7-5 (28))
	50-51.5		42.0				NP	0	28	72		ML (A-4 (0))
	60-61.5		35.5				NP	0	36	64		ML (A-4 (0))
	70-71.3		33.6				NP	3	54	43		SM (A-4 (0))
	80-80.8		16.7				NP	6	64	30		SM (A-2-4 (0))
09-S1-6	5-6.5		11.2		22	18	4	45	33	22		GC-GM (A-1-b (0))
	10-11.1	99.9	19.0	uu 4685	33	15	18	4	14	82		CL (A-6 (13))
	20-20.5		15.3				NP	18	59	23		SM (A-2-4 (0))
	20.5-21.5		14.3		30	22	8	16	50	34		SC (A-2-4 (0))
	30-31.5		20.3				NP	45	39	16		GM (A-1-b (0))
	40-41.5		16.8				NP	31	54	15		SM (A-1-b (0))
	50-51.5		37.0		58	50	5	0	30	70		MH (A-5 (7))
	60-61		31.0				NP	0	60	40		SM (A-4 (0))
	70-70.8		34.9				NP	0	33	67		ML (A-4 (0))
	80-81.0		19.8				NP	0	68	32		SM (A-2-4 (0))
	90-90.8		15.4				NP	31	50	19		SM (A-1-b (0))
09-S1-7	5-6.5		9.3				NP	46	33	21		GM (A-1-b (0))
	15-16	87.9	14.5				NP	1	62	37		SM (A-4 (0))
	16-17.5		17.4				NP	10	58	32		SM (A-2-4 (0))
	25-26.5		12.0				NP	31	57	12		SP-SM (A-1-b (0))
	40-41.4		14.6				NP	30	55	15		SM (A-1-b (0))
	50-51.5		34.7				NP	0	47	53		ML (A-4 (0))
	55-55.8		30.7				NP	0	65	35		SM (A-2-4 (0))
	65-65.9		20.7				NP	7	55	38		SM (A-4 (0))
	85-86.3		16.8				NP	27	54	19		SM (A-1-b (0))
	95-96.3		15.6				NP	22	55	23		SM (A-1-b (0))

NP=Non-Plastic

RB&G ENGINEERING, INC.

Table 1

SUMMARY OF TEST DATA

PROJECT	Mountain View Corridor	PROJECT NO.	200901-200
LOCATION	Juniper Canyon	FEATURE	Frontage Road Bridge Foundations

HOLE NO.	DEPTH BELOW GROUND SURFACE (ft)	IN-PLACE DRY UNIT WEIGHT (pcf)	IN-PLACE MOISTURE (%)	UNCONFINED COMPRESSIVE STRENGTH (psf)	ATTERBERG LIMITS LIQUID LIMIT (%)	ATTERBERG LIMITS PLASTIC LIMIT (%)	ATTERBERG LIMITS PLASTICITY INDEX (%)	MECHANICAL ANALYSIS PERCENT GRAVEL	MECHANICAL ANALYSIS PERCENT SAND	MECHANICAL ANALYSIS PERCENT SILT & CLAY	PERCENT FINER THAN 0.005 mm	UNIFIED SOIL CLASSIFICATION SYSTEM / (AASHTO CLASSIFICATION)
09-S1-8	10-11.5		9.0				NP	51	42	7		GP-GM (A-1-a (0))
	20-21.5		19.6		29	21	8	19	37	44		SC (A-4 (1))
	30-31.5		13.5		25	17	8	29	36	35		SC (A-2-4 (0))
	40-41.5		12.7		22	17	5	47	30	23		GC-GM (A-1-b (0))
	50-51.5		13.1				NP	37	49	14		SM (A-1-a (0))
09-S1-9	0.5-2		10.3				NP	2	64	34		SM (A-2-4 (0))
	5-6.5		13.3		30	19	11	36	30	34		GC (A-2-6 (0))
	10-11.5		14.9		43	21	22	17	22	61		CL (A-7-6 (11))
	15-15.9		11.4				NP	37	48	15		SM (A-1-b (0))
	25-26.2		10.6				NP	61	26	13		GM (A-1-a (0))
	40-40.8		18.1				NP	16	60	24		SM (A-1-b (0))
	45-45.8		16.6				NP	15	56	29		SM (A-2-4 (0))
	60-60.8		24.8				NP	0	66	34		SM (A-2-4 (0))
	70-70.7		16.3				NP	5	78	17		SM (A-2-4 (0))
09-S1-10	0.5-2		10.7				NP	2	79	19	8	SM (A-2-4 (0))
	10.2-11.5		38.9		43	28	15	0	8	92		ML (A-7-6 (16))
	15-16.5	85.7	25.6	uu 1528	29	18	11	0	15	85		CL (A-6 (8))
	20-20.8		20.0		22	18	4	1	44	55		CL-ML (A-4 (0))
	30-30.8		12.0				NP	37	54	9		SP-SM (A-1-b (0))
	30.8-31.5		17.4				NP	23	52	25		SM (A-2-4 (0))
	35-36.4		18.3				NP	11	60	29		SM (A-2-4 (0))
	50-50.8		14.8				NP	27	49	24		SM (A-1-b (0))
09-S1-11	0.5-2		12.4				NP	8	67	25		SM (A-2-4 (0))
	5-6.5		14.2				NP	3	57	40		SM (A-4 (0))
	10-10.8	94.2	17.7				NP	35	50	15		SM (A-1-b (0))
	15-16.5		10.4				NP	34	41	25		SM (A-1-b (0))
	25-26.3		15.6				NP	11	57	32		SM (A-2-4 (0))
	35-35.8		15.5				NP	21	61	18		SM (A-1-b (0))
	50-50.8		11.8				NP	12	61	27		SM (A-2-4 (0))
	65-65.7		10.6				NP	28	59	13		SM (A-1-b (0))
	95-95.5		16.6				NP	2	64	34		SM (A-2-4 (0))

NP=Non-Plastic

RB&G ENGINEERING, INC.

Table 1

SUMMARY OF TEST DATA

PROJECT Mountain View Corridor — PROJECT NO. 200901-200
LOCATION Juniper Canyon — FEATURE Frontage Road Bridge Foundations

HOLE NO.	DEPTH BELOW GROUND SURFACE (ft)	IN-PLACE		UNCONFINED COMPRESSIVE STRENGTH (psf)	ATTERBERG LIMITS			MECHANICAL ANALYSIS			PERCENT FINER THAN 0.005 mm	UNIFIED SOIL CLASSIFICATION SYSTEM / (AASHTO CLASSIFICATION)
		DRY UNIT WEIGHT (pcf)	MOISTURE (%)		LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PERCENT GRAVEL	PERCENT SAND	PERCENT SILT & CLAY		
09-S1-12	0.5-2		9.4				NP	30	41	29		SM (A-2-4 (0))
	5-6.5		12.0		24	16	8	38	33	29		GC (A-2-4 (0))
	10-10.3	86.1	24.1									
	10.3-11.8		13.2				NP	25	55	20		SM (A-1-b (0))
	15-16.5		12.9				NP	11	54	35		SM (A-2-4 (0))
	25-25.9		16.8				NP	15	51	34		SM (A-2-4 (0))
	35-35.8		13.8				NP	18	58	24		SM (A-2-4 (0))
	45-45.8		12.8				NP	31	56	13		SM (A-1-b (0))
	55-56.8		12.6				NP	20	64	16		SM (A-1-b (0))
09-S1-13	5-6.5		28.0				NP	0	53	47		SM (A-4 (0))
	15-16.5		38.7				NP	0	28	72		ML (A-4 (0))
	30-31.5		31.9				NP	1	56	43		SM (A-4 (0))
	35.7-37.2		22.7				NP	5	66	29		SM (A-2-4 (0))
	40-41.5		29.6				NP	1	65	34		SM (A-2-4 (0))
	50-51.5		31.5		31	26	5	2	39	59		ML (A-4 (2))
	60-60.9		17.2				NP	17	67	16		SM (A-1-b (0))
	80-81.5		16.6				NP	14	71	15		SM (A-1-b (0))

Hole No.	Depth (ft)	pH	Resistivity (ohm-cm)	Sulfate (mg/kg-dry)	Chloride (mg/kg-dry)
09-S1-1	4-5.5	7.8	3200	92	28
	21-22.5	7.5	1750	4.5	5.4
09-S1-4	10-11.5	8.0	2800	29	14
09-S1-5	18-19.5	7.9	800	99	84
09-S1-6	0-1.5	6.6	1110	<5.5	<5.5
09-S1-7	2-3.5	8.6	3700	<5.0	5.4
	20-21	7.4	1150	310	16
09-S1-8	0-1.5	7.5	4000	<5.0	<5.0
09-S1-9	20-21.1	7.1	1900	24	11
09-S1-10	5-6.5	7.4	5150	<5.0	<5.0
	35-36.4	7.4	2100	79	<5.0
09-S1-11	10-10.8	8.5	1650	<5.9	<5.9
09-S1-12	10.3-11.8	7.2	660	2400	<5.1
	25-25.9	7.7	1300	420	5.8
09-S1-13	10-11.5	8.4	2250	<5.0	<5.0
	25-26.5	8.5	2200	51	8.8

NP=Non-Plastic

RB&G ENGINEERING, INC

Table 1

SUMMARY OF TEST DATA

PROJECT	Mountain View Corridor	PROJECT NO.	200901-200
LOCATION	Segment 1	FEATURE	Culverts

HOLE NO	DEPTH BELOW GROUND SURFACE (ft)	IN-PLACE DRY UNIT WEIGHT (pcf)	IN-PLACE MOISTURE (%)	UNCONFINED OR UU TRIAXIAL COMPRESSIVE STRENGTH (psf)	ATTERBERG LIMITS LIQUID LIMIT (%)	ATTERBERG LIMITS PLASTIC LIMIT (%)	ATTERBERG LIMITS PLASTICITY INDEX (%)	MECHANICAL ANALYSIS PERCENT GRAVEL	MECHANICAL ANALYSIS PERCENT SAND	MECHANICAL ANALYSIS PERCENT SILT & CLAY	PERCENT FINER THAN 0 005 mm	UNIFIED SOIL CLASSIFICATION SYSTEM / (AASHTO CLASSIFICATION)
09-C1-1	0-1 5		12 1		29	14	15	42	36	22		GC (A-2-6 (0))
	15-15 8		22 6				NP	6	58	36		SM (A-4 (0))
09-C1-2	0-1.5		13.8		34	28	6	32	48	20		SM (A-1-b (0))
	15-16.5		17 4				NP	8	64	28		SM (A-2-4 (0))
	25-26 5		23 6				NP	10	65	25		SM (A-2-4 (0))

HOLE NO	DEPTH (ft)	pH	RESISTIVITY (ohm-cm)	SULFATE (mg/kg-dry)	CHLORIDE (mg/kg-dry)
09-C1-1	5-6.5	7 8	4250	23	4.7
09-C1-2	10-11 5	7 5	3500	25	17

NP=Non-Plastic

RB&G ENGINEERING, INC.

Table 1

SUMMARY OF TEST DATA

PROJECT	Mountain View Corridor	PROJECT NO.	200901-200
LOCATION	Segment 1	FEATURE	Retaining Walls

HOLE NO.	DEPTH BELOW GROUND SURFACE (ft)	IN-PLACE		UNCONFINED OR UU TRIAXIAL COMPRESSIVE STRENGTH (psf)	ATTERBERG LIMITS			MECHANICAL ANALYSIS			PERCENT FINER THAN 0.005 mm	UNIFIED SOIL CLASSIFICATION SYSTEM / (AASHTO CLASSIFICATION)
		DRY UNIT WEIGHT (pcf)	MOISTURE (%)		LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PERCENT GRAVEL	PERCENT SAND	PERCENT SILT & CLAY		
09-W1-01	10-10.2		20.4				NP	2	70	28		SM (A-2-4 (0))
	20-20.4		20.2		28	20	8	7	57	36		SC (A-4 (0))
	30-30.8		14.1				NP	39	46	15		SM (A-1-b (0))
09-W1-02	0-1.5		6.3		31	20	11	17	50	33		SC (A-2-6 (0))
	10-11.4		15.2				NP	25	61	14		SM (A-1-b (0))
	20-20.9		13.4				NP	9	74	17		SM (A-1-b (0))
09-W1-03	5-6.9		8.5				NP	27	63	10		SP-SM (A-1-b (0))
	15-15.5		27.5		35	24	11	7	54	39		SC (A-6 (1))
	20-20.4		15.4				NP	13	73	14		SM (A-1-b (0))
09-W1-04	0-1.5		5.5		30	17	13	31	35	34		SC (A-2-6 (1))
	10-11.5		22.3		27	17	10	1	39	60		CL (A-4 (3))
09-W1-9	0-1.5		5.6		27	18	9	31	49	20		SC (A-2-4 (0))
	10-10.6		14.0				NP	27	61	12		SP-SM (A-1-b (0))
09-W1-10	0-1.5		5.3				NP	11	71	18		SM (A-2-4 (0))
	5-6.5		13.6				NP	17	68	15		SM (A-1-b (0))
	15-16		19.7		31	23	8	31	48	21		SM (A-2-4 (0))
09-W1-11	0-1.5		4.6				NP	5	70	25		SM (A-2-4 (0))
	10-11.5		13.6				NP	22	69	9		SP-SM (A-1-b (0))
	15-16.5		26.5				NP	29	46	25		SM (A-1-b (0))
09-W1-12	0-1.5		5.0		25	19	6	8	66	26		SC-SM (A-2-4 (0))
	5-6.5		16.7				NP	8	69	23		SM (A-1-b (0))
	15-15.9		13.1				NP	35	56	9		SP-SM (A-1-a (0))
09-W1-13	0-1.5		5.3		29	17	12	38	37	25		GC (A-2-6 (0))
	10-11.5		12.5				NP	37	49	14		SM (A-1-b (0))
09-W1-14	0.5-1.5		5.5		26	19	7	3	63	34		SC-SM (A-2-4 (0))
	10-11.5		14.6				NP	17	63	20		SM (A-1-b (0))
09-W1-15	5-6.5		39.2				NP	0	15	85		ML (A-4 (0))
09-W1-16	10-11.5		18.9		29	23	6	17	36	47		SM (A-4 (0))
	15-16		21.3				NP	1	44	55		ML (A-4 (0))
09-W1-17	5-6.5		7.3				NP	3	61	36		SM (A-4 (0))
	15-15.8		13.4				NP	33	52	15		SM (A-1-b (0))
	20-21.4		19.6				NP	9	68	23		SM (A-2-4 (0))
09-W1-18	0-1.5		7.1		25	19	6	7	56	37		SC-SM (A-4 (0))
	10-11.5		13.0				NP	1	66	33		SM (A-2-4 (0))

NP=Non-Plastic

RB&G
ENGINEERING, INC.

Table 1

SUMMARY OF TEST DATA

PROJECT Mountain View Corridor
LOCATION Segment 1
PROJECT NO. 200901-200
FEATURE Retaining Walls

HOLE NO.	DEPTH BELOW GROUND SURFACE (ft)	IN-PLACE		UNCONFINED OR UU TRIAXIAL COMPRESSIVE STRENGTH (psf)	ATTERBERG LIMITS			MECHANICAL ANALYSIS			PERCENT FINER THAN 0.005 mm	UNIFIED SOIL CLASSIFICATION SYSTEM / (AASHTO CLASSIFICATION)
		DRY UNIT WEIGHT (pcf)	MOISTURE (%)		LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PERCENT GRAVEL	PERCENT SAND	PERCENT SILT & CLAY		
09-W1-19	0-1.5		4.3				NP	10	54	36		SM (A-4 (0))
	5-5.8		9.6				NP	49	38	13		GM (A-1-a (0))
09-W1-20	5-6.3		24.4		27	21	6	10	23	67		CL-ML (A-4 (2))
	15-16.5		19.6				NP	26	57	17		SM (A-1-b (0))
	25-26.5		19.1				NP	19	62	19		SM (A-1-b (0))
09-W1-21	0-1.5		7.5		33	16	17	12	41	47		SC (A-6 (4))
	10-11.5		10.8				NP	47	42	11		GP-GM (A-1-a (0))
	15-16.5		12.6				NP	54	37	9		GP-GM (A-1-a (0))
	35-35.8		18.7				NP	22	60	18		SM (A-1-b (0))
09-W1-22	0-1.5		7.8		31	21	10	0	23	77		CL (A-4 (7))
	10-11.5		11.3				NP	0	10	90		ML (A-4 (0))
09-W1-23	0-1.5		4.4		25	18	7	47	34	19		GC-GM (A-2-4 (0))
	5-6.5		11.1				NP	19	67	14		SM (A-1-b (0))
	17-18.5		8.0				NP	44	46	10		SP-SM (A-1-a (0))
	20-21.5		10.5				NP	39	59	2		SP (A-1-a (0))
09-W1-24	5-6.5		6.7		29	20	9	28	36	36		SC (A-4 (0))
	12-12.7	72.9	28.3		32	21	11	0	52	48		SC (A-6 (2))
09-W1-25	0-0.6		5.9		26	19	7	3	53	44		SC-SM (A-4 (0))
	5-6.5		3.5				NP	26	56	18		SM (A-1-b (0))
09-W1-26	0-1.5		6.5		25	15	10	4	48	48		SC (A-4 (2))
	5.5-6.5		4.8				NP	19	60	21		SM (A-1-b (0))

HOLE NO.	DEPTH (ft)	pH	RESISTIVITY (ohm-cm)	SULFATE (mg/kg-dry)	CHLORIDE (mg/kg-dry)
09-W1-04	10-11.5	7.6	2250	8.3	5.6
09-W1-9	5-6.5	7.7	10400	16	5.2
09-W1-11	5-6.5	7.6	3850	10	4.9
09-W1-13	5-6.5	8.1	4700	14	4.0
09-W1-14	5-6.3	7.7	6150	14	3.2
09-W1-16	5-6.3	8.9	2000	16	3.2
09-W1-18	5-6.5	8.7	2400	12	4.2
09-W1-20	10-10.9	8.3	9600	6.3	2.3

NP=Non-Plastic

RB&G ENGINEERING, INC.

Table 1

SUMMARY OF TEST DATA

PROJECT Mountain View Corridor PROJECT NO. 200901-200
LOCATION Segment 1 FEATURE Embankments

HOLE NO.	DEPTH BELOW GROUND SURFACE (ft)	IN-PLACE		UNCONFINED OR UU TRIAXIAL COMPRESSIVE STRENGTH (psf)	ATTERBERG LIMITS			MECHANICAL ANALYSIS			PERCENT FINER THAN 0.005 mm	UNIFIED SOIL CLASSIFICATION SYSTEM / (AASHTO CLASSIFICATION)
		DRY UNIT WEIGHT (pcf)	MOISTURE (%)		LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PERCENT GRAVEL	PERCENT SAND	PERCENT SILT & CLAY		
09-E1-1	0-1.5		3.6				NP	14	50	36		SM (A-4 (0))
	10-11.5		6.5				NP	33	52	15		SM (A-1-b (0))
	20-21.0		7.6				NP	54	33	13		GM (A-1-a (0))
	40-41.4		10.9				NP	41	44	15		SM (A-1-a (0))
09-E1-2	0-1.5		2.2				NP	2	81	17		SM (A-2-4 (0))
09-E1-3	0-0.7		1.9				NP	24	62	14		SM (A-2-4 (0))
	5-6.5		7.1				NP	56	38	6		GP-GM (A-1-a (0))
09-E1-4	0-1.5		3.4		23	20	3	29	46	25		SM (A-2-4 (0))
	5-6.5		7.4				NP	43	40	17		GM (A-1-b (0))
	10-11.5		7.9				NP	32	49	19		SM (A-1-b (0))
	20-21.5		10.3				NP	50	34	16		GM (A-1-b (0))
	25-26.5		12.9				NP	24	56	20		SM (A-1-b (0))
09-E1-5	0-1.5		4.4		26	16	10	9	50	41		SC (A-4 (1))
	5-6.3		24.0				NP	0	55	45		SM (A-4 (0))
	10-11.5		31.9				NP	0	49	51		ML (A-4 (0))
	15-16.5		33.9				NP	1	49	50		ML (A-4 (0))
	20-20.4		23.4				NP	3	63	34		SM (A-2-4 (0))
	25-26.5		19.6				NP	8	61	31		SM (A-2-4 (0))
	30-31.5		29.2				NP	6	44	50		ML (A-4 (0))
09-E1-6	10-11.5		27.7		33	28	5	7	40	53		ML (A-4 (1))
	15-15.3		27.7		37	33	5	24	43	33		SM (A-2-4 (0))
	15.3-15.6		11.5				NP	32	51	17		SM (A-1-b (0))
	25-25.8		16.0				NP	15	49	36		SM (A-4 (0))
09-E1-7	0-1		7.8		26	16	10	2	50	48		SC (A-4 (2))
	10-11.5		8.8				NP	46	46	8		SP-SM (A-1-a (0))
	25-26.4		9.9				NP	45	47	8		SP-SM (A-1-a (0))

NP=Non-Plastic

RB&G ENGINEERING, INC.

Table 1

SUMMARY OF TEST DATA

PROJECT	Mountain View Corridor	PROJECT NO.	200901-200
LOCATION	Segment 1	FEATURE	Detention Basins

HOLE NO.	DEPTH BELOW GROUND SURFACE (ft)	IN-PLACE		UNCONFINED OR UU TRIAXIAL COMPRESSIVE STRENGTH (psf)	ATTERBERG LIMITS			MECHANICAL ANALYSIS			PERCENT FINER THAN 0.005 mm	UNIFIED SOIL CLASSIFICATION SYSTEM / (AASHTO CLASSIFICATION)
		DRY UNIT WEIGHT (pcf)	MOISTURE (%)		LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PERCENT GRAVEL	PERCENT SAND	PERCENT SILT & CLAY		
09-D1-01	2.5-4		3.3				NP	58	27	15		GM (A-1-a (0))
	5-6.5		14.9				NP	17	60	23		SM (A-1-b (0))
	10-11.5	89.6	20.0		31	20	11	1	13	86		CL (A-6 (9))
09-D1-02	2.5-4		7.5		28	17	11	24	40	36		SC (A-6 (0))
	10-11.5		17.3				NP	0	78	22		SM (A-2-4 (0))
09-D1-03	5-6.5		14.4		27	19	8	0	19	81		CL (A-4 (5))
	7.5-9		13.8				NP	8	74	18		SM (A-1-b (0))
09-D1-04	2.5-4		6.7				NP	8	55	37		SM (A-4 (0))
	7.5-8.3		13.0				NP	29	58	13		SM (A-1-b (0))
09-D1-05	0-1.5		4.4		26	15	11	14	53	33		SC (A-2-6 (0))
	5-6.5		5.2				NP	8	67	25		SM (A-1-b (0))
	7.5-9		9.2		21	18	3	9	66	25		SM (A-1-b (0))
09-D1-06	0-1.5		5.0		22	15	7	17	53	30		SC-SM (A-2-4 (0))
	5-6.3		12.7				NP	27	61	12		SP-SM (A-1-b (0))
09-D1-07	2.5-4		8.1		27	19	8	20	60	20		SC (A-2-4 (0))
	7.5-9		10.0				NP	30	56	14		SM (A-1-b (0))
09-D1-08	2.5-3.7		16.9				NP	12	53	35		SM (A-2-4 (0))
	7.5-8.3		16.5				NP	3	68	29		SM (A-2-4 (0))
09-D1-09	2.5-3.9		17.1				NP	28	61	11		SP-SM (A-1-b (0))
	5-5.3		4.7				NP	9	64	27		SM (A-2-4 (0))
	7.5-8.2		13.5				NP	38	52	10		SP-SM (A-1-a (0))
09-D1-10	0-1.5		6.2				NP	10	51	39		SM (A-4 (0))
	5-6.5		13.7				NP	18	68	14		SM (A-1-b (0))
09-D1-11	0-1.5		6.1		23	17	6	9	49	42		SC-SM (A-4 (0))
09-D1-12	0-0.8		7.1				NP	25	51	24		SM (A-2-4 (0))
	7.5-8.8		16.3				NP	34	47	19		SM (A-1-b (0))
09-D1-13	2.5-4		11.8				NP	42	52	6		SP-SM (A-1-a (0))
	10-11.5		13.1				NP	34	53	13		SM (A-1-b (0))
09-D1-14	0-1.5		3.1				NP	69	21	10		GP-GM (A-1-a (0))
	10-10.7		13.1				NP	27	53	20		SM (A-1-b (0))

NP=Non-Plastic

RB&G
ENGINEERING, INC.

Table 1

SUMMARY OF TEST DATA

PROJECT: Mountain View Corridor — PROJECT NO. 200901-200
LOCATION: Segment 1 — FEATURE: Detention Basins

HOLE NO.	DEPTH BELOW GROUND SURFACE (ft)	IN-PLACE		UNCONFINED OR UU TRIAXIAL COMPRESSIVE STRENGTH (psf)	ATTERBERG LIMITS			MECHANICAL ANALYSIS			PERCENT FINER THAN 0.005 mm	UNIFIED SOIL CLASSIFICATION SYSTEM / (AASHTO CLASSIFICATION)
		DRY UNIT WEIGHT (pcf)	MOISTURE (%)		LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PERCENT GRAVEL	PERCENT SAND	PERCENT SILT & CLAY		
09-D1-15	0-1.5		5.7		26	18	8	23	46	31		SC (A-2-4 (0))
	7.5-9		10.0				NP	31	58	11		SP-SM (A-1-b (0))
09-D1-16	0-1.5		6.1		25	19	6	16	45	39		SC-SM (A-4 (0))
	5-6.5		9.8				NP	44	43	13		GM (A-1-b (0))
09-D1-17	0-1.5		4.3		26	21	5	7	56	37		SC-SM (A-4 (0))
	5-6.5		15.2		24	20	4	5	41	54		CL-ML (A-4 (0))
09-D1-18	2.5-4		15.5				NP	6	42	52		ML (A-4 (0))
	7.5-9		19.0		23	19	4	3	22	75		CL-ML (A-4 (1))
09-D1-19	2.5-4		22.6		24	19	5	5	42	53		CL-ML (A-4 (0))
	7.5-9		10.6		21	16	5	45	31	24		GC-GM (A-1-b (0))
09-D1-20	2.5-4		14.6				NP	0	35	65		ML (A-4 (0))
	7.5-9		20.0				NP	40	32	28		GM (A-2-4 (0))
	10-11.5		22.2				NP	29	42	29		SM (A-2-4 (0))
09-D1-21	2.5-4		19.0		23	18	5	10	49	41		SC-SM (A-4 (0))
	5-6.5		17.0				NP	15	51	34		SM (A-2-4 (0))
	10-11.5		10.0				NP	36	45	19		SM (A-1-b (0))

HOLE NO.	DEPTH (ft)	pH	RESISTIVITY (ohm-cm)	SULFATE (mg/kg-dry)	CHLORIDE (mg/kg-dry)
09-D1-02	0-1.5	7.9	1350	290	33
09-D1-03	10-11.5	8.4	2150	40	15
09-D1-04	0-1.5	7.2	2950	3.2	4.5
	5-6.5	8.5	6500	12	4.2
09-D1-06	2.5-4	7.3	6300	14	7.6
09-D1-07	0-1.5	6.2	2150	14	7.6
	5-6.5	7.9	8300	16	3.4
09-D1-13	0-1.5	7.0	3600	8.5	2.3
09-D1-16	7.5-9	8.0	8300	23	6.0
09-D1-17	2.5-4	7.5	4500	9.2	4.6
09-D1-18	5-6.5	8.1	4150	19	4.4
09-D1-19	0-1.5	6.6	4400	6.7	4.7
09-D1-21	7.5-9	7.9	4850	21	3.6

NP=Non-Plastic

RB&G ENGINEERING, INC.

Table 1

SUMMARY OF TEST DATA

PROJECT	Mountain View Corridor	PROJECT NO.	200901-200
LOCATION	Segment 1	FEATURE	Roadway Borings

HOLE NO.	DEPTH BELOW GROUND SURFACE (ft)	IN-PLACE		UNCONFINED OR UU TRIAXIAL COMPRESSIVE STRENGTH (psf)	ATTERBERG LIMITS			MECHANICAL ANALYSIS			UNIFIED SOIL CLASSIFICATION SYSTEM / (AASHTO CLASSIFICATION)
		DRY UNIT WEIGHT (pcf)	MOISTURE (%)		LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PERCENT GRAVEL	PERCENT SAND	PERCENT SILT & CLAY	
09-MVC-1	5-6.5		12.6				NP	1	55	44	SM (A-4 (0))
	10-11.5		7.5				NP	1	77	22	SM (A-1-b (0))
	12.5-14		14.9				NP	8	69	23	SM (A-1-b (0))
09-MVC-2	5-6.5		10.0				NP	27	49	24	SM (A-2-4 (0))
	11.5-13		5.2		23	16	7	43	34	23	GC-GM (A-2-4 (0))
	14-15.5		11.1				NP	16	58	26	SM (A-2-4 (0))
09-MVC-3	2.5-4		6.9				NP	16	71	13	SM (A-1-b (0))
	5-6.5		7.1				NP	5	65	30	SM (A-2-4 (0))
	0.5-1.2		18.1		24	19	5	6	61	33	SC-SM (A-2-4 (0))
09-MVC-4	2.5-4	106.2	5.7		20	16	4	5	54	41	SC-SM (A-4 (0))
	5-6.5		7.1				NP	1	77	22	SM (A-2-4 (0))
09-MVC-5	0-1.5		9.7		21	17	4	0	74	26	SC-SM (A-2-4 (0))
	2.5-4		4.9				NP	45	44	11	SP-SM (A-1-a (0))
	0.5-1.5		10.9				NP	1	76	23	SM (A-2-4 (0))
09-MVC-6	0-1.5		6.9		31	21	10	36	34	30	GC (A-2-4 (0))
	5-6.5		8.5				NP	29	52	19	SM (A-1-b (0))
09-MVC-7	8.5-10	91.0	18.5		26	19	7	0	10	90	CL-ML (A-4 (5))
	11-12.5		19.0		25	18	7	0	20	80	CL-ML (A-4 (4))
09-MVC-8	8.5-11		13.6				NP	11	61	28	SM (A-2-4 (0))
	11-12.5		7.4				NP	34	51	15	SM (A-1-b (0))
	14.5-16		5.6		21	16	5	1	58	41	SC-SM (A-4 (0))
09-MVC-9	10-11		12.8				NP	17	72	11	SP-SM (A-1-b (0))
	25-25.9		15.1				NP	2	80	18	SM (A-2-4 (0))
	41-42.5		15.5				NP	17	66	17	SM (A-1-b (0))
	43.5-44.3		10.9				NP	36	50	14	SM (A-1-b (0))
09-MVC-10	3-4.5		12.9				NP	8	73	19	SM (A-1-b (0))
	8-9.5		8.8		22	16	6	5	65	30	SC-SM (A-2-4 (0))
09-MVC-11	0-1.5		4.7		28	21	7	34	34	32	SC-SM (A-2-4 (0))
	5-6.5		5.4		21	18	3	12	58	30	SM (A-2-4 (0))
09-MVC-12	0-1.5		11.2		23	18	5	7	53	40	SC-SM (A-4 (0))
	2.5-4		14.9		26	19	7	20	28	52	CL-ML (A-4 (1))
	2.25-2.75		17.5		27	20	7	2	38	60	CL-ML (A-4 (2))
09-MVC-13	0-1.5		9.1		24	16	8	18	49	33	SC (A-2-4 (0))
	5-6.5		7.1		23	20	3	17	63	20	SM (A-1-b (0))

NP=Non-Plastic

RB&G ENGINEERING, INC.

Table 1

SUMMARY OF TEST DATA

PROJECT Mountain View Corridor PROJECT NO. 200901-200
LOCATION Segment 1 FEATURE Roadway Borings

HOLE NO.	DEPTH BELOW GROUND SURFACE (ft)	IN-PLACE		UNCONFINED OR UU TRIAXIAL COMPRESSIVE STRENGTH (psf)	ATTERBERG LIMITS			MECHANICAL ANALYSIS			UNIFIED SOIL CLASSIFICATION SYSTEM / (AASHTO CLASSIFICATION)
		DRY UNIT WEIGHT (pcf)	MOISTURE (%)		LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PERCENT GRAVEL	PERCENT SAND	PERCENT SILT & CLAY	
09-MVC-14	2-3.5		7.2				NP	8	69	23	SM (A-2-4 (0))
	4.5-6		7.9				NP	36	42	22	SM (A-1-b (0))
	7-8.5		12.0				NP	35	44	21	SM (A-1-b (0))
09-MVC-15	0-1.5		5.2				NP	11	73	16	SM (A-2-4 (0))
	2.5-4		4.6				NP	9	83	8	SP-SM (A-1-b (0))
09-MVC-16	0.5-2		7.0				NP	35	55	10	SP-SM (A-1-b (0))
	5.5-7		7.8				NP	17	69	14	SM (A-1-b (0))
	2.25-2.5		9.1		22	20	2	49	38	13	GM (A-1-a (0))
09-MVC-17	0-1.5		3.5				NP	26	62	12	SP-SM (A-1-b (0))
	2.5-4		4.3				NP	29	63	8	SP-SM (A-1-a (0))
09-MVC-18	3-4.5		6 2				NP	18	65	17	SM (A-2-4 (0))
	5.5-7		7.1				NP	14	68	18	SM (A-2-4 (0))
09-MVC-19	2-3		5.1				NP	35	63	2	SP (A-3 (0))
	8-9		4.5				NP	57	42	1	GP (A-1-a (0))
09-MVC-20	1.5-3		8.4				NP	17	53	30	SM (A-2-4 (0))
	6.5-8		5.2				NP	12	62	26	SM (A-2-4 (0))
09-MVC-21	0-1.5		9.7		27	15	12	12	59	29	SC (A-2-6 (0))
	2.5-4		6.0				NP	34	60	6	SP-SM (A-1-a (0))
	0.5-1.5		12.5		28	17	11	11	59	30	SC (A-2-6 (0))
09-MVC-22	3.-4.5	91.6	9 3				NP	6	72	22	SM (A-2-4 (0))
	4.5-6		8.7				NP	6	69	25	SM (A-2-4 (0))
09-MVC-23	2.5-4		13.0				NP	4	73	23	SM (A-2-4 (0))
	5-6.5		11.9				NP	5	77	18	SM (A-2-4 (0))
09-MVC-24	2.5-4		10.0				NP	5	71	24	SM (A-2-4 (0))
	4-6.5		10.1				NP	7	73	20	SM (A-2-4 (0))
09-MVC-25	0-1.5		11.9		30	18	12	12	48	40	SC (A-6 (1))
	5-6.5		14.8				NP	40	47	13	SM (A-1-a (0))
09-MVC-26	1.5-3		11.4		27	17	10	11	58	31	SC (A-2-4 (0))
	4-5.5		15.4				NP	43	40	17	GM (A-1-b (0))
09-MVC-27	0-1.5		6 2				NP	15	60	25	SM (A-2-4 (0))
	2.5-4		8.3				NP	22	55	23	SM (A-1-b (0))
09-MVC-28	3-3.4		25.3				NP	30	25	45	GM (A-4 (0))
	3.4-4.9		27.1				NP	35	35	30	SM (A-2-4 (0))
	12.5-14		8.7				NP	0	82	18	SM (A-2-4 (0))

NP=Non-Plastic

RB&G ENGINEERING, INC.

Table 1

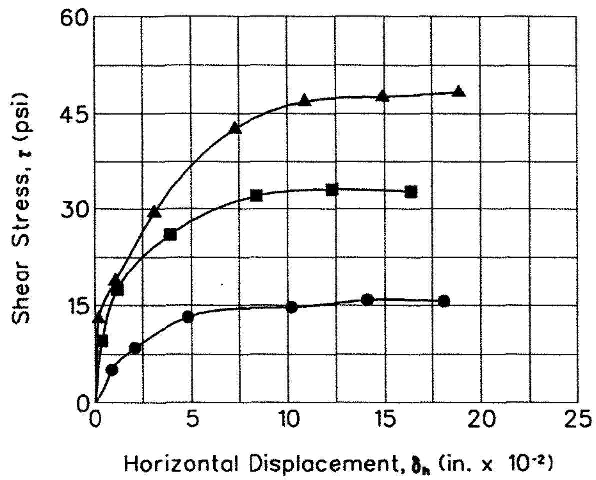
SUMMARY OF TEST DATA

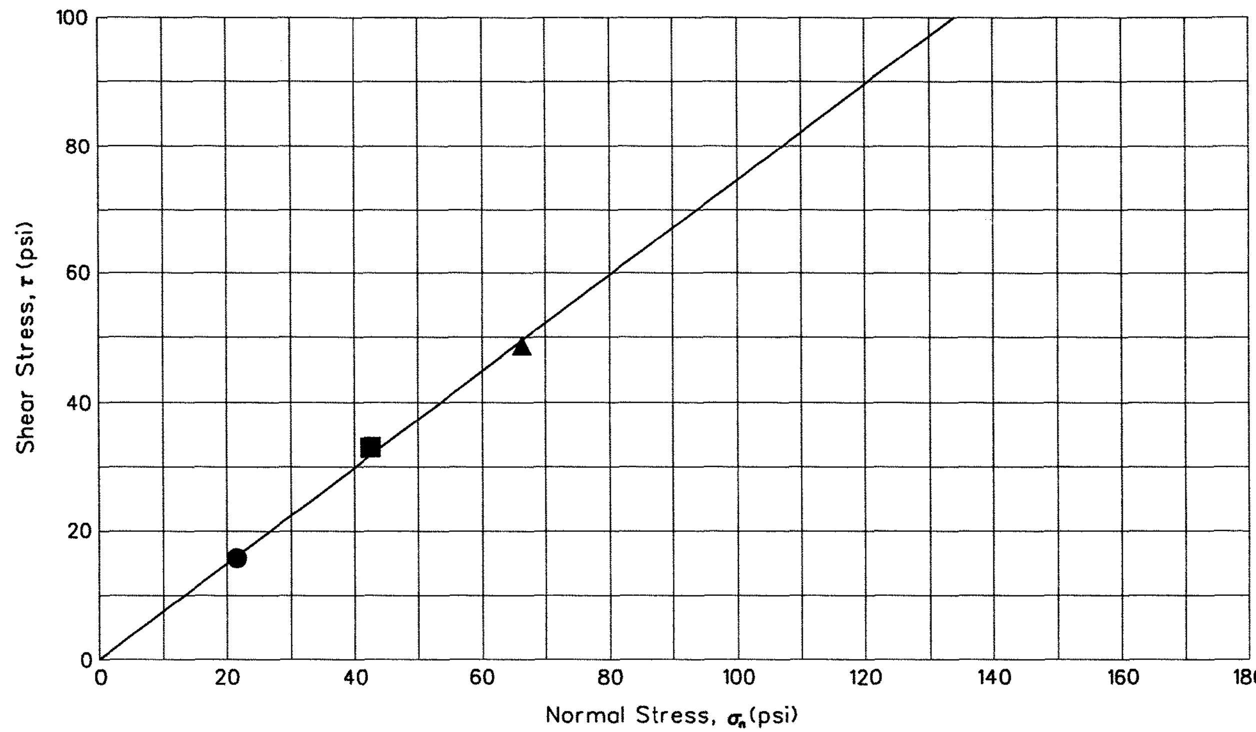
PROJECT	Mountain View Corridor	PROJECT NO.	200901-200
LOCATION	Segment 1	FEATURE	Roadway Borings

HOLE NO.	DEPTH BELOW GROUND SURFACE (ft)	IN-PLACE		UNCONFINED OR UU TRIAXIAL COMPRESSIVE STRENGTH (psf)	ATTERBERG LIMITS			MECHANICAL ANALYSIS			UNIFIED SOIL CLASSIFICATION SYSTEM / (AASHTO CLASSIFICATION)
		DRY UNIT WEIGHT (pcf)	MOISTURE (%)		LIQUID LIMIT (%)	PLASTIC LIMIT (%)	PLASTICITY INDEX (%)	PERCENT GRAVEL	PERCENT SAND	PERCENT SILT & CLAY	
09-MVC-30	0-1.5		8.8				NP	11	54	35	SM (A-2-4 (0))
	0.6-1.2		10.6		21	19	2	11	63	26	SM (A-2-4 (0))
09-MVC-31	19-19.5		14.1				NP	34	54	12	SP-SM (A-1-b (0))
	21.5-22.0		15.9				NP	21	60	19	SM (A-1-b (0))
	27.5-28		15.6				NP	38	55	7	SP-SM (A-1-a (0))
09-MVC-32	2.5-4.0	96.6	11.2		29	23	6	0	12	88	ML (A-4 (5))
	5.0-6.5		15.3		28	24	4	0	15	85	ML (A-4 (3))
09-MVC-33	5.5-6.5	92.5	19.7				NP	0	15	85	ML (A-4 (0))
	8.0-9.5		8.0				NP	0	47	53	ML (A-4 (0))
09-MVC-34	2.5-3.0		11.1		29	24	5	0	20	80	ML (A-4 (3))
	3.5-4.5		6.8		30	27	3	0	21	79	ML (A-4 (2))
	9.0-10.5		6.5		23	21	2	0	18	82	ML (A-4 (0))
	10.5-11		9.7		26	20	6	0	5	95	CL-ML (A-4 (5))
09-MVC-35	2.5-4.0	102.3	5.7		27	20	7	0	16	84	CL-ML (A-4 (5))
	8.5-10.0		7.7		26	20	6	0	33	67	CL-ML (A-4 (2))
09-MVC-37	1-2.5		6.5		28	19	9	49	27	24	GC (A-2-4 (0))
	6-7.5		4.9				NP	37	49	14	SM (A-1-b (0))
09-MVC-38	0-1.5		3.2				NP	6	59	35	SM (A-2-4 (0))
	2.5-4		11.3		28	24	4	23	43	34	SM (A-2-4 (0))
	5-6.5		5.6				NP	39	49	12	SP-SM (A-1-a (0))
09-MVC-39	0-1.5		9.9		24	15	9	20	42	38	SC (A-4 (0))

HOLE NO.	DEPTH (ft)	CHLORIDE (mg/kg-dry)	SULFATE (mg/kg-dry)	pH @ 25° C	RESISTIVITY (ohm-cm)		
09-MVC-2	9-10.5	15	120	7.8	2150		
09-MVC-6	0-1.5			6.9	830		
09-MVC-7	6-7.5	<6.0	<30	7.6	1250		
09-MVC-10	5.5-7	<5.0	<25	7.4	3700		
09-MVC-14	10.5-11	<6.3	<31	7.7	3600		
09-MVC-20	4-4.8	6.4	44	7.4	3550		
09-MVC-23	0-1.5	<53	190	6.0	2000		
09-MVC-26	6.5-8	7.6	<25	7.3	4300		
09-MVC-31	24-24.5	<6.6	<33	8.2	3300		
09-MVC-34	6-7.5	<5.3	<130	8.1	1900		
09-MVC-39	5-6.5	15	<25	8.6	2100		

NP=Non-Plastic





Test No. or Symbol	Sample Size (inches)	Sample Data: Dry Density (pcf)	Sample Data: Moisture Content (%)	Degree of Saturation (%)	Normal Stress δ_n (psi)	Maximum Shear Stress τ (psi)	Strain Rate (inches/minute)	Shear Strength Parameters: Friction Angle φ (degrees)	Shear Strength Parameters: Cohesion (c/psi)
●	2.375	98.4	14.2	~100	21.5	15.8	0.0009	36.7	0
■	2.375	98.2	14.4	~100	42.5	33.0	0.0009		
▲	2.375	98.4	13.8	~100	66.3	48.2	0.0009		

MATERIAL: SILTY SAND, SM (A-4(0)) (REMOLDED)

RB&G ENGINEERING INC.
Provo, Utah

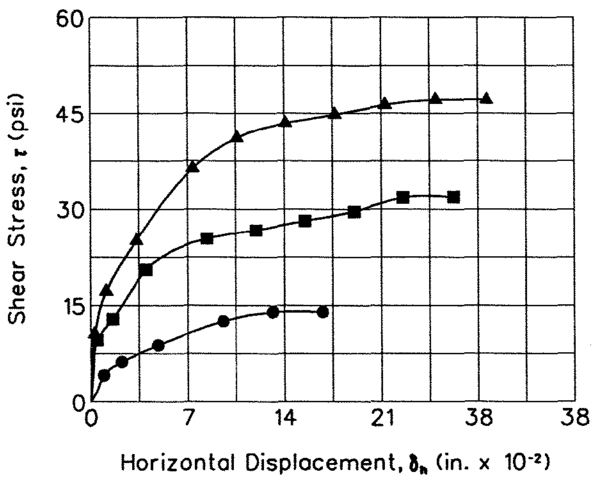
DIRECT SHEAR TEST

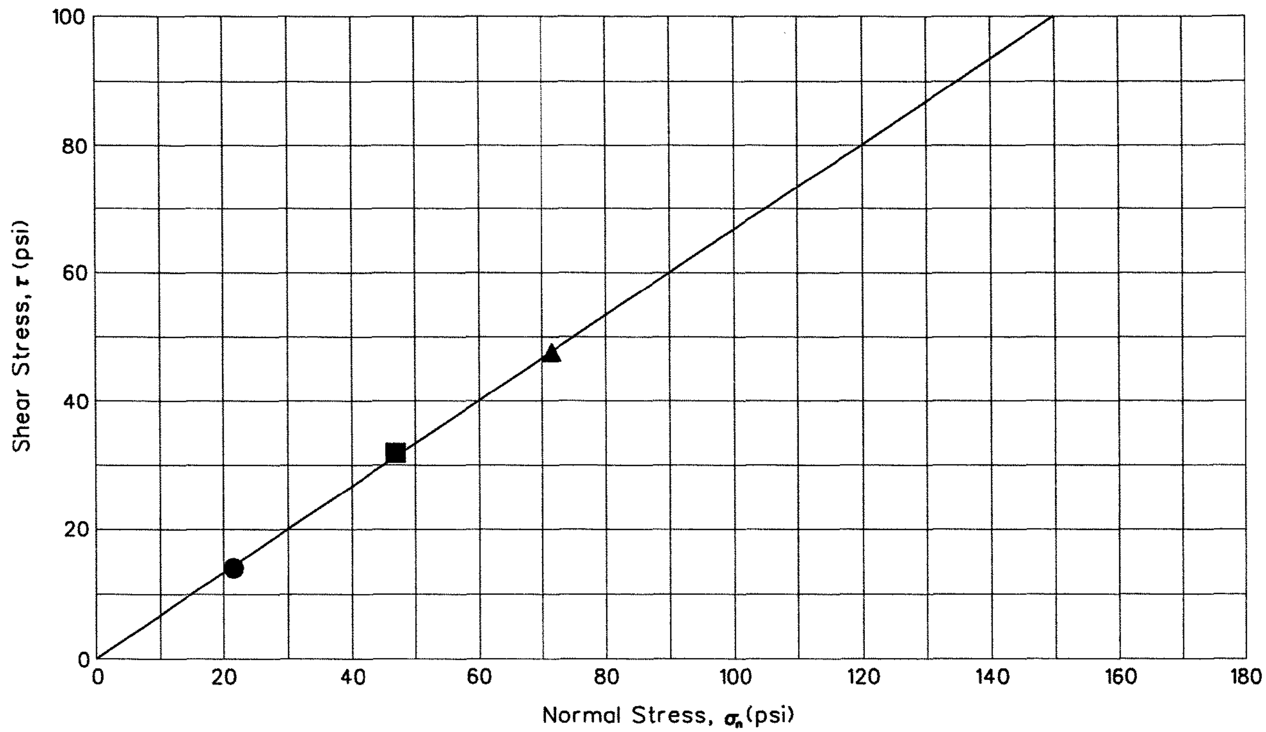
Project: *Mountain View Corridor*
Salt Lake County, Utah

HOLE NO.: 09-S1-1

DEPTH: 10'-11.5'

Figure





Test No. or Symbol	Sample Size (inches)	Sample Data: Dry Density (pcf)	Sample Data: Moisture Content (%)	Degree of Saturation (%)	Normal Stress δ_n (psi)	Maximum Shear Stress τ (psi)	Strain Rate (inches/minute)	Shear Strength Parameters: Friction Angle φ (degrees)	Shear Strength Parameters: Cohesion (c/psi)
●	2.375	87.9	14.5	~100	21.5	14.0	0.0009	33.7	0
■	2.375	87.5	14.7	~100	46.9	31.9	0.0009		
▲	2.375	87.9	14.6	~100	71.5	47.1	0.0009		

MATERIAL: SILTY SAND, SM (A-4(0))

RB&G ENGINEERING INC.
Provo, Utah

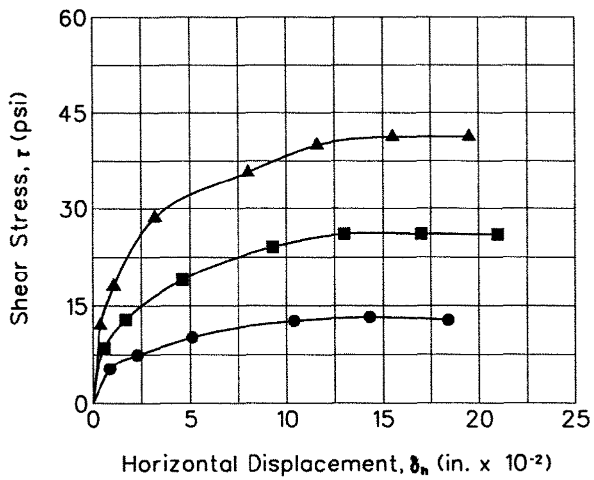
DIRECT SHEAR TEST

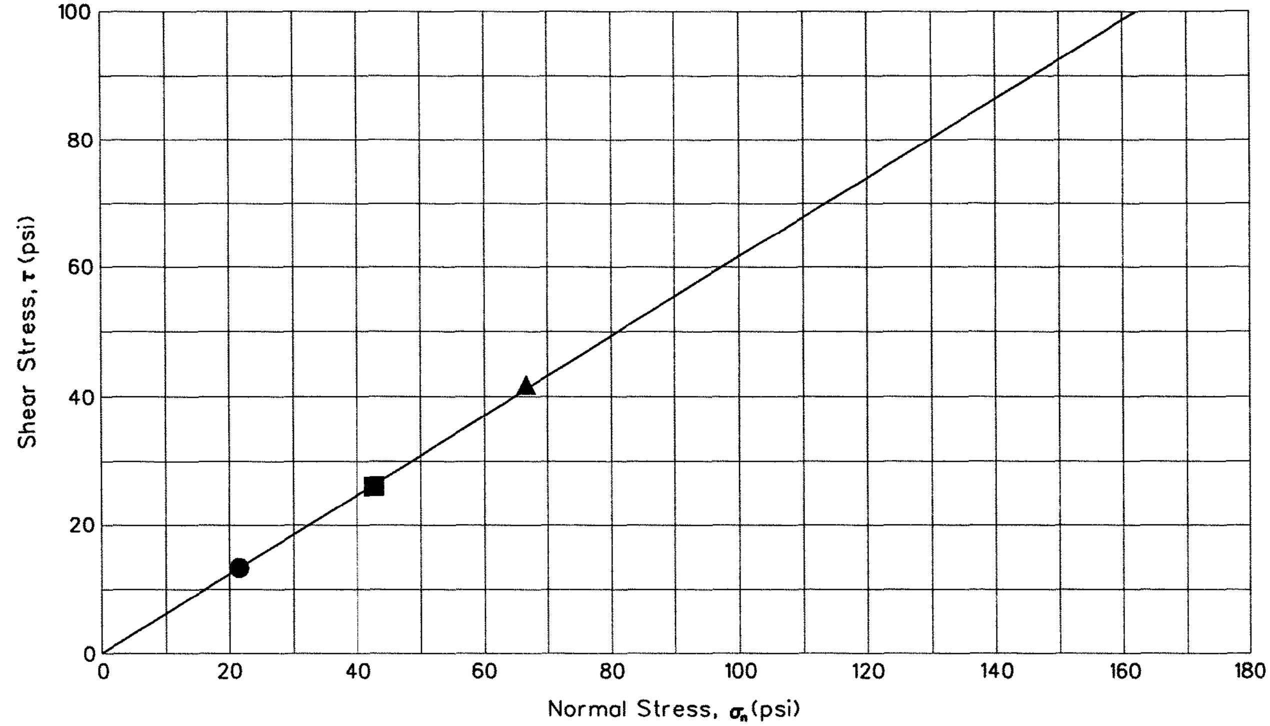
Project: *Mountain View Corridor*
Salt Lake County, Utah

HOLE NO.: 09-S1-7

DEPTH: 15'-16'

Figure





Test No. or Symbol	Sample Size (inches)	Sample Data: Dry Density (pcf)	Sample Data: Moisture Content (%)	Degree of Saturation (%)	Normal Stress σ_n (psi)	Maximum Shear Stress τ (psi)	Strain Rate (inches/ minute)	Shear Strength Parameters: Friction Angle φ (degrees)	Shear Strength Parameters: Cohesion (c/psi)
●	2.375	88.0	14.4	~100	21.5	13.3	0.0009		
■	2.375	88.3	15.2	~100	42.7	26.1	0.0009	31.7	0
▲	2.375	88.2	14.9	~100	66.6	41.3	0.0009		

MATERIAL: SILTY SAND, SM (A-4(0)) (REMOLDED)

RB&G ENGINEERING INC.
Provo, Utah

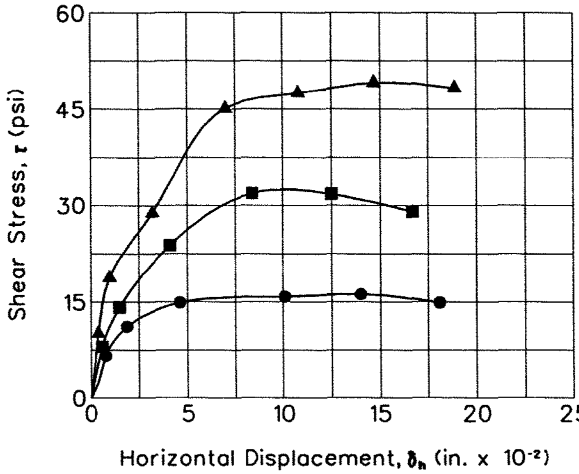
DIRECT SHEAR TEST

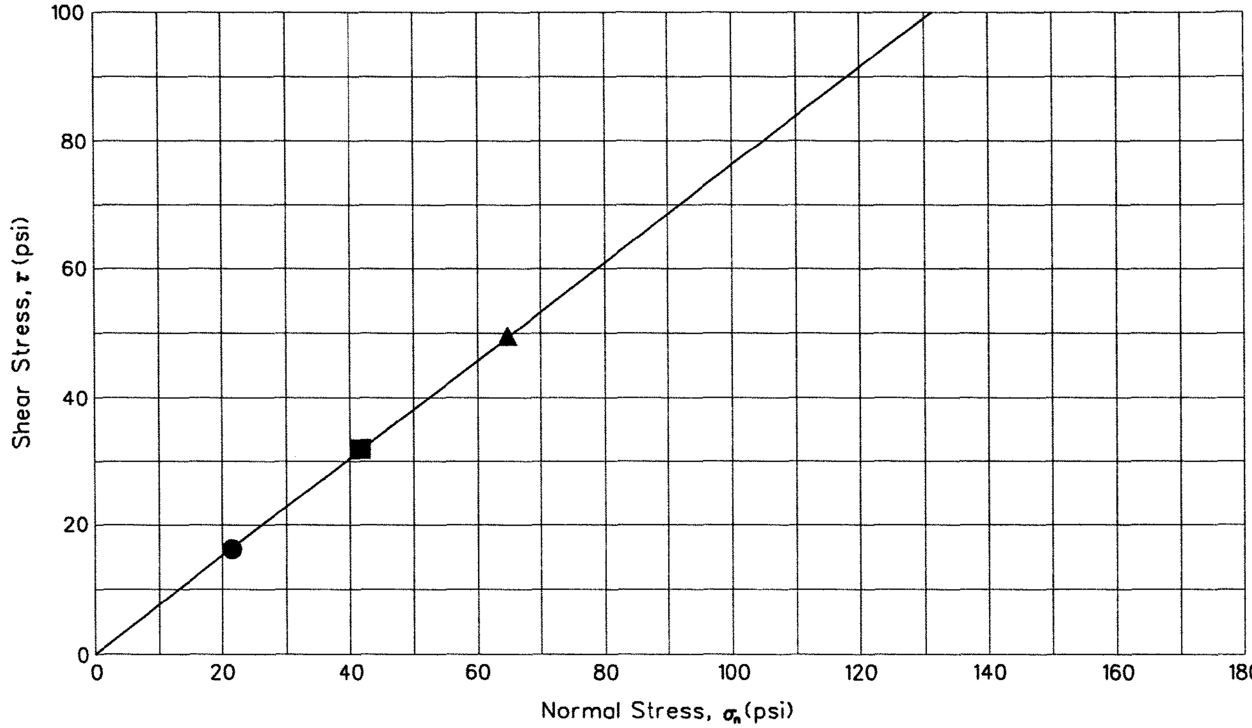
Project: *Mountain View Corridor*
Salt Lake County, Utah

HOLE NO.: 09-S1-11

DEPTH: 5'-6.5'

Figure





Test No. or Symbol	Sample Size (inches)	Sample Data		Degree of Saturation (%)	Normal Stress δ_n (psi)	Maximum Shear Stress τ (psi)	Strain Rate (inches/minute)	Shear Strength Parameters	
		Dry Density (pcf)	Moisture Content (%)					Friction Angle φ (degrees)	Cohesion (c/psi)
●	2.375	102.3	12.7	~100	21.5	16.2	0.0009	37.3	0
■	2.375	102.4	12.6	~100	41.6	31.9	0.0009		
▲	2.375	102.3	12.4	~100	64.7	49.1	0.0009		

MATERIAL: SILTY SAND, SM (A-2-4(0)) (REMOLDED)

RB&G ENGINEERING INC.
Provo, Utah

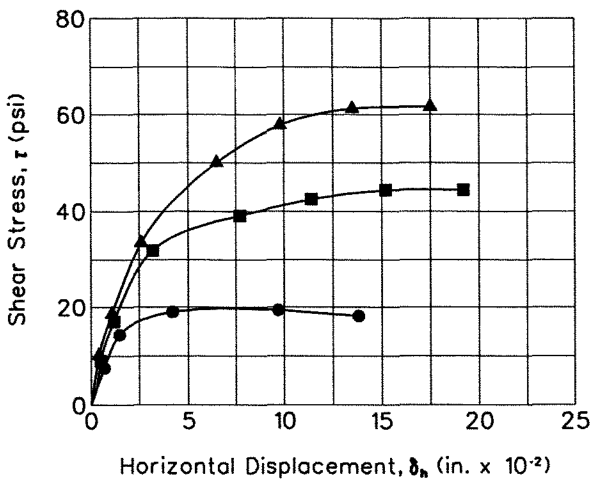
DIRECT SHEAR TEST

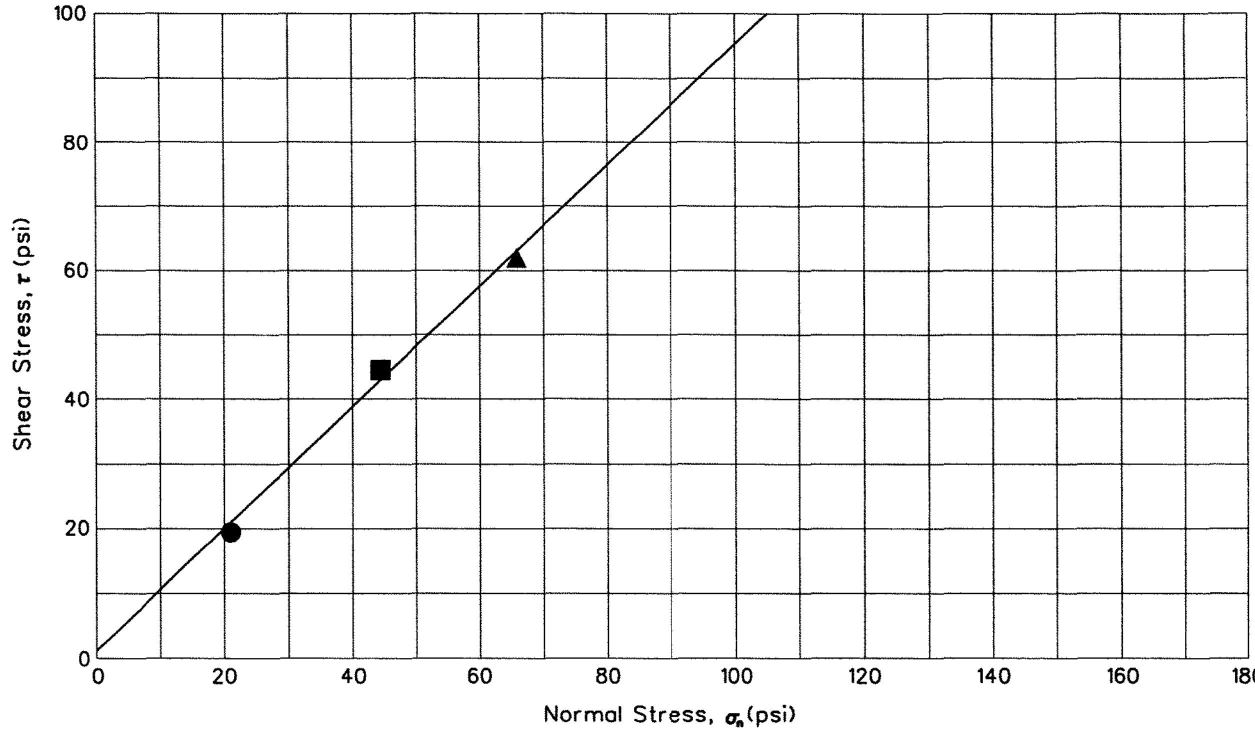
Project: *Mountain View Corridor*
Salt Lake County, Utah

HOLE NO.: 09-S1-12

DEPTH: 15'-16.5'

Figure





Test No. or Symbol	Sample Size (inches)	Sample Data		Degree of Saturation (%)	Normal Stress δ_n (psi)	Maximum Shear Stress τ (psi)	Strain Rate (inches/ minute)	Shear Strength Parameters	
		Dry Density (pcf)	Moisture Content (%)					Friction Angle φ (degrees)	Cohesion (c/psi)
●	2.375	70.9	37.0	~100	21.0	19.4	0.0009	43.2	1
■	2.375	70.9	37.0	~100	44.3	44.4	0.0009		
▲	2.375	70.5	37.1	~100	65.8	61.5	0.0009		

MATERIAL: SANDY SILT, ML (A-4(0)) (REMOLDED)

RB&G ENGINEERING INC.
Provo, Utah

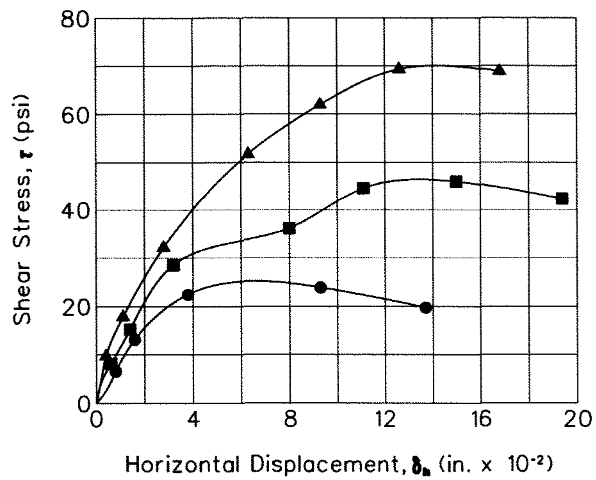
DIRECT SHEAR TEST

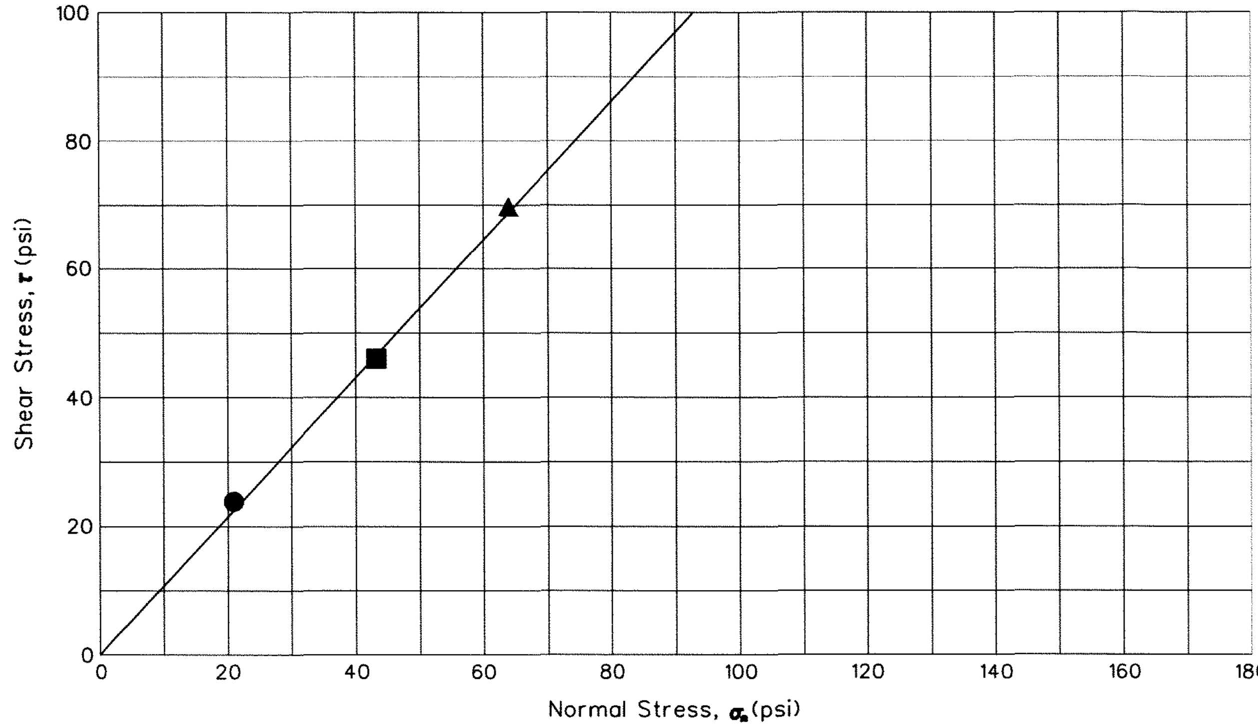
Project: *Mountain View Corridor*
Salt Lake County, Utah

HOLE NO.: 09-S1-13

DEPTH: 15'-16.5'

Figure





Test No. or Symbol	Sample Size (inches)	Sample Data		Degree of Saturation (%)	Normal Stress σ_n (psi)	Maximum Shear Stress τ (psi)	Strain Rate (inches/minute)	Shear Strength Parameters	
		Dry Density (pcf)	Moisture Content (%)					Friction Angle ϕ (degrees)	Cohesion (c/psi)
●	2.375	112.2	15.3	~100	20.9	23.9	0.0014	47.1	0
■	2.375	112.8	15.7	~100	43.2	46.0	0.0014		
▲	2.375	113.3	15.7	~100	63.9	69.3	0.0014		

MATERIAL: SILTY SAND W/GRAVEL, SM (A-1-b(0)) (REMOLDED, -3/8" MATERIAL)

RB&G ENGINEERING INC.
Provo, Utah

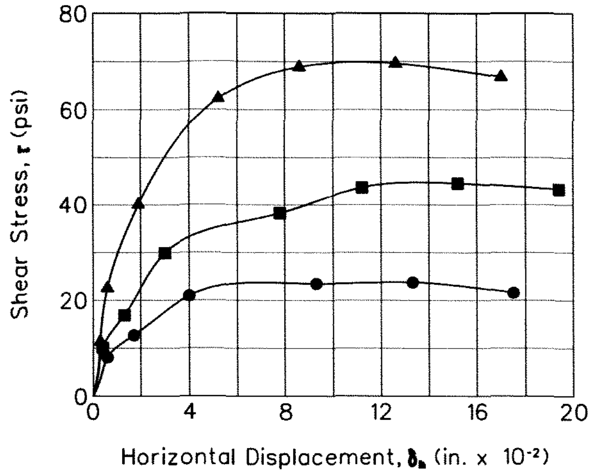
DIRECT SHEAR TEST

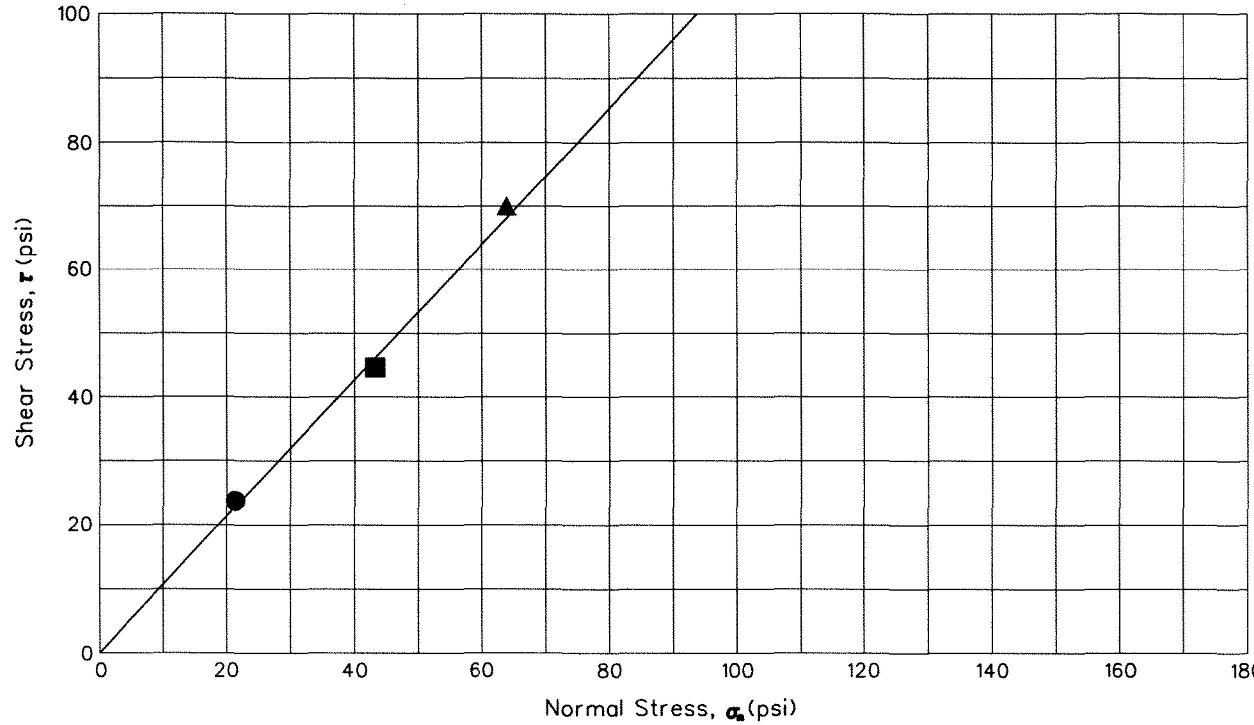
Project: *Mountain View Corridor*
Salt Lake County, Utah

HOLE NO.: 09-W1-02

DEPTH: 10'-11.4'

Figure





Test No. or Symbol	Sample Size (inches)	Sample Data		Degree of Saturation (%)	Normal Stress σ_n (psi)	Maximum Shear Stress τ (psi)	Strain Rate (inches/minute)	Shear Strength Parameters	
		Dry Density (pcf)	Moisture Content (%)					Friction Angle ϕ (degrees)	Cohesion (c/psi)
●	2.375	117.6	13.4	~100	21.4	23.8	0.0014	46.8	0
■	2.375	116.7	13.6	~100	43.2	44.6	0.0014		
▲	2.375	116.8	13.6	~100	63.9	69.6	0.0014		

MATERIAL: SAND W/SILT & GRAVEL, SP-SM (A-1-b(0)) (REMOLDED)

RB&G ENGINEERING INC.
Provo, Utah

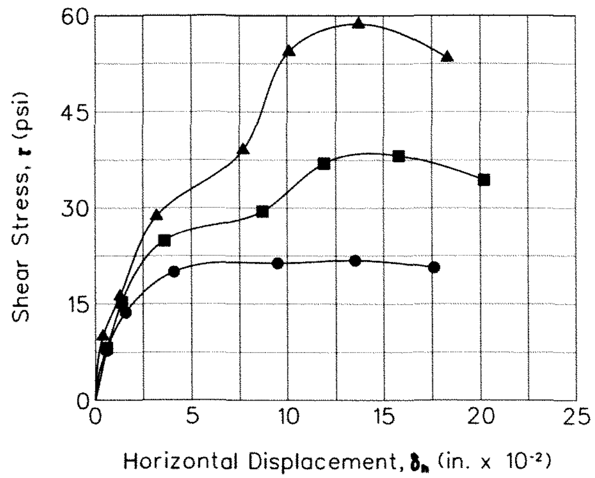
DIRECT SHEAR TEST

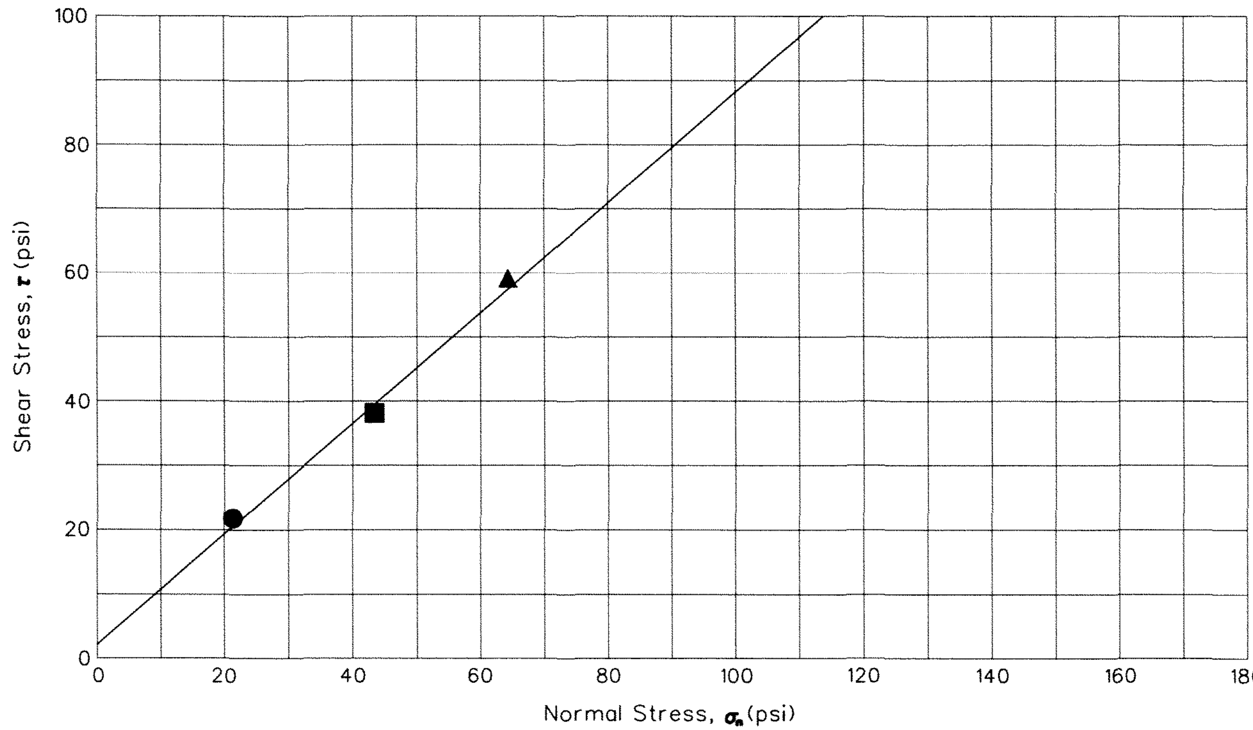
Project: *Mountain View Corridor*
Salt Lake County, Utah

HOLE NO.: 09-W1-11

DEPTH: 10'-11.5'

Figure





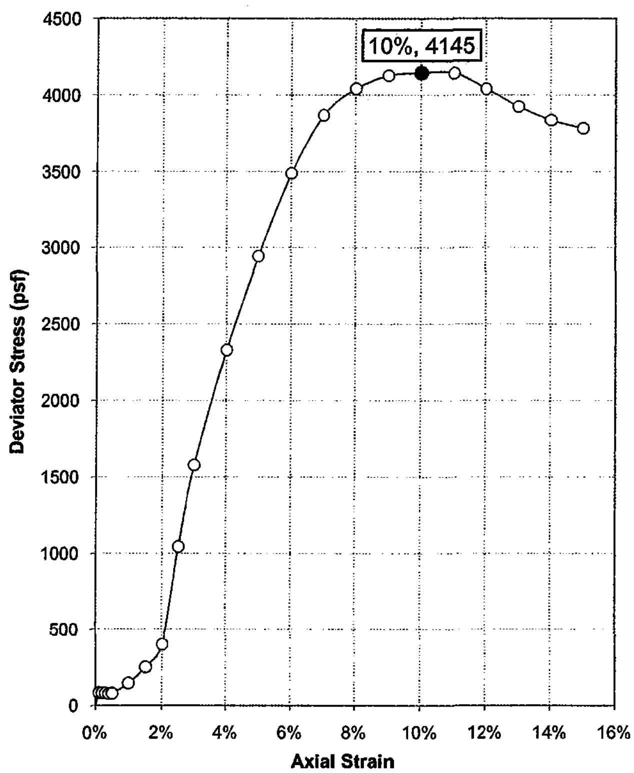
Test No. or Symbol	Sample Size (inches)	Sample Data		Degree of Saturation (%)	Normal Stress δ_n (psi)	Maximum Shear Stress τ (psi)	Strain Rate (inches/ minute)	Shear Strength Parameters	
		Dry Density (pcf)	Moisture Content (%)					Friction Angle φ (degrees)	Cohesion (c/psi)
●	2.375	68.2	39.0	~100	21.4	21.8	0.0014		
■	2.375	67.8	39.1	~100	43.4	38.2	0.0014	40.7	2
▲	2.375	69.1	39.3	~100	64.3	58.7	0.0014		

MATERIAL: SILT W/SAND, ML (A-4(0)) (REMOLDED)

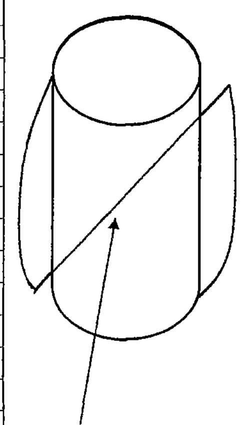
RB&G ENGINEERING, INC.

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS

Project	Moutain View Corridor	**Boring No.**	09-S1-4
Project No.	200901-200	**Sample**	1
Location	Juniper Canyon	**Depth / Elev. (ft)**	35-36.5'
Date	Saturday, October 03, 2009	**Sample Description**	Fat Clay CH (A-7-6(30))
Tested By	J Boone	**Sample Type**	Undisturbed



Axial Strain	σ_d (psf)	$\sigma_d / 2$ (psf)	Sketch of Specimen After Failure
0.0%	0	0	
0.1%	83	42	
0.2%	82	41	
0.3%	81	40	
0.4%	76	38	
0.5%	79	39	
1.0%	146	73	
1.5%	253	127	
2.0%	402	201	
2.5%	1044	522	
3.0%	1578	789	
4.0%	2329	1165	
5.0%	2943	1472	
6.0%	3490	1745	
7.0%	3870	1935	
8.0%	4041	2021	
9.0%	4126	2063	
10.0%	4145	2073	
11.0%	4142	2071	
12.0%	4040	2020	
13.0%	3925	1963	
14.0%	3837	1918	
15.0%	3785	1892	



Initial Sample Data

Initial height of specimen	L_o	4.54	(in)	**Moisture content***	w	13.5%	
Initial diameter of specimen	D_o	2.58	(in)	**Dry unit weight**	γ_d	81.3	(pcf)
Height-to-diameter ratio	L_o / D_o	1.76		**Specific gravity of soil solids**	G_s	2.68	*[Estimated value]*
Liquid limit	LL	52		**Initial void ratio**	e_o	1.056	
Plastic index	PI	27		**Saturation**	S	34%	

Test Results

Deviator stress at failure**	$\sigma_{d,f}$	4145	(psf)	**Major principal stress at failure****	σ_1	7746	(psf)
Shear stress at failure**	c_u	2073	(psf)	**Minor principal stress at failure****	σ_3	3601	(psf)

Average strain rate to failure 1% / min

Strain at failure 10%

Remarks ______________________

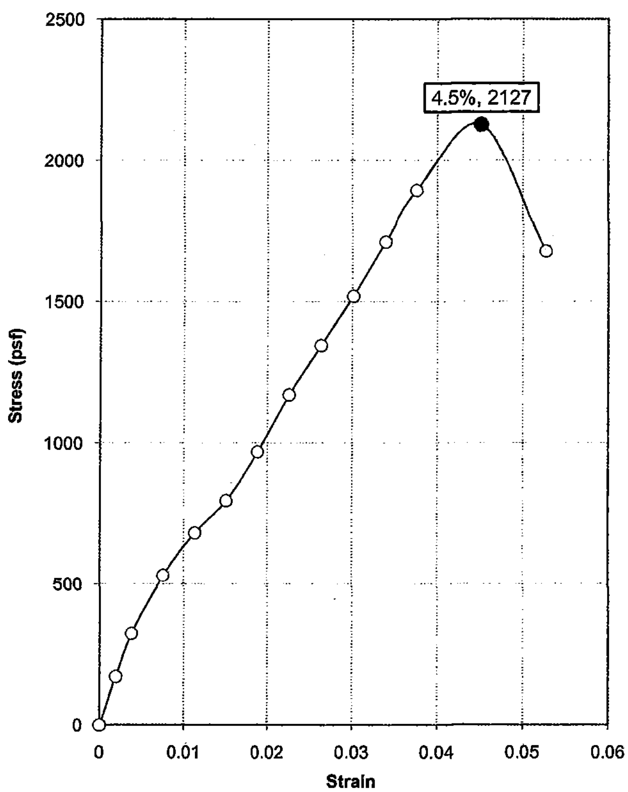
*Moisture content obtained from cuttings and or excess material
**Values corrected for membrane effects

RB&G ENGINEERING, INC.

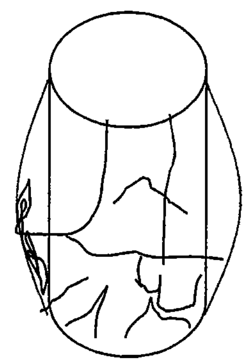
UNCONFINED COMPRESSION TEST ON COHESIVE SOILS

Project	Mtn. View Corridor	**Boring No.**	09-S1-5
Project No.	200901-200	**Sample**	1
Location	Juniper Canyon	**Depth / Elev. (ft)**	5-6.5'
Date	Friday, July 10, 2009	**Sample Description**	MH (A-7-5(25))
Tested By	S Neil	**Sample Type**	Undisturbed (shelby)

Apparatus No.	UC - 1	**Proving Ring No.**	5552



Total Strain	Stress (psf)	Sketch of Specimen After Failure
0.0%	0	
0.2%	172	
0.4%	323	
0.8%	531	
1.1%	683	
1.5%	796	
1.9%	968	
2.3%	1170	
2.6%	1345	
3.0%	1518	
3.4%	1711	
3.8%	1893	
4.5%	2127	
5.3%	1678	



Initial Sample Data

Initial height of specimen	L_o	5.32	(in)	**Liquid limit**	LL	53
Initial diameter of specimen	D_o	2.59	(in)	**Plastic index**	PI	23
Height-to-diameter ratio	L_o / D_o	2.05		**Moisture content***	w	42.8%
Dry unit weight	γ_d	70.6	(pcf)			

Test Results

Unconfined compressive strength	q_u	2127	(psf)
Shear strength	c_u	1064	(psf)
Average strain rate to failure		1%	/ min
Strain at failure		4.5%	

Remarks cracked and crumbly

*Moisture content obtained from cuttings and or excess material

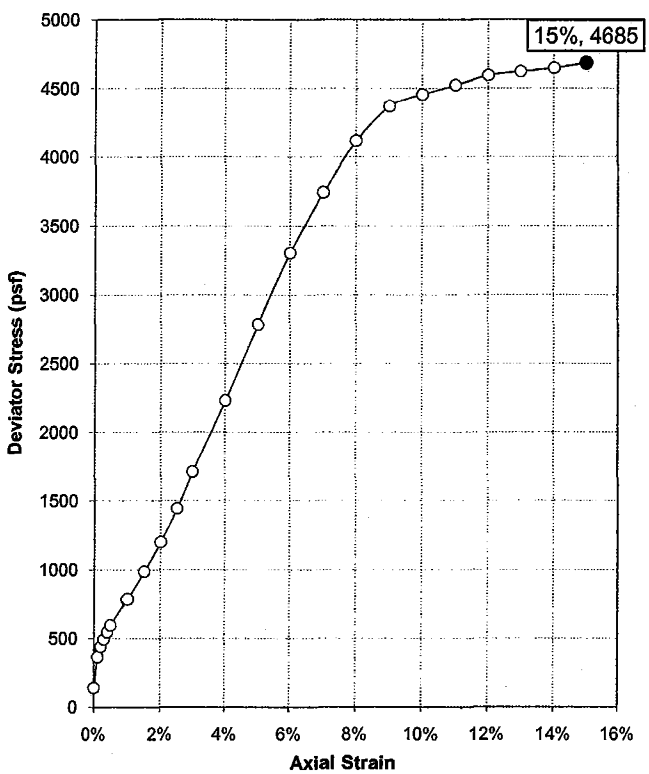
ASTM D 2166

H:\2009\200_MVCRedwoodRdto6200So\Structure Borings\Lab Testing\UU Testing\09-S1-5 @ 5-6.5' UC

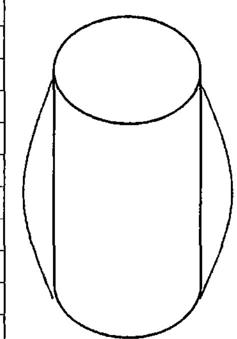
RB&G ENGINEERING, INC.

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS

Project	Moutain View Corridor	**Boring No.**	09-S1-6
Project No.	200901-200	**Sample**	1
Location	Juniper Canyon	**Depth / Elev. (ft)**	10-11'
Date	Saturday, October 03, 2009	**Sample Description**	Lean Clay CL (A-6(13))
Tested By	J Boone	**Sample Type**	Undisturbed



Axial Strain	σ_d (psf)	$\sigma_d / 2$ (psf)	Sketch of Specimen After Failure
0.0%	142	71	
0.1%	367	183	
0.2%	442	221	
0.3%	495	247	
0.4%	547	274	
0.5%	596	298	
1.0%	786	393	
1.5%	987	493	
2.0%	1200	600	
2.5%	1443	721	
3.0%	1711	856	
4.0%	2232	1116	
5.0%	2784	1392	
6.0%	3303	1651	
7.0%	3743	1871	
8.0%	4116	2058	
9.0%	4369	2184	
10.0%	4455	2228	
11.0%	4523	2261	
12.0%	4594	2297	
13.0%	4623	2311	
14.0%	4648	2324	
15.0%	4685	2342	



Initial Sample Data

Initial height of specimen	L_o	3.97	(in)	**Moisture content***	w	19.0%	
Initial diameter of specimen	D_o	2.60	(in)	**Dry unit weight**	γ_d	100.2	(pcf)
Height-to-diameter ratio	L_o / D_o	1.53		**Specific gravity of soil solids**	G_s	2.68	*[Estimated value]*
Liquid limit	LL	33		**Initial void ratio**	e_o	0.669	
Plastic index	PI	18		**Saturation**	S	76%	

Test Results

Deviator stress at failure**	$\sigma_{d,f}$	4685	(psf)	**Major principal stress at failure****	σ_1	5405	(psf)
Shear stress at failure**	c_u	2342	(psf)	**Minor principal stress at failure****	σ_3	720	(psf)

Average strain rate to failure 1% / min

Strain at failure 15%

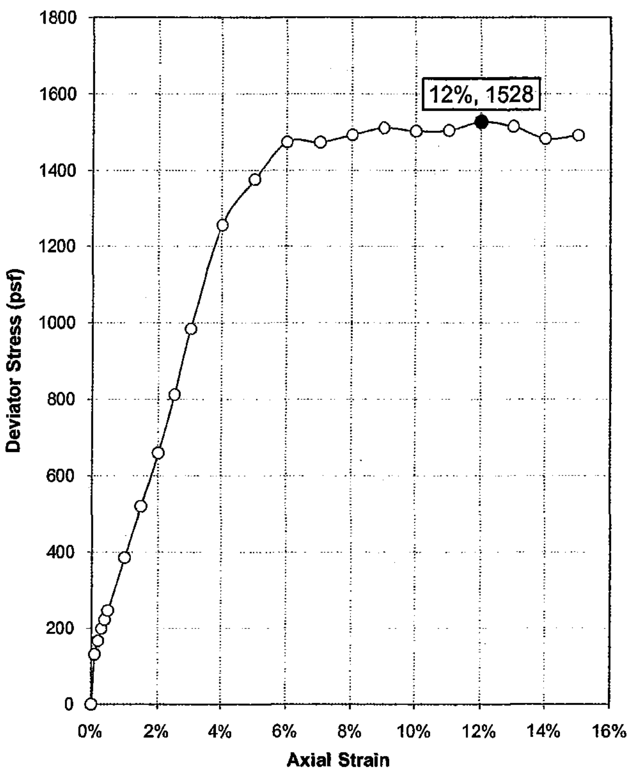
Remarks ______

*Moisture content obtained from cuttings and or excess material
**Values corrected for membrane effects

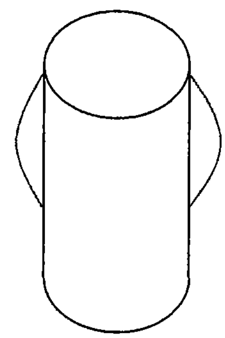
RB&G ENGINEERING, INC.

UNCONSOLIDATED-UNDRAINED TRIAXIAL COMPRESSION TEST ON COHESIVE SOILS

Project	Moutain View Corridor	**Boring No.**	09-S1-10
Project No.	200901-200	**Sample**	1
Location	Juniper Canyon	**Depth / Elev. (ft)**	15-16.5'
Date	Tuesday, July 14, 2009	**Sample Description**	lean clay CL (A-6(8))
Tested By	L Price	**Sample Type**	Undisturbed (shelby)



Axial Strain	σ_d (psf)	$\sigma_d / 2$ (psf)	Sketch of Specimen After Failure
0.0%	1	0	
0.1%	132	66	
0.2%	167	83	
0.3%	199	99	
0.4%	223	112	
0.5%	247	124	
1.0%	386	193	
1.5%	520	260	
2.0%	660	330	
2.5%	812	406	
3.0%	984	492	
4.0%	1256	628	
5.0%	1377	688	
6.0%	1474	737	
7.0%	1474	737	
8.0%	1494	747	
9.0%	1512	756	
10.0%	1503	752	
11.0%	1505	752	
12.0%	1528	764	
13.0%	1515	757	
14.0%	1483	742	
15.0%	1492	746	



Initial Sample Data

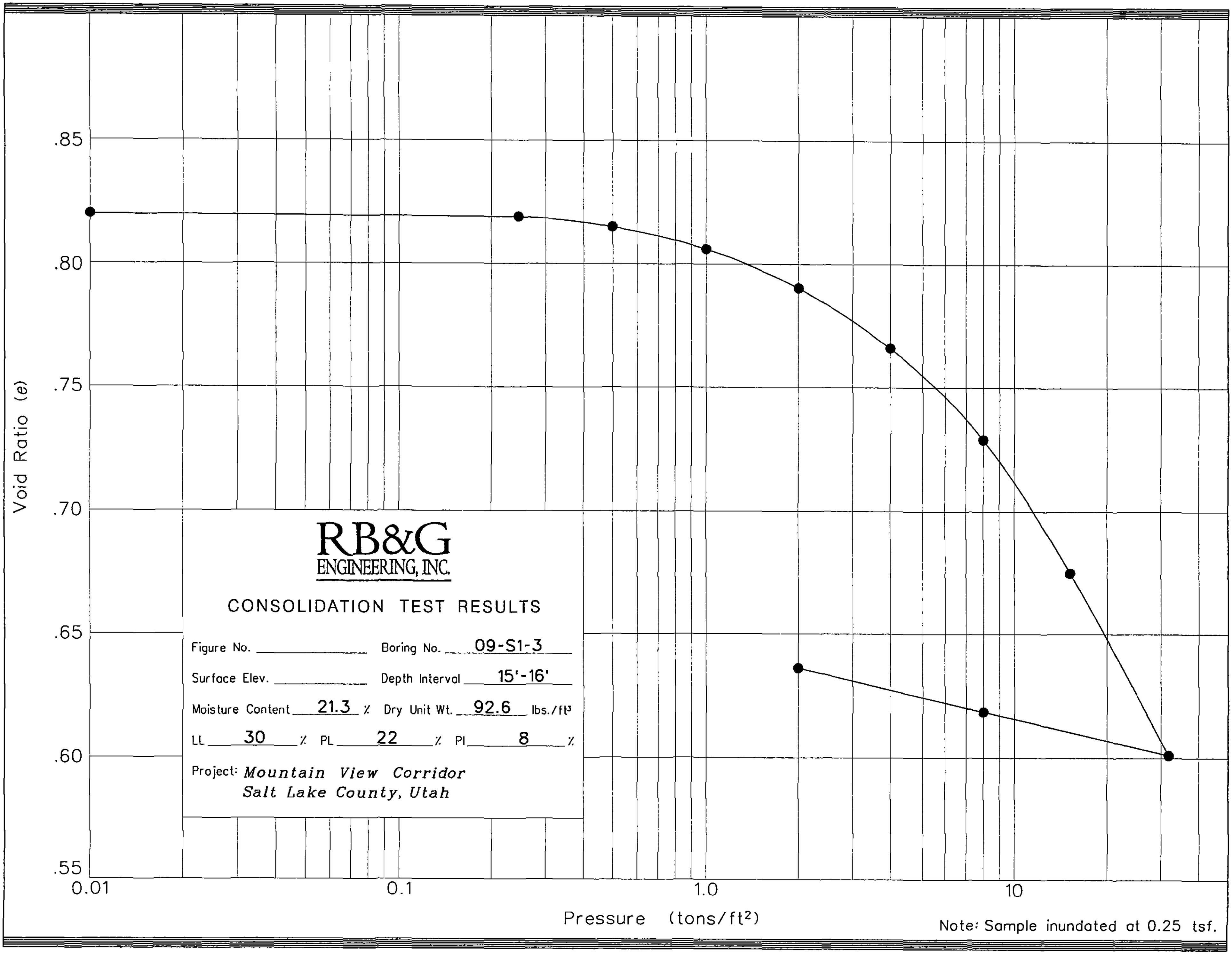
Initial height of specimen	L_o	5.75	(in)	**Moisture content***	w	25.6%	
Initial diameter of specimen	D_o	2.58	(in)	**Dry unit weight**	γ_d	88.8	(pcf)
Height-to-diameter ratio	L_o / D_o	2.23		**Specific gravity of soil solids**	G_s	2.68	*[Estimated value]*
Liquid limit	LL	29		**Initial void ratio**	e_o	0.884	
Plastic index	PI	11		**Saturation**	S	78%	

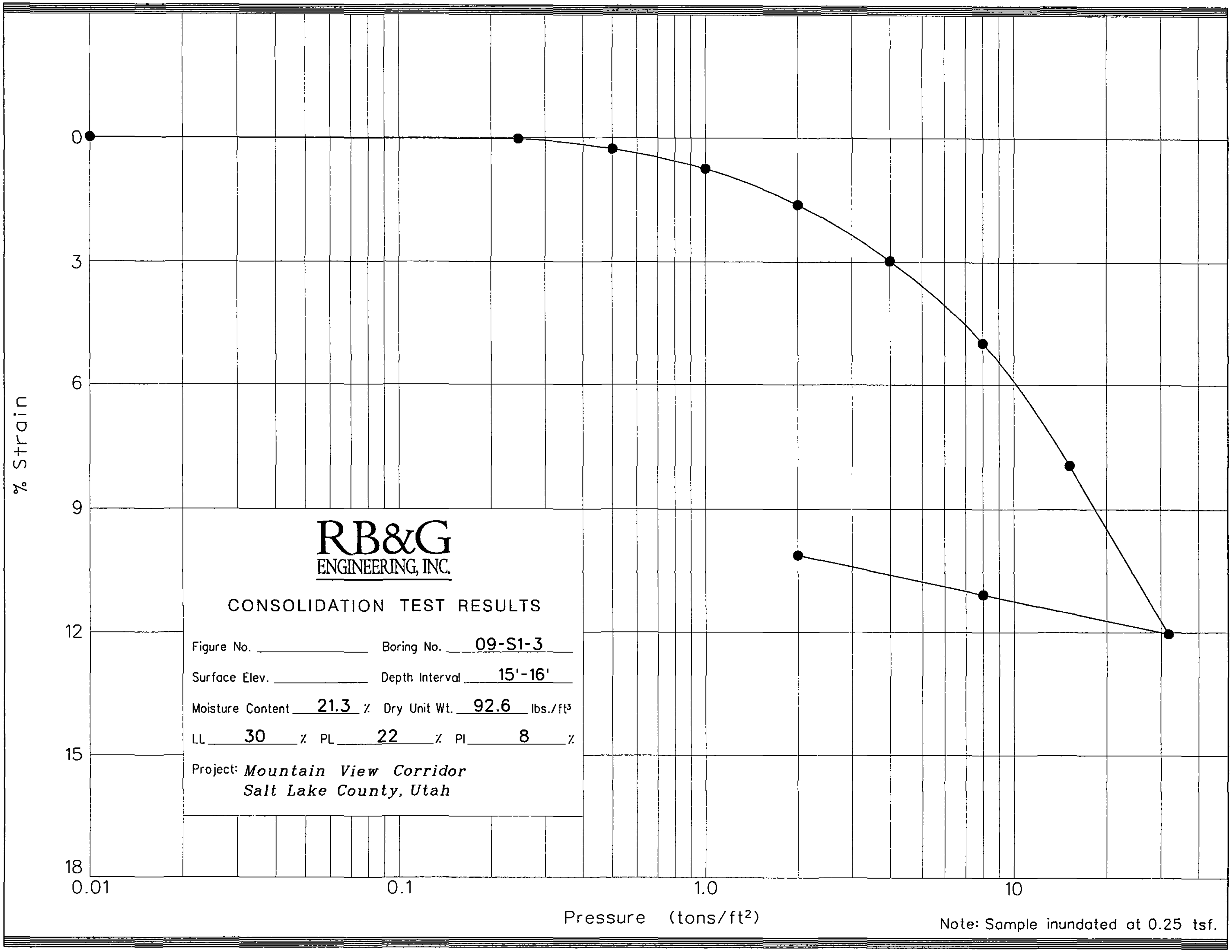
Test Results

Deviator stress at failure**	$\sigma_{d,f}$	1528	(psf)	**Major principal stress at failure****	σ_1	3099	(psf)
Shear stress at failure**	c_u	764	(psf)	**Minor principal stress at failure****	σ_3	1572	(psf)
Average strain rate to failure		1%	/ min				
Strain at failure		12%					

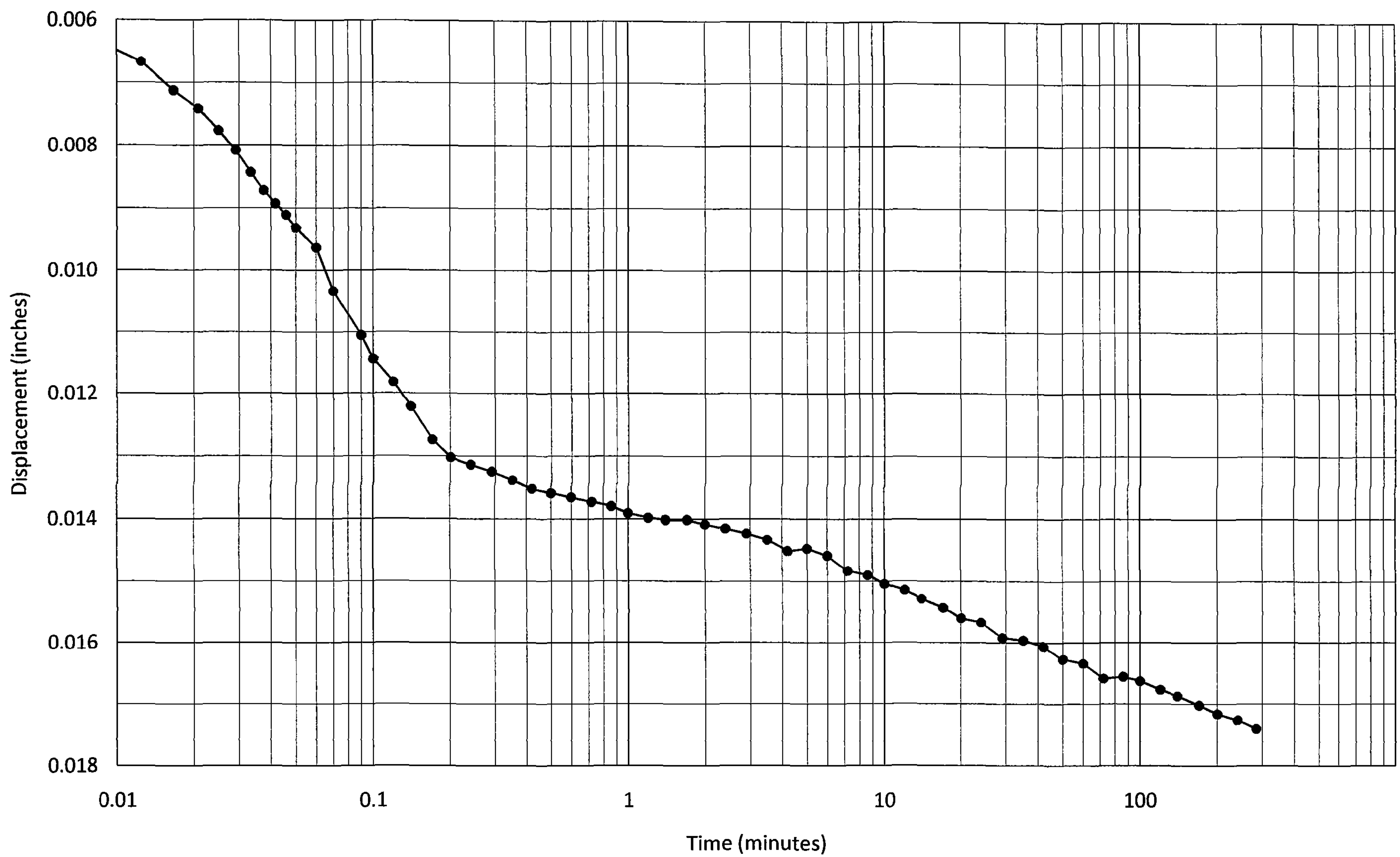
Remarks ____________________

*Moisture content obtained from cuttings and or excess material
**Values corrected for membrane effects


RB&G ENGINEERING, INC.
CONSOLIDATION TEST RESULTS
Figure No.
Boring No. 09-S1-3
Surface Elev.
Depth Interval 15'-16'
Moisture Content 21.3 %
Dry Unit Wt. 92.6 lbs./ft³
LL 30 %
PL 22 %
PI 8 %
Project: Mountain View Corridor
Salt Lake County, Utah
Void Ratio (e)
.85
.80
.75
.70
.65
.60
.55
0.01
0.1
1.0
10
Pressure (tons/ft²)
Note: Sample inundated at 0.25 tsf.



% Strain
0
3
6
9
12
15
18
0.01
0.1
1.0
10
Pressure (tons/ft²)
Note: Sample inundated at 0.25 tsf.
RB&G ENGINEERING, INC.
CONSOLIDATION TEST RESULTS
Figure No.
Boring No. 09-S1-3
Surface Elev.
Depth Interval 15'-16'
Moisture Content 21.3 %
Dry Unit Wt. 92.6 lbs./ft³
LL 30 %
PL 22 %
PI 8 %
Project: Mountain View Corridor
Salt Lake County, Utah



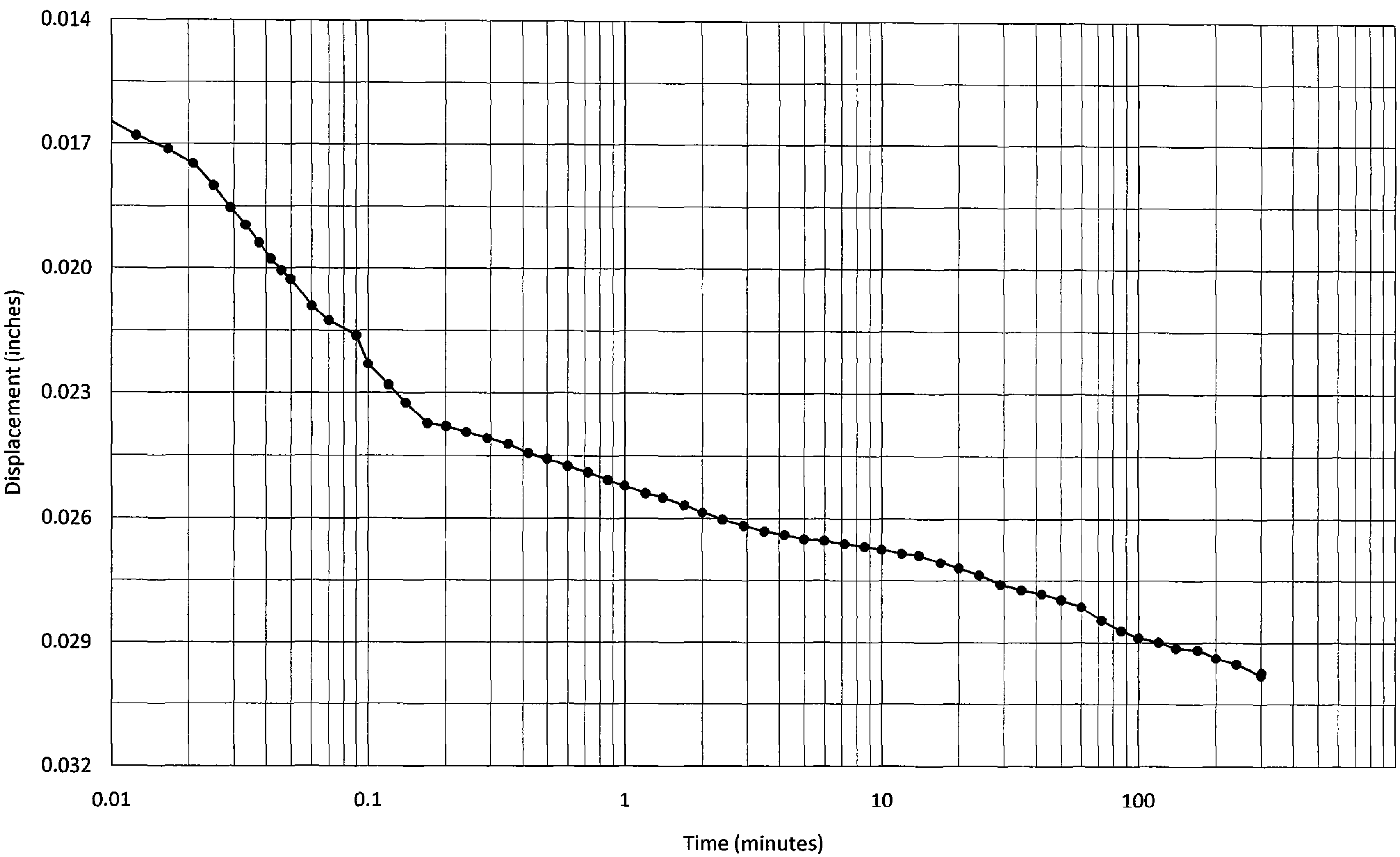
RB&G ENGINEERING, INC.

Hole no.: 09-S1-3
Depth: 15'-16'
Load: 1 to 2 tsf

TIME CONSOLIDATION

Mountain View Corridor

Salt Lake County, Utah



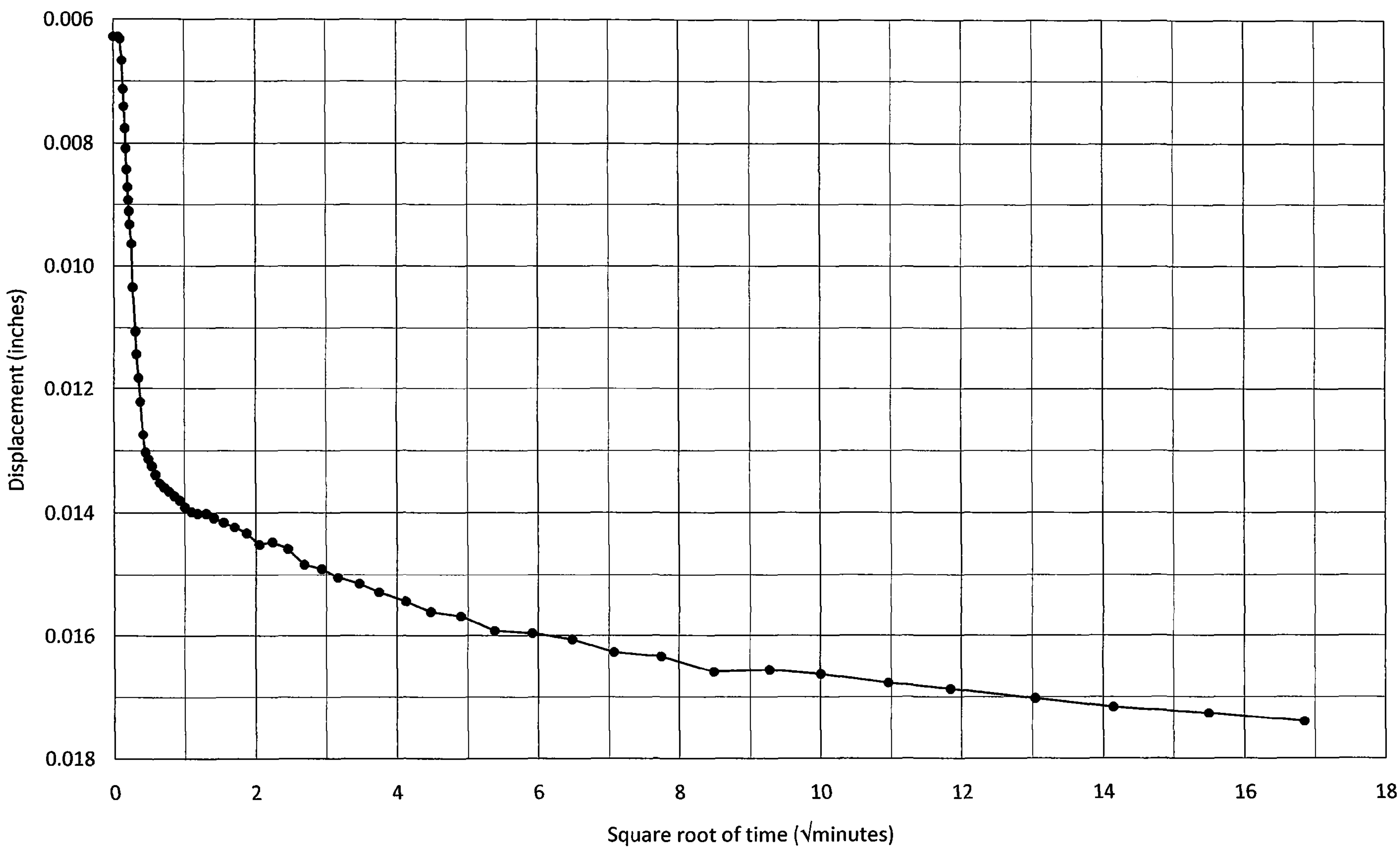
RB&G
ENGINEERING, INC.

Hole no.: 09-S1-3
Depth: 15'-16'
Load: 2 to 4 tsf

TIME CONSOLIDATION

Mountain View Corridor

Salt Lake County, Utah



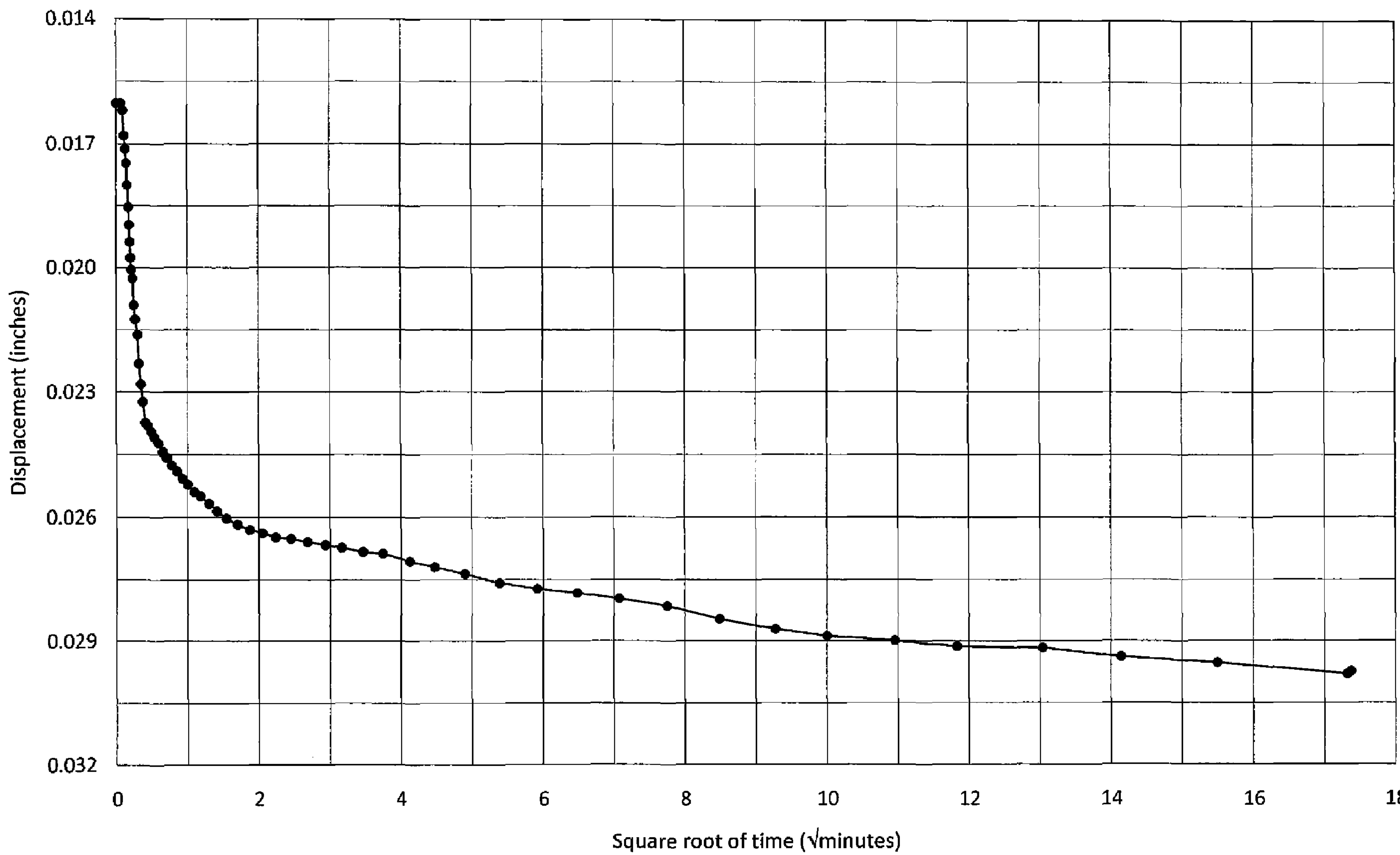
RB&G ENGINEERING, INC.

Hole no.: 09-S1-3
Depth: 15'-16'
Load: 1 to 2 tsf

TIME CONSOLIDATION

Mountain View Corridor

Salt Lake County, Utah



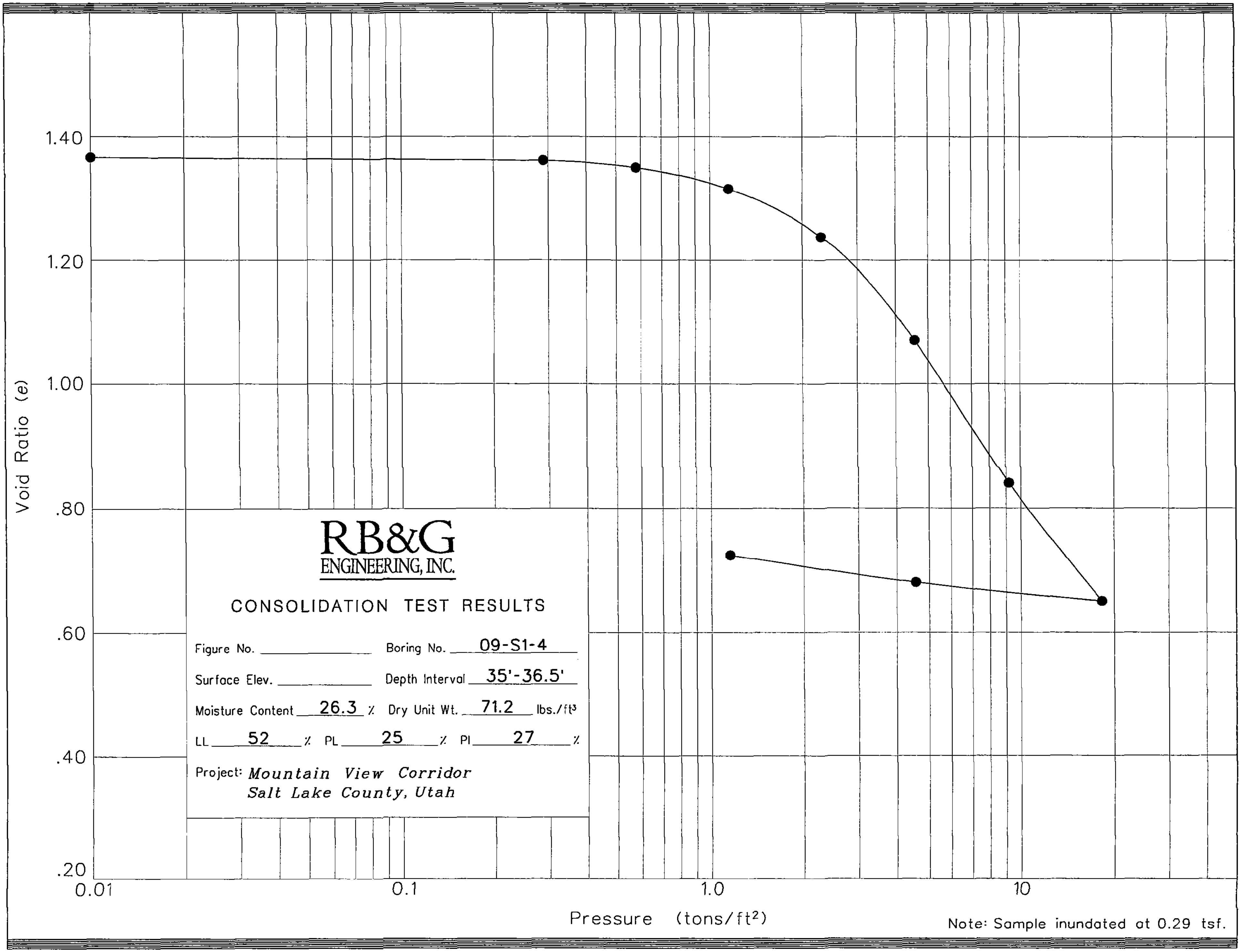
RB&G
ENGINEERING, INC.

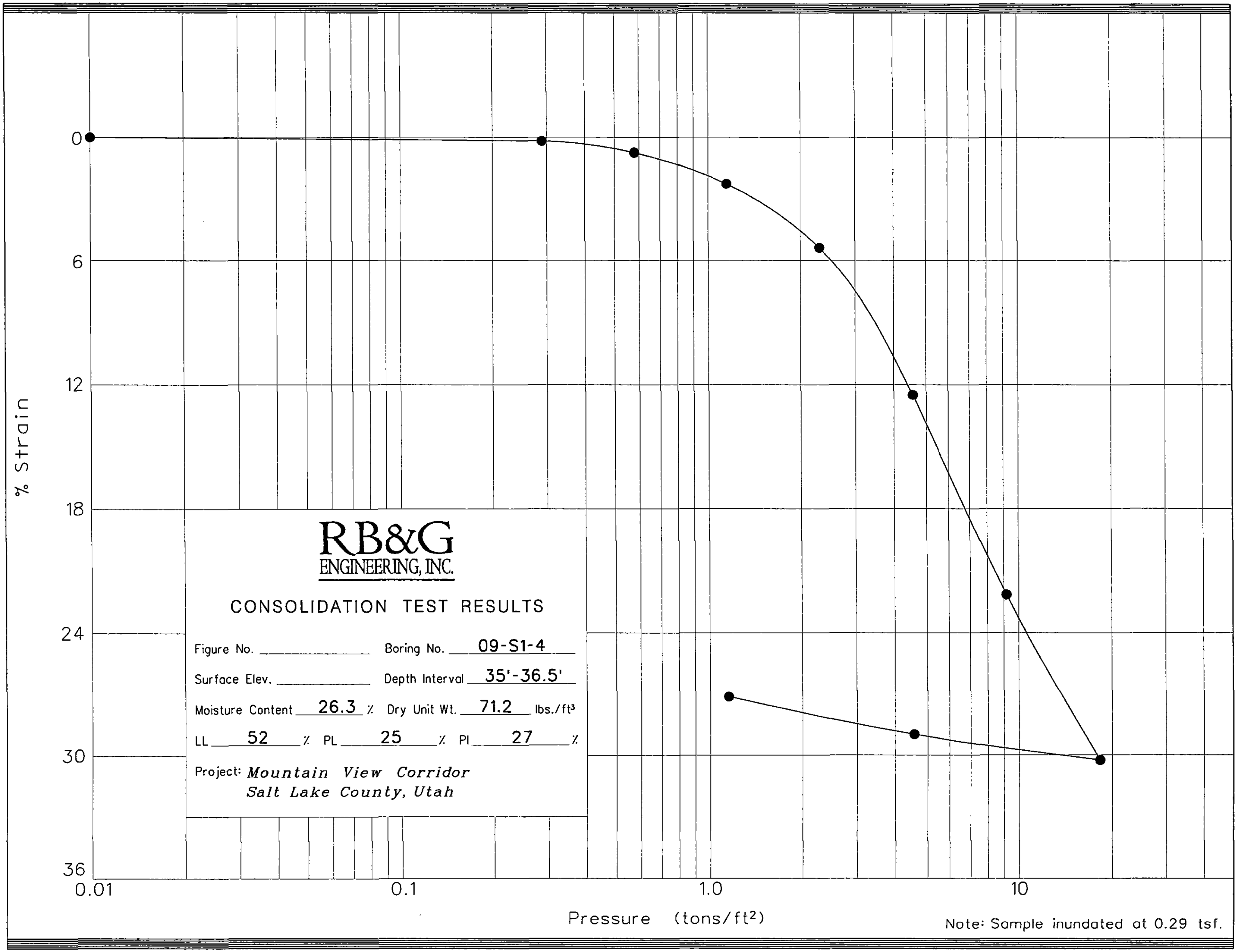
Hole no.: 09-S1-3
Depth: 15'-16'
Load: 2 to 4 tsf

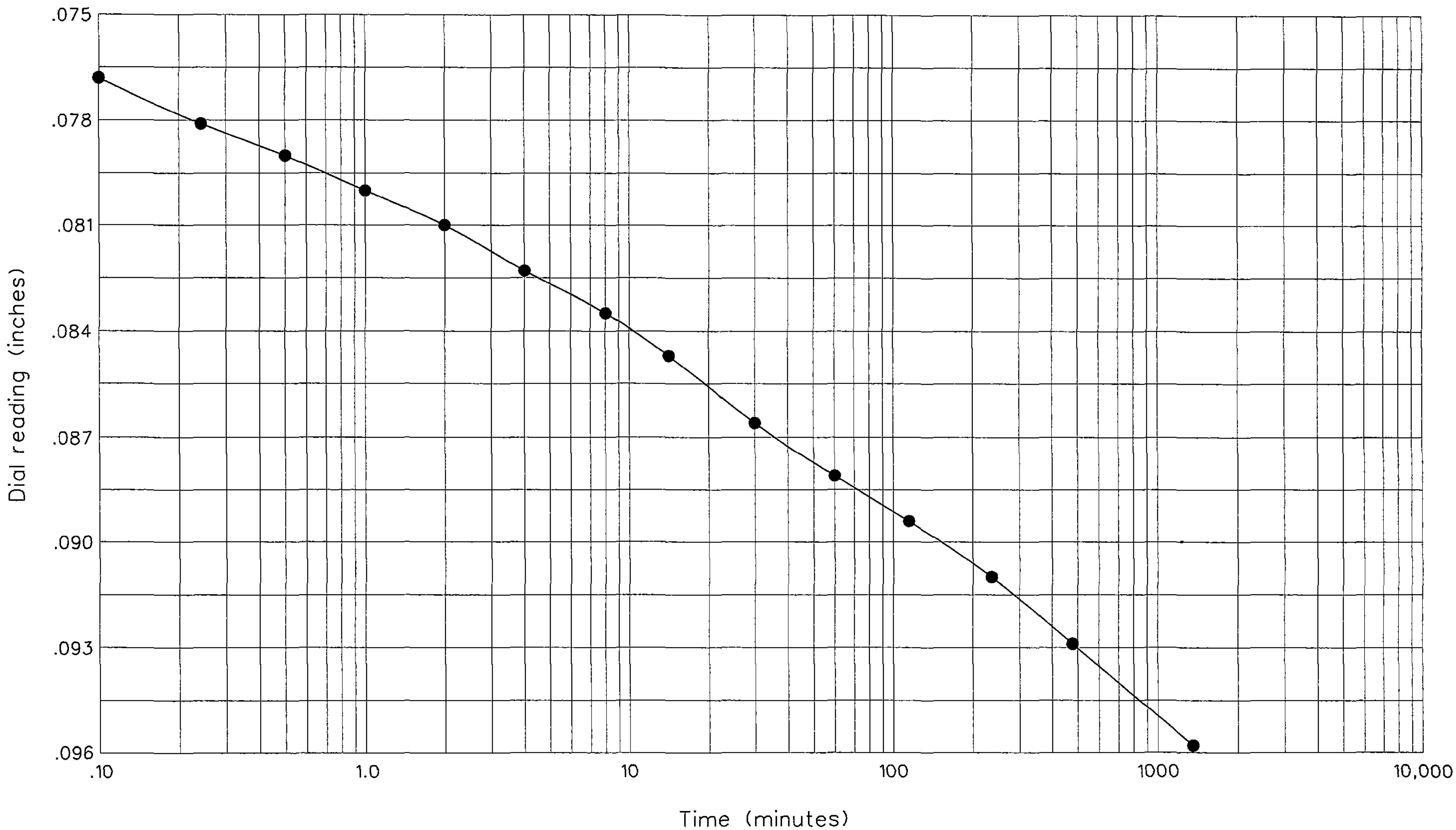
TIME CONSOLIDATION

Mountain View Corridor

Salt Lake County, Utah


RB&G ENGINEERING, INC.
CONSOLIDATION TEST RESULTS
Figure No.
Boring No. 09-S1-4
Surface Elev.
Depth Interval 35'-36.5'
Moisture Content 26.3 %
Dry Unit Wt. 71.2 lbs./ft³
LL 52 %
PL 25 %
PI 27 %
Project: Mountain View Corridor
Salt Lake County, Utah
Void Ratio (e)
1.40
1.20
1.00
.80
.60
.40
.20
0.01
0.1
1.0
10
Pressure (tons/ft²)
Note: Sample inundated at 0.29 tsf.


0
6
12
18
24
30
36
% Strain
0.01
0.1
1.0
10
Pressure (tons/ft²)
Note: Sample inundated at 0.29 tsf.
RB&G ENGINEERING, INC.
CONSOLIDATION TEST RESULTS
Figure No.
Boring No. 09-S1-4
Surface Elev.
Depth Interval 35'-36.5'
Moisture Content 26.3 % Dry Unit Wt. 71.2 lbs./ft³
LL 52 % PL 25 % PI 27 %
Project: Mountain View Corridor
Salt Lake County, Utah



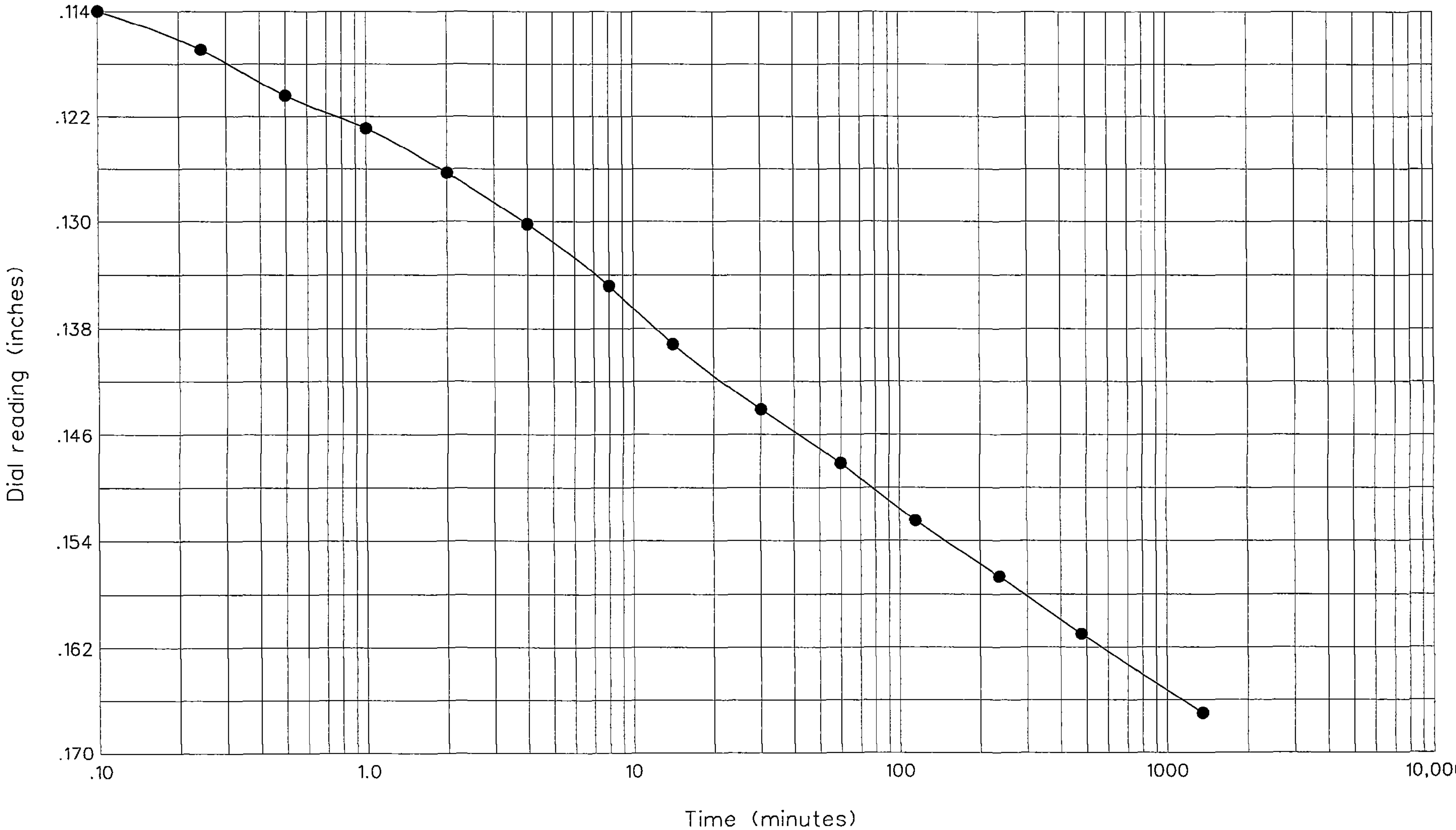
RB&G ENGINEERING, INC.

Hole no.: 09-S1-04
Depth: 35'-36.5'
Load: 1.15 to 2.30 tons

TIME CONSOLIDATION

Mountain View Corridor
Salt Lake County, Utah

Figure



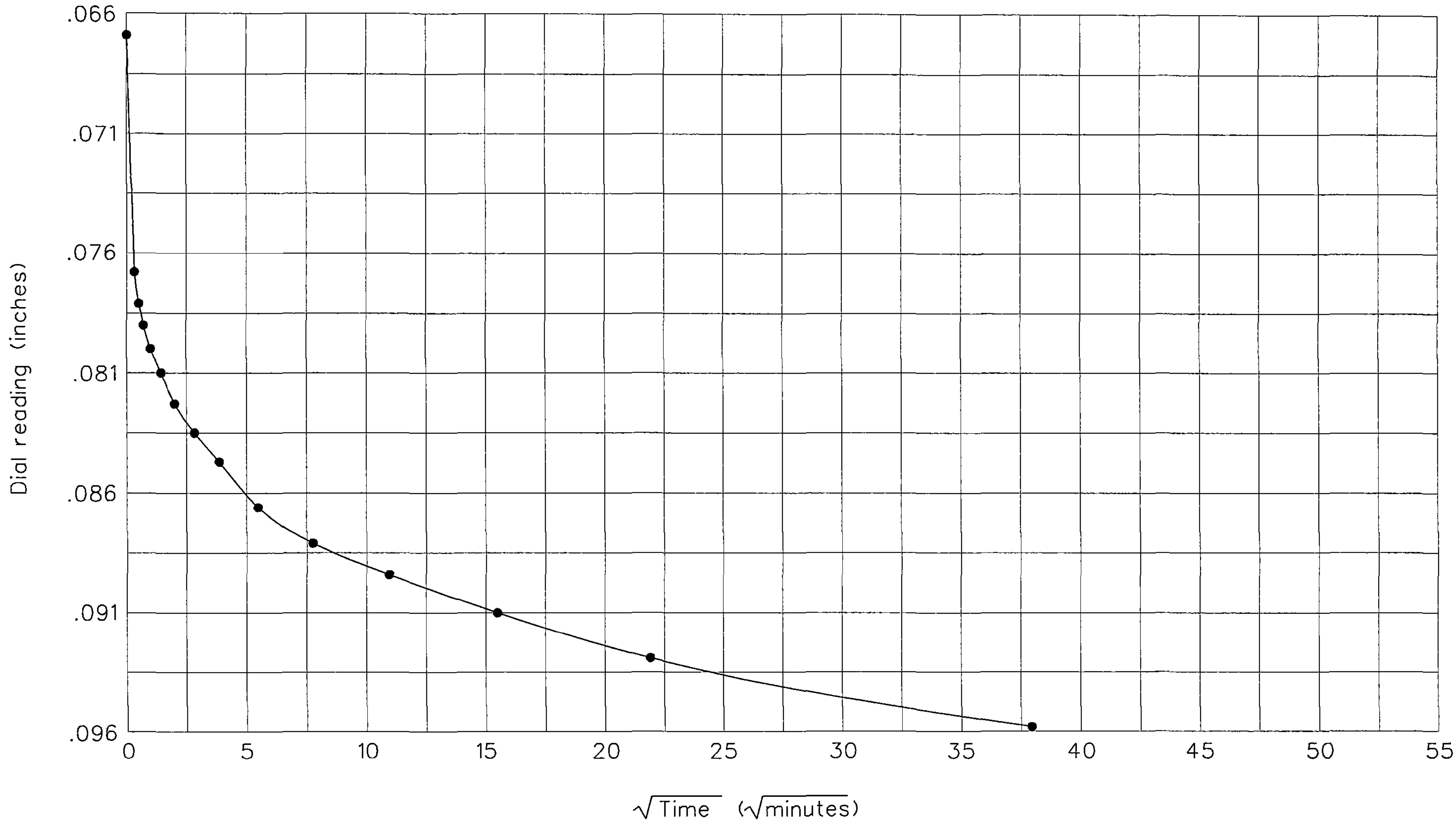
RB&G ENGINEERING, INC.

Hole no.: 09-S1-04
Depth: 35'-36.5'
Load: 2.30 to 4.60 tons

TIME CONSOLIDATION

Mountain View Corridor
Salt Lake County, Utah

Figure



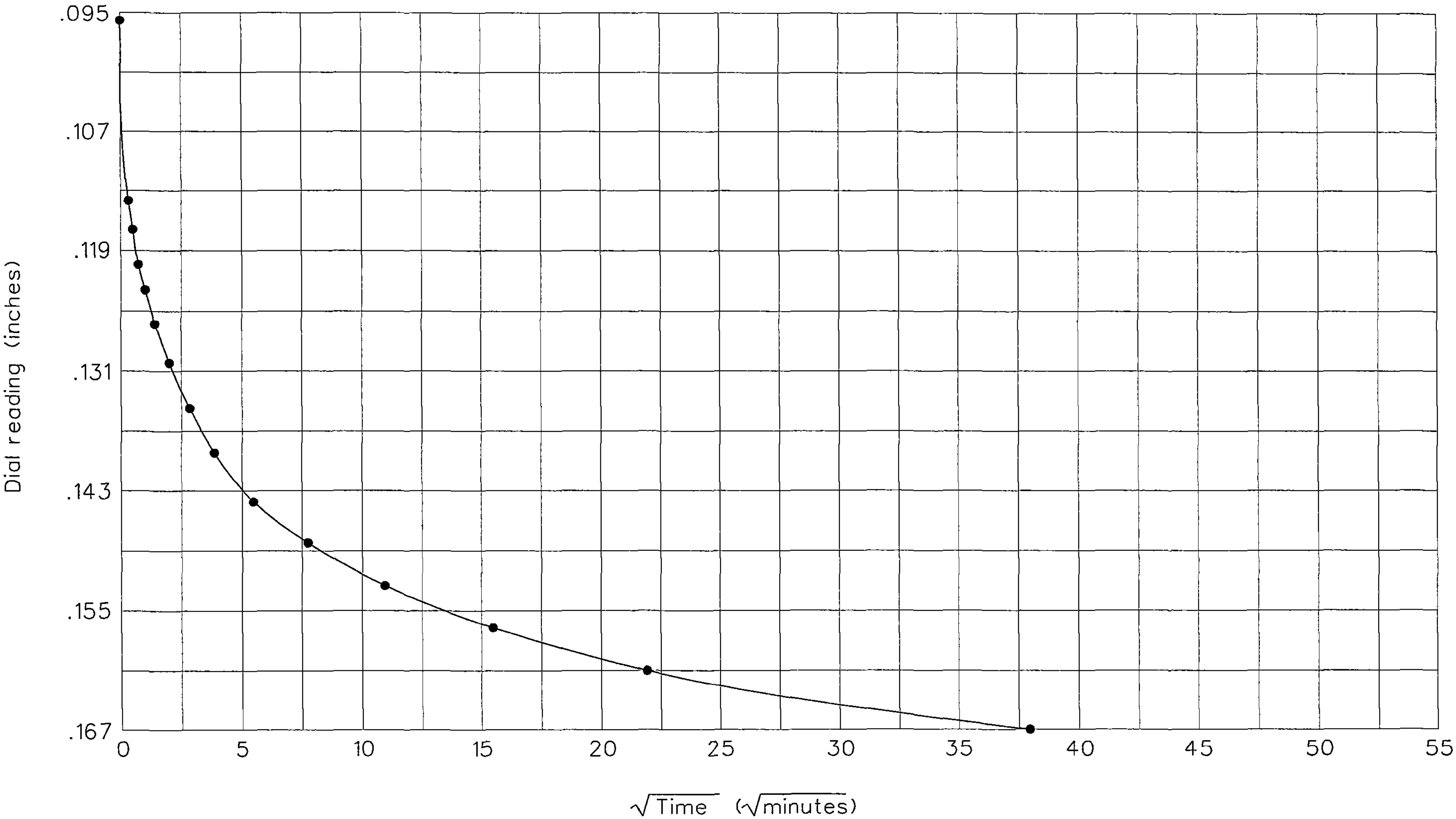
RB&G ENGINEERING, INC.

Hole no.: 09-S1-04
Depth: 35'-36.5'
Load: 1.15 to 2.30 tons

TIME CONSOLIDATION

Mountain View Corridor
Salt Lake County, Utah

Figure



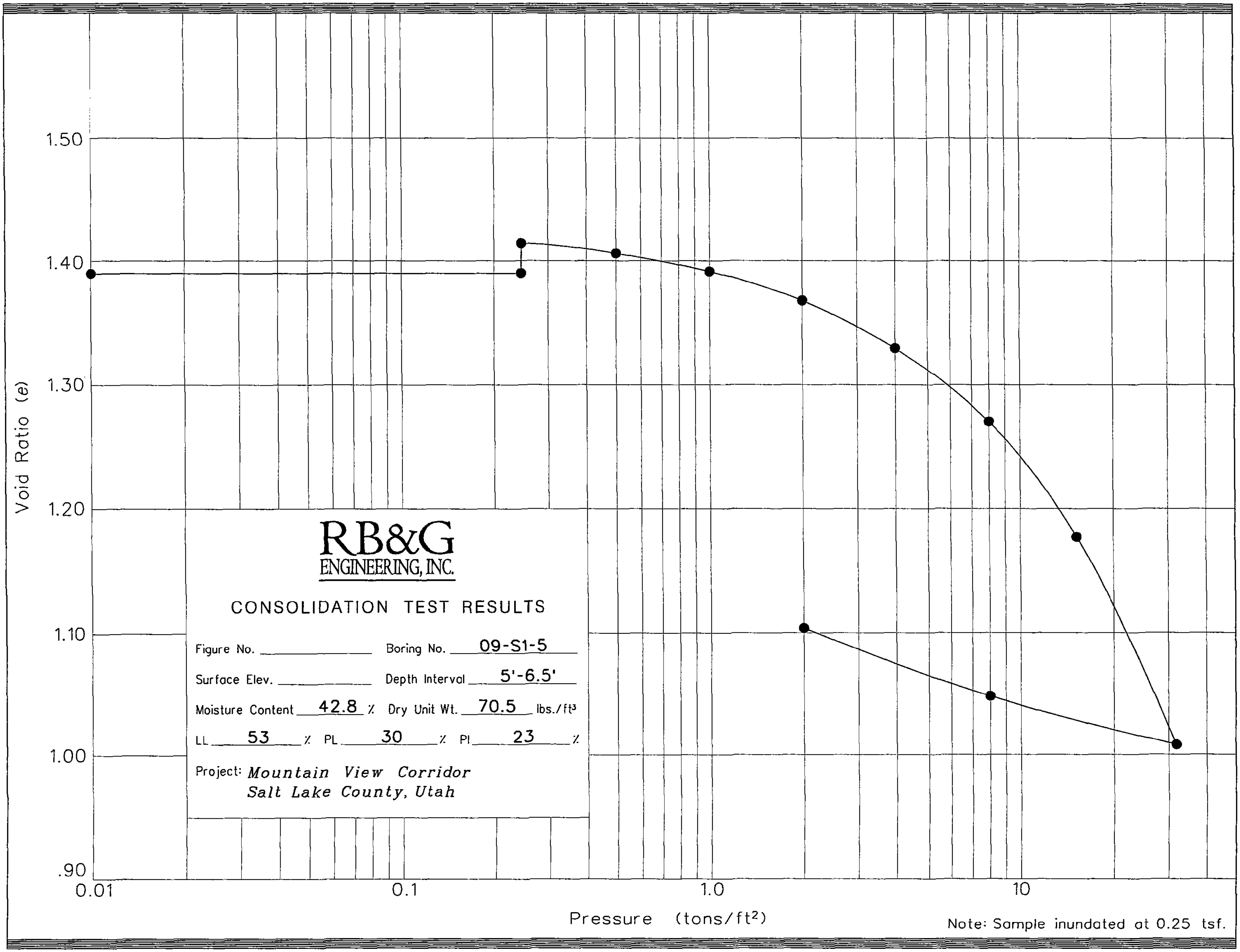
RB&G ENGINEERING, INC.

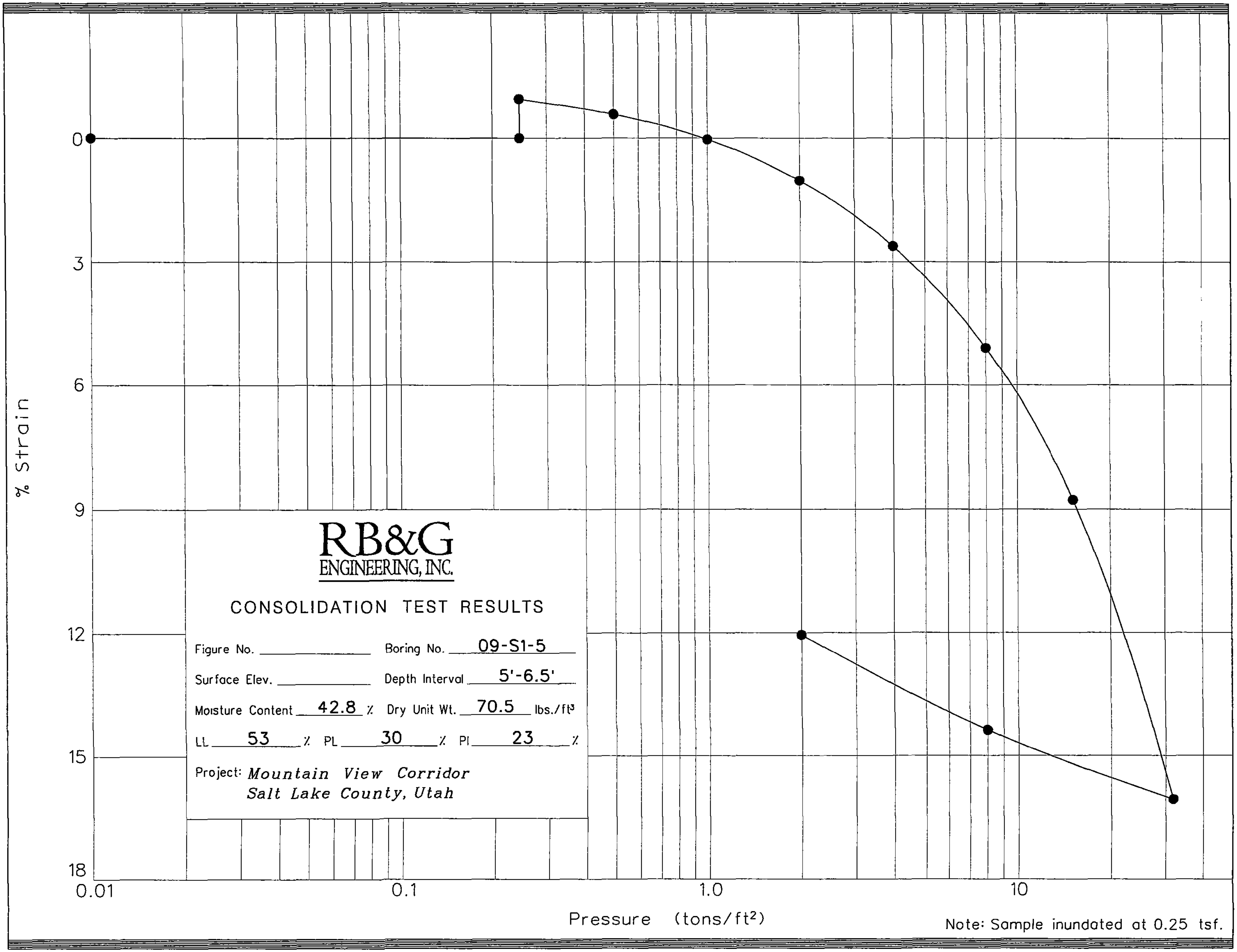
Hole no.: 09-S1-04
Depth: 35'-36.5'
Load: 2.30 to 4.60 tons

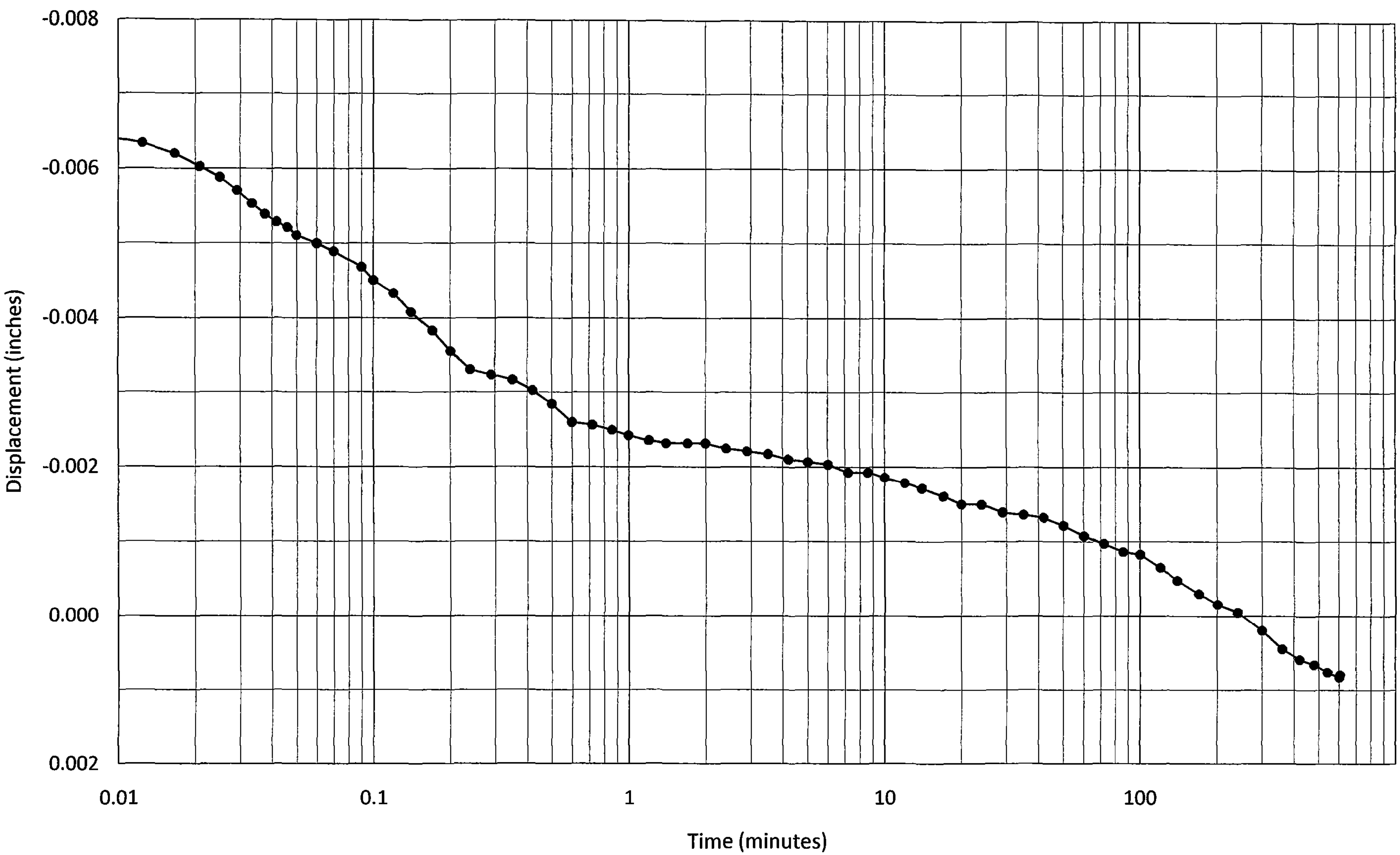
TIME CONSOLIDATION

Mountain View Corridor
Salt Lake County, Utah

Figure


RB&G
ENGINEERING, INC.
CONSOLIDATION TEST RESULTS
Figure No.
Boring No. 09-S1-5
Surface Elev.
Depth Interval 5'-6.5'
Moisture Content 42.8 %
Dry Unit Wt. 70.5 lbs./ft³
LL 53 %
PL 30 %
PI 23 %
Project: Mountain View Corridor
Salt Lake County, Utah
Void Ratio (e)
1.50
1.40
1.30
1.20
1.10
1.00
.90
0.01
0.1
1.0
10
Pressure (tons/ft²)
Note: Sample inundated at 0.25 tsf.


RB&G
ENGINEERING, INC.
CONSOLIDATION TEST RESULTS
Figure No.
Boring No. 09-S1-5
Surface Elev.
Depth Interval 5'-6.5'
Moisture Content 42.8 %
Dry Unit Wt. 70.5 lbs./ft³
LL 53 %
PL 30 %
PI 23 %
Project: Mountain View Corridor
Salt Lake County, Utah
% Strain
0
3
6
9
12
15
18
0.01
0.1
1.0
10
Pressure (tons/ft²)
Note: Sample inundated at 0.25 tsf.



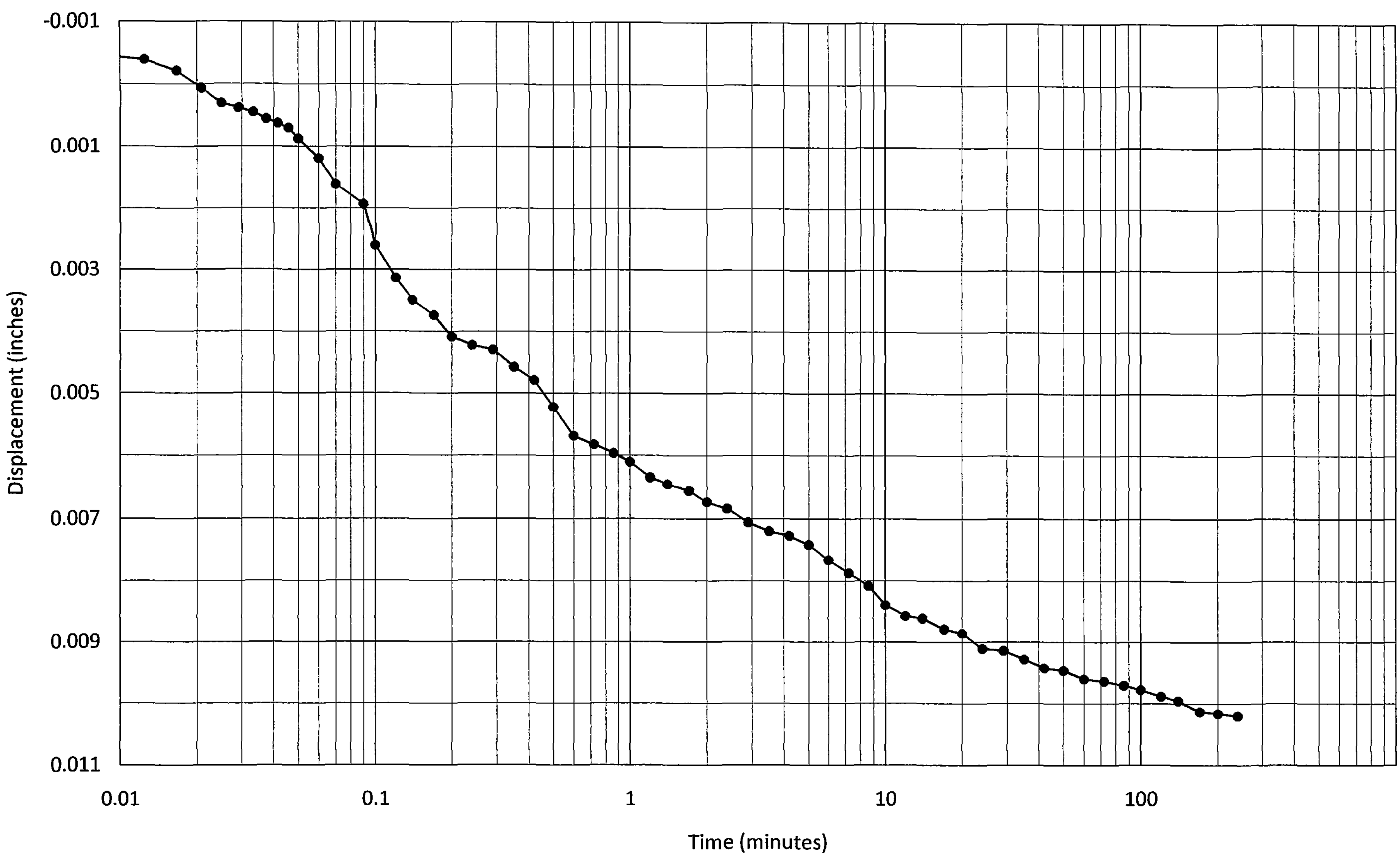
RB&G
ENGINEERING, INC.

Hole no.: 09-S1-5
Depth: 5'-6.5'
Load: 0.5 to 1 tsf

TIME CONSOLIDATION

Mountain View Corridor

Salt Lake County, Utah



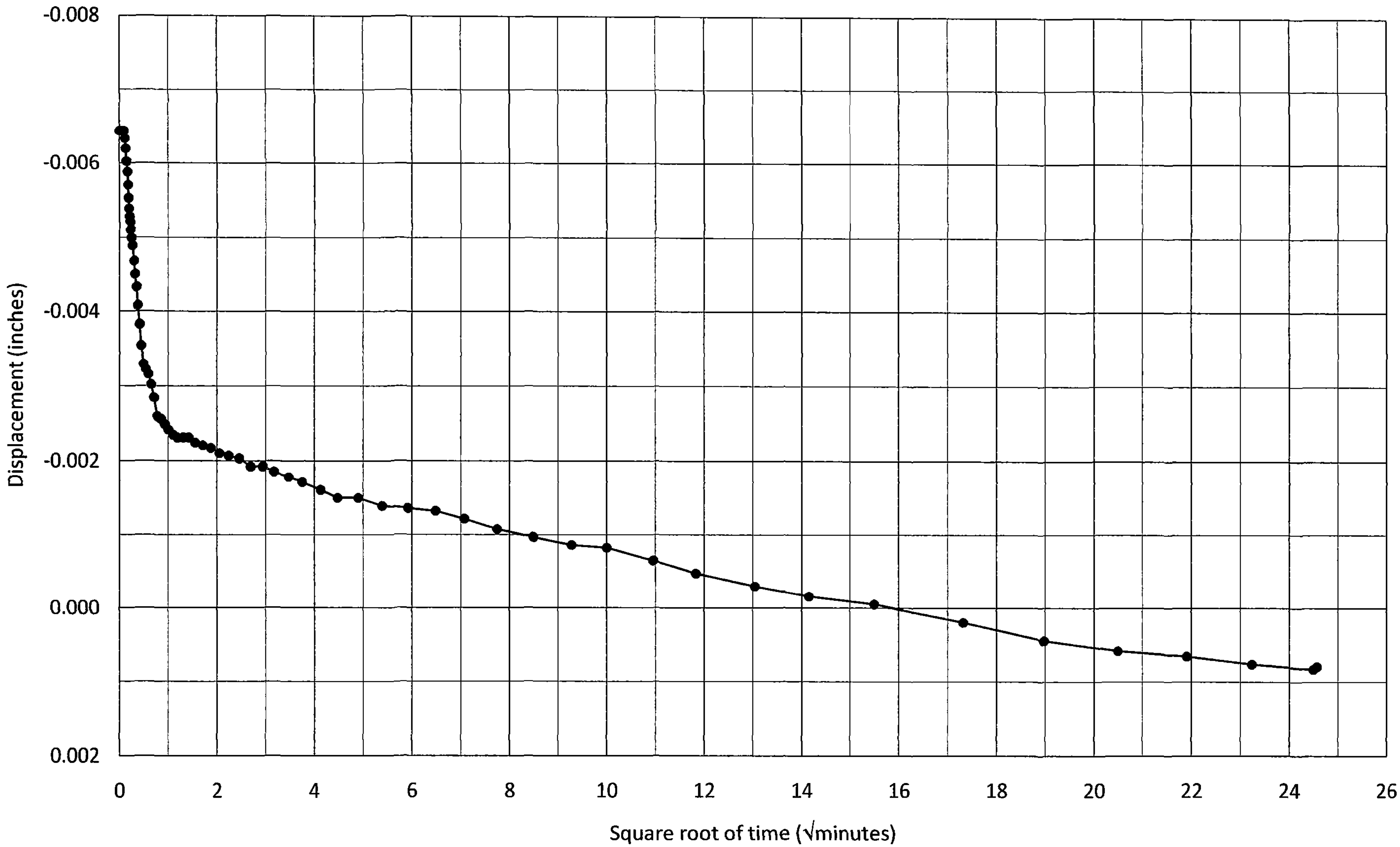
RB&G
ENGINEERING, INC.

Hole no.: 09-S1-5
Depth: 5'-6.5'
Load: 1 to 2 tsf

TIME CONSOLIDATION

Mountain View Corridor

Salt Lake County, Utah



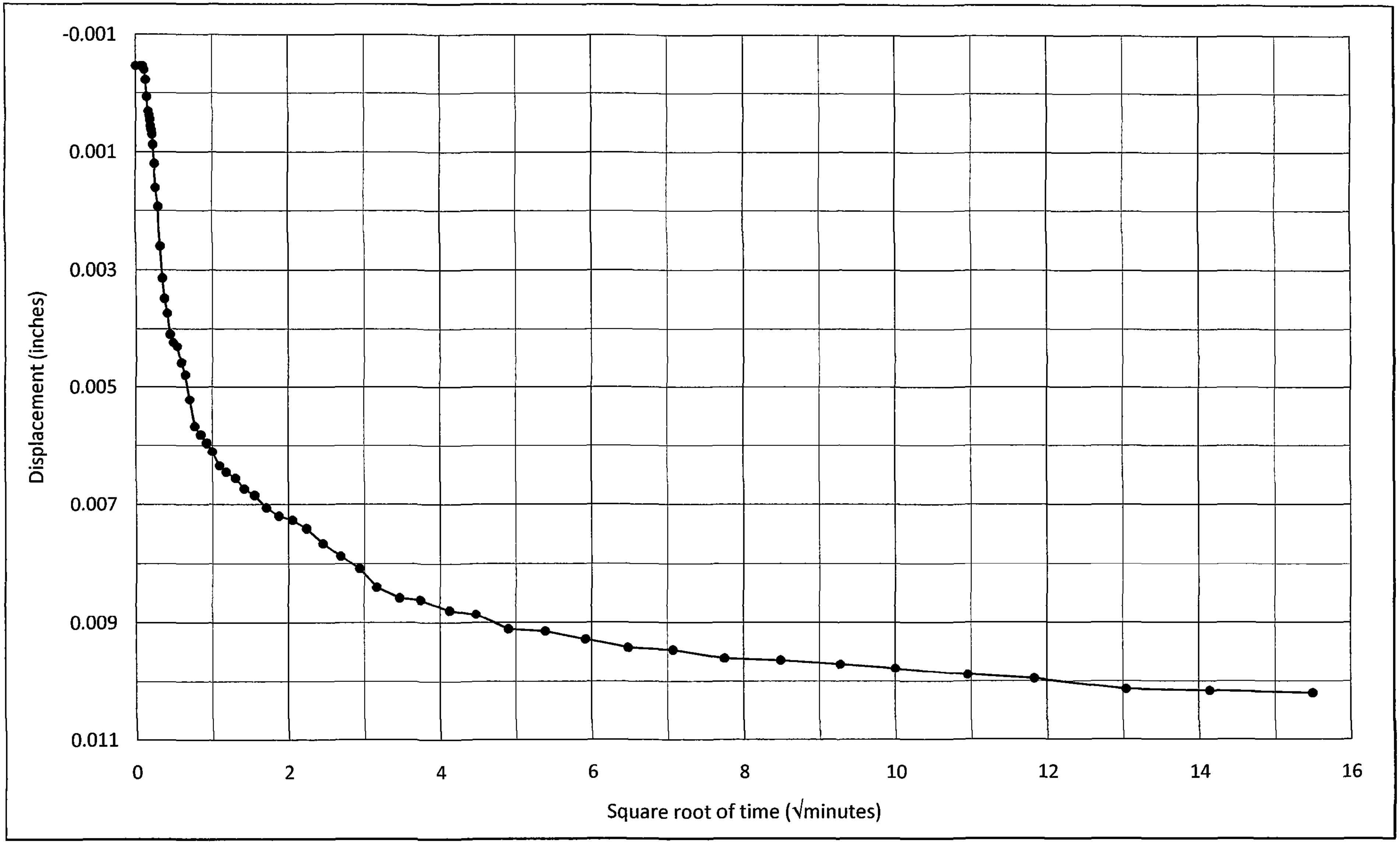
RB&G
ENGINEERING, INC.

Hole no.: 09-S1-5
Depth: 5'-6.5'
Load: 0.5 to 1 tsf

TIME CONSOLIDATION

Mountain View Corridor

Salt Lake County, Utah



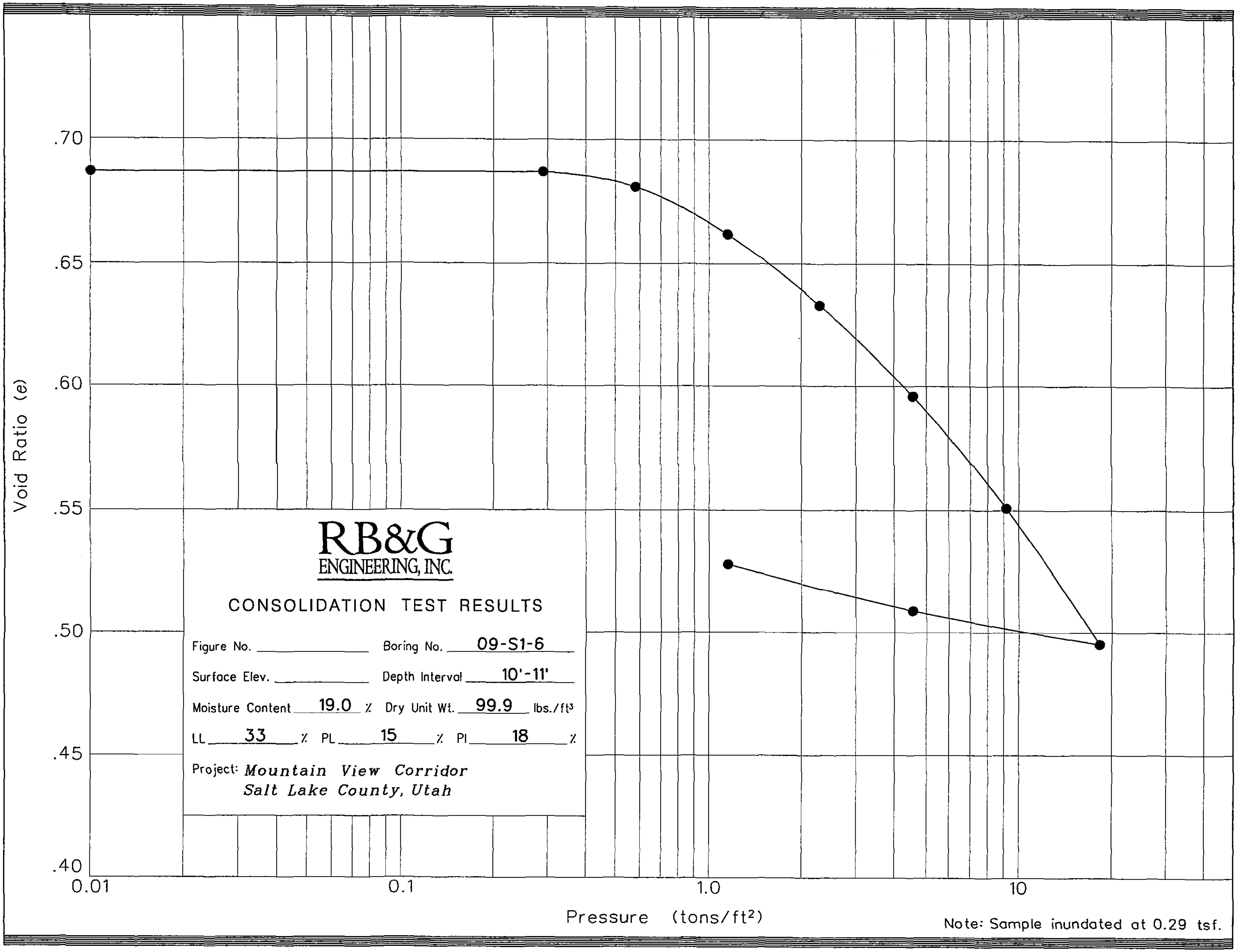
RB&G ENGINEERING, INC.

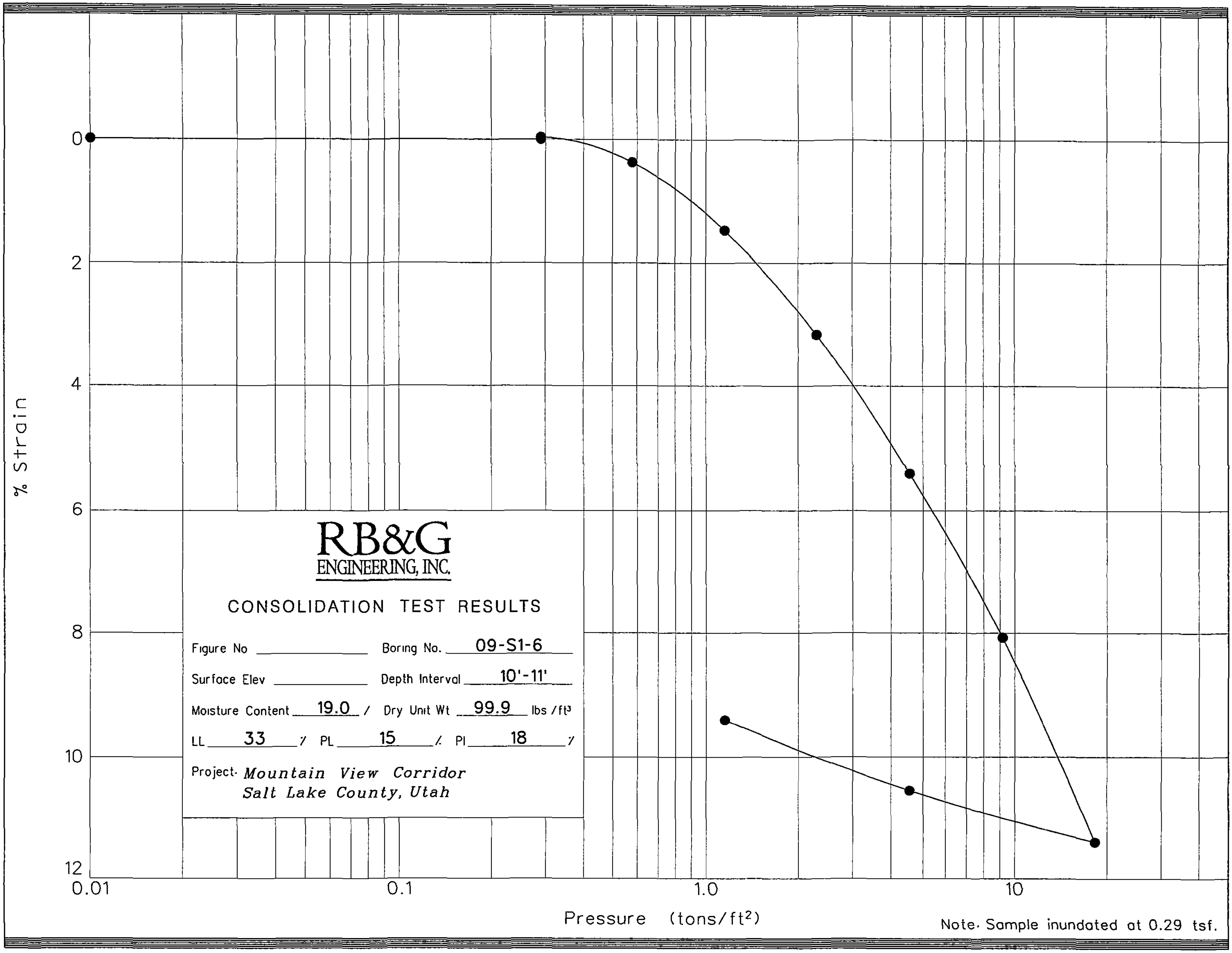
Hole no.: 09-S1-5
Depth: 5'-6.5'
Load: 1 to 2 tsf

TIME CONSOLIDATION

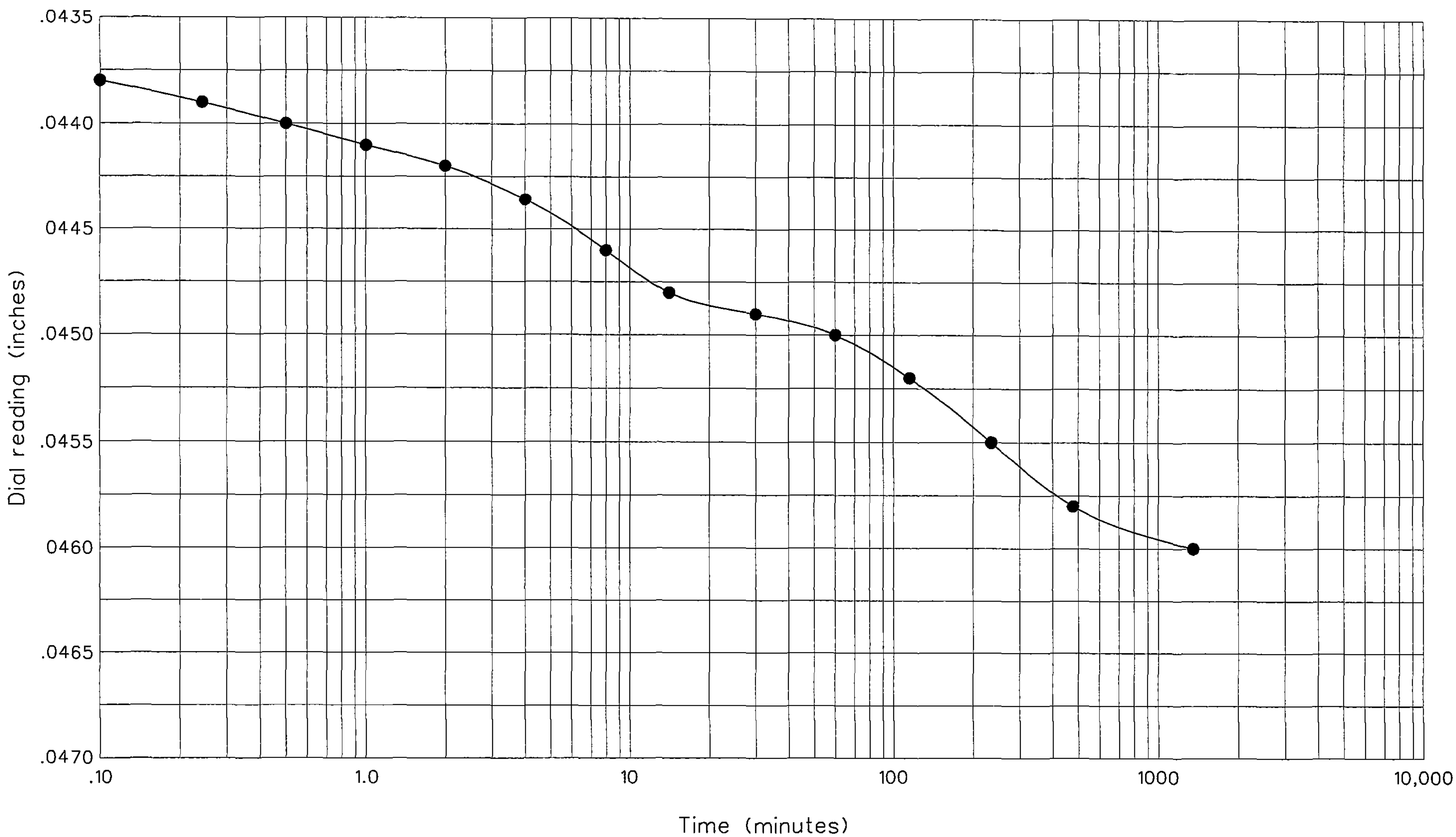
Mountain View Corridor

Salt Lake County, Utah


.70
.65
.60
.55
.50
.45
.40
Void Ratio (e)
0.01
0.1
1.0
10
Pressure (tons/ft²)
Note: Sample inundated at 0.29 tsf.
RB&G
ENGINEERING, INC.
CONSOLIDATION TEST RESULTS
Figure No.
Boring No. 09-S1-6
Surface Elev.
Depth Interval 10'-11'
Moisture Content 19.0 % Dry Unit Wt. 99.9 lbs./ft³
LL 33 % PL 15 % PI 18 %
Project: Mountain View Corridor
Salt Lake County, Utah



% Strain
0
2
4
6
8
10
12
0.01
0.1
1.0
10
Pressure (tons/ft^2)
RB&G ENGINEERING, INC.
CONSOLIDATION TEST RESULTS
Figure No
Boring No. 09-S1-6
Surface Elev
Depth Interval 10'-11'
Moisture Content 19.0 % Dry Unit Wt 99.9 lbs/ft^3
LL 33 % PL 15 % PI 18 %
Project: Mountain View Corridor
Salt Lake County, Utah
Note: Sample inundated at 0.29 tsf.



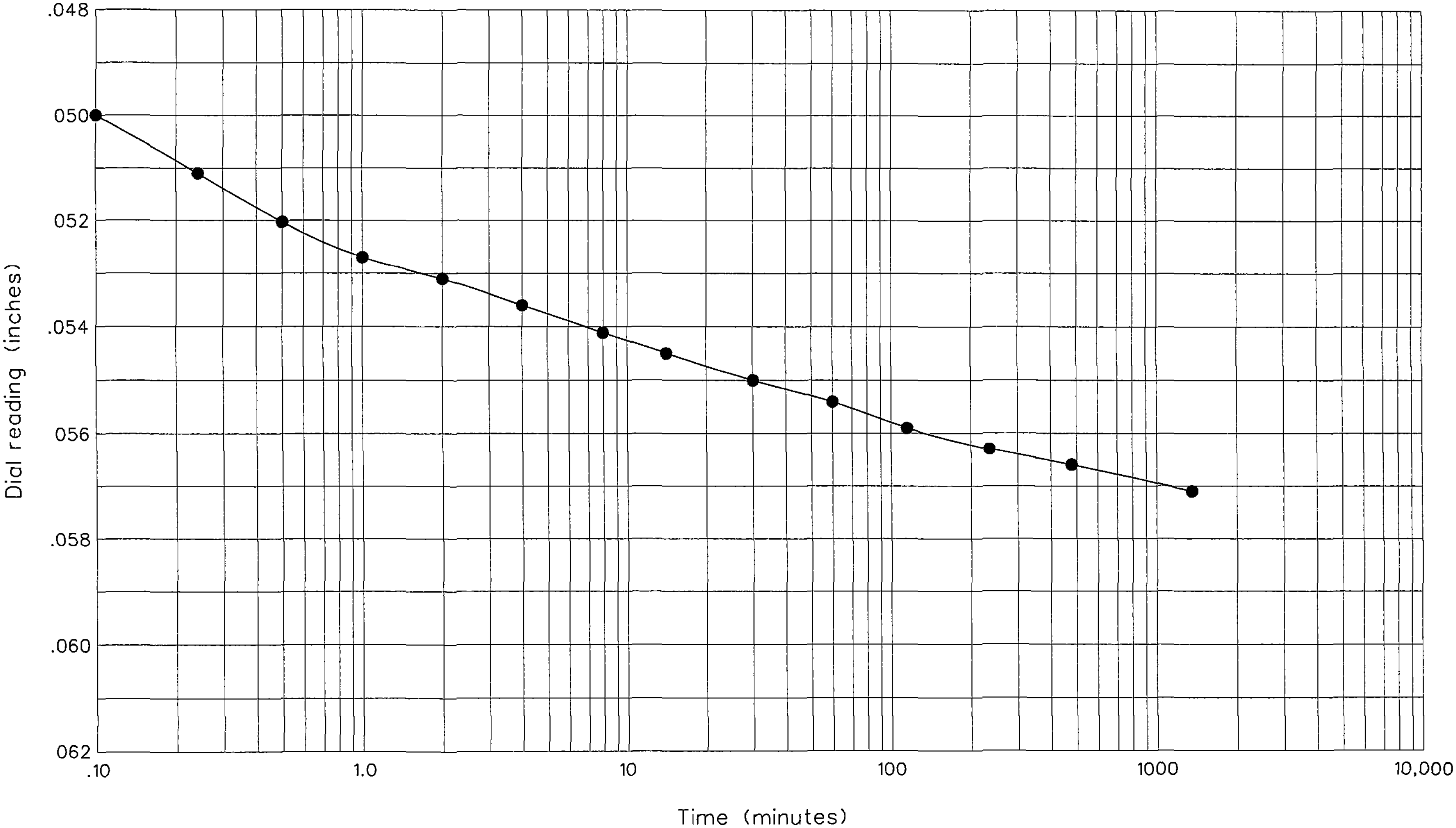
RB&G ENGINEERING, INC.

Hole no.: 09-S1-6
Depth: 10'-11'
Load: 0.29 to 0.58 tons

TIME CONSOLIDATION

Mountain View Corridor
Salt Lake County, Utah

Figure



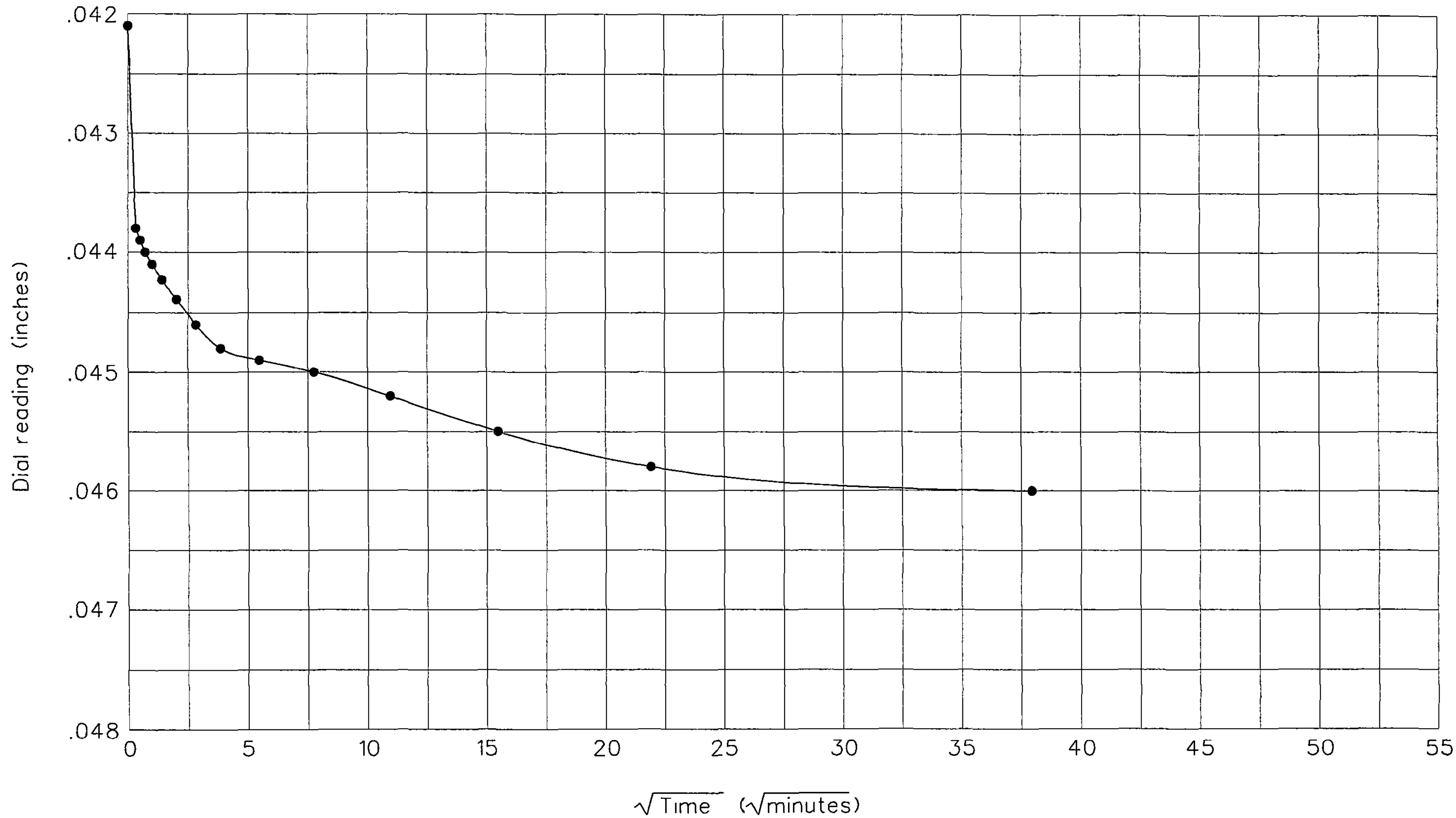
RB&G ENGINEERING, INC.

Hole no.: 09-S1-6
Depth: 10'-11'
Load: 0.58 to 1.15 tons

TIME CONSOLIDATION

Mountain View Corridor
Salt Lake County, Utah

Figure



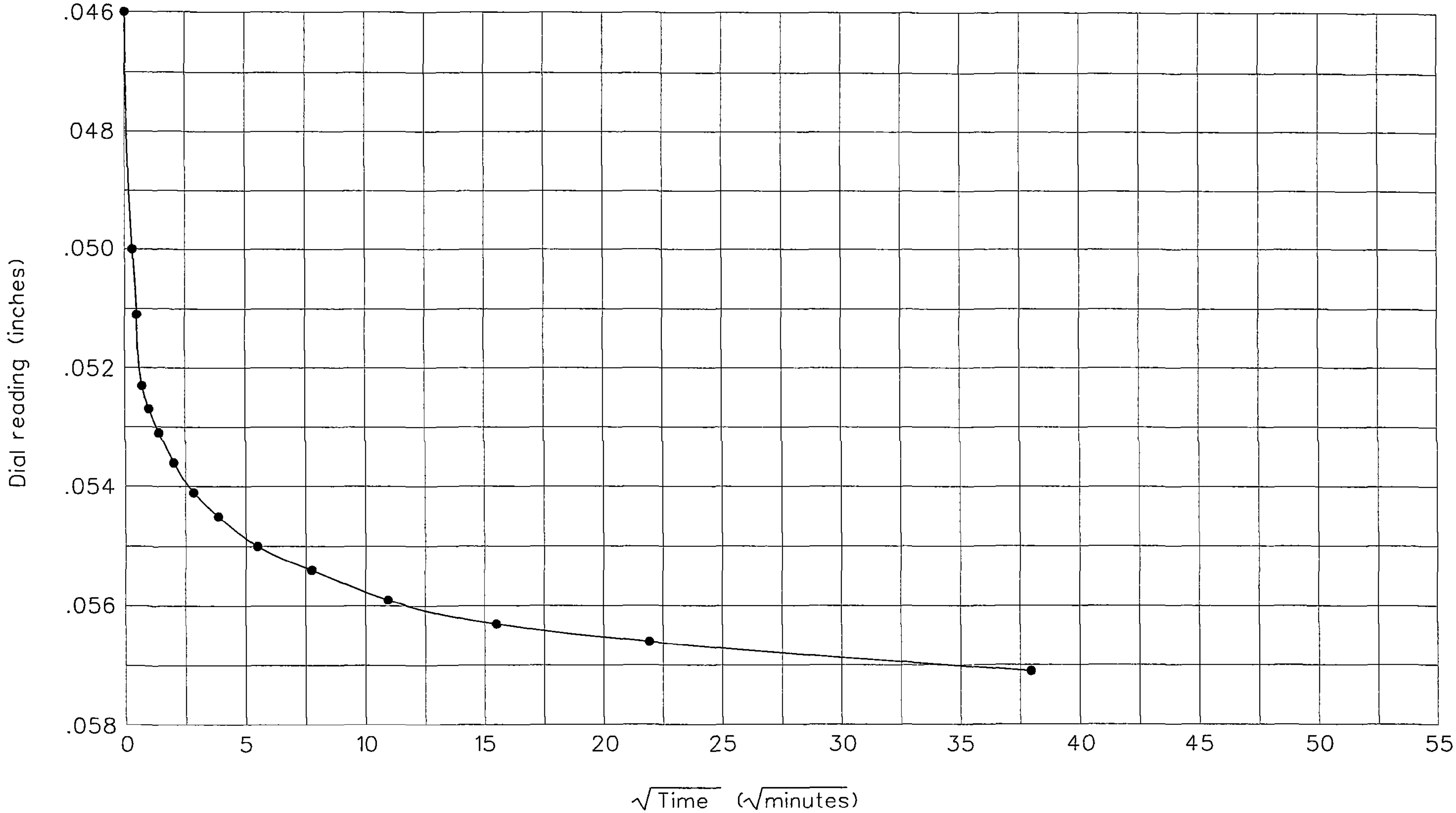
RB&G ENGINEERING, INC.

Hole no.: 09-S1-6
Depth: 10'-11'
Load: 0.29 to 0.58 tons

TIME CONSOLIDATION

Mountain View Corridor
Salt Lake County, Utah

Figure



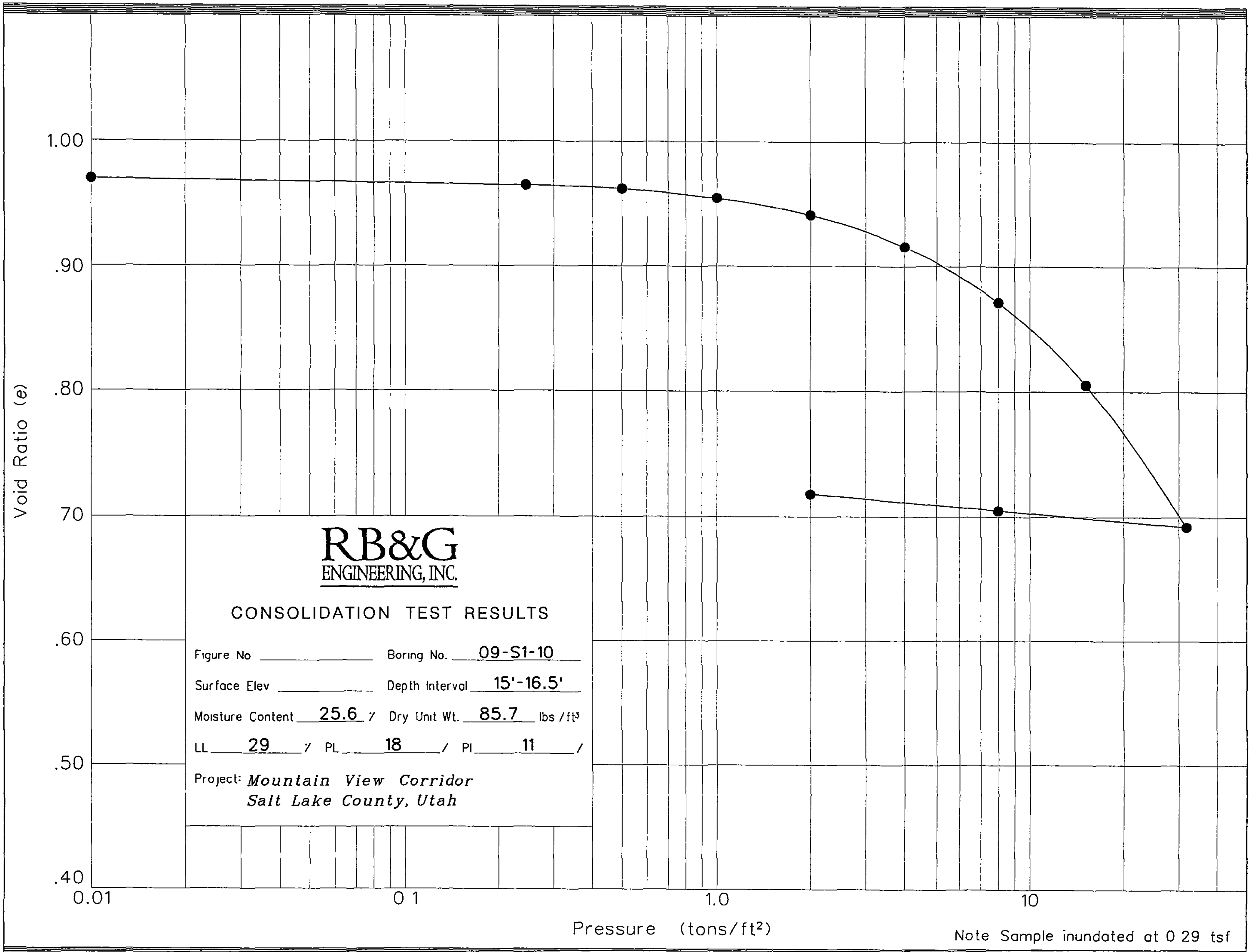
RB&G ENGINEERING, INC.

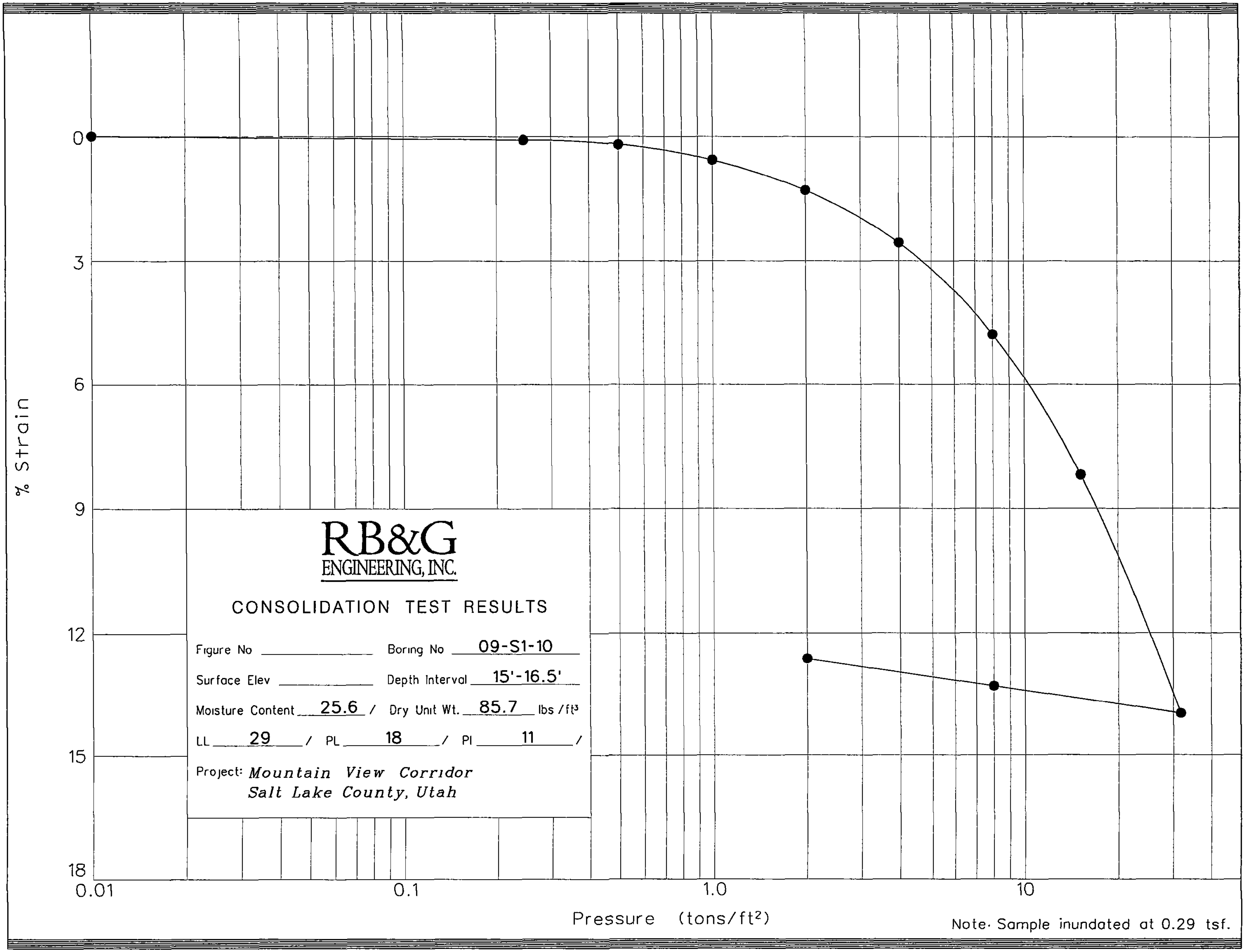
Hole no.: 09-S1-6
Depth: 10'-11'
Load: 0.58 to 1.15 tons

TIME CONSOLIDATION

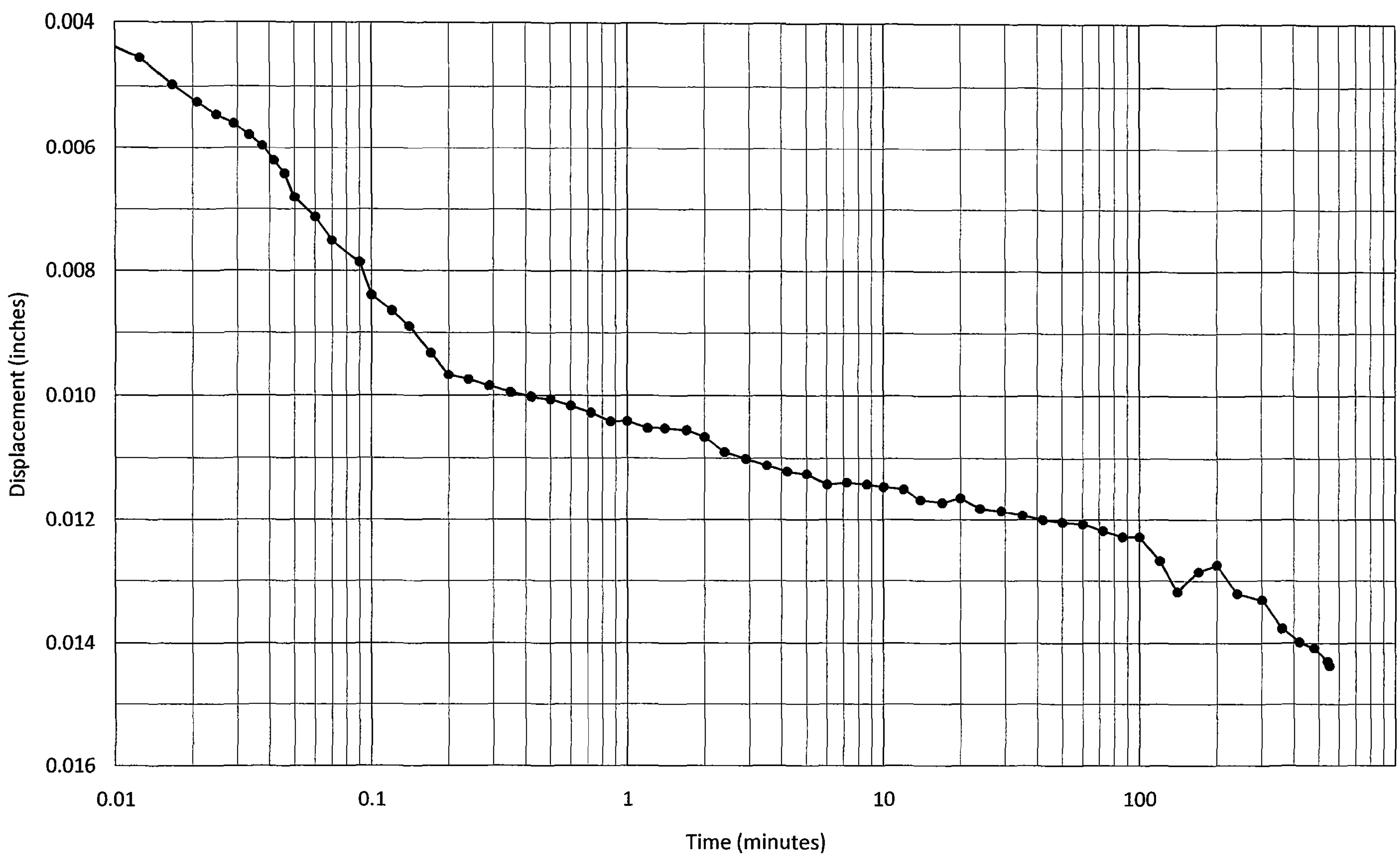
Mountain View Corridor
Salt Lake County, Utah

Figure


1.00
.90
.80
.70
.60
.50
.40
Void Ratio (e)
0.01
0 1
1.0
10
Pressure (tons/ft²)
Note Sample inundated at 0 29 tsf
RB&G
ENGINEERING, INC.
CONSOLIDATION TEST RESULTS
Figure No
Boring No. 09-S1-10
Surface Elev
Depth Interval 15'-16.5'
Moisture Content 25.6 %
Dry Unit Wt. 85.7 lbs /ft³
LL 29 %
PL 18 %
PI 11 %
Project: Mountain View Corridor
Salt Lake County, Utah



RB&G ENGINEERING, INC.
CONSOLIDATION TEST RESULTS
Figure No
Boring No 09-S1-10
Surface Elev
Depth Interval 15'-16.5'
Moisture Content 25.6 /
Dry Unit Wt. 85.7 lbs/ft³
LL 29 / PL 18 / PI 11 /
Project: Mountain View Corridor
Salt Lake County, Utah
% Strain
0
3
6
9
12
15
18
0.01
0.1
1.0
10
Pressure (tons/ft²)
Note: Sample inundated at 0.29 tsf.



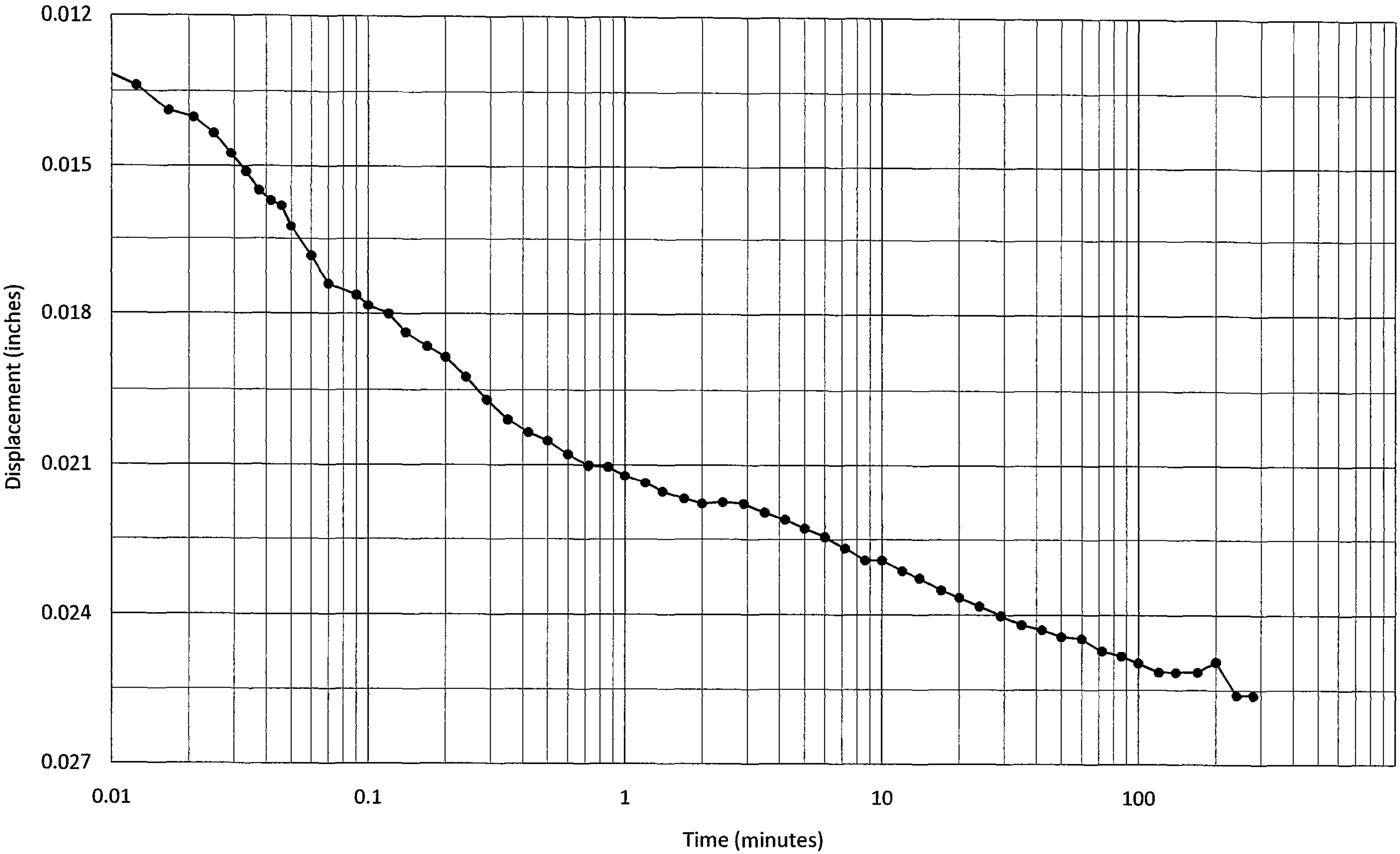
RB&G
ENGINEERING, INC.

Hole no.: 09-S1-10
Depth: 15'-16.5'
Load: 1 to 2 tsf

TIME CONSOLIDATION

Mountain View Corridor

Salt Lake County, Utah



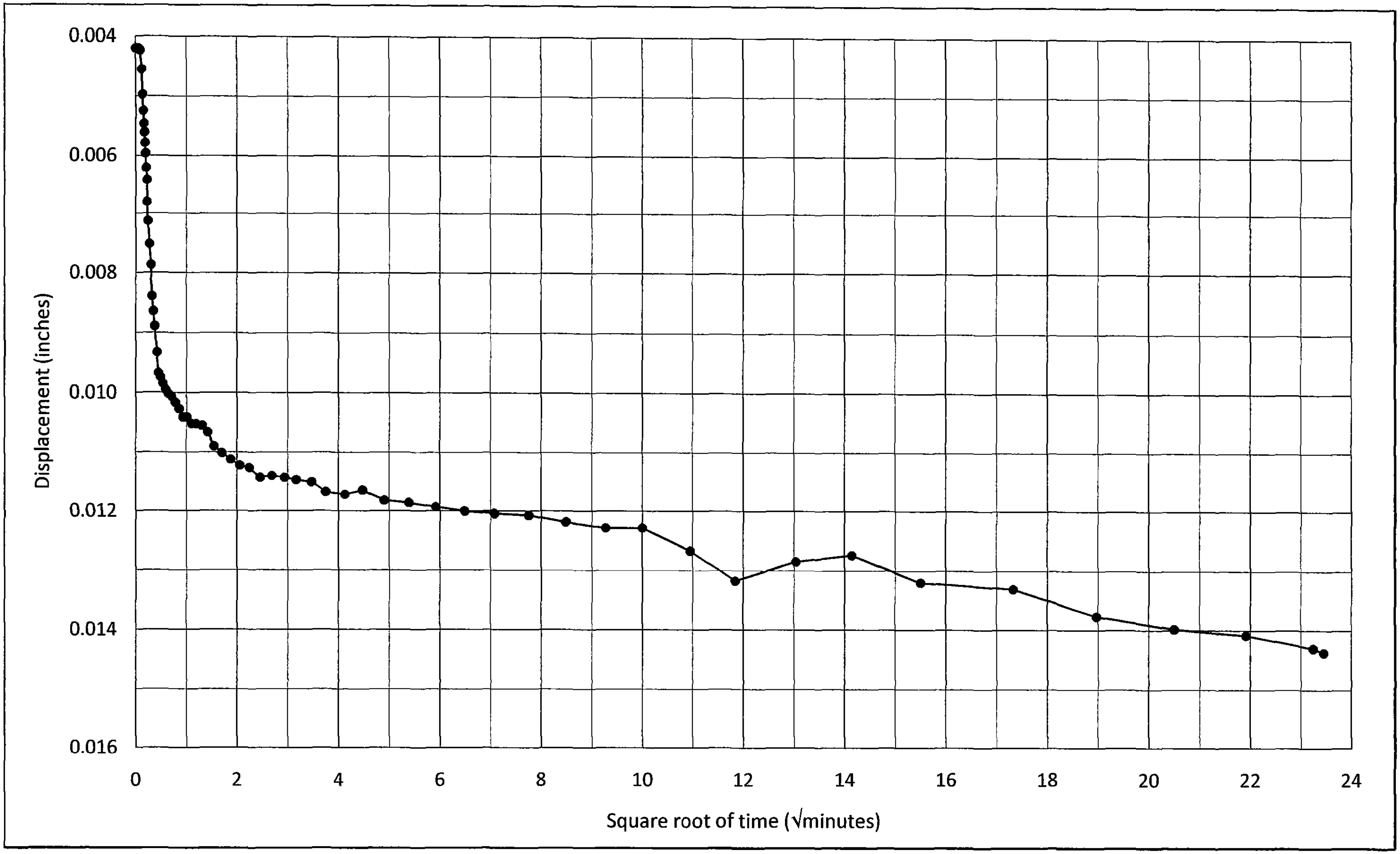
RB&G
ENGINEERING, INC.

Hole no.: 09-S1-10
Depth: 15'-16.5'
Load: 2 to 4 tsf

TIME CONSOLIDATION

Mountain View Corridor

Salt Lake County, Utah



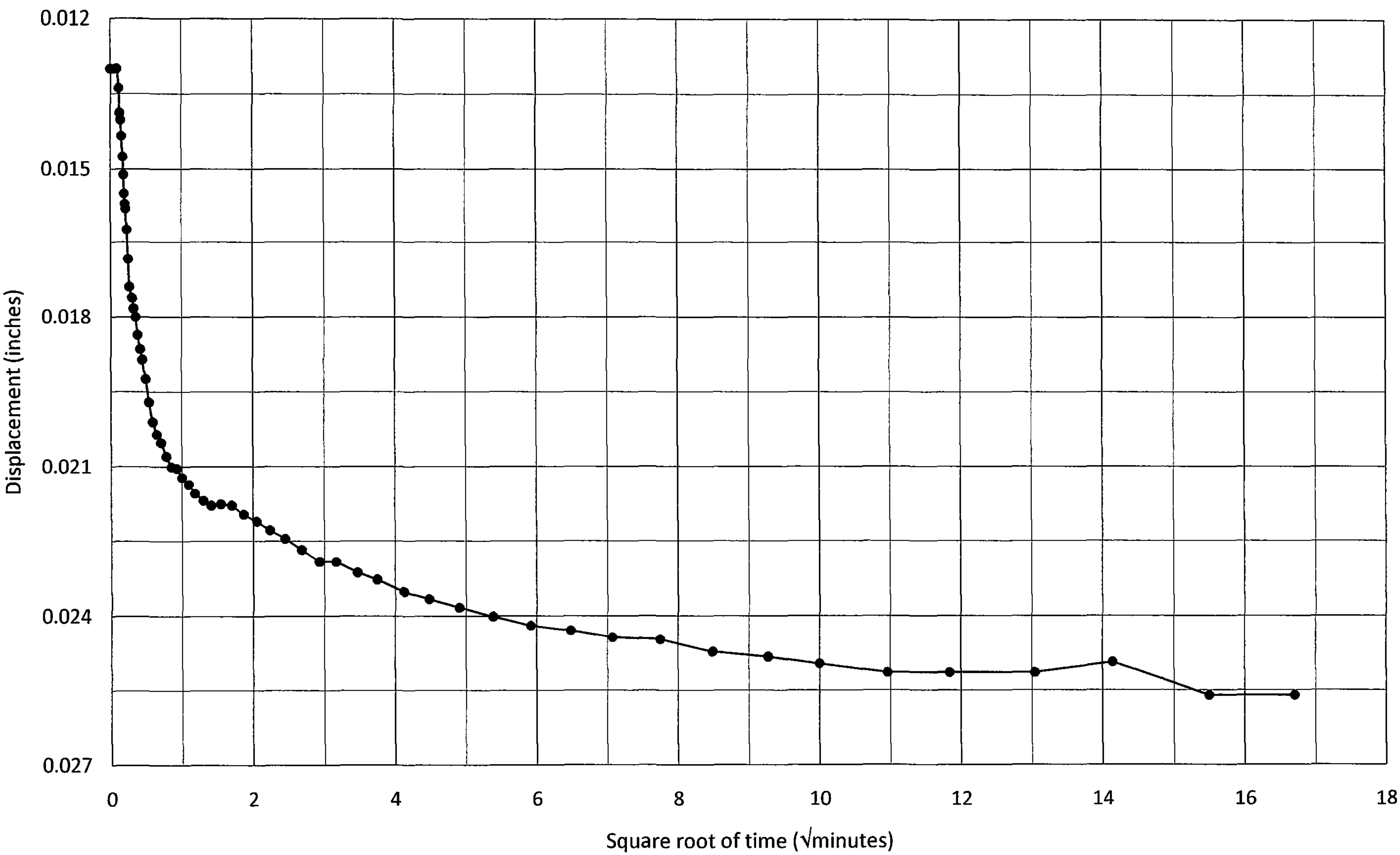
RB&G ENGINEERING, INC.

Hole no.: 09-S1-10
Depth: 15'-16.5'
Load: 1 to 2 tsf

TIME CONSOLIDATION

Mountain View Corridor

Salt Lake County, Utah



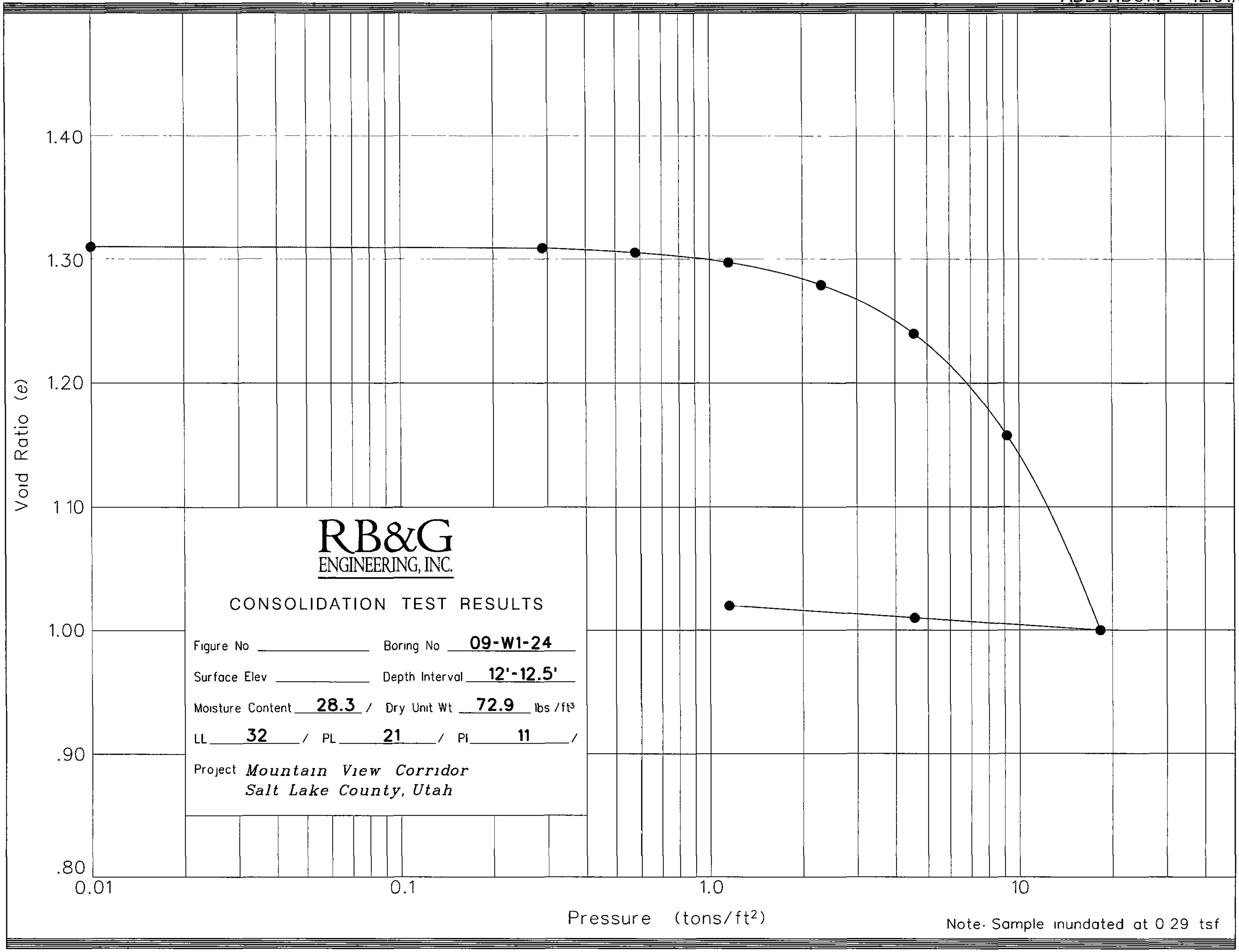
RB&G ENGINEERING, INC.

Hole no.: 09-S1-10
Depth: 15'-16.5'
Load: 2 to 4 tsf

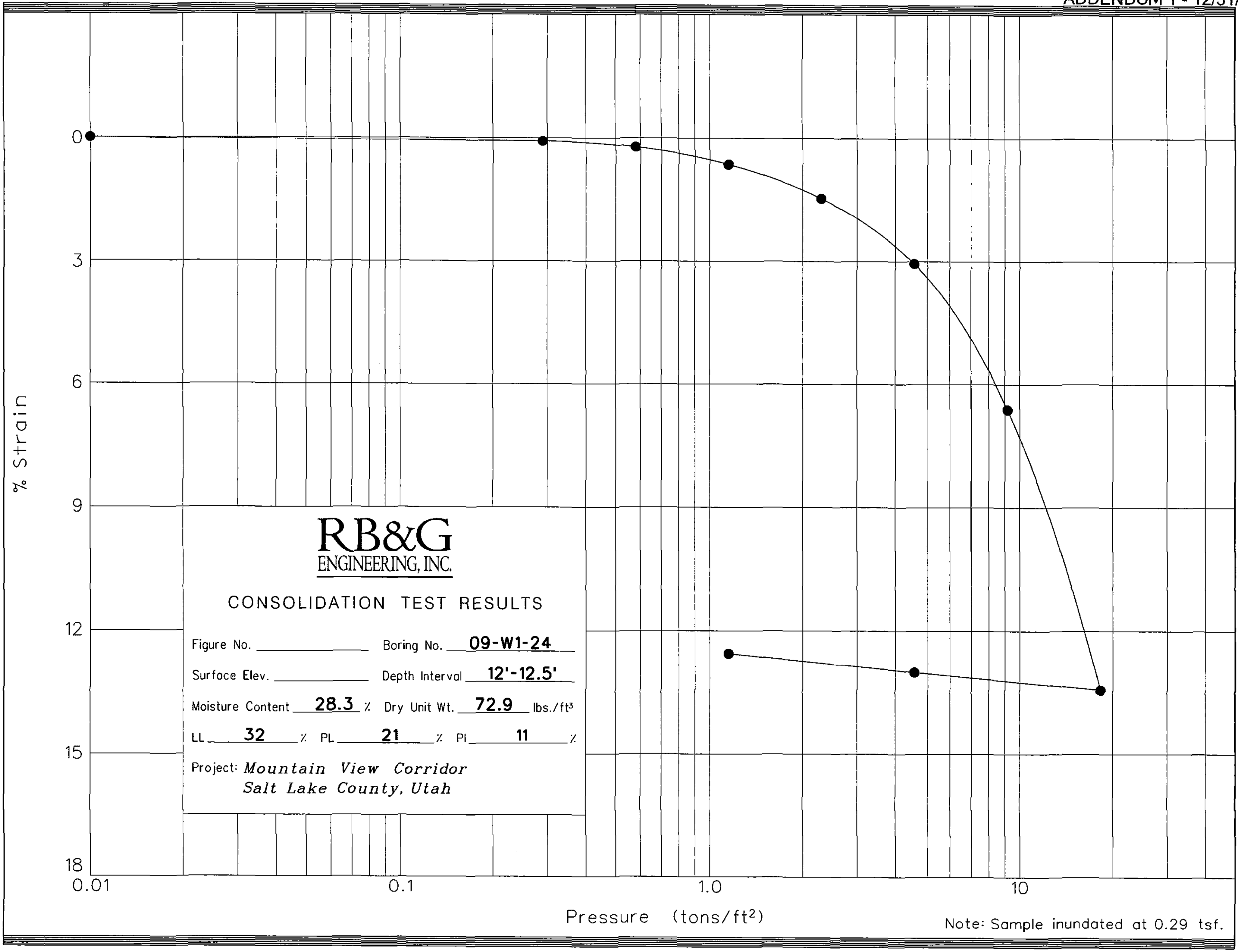
TIME CONSOLIDATION

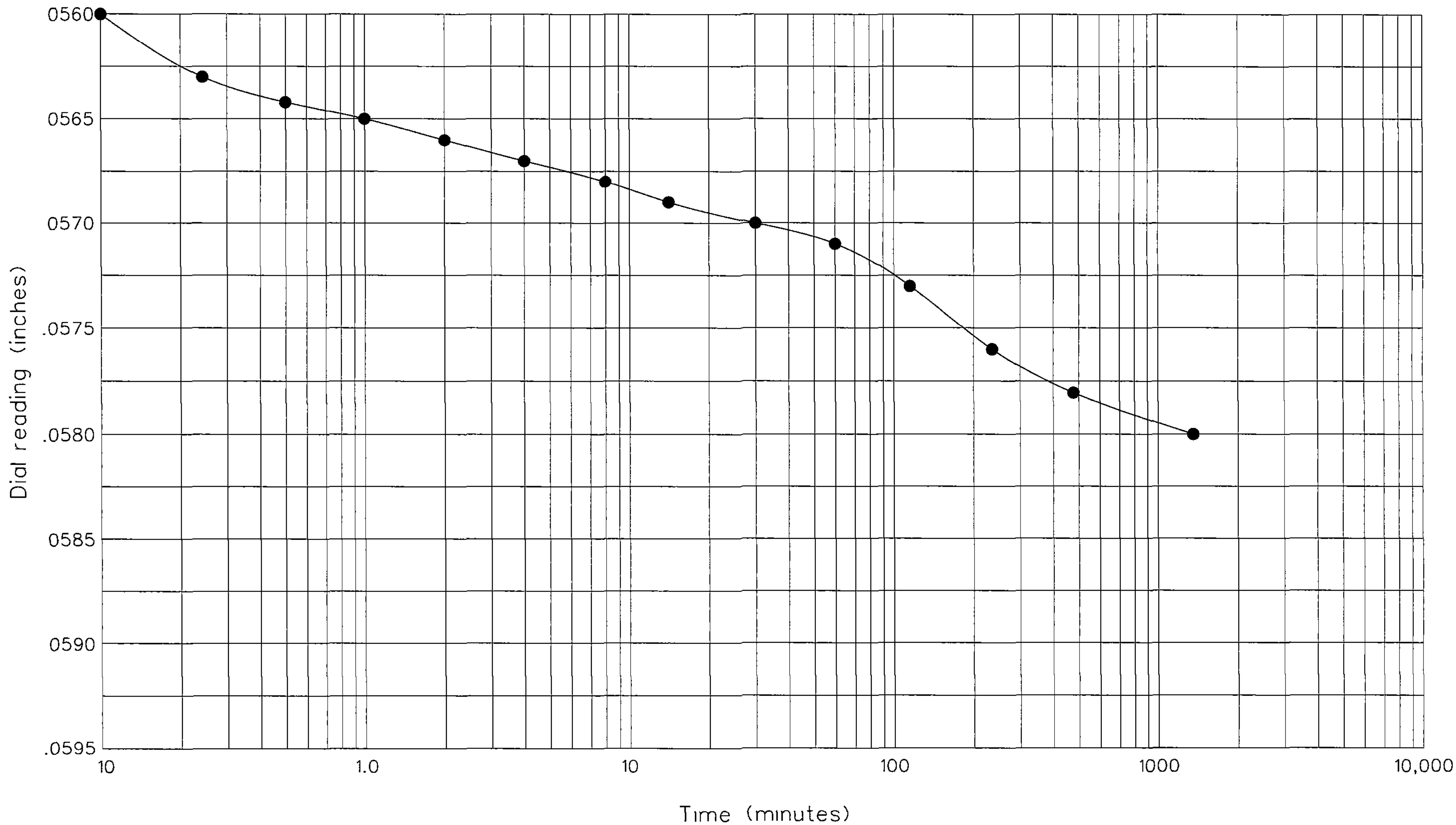
Mountain View Corridor

Salt Lake County, Utah


RB&G ENGINEERING, INC.
CONSOLIDATION TEST RESULTS
Figure No
Boring No 09-W1-24
Surface Elev
Depth Interval 12'-12.5'
Moisture Content 28.3 / Dry Unit Wt 72.9 lbs/ft³
LL 32 / PL 21 / PI 11 /
Project Mountain View Corridor
Salt Lake County, Utah
Void Ratio (e)
1.40
1.30
1.20
1.10
1.00
.90
.80
0.01
0.1
1.0
10
Pressure (tons/ft²)
Note: Sample inundated at 0.29 tsf

ADDENDUM 1 - 12/31/09





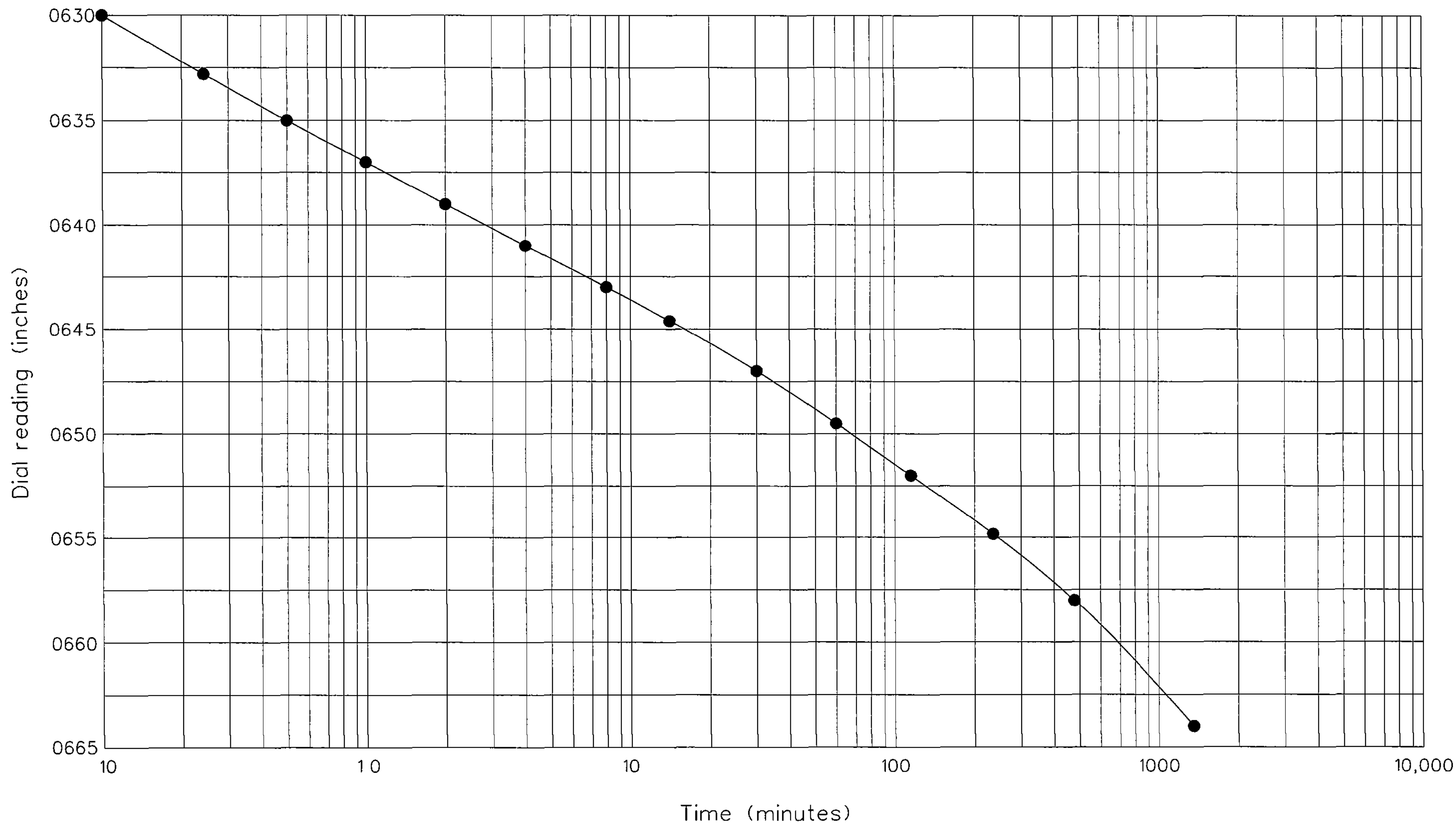
RB&G ENGINEERING, INC.

Hole no : 09-W1-24
Depth: 12'-12.5'
Load 0.58 to 1.15 tons

TIME CONSOLIDATION

Mountain View Corridor
Salt Lake County, Utah

Figure



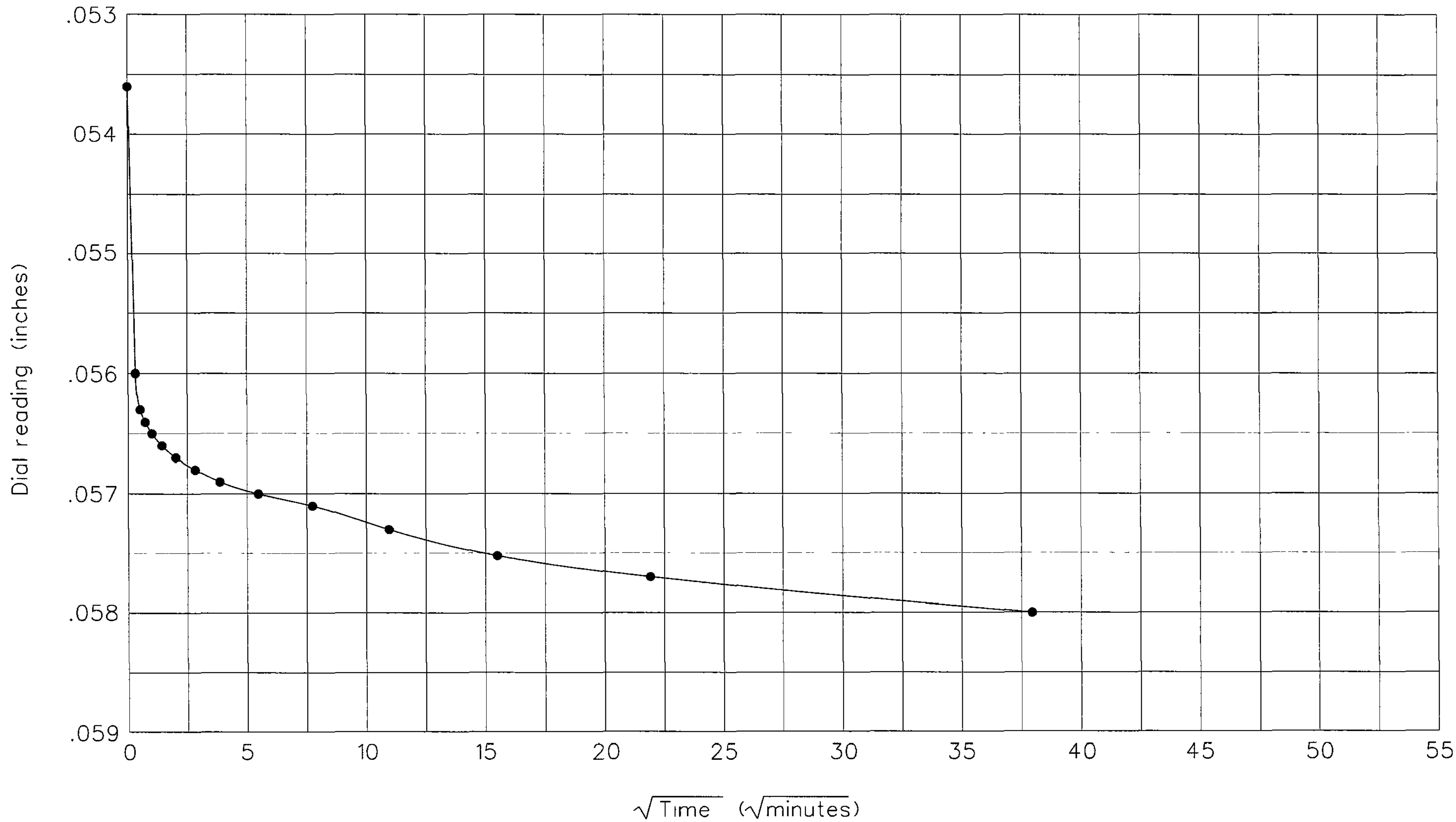
RB&G ENGINEERING, INC.

Hole no 09-W1-24
Depth: 12'-12.5'
Load 1.15 to 2.30 tons

TIME CONSOLIDATION

Mountain View Corridor
Salt Lake County, Utah

Figure



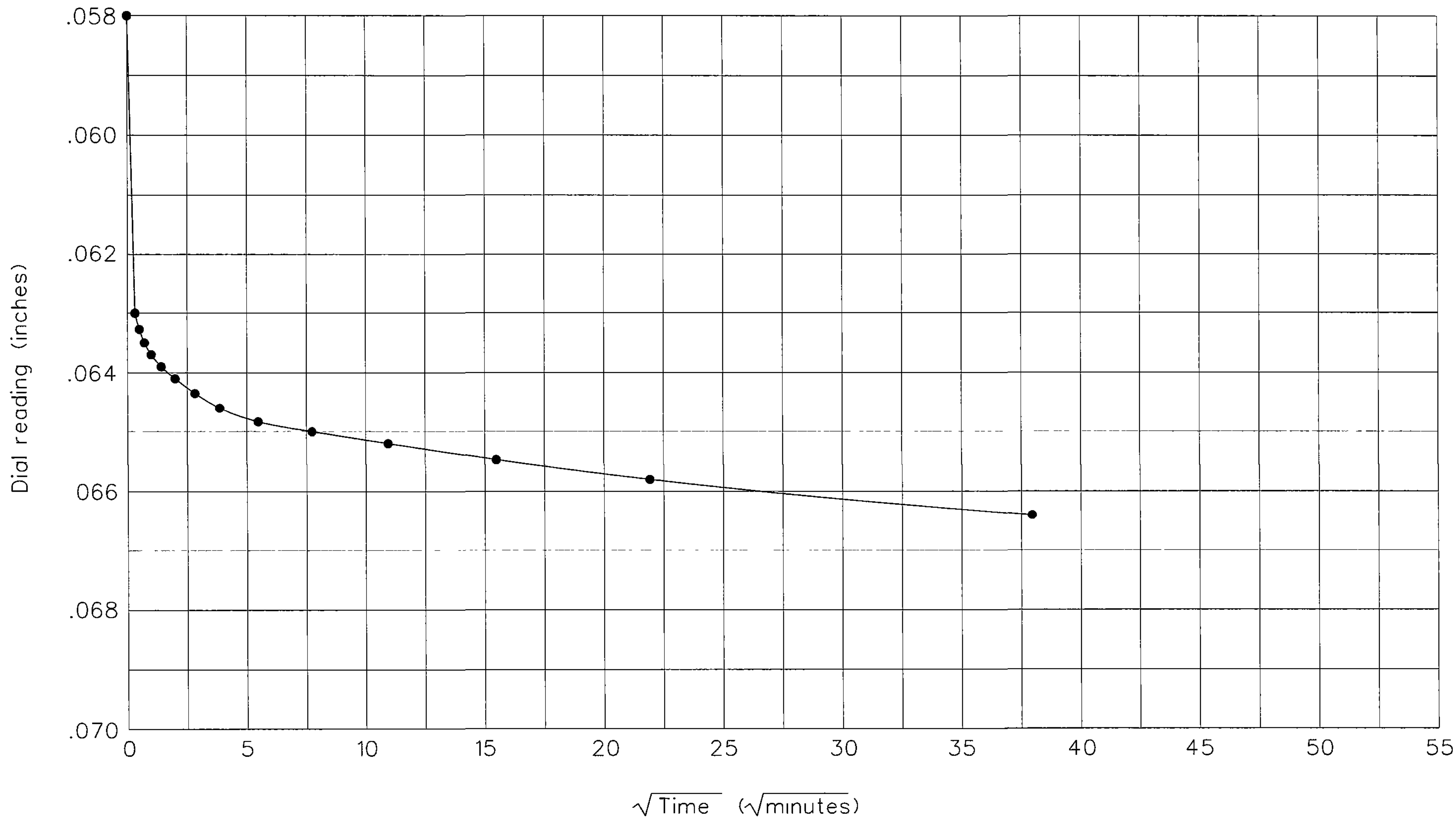
RB&G ENGINEERING, INC.

Hole no : 09-W1-24
Depth: 12'-12.5'
Load: 0 58 to 1.15 tons

TIME CONSOLIDATION

Mountain View Corridor
Salt Lake County, Utah

Figure



RB&G ENGINEERING, INC.

Hole no.: 09-W1-24
Depth: 12'-12 5'
Load: 1.15 to 2.30 tons

TIME CONSOLIDATION

Mountain View Corridor
Salt Lake County, Utah

Figure

RB&G ENGINEERING, INC.
1435 West 820 North, Provo, Utah 84601
801 374-5771 Provo
801 521-5771 Salt Lake City

PROJECT NO.	200901.200

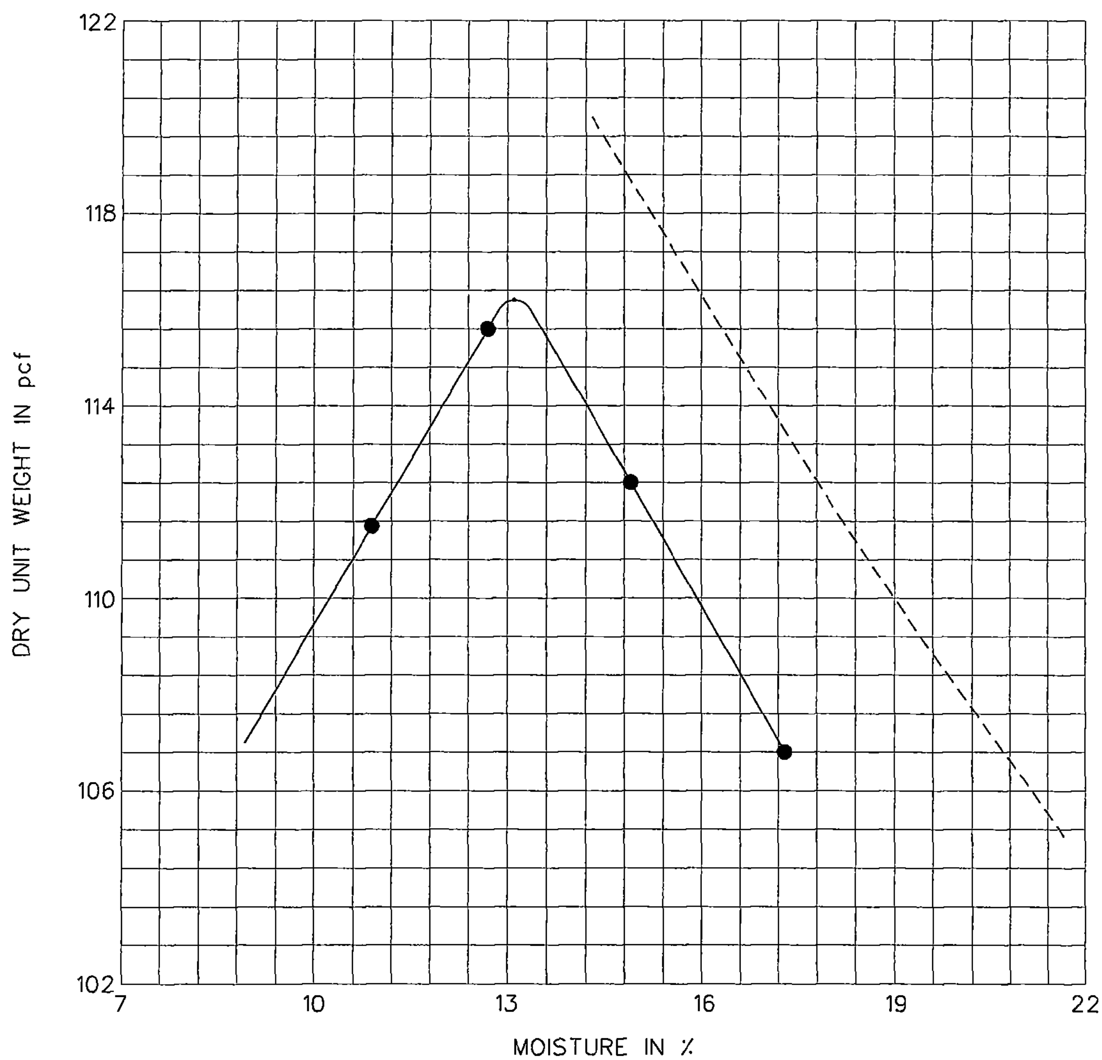
MOISTURE-DENSITY RELATION (PROCTOR)

Project	MOUNTAIN VIEW CORRIDOR - REDWOOD ROAD TO 6200 SOUTH			Date	7/1/2009
Location / No.	NEAR BORING 09-MVC-003 AT 0.5'-1.2'			Technician	J. LINDO
Material Description	DK. BROWN SILTY CLAYEY SAND	USCS	SC-SM (A-4(0))	Method	AASHTO T-99

Procedure Used[1]	C
Classification Procedure[2]	Test

[1] A-No 4 Sieve, B-3/8" Sieve, C-3/4" Sieve
[2] Visual as per ASTM D 2488, Test as per ASTM D 2487

Preparation Method	Moist
Rammer Used	Manual
As-Received Moisture Content (%)	18.2



Maximum Dry Density (pcf)	116.2
Optimum Moisture Content (%)	13.1
Modified Maximum Density (pcf)	**116.2**
Modified Optimum Moisture Content (%)	**13.1**

Specific Gravity of Soil	2.65	Est

OVERSIZE CORRECTION-AASHTO T-224

Specific Gravity of Soil +3/4	2.65	Est.
Percent Oversize	0.0	

------ 100% Saturation Curve

Type of Specific Gravity is BULK Unless Otherwise Indicated

RB&G ENGINEERING, INC.
1435 West 820 North, Provo, Utah 84601
801 374-5771 Provo
801 521-5771 Salt Lake City

PROJECT NO.	200901.200

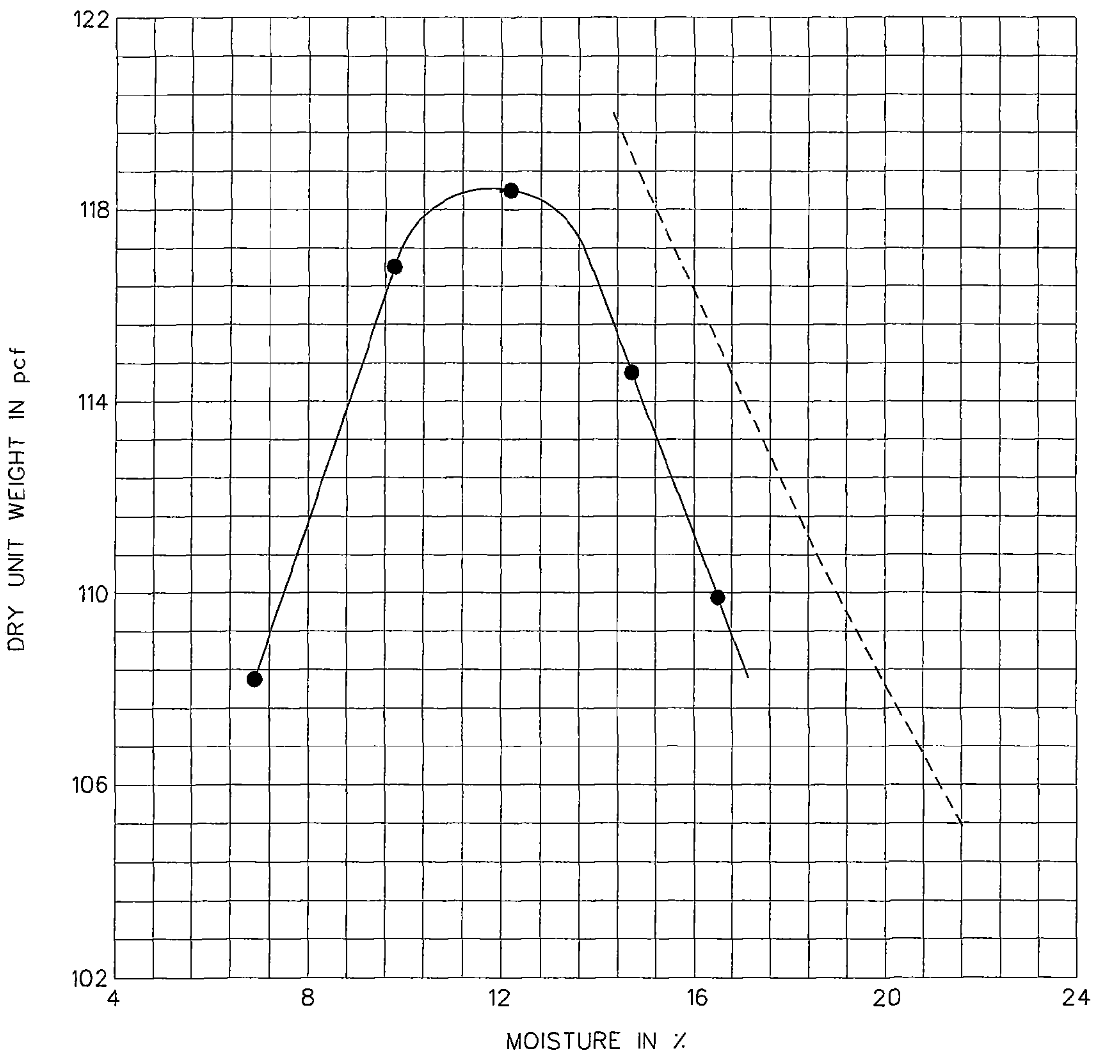
MOISTURE-DENSITY RELATION (PROCTOR)

Project	MOUNTAIN VIEW CORRIDOR - REDWOOD ROAD TO 6200 SOUTH			Date	7/2/2009
Location / No.	NEAR BORING 09-MVC-005 AT 0.5'-1.5'			Technician	M. JOHNSON
Material Description	DK. BROWN SILTY SAND	USCS	SM (A-2-4(0)	Method	AASHTO T-99

Procedure Used[1]	C
Classification Procedure[2]	Test

[1] A-No. 4 Sieve, B-3/8" Sieve, C-3/4" Sieve
[2] Visual as per ASTM D 2488, Test as per ASTM D 2487

Preparation Method	Moist
Rammer Used	Manual
As-Received Moisture Content (%)	10.9



Maximum Dry Density (pcf)	118.4
Optimum Moisture Content (%)	12.0
Modified Maximum Density (pcf)	**118.4**
Modified Optimum Moisture Content (%)	**12.0**

----- 100% Saturation Curve

Specific Gravity of Soil	2.65	Est.

OVERSIZE CORRECTION-AASHTO T-224

Specific Gravity of Soil +3/4	2.65	Est.
Percent Oversize	0.0	

Type of Specific Gravity is BULK Unless Otherwise Indicated

RB&G ENGINEERING, INC. 1435 West 820 North, Provo, Utah 84601
801 374-5771 Provo
801 521-5771 Salt Lake City

PROJECT NO.	200901.200

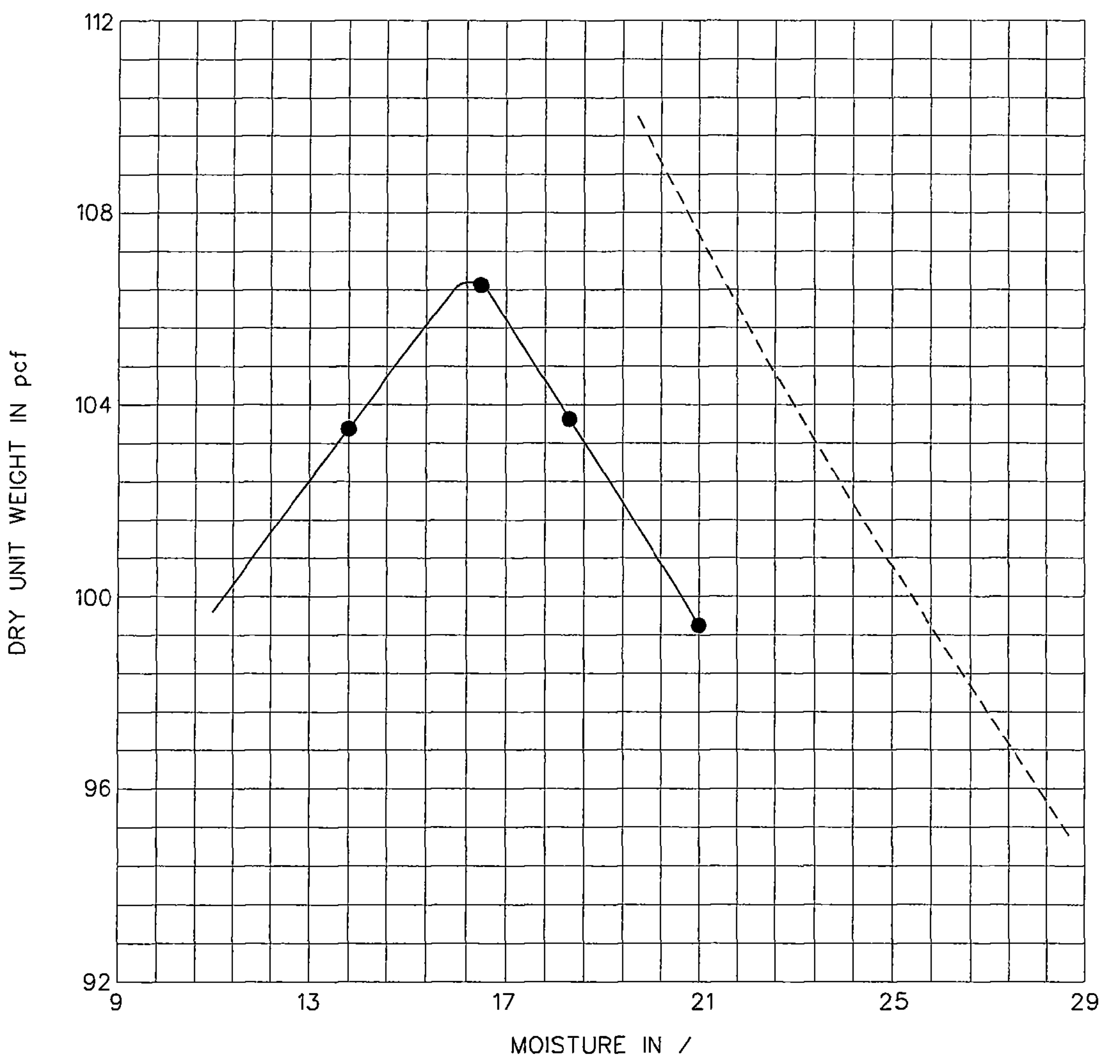
MOISTURE-DENSITY RELATION (PROCTOR)

Project	MOUNTAIN VIEW CORRIDOR - REDWOOD ROAD TO 6200 SOUTH			Date	7/23/2009
Location / No.	NEAR BORING 09-MVC-012 AT 2.25'-2.75'			Technician	S. GUNNELL
Material Description	BROWN SANDY SILTY CLAY	USCS	CL-ML (A-4(2))	Method	AASHTO T-99

Procedure Used[1]	D
Classification Procedure[2]	Test

[1] A-No. 4 Sieve, B-3/8" Sieve, C-3/4" Sieve
[2] Visual as per ASTM D 2488, Test as per ASTM D 2487

Preparation Method	Moist
Rammer Used	Manual
As-Received Moisture Content (%)	17 0



Maximum Dry Density (pcf)	106.0
Optimum Moisture Content (%)	16 0
Modified Maximum Density (pcf)	**106.0**
Modified Optimum Moisture Content (%)	**16.0**

Specific Gravity of Soil	2.70	Est

OVERSIZE CORRECTION-AASHTO T-224

Specific Gravity of Soil +3/4	2.70	Est.
Percent Oversize	0.0	

----- 100% Saturation Curve

Type of Specific Gravity is BULK Unless Otherwise Indicated

RB&G ENGINEERING, INC.
1435 West 820 North, Provo, Utah 84601
801 374-5771 Provo
801 521-5771 Salt Lake City

PROJECT NO.	200901.200

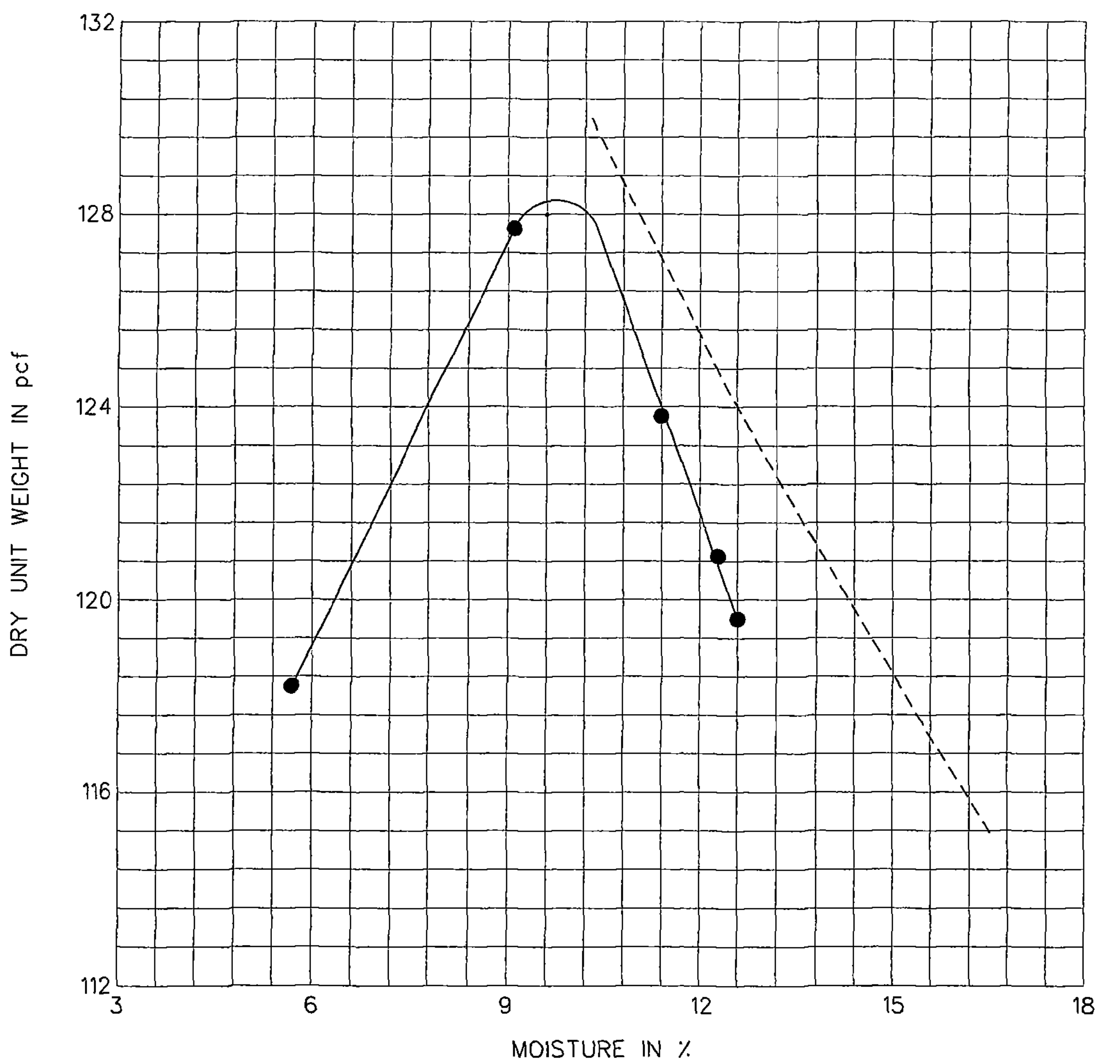
MOISTURE-DENSITY RELATION (PROCTOR)

Project	MOUNTAIN VIEW CORRIDOR - REDWOOD ROAD TO 6200 SOUTH			Date	7/28/2009
Location / No.	NEAR BORING 09-MVC-016 AT 2.25'-2.5'			Technician	K. MARTINEZ
Material Description	BROWN SILTY GRAVEL W/SAND	USCS	GM (A-1-a(0))	Method	AASHTO T-180

Procedure Used[1]	C
Classification Procedure[2]	Test

[1] A-No 4 Sieve, B-3/8" Sieve, C-3/4" Sieve
[2] Visual as per ASTM D 2488, Test as per ASTM D 2487

Preparation Method	Moist
Rammer Used	Manual
As-Received Moisture Content (%)	9.1



Maximum Dry Density (pcf)	128.0
Optimum Moisture Content (%)	9.6
Modified Maximum Density (pcf)	**137.0**
Modified Optimum Moisture Content (%)	**9.0**

----- 100% Saturation Curve

Specific Gravity of Soil	2.65	Est.

OVERSIZE CORRECTION-AASHTO T-224

Specific Gravity of Soil +3/4	2.65	Est
Percent Oversize	28.1	

Type of Specific Gravity is BULK Unless Otherwise Indicated

RB&G ENGINEERING, INC.

1435 West 820 North, Provo, Utah 84601
801 374-5771 Provo
801 521-5771 Salt Lake City

PROJECT NO.	200901.200

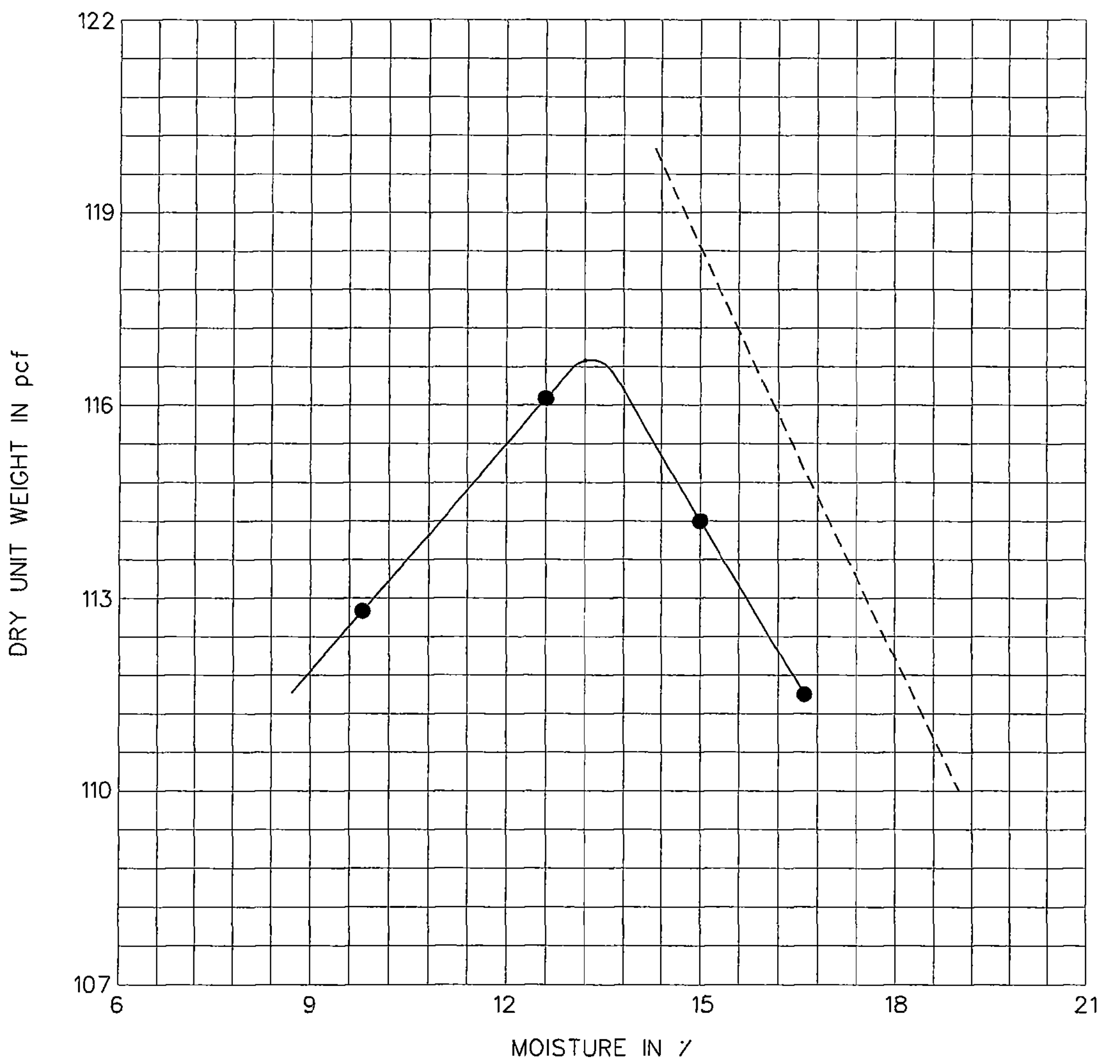
MOISTURE-DENSITY RELATION (PROCTOR)

Project	MOUNTAIN VIEW CORRIDOR - REDWOOD ROAD TO 6200 SOUTH			Date	7/1/2009
Location / No.	NEAR BORING 09-MVC-021 AT 0.5'-1.3'			Technician	K. MARTINEZ
Material Description	DK. BROWN CLAYEY SAND	USCS	SC (A-2-6(0))	Method	AASHTO T-99

Procedure Used[1]	D
Classification Procedure[2]	Test

[1] A-No. 4 Sieve, B-3/8" Sieve, C-3/4" Sieve
[2] Visual as per ASTM D 2488, Test as per ASTM D 2487

Preparation Method	Moist
Rammer Used	Manual
As-Received Moisture Content (%)	12.6



Maximum Dry Density (pcf)	116.7
Optimum Moisture Content (%)	13.2
Modified Maximum Density (pcf)	**116.7**
Modified Optimum Moisture Content (%)	**13.2**

Specific Gravity of Soil	2.65	Est.

OVERSIZE CORRECTION-AASHTO T-224

Specific Gravity of Soil +3/4	2 65	Est.
Percent Oversize	0.0	

----- 100% Saturation Curve

Type of Specific Gravity is BULK Unless Otherwise Indicated

RB&G ENGINEERING, INC.
1435 West 820 North, Provo, Utah 84601
801 374-5771 Provo
801 521-5771 Salt Lake City

PROJECT NO.	200901.200

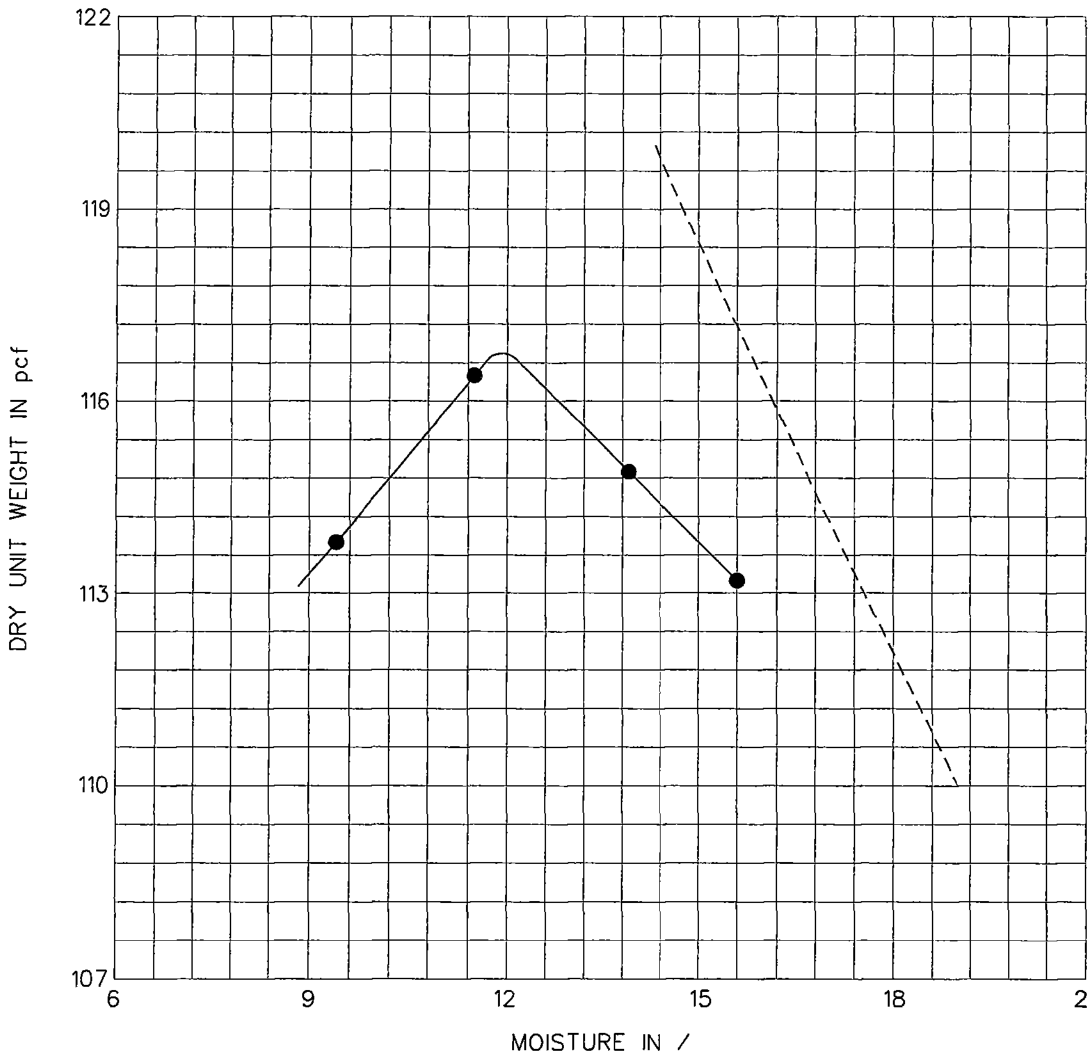
MOISTURE-DENSITY RELATION (PROCTOR)

Project	MOUNTAIN VIEW CORRIDOR - REDWOOD ROAD TO 6200 SOUTH			Date	7/23/2009
Location / No.	NEAR BORING 09-MVC-025 AT 1.5'-2'			Technician	J. LINDO
Material Description	DK. BROWN CLAYEY SAND	USCS	SC (A-6(1))	Method	AASHTO T-99

Procedure Used[1]	D
Classification Procedure[2]	Test

[1] A-No 4 Sieve, B-3/8" Sieve, C-3/4" Sieve
[2] Visual as per ASTM D 2488, Test as per ASTM D 2487

Preparation Method	Moist
Rammer Used	Manual
As-Received Moisture Content (%)	9 4



Maximum Dry Density (pcf)	117.0
Optimum Moisture Content (%)	12.0
Modified Maximum Density (pcf)	**117.0**
Modified Optimum Moisture Content (%)	**12.0**

----- 100% Saturation Curve

Specific Gravity of Soil	2 65	Est.

OVERSIZE CORRECTION-AASHTO T-224

Specific Gravity of Soil +3/4	2 65	Est.
Percent Oversize	0.0	

Type of Specific Gravity is BULK Unless Otherwise Indicated

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801 521-5771 Salt Lake City

PROJECT NO	200901.200

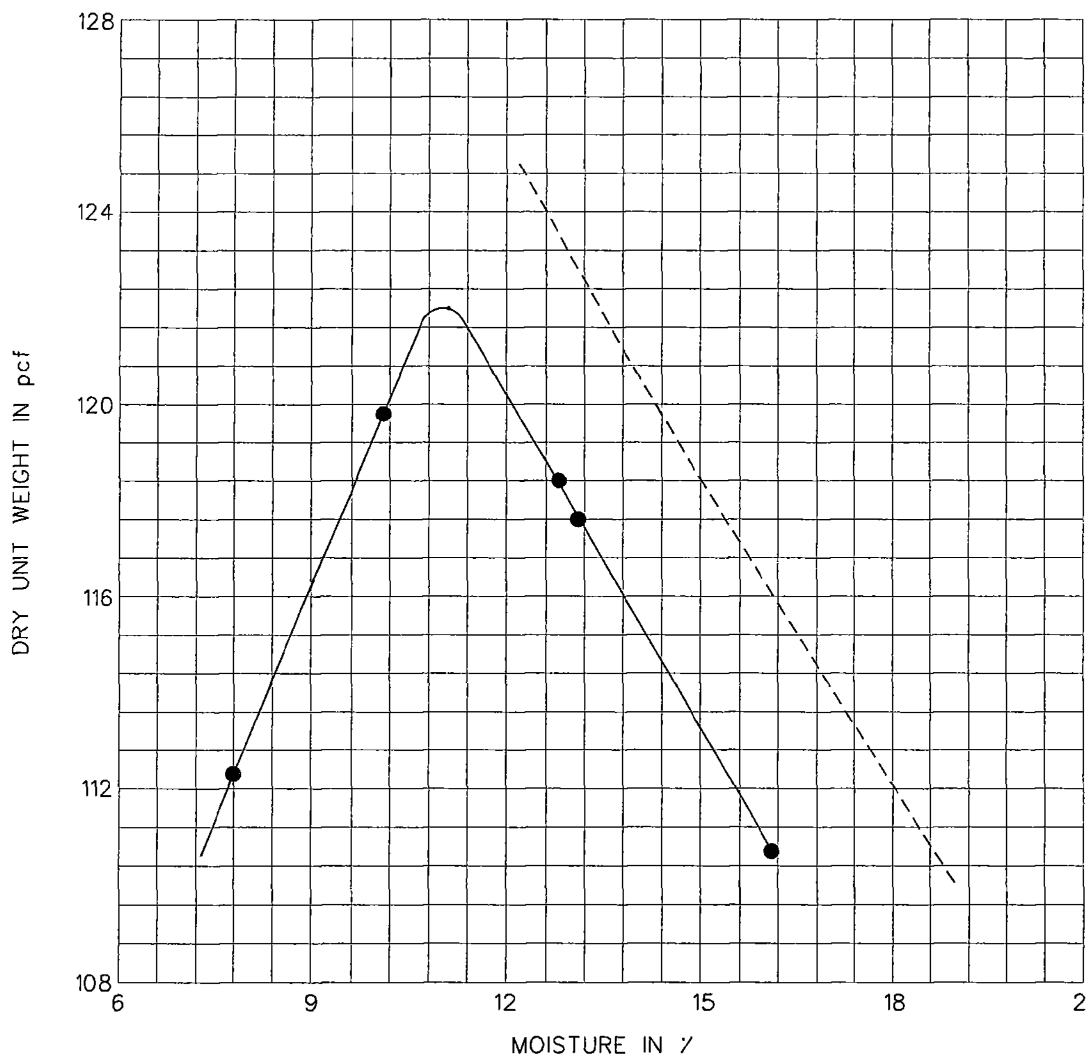
MOISTURE-DENSITY RELATION (PROCTOR)

Project	MOUNTAIN VIEW CORRIDOR - REDWOOD ROAD TO 6200 SOUTH			Date	7/1/2009
Location / No.	NEAR BORING 09-MVC-030 AT 0.6'-1.2'			Technician	D. WALKER
Material Description	DK. BROWN SILTY SAND	USCS	SM (A-2-4(0))	Method	AASHTO T-99

Procedure Used[1]	C
Classification Procedure[2]	Test

[1] A-No 4 Sieve, B-3/8" Sieve, C-3/4" Sieve
[2] Visual as per ASTM D 2488, Test as per ASTM D 2487

Preparation Method	Moist
Rammer Used	Manual
As-Received Moisture Content (%)	10.1



Maximum Dry Density (pcf)	122.0
Optimum Moisture Content (%)	11 1
Modified Maximum Density (pcf)	**122.0**
Modified Optimum Moisture Content (%)	**11.1**

Specific Gravity of Soil	2 65	Est.

OVERSIZE CORRECTION-AASHTO T-224

Specific Gravity of Soil +3/4	2 65	Est.
Percent Oversize	0 5	

----- 100% Saturation Curve

Type of Specific Gravity is BULK Unless Otherwise Indicated

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1435 West 820 North, Provo, Utah 84601
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801 521-5771 Salt Lake City

PROJECT NO.	200901.200

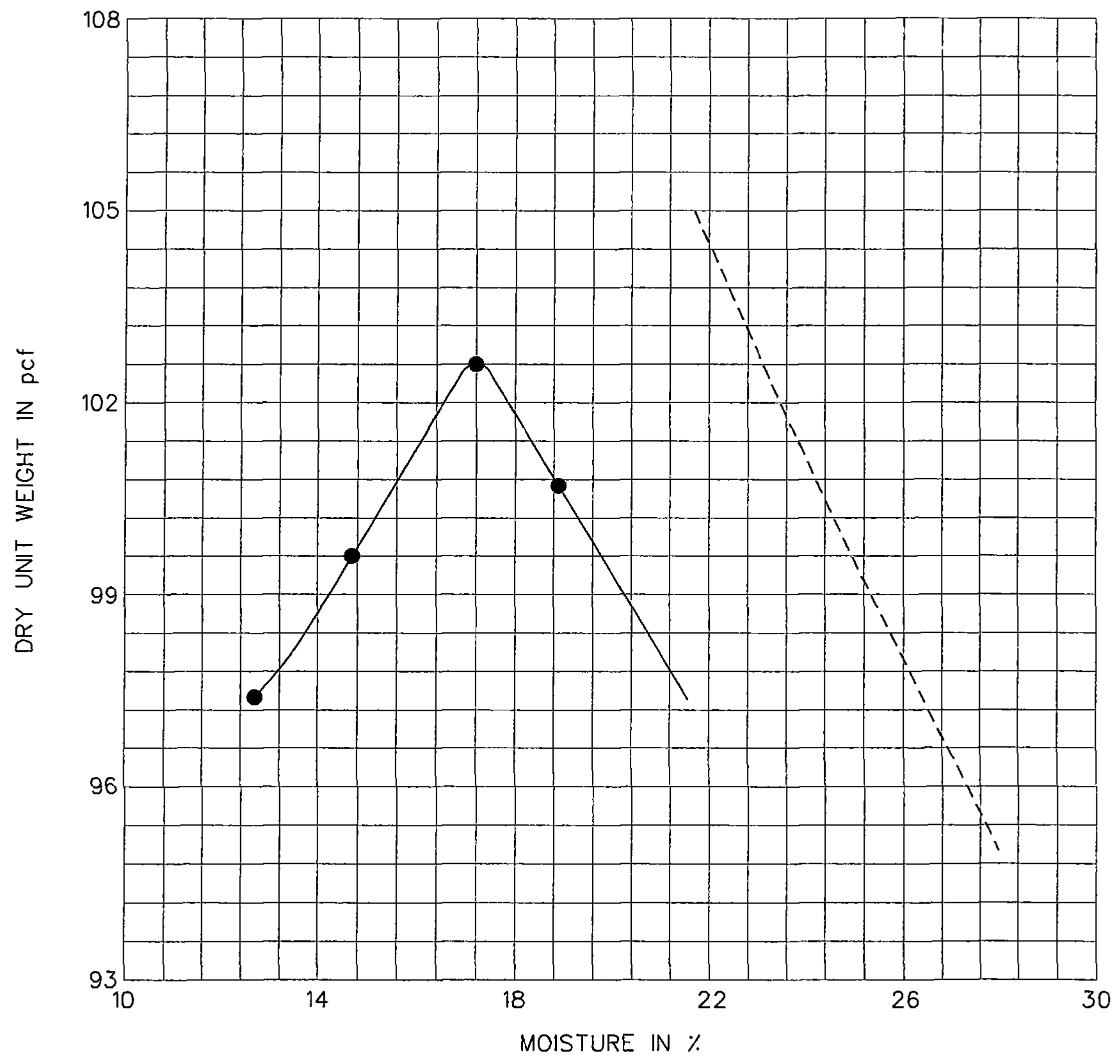
MOISTURE-DENSITY RELATION (PROCTOR)

Project	MOUNTAIN VIEW CORRIDOR - REDWOOD ROAD TO 6200 SOUTH			Date	7/21/2009
Location / No.	NEAR BORING 09-MVC-034 AT 2.5'-3'			Technician	K. MARTINEZ
Material Description	LT. BROWN SILT W/SAND	USCS	ML (A-4(3))	Method	AASHTO T-99

Procedure Used[1]	B
Classification Procedure[2]	Test

[1] A-No 4 Sieve, B-3/8" Sieve, C-3/4" Sieve
[2] Visual as per ASTM D 2488, Test as per ASTM D 2487

Preparation Method	Moist
Rammer Used	Manual
As-Received Moisture Content (%)	11.1



Maximum Dry Density (pcf)	103.0
Optimum Moisture Content (%)	17.0
Modified Maximum Density (pcf)	**103.0**
Modified Optimum Moisture Content (%)	**17.0**

Specific Gravity of Soil	2.65	Est.

OVERSIZE CORRECTION-AASHTO T-224

Specific Gravity of Soil +3/4	2.65	Est.
Percent Oversize	0.0	

----- 100% Saturation Curve

Type of Specific Gravity is BULK Unless Otherwise Indicated

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801 521-5771 Salt Lake City

PROJECT NO.	200901.200

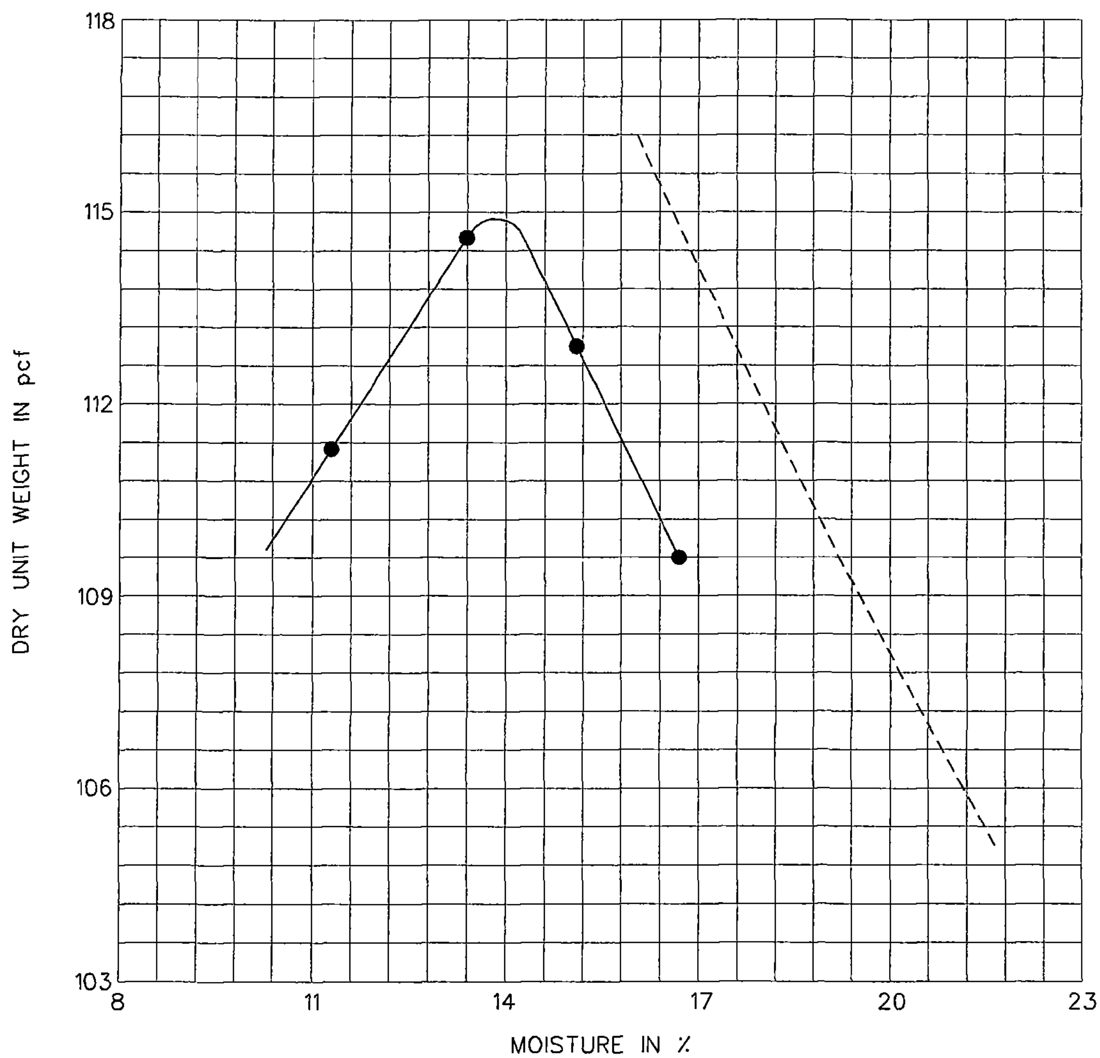
MOISTURE-DENSITY RELATION (PROCTOR)

Project	MOUNTAIN VIEW CORRIDOR - REDWOOD ROAD TO 6200 SOUTH			Date	7/21/2009
Location / No.	NEAR BORING 09-MVC-039 AT 1.75'-2'			Technician	K. MARTINEZ
Material Description	BROWN CLAYEY GRAVEL W/SAND	USCS	GC (A-2-4(0))	Method	AASHTO T-99

Procedure Used[1]	C
Classification Procedure[2]	Test

[1] A-No. 4 Sieve, B-3/8" Sieve, C-3/4" Sieve
[2] Visual as per ASTM D 2488, Test as per ASTM D 2487

Preparation Method	Moist
Rammer Used	Manual
As-Received Moisture Content (%)	11.1



Maximum Dry Density (pcf)	114.9
Optimum Moisture Content (%)	13.8
Modified Maximum Density (pcf)	**126.0**
Modified Optimum Moisture Content (%)	**11.0**

----- 100% Saturation Curve

Specific Gravity of Soil	2.65	Est.

OVERSIZE CORRECTION-AASHTO T-224

Specific Gravity of Soil +3/4	2.65	Est
Percent Oversize	30.0	

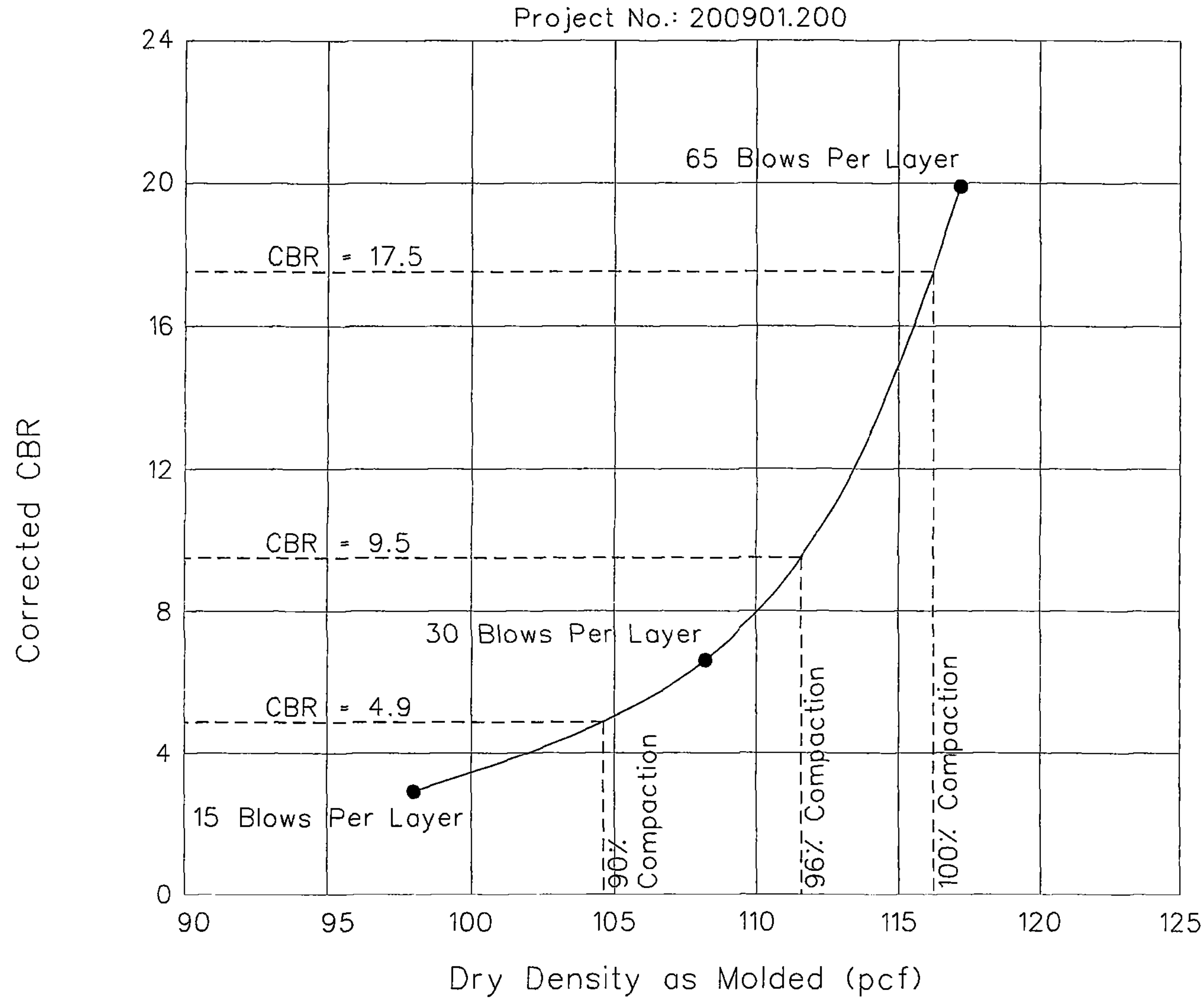
Type of Specific Gravity is BULK Unless Otherwise Indicated

Mountain View Corridor
Redwood Road to 6200 South

Segment 1 California Bearing Ratio Test Result Summary

Boring No.	Depth Below Ground Surface (ft)	Location			Unified Soil Classification System / (AASHTO Classification)	CBR		PROCTOR		
		Line	Station	Offset		@ 96%* Compaction	@ 100% Compaction	AASHTO Method	Maximum Density (pcf)	Optimum Moisture (%)
09-MVC-003	0 5-1.2	South Hills	94+00	0 RT	SC-SM (A-2-4(0))	9.5	17.5	T-99	116.2	13.1
09-MVC-005	0.5-1.5	South Hills	84+00	0 RT	SM (A-2-4(0))	8.3	15.2	T-99	118 4	12.0
09-MVC-012	2.25-2 75	MVC Mainline	867+00	178 RT	CL-ML (A-4(2))	8.8	12.4	T-99	106 0	16.0
09-MVC-016	2.25-2.5	MVC Mainline	887+00	178 RT	GM (A-1-a(0))	34.5	48.8	T-180	137.0	9 0
09-MVC-021	0.5-1.3	MVC Mainline	912+00	178 LT	SC (A-2-6(0))	7.7	12.5	T-99	116 7	13.2
09-MVC-025	1 5-2.0	MVC Mainline	932+00	178 LT	SC (A-6(1))	8 5	12.1	T-99	117 0	12.0
09-MVC-030	0.6-1.2	MVC Mainline	957+00	189 RT	SM (A-2-4(0))	20.2	34.7	T-99	122.0	11.1
09-MVC-034	2.5-3.0	MVC Mainline	977+00	178 RT	ML (A-4(3))	8.8	12.1	T-99	103.0	17.0
09-MVC-039	1.75-2.0	MVC Mainline	1002+00	188 LT	GC (A-2-4(0))	11 7	16.0	T-99	126.0	11.0

* Minimum average density required in the UDOT Minimum Sampling and Testing Requirements 02056· Embankment, Base and Borrow specification 1.6 c



Location NEAR BORING 09-MVC-003 AT 0.5'-1.2'
Material DK. BROWN SILTY CLAYEY SAND
SC-SM (A-4(0))
Soil Moisture-Density Relationship:
AASHTO T-99
Maximum Density 116.2 pcf
Optimum Moisture Content 13.1 %

Test method: AASHTO T-193
Condition ☐ unsoaked ☒ soaked
Surcharge amount 10 lbs
Swell 0.0 %
Bearing ratio @ 90% compaction 4.9 %
Bearing ratio @ 96% compaction 9.5 %
Bearing ratio @ 100% compaction 17.5 %

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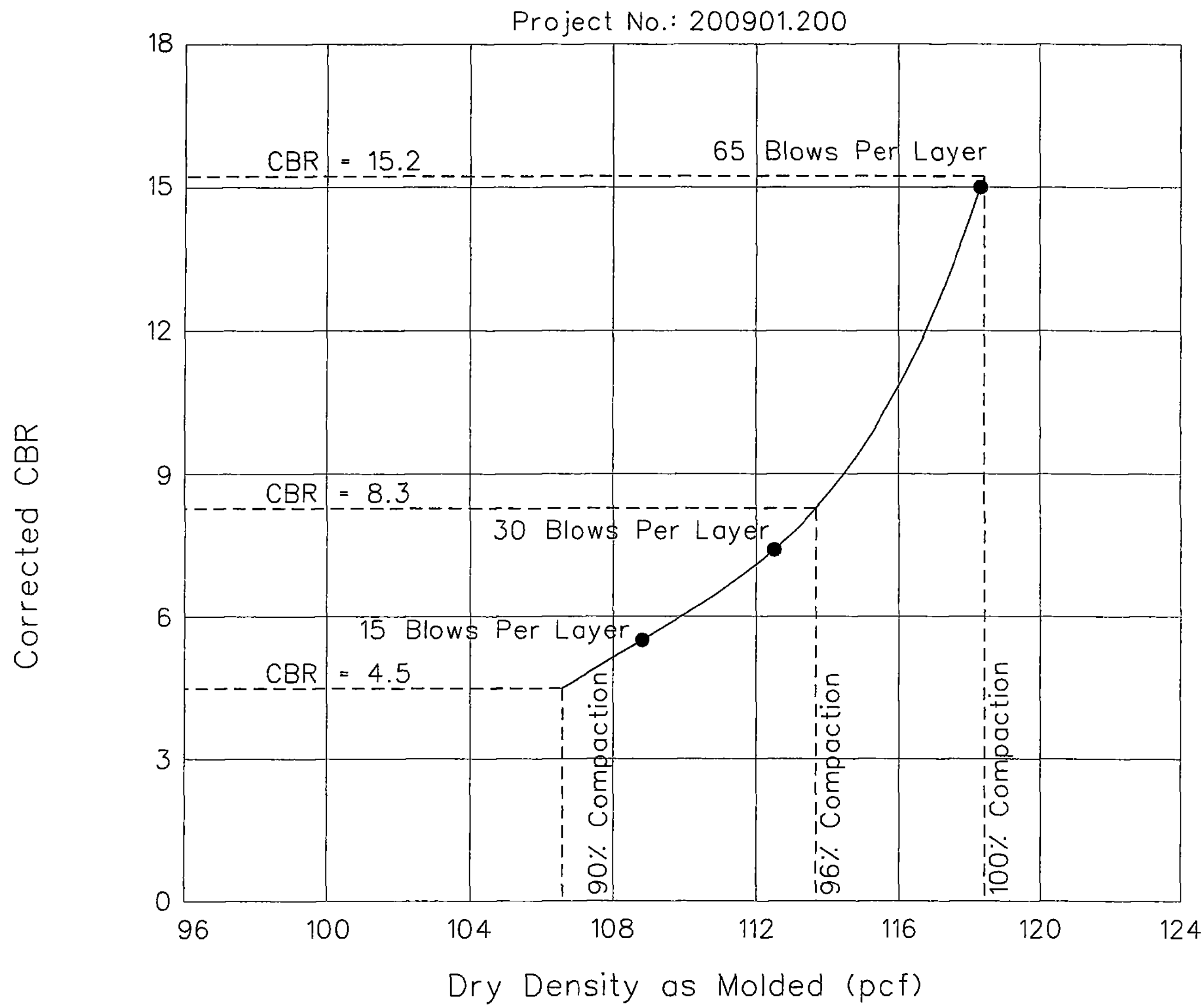
Figure CALIFORNIA BEARING RATIO TEST RESULTS

Mountain View Corridor - Redwood Road to 6200 South
Salt Lake County, Utah



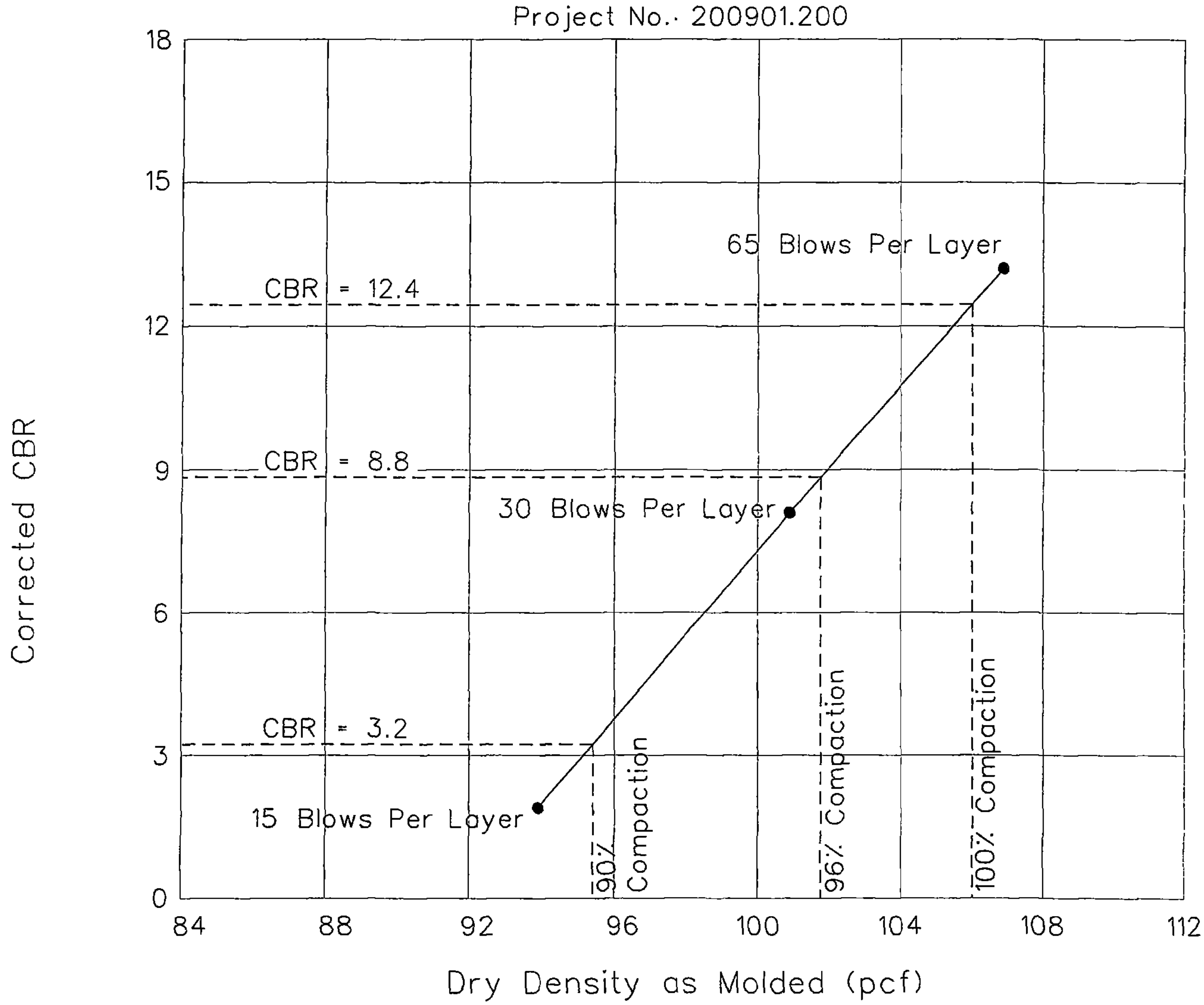
Location NEAR BORING 09-MVC-005 AT 0.5'-1.5'
Material DK. BROWN SILTY SAND
SM (A-2-4(0))
Soil Moisture-Density Relationship:
AASHTO T-99
Maximum Density 118.4 pcf
Optimum Moisture Content 12.0 %

Test method: AASHTO T-193
Condition ☐ unsoaked ☒ soaked
Surcharge amount 10 lbs
Swell 0.0 %
Bearing ratio @ 90% compaction 4.5 %
Bearing ratio @ 96% compaction 8.3 %
Bearing ratio @ 100% compaction 15.2 %

RB&G ENGINEERING, INC.

Figure CALIFORNIA BEARING RATIO TEST RESULTS

Mountain View Corridor - Redwood Road to 6200 South
Salt Lake County, Utah



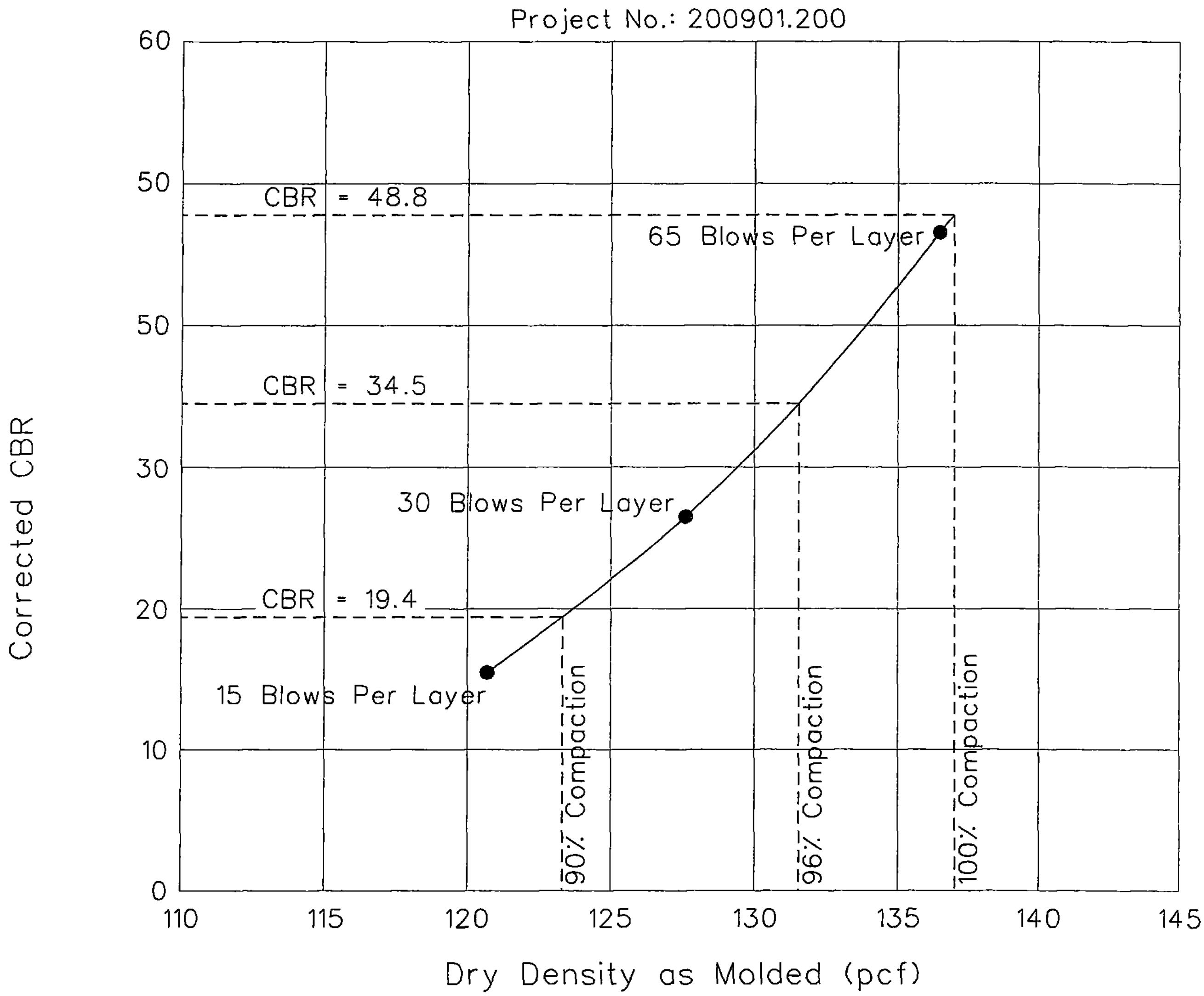
Location NEAR BORING 09-MVC-012 AT 2.25'-2.75'
Material BROWN SANDY SILTY CLAY
CL-ML (A-4(2))
Soil Moisture-Density Relationship:
AASHTO T-99
Maximum Density 106.0 pcf
Optimum Moisture Content 16.0 %

Test method: AASHTO T-193
Condition ☐ unsoaked ☒ soaked
Surcharge amount 10 lbs
Swell 0.4 %
Bearing ratio @ 90% compaction 3.2 %
Bearing ratio @ 96% compaction 8.8 %
Bearing ratio @ 100% compaction 12.4 %

RB&G ENGINEERING, INC.

Figure CALIFORNIA BEARING RATIO TEST RESULTS

Mountain View Corridor - Redwood Road to 6200 South
Salt Lake County, Utah



Location NEAR BORING 09-MVC-016 AT 2.25'-2.5'

Material BROWN SILTY GRAVEL W/SAND

GM (A-1-a(0))

Soil Moisture-Density Relationship:

AASHTO T-180

Maximum Density 137.0 pcf

Optimum Moisture Content 9.0 %

Test method: AASHTO T-193

Condition ☐ unsoaked ☒ soaked

Surcharge amount 10 lbs

Swell 0.0 %

Bearing ratio @ 90% compaction 19.4 %

Bearing ratio @ 96% compaction 34.5 %

Bearing ratio @ 100% compaction 48.8 %

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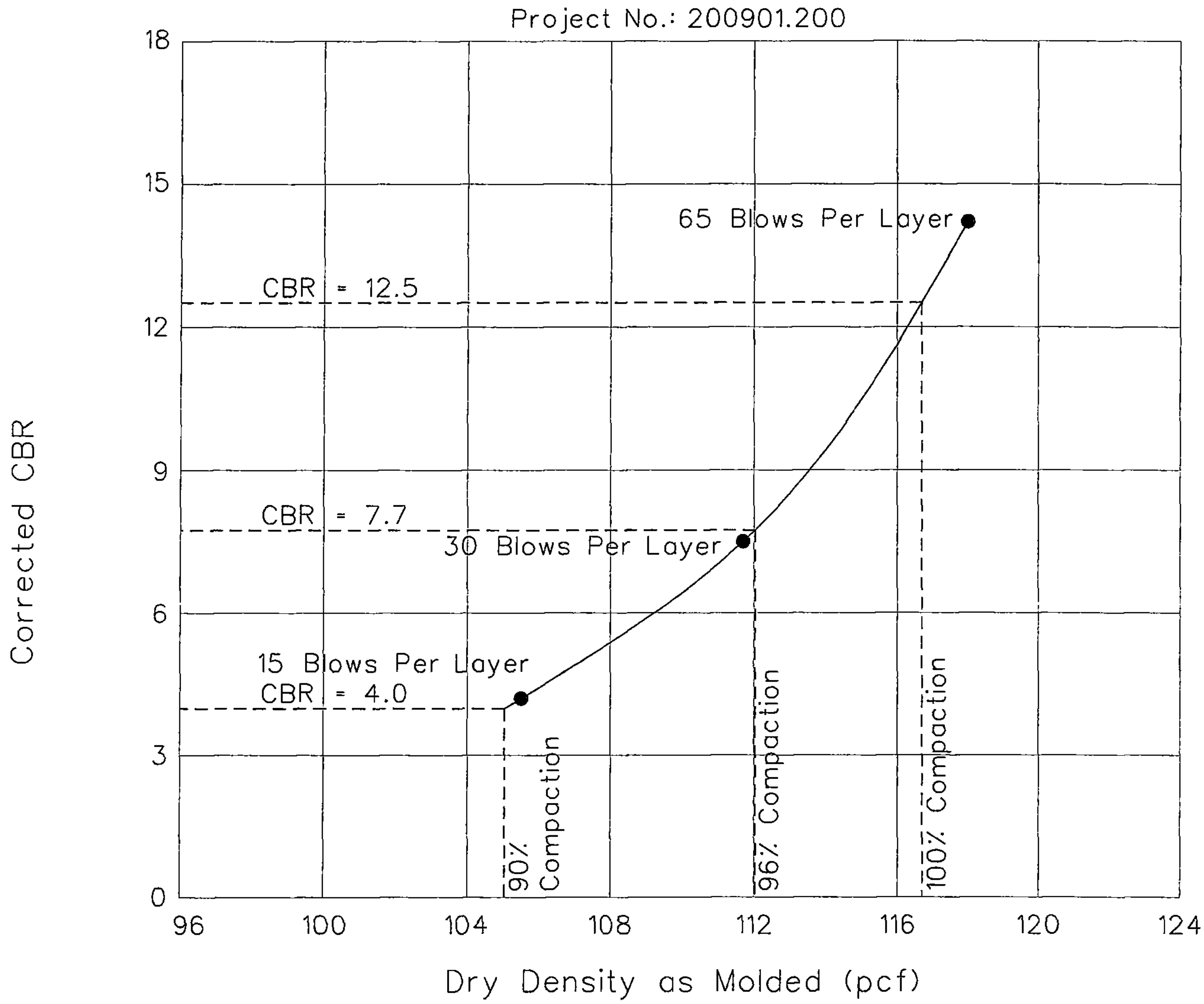
Figure CALIFORNIA BEARING RATIO TEST RESULTS

Mountain View Corridor - Redwood Road to 6200 South
Salt Lake County, Utah



Location NEAR BORING 09-MVC-021 AT 0.5'-1.3'

Material DK. BROWN CLAYEY SAND

SC (A-2-6(0))

Soil Moisture-Density Relationship:

AASHTO T-99

Maximum Density 116.7 pcf

Optimum Moisture Content 13.2 %

Test method: AASHTO T-193

Condition ☐ unsoaked ☒ soaked

Surcharge amount 10 lbs

Swell 0.0 %

Bearing ratio @ 90% compaction 4.0 %

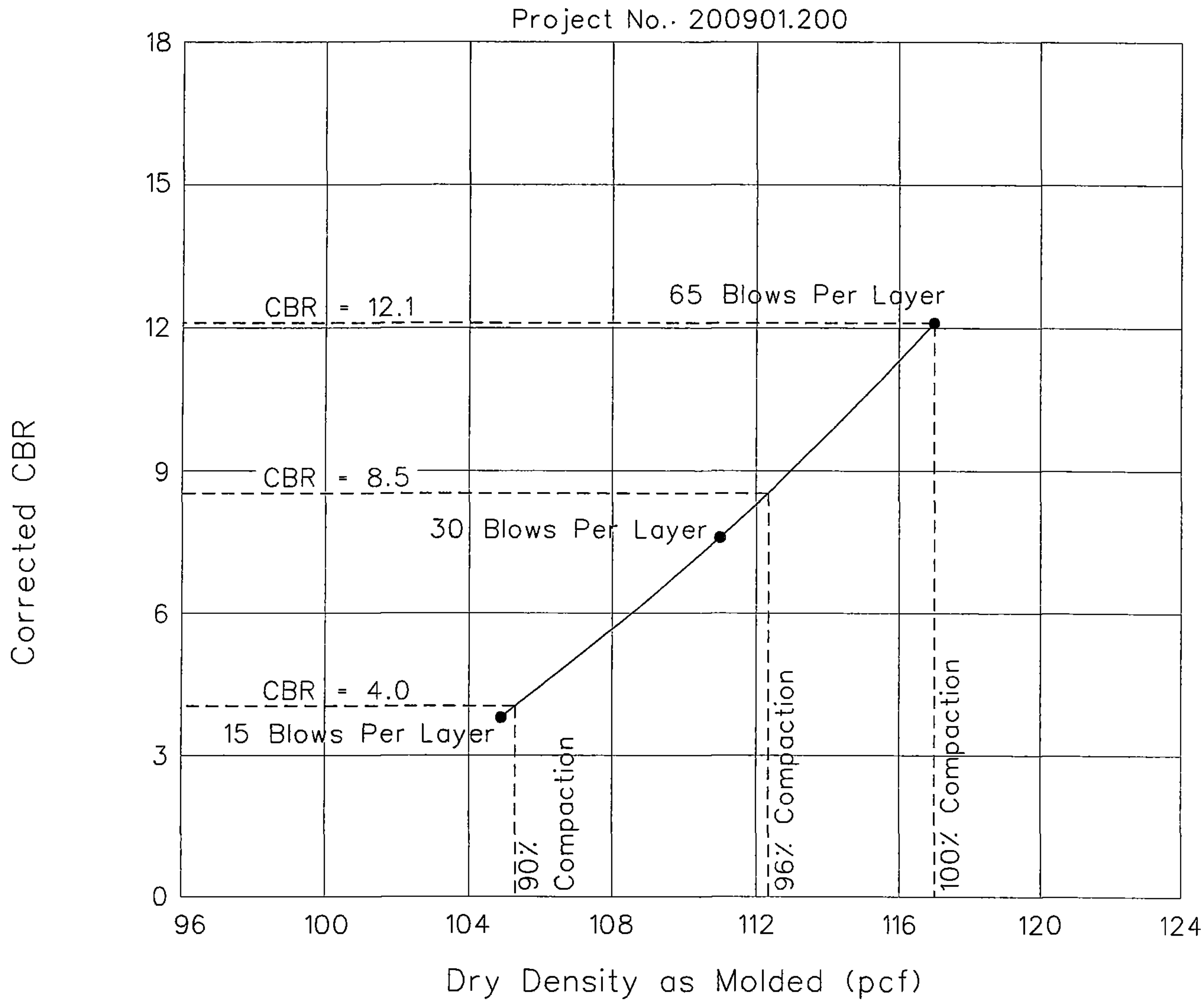
Bearing ratio @ 96% compaction 7.7 %

Bearing ratio @ 100% compaction 12.5 %

RB&G ENGINEERING, INC.

Figure CALIFORNIA BEARING RATIO TEST RESULTS

Mountain View Corridor - Redwood Road to 6200 South
Salt Lake County, Utah



Location NEAR BORING 09-MVC-025 AT 1.5'-2'

Material DK. BROWN CLAYEY SAND

SC (A-6(1))

Soil Moisture-Density Relationship:

AASHTO T-99

Maximum Density 117.0 pcf

Optimum Moisture Content 12.0 %

Test method: AASHTO T-193

Condition ☐ unsoaked ☒ soaked

Surcharge amount 10 lbs

Swell 0.2 %

Bearing ratio @ 90% compaction 4.0 %

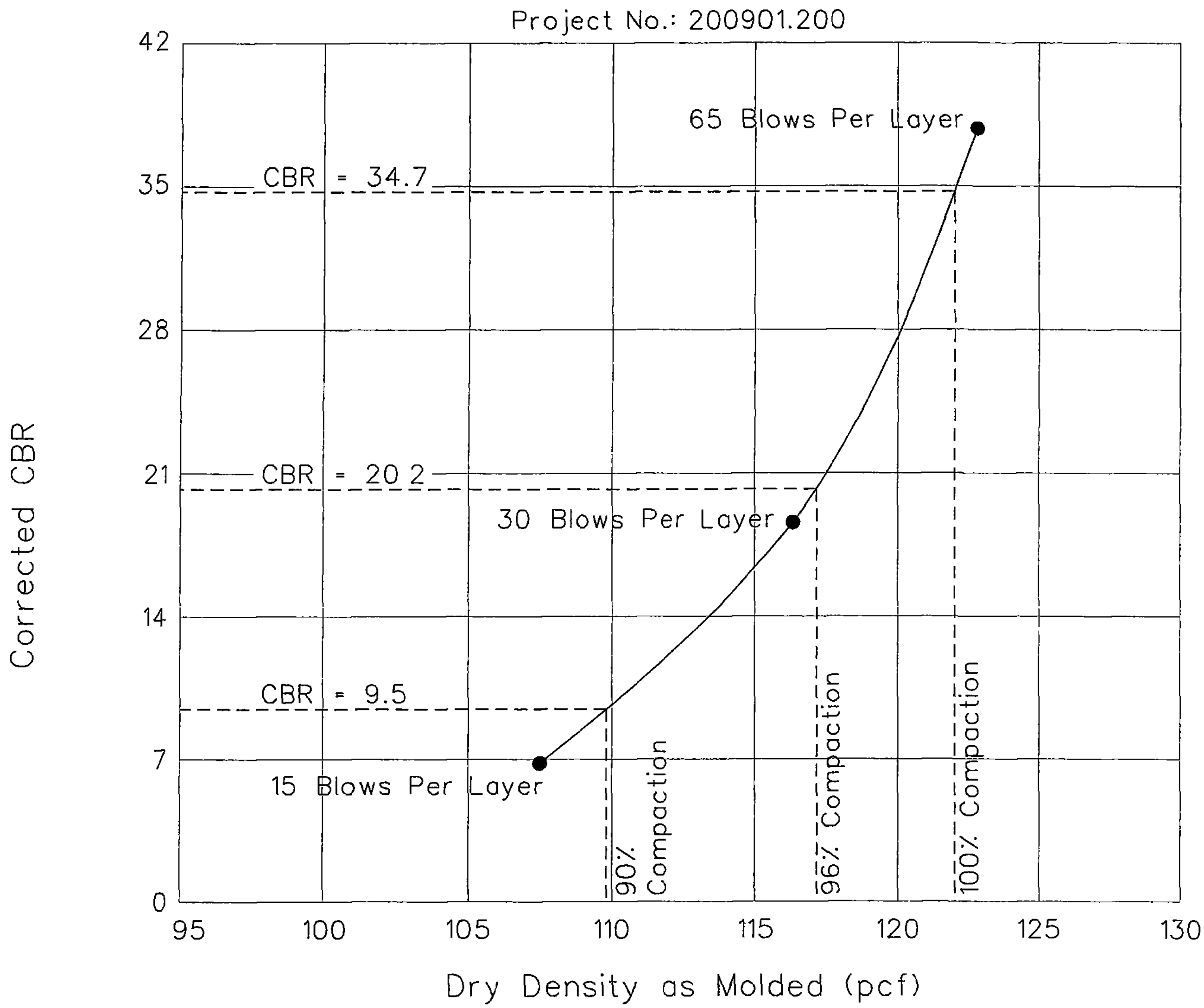
Bearing ratio @ 96% compaction 8.5 %

Bearing ratio @ 100% compaction 12.1 %

RB&G ENGINEERING, INC.

Figure CALIFORNIA BEARING RATIO TEST RESULTS

Mountain View Corridor - Redwood Road to 6200 South
Salt Lake County, Utah



Location NEAR BORING 09-MVC-030 AT 0.6'-1.2'

Material DK. BROWN SILTY SAND

SM (A-2-4(0))

Soil Moisture-Density Relationship:

AASHTO T-99

Maximum Density 122.0 pcf

Optimum Moisture Content 11.1 %

Test method: AASHTO T-193

Condition ☐ unsoaked ☒ soaked

Surcharge amount 10 lbs

Swell 0.0 %

Bearing ratio @ 90% compaction 9.5 %

Bearing ratio @ 96% compaction 20.2 %

Bearing ratio @ 100% compaction 34.7 %

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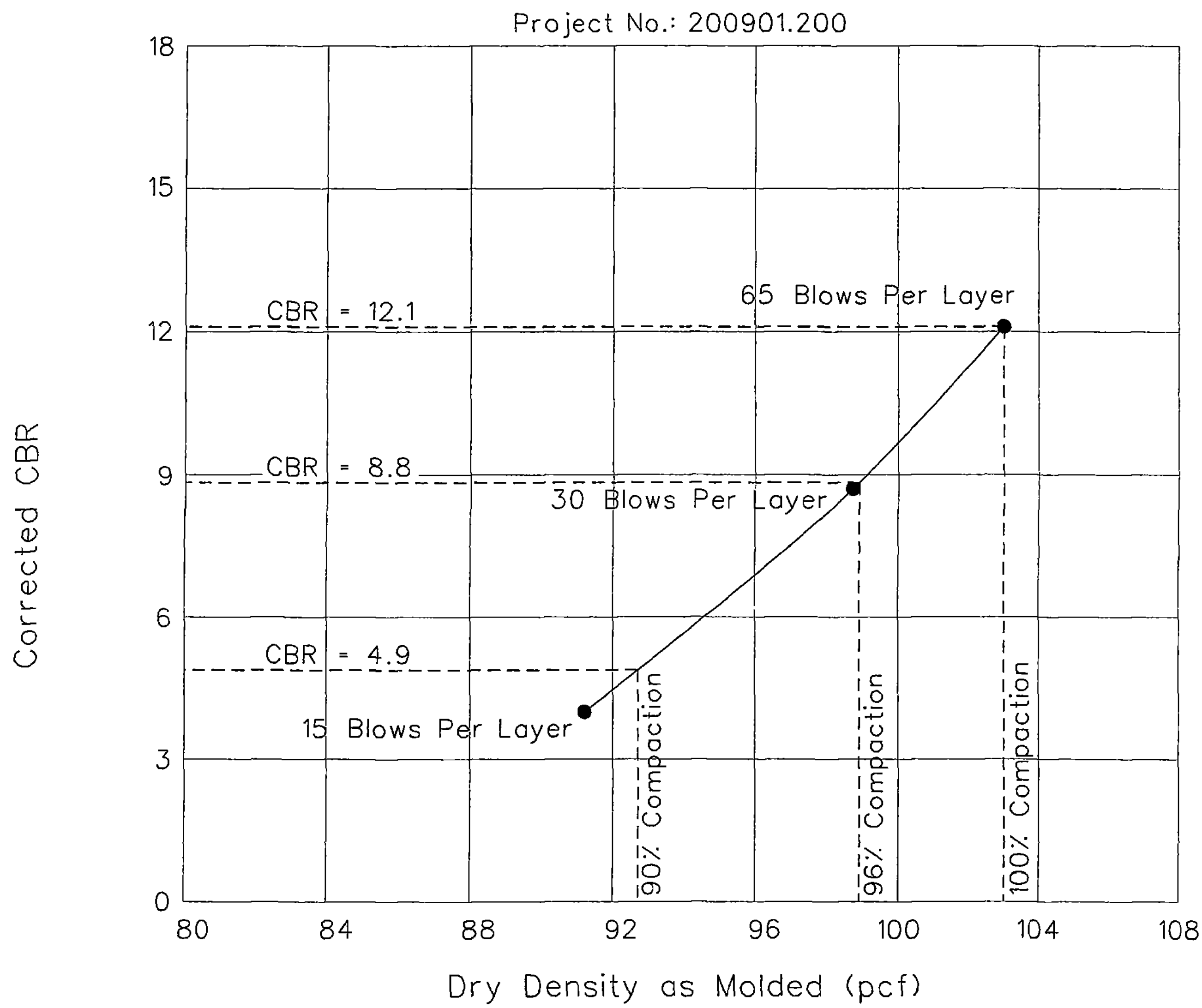
Figure CALIFORNIA BEARING RATIO TEST RESULTS

Mountain View Corridor - Redwood Road to 6200 South
Salt Lake County, Utah



Location: NEAR BORING 09-MVC-034 AT 2.5'-3'

Material: LT. BROWN SILT W/SAND ML (A-4(3))

Soil Moisture-Density Relationship: AASHTO T-99

Maximum Density: 103.0 pcf

Optimum Moisture Content: 17.0 %

Test method: AASHTO T-193

Condition: ☐ unsoaked ☒ soaked

Surcharge amount: 10 lbs

Swell: 0.4 %

Bearing ratio @ 90% compaction: 4.9 %

Bearing ratio @ 96% compaction: 8.8 %

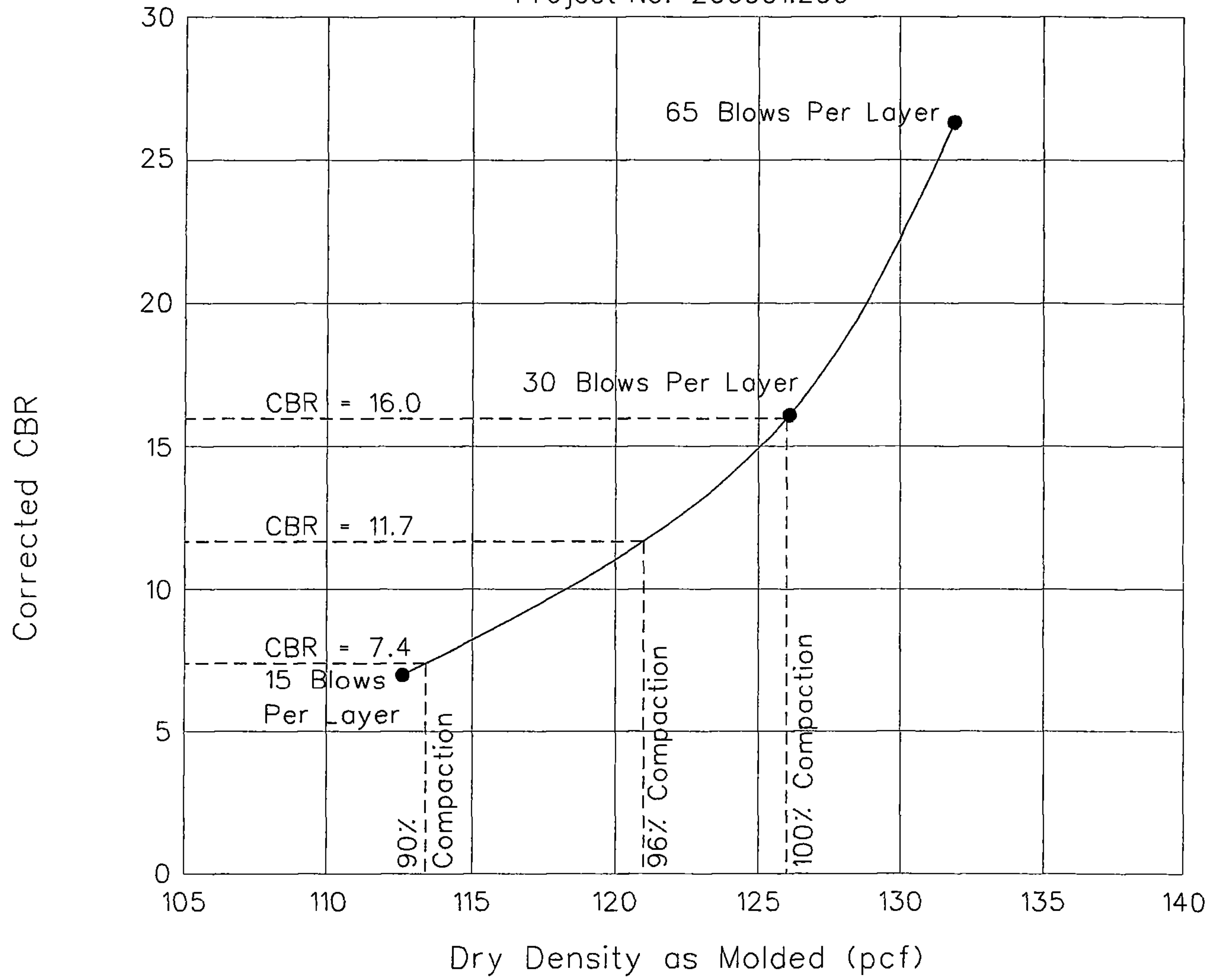
Bearing ratio @ 100% compaction: 12.1 %

RB&G ENGINEERING, INC.

Figure CALIFORNIA BEARING RATIO TEST RESULTS

Mountain View Corridor - Redwood Road to 6200 South
Salt Lake County, Utah

Project No.: 200901.200



Location NEAR BORING 09-MVC-039 AT 1.75'-2'
Material BROWN CLAYEY GRAVEL W/SAND
GC (A-2-4(0))
Soil Moisture-Density Relationship:
AASHTO T-99
Maximum Density 126.0 pcf
Optimum Moisture Content 11.0 %

Test method: AASHTO T-193
Condition ☐ unsoaked ☒ soaked
Surcharge amount 10 lbs
Swell 0.1 %
Bearing ratio @ 90% compaction 7.4 %
Bearing ratio @ 96% compaction 11.7 %
Bearing ratio @ 100% compaction 16.0 %

RB&G ENGINEERING, INC.

Figure CALIFORNIA BEARING RATIO TEST RESULTS

Mountain View Corridor - Redwood Road to 6200 South
Salt Lake County, Utah

APPENDIX D

Seismic Acceleration Response Spectrum
AASHTO General Procedure

Site: Juniper Canyon Bridges
AASHTO Site Class D

Mapped accleration values from USGS Interactive Deaggregations

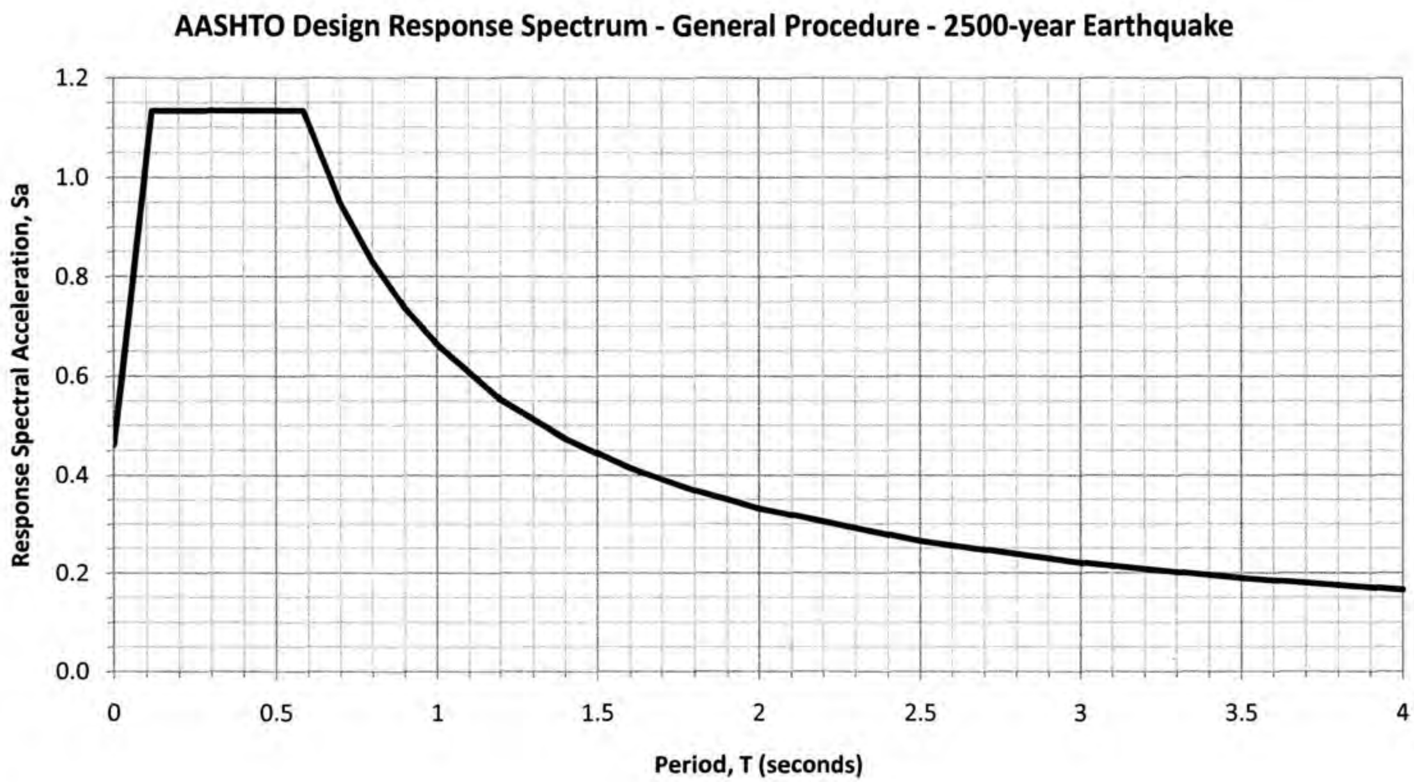
Event	2475-yr	975-yr	475-yr
PGA	0.43	0.30	0.20
Ss	1.05	0.71	0.48
S1	0.42	0.26	0.16

AASHTO Site Coefficients for approx. 2500-year event

Fpga	1.07	As	0.4601
Fa	1.08	Sds	1.1340
Fv	1.58	Sd1	0.6636

Ts	0.5852
T0	0.1170

Period, T (sec)	Sa (g)
0	0.4601
0.1170	1.1340
0.5852	1.1340
0.7	0.9480
0.8	0.8295
0.9	0.7373
1.0	0.6636
1.2	0.5530
1.4	0.4740
1.6	0.4148
1.8	0.3687
2.0	0.3318
2.5	0.2654
3.0	0.2212
3.5	0.1896
4.0	0.1659



Seismic Acceleration Response Spectrum
AASHTO General Procedure

Site: Juniper Canyon Bridges
AASHTO Site Class D

Mapped accleration values from USGS Interactive Deaggregations

Event	2475-yr	975-yr	475-yr
PGA	0.43	0.30	0.20
Ss	1.05	0.71	0.48
S1	0.42	0.26	0.16

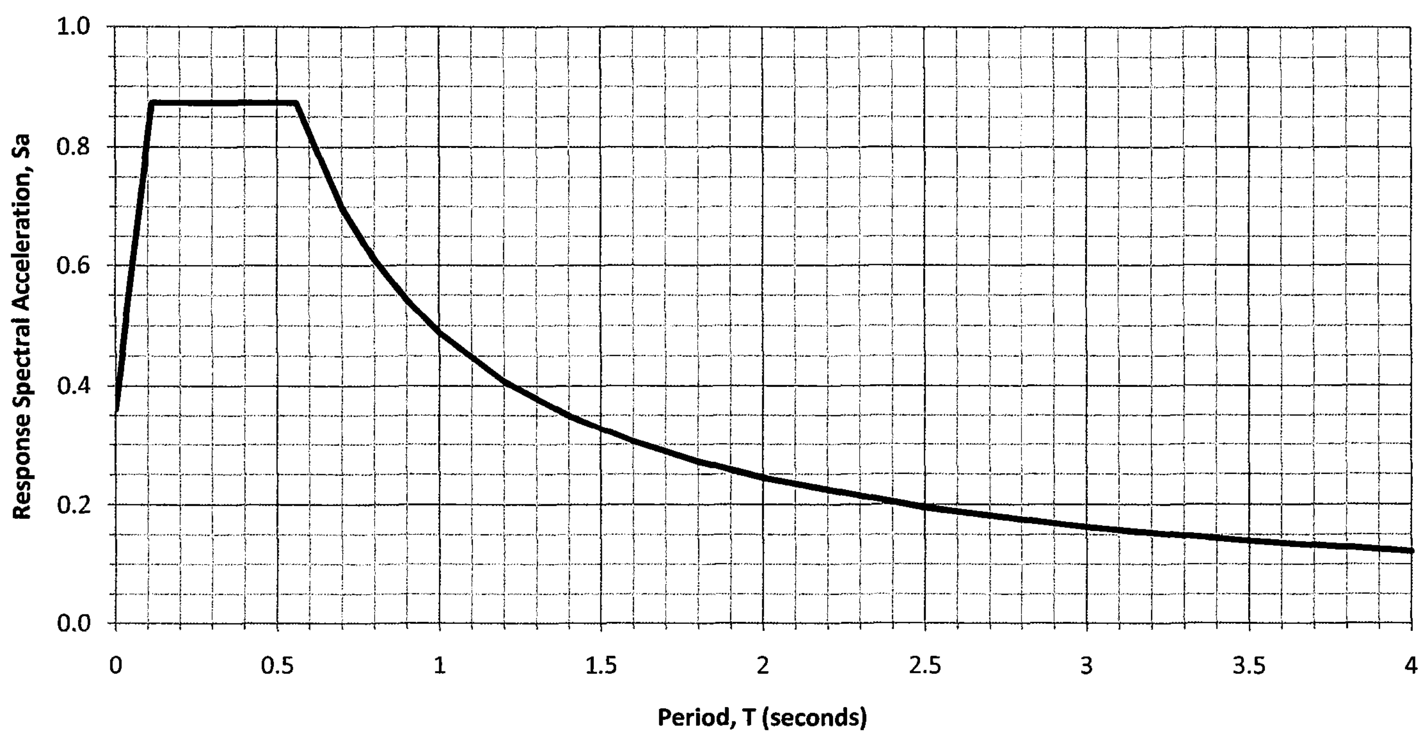
AASHTO Site Coefficients for approx. 1000-year event

Fpga	1.20	As	0.3600
Fa	1.23	Sds	0.8733
Fv	1.88	Sd1	0.4888

Ts	0.5597
T0	0.1119

Period, T (sec)	Sa (g)
0	0.3600
0.1119	0.8733
0.5597	0.8733
0.7	0.6983
0.8	0.6110
0.9	0.5431
1.0	0.4888
1.2	0.4073
1.4	0.3491
1.6	0.3055
1.8	0.2716
2.0	0.2444
2.5	0.1955
3.0	0.1629
3.5	0.1397
4.0	0.1222

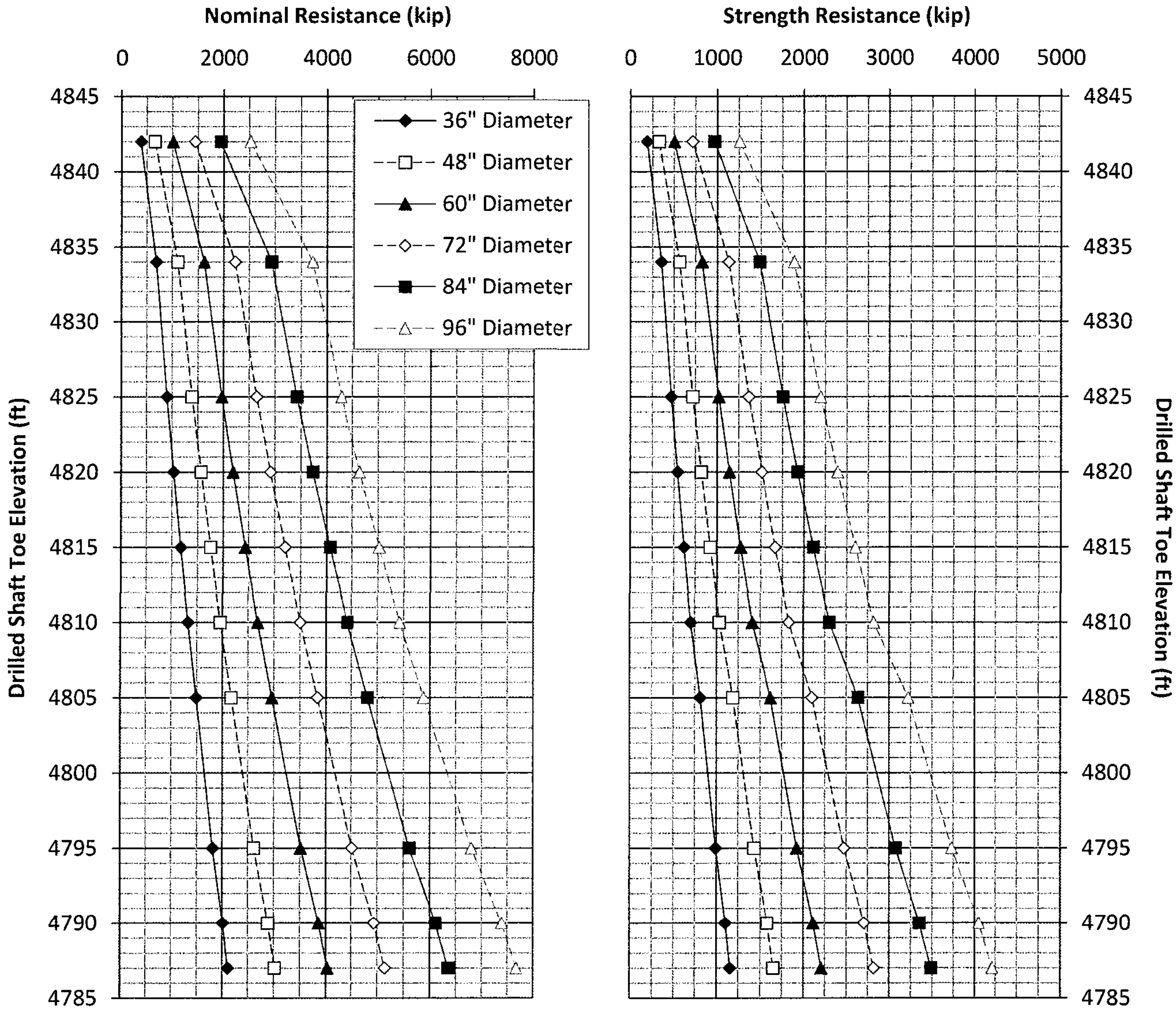
AASHTO Design Response Spectrum - General Procedure - 1000-year Earthquake



DRILLED SHAFT AXIAL RESISTANCE SUMMARY

Mountain View Corridor - Juniper Canyon - NB Frontage Road Bridge - Abut 1 (South Abut)

Toe Elev (ft)	Axial Compression Resistance (kip)											
	36" Diameter		48" Diameter		60" Diameter		72" Diameter		84" Diameter		96" Diameter	
	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength
4842	381	189	659	327	1012	503	1441	716	1945	968	2525	1257
4834	690	354	1108	566	1621	826	2228	1132	2929	1486	3725	1887
4825	900	470	1388	720	1971	1018	2648	1363	3419	1755	4285	2195
4820	1034	543	1567	818	2194	1141	2916	1510	3731	1927	4641	2391
4815	1176	622	1757	923	2432	1272	3201	1667	4064	2110	5022	2600
4810	1326	704	1956	1033	2681	1409	3500	1832	4413	2302	5420	2819
4805	1486	813	2173	1190	2956	1619	3834	2100	4808	2635	5878	3222
4795	1811	992	2612	1431	3512	1925	4510	2472	5607	3074	6803	3731
4790	2012	1102	2885	1581	3859	2116	4935	2706	6112	3352	7390	4053
4787	2108	1155	3016	1653	4027	2208	5140	2819	6356	3486	7674	4210



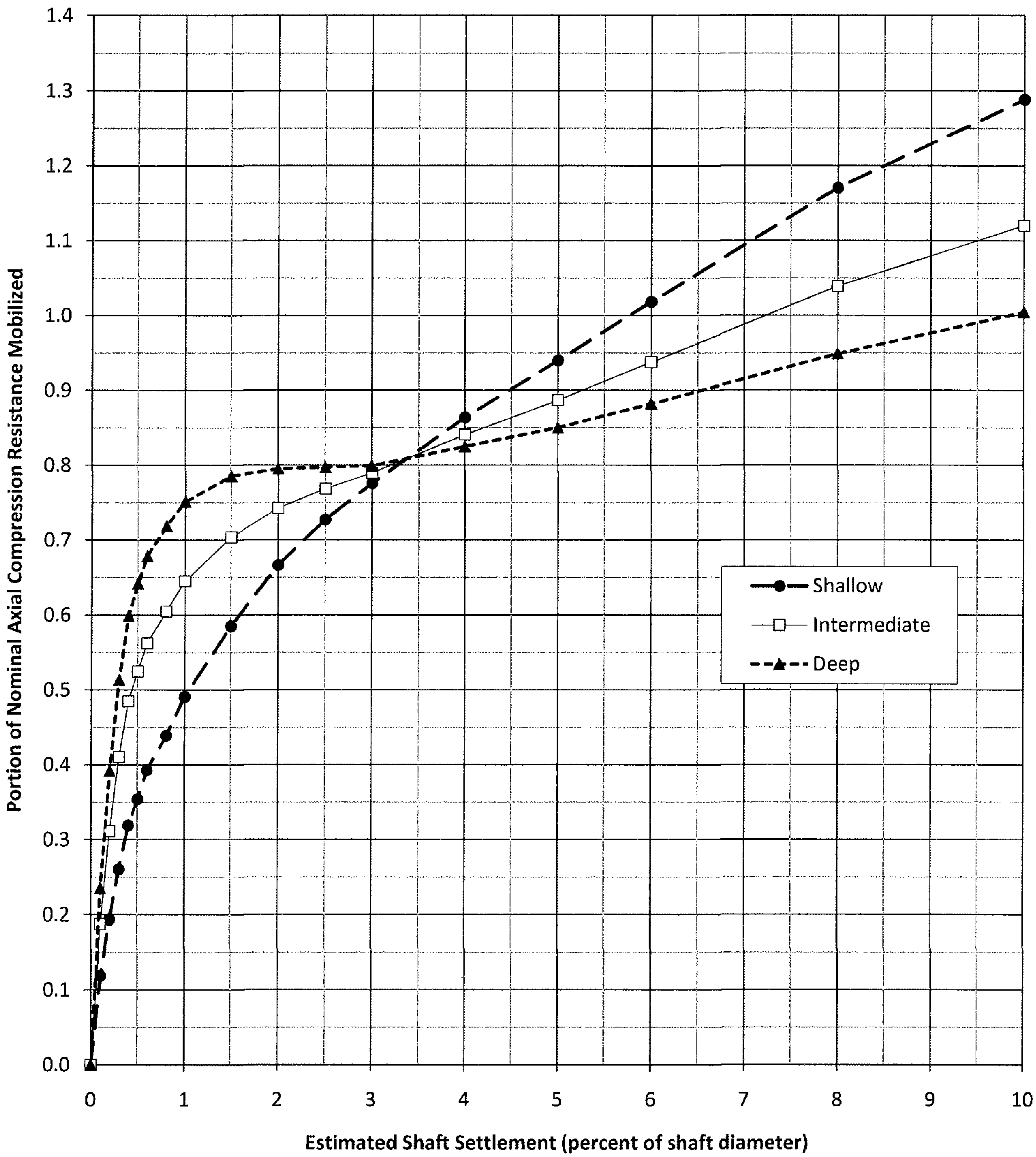
Notes: 1 Reduce these values by 20 percent if shaft is a nonredundant foundation (see AASHTO LRFD 10.5.5 2.4)
2. It is recommended that all drilled shafts at this bent extend to elevation 4840 ft or deeper.
3 Deeper verification boring may be required if shaft toe located less than 3 diameters above elev 4787 ft.
4. For shafts spaced less than 4 diameters on centers, apply η factor from AASHTO LRFD 10 8 3 6 3

DRILLED SHAFT SETTLEMENT - GENERALIZED SUMMARY

Mountain View Corridor - Juniper Canyon - NB Frontage Road Bridge - Abut 1 (South Abut)

Axial load-deflection behavior will depend upon shaft depth. Plots for shallow, intermediate, and deep shaft toe elevations are provided below. Plots for specific toe elevations and shaft diameters can be developed upon request.

On the plot below:	"Shallow" toe elevation =	4834 ft
	"Intermediate" toe elev. =	4815 ft
	"Deep" toe elevation =	4790 ft

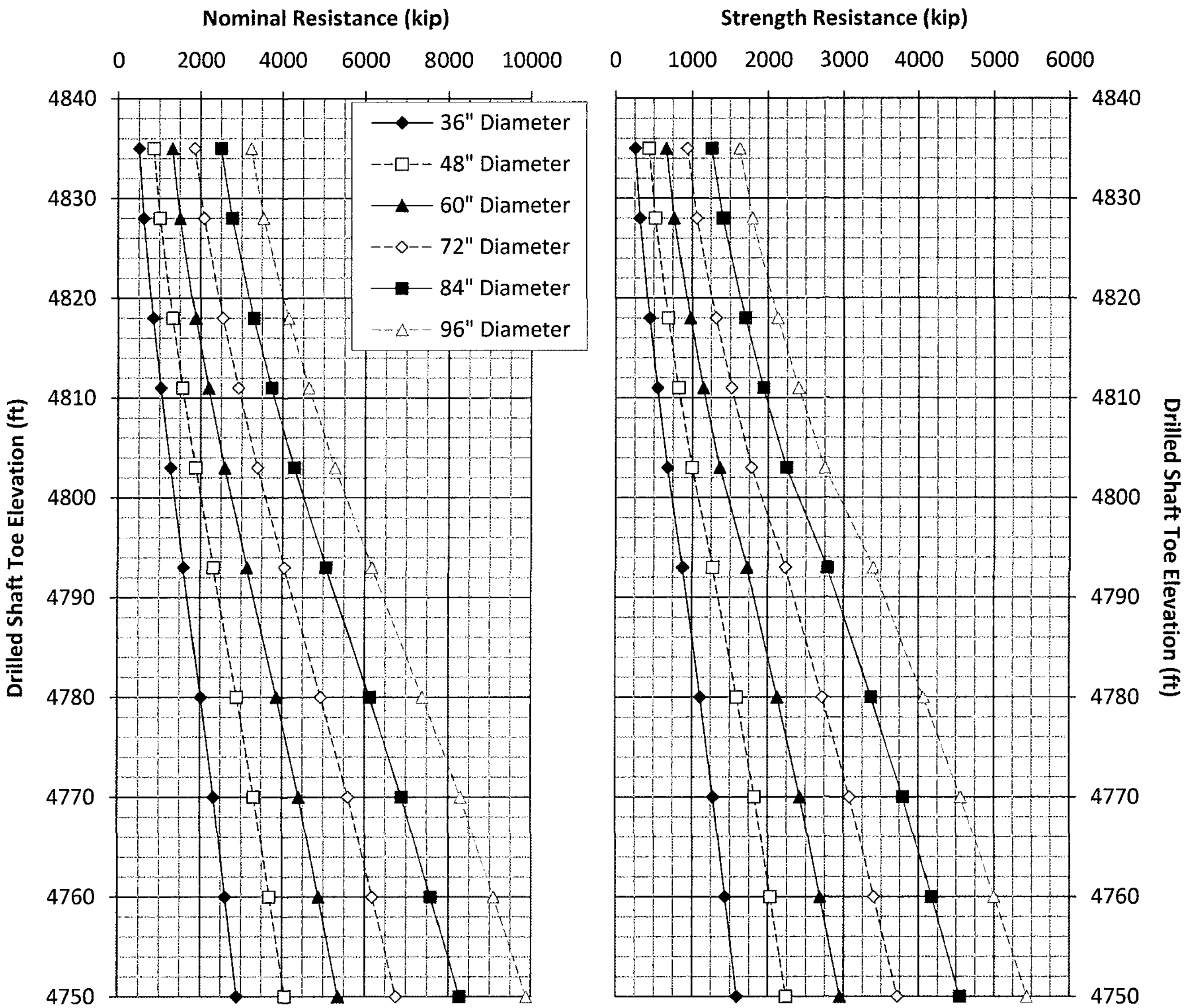


Notes: 1. Plot developed using Figures 10.8.2.2.2-3 and 10.8.2.2.2-4 of AASHTO LRFD Bridge Design Specs.
2. Mobilized side resistance was extrapolated for settlements greater than 2% of shaft diameter.

DRILLED SHAFT AXIAL RESISTANCE SUMMARY

Mountain View Corridor - Juniper Canyon - NB Frontage Road Bridge - Bent 2 (Center Bent)

Toe Elev (ft)	Axial Compression Resistance (kip)											
	36" Diameter		48" Diameter		60" Diameter		72" Diameter		84" Diameter		96" Diameter	
	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength
4835	505	256	862	436	1313	663	1858	937	2497	1258	3231	1626
4828	619	319	1014	520	1503	768	2086	1063	2764	1405	3536	1794
4818	844	443	1314	685	1878	974	2537	1310	3290	1694	4136	2124
4811	1033	547	1566	823	2193	1147	2914	1518	3729	1936	4639	2401
4803	1269	677	1881	997	2586	1364	3387	1778	4281	2239	5269	2747
4793	1591	875	2313	1272	3132	1723	4047	2226	5059	2782	6166	3391
4780	2018	1110	2892	1591	3866	2126	4941	2717	6116	3364	7392	4065
4770	2330	1282	3315	1823	4404	2422	5597	3079	6895	3792	8296	4563
4760	2607	1434	3690	2029	4879	2684	6176	3397	7579	4169	9090	4999
4750	2886	1587	4067	2237	5357	2946	6756	3716	8265	4546	9884	5436



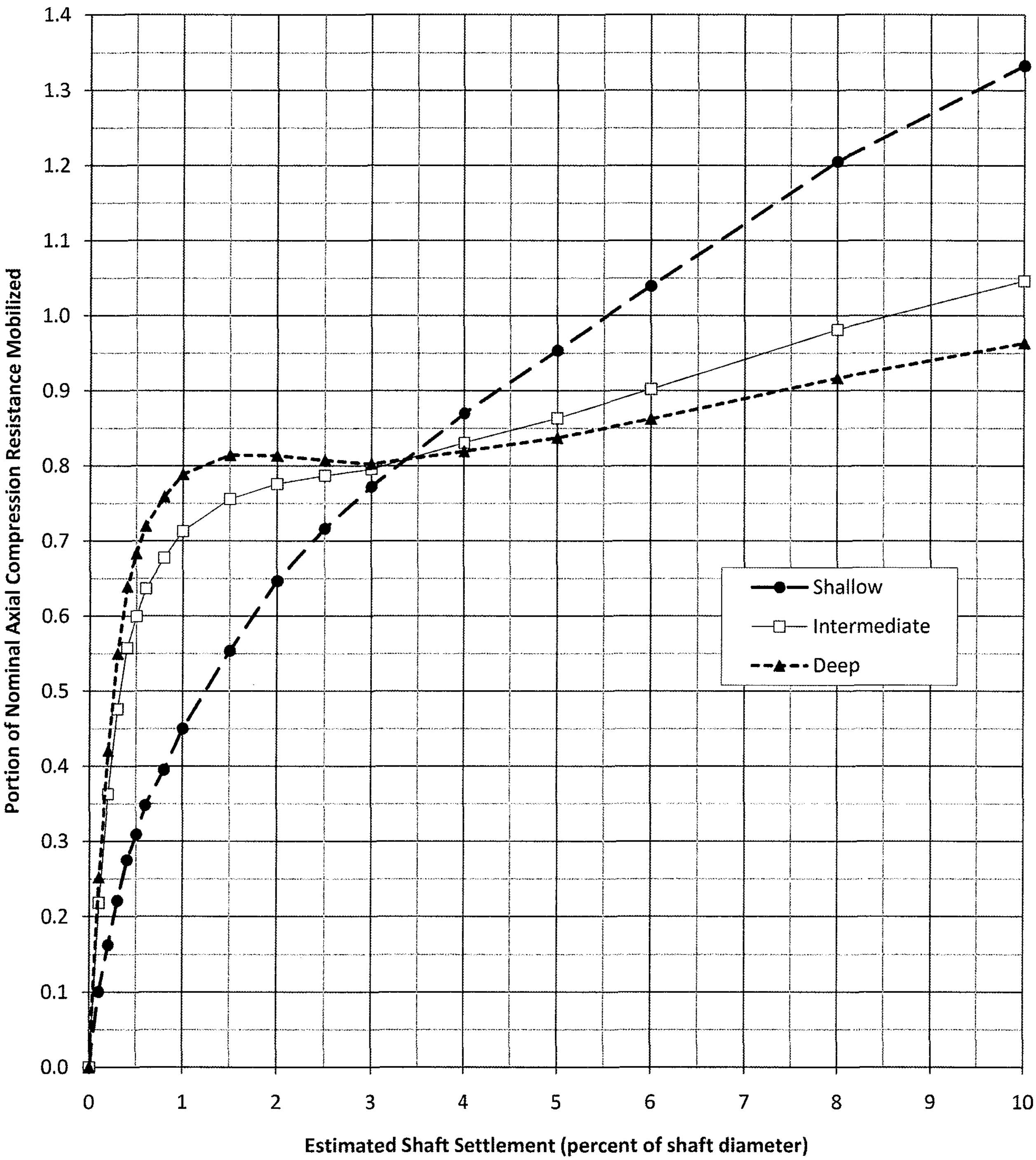
Notes:
1. Reduce these values by 20 percent if shaft is a nonredundant foundation (see AASHTO LRFD 10.5.5.2.4).
2. It is recommended that all drilled shafts at this bent extend to elevation 4830 ft or deeper.
3. Deeper verification boring may be required if shaft toe located less than 3 diameters above elev. 4750 ft.
4. For shafts spaced less than 4 diameters on centers, apply η factor from AASHTO LRFD 10.8.3.6.3.

DRILLED SHAFT SETTLEMENT - GENERALIZED SUMMARY

Mountain View Corridor - Juniper Canyon - NB Frontage Road Bridge - Bent 2 (Center Bent)

Axial load-deflection behavior will depend upon shaft depth. Plots for shallow, intermediate, and deep shaft toe elevations are provided below. Plots for specific toe elevations and shaft diameters can be developed upon request.

On the plot below:	"Shallow" toe elevation =	4828 ft
	"Intermediate" toe elev. =	4793 ft
	"Deep" toe elevation =	4760 ft

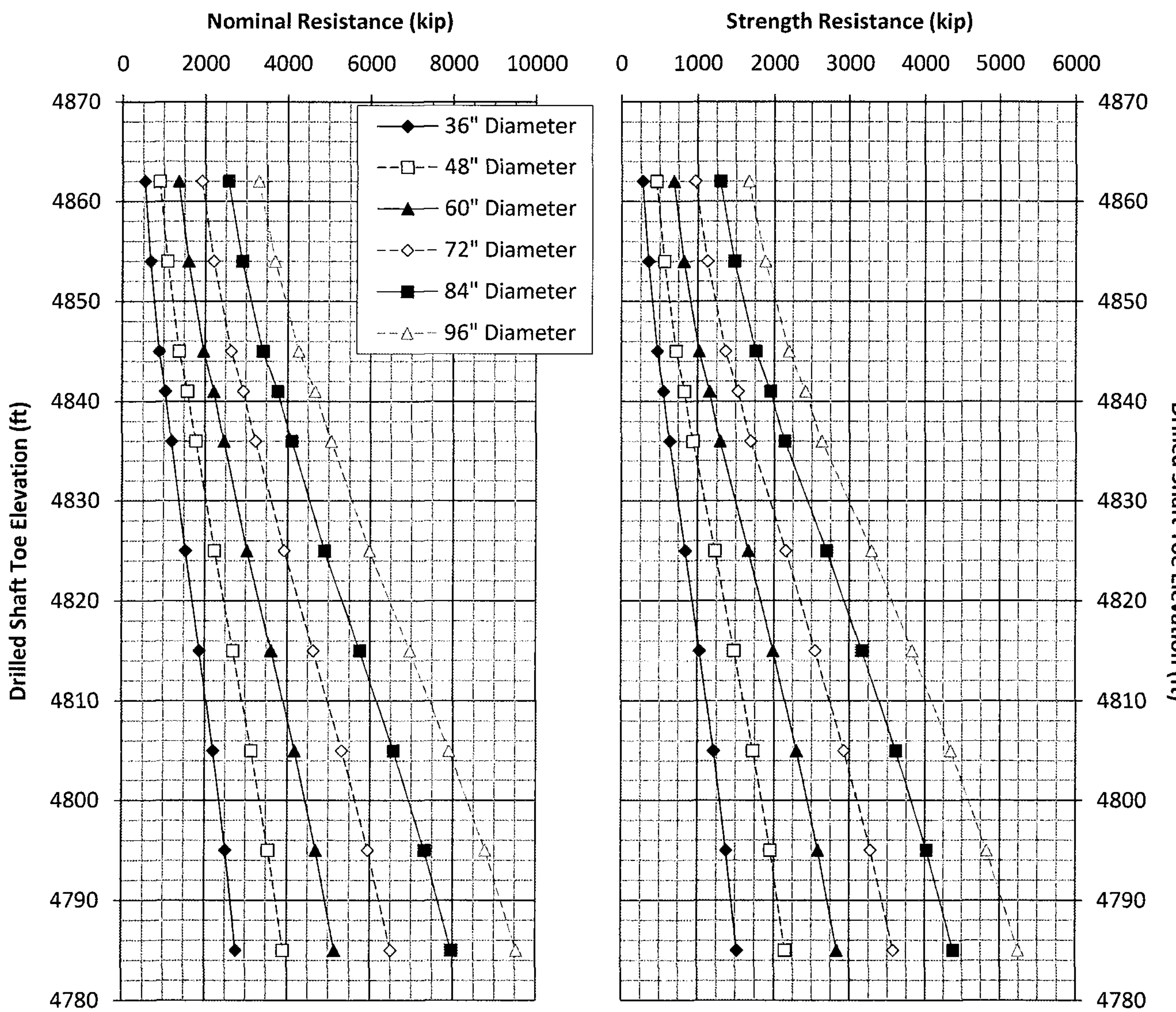


Notes: 1. Plot developed using Figures 10.8.2.2.2-3 and 10.8.2.2.2-4 of AASHTO LRFD Bridge Design Specs.
2. Mobilized side resistance was extrapolated for settlements greater than 2% of shaft diameter.

DRILLED SHAFT AXIAL RESISTANCE SUMMARY

Mountain View Corridor - Juniper Canyon - NB Frontage Road Bridge - Abut 3 (North Abut)

Toe Elev (ft)	Axial Compression Resistance (kip)											
	36" Diameter		48" Diameter		60" Diameter		72" Diameter		84" Diameter		96" Diameter	
	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength
4862	530	270	895	455	1355	686	1908	965	2556	1291	3298	1663
4854	677	351	1091	562	1599	820	2201	1126	2898	1479	3689	1878
4845	893	470	1380	721	1960	1019	2635	1364	3404	1757	4267	2196
4841	1044	553	1581	832	2211	1157	2936	1530	3756	1950	4669	2417
4836	1189	633	1774	938	2454	1291	3227	1690	4095	2137	5057	2630
4825	1532	843	2232	1228	3027	1665	3916	2154	4900	2695	5979	3288
4815	1871	1029	2692	1481	3612	1987	4631	2547	5748	3162	6965	3831
4805	2199	1209	3136	1725	4175	2296	5317	2924	6560	3608	7906	4348
4795	2502	1376	3547	1951	4696	2583	5951	3273	7311	4021	8776	4827
4785	2768	1523	3907	2149	5153	2834	6507	3579	7969	4383	9539	5246



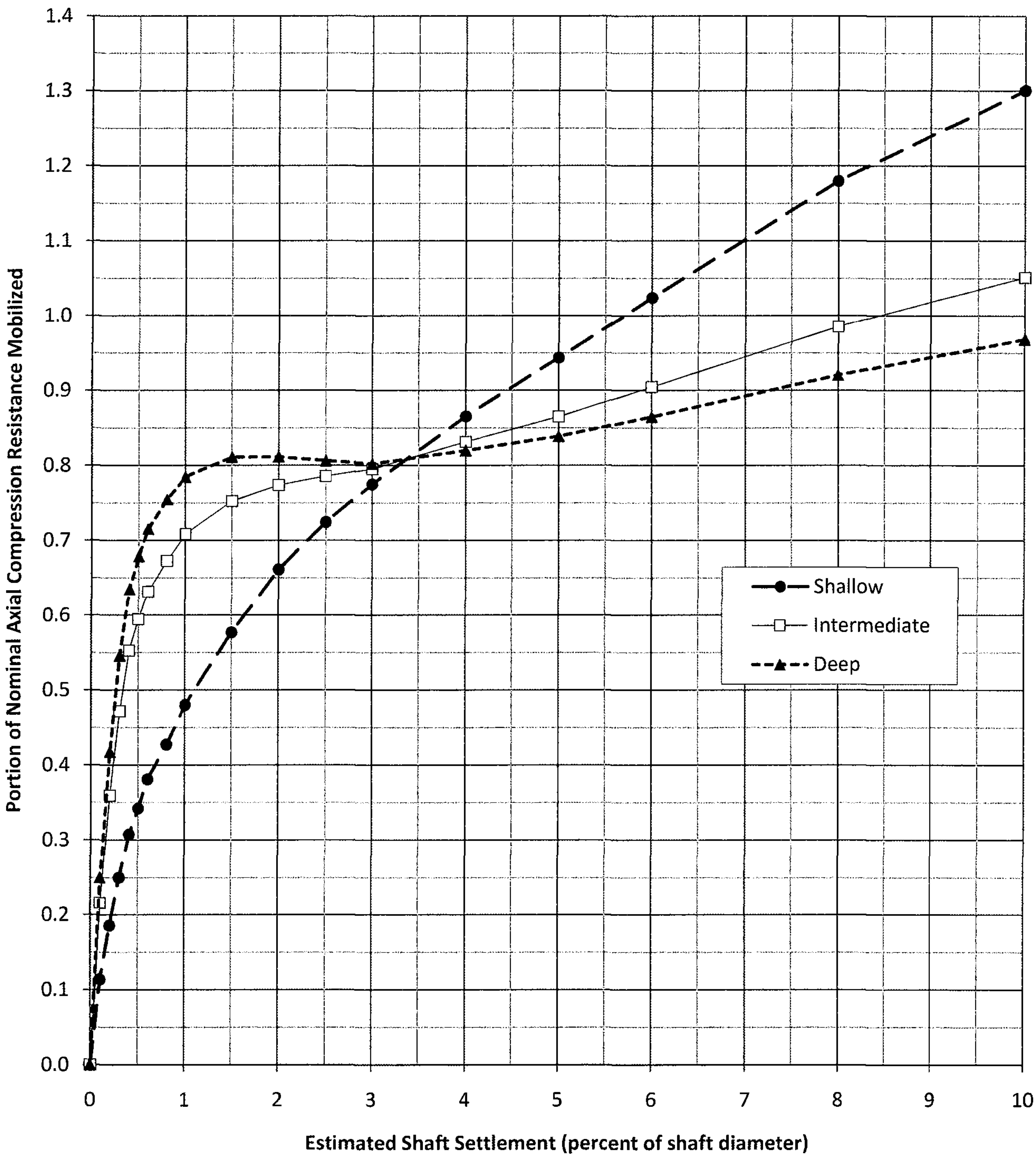
Notes:
1. Reduce these values by 20 percent if shaft is a nonredundant foundation (see AASHTO LRFD 10.5.5.2.4).
2. It is recommended that all drilled shafts at this abutment extend to elevation 4862 ft or deeper.
3. Deeper verification boring may be required if shaft toe is located less than 3 diameters above elev. 4785 ft.
4. For shafts spaced less than 4 diameters on centers, apply η factor from AASHTO LRFD 10.8.3.6.3.

DRILLED SHAFT SETTLEMENT - GENERALIZED SUMMARY

Mountain View Corridor - Juniper Canyon - NB Frontage Road Bridge - Abut 3 (North Abut)

Axial load-deflection behavior will depend upon shaft depth. Plots for shallow, intermediate, and deep shaft toe elevations are provided below. Plots for specific toe elevations and shaft diameters can be developed upon request.

On the plot below:		
	"Shallow" toe elevation =	4854 ft
	"Intermediate" toe elev. =	4825 ft
	"Deep" toe elevation =	4795 ft

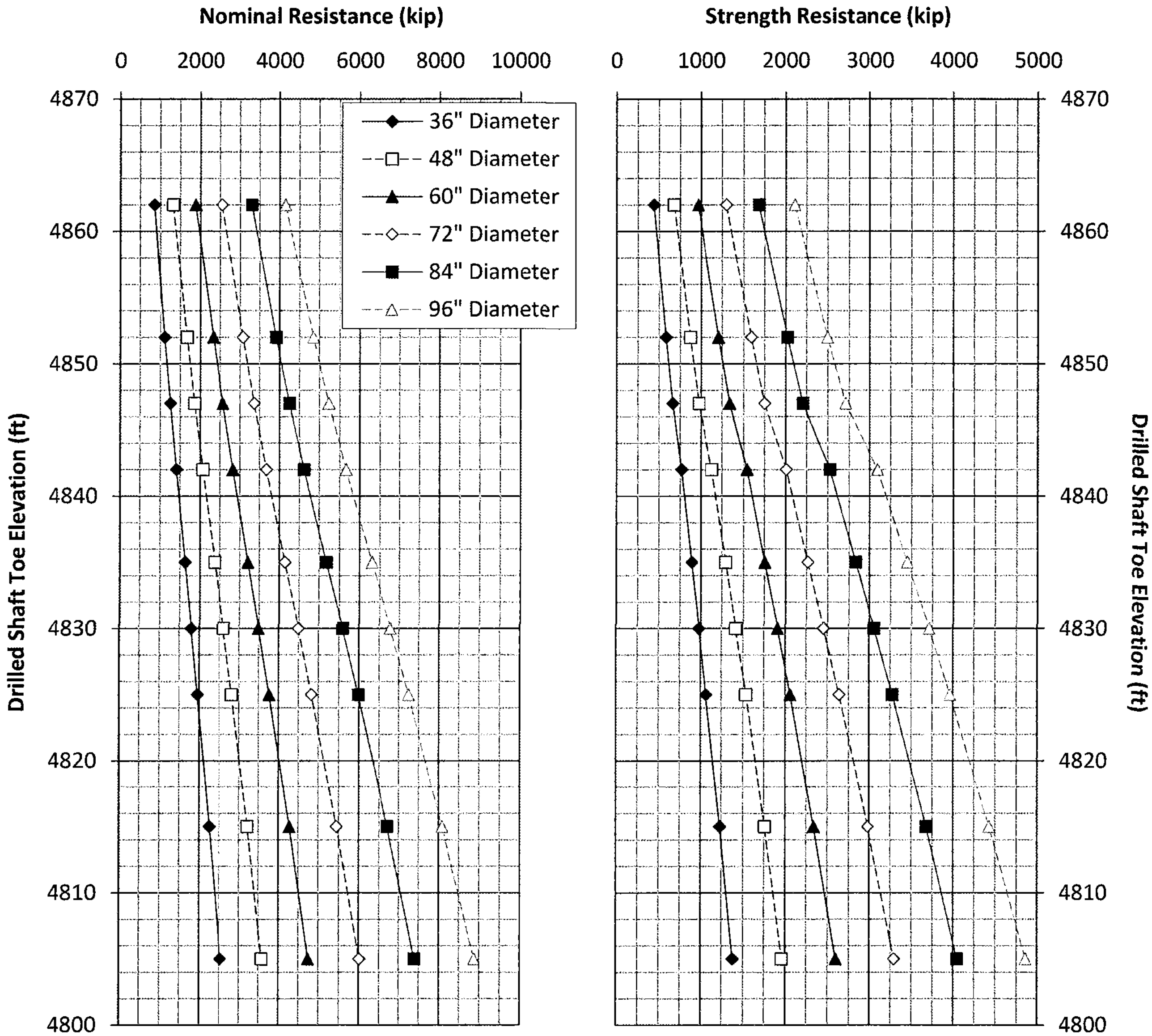


Notes: 1. Plot developed using Figures 10.8.2.2.2-3 and 10.8.2.2.2-4 of AASHTO LRFD Bridge Design Specs.
2. Mobilized side resistance was extrapolated for settlements greater than 2% of shaft diameter.

DRILLED SHAFT AXIAL RESISTANCE SUMMARY

Mountain View Corridor - Juniper Canyon - SB Frontage Road Bridge - Abutment 1 (South Abut)

Toe Elev (ft)	Axial Compression Resistance (kip)											
	36" Diameter		48" Diameter		60" Diameter		72" Diameter		84" Diameter		96" Diameter	
	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength
4862	848	437	1319	678	1884	965	2543	1299	3297	1681	4145	2109
4852	1112	583	1671	871	2324	1207	3072	1589	3913	2019	4849	2496
4847	1256	662	1863	977	2564	1339	3359	1748	4249	2204	5233	2707
4842	1409	767	2068	1128	2823	1540	3674	2005	4619	2523	5659	3093
4835	1633	890	2372	1295	3209	1753	4144	2264	5176	2829	6306	3448
4830	1795	980	2594	1417	3492	1908	4490	2454	5588	3056	6785	3712
4825	1954	1067	2808	1535	3765	2058	4822	2637	5982	3272	7243	3963
4815	2253	1232	3212	1757	4275	2339	5442	2978	6713	3675	8088	4428
4805	2524	1380	3579	1958	4740	2595	6009	3290	7385	4044	8868	4857



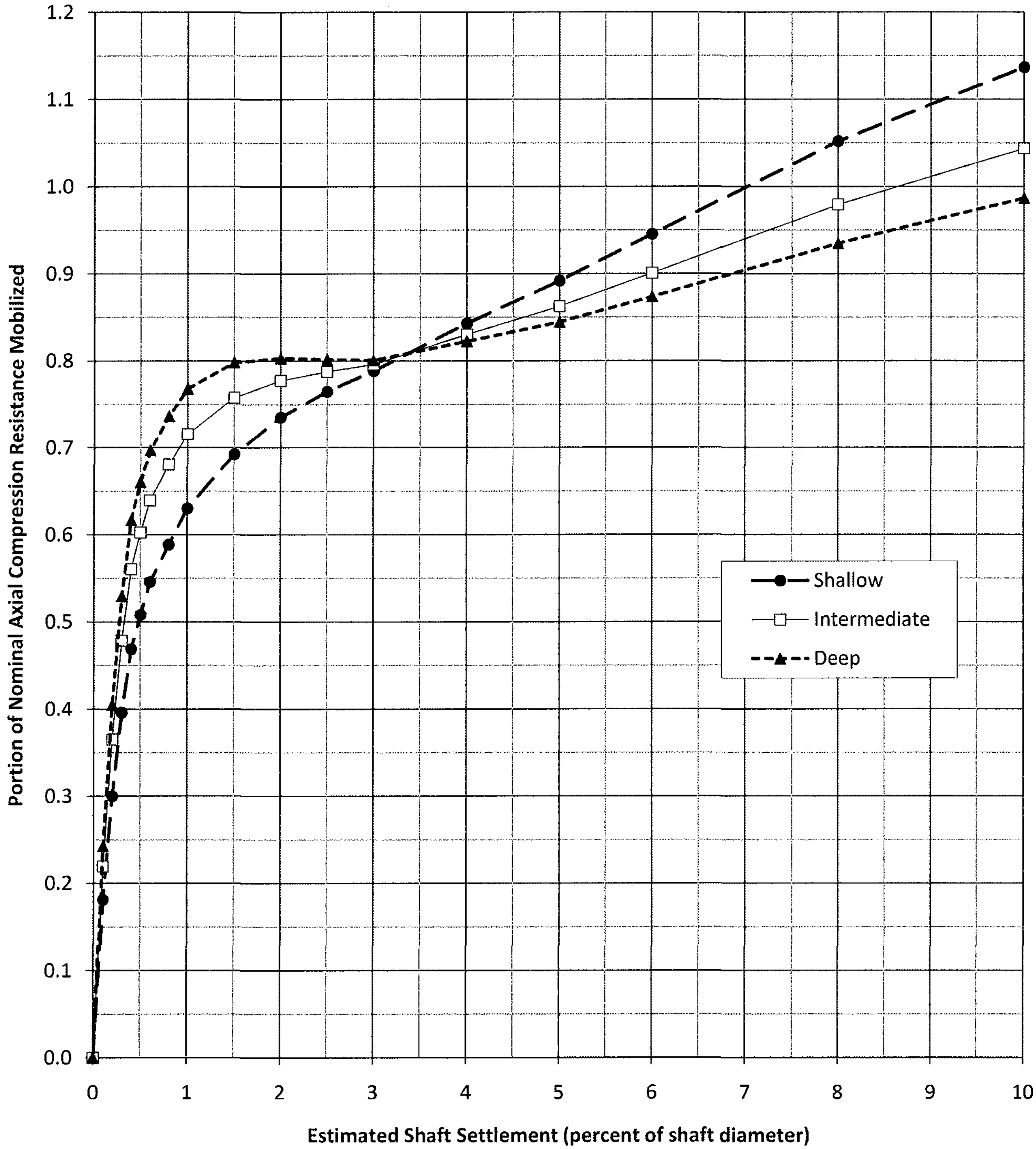
Notes:
1. Reduce these values by 20 percent if shaft is a nonredundant foundation (see AASHTO LRFD 10.5.5.2.4).
2. It is recommended that all drilled shafts at this abutment extend to elevation 4862 ft or deeper.
3. Deeper verification boring may be required if shaft toe located less than 3 diameters above elev. 4805 ft.
4. For shafts spaced less than 4 diameters on centers, apply η factor from AASHTO LRFD 10.8.3.6.3.

DRILLED SHAFT SETTLEMENT - GENERALIZED SUMMARY

Mountain View Corridor - Juniper Canyon - SB Frontage Road Bridge - Abutment 1 (South Abut)

Axial load-deflection behavior will depend upon shaft depth. Plots for shallow, intermediate, and deep shaft toe elevations are provided below. Plots for specific toe elevations and shaft diameters can be developed upon request.

On the plot below:		
	"Shallow" toe elevation =	4852 ft
	"Intermediate" toe elev. =	4835 ft
	"Deep" toe elevation =	4815 ft

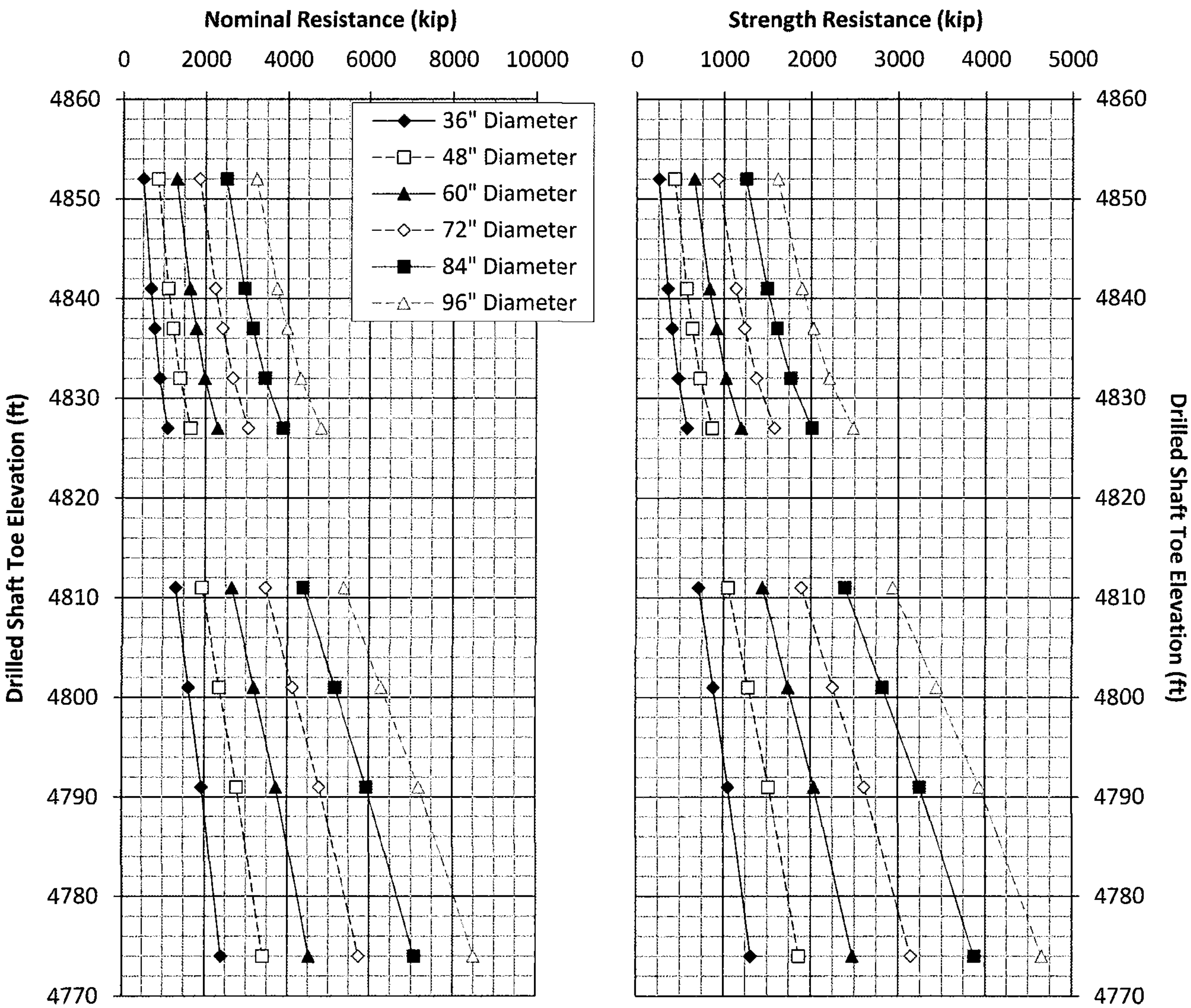


Notes:
1. Plot developed using Figures 10.8.2.2.2-3 and 10.8.2.2.2-4 of AASHTO LRFD Bridge Design Specs.
2. Mobilized side resistance was extrapolated for settlements greater than 2% of shaft diameter.

DRILLED SHAFT AXIAL RESISTANCE SUMMARY

Mountain View Corridor - Juniper Canyon - SB Frontage Road Bridge - Bent 2 (Center Bent)

Toe Elev (ft)	Axial Compression Resistance (kip)											
	36" Diameter		48" Diameter		60" Diameter		72" Diameter		84" Diameter		96" Diameter	
	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength
4852	507	254	865	433	1317	659	1863	932	2503	1252	3237	1620
4841	695	357	1115	571	1630	831	2239	1139	2942	1494	3739	1896
4837	784	406	1234	636	1778	913	2417	1237	3149	1608	3976	2026
4832	908	474	1399	727	1984	1026	2664	1373	3438	1767	4306	2207
4827	1096	578	1650	865	2298	1199	3041	1580	3878	2009	4809	2484
4811	1303	710	1927	1051	2646	1444	3460	1889	4368	2386	5371	2936
4801	1621	885	2358	1288	3194	1745	4128	2257	5160	2822	6291	3442
4791	1931	1055	2779	1519	3728	2039	4779	2615	5932	3247	7187	3934
4774	2394	1310	3403	1863	4519	2474	5740	3143	7067	3871	8500	4657



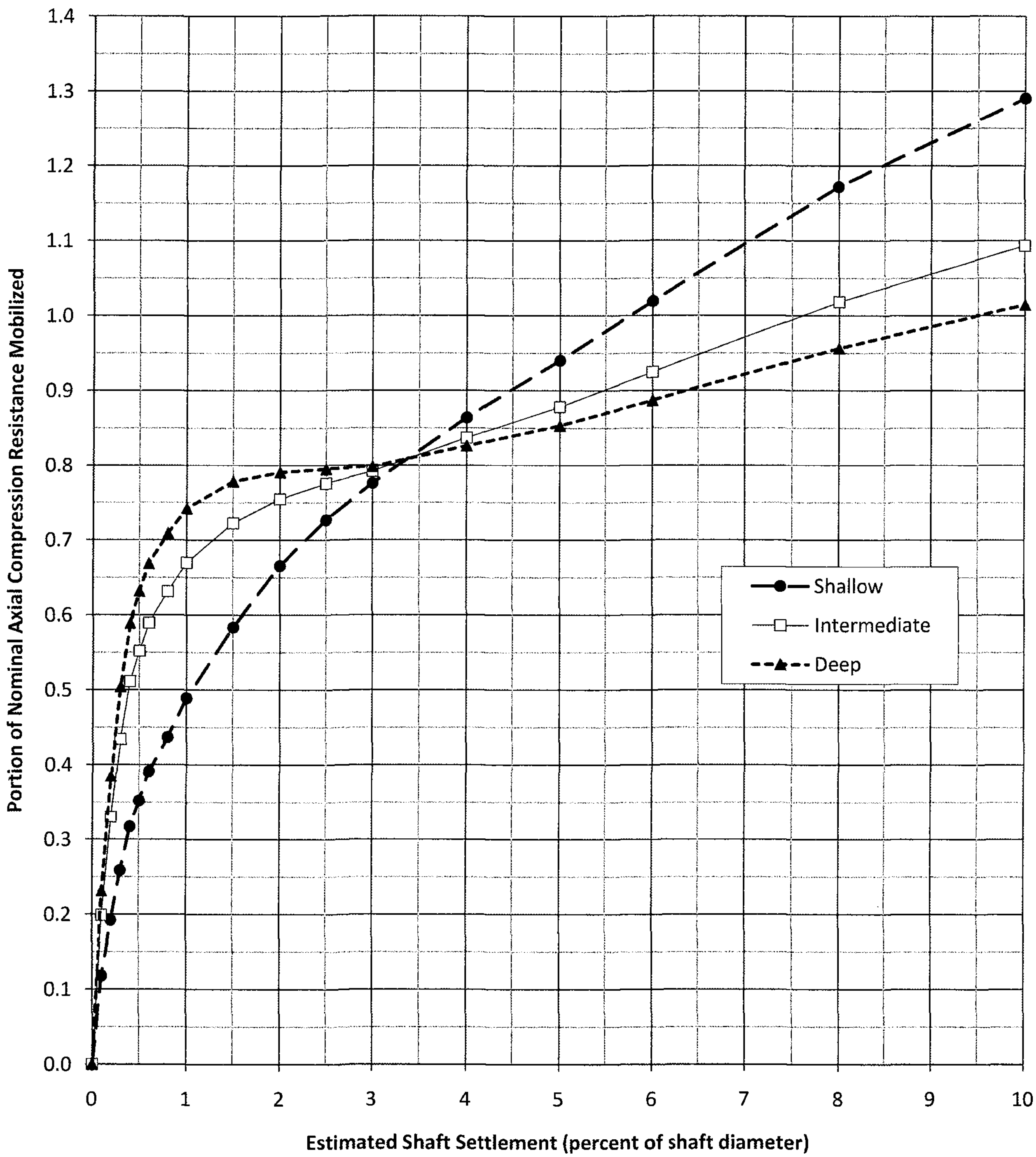
Notes:
1. Reduce these values by 20 percent if shaft is a nonredundant foundation (see AASHTO LRFD 10.5.5.2.4).
2. It is recommended that all drilled shafts at this bent extend to elevation 4862 ft or deeper.
3. Deeper verification boring may be required if shaft toe located less than 3 diameters above elev. 4774 ft.
4. For shafts spaced less than 4 diameters on centers, apply η factor from AASHTO LRFD 10.8.3.6.3.
5. To avoid toe bearing on/in the soft elastic silt zone, drilled shafts at this bent should terminate either below elevation 4811 feet or at least 3 diameters above elevation 4821 feet.

DRILLED SHAFT SETTLEMENT - GENERALIZED SUMMARY

Mountain View Corridor - Juniper Canyon - SB Frontage Road Bridge - Bent 2 (Center Bent)

Axial load-deflection behavior will depend upon shaft depth. Plots for shallow, intermediate, and deep shaft toe elevations are provided below. Plots for specific toe elevations and shaft diameters can be developed upon request.

On the plot below:		
	"Shallow" toe elevation =	4841 ft
	"Intermediate" toe elev. =	4811 ft
	"Deep" toe elevation =	4791 ft

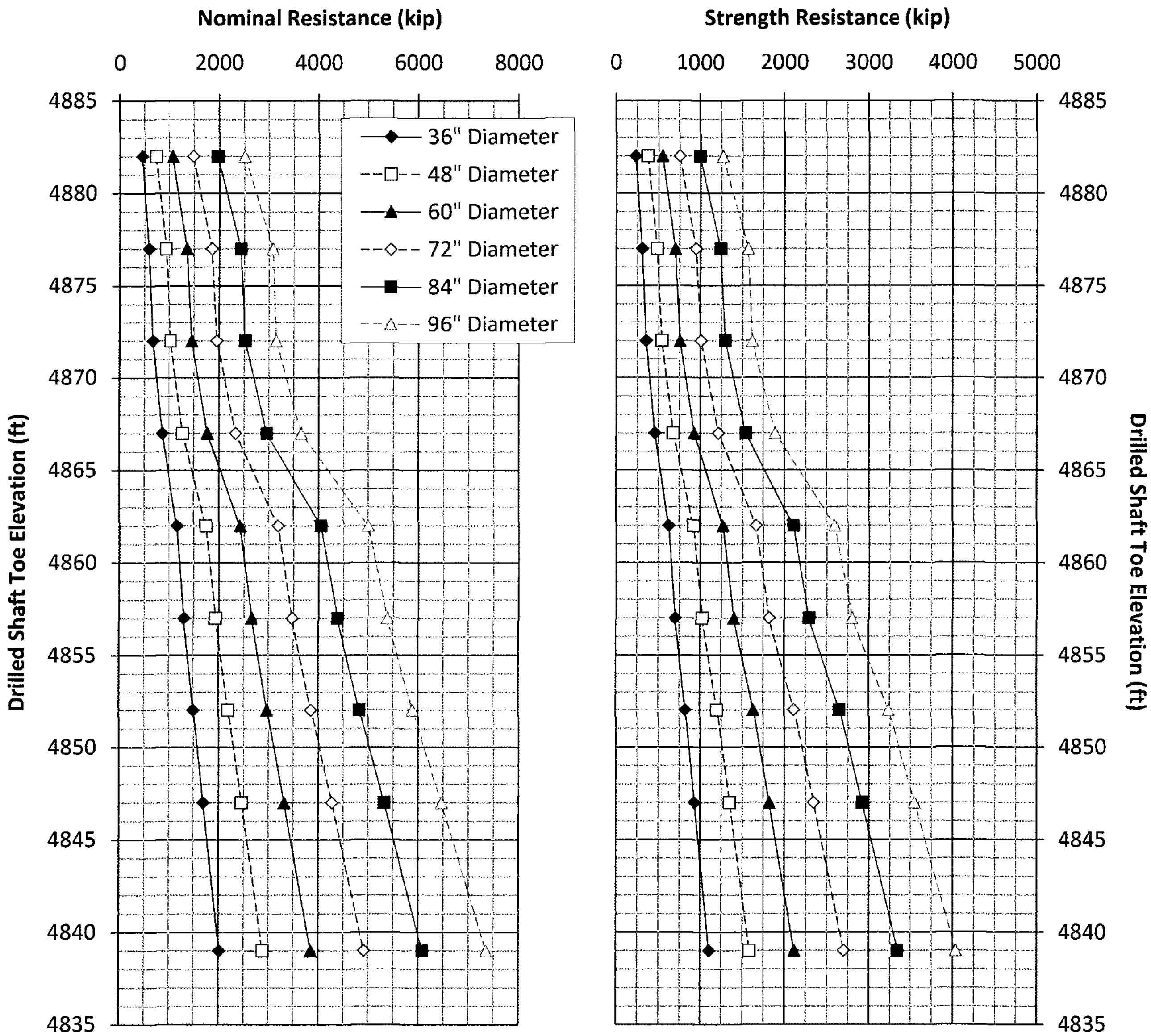


Notes: 1. Plot developed using Figures 10.8.2.2.2-3 and 10.8.2.2.2-4 of AASHTO LRFD Bridge Design Specs.
2. Mobilized side resistance was extrapolated for settlements greater than 2% of shaft diameter.

DRILLED SHAFT AXIAL RESISTANCE SUMMARY

Mountain View Corridor - Juniper Canyon - SB Frontage Road Bridge - Abutment 3 (North Abut)

Toe Elev (ft)	Axial Compression Resistance (kip)											
	36" Diameter		48" Diameter		60" Diameter		72" Diameter		84" Diameter		96" Diameter	
	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength
4882	445	228	726	370	1072	545	1485	752	1963	993	2507	1267
4877	589	305	937	482	1359	697	1857	949	2431	1239	3080	1567
4872	671	351	1030	536	1457	755	1953	1008	2515	1295	3146	1616
4867	859	455	1282	675	1772	928	2330	1216	2955	1537	3649	1892
4862	1167	618	1744	918	2416	1266	3182	1660	4042	2102	4996	2591
4857	1310	697	1936	1024	2655	1398	3469	1819	4377	2287	5380	2802
4852	1500	823	2190	1201	2974	1632	3852	2114	4825	2648	5893	3235
4847	1699	932	2458	1349	3315	1819	4268	2343	5318	2919	6464	3549
4839	2012	1104	2881	1581	3849	2113	4916	2699	6083	3340	7349	4036



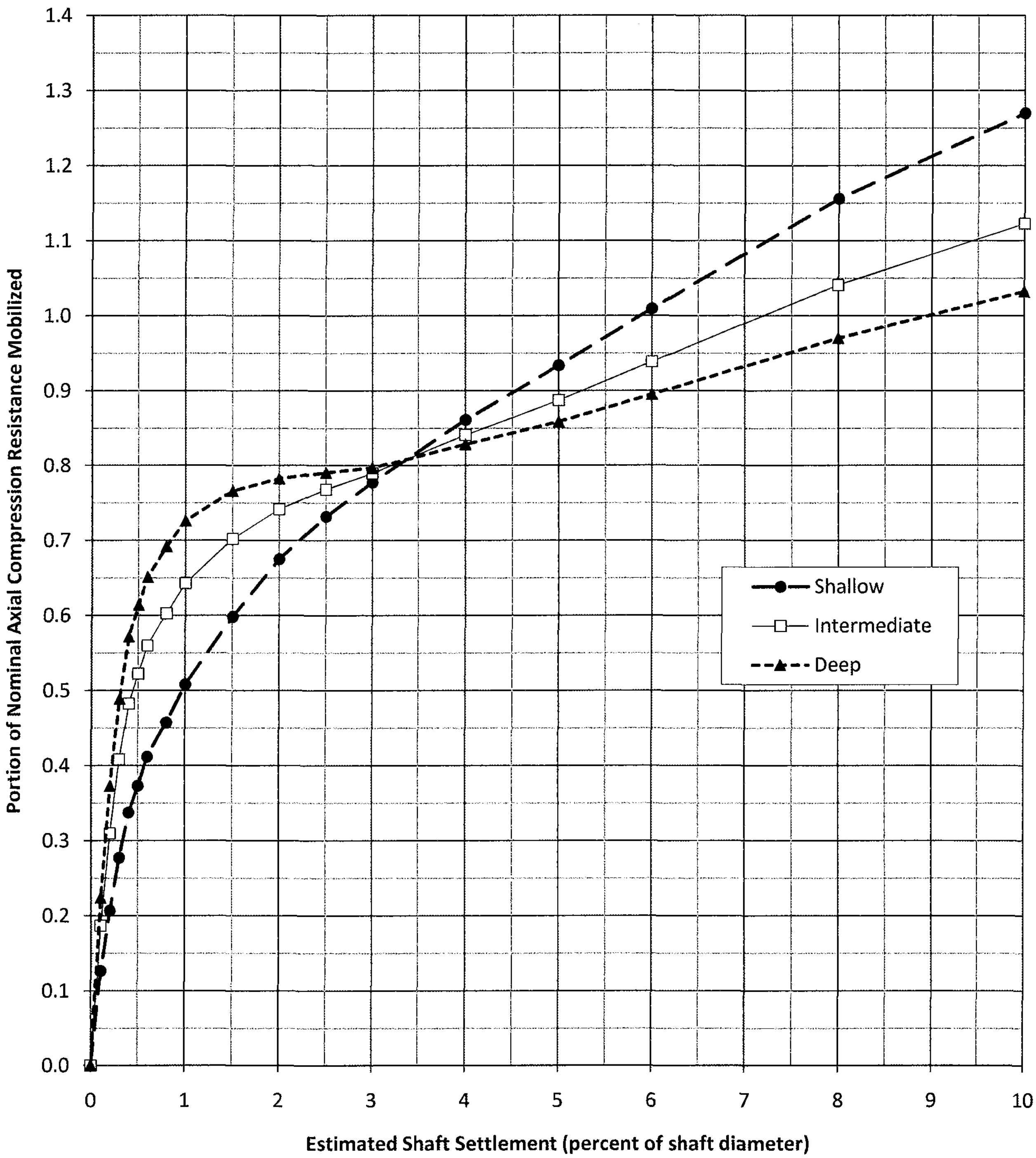
Notes:
1. Reduce these values by 20 percent if shaft is a nonredundant foundation (see AASHTO LRFD 10.5.5.2.4).
2. It is recommended that all drilled shafts at this abutment extend to elevation 4880 ft or deeper.
3. Deeper verification boring may be required if shaft toe located less than 3 diameters above elev. 4839 ft.
4. For shafts spaced less than 4 diameters on centers, apply η factor from AASHTO LRFD 10.8.3.6.3.

DRILLED SHAFT SETTLEMENT - GENERALIZED SUMMARY

Mountain View Corridor - Juniper Canyon - SB Frontage Road Bridge - Abutment 3 (North Abut)

Axial load-deflection behavior will depend upon shaft depth. Plots for shallow, intermediate, and deep shaft toe elevations are provided below. Plots for specific toe elevations and shaft diameters can be developed upon request.

On the plot below:	"Shallow" toe elevation =	4877 ft
	"Intermediate" toe elev. =	4862 ft
	"Deep" toe elevation =	4847 ft

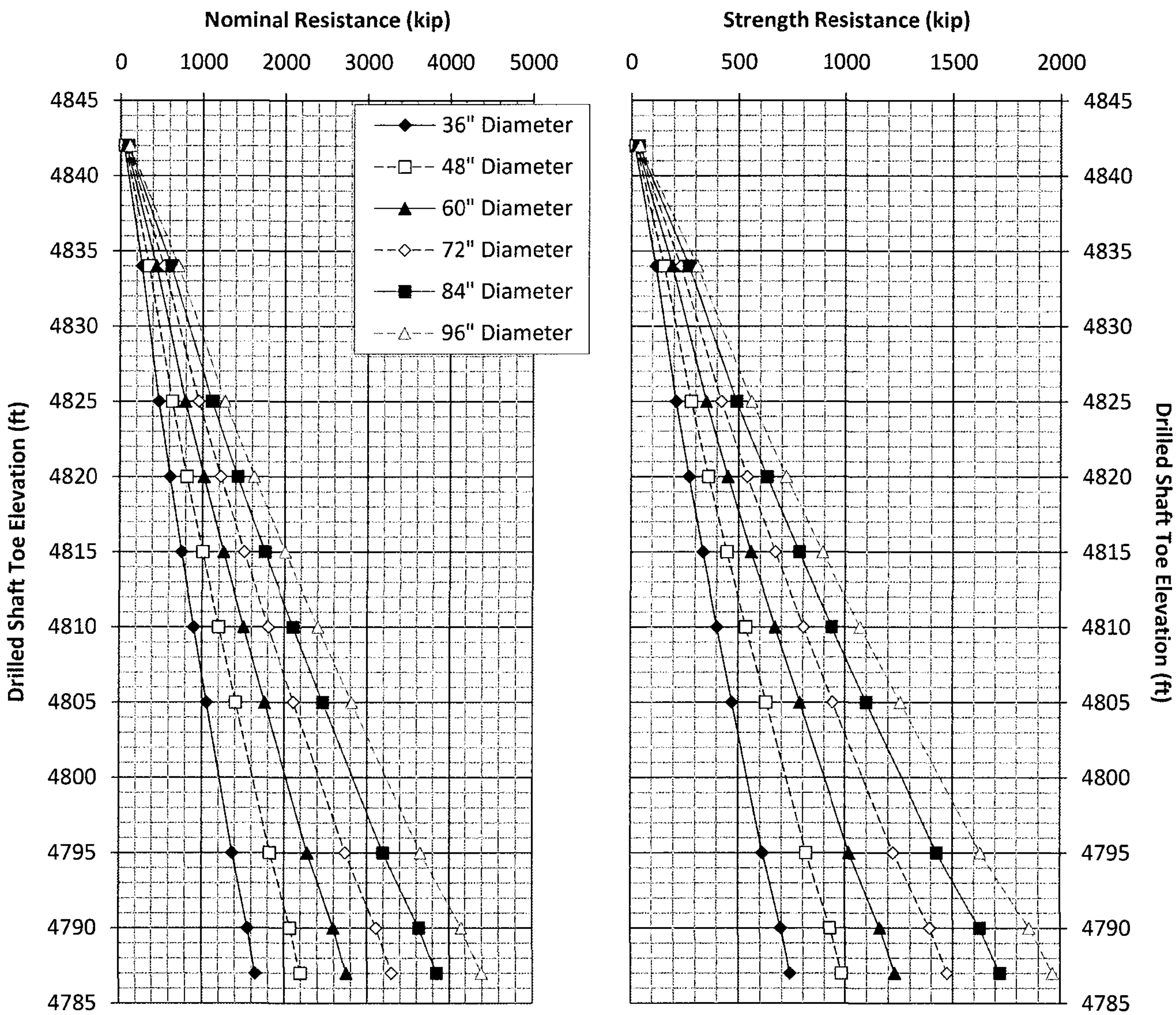


Notes: 1. Plot developed using Figures 10.8.2.2.2-3 and 10.8.2.2.2-4 of AASHTO LRFD Bridge Design Specs.
2. Mobilized side resistance was extrapolated for settlements greater than 2% of shaft diameter.

DRILLED SHAFT UPLIFT RESISTANCE

Mountain View Corridor - Juniper Canyon - NB Frontage Road Bridge - Abut 1 (South Abut)

Toe Elev (ft)	Axial Uplift Resistance (kip)											
	36" Diameter		48" Diameter		60" Diameter		72" Diameter		84" Diameter		96" Diameter	
	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength
4842	42	15	56	20	70	24	84	29	98	34	112	39
4834	266	115	354	154	443	192	532	231	620	269	709	308
4825	476	210	634	280	793	350	952	420	1110	490	1269	560
4820	610	270	813	360	1016	450	1219	540	1422	630	1625	720
4815	752	334	1003	446	1254	557	1505	669	1755	780	2006	892
4810	902	402	1202	535	1503	669	1803	803	2104	937	2405	1071
4805	1055	471	1407	628	1759	785	2111	941	2462	1098	2814	1255
4795	1367	611	1823	815	2279	1019	2735	1222	3191	1426	3647	1630
4790	1556	696	2075	928	2593	1160	3112	1392	3631	1624	4149	1856
4787	1647	737	2196	983	2745	1228	3294	1474	3843	1719	4392	1965

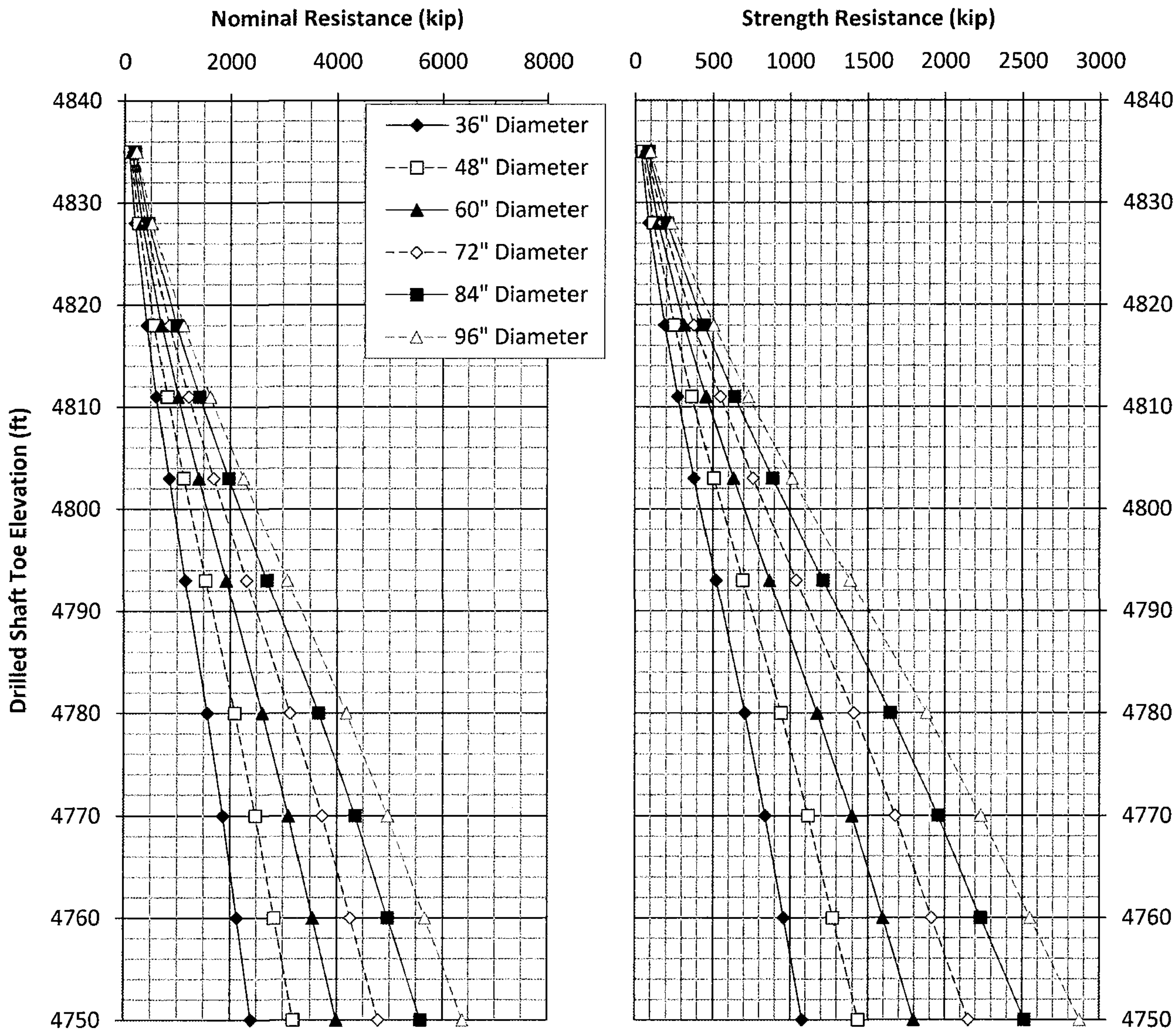


Notes:
1. For extreme event uplift resistance, multiply nominal uplift resistance by resistance factor of 0.80.
2. Further reduce factored resistance by 20 percent if shaft is a nonredundant foundation.
3. Group uplift resistance for shafts spaced at less than four diameters on centers should be evaluated by the geotechnical engineer on a case-by-case basis.

DRILLED SHAFT UPLIFT RESISTANCE

Mountain View Corridor - Juniper Canyon - NB Frontage Road Bridge - Bent 2 (Center Bent)

Toe Elev (ft)	Axial Uplift Resistance (kip)											
	36" Diameter		48" Diameter		60" Diameter		72" Diameter		84" Diameter		96" Diameter	
	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength
4835	81	36	108	48	135	61	161	73	188	85	215	97
4828	195	88	260	117	325	146	390	175	455	205	520	234
4818	420	189	560	252	700	315	840	378	980	441	1121	504
4811	609	274	812	365	1015	457	1217	548	1420	639	1623	730
4803	845	380	1127	507	1408	634	1690	761	1972	887	2253	1014
4793	1158	521	1543	695	1929	868	2315	1042	2701	1215	3087	1389
4780	1566	705	2088	940	2610	1175	3132	1410	3654	1645	4177	1879
4770	1862	838	2483	1117	3103	1396	3724	1676	4344	1955	4965	2234
4760	2126	957	2835	1276	3543	1595	4252	1913	4961	2232	5669	2551
4750	2393	1077	3191	1436	3989	1795	4787	2154	5585	2513	6383	2872

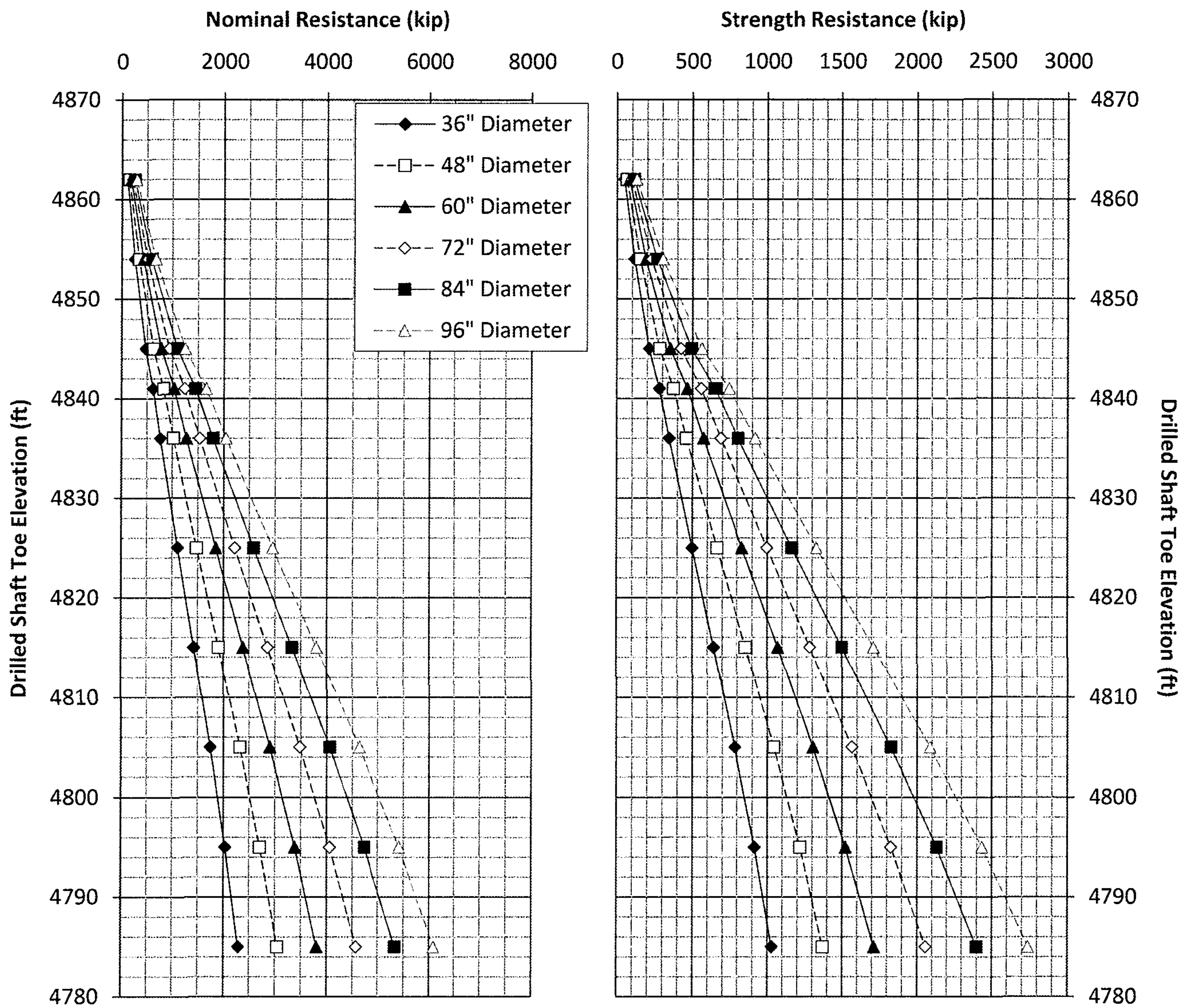


Notes:
1. For extreme event uplift resistance, multiply nominal uplift resistance by resistance factor of 0.80.
2. Further reduce factored resistance by 20 percent if shaft is a nonredundant foundation.
3. Group uplift resistance for shafts spaced at less than four diameters on centers should be evaluated by the geotechnical engineer on a case-by-case basis.

DRILLED SHAFT UPLIFT RESISTANCE

Mountain View Corridor - Juniper Canyon - NB Frontage Road Bridge - Abut 3 (North Abut)

Toe Elev (ft)	Axial Uplift Resistance (kip)											
	36" Diameter		48" Diameter		60" Diameter		72" Diameter		84" Diameter		96" Diameter	
	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength
4862	106	48	141	64	177	79	212	95	247	111	283	127
4854	252	114	337	151	421	189	505	227	589	265	673	303
4845	469	211	626	282	782	352	938	422	1095	493	1251	563
4841	620	279	827	372	1033	465	1240	558	1447	651	1653	744
4836	765	344	1020	459	1275	574	1531	689	1786	804	2041	918
4825	1107	498	1476	664	1844	830	2213	996	2582	1162	2951	1328
4815	1427	642	1902	856	2378	1070	2853	1284	3329	1498	3804	1712
4805	1739	783	2319	1043	2898	1304	3478	1565	4058	1826	4637	2087
4795	2029	913	2706	1218	3382	1522	4058	1826	4735	2131	5411	2435
4785	2283	1027	3044	1370	3805	1712	4566	2055	5327	2397	6089	2740

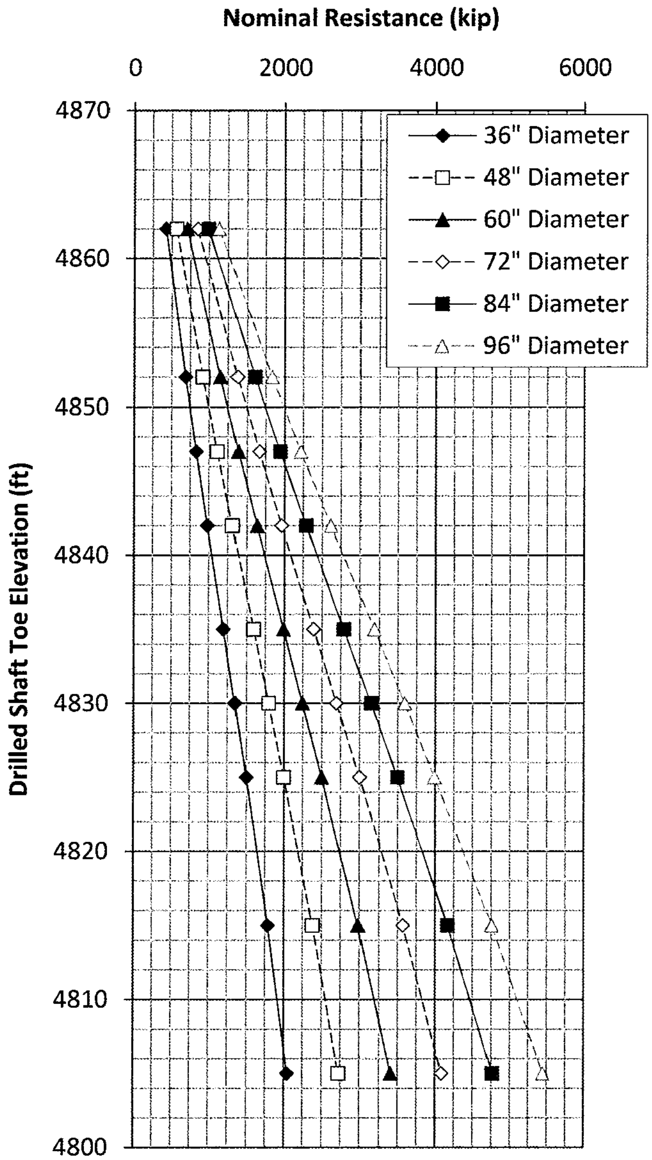


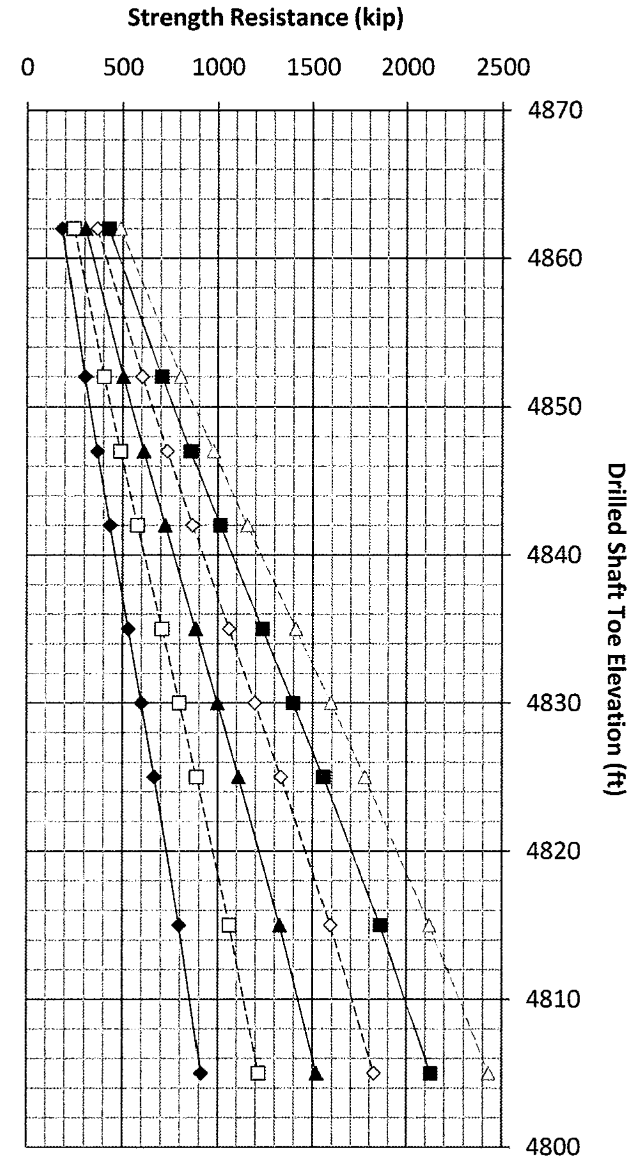
Notes:
1. For extreme event uplift resistance, multiply nominal uplift resistance by resistance factor of 0.80.
2. Further reduce factored resistance by 20 percent if shaft is a nonredundant foundation.
3. Group uplift resistance for shafts spaced at less than four diameters on centers should be evaluated by the geotechnical engineer on a case-by-case basis.

DRILLED SHAFT UPLIFT RESISTANCE

Mountain View Corridor - Juniper Canyon - SB Frontage Road Bridge - Abutment 1 (South Abut)

Toe Elev (ft)	Axial Uplift Resistance (kip)											
	36" Diameter		48" Diameter		60" Diameter		72" Diameter		84" Diameter		96" Diameter	
	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength
4862	424	183	565	244	706	305	847	366	988	427	1129	488
4852	688	302	917	403	1146	503	1375	604	1604	704	1833	805
4847	831	367	1109	489	1386	611	1663	733	1940	856	2217	978
4842	980	434	1307	578	1634	723	1961	867	2288	1012	2615	1157
4835	1193	530	1591	706	1989	883	2387	1059	2785	1236	3183	1412
4830	1346	598	1795	798	2243	997	2692	1196	3141	1396	3589	1595
4825	1497	666	1996	888	2494	1110	2993	1332	3492	1554	3991	1776
4815	1785	796	2380	1061	2975	1326	3570	1591	4164	1856	4759	2122
4805	2042	912	2723	1215	3404	1519	4085	1823	4766	2127	5446	2431



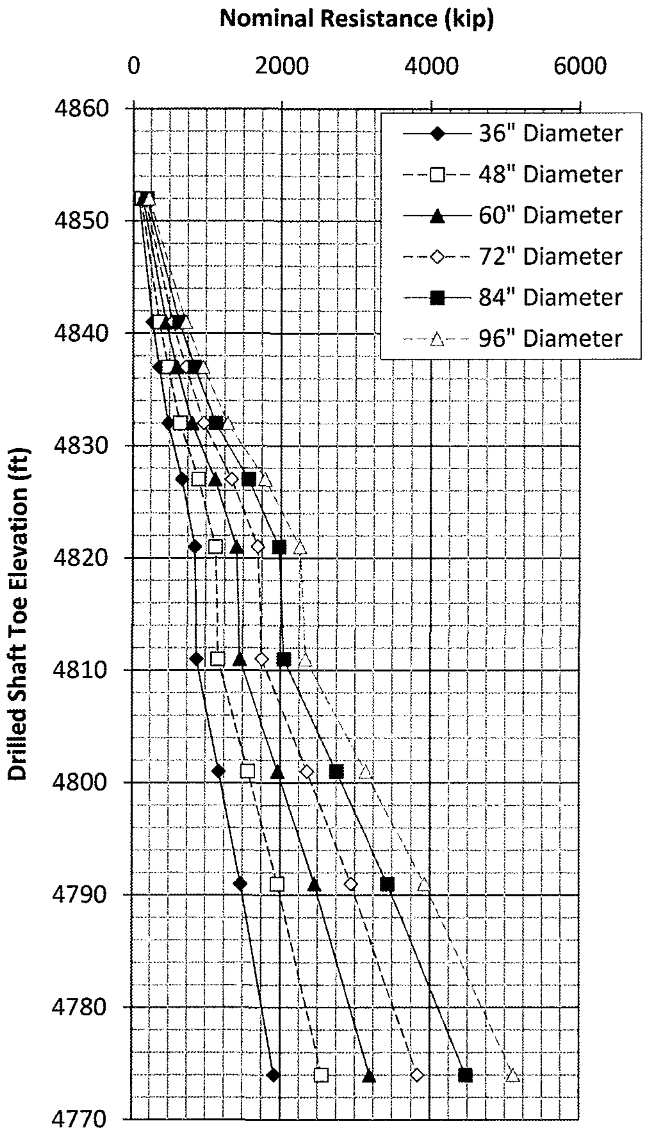


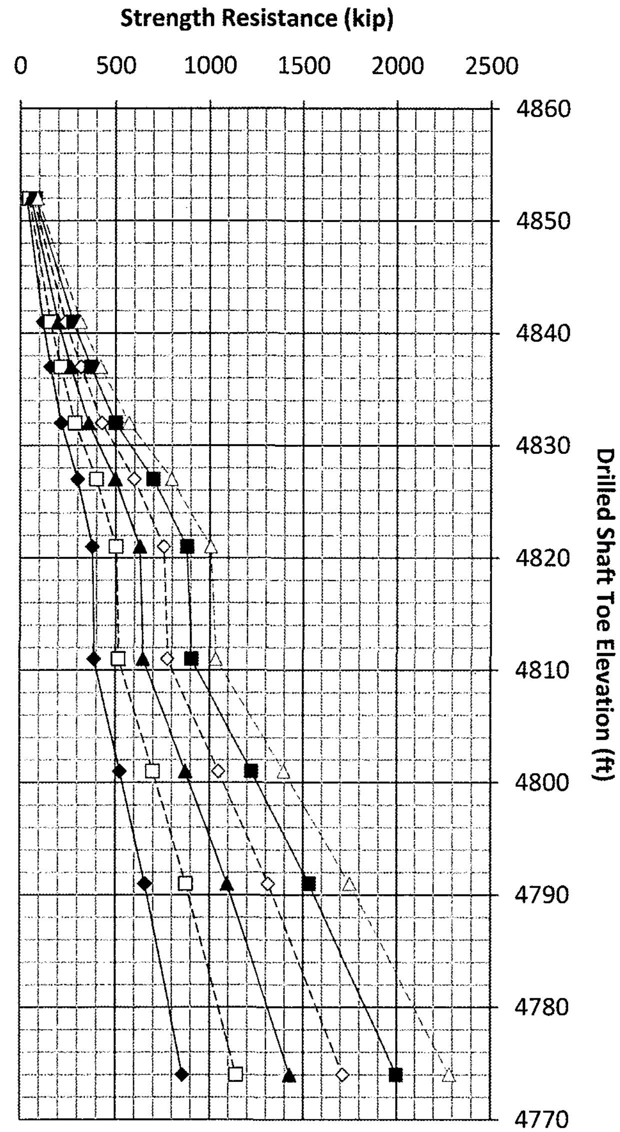
Notes:
1. For extreme event uplift resistance, multiply nominal uplift resistance by resistance factor of 0.80.
2. Further reduce factored resistance by 20 percent if shaft is a nonredundant foundation.
3. Group uplift resistance for shafts spaced at less than four diameters on centers should be evaluated by the geotechnical engineer on a case-by-case basis.

DRILLED SHAFT UPLIFT RESISTANCE

Mountain View Corridor - Juniper Canyon - SB Frontage Road Bridge - Bent 2 (Center Bent)

Toe Elev (ft)	Axial Uplift Resistance (kip)											
	36" Diameter		48" Diameter		60" Diameter		72" Diameter		84" Diameter		96" Diameter	
	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength
4852	83	34	111	45	138	56	166	67	194	78	221	90
4841	271	118	361	158	452	197	542	237	633	276	723	315
4837	360	158	480	211	600	264	720	317	840	369	960	422
4832	484	214	645	285	806	357	967	428	1129	499	1290	571
4827	672	299	896	398	1120	498	1344	598	1569	697	1793	797
4821	846	377	1127	502	1409	628	1691	754	1973	879	2255	1005
4811	877	388	1169	517	1461	646	1753	775	2046	905	2338	1034
4801	1179	524	1572	698	1965	873	2357	1047	2750	1222	3143	1396
4791	1473	656	1965	875	2456	1094	2947	1312	3438	1531	3929	1750
4774	1918	856	2557	1141	3196	1427	3835	1712	4475	1998	5114	2283



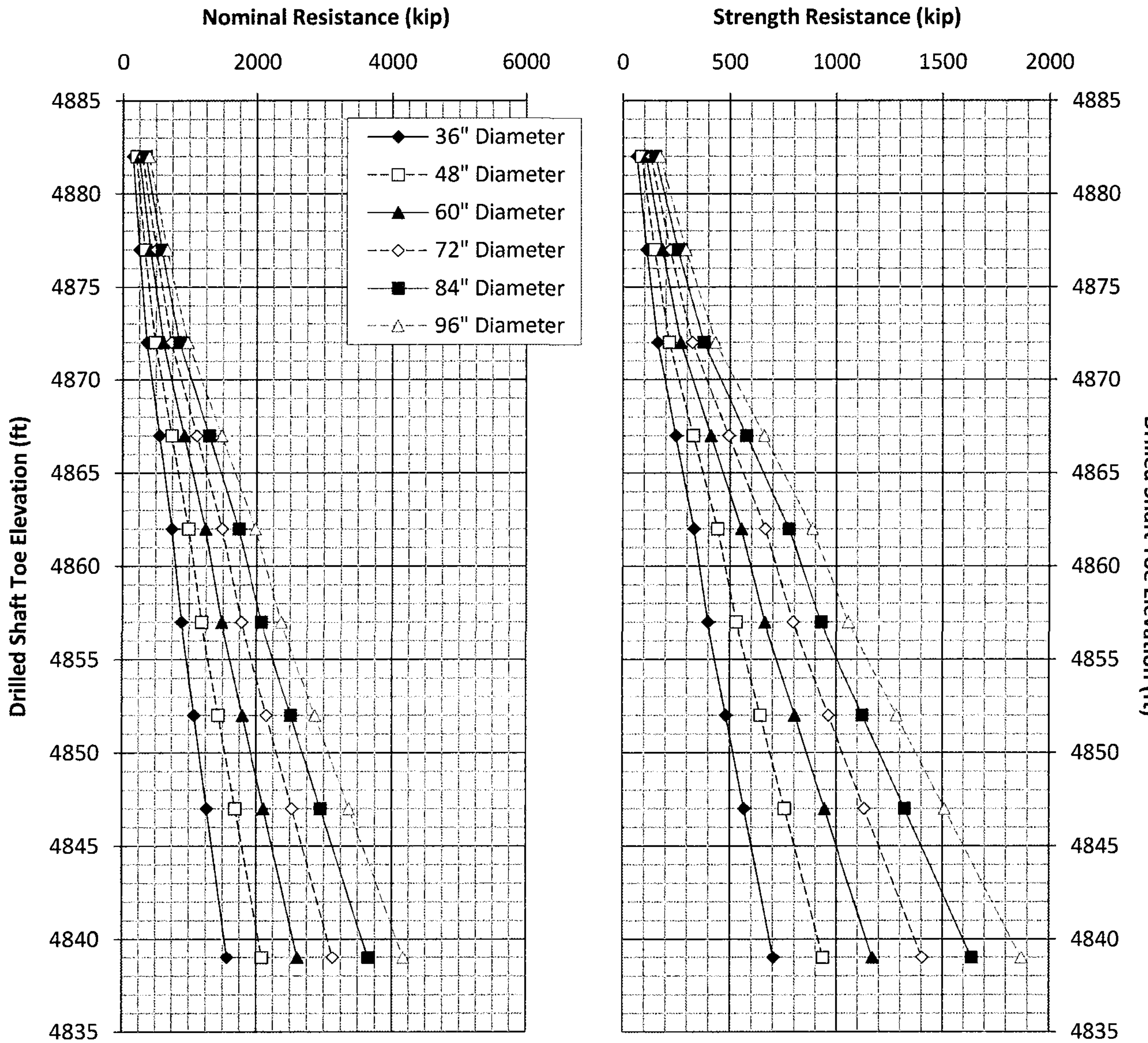


Notes:
1. For extreme event uplift resistance, multiply nominal uplift resistance by resistance factor of 0.80.
2. Further reduce factored resistance by 20 percent if shaft is a nonredundant foundation.
3. Group uplift resistance for shafts spaced at less than four diameters on centers should be evaluated by the geotechnical engineer on a case-by-case basis.

DRILLED SHAFT UPLIFT RESISTANCE

Mountain View Corridor - Juniper Canyon - SB Frontage Road Bridge - Abutment 3 (North Abut)

Toe Elev (ft)	Axial Uplift Resistance (kip)											
	36" Diameter		48" Diameter		60" Diameter		72" Diameter		84" Diameter		96" Diameter	
	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength	Nominal	Strength
4882	148	64	198	86	247	107	297	129	346	150	396	172
4877	250	110	333	147	417	184	500	220	584	257	667	294
4872	366	162	487	216	609	270	731	324	853	378	975	432
4867	554	247	739	329	923	412	1108	494	1293	576	1477	659
4862	743	332	990	442	1238	553	1485	664	1733	774	1980	885
4857	886	397	1182	529	1477	661	1773	793	2068	925	2364	1057
4852	1075	481	1433	642	1791	802	2150	963	2508	1123	2866	1284
4847	1263	566	1684	755	2106	944	2527	1132	2948	1321	3369	1510
4839	1565	702	2087	936	2608	1170	3130	1404	3652	1638	4173	1872



Notes:
1. For extreme event uplift resistance, multiply nominal uplift resistance by resistance factor of 0.80.
2. Further reduce factored resistance by 20 percent if shaft is a nonredundant foundation.
3. Group uplift resistance for shafts spaced at less than four diameters on centers should be evaluated by the geotechnical engineer on a case-by-case basis.

Recommendations for LPILE and GROUP analyses.

Project: Mountain View Corridor
Bridge Site: Juniper Canyon

Bridge: NB
Support: Abut 1
Boring No.: 09-S1-10

Approx. Ground Elev.: 4863 ft (at boring)
Est. Shaft Tip Elev: To Be Determined
Shaft Length Below Ground: To Be Determined

Foundation Type: Drilled Shaft
Size: 36" to 96" Diameter
Water Table: Below Investigated Depth

Soil Layers

Thickness (ft)	Top Elev (ft)	Bottom Elev (ft)	Soil Type (p-y model)	Eff. Unit Wt. (pci)	Cohesion (psi)	Strain Factor ε_{50}	Friction Angle (degrees)	p-y Modulus, k (pci)	Unit Resistance Side (psi)	Unit Resistance End (psi)
4	4863	4859	Sand (Reese)	0.058	0	0	28	25	1.7	
6	4859	4853	Sand (Reese)	0.072	0	0	34	90	2.7	
11	4853	4842	Soft Clay (Matlock)	0.063	6.25	0.01	0	100	3.5	
8	4842	4834	Sand (Reese)	0.072	0	0	36	225	20.6	417
9	4834	4825	Sand (Reese)	0.072	0	0	36	225	17.2	417
10	4825	4815	Sand (Reese)	0.072	0	0	36	225	20.3	417
28	4815	4787	Sand (Reese)	0.072	0	0	36	225	23.5	431

Other Considerations

Group Effects
Use P-Multipliers for shaft groups as outlined in AASHTO LRFD 2007 Section 10.7.2.4

Abutment Fill
For the length of the shaft extending through the abutment fill:
For Effective Unit Weights use 0.075 pci (regular weight) or 0.049 pci (85-pcf lighweight)
Assume Friction Angle of 38 degrees. Consider reduced parameters for loading toward MSE wall face.

MSE Walls
For piles located less than 6B from MSE wall, use P-Multiplier of 0.3 or less for the MSE fill layer when loading is perpendicular to MSE wall face. MSE wall designer should be notified if MSE fill will be relied upon for lateral pile resistance.

Recommendations for LPILE and GROUP analyses.

Project: Mountain View Corridor
Bridge Site: Juniper Canyon

Bridge: NB
Support: Bent 2
Boring No.: 09-S1-11

Approx. Ground Elev.: 4851 ft (at boring)
Est. Shaft Tip Elev: To Be Determined
Shaft Length Below Ground: To Be Determined

Foundation Type: Drilled Shaft
Size: 36" to 96" Diameter
Water Table: Below Investigated Depth

Soil Layers

Thickness (ft)	Top Elev (ft)	Bottom Elev (ft)	Soil Type (p-y model)	Eff. Unit Wt. (pci)	Cohesion (psi)	Strain Factor ε_{50}	Friction Angle (degrees)	p-y Modulus, k (pci)	Unit Resistance Side (psi)	Unit Resistance End (psi)
9	4851	4842	Sand (Reese)	0.058	0	0	28	25	2.5	
14	4842	4828	Sand (Reese)	0.072	0	0	36	225	9.7	417
10	4828	4818	Sand (Reese)	0.072	0	0	36	225	16.6	417
15	4818	4803	Sand (Reese)	0.072	0	0	36	225	20.8	417
10	4803	4793	Sand (Reese)	0.072	0	0	36	225	23.1	425
13	4793	4780	Sand (Reese)	0.072	0	0	36	225	23.2	444
30	4780	4750	Sand (Reese)	0.072	0	0	36	225	20.3	484

Other Considerations

Group Effects

Use P-Multipliers for shaft groups as outlined in AASHTO LRFD 2007 Section 10.7.2.4

Abutment Fill

For the length of the shaft extending through the abutment fill:
For Effective Unit Weights use 0.075 pci (regular weight) or 0.049 pci (85-pcf lighweight)
Assume Friction Angle of 38 degrees. Consider reduced parameters for loading toward MSE wall face.

MSE Walls

For piles located less than 6B from MSE wall, use P-Multiplier of 0.3 or less for the MSE fill layer when loading is perpendicular to MSE wall face. MSE wall designer should be notified if MSE fill will be relied upon for lateral pile resistance.

Recommendations for LPILE and GROUP analyses.

Project: Mountain View Corridor
Bridge Site: Juniper Canyon

Bridge: NB
Support: Abut 3
Boring No.: 09-S1-13

Approx. Ground Elev.: 4890 ft (at boring)
Est. Shaft Tip Elev: To Be Determined
Shaft Length Below Ground: To Be Determined

Foundation Type: Drilled Shaft
Size: 36" to 96" Diameter
Water Table: Below Investigated Depth

Soil Layers

Thickness (ft)	Top Elev (ft)	Bottom Elev (ft)	Soil Type (p-y model)	Eff. Unit Wt. (pci)	Cohesion (psi)	Strain Factor ε_{50}	Friction Angle (degrees)	p-y Modulus, k (pci)	Unit Resistance Side (psi)	Unit Resistance End (psi)
13	4890	4877	Sand (Reese)	0.072	0	0	36	200	6.3	
15	4877	4862	Sand (Reese)	0.072	0	0	36	225	8.6	417
17	4862	4845	Sand (Reese)	0.072	0	0	36	225	15.6	417
4	4845	4841	Sand (Reese)	0.075	0	0	36	225	27.8	417
5	4841	4836	Sand (Reese)	0.069	0	0	36	225	21.4	417
11	4836	4825	Sand (Reese)	0.072	0	0	36	225	22.8	418
40	4825	4785	Sand (Reese)	0.072	0	0	36	225	21.7	451

Other Considerations

Group Effects
Use P-Multipliers for shaft groups as outlined in AASHTO LRFD 2007 Section 10.7.2.4

Abutment Fill
For the length of the shaft extending through the abutment fill:
For Effective Unit Weights use 0.075 pci (regular weight) or 0.049 pci (85-pcf lighweight)
Assume Friction Angle of 38 degrees. Consider reduced parameters for loading toward MSE wall face.

MSE Walls
For piles located less than 6B from MSE wall, use P-Multiplier of 0.3 or less for the MSE fill layer when loading is perpendicular to MSE wall face. MSE wall designer should be notified if MSE fill will be relied upon for lateral pile resistance.

Recommendations for LPILE and GROUP analyses.

JM

Project: Mountain View Corridor

Bridge Site: Juniper Canyon

Bridge: SB

Support: Abut 1

Boring No.: 09-S1-4

Approx. Ground Elev.: 4905 ft (at boring)

Est. Shaft Tip Elev: To Be Determined

Shaft Length Below Ground: To Be Determined

Foundation Type: Drilled Shaft

Size: 36" to 96" Diameter

Water Table: Below Investigated Depth

Soil Layers

Thickness (ft)	Top Elev (ft)	Bottom Elev (ft)	Soil Type (p-y model)	Eff. Unit Wt. (pci)	Cohesion (psi)	Strain Factor ε_{50}	Friction Angle (degrees)	p-y Modulus, k (pci)	Unit Resistance Side (psi)	Unit Resistance End (psi)
8	4905	4897	Sand (Reese)	0.064	0	0	32	50	3.8	
15	4897	4882	Sand (Reese)	0.067	0	0	34	90	5.2	
10	4882	4872	Sand (Reese)	0.072	0	0	36	225	19.9	
10	4872	4862	Soft Clay (Matlock)	0.053	10.1	0.008	0	125	5.6	
10	4862	4852	Sand (Reese)	0.072	0	0	36	225	19.4	417
5	4852	4847	Sand (Reese)	0.075	0	0	36	225	21.2	417
42	4847	4805	Sand (Reese)	0.072	0	0	36	225	21.5	444

Other Considerations

Group Effects

Use P-Multipliers for shaft groups as outlined in AASHTO LRFD 2007 Section 10.7.2.4

Abutment Fill

For the length of the shaft extending through the abutment fill:

For Effective Unit Weights use 0.075 pci (regular weight) or 0.049 pci (85-pcf lighweight)

Assume Friction Angle of 38 degrees. Consider reduced parameters for loading toward MSE wall face.

MSE Walls

For piles located less than 6B from MSE wall, use P-Multiplier of 0.3 or less for the MSE fill layer when loading is perpendicular to MSE wall face. MSE wall designer should be notified if MSE fill will be relied upon for lateral pile resistance.

Recommendations for LPILE and GROUP analyses.

Project:	Mountain View Corridor	Bridge:	SB
Bridge Site:	Juniper Canyon	Support:	Bent 2
		Boring No.:	09-S1-6
Approx. Ground Elev.:	4865 ft (at boring)	Foundation Type:	Drilled Shaft
Est. Shaft Tip Elev:	To Be Determined	Size:	36" to 96" Diameter
Shaft Length Below Ground:	To Be Determined	Water Table:	Below Investigated Depth

Soil Layers

Thickness (ft)	Top Elev (ft)	Bottom Elev (ft)	Soil Type (p-y model)	Eff. Unit Wt. (pci)	Cohesion (psi)	Strain Factor ε_{50}	Friction Angle (degrees)	p-y Modulus, k (pci)	Unit Resistance Side (psi)	Unit Resistance End (psi)
4	4865	4861	Sand (Reese)	0.064	0	0	32	50	1.8	
5	4861	4856	Sand (Reese)	0.069	0	0	35	150	9.0	
4	4856	4852	Soft Clay (Matlock)	0.069	12.5	0.007	0	150	6.9	
15	4852	4837	Sand (Reese)	0.069	0	0	35	150	14.5	417
16	4837	4821	Sand (Reese)	0.720	0	0	36	225	22.4	417
5	4821	4816	Soft Clay (Matlock)	0.058	4.2	0.017	0	35	2.3	
58	4816	4758	Sand (Reese)	0.720	0	0	36	225	21.0	443

Other Considerations

Group Effects

Use P-Multipliers for shaft groups as outlined in AASHTO LRFD 2007 Section 10.7.2.4

Abutment Fill

For the length of the shaft extending through the abutment fill:

For Effective Unit Weights use 0.075 pci (regular weight) or 0.049 pci (85-pcf lighweight)

Assume Friction Angle of 38 degrees. Consider reduced parameters for loading toward MSE wall face.

MSE Walls

For piles located less than 6B from MSE wall, use P-Multiplier of 0.3 or less for the MSE fill layer when loading is perpendicular to MSE wall face. MSE wall designer should be notified if MSE fill will be relied upon for lateral pile resistance.

Recommendations for LPILE and GROUP analyses.

Project: Mountain View Corridor
Bridge Site: Juniper Canyon

Bridge: SB
Support: Abut 3
Boring No.: 09-S1-8

Approx. Ground Elev.: 4910 ft (at boring)
Est. Shaft Tip Elev: To Be Determined
Shaft Length Below Ground: To Be Determined

Foundation Type: Drilled Shaft
Size: 36" to 96" Diameter
Water Table: Below Investigated Depth

Soil Layers

Thickness (ft)	Top Elev (ft)	Bottom Elev (ft)	Soil Type (p-y model)	Eff. Unit Wt. (pci)	Cohesion (psi)	Strain Factor ε_{50}	Friction Angle (degrees)	p-y Modulus, k (pci)	Unit Resistance Side (psi)	Unit Resistance End (psi)
3	4910	4907	Sand (Reese)	0.064	0	0	32	50	1.5	
10	4907	4897	Sand (Reese)	0.069	0	0	34	90	9.5	
10	4897	4887	Sand (Reese)	0.067	0	0	34	90	8.1	
5	4887	4882	Soft Clay (Matlock)	0.064	6.25	0.01	0	100	3.5	333
10	4882	4872	Sand (Reese)	0.067	0	0	34	90	16.0	300
10	4872	4862	Sand (Reese)	0.069	0	0	34	100	27.8	358
23	4862	4839	Sand (Reese)	0.720	0	0	36	225	26.1	425

Other Considerations

Group Effects
Use P-Multipliers for shaft groups as outlined in AASHTO LRFD 2007 Section 10.7.2.4

Abutment Fill
For the length of the shaft extending through the abutment fill:
For Effective Unit Weights use 0.075 pci (regular weight) or 0.049 pci (85-pcf lighweight)
Assume Friction Angle of 38 degrees. Consider reduced parameters for loading toward MSE wall face.

MSE Walls
For piles located less than 6B from MSE wall, use P-Multiplier of 0.3 or less for the MSE fill layer when loading is perpendicular to MSE wall face. MSE wall designer should be notified if MSE fill will be relied upon for lateral pile resistance.

MOUNTAIN VIEW CORRIDOR - PHASE I - SEGMENT 1
SUMMARY OF ANALYSES OF GLOBAL STABILITY

Analysis location and description of embankment/cut configuration	Computed Factors of Safety*			
	Construction	Static	Pseudostatic	Post-Earthquake
MVC Sta. 916+00 - 25' Cut Slope - 2H:1V	1.26	1.36	n/a	n/a
Wall 1F Near Sta. 951+00 - 12' MSE Wall with B = 8'	1.33 (1.52)	1.40 (1.60)	1.06 (1.12)	1.31 (1.46)
MVC Sta. 968+00 - 18' Fill Slope - 2H:1V	1.15	1.40	n/a	n/a
Wall 1H Near Sta. 978+00 - 5' MSE Wall with B = 5'	1.32 (1.52)	1.88 (2.10)	1.25 (1.35)	1.56 (1.73)
MVC Sta. 982+00 - 40' Fill Slope - 2H:1V	1.16 (1.30)	1.41 (1.42)	n/a	n/a
Wall 1K Near Sta. 1002+00 - 8' MSE Wall with B = 8'	n/a	1.39 (1.44)	1.01 (1.07)	n/a

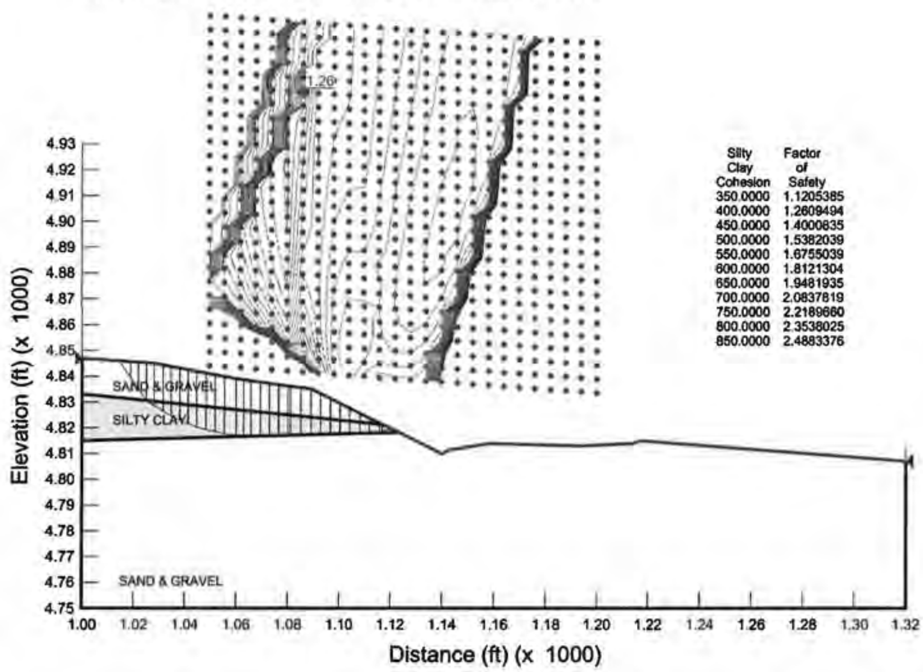
*Optimized factors of safety are shown first. In some cases, factors of safety for critical circular surface is shown in parentheses.

n/a = Case not applicable due to wall/slope location and/or subsurface material types.

Note: These analyses are preliminary, and must be refined if the modeled wall type and/or dimensions are not representative of those selected for construction.

Mountain View Corridor - Segment 1
MVC Station 916+00
NB Frontage Road - 25' cut slope (2H:1V)
Construction Short-term Case

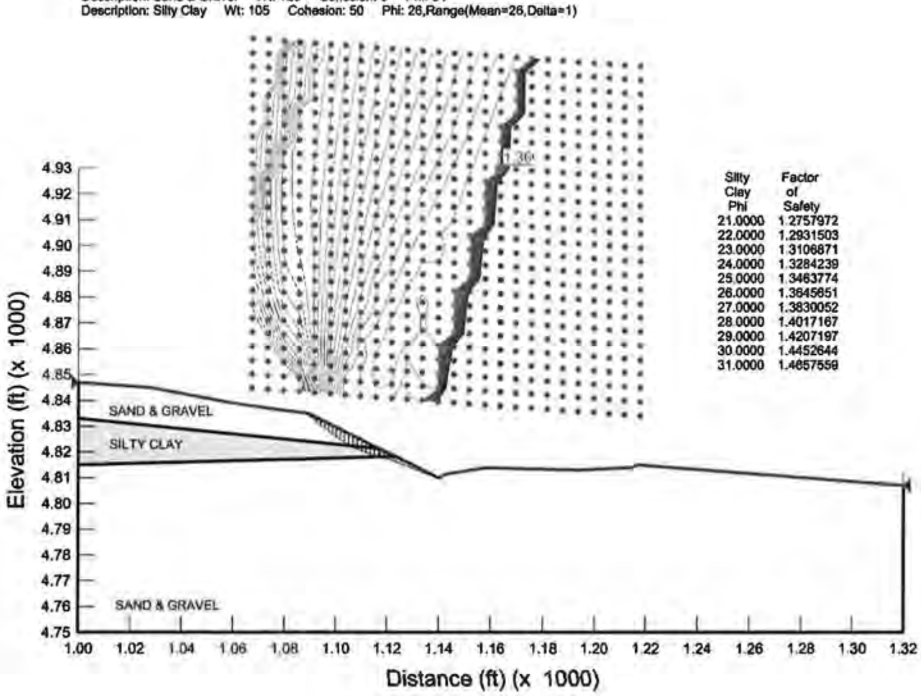
Description: Compacted Fill Wt: 135 Cohesion: 0 Phi: 35
Description: Sand & Gravel Wt: 125 Cohesion: 0 Phi: 34
Description: Silty Clay Wt: 105 Cohesion: 400,Range(Mean=600,Delta=50) Phi: 0



Silty Clay Cohesion	Factor of Safety
350.0000	1.1205385
400.0000	1.2609494
450.0000	1.4000835
500.0000	1.5382039
550.0000	1.6755039
600.0000	1.8121304
650.0000	1.9481935
700.0000	2.0837819
750.0000	2.2189660
800.0000	2.3538025
850.0000	2.4883376

Mountain View Corridor - Segment 1
MVC Station 916+00
NB Frontage Road - 25' cut slope (2H:1V)
Static Long-term Case

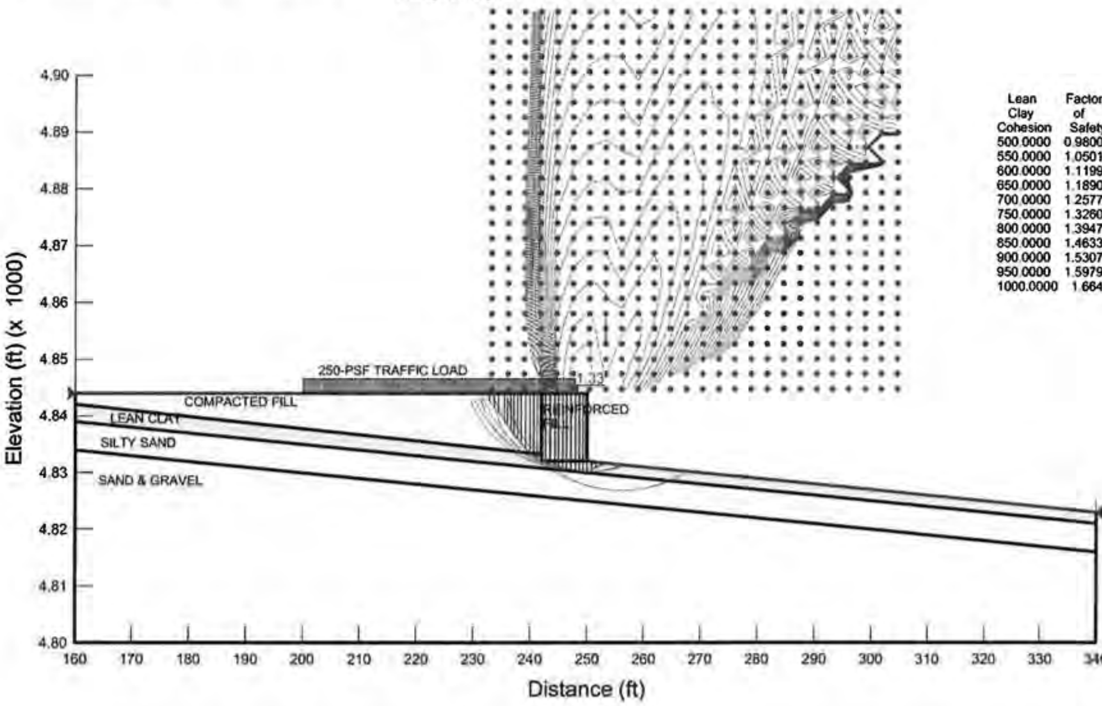
Description: Compacted Fill Wt: 135 Cohesion: 0 Phi: 35
Description: Sand & Gravel Wt: 125 Cohesion: 0 Phi: 34
Description: Silty Clay Wt: 105 Cohesion: 50 Phi: 26,Range(Mean=26,Delta=1)



Silty Clay Phi	Factor of Safety
21.0000	1.2757972
22.0000	1.2931503
23.0000	1.3106871
24.0000	1.3284239
25.0000	1.3463774
26.0000	1.3645651
27.0000	1.3830052
28.0000	1.4017167
29.0000	1.4207197
30.0000	1.4452644
31.0000	1.4657559

Mountain View Corridor - Segment 1
Wall 1F near MVC Sta. 951+00
NB Frontage Road - 12' MSE Wall, B = 8'
Construction Case - Undrained clay strengths

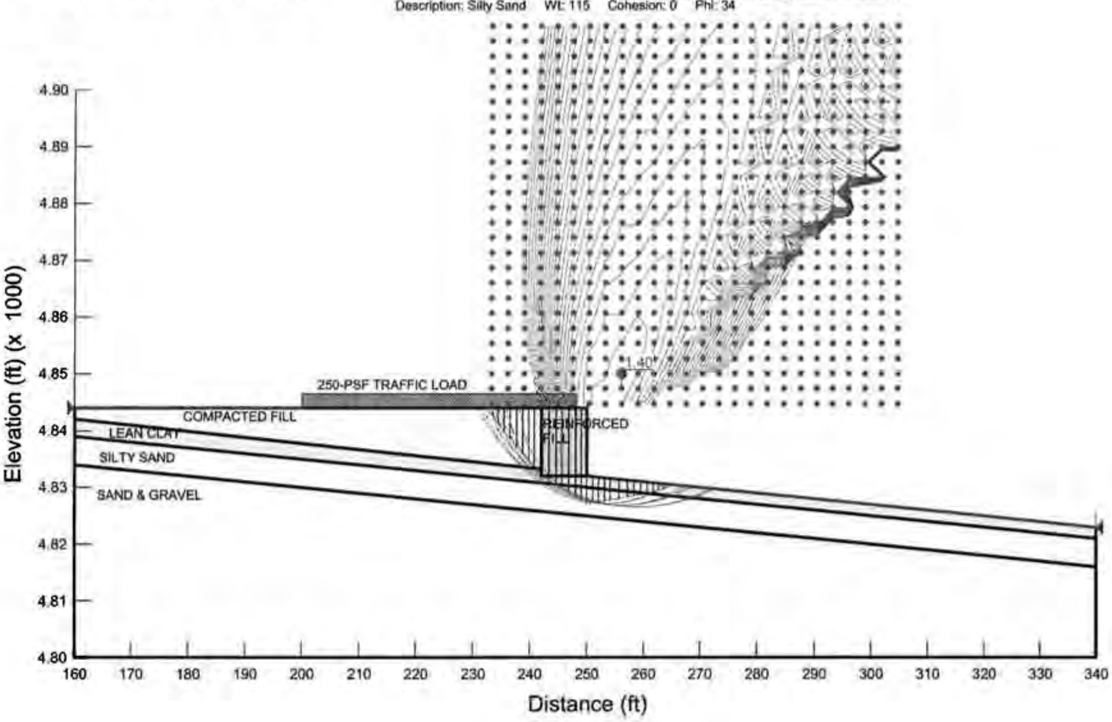
Description: Reinforced Fill Wt: 145 Cohesion: 1000 Phi: 34
Description: Compacted Fill Wt: 145 Cohesion: 0 Phi: 35
Description: Sand & Gravel Wt: 125 Cohesion: 0 Phi: 36
Description: Lean Clay Wt: 120 Cohesion: 750,Range(Mean=750,Delta=50) Phi: 0
Description: Silty Sand Wt: 115 Cohesion: 0 Phi: 34

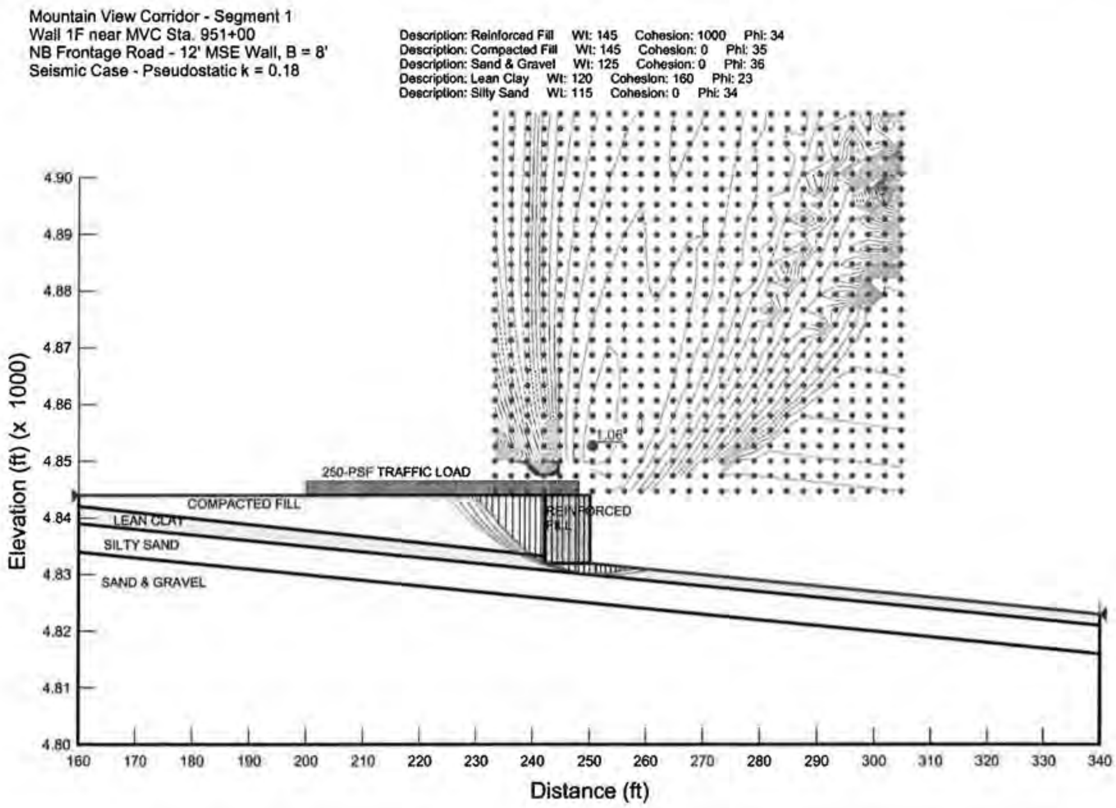


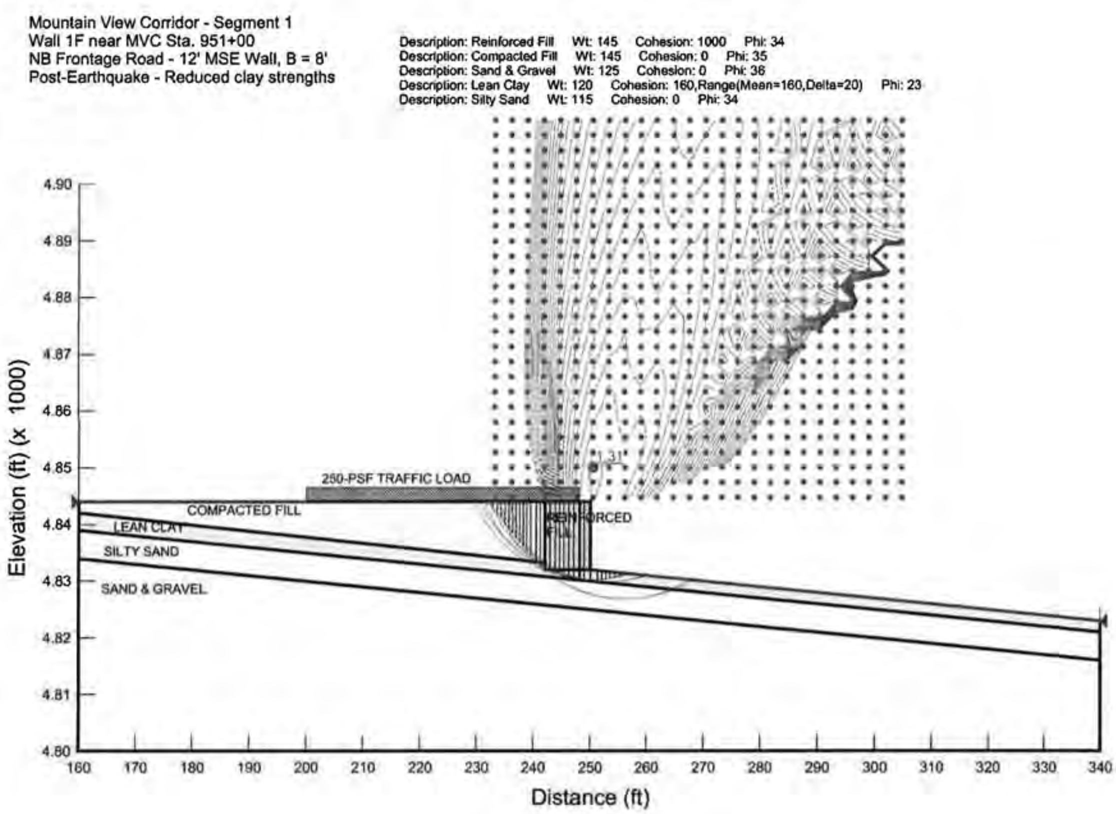
Lean Clay Cohesion	Factor of Safety
500.0000	0.9800545
550.0000	1.0501860
600.0000	1.1199100
650.0000	1.1890627
700.0000	1.2577383
750.0000	1.3260085
800.0000	1.3947612
850.0000	1.4633502
900.0000	1.5307712
950.0000	1.5979584
1000.0000	1.6649395

Mountain View Corridor - Segment 1
Wall 1F near MVC Sta. 951+00
NB Frontage Road - 12' MSE Wall, B = 8'
Static Case - Long-term clay strengths

Description: Reinforced Fill Wt: 145 Cohesion: 1000 Phi: 34
Description: Compacted Fill Wt: 145 Cohesion: 0 Phi: 35
Description: Sand & Gravel Wt: 125 Cohesion: 0 Phi: 36
Description: Lean Clay Wt: 120 Cohesion: 200 Phi: 28,Range(Mean=28,Delta=1)
Description: Silty Sand Wt: 115 Cohesion: 0 Phi: 34

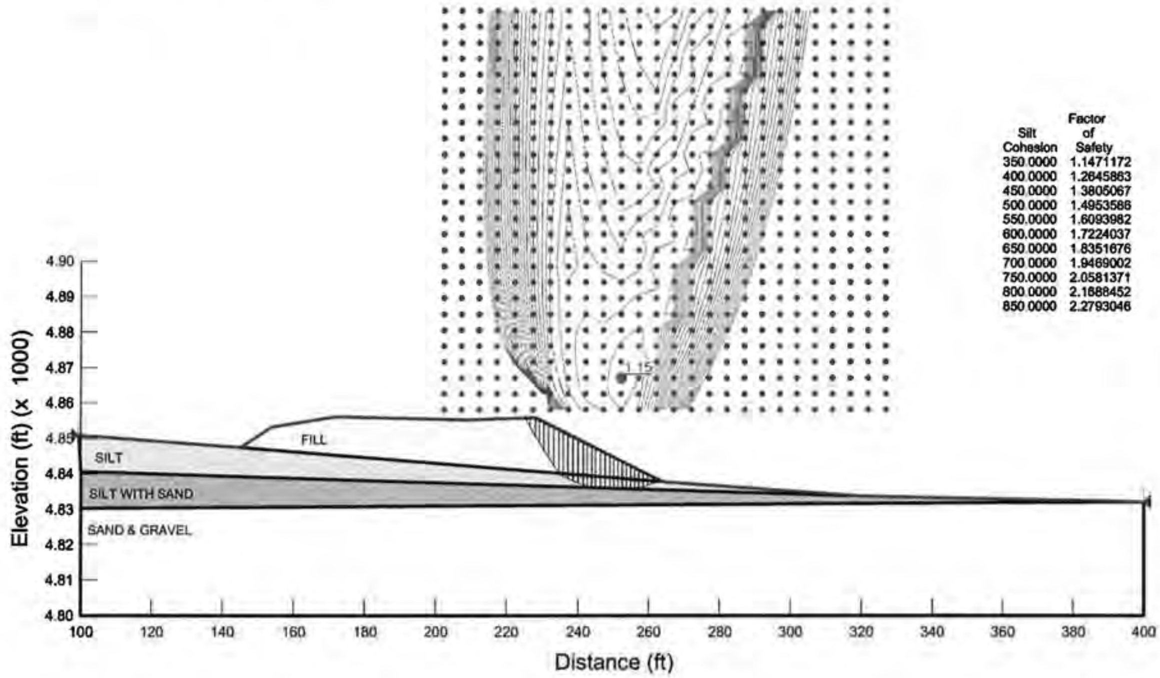



Mountain View Corridor - Segment 1
Wall 1F near MVC Sta. 951+00
NB Frontage Road - 12' MSE Wall, B = 8'
Seismic Case - Pseudostatic k = 0.18
Description: Reinforced Fill Wt: 145 Cohesion: 1000 Phi: 34
Description: Compacted Fill Wt: 145 Cohesion: 0 Phi: 35
Description: Sand & Gravel Wt: 125 Cohesion: 0 Phi: 36
Description: Lean Clay Wt: 120 Cohesion: 160 Phi: 23
Description: Silty Sand Wt: 115 Cohesion: 0 Phi: 34
1.06
250-PSF TRAFFIC LOAD
COMPACTED FILL
REINFORCED FILL
LEAN CLAY
SILTY SAND
SAND & GRAVEL
Elevation (ft) (x 1000)
Distance (ft)


Mountain View Corridor - Segment 1
Wall 1F near MVC Sta. 951+00
NB Frontage Road - 12' MSE Wall, B = 8'
Post-Earthquake - Reduced clay strengths
Description: Reinforced Fill Wt: 145 Cohesion: 1000 Phi: 34
Description: Compacted Fill Wt: 145 Cohesion: 0 Phi: 35
Description: Sand & Gravel Wt: 125 Cohesion: 0 Phi: 36
Description: Lean Clay Wt: 120 Cohesion: 160,Range(Mean=160,Delta=20) Phi: 23
Description: Silty Sand Wt: 115 Cohesion: 0 Phi: 34
1.31
250-PSF TRAFFIC LOAD
COMPACTED FILL
REINFORCED FILL
LEAN CLAY
SILTY SAND
SAND & GRAVEL
Elevation (ft) (x 1000)
Distance (ft)

Mountain View Corridor - Segment 1
MVC Station 968+00
NB Frontage Road - 18' fill slope (2H:1V)
Construction Short-term Case

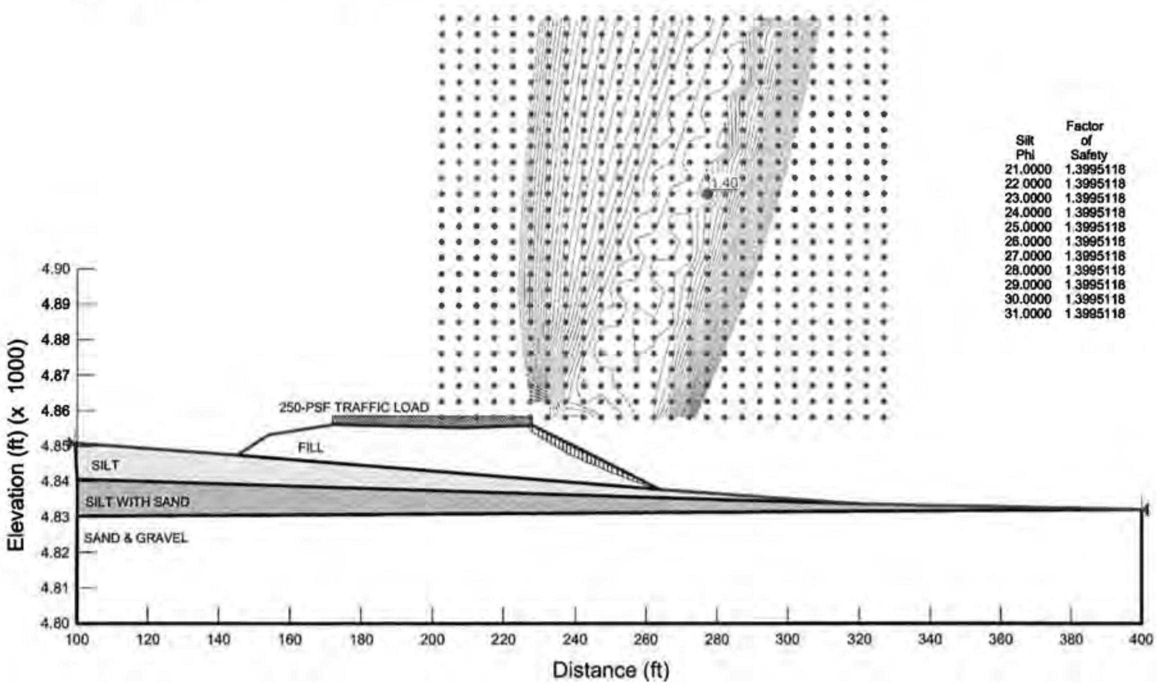
Description: Compacted Fill Wt: 135 Cohesion: 0 Phi: 35
Description: Sand & Gravel Wt: 125 Cohesion: 0 Phi: 34
Description: Silt Wt: 105 Cohesion: 350,Range(Mean=600,Delta=50) Phi: 0
Description: Silt with Sand Wt: 110 Cohesion: 800 Phi: 0



Silt Cohesion	Factor of Safety
350.0000	1.1471172
400.0000	1.2645863
450.0000	1.3805067
500.0000	1.4953586
550.0000	1.6093982
600.0000	1.7224037
650.0000	1.8351676
700.0000	1.9469002
750.0000	2.0581371
800.0000	2.1688452
850.0000	2.2793046

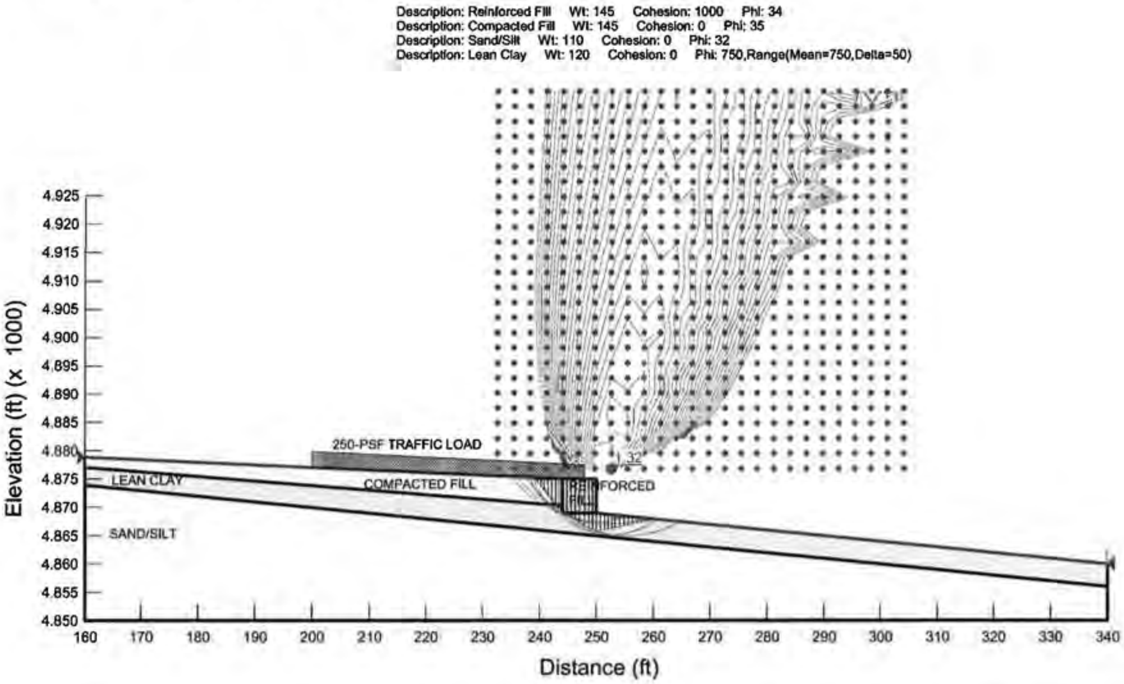
Mountain View Corridor - Segment 1
MVC Station 968+00
NB Frontage Road - 18' fill slope (2H:1V)
Static Long-term Case

Description: Compacted Fill Wt: 135 Cohesion: 0 Phi: 35
Description: Sand & Gravel Wt: 125 Cohesion: 0 Phi: 34
Description: Silt Wt: 105 Cohesion: 50 Phi: 26,Range(Mean=26,Delta=1)
Description: Silt with Sand Wt: 110 Cohesion: 50 Phi: 28

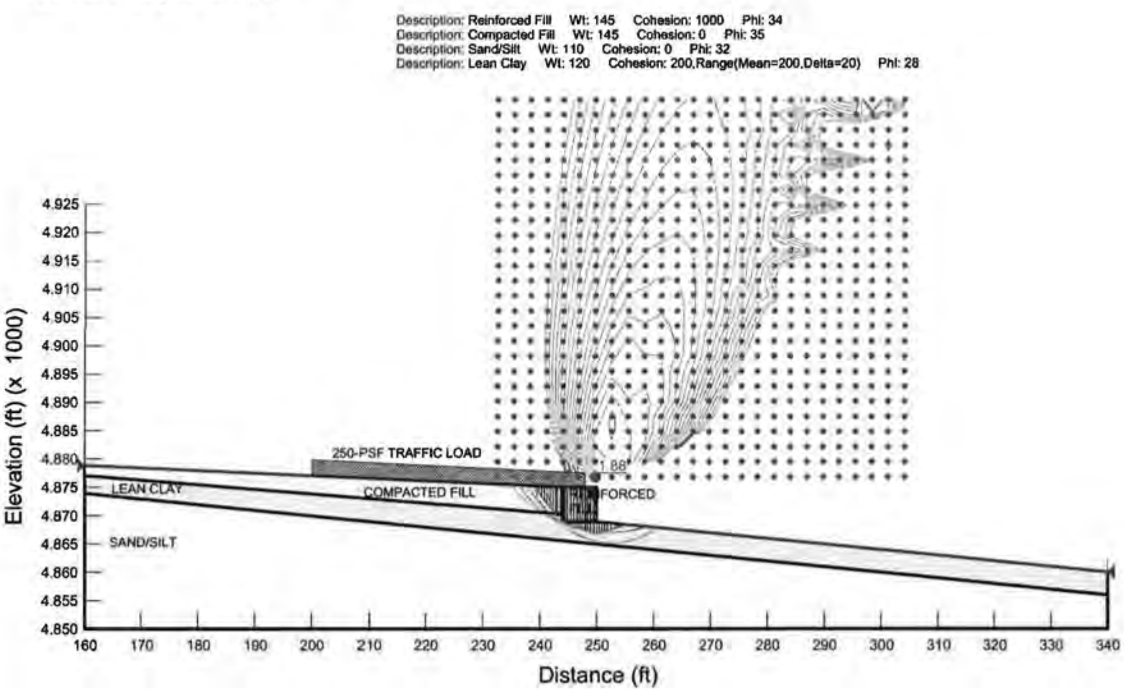


Silt Phi	Factor of Safety
21.0000	1.3995118
22.0000	1.3995118
23.0000	1.3995118
24.0000	1.3995118
25.0000	1.3995118
26.0000	1.3995118
27.0000	1.3995118
28.0000	1.3995118
29.0000	1.3995118
30.0000	1.3995118
31.0000	1.3995118

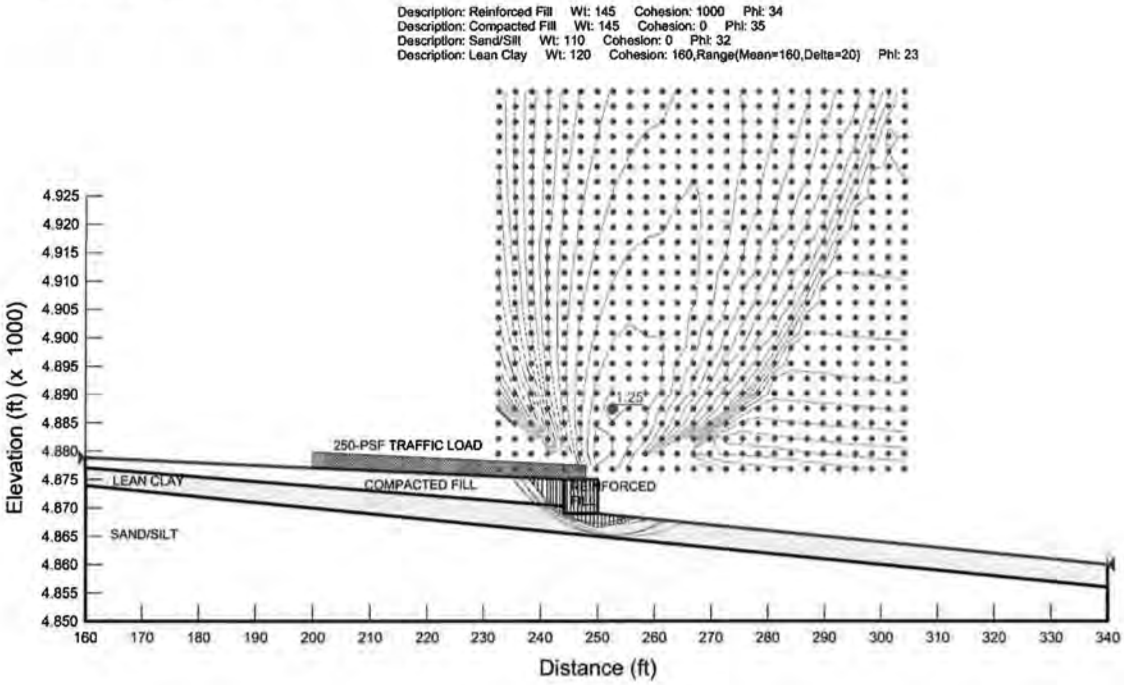
Mountain View Corridor - Segment 1
Wall 1H near MVC Sta. 978+00
NB Frontage Road - 5' MSE Wall, B = 5'
Construction Case - Undrained Clay Strengths



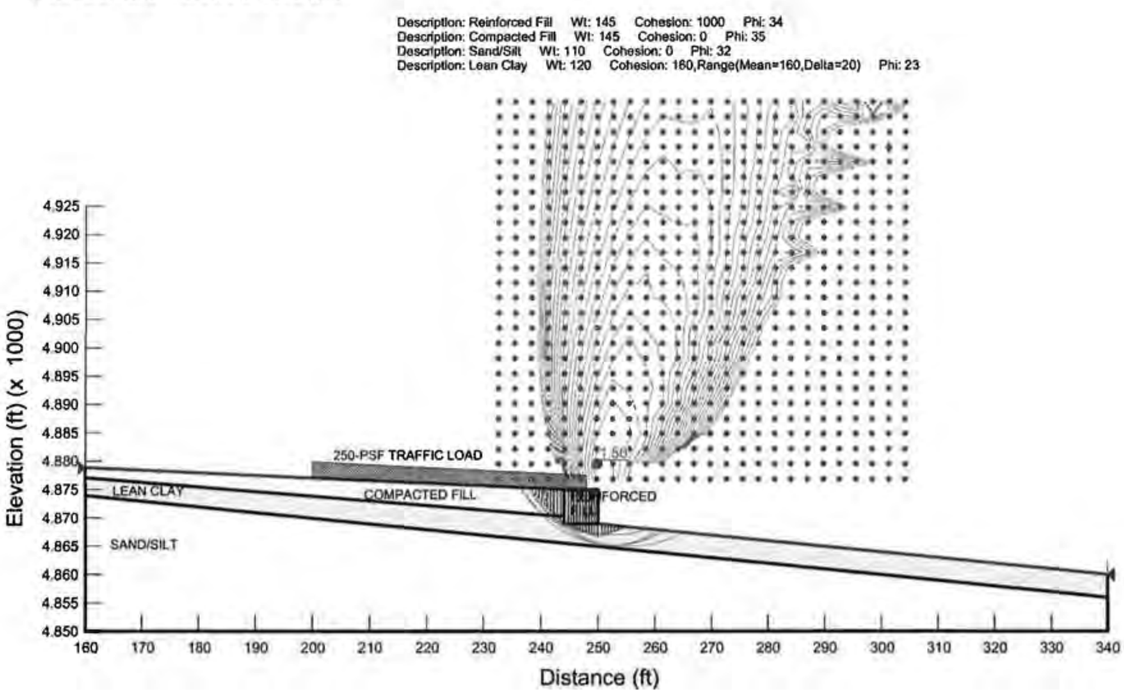
Mountain View Corridor - Segment 1
Wall 1H near MVC Sta. 978+00
NB Frontage Road - 5' MSE Wall, B = 5'
Static Case - Long-term strengths

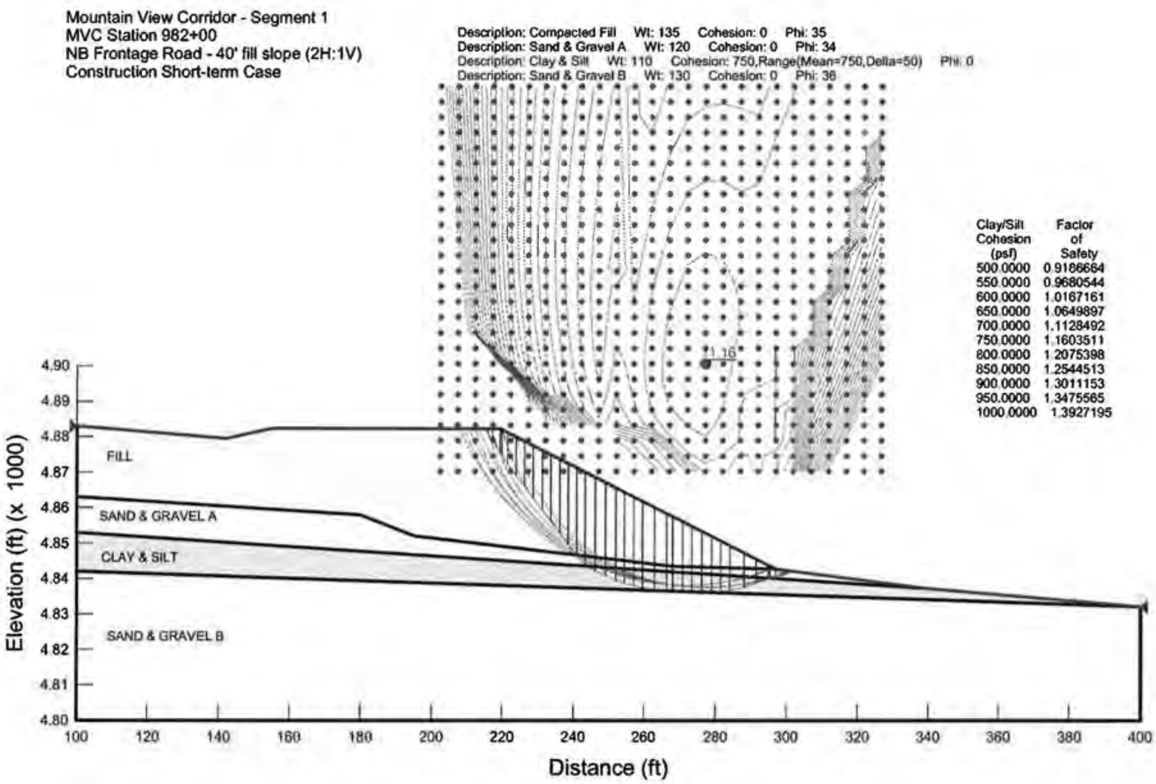


Mountain View Corridor - Segment 1
Wall 1H near MVC Sta. 978+00
NB Frontage Road - 5' MSE Wall, B = 5'
Seismic Case - Pseudostatic k = 0.18

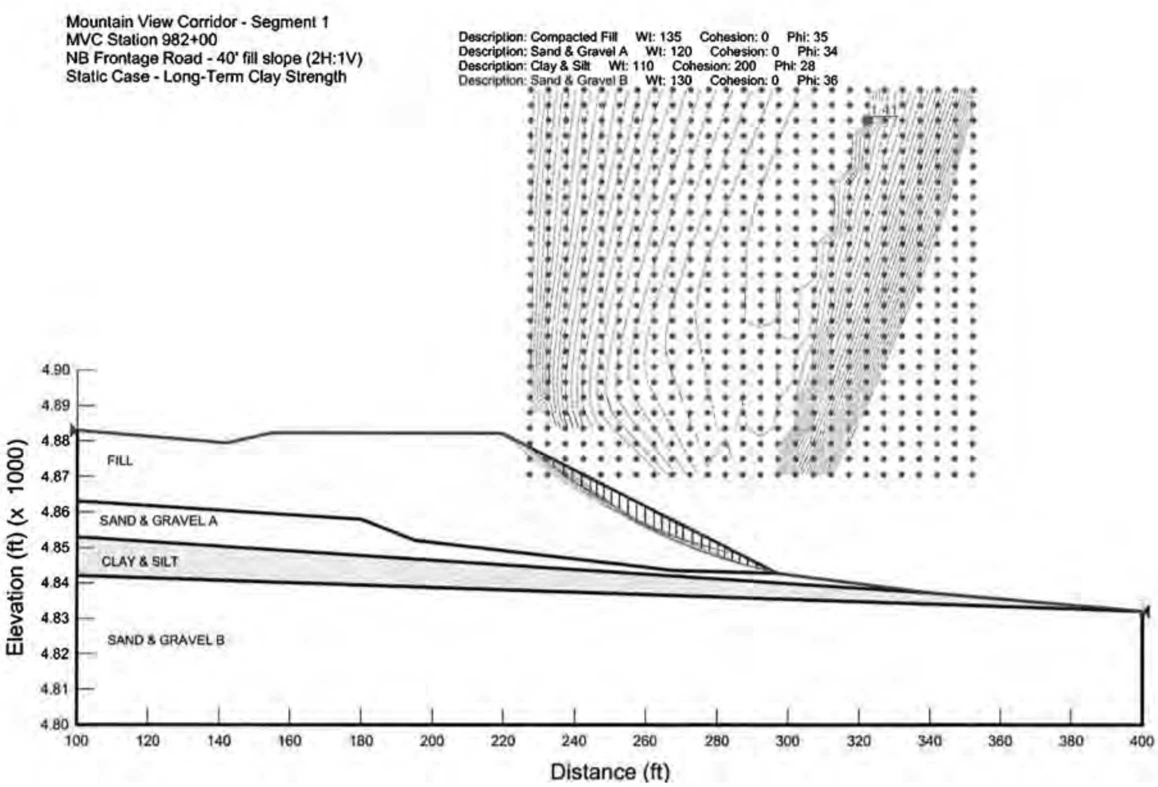


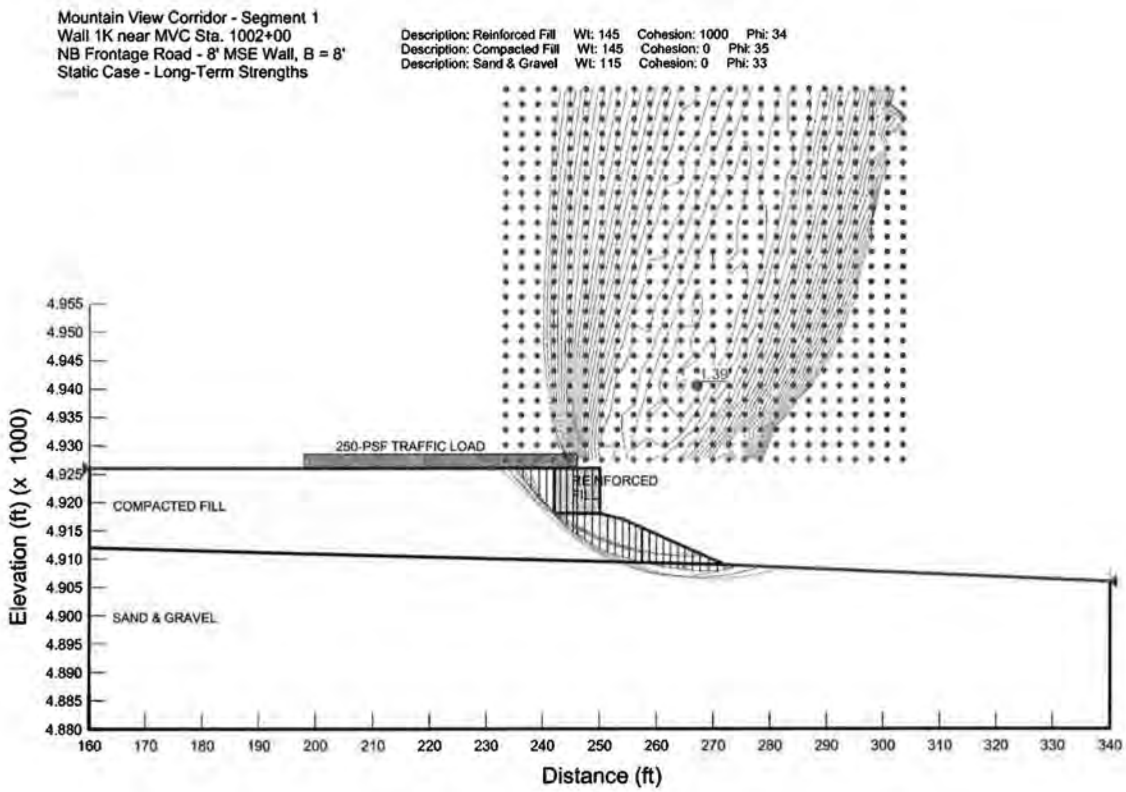
Mountain View Corridor - Segment 1
Wall 1H near MVC Sta. 978+00
NB Frontage Road - 5' MSE Wall, B = 5'
Post-Earthquake - Reduced clay strengths

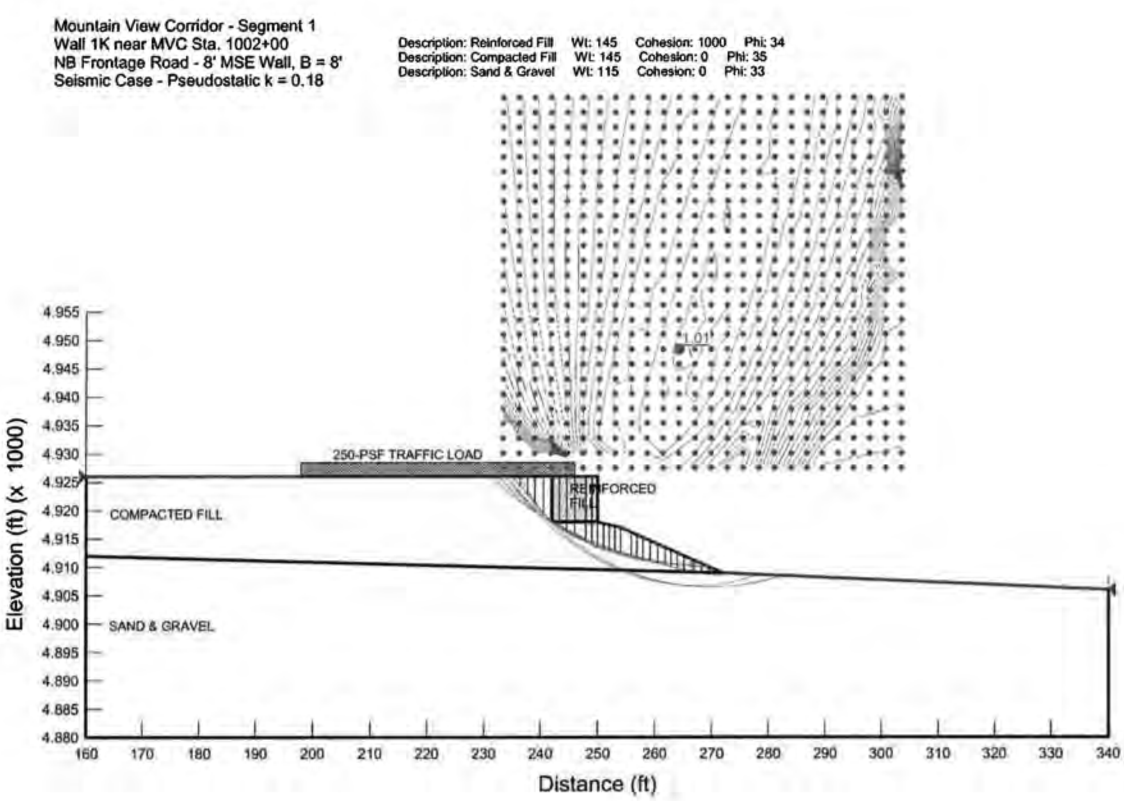




Clay/Silt Cohesion (psf)	Factor of Safety
500.0000	0.9186664
550.0000	0.9680544
600.0000	1.0167161
650.0000	1.0649897
700.0000	1.1128492
750.0000	1.1603511
800.0000	1.2075398
850.0000	1.2544513
900.0000	1.3011153
950.0000	1.3475565
1000.0000	1.3927195




Mountain View Corridor - Segment 1
Wall 1K near MVC Sta. 1002+00
NB Frontage Road - 8' MSE Wall, B = 8'
Static Case - Long-Term Strengths
Description: Reinforced Fill Wt: 145 Cohesion: 1000 Phi: 34
Description: Compacted Fill Wt: 145 Cohesion: 0 Phi: 35
Description: Sand & Gravel Wt: 115 Cohesion: 0 Phi: 33
1.39
250-PSF TRAFFIC LOAD
REINFORCED FILL
COMPACTED FILL
SAND & GRAVEL
Elevation (ft) (x 1000)
Distance (ft)


Mountain View Corridor - Segment 1
Wall 1K near MVC Sta. 1002+00
NB Frontage Road - 8' MSE Wall, B = 8'
Seismic Case - Pseudostatic k = 0.18
Description: Reinforced Fill Wt: 145 Cohesion: 1000 Phi: 34
Description: Compacted Fill Wt: 145 Cohesion: 0 Phi: 35
Description: Sand & Gravel Wt: 115 Cohesion: 0 Phi: 33
1.01
250-PSF TRAFFIC LOAD
REINFORCED FILL
COMPACTED FILL
SAND & GRAVEL
Elevation (ft) (x 1000)
Distance (ft)

MOUNTAIN VIEW CORRIDOR PHASE I - SEGMENT 1

Estimated LRFD Bearing Resistance for MSE Walls

B'	Bearing Resist. (psf)	
(ft)	Ultimate	Factored
6	9,381	6,098
8	11,218	7,292
10	13,055	8,486
12	14,892	9,680
14	16,729	10,874
16	18,566	12,068
18	20,403	13,262
20	22,240	14,456
22	24,077	15,650
24	25,914	16,844
26	27,751	18,038
28	29,588	19,232
30	31,425	20,426
32	33,262	21,620
34	35,099	22,814

Foundation Soil Parameters

foundation soil friction angle:	28 deg
foundation soil cohesion:	150 psf
foundation soil unit weight:	110 pcf

Bearing Capacity Factors

Nc:	25.8
Ngamma:	16.7

(see AASHTO LRFD Table 10.6.3.1.2a-1)

Groundwater Coefficient

Water Depth:	>60 ft
Cwgamma:	1

(see AASHTO LRFD Table 10.6.3.1.2a-2)

Resistance Factor: 0.65

(see AASHTO LRFD Table 11.5.6-1)

B' = L - 2e, where L = length of bottom reinforcement layer, and e = wall eccentricity

Mountain View Corridor - Segment 1

Summary of Lateral Earth Pressure Recommendations

Recommended Soil Parameters

Fill Description	Total Unit Weight (pcf)	Internal Friction Angle (degrees)	Cohesion (psf)
Sandy Gravel (Import)	145	36	0
Silty Sand (Road Ex.)	125	34	0

In the equations listed herein:

γ = effective unit weight of soil

H = height of wall

(1) Active Lateral Earth Force (yielding walls)

$P_A = 0.5K_A\gamma H^2$ (triangular distribution)

$K_A = 0.26$ (imported gravel)

0.28 (silty sand)

(2) Passive Lateral Earth Force (yielding walls)

$P_P = 0.5K_P\gamma H^2$ (triangular distribution)

$K_P = 3.85$ (imported gravel)

3.54 (silty sand)

(3) At-Rest Lateral Earth Force (non-yielding walls)

$P_O = 0.5K_O\gamma H^2$ (triangular distribution)

$K_O = 0.41$ (imported gravel)

0.44 (silty sand)

(4) At-Rest Lateral Earth Force Modified for Compaction (non-yielding walls)

Use if activity of mechanical compaction equipment is anticipated within a distance equal to half the wall height.

General Equations for walls less than about 8 feet high

$P_O^* = 0.5(K_O^*)\gamma H^2$ (triangular distribution)

$K_O^* = 2.8$ for granular fill

Computed based on Sharif et al. (1984) as described in Das (1994).

Walls greater than 8 feet high should be considered on a case-by-case basis.
Pressures listed above may be reduced by limiting size of compaction equipment permitted within a distance equal to half the wall height.

(5) Seismic Lateral Earth Forces (yielding walls)

Site Peak Ground Acceleration $A_s = F_{pga}PGA$

Bridge Site Location	7% PE in 75 Years	3% PE in 75 Years
South Hills Drive Area - Site Class D	0.37	0.48
Juniper Canyon Area - Site Class D	0.36	0.46

PGA = 0.30-0.31g for 7% PE in 75 yrs, and PGA = 0.43-0.47g for 3% PE in 75 yrs.

Equations by Okabe (1926) and Mononobe and Matsuo (1929), referenced in Kramer (1996)

Total Active Thrust

$P_{AE} = 0.5K_{AE}\gamma H^2$

K_{AE} = (see table below)

Dynamic Component

$\Delta P_{AE} = P_{AE} - P_A$

P_A has triangular distribution (resultant at H/3 above base of wall)

ΔP_{AE} acts at about 0.6H above base of wall (same direction as P_A)

(5) Seismic Lateral Earth Forces (continued from previous page)

Total Passive Thrust

$P_{PE} = 0.5K_{PE}\gamma H^2$

K_{PE} = (see table below)

Dynamic Component

$\Delta P_{PE} = P_P - P_{PE}$

P_P has triangular distribution (resultant at H/3 above base of wall)

ΔP_{PE} acts at about 0.6H above base of wall (opposite P_P)

Dynamic Earth Pressure Coefficients (for minimal wall displacement)*

Case	Friction Angle	Acceleration A_s			
		0.36	**0.37**	**0.46**	**0.48**
Active (K_{AE})	**34**	0.48	0.49	0.56	0.58
	36	0.45	0.46	0.53	0.54
Passive (K_{PE})	**34**	2.95	2.93	2.76	2.72
	36	3.24	3.22	3.05	3.01

* Assumes $k_h = 0.8A_s$.

*Dynamic Earth Pressure Coefficients (for wall displacement up to 10A inches**)*

Case	Friction Angle	Acceleration A_s			
		0.36	**0.37**	**0.46**	**0.48**
Active (K_{AE})	**34**	0.40	0.40	0.43	0.44
	36	0.37	0.37	0.40	0.41
Passive (K_{PE})	**34**	3.18	3.17	3.08	3.05
	36	3.48	3.47	3.37	3.35

** Assumes $k_h = 0.5A_s$. See AASHTO LRFD A11.1.1.2 "Design for Displacement"

(6) Seismic Lateral Earth Pressures (non-yielding walls)

Equations by Wood (1973), referenced in Kramer (1996)

Dynamic Thrust

$\Delta P_{eq} = a_h\gamma H^2$

a_h= Peak Ground Acceleration Coefficient (A_s)

Dynamic Overturning Moment

$\Delta M_{eq} = 0.53a_h\gamma H^3$

Point of Application of Dynamic Thrust

$h_{eq} = \Delta M_{eq}/\Delta P_{eq}$

$\approx 0.53H$

ALL COEFFICIENTS LISTED ABOVE ASSUME NEGLIGIBLE BACKSLOPE ABOVE WALL.

References

Das, B. (1994). "Principles of geotechnical engineering, 3rd edition, PWS Publishing, Boston, MA.
Kramer, S. (1996). "Geotechnical earthquake engineering," Prentice Hall, Upper Saddle River, NJ.
Mononobe, N. and Matsuo, H. (1929). "On the determination of earth pressures during earthquakes," *Proceedings, World Engineering Congress,* 9 p.
Okabe, S. (1926). "General theory of earth pressures," *Journal of the Japan Society of Civil Engineering* , Vol. 12, No. 1.

Segment 1 Detention Basin Borings - Permeability Summary

Pond 205

Boring 09-D1-01
Ground Elev. 4660.2 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4660.2	4655.2	1,040	SC, GM, SM
5.0	10.0	4655.2	4650.2	115	SM, CL

Boring 09-D1-02
Ground Elev. 4648.0 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4648.0	4643.0	52,400	SC, GM
5.0	10.0	4643.0	4638.0	21,300	GM, SM

Boring 09-D1-03
Ground Elev. 4654.1 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4654.1	4649.1	311	SC, CL
5.0	10.0	4649.1	4644.1	519	CL, SM

Pond 210

Boring 09-D1-04
Ground Elev. 4800.8 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4800.8	4795.8	493	CL, SM
5.0	10.0	4795.8	4790.8	102	SM

Boring 09-D1-05
Ground Elev. 4807.7 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4807.7	4802.7	726	SC, SM
5.0	10.0	4802.7	4797.7	187	SM

Segment 1 Detention Basin Borings - Permeability Summary

Pond 240

Boring 09-D1-06
Ground Elev. 4793.7 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4793.7	4788.7	519	SC-SM, SP-SM
5.0	10.0	4788.7	4783.7	259	SP-SM, GP-GM

Boring 09-D1-07
Ground Elev. 4774.2 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4774.2	4769.2	207	SC
5.0	10.0	4769.2	4764.2	346	SC-SM

Boring 09-D1-08
Ground Elev. 4784.0 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4784.0	4779.0	156	CL, SM
5.0	10.0	4779.0	4774.0	46	SM

Boring 09-D1-09
Ground Elev. 4796.0 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	3.0	4796.0	4793.0	683	SC, SP-SM
5.0	10.0	4791.0	4786.0	104*	SM, SP-SM

Boring 09-D1-10
Ground Elev. 4777.5 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4777.5	4772.5	207	SM
5.0	10.0	4772.5	4767.5	277	SM, ML

Boring 09-D1-11
Ground Elev. 4790.8 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	3.0	4790.8	4787.8	745	SC-SM, GP-GM
5.0	10.0	4785.8	4780.8	218*	SC-SM, SM

Boring 09-D1-12
Ground Elev. 4801.7 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	3.0	4801.7	4798.7	248	SM
5.0	10.0	4796.7	4791.7	103	SM, SC-SM

Boring 09-D1-13
Ground Elev. 4786.6 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	3.0	4786.6	4783.6	1,120	SM, SP-SM
5.0	10.0	4781.6	4776.6	337	SP-SM, SM

Boring 09-D1-14
Ground Elev. 4802.5 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	3.7	4802.5	4798.8	94,300	GP-GM
5.0	10.0	4797.5	4792.5	1,860	GP-GM, SM

Boring 09-D1-15
Ground Elev. 4814.4 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4814.4	4809.4	804	SC, SM, SP-SM
5.0	10.0	4809.4	4804.4	354	SP-SM

Boring 09-D1-16
Ground Elev. 4796.8 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4796.8	4791.8	570	SC-SM, GM
5.0	10.0	4791.8	4786.8	372	GM, SP-SM

*Auger-soil interface not sealed. Test may be invalid.

Segment 1 Detention Basin Borings - Permeability Summary

Pond near 14400 South

Boring 09-D1-17
Ground Elev. 4820.6 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4820.6	4815.6	156	SC-SM, CL-ML
5.0	10.0	4815.6	4810.6	31	CL-ML

Boring 09-D1-18
Ground Elev. 4808.8 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4808.8	4803.8	259	CL-ML, ML
5.0	10.0	4803.8	4798.8	35	ML, CL-ML, GM

Boring 09-D1-19
Ground Elev. 4814.3 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4814.3	4809.3	182	CL-ML
5.0	10.0	4809.3	4804.3	53	CL-ML, GC-GM

Boring 09-D1-20
Ground Elev. 4825.1 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4825.1	4820.1	182	ML
5.0	10.0	4820.1	4815.1	30,200	ML, GM, SM

Boring 09-D1-21
Ground Elev. 4810.7 ft

Depth Interval		Elevation Interval		*k*	USCS Soil
Top (ft)	Btm (ft)	Top (ft)	Btm (ft)	(ft/yr)	Type(s)
0.0	5.0	4810.7	4805.7	182	SC-SM, SM
5.0	10.0	4805.7	4800.7	61	SM, ML