February 19, 2020

Bear Valley Road and 2nd Avenue, LLC
c/o Michael Asheghian
12300 Wilshire Blvd #410
Los Angeles, CA 90025

Subject: **Geotechnical Report Update | Victorville Connection | Bear Valley Road and 2nd Avenue, Victorville, CA | M.J. Project No. 3526.001.500**

Mr. Asheghian:

Introduction

In accordance with your authorization, we have performed an update to the geotechnical investigation report dated November 16, 2005 Merrell Engineering Company (predecessor to Merrell Johnson) performed for the Victorville Connection development. The project was formerly identified by its location northwest of the intersection of Bear Valley Parkway and 2nd Avenue in Victorville, California.

The scope of this update consisted of a review of the data, conclusions and recommendations in the November 16, 2005 report, and a site reconnaissance on February 12, 2020 by the Merrell Johnson representative who performed the original field exploration and prepared the 2005 geotechnical report. Existing site conditions were compared with surface conditions noted during the original investigation to evaluate whether significant changes had occurred that could affect the findings and conclusions in the original report.

Currently Proposed Development

The development as currently envisioned consists of:

- Parcel A – Gas Station and Retail: 2.1 acres
- Parcel B – Fast Food: 1.2 acres
- Parcel C1 – Retail: 2.9 acres
- Parcel C2 – Retail/Office: 6.9 acres

- Parcel C3 – Retail/Office/Medical: 3.3 acres
- Parcel D – Residential: 13.2 acres
- Parcel E – Storage & Business Center 6.1 acres

An alternative currently being considered to the configuration described above would increase Parcel C2 to 10.3 acres, eliminate Parcel C3, and replace a major retail space with additional residential units.

Conclusions and Recommendations

Existing Surficial Conditions

The recent site reconnaissance indicated that limited earthwork has been performed since the original geotechnical report was prepared. It appears from surface conditions that individual building pads have been graded in anticipation of future construction. No structures have been constructed.

In addition to the individual building pad earthwork, it appears that some site utilities such as water lines have been installed, and curb and gutter, sidewalks and driveway approaches have been built. No information is available regarding the work performed. The earthwork and improvements do not appear to correlate with current development plans. It is anticipated that regrading the entire site will need to be performed for development of the Victorville Connection project.

Additional Earthwork Recommendations

Recommendations for site preparation and grading contained in Merrell Johnson's 2005 geotechnical report remain applicable to the presently-proposed development. In addition to the recommendations in that report, existing fill soils as well as pavements, curbs and slabs should be excavated from areas to be graded and where structures will be constructed. A Merrell Johnson representative should observe site preparation and grading, and check that existing fill and other materials have been removed.

Existing asphalt concrete and portland cement concrete can be pulverized to less than 4 inches in maximum dimension and mixed with on-site soils for use as fill. Subgrade preparation as well as fill material, placement and compaction procedures are described in the 2005 geotechnical report. Over-excavation, replacement and compaction criteria below structure foundations are also presented in the 2005 report.

Foundation Design Update

Review of the foundation design recommendations in the original report indicates that an update is appropriate. It is recommended that the planned structures be supported on shallow spread footings with bottom levels in compacted fill as indicated in the report. Footings should have bottom levels at a minimum depth of 18” below the lowest adjacent finished grade. A minimum width of 12” is recommended for continuous footings. Isolated footings should be at least 18” wide. Footings can be designed for an allowable bearing pressure of 2000 pounds per square foot for dead plus long-term live loads. This bearing pressure can be increased by 250 pounds per square foot for each additional foot of depth to a maximum bearing pressure of 3000 pounds per square foot for dead plus long-term live loads. These values can be increased by ⅓ for the total of all loads, including wind or seismic forces.

Groundwater

A review of groundwater data maintained by the United States Geological Survey indicates that groundwater depths in the area generally have decreased since 2005, and are on the order of 200 feet or more below the ground surface. The potential for liquefaction or soil compression due to seismic shaking remains very low.

Seismic Considerations

Some changes have occurred in the seismic provisions of the California Building Code (CBC) since the original report was prepared. Revised seismic parameters based on the 2019 CBC are listed in the following table. These parameters replace the values in the 2005 geotechnical investigation report.

SEISMIC DESIGN PARAMETERS

2019 CALIFORNIA BUILDING CODE

TYPE	VALUE	DESCRIPTION
S_S	1.251	MCE_R ground motion (for 0.2 second period).
S_1	0.482	MCE_R ground motion (for 1.0 second period).
S_{MS}	1.251	Site-modified spectral acceleration value.
S_{M1}	null	Site-modified spectral acceleration value.
S_{DS}	0.834	Numeric seismic design value at 0.2 second SA.
S_{D1}	null	Numeric seismic design value at 1.0 second SA.
PGA	0.5	MCE_G peak ground acceleration.
F_{PGA}	1.1	Site amplification factor at PGA.
PGA_M	0.55	Site modified peak ground acceleration.

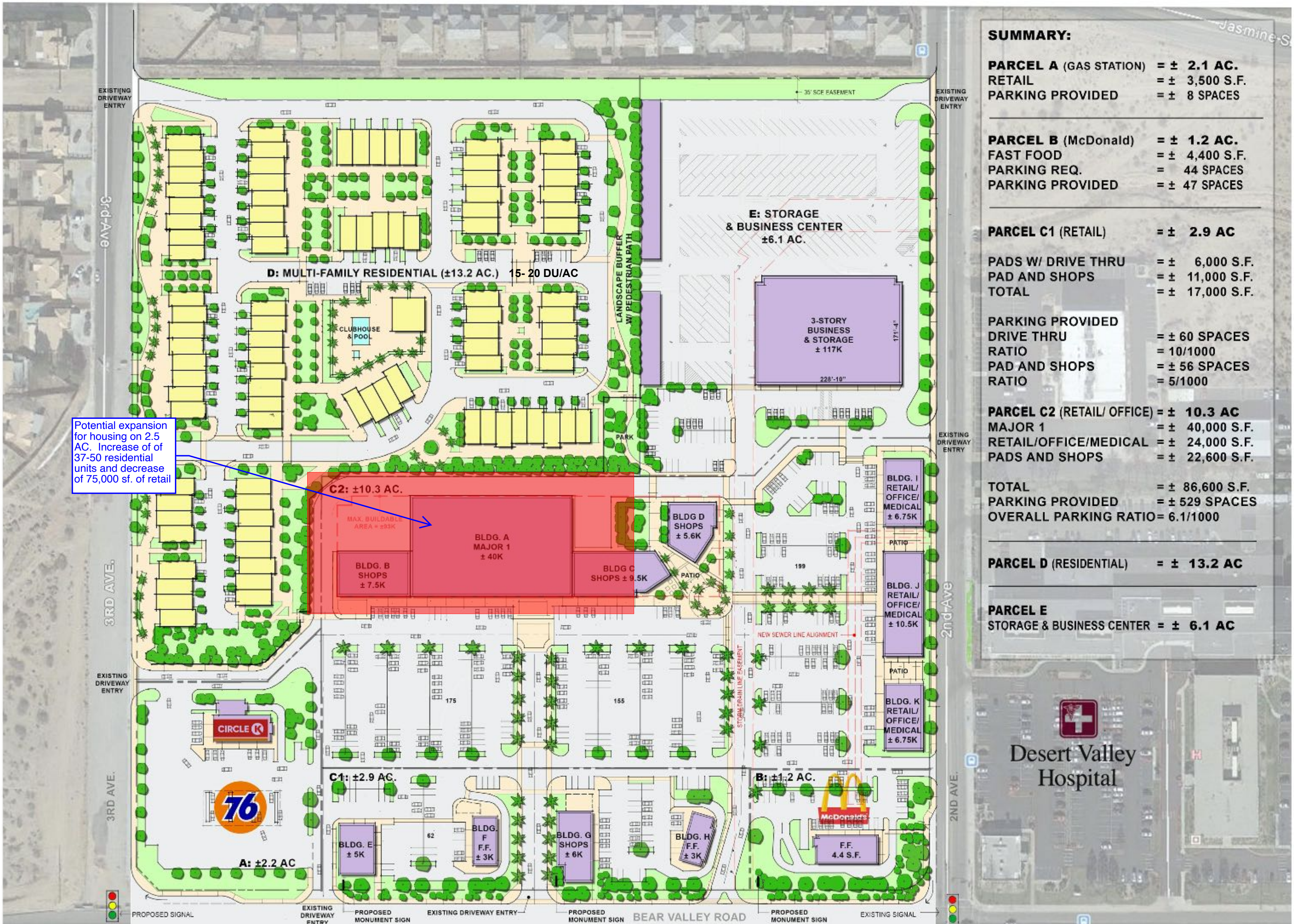
As noted in the original report, the site is not within an Alquist-Priolo Earthquake Fault Zone, a Liquefaction Zone or a Landslide Hazards Zone.

We trust the findings and conclusions presented above provide the information needed at this time. If you have any questions, don't hesitate to contact this office.

Sincerely,

Merrell Johnson Companies

James Stone
RGE 808 Exp. 12/31/2021



SUMMARY:

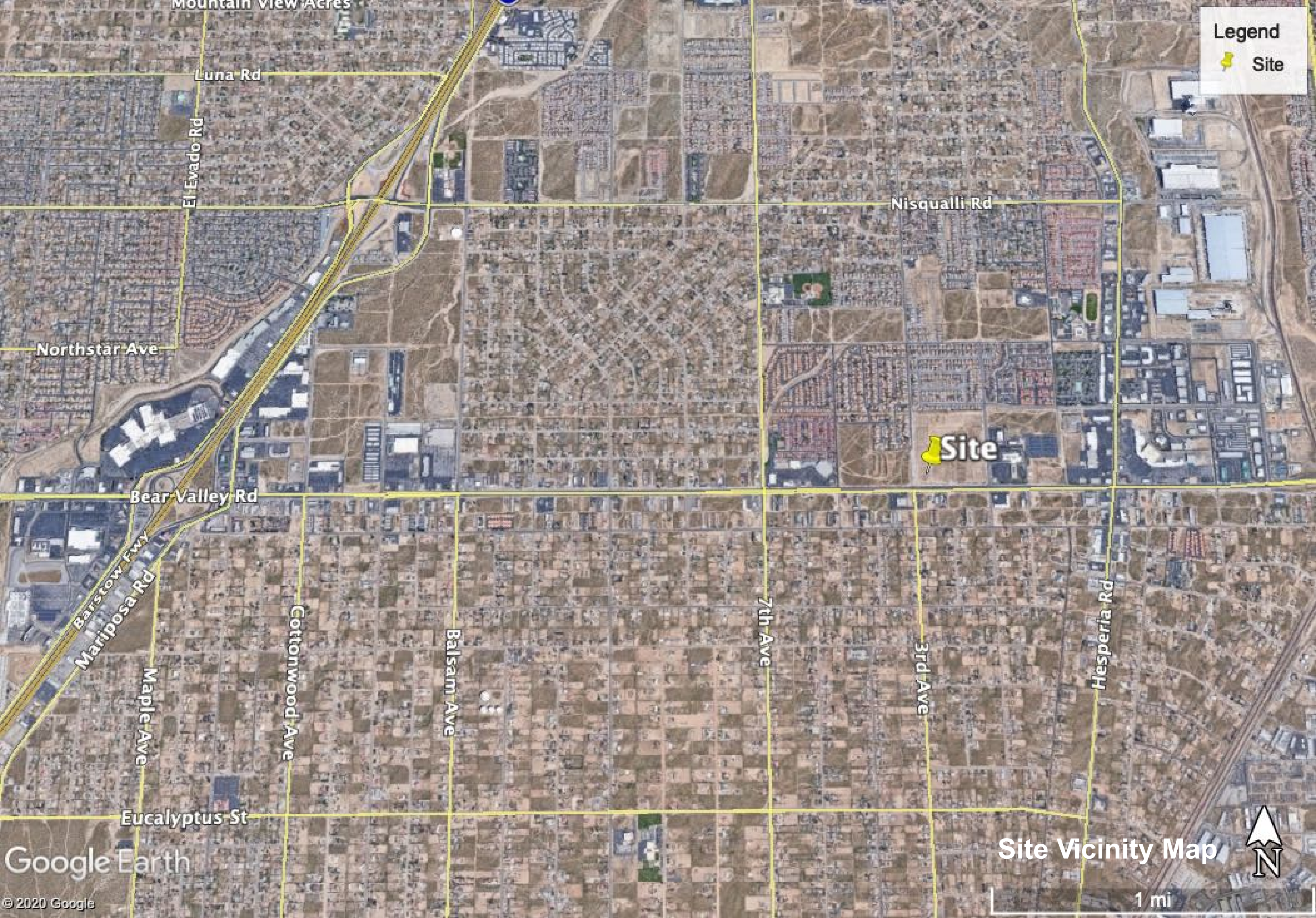
PARCEL A (GAS STATION)	= ± **2.1 AC.**
RETAIL	= ± 3,500 S.F.
PARKING PROVIDED	= ± 8 SPACES
PARCEL B (McDonald)	= ± **1.2 AC.**
FAST FOOD	= ± 4,400 S.F.
PARKING REQ.	= 44 SPACES
PARKING PROVIDED	= ± 47 SPACES
PARCEL C1 (RETAIL)	= ± **2.9 AC**
PADS W/ DRIVE THRU	= ± 6,000 S.F.
PAD AND SHOPS	= ± 11,000 S.F.
TOTAL	= ± 17,000 S.F.
PARKING PROVIDED	
DRIVE THRU	= ± 60 SPACES
RATIO	= 10/1000
PAD AND SHOPS	= ± 56 SPACES
RATIO	= 5/1000
PARCEL C2 (RETAIL/ OFFICE)	= ± **10.3 AC**
MAJOR 1	= ± 40,000 S.F.
RETAIL/OFFICE/MEDICAL	= ± 24,000 S.F.
PADS AND SHOPS	= ± 22,600 S.F.
TOTAL	= ± 86,600 S.F.
PARKING PROVIDED	= ± 529 SPACES
OVERALL PARKING RATIO	= 6.1/1000
PARCEL D (RESIDENTIAL)	= ± **13.2 AC**
PARCEL E	
STORAGE & BUSINESS CENTER	= ± **6.1 AC**

PROPOSED SITE PLAN
Conceptual Design | SCALE: 1" = 50' -0"

VICTOR VALLEY CONNECTION
VICTORVILLE, CALIFORNIA

NOVEMBER 1, 2019

DLR Group


Mountain View Acres
Luna Rd
El Evado Rd
Nisqualli Rd
Northstar Ave
Bear Valley Rd
Barstow Fwy
Mariposa Rd
Maple Ave
Cottonwood Ave
Balsam Ave
7th Ave
3rd Ave
Hesperia Rd
Eucalyptus St
Site
Legend
Site
Site Vicinity Map
N
1 mi
Google Earth
© 2020 Google

Merrell Johnson

Bear Valley Plaza - 76 Gas Station
Bear Valley Road, between 2nd and 3rd Avenues
Victorville, CA

Results of Two Percolation Tests and Calculated Infiltration Rates

For: Bear Valley Road and 2nd Avenue, LLC
Prepared By: Merrell Johnson Companies

May 15, 2020

Sheryl Hernandez
Bear Valley Road and 2nd Avenue, LLC
c/o Michael Asheghian
12300 Wilshire Blvd. #410
Los Angeles, CA 90025

Subject: Results of Two Percolation Tests and Calculated Infiltration Rates | Proposed 76 Gas Station | NE Corner of Bear Valley Road and 3rd Avenue, Victorville, CA | M.J. Project No. 3526.001.500

Ms. Hernandez:

Construction of a 76 Gas Station is proposed at the southwest corner of the 36-acre Bear Valley Plaza site, which is located on the north side of Bear Valley Road between 2nd and 3rd Avenues. The Gas Station will incorporate a convenience store, pump islands, and car wash.

Storm and nuisance water from the site will be directed to two infiltration basins, designated Basins A and B. Basin A will be a 5-foot-deep basin excavated to the east of the convenience store. Basin B will be a 7.5-foot-deep underground basin that will be located north of the car wash. A temporary graded basin, designated Basin C, will be excavated outside the northeast corner of the site. The configurations of the proposed Gas Station and associated basins are shown on the attached Conceptual Grading Plan, Exhibit “A” Infiltration Test Locations, prepared by DRC Engineering, Inc., revised April 28, 2020.

TEST BORINGS

On May 11, 2020 we excavated two test borings within the boundaries of the proposed basins. The borings within Basins A and B were drilled to depths of 5.0 and 7.5 feet, respectively. The soil percolation rate was measured in both borings. The Porchet Method equation was then used to covert the percolation rate to the approximate infiltration rate. The Porchet Method procedures used for this report were outlined in the Riverside County Low Impact Development BMP Handbook, rev. 9/2011. A corresponding Technical Guidance Document Errata Sheet #2 was prepared by Orange County Public Works on February 5, 2013, which correcting some equation errors listed in Riverside County's Handbook.

The approximate locations of the test borings are shown on the attached Conceptual Grading Plan.

SOIL CONDITIONS

The soil conditions encountered in the test borings are tabulated below:

Boring No.	Depth (feet)	Soil Description	Lab Test
P-1	0-1.0	Brown silty sand with gravel (SM), dense (compacted), dry	
	1.0-2.5	Brown sand with silt & gravel (SP-SM) medium dense, moist	
	2.5-5.0	Light brown well graded sand with gravel (SP), medium dense, moist	4.7% Passing #200
P-2	0-1.0	Brown silty sand with gravel (SM), dense (compacted), dry	
	1.0-2.5	Brown sand with silt & gravel (SP-SM) medium dense, moist	
	2.5-7.5	Light brown well graded sand with gravel (SP), medium dense, moist	

GROUNDWATER

Water well data published by the California Department of Water Resources lists a well located about 0.8 miles northeast of the site near the southeast corner of 1st Avenue and Jasmine Street. Their data indicates the groundwater table is about 250 feet below the ground surface at this location. The following is a link to their website: http://wdl.water.ca.gov/waterdatalibrary/

PERCOLATION TESTS

Test Preparation

Percolation Test Borings P-1 and P-2 were excavated to depths of 5.0 and 7.5 feet, respectively. The bottoms of the holes correspond to the designed depths of the respective basins. The bottoms of the test holes were covered with 2 inches of 3/8-inch pea gravel. To minimize caving, a 4-inch diameter perforated PVC pipe was inserted into each hole.

Pre-soaking

The holes were pre-soaked by filling each hole with about 15 gallons of water. This provided sufficient water to fill the holes to a level at least 5 times the holes' radiuses (4-inch radius). The water levels in both borings dropped rapidly after the filling stopped, percolating away completely in approximately 3 minutes.

Test Procedure

Following the pre-soak described above, the holes were refilled twice. The two consecutive measurements showed that at least 6 inches of water seeped away in less than 25 minutes, therefore; the sandy soil criteria for testing was used as is described below:

- The holes were filled with potable water to a depth of at least 5 times the holes' radiuses.
- The drop in the water level was measured every 10 minutes or until all the water had percolated away.
- The holes were refilled between measurements.
- Measurements were taken from a fixed reference point at a precision of 0.1 inch using an electronic measuring meter (tape) that audibly signaled contact with the water level.

- The measurements were recorded on the attached Percolation Test Data Sheets.

PERCOLATION TEST RESULTS

The results of the percolation test are listed below.

- P-1 = 0.34 minutes/inch
- P-2 = 0.36 minutes/inch

INFILTRATION RATE CALCULATIONS

The observed infiltration rate (I_t) was converted from the data collected at the final percolation test interval using the Porchet Method equation presented below:

$$I_t = \frac{\Delta H \Pi r^2\ 60}{\Delta t\ (\Pi r^2 + 2\Pi r\ H_{avg})} = \frac{\Delta H\ 60\ r}{\Delta t\ (r + 2\ H_{avg})}$$

Where:

I_t = observed infiltration rate, inches per hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
r = effective radius of the test hole H_{avg}

P-1 - The observed infiltration rate for Boring P-1 was calculated as follows:

- Time interval, Δt = 7.8 minutes
- Final depth to water, D_f = 60.0 inches
- Test hole radius, r = 4 inches
- Initial depth to water, D_0 = 37.0 inches
- Total depth of test hole, D_t = 60.0 inches

The conversion equation is used:

$$I_t = \frac{\Delta H\ 60\ r}{\Delta t\ (r + 2H_{avg})}$$

$H_0 = D_{t.} – D_0 = 60$ inches – 37 inches = 23 inches
$H_f = D_t – D_f = 60$ inches – 60 inches = 0 inches
$\Delta H = \Delta D = H_0 – H_f = 23$ inches – 0 inches = 23 inches
$H_{avg} = (H_0 + H_f) / 2 = (23 + 0) / 2 = 11.5$ inches

$$\text{P-1 } I_t = \frac{\Delta H\ 60\ r}{\Delta t\ (r+2H_{avg})} = \frac{(23\text{ in})(60\text{ min/hr})(4\text{ in})}{7.8\text{ min }((4\text{ in} + 2\ (11.5\text{ in}))} = \mathbf{26.2\ in/hr}$$

P-2 - The observed infiltration rate for Boring P-1 was calculated as follows:

- Time interval, $\Delta t = 8.0$ minutes
- Final depth to water, $D_f = 90.0$ inches
- Test hole radius, $r = 4$ inches
- Initial depth to water, $D_0 = 68.0$ inches
- Total depth of test hole, $D_t = 90.0$ inches

The conversion equation is used:

$$I_t = \frac{\Delta H\ 60\ r}{\Delta t\ (r+2H_{avg})}$$

$H_0 = D_{t.} – D_0 = 90$ inches – 68 inches = 22 inches
$H_f = D_{t.} – D_f = 90$ inches – 90 inches = 0 inches
$\Delta H = \Delta D = H_0 – H_f = 22$ inches – 0 inches = 22 inches
$H_{avg} = (H_0 + H_f) / 2 = (22 + 0) / 2 = 11.0$ inches

$$\text{P-1 } I_{t.} = \frac{\Delta H\ 60\ r}{\Delta t\ (r+2H_{avg})} = \frac{(22\text{ in})(60\text{ min/hr})(4\text{ in})}{8.0\text{ min }((4\text{ in} + 2\ (11.0\text{ in}))} = \mathbf{25.4\ in/hr}$$

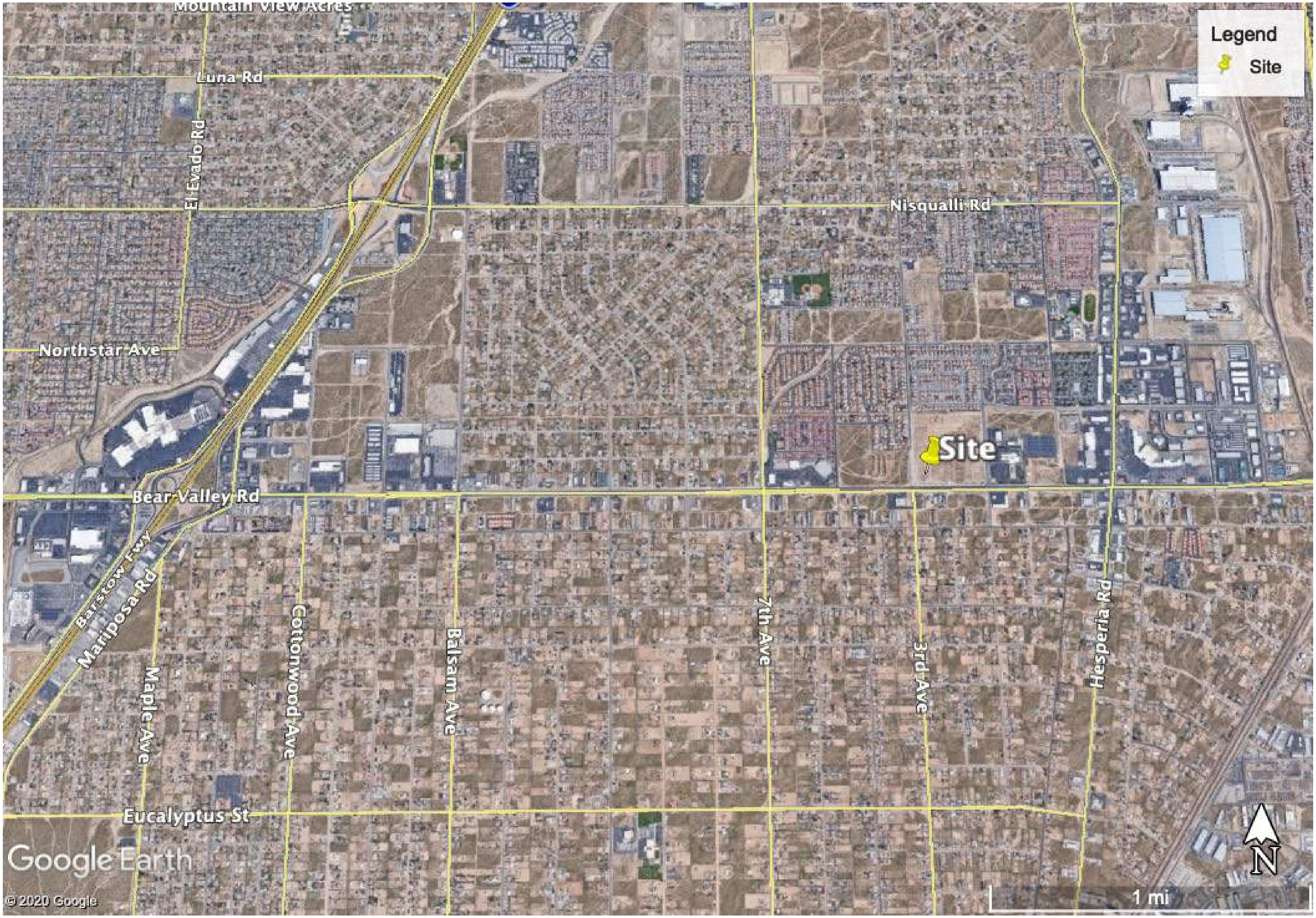
Summary of Results				
Test Boring	**Boring Depth (inches)**	**Soil Type**	**Measured Percolation Rate (min/in)**	**Observed Infiltration Rate (in/hr)**
P-1	60	SP	0.34	26.2
P-2	90	SP	0.36	25.4

We appreciate this opportunity to be of service. Should you have questions, please contact our office.

Sincerely,
Merrell Engineering Company, Inc.

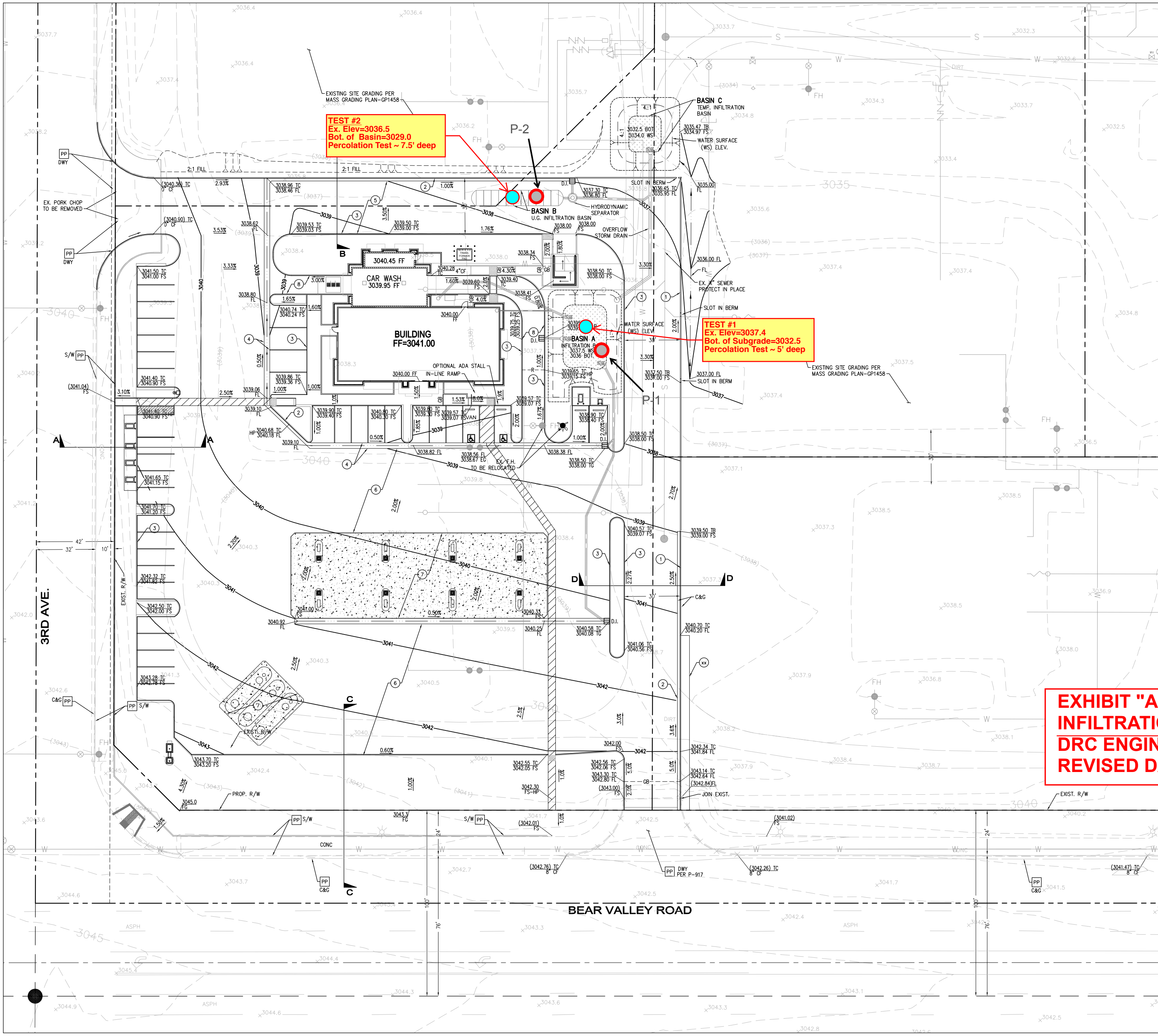
Brad S. Merrell, P.E.
President
R.C.E. 49423 Exp. 09/30/20

Appendix A
Figures



May 15, 2020
Observed Infiltration Rates Derived Using the Porchet Method
Proposed 76 Gas Station Infiltration Basins, Bear Valley Road and 3rd Avenue, Victorville, CA
MJ Project No. 3526.001.500
Figure 1 | Site Vicinity

MerrellJohnson



GRADING CONSTRUCTION NOTES

1. CONSTRUCT 6" AC CURB PER SPPWC STANDARD PLAN 120-2, D1-6
2. CONSTRUCT 6" CURB & GUTTER PER CITY OF VICTORVILLE STD DWG S-01
3. CONSTRUCT 6" CURB PER CITY OF VICTORVILLE STD DWG S-09
4. CONSTRUCT 3' WIDE CONCRETE RIBBON GUTTER PER DETAIL X ON SHEET X
5. CONSTRUCT 4" A.C. OVER 8" CLASS II A.B. OVER COMPACTED NATIVE SOILS PER SOILS REPORT AND CITY REQUIREMENT (SEE GENERAL NOTE 12)
6. CONSTRUCT 3" A.C. OVER 5" CLASS II A.B. OVER COMPACTED NATIVE SOILS PER SOILS REPORT AND CITY REQUIREMENT (SEE GENERAL NOTE 12)
7. CONSTRUCT 6" CONCRETE PAVEMENT OVER 4" A.B.
8. CONSTRUCT 6" CONCRETE PAVEMENT OVER 6" A.B. OR CMB OVER 12" COMPACTED SUBGRADE

Legend

P-1, Percolation Test Boring

GRAPHIC SCALE: 1"=20'

NOT FOR CONSTRUCTION

DRC Engineering, Inc.
Civil Engineering/Land Surveying/Land Planning
160 S. Old Springs Road
Suite 210
Anaheim Hills, CA 92808
714-685-6860

DATE:

NO.: REVISION:

PROJECT: VICTORVILLE CONNECTION
BEAR VALLEY ROAD & 3RD AVE.
VICTORVILLE, CA

DRAWING NAME: CONCEPTUAL GRADING PLAN

ISSUE:	CONCEPTUAL
DATE:	04/13/20
CHECKED: RS	DRAWN: BJ
DRAWING FILE:	20523CG
PROJECT NO.:	20-523
SHEET NUMBER:	1
OF 1 SHEETS	
SCALE:	PER PLAN

Appendix B
Laboratory Testing

Particle-Size Analysis of Soil

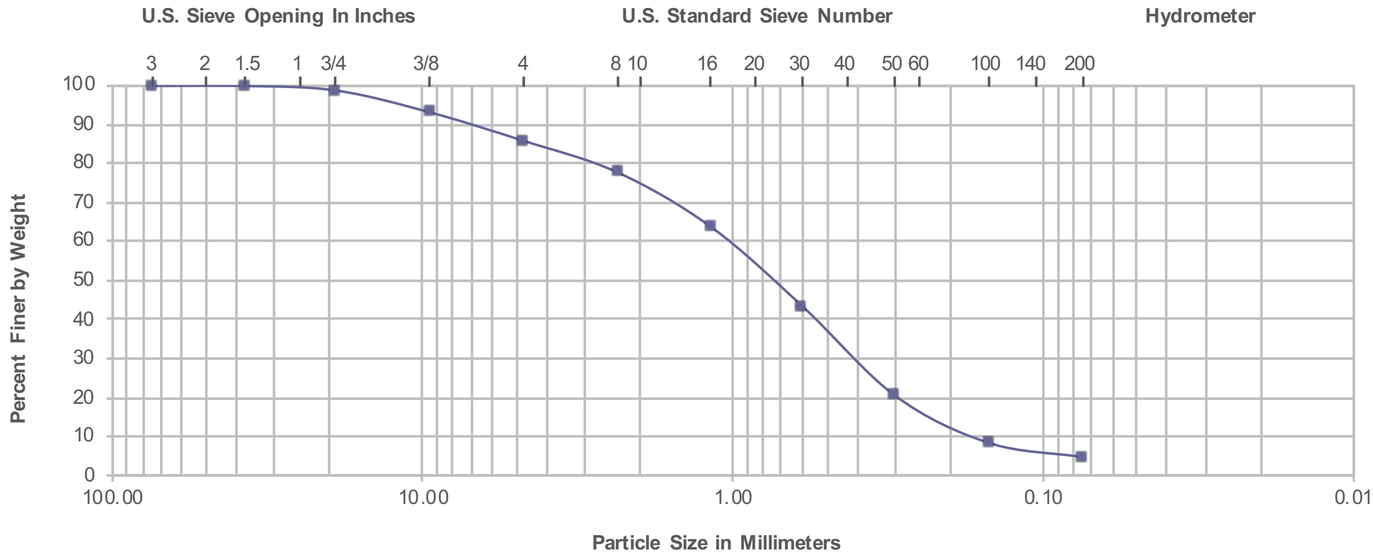
D422, D1140, D2487

Report Date: 05/14/20
Sheet: 1 of 1
Attachments: DR01, SS01
Permit No:
Client Project No:
Other:
DSA File No:
DSA Application No:
DSA LEA No:

Project Number: 3526.001.500
Project Title: Gas Station, Bear Valley Plaza
Project Location: NE Cor. Of Bear Valley Rd. & Thrid Ave.,Victorville, CA
Client: Bear Valley Road & Second Avenue, LLC

Sample ID: CDL05112001 **Gravel**(%): 14.1% **Sand** (%): 81.2% **Fines** (%): 4.7%

Classification, ASTM D2487: Well graded sand
Sample Origin: P-1, 3' to 5'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	Other
6	1	3.3%	37.500	1.050	0.405	0.185	ND	ND	ND	ND	ND	-

Method / Procudure Used: D422, D1140
Size of Initial Dry Mass(g): 998.4
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/12 hr
Type & Amount of Agent: Defloc. & 1.0
Laboratory Comments:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

MerrellJohnson. engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson

Appendix C
Percolation Test Results

May 15, 2020
Observed Infiltration Rates Derived Using the Porchet Method
Proposed 76 Gas Station Infiltration Basins, Bear Valley Road and 3rd Avenue, Victorville, CA
MJ Project No. 3526.001.500

Percolation Test Data Sheet

Project:	Bear Valley Plaza	Project No:	3526.001.500	Date:	05/11/20	
Test Hole No:	P-1	Tested By:	CDL			
Depth of Test Hole, D_T:	60"	USCS Soil Classification:	SP			
Test Hole Dimensions (inches)				Length	Width	
Diameter (if round)=	8"	Sides (if rectangular)=				

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	0805	0830	25	29.0	dry	31+	y
2	0842	0907	25	28.0	dry	32+	y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	0910	0913.5	3.5	40.0	dry	20.0	0.18
2	0920	0924.8	4.8	39.0	dry	21.0	0.23
3	0930	0936.7	6.7	39.0	dry	21.0	0.32
4	0940	0947.5	7.5	37.0	dry	23.0	0.33
5	0950	0957.7	7.7	36.0	dry	24.0	0.32
6	1000	1008.1	8.1	36.0	dry	24.0	0.34
7	1010	1017.8	7.8	37.0	dry	23.0	0.34
8							
9							
10							
11							
12							
13							
14							
15							

COMMENTS:

Percolation Test Data Sheet

Project:	Bear Valley Plaza		Project No:	3526.001.500		Date:	5/11/20
Test Hole No:		P-2	Tested By:	CDL			
Depth of Test Hole, D_T:		90"	USCS Soil Classification:		SP		
Test Hole Dimensions (inches)					Length	Width	
Diameter (if round)=		8"	Sides (if rectangular)=				

Sandy Soil Criteria Test*

Trial No.	Start Time	Stop Time	Time Interval, (min.)	Initial Depth to Water (in.)	Final Depth to Water (in.)	Change in Water Level (in.)	Greater than or Equal to 6"? (y/n)
1	0900	0925	25	62.0	dry	28+	y
2	0931	0956	25	63.0	dry	29+	y

*If two consecutive measurements show that six inches of water seeps away in less than 25 minutes, the test shall be run for an additional hour with measurements taken every 10 minutes. Other wise, pre-soak (fill) overnight. Obtain at least twelve measurements per hole over at least six hours (approximately 30 minute intervals) with a precision of at least 0.25".

Trial No.	Start Time	Stop Time	Δt Time Interval (min.)	D_o Initial Depth to Water (in.)	D_f Final Depth to Water (in.)	ΔD Change in Water Level (in.)	Percolation Rate (min./in.)
1	1005	1009.0	3.3	68.0	dry	22.0	0.15
2	1015	1019.9	4.9	68.0	dry	22.0	0.23
3	1025	1031.3	6.3	67.0	dry	23.0	0.27
4	1035	1042.1	7.1	68.0	dry	22.0	0.32
5	1045	1054.9	7.9	68.0	dry	22.0	0.36
6	1100	1107.7	7.7	68.0	dry	22.0	0.35
7	1110	1118.0	8.0	68.0	dry	22.0	0.36
8							
9							
10							
11							
12							
13							
14							
15							

COMMENTS:

Merrell Engineering Company, Inc.
Materials Engineering - Special Inspections - Geotechnical Services

GEOTECHNICAL INVESTIGATION
NW Corner of BEAR VALLEY ROAD and SECOND AVENUE

APN # 3091-351-01

VICTORVILLE

CALIFORNIA

Prepared For:

BEAR VALLEY DEVELOPMENT

12490 Business Center Drive, Suite 4

Victorville, CA 92393

Project No. 29.9

November 2005

Merrell Engineering Company, Inc.
Materials Engineering - Special Inspections - Geotechnical Services

November 16, 2005

Bear Valley Development
12490 Business Center Drive, Suite 4
Victorville, CA 92392
Attn: Joe Faherty

RE: Project No. 29.9
Geotechnical Investigation
NW Corner of Bear Valley Road and Second Avenue
APN # 3091-221-02
Victorville, CA

Mr. Faherty:

In accordance with your authorization, we have performed a preliminary soils investigation for the above-referenced project. The following report presents our findings based on the results of our field and laboratory investigation.

The investigation was planned and performed using the information provided to our firm and using the information we have obtained in the development of this project. Our report includes recommendations for the development of this site and presents an evaluation of existing conditions for design of proposed foundations within this project site.

We hope the enclosed information will be useful during the design and construction phases of this project.

Thank you for this opportunity to be of service. If you have questions, please do not hesitate to contact our office.

Sincerely,

Merrell Engineering Company, Inc.

REGISTERED PROFESSIONAL ENGINEER
BRAD S. MERRELL
NO. C-49423
EXP. 9/30/06
CIVIL
STATE OF CALIFORNIA

Brad S. Merrell, PE
President
R.C.E. 49423 Exp. 09/30/06

Jeff S. Burns
Project Manager

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D-1 Transition Lot Detail
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APPENDIX E – GENERAL GRADING SPECIFICATIONS

APPENDIX F – LIQUEFACTION ANALYSIS & UBC SEISMIC DESIGN PARAMETERS

F-1 Empirical Prediction of Earthquake-Induced Liquefaction Potential
F-2 Computation of 1997 Uniform Building Code Seismic Design Parameters

1. INTRODUCTION

1.1. Investigation

The purpose of this investigation was to explore and evaluate the subsurface soil conditions specifically for the proposed commercial development site located on the northwest corner of Bear Valley Road and Second Avenue, Victorville, California and to provide recommendations for site grading, design and construction of the proposed building foundation(s), pavement section and site improvements.

We have performed a foundation investigation and comprised this report with our findings. This report represents the results of a subsurface soils investigation at the site. The location of the proposed commercial development is on the enclosed Site Vicinity Map (Exhibit C-4).

This report was written specifically for this project as described in this report. It is intended for this addition and to be used by Bear Valley Development and associated design professionals in the development of this project. Since this report is intended for use by the designer(s), it should be recognized that it is impossible to include all construction details at this phase in the project. Additional consultation may be prudent to interpret these findings for contractors, or possibly refine these recommendations based upon the final and actual conditions encountered during construction.

1.2. Scope of Services

Specifically, the scope of the investigation included the following:

- Field investigation consisting of a total of eleven (11) exploratory borings. The exploratory borings extended to a maximum depth of fifty (50) feet and a minimum depth of twenty (20) feet below the existing surface elevations.
- Laboratory investigation consisting of ph sulfate corrosion (resistivity), sieve analysis, compaction characteristics (moisture density test), consolidation, direct shear, sand equivalent and r-value.
- Liquefaction Evaluation
- AC Pavement Design Recommendations
- Preparing this report, presenting our findings, conclusions and recommendations.

The scope of our investigation did **not** include the following:

- A detailed study of groundwater conditions
- The determination of dynamic soil properties
- A detailed study of geological and seismic hazards studies
- The assessment of general site environmental conditions for the presence of contaminants in the soils and groundwater

1.3. Site Conditions

This proposed site for a commercial development is fronting on the north side of Bear Valley Road and the west side of Second Avenue within the City of Victorville, County of San Bernardino, California. A vicinity map has been included within this report (Exhibit C-4).

The existing topography for the site is shown on the enclosed Topographic Map (Exhibit C-3). The site terrain is sloping primarily from the Southwest and Southeast corners of the property to a San Bernardino County drainage easement, with a maximum difference in elevation of approximately twenty-five (25) feet. The site is bound on the North by similar vacant land, on the east by Second Avenue and on the west by Third Ave.

During the time of our investigation the site was vacant except for some deleterious surface materials.

The existing surface conditions consist of poorly graded sands with silts (some clays present). There was vegetation growth consisting of seasonal desert weeds, brush, creosote, and green uniform grasses/weeds,

1.4. Proposed Development

The details provided to our office in regards to the proposed commercial development are; that Bear Valley Development plans to develop this site as a commercial office/retail center facing Bear Valley Road. It is unknown as to the size of the proposed office/retail center. It is anticipated that the structures will be constructed of wood framed/concrete masonry and stucco type. The heights of the proposed structures are anticipated to be one to two story with portions of the structure reaching a maximum of approximately thirty-five (35) feet. The structure(s) approximate pad elevation(s) were unknown at time this report was developed. It is anticipated that the bottom of the foundations will extend below the finish floor elevations approximately two (2) to three (3) feet depending on the type of structure(s) and structural engineers' design. The structural details for the proposed structures were not available at the time of this report. It should be noted that once the details for the structure(s) are available our office should be provided a set of plans for review and comments to develop additional recommendations if necessary.

The extent of site work is anticipated to include mass grading asphalt/concrete paving, concrete sidewalks, landscaping and proposed utility improvements.

It is believed that the grading operations for the site will consist of over-excavating and backfilling to create a uniformly compacted and level foundations and pads for the proposed structures. If grading limits/operations are in excess of those stated, our office should be notified to evaluate the conditions or to develop additional recommendations. Our office should be provided a copy of the approved grading plan for review and comments to develop additional recommendations if necessary.

2. FINDINGS

2.1. Field Investigation

The soil conditions underlying the site were explored by means of eleven (11) exploratory borings to a maximum depth of fifty (50) feet below the existing ground surface elevation. The exploratory boring was conducted with a CME-55 hollow stem auger drill rig equipped with eight (8) inch diameter hollow stem augers. At intervals of five (5) feet, standard penetration tests were performed. The number of blows needed to drive the 1½-inch diameter standard penetration (SPT) sample every six (6) inches was then recorded. The hammer used to drive this sampler was 140 pounds in weight and was allowed a drop of 30 inches.

A continuous log of the subsurface conditions encountered within the exploratory boring was recorded at the time of boring operations and has been included as Appendix A-2 within this report. Relatively undisturbed as well as relatively disturbed soil samples of typical soil types were obtained and returned to the laboratory for testing and evaluation.

2.2. Laboratory Investigation

The laboratory test program for the soil types encountered included the following:

- Sieve Analysis
- Unit Weight

- Consolidation
- Direct Shear
- PH Sulfate Corrosion / Resistivity
- Sand Equivalent
- R-Value

Results of the above tests have been included as Appendix B within this report.

2.3. Subsurface Conditions

Data from our exploratory boring indicates that the soil profile at the subject site typically consists of what appears to be natural occurring alluvium and colluvial materials to the maximum depths explored in each individual boring. The subsurface soils consisting of poorly graded sand, sand with silt, sand-silt mixtures and some silty clays.

We did not encounter free ground water in our field borings. According to the Mojave Water Agency (MWA), Inventory of Groundwater Stored in the Mojave River Basins (May of 1990) the water table is around 200 feet below the surface. We have not been able to obtain historical ground water elevations for this site. The depth to bedrock is estimated to be around 3500 feet.

It should be noted that upon completion some caving of the boring holes occurred during the removal of augers, indicating potentially non-cohesive soils.

2.4. Site Coefficient and Seismic Proximity

Since Chapter 16 of the 2001 California Building Code requires that, “a site-specific geotechnical investigation, which includes one or more exploratory borings to a minimum depth of 100 feet” be conducted. And since this was not preformed for this site, a site coefficient S_D should be used. The fault nearest the site is the North Frontal Fault Zone, located approximately 12.8 kilometers southeast of the site (Maps of Known Active Fault Near-Sources Zones In California and Adjacent Portions of Nevada 1998, O-31). The nearest fault is designated to be a type B seismic source by the California Division of Mines and Geology. With this proximity to the North Frontal Fault Zone the code values of N_a and N_v should be taken as 1.0 and 1.0 respectively.

3. CONCLUSIONS AND RECOMMENDATIONS

3.1. Conclusions

Based upon our field investigation and test data, combined with our engineering analysis, experience and judgment the on-site natural soils are considered to have good strength characteristics and low to moderate compressibility under relatively light to moderately heavy loads.

Existing upper soils overlying localized areas of the site are not considered suitable for the support of permanent foundations, floor slabs and pavements. These upper soils will not in their present condition, provide a uniform or adequate support for the proposed permanent structures. The underlying native soils are generally in a dense state. From a foundation standpoint, the underlying natural soils are generally considered competent bearing materials.

Because of the site conditions, it will be necessary to remove the existing upper surface soils in all building/pad areas. To provide adequate support for the proposed structures, it is our recommendation that the building area be sub-excavated as recommended in this report and recompacted to provide a compacted fill mat beneath footings and slabs. Construction of a compacted fill mat should ensure removal and recompaction or densification of any disturbed or loose soils. Conventional spread footings or continuous wall footings may be utilized in conjunction with the compacted fill mat.

The soils encountered on this site consist of silts and silty clays, poorly graded sands, sand-silt mixtures, and gravel-sand-silt with some silt and silty clay having percent fines (passing the No. 200 sieve) of 0.4 to 74.

Based on the consolidation test data conducted on a representative sample and the high blow counts obtained in our field investigation, the potential for sub-surface soils being hydro-collapsible is low.

The on-site soils are considered to have the potential for being moderately expansive (medium). Adequate provisions in design and construction with the on-site soils should be considered to reduce their shrink-swell effects on foundations and floor slabs.

Although the possibility of a ground water condition existing is unlikely (+/- 200'), the stiff to hard and generally dense subsoils are such that the liquefaction potential at the site is considered to be low to moderate for ground motions resulting from the maximum credible earthquake that could conceivably occur and affect the site. In the unlikely event of liquefaction at the site, it is expected to be localized and would have a minor impact on the development, provided that the recommendations of this report are implemented.

It is our opinion that the proposed commercial development is feasible, provided the recommendations in this report are implemented and special consideration/precautions are taken in design of the foundations and structures.

3.2. General Recommendations

Pre-Job Conference

Prior to the commencement of grading, a pre-job conference meeting should be held with representatives of this firm. The purpose of this meeting would be to clarify any questions related to the recommendations and specifications of this report.

3.3. Grading Requirements

All grading operations must be observed and tested by our firm. Any imported fill material must be approved for use prior to importing. The governmental agencies having jurisdiction over the project must be notified prior to commencement of grading so that the necessary grading permits may be obtained and arrangements may be made for the required inspection(s).

Clearing & Grubbing

All debris, vegetation, and deleterious material shall be removed prior to any grading work performed.

No debris or vegetation will be placed as site fill or grading operations. All deleterious materials (asphalt concrete, concrete, wood, trash, etc.) shall be disposed in accordance with the owner's instructions. Any roots shall be removed to a depth of five (5) feet below the pad elevation.

Scarification

All areas to receive fill and all areas of cut to support sub-grade soils shall be scarified to a depth of 12 inches. Scarified material shall be brought to +/- 2% optimum moisture content and compacted to a minimum 90 percent relative compaction prior to the placement of fill.

Compacted Fill Material

Fill material shall be from clean on-site soils with rocks or other particles no larger than four (4) inches in diameter. Our Engineer or representative shall approve any import fill prior to placement. The on-site soils, less the oversized particles, debris or organic matter may be used in required fills.

Cobbles, rock and other particles larger than four (4) inches in diameter should not be used in the fill.

Compacted Fill Placement

All fill placement and compaction shall be in accordance with the specification contained in this report, see Appendix E General Grading Specifications.

Sub-Excavation

All footings shall be over-excavated a minimum of three (3) feet below the bottom of the lowest grade for foundations/footings. The above-mentioned re-compacted soil beneath the bottom of the proposed foundation shall extend horizontally 5 feet beyond the foundation structure.

Cut areas should be sub-excavated to a suitable soil condition determined by our Engineer or representative (approximately 3 feet below the bottom of the lowest grade for foundations/footings or as determined by our field representative) and re-compacted and filled in accordance with this report. The sub-excavation requirements must be followed in cut areas also (see Attachment D-1, Transition Lot Detail).

Imported Soils

Imported soils required to complete the grading operations should consist of predominantly granular material with an expansion index less than 35 when tested in accordance with ASTM D-4829 and shall have a minimum R-Value of 60. All imported material shall be inspected and approved by our Engineer or representative prior to placement. Imported material utilized for trench backfill operations shall consist of granular material with a minimum sand equivalent of 35.

The imported materials should contain sufficient fines (binder material) so as to be relatively impermeable and result in stable sub-grade when compacted. All proposed import materials should be approved prior to being placed on site by our personnel.

3.4. Foundation Design

If the areas are prepared as recommended, the proposed structure may be supported on a foundation in a firm dense soil as designed and established by the structural engineer for this project. The minimum width and depth of the footings should be per the structural engineer's design and reviewed by our office. In no case shall they be less than 12 inches in width an 12 inches in depth.

For the minimum width and depth, footings may be designed for a maximum safe soil bearing pressure of 2500 pounds per square foot for dead plus live loads for a depth of one (1) foot below grade. This allowable bearing pressure may be increased by 250 pounds per square foot for each additional foot of depth to a maximum safe soil bearing pressure of 3000 pounds per square foot for dead plus live loads. The 3000 pounds per square foot is for a depth three (3) feet below grade. These bearing values may be increased by one-third for wind or seismic loading. The actual bearing value of the fill will depend on the material used and the compaction methods employed. The quoted bearing value should be applicable if the on-site or other acceptable materials are used and compacted as recommended. The bearing value of the fill should be confirmed upon completion of the grading operations.

Since the recommended bearing value is a net value, the weight of the concrete within the footings may be taken as equal to 50 pounds per cubic foot, and the weight of soil backfill may be neglected in determining the downward foundation loads for footing design.

Foundation concrete should be placed in compact trenches with no caving of the sidewalls. The foundation excavation should be properly backfilled as recommended for site fill and tested for the percent of compaction. Concrete forms should not be placed until our office has inspected and conducted the field and laboratory testing required

All footing excavations should be observed by personnel of our firm to verify satisfactory of supporting soils. Footings should be deepened if necessary to extend into satisfactory supporting soils.

Concrete foundations should be designed according to current local and state codes and constructed with a minimum 28-day compressive strength of 3000 psi and water/cement ratio as dictated by the American Concrete Institutes Manuals of Concrete Practice. The foundation reinforcement shall be designed and calculated by the structural engineer in accordance with the reinforcement requirements per the Uniformed Building Code or California Building Code as indicated by the governing agency.

Foundations should be designed with continuous reinforcing steel top and bottom.

3.5. Slabs on Grade

If the sub-grade is prepared as recommended as indicated within this report, building floor slabs can be supported on grade. To provide adequate support, concrete slabs on grade should bear a minimum of 24 inches of compacted soil. The final pad surface should be rolled to provide a smooth dense surface upon which to place the concrete. Therefore, we recommend that our field representative observe all grading operations and the condition of the final sub-grade soils immediately prior to slab-on grade construction and if necessary, perform further density and moisture content tests to determine the suitability of the final prepared sub-grade.

If the slab is to receive moisture sensitive coverings, it should be provided with a moisture vapor barrier. A low-slump concrete should be used to minimize possible curling of the slab. A 2-inch-thick layer of coarse sand can be placed over the vapor retarding membrane to reduce slab curling. If this sand bedding is used, care should be taken during the placement of the concrete to prevent displacement of the sand. The concrete slab should be allowed to cure properly before placing vinyl or other moisture-sensitive floor covering.

Concrete slabs on grade should be minimum thickness of four (4) inches with a 28-day compressive strength of 2,500 psi and water/cement ratio as dictated by the American Concrete Institutes Manuals of Concrete Practice. Slabs on grade shall have a minimum reinforcement per the American Concrete Institutes Manual of Concrete Practice and minimum code concrete to steel ratios for temperature and shrinkage requirements. ***The slab on grade reinforcement shall be tied into the foundation reinforcement***. All concrete slabs should be designed to have concrete construction (i.e. jointing, etc.) in conformance with the American Concrete Institute Manual of Concrete Practice design and construction standards.

Slabs on grade should be designed with reinforcing steel in each direction. The structural designer of proposed development should allow for minimum or better ratios of temperature and shrinkage reinforcing steel. Slab on grade reinforcing steel should be doweled/tied into foundations and/or grade beams.

3.6. Lateral Loading

Resistance to lateral loads will be provided by passive earth pressure and base friction. For footings bearing against approved native fill, the passive earth pressure may be developed at a rate of 300 pounds per square foot of depth. A safe assumption for basal friction would be 0.30 of the actual dead load. Base friction and passive earth pressure may be combined without reduction. Active earth pressure for retaining structures (retaining walls 8 feet in height) should be designed with an equivalent fluid pressure of 40 pounds per square foot of height, plus any additional building or equipment surcharges.

3.7. Drainage

It is important that all water be kept a minimum of 10 feet from structures and slabs. No ponding adjacent to buildings/structures is allowed. All surfaces shall have a positive two percent minimum slope away from structures.

Retaining walls should be designed to resist hydrostatic pressures or be provided with a drainpipe, weep holes and/or the necessary drainage capabilities for the wall.

If a basement or subterranean structure is constructed a subsurface drainage system is recommended to be designed and constructed.

3.8. Footing and Utility Excavations

Footing and utility excavations for this project may require sloping sidewalls or shoring. All excavations shall be done in accordance with the California Administrative code, Title 8, Industrial Relations, Chapter 4, Division of Industrial Safety, Subchapter 4, Construction Safety Orders, Article 6. Temporary excavations shall have sloping sidewalls no steeper than 1(H): 1(V).
Footings shall be over-excavated in accordance with the requirements/recommendations of this report.

<u>Excavation Procedures</u>
Temporary excavations in site soils should be shored or sloped in accordance with Cal OSHA requirements. ***Presented herein are guidelines for temporary slope construction and recommendations for shoring in granular soils, (Type C Soils), which were the predominant soils encountered in our borings.*** In addition, alternate guidelines are provided for temporary slope construction in clayey soils, (Type B Soils) which were encountered in some borings and may be encountered in the areas of planned excavations.

Temporary Slopes

Temporary excavations in site granular soils (Type C Soils) should be sloped no steeper than 1.5 horizontal to 1 vertical for excavations up to 20 feet in depth. Compound excavations with vertical sides in lower portions should be properly shielded to a minimum height of 18 inches above the top of the vertical side, with the upper portion having a maximum allowable slope of 1.5 horizontal to 1 vertical.

Temporary excavations in site clayey soils (Type B Soils) should be sloped no steeper than 1 horizontal to 1 vertical for trenches up to 20 feet in depth. Benched excavations 20 feet in depth or less in site clayey soils should be sloped no steeper than 1 horizontal to 1 vertical, with a maximum bench height of 4 feet. Compound excavations with vertical sides in the lower portions should be properly shielded to a minimum height of 18 inches above the top of the vertical side, with upper portion having a maximum allowable slope of 1 horizontal to 1 vertical.

A Registered Professional Engineer should design slopes or benching for excavations greater than 20 feet in depth.

Should running sand conditions be experienced during excavations operations, flattening of cut slopes faces, or other special procedures, may be required to achieve stable, temporary slopes.

During construction, the soil conditions should be regularly evaluated to verify that conditions are as anticipated. The contractor should be responsible for providing the "competent person" required by OSHA standards to evaluate the soil conditions. Close coordination between the competent person and the soils engineer should be maintained to facilitate construction while providing safe excavations.

Shoring

Temporary shoring will be required for those excavations where temporary slope cuts as specified above are not feasible. Internally braced shoring may be utilized for excavations, ***however, it is anticipated that difficulties will be experienced during shoring installation due to the presence of dry loose soils in some areas***. It is recommended that temporary braced shoring retaining site sandy/gravelly soils be designed considering a uniform lateral earth pressure distribution for the full height of the shoring, with a maximum pressure equal to 22H in pounds per square foot, where H is the height of shoring in feet.

The recommended soil pressure will apply to level soil conditions behind braced shoring. Where a combination of slope embankment and braced shoring is used, the soil pressure will be greater and must be evaluated for actual conditions.

In addition to the above recommended lateral earth pressures, a minimum uniform lateral pressure of 125 pounds per square foot should be incorporated in the design of the upper ten feet of shoring when normal traffic is permitted within ten feet of the shoring. The design of temporary shoring should also include the surcharge loading effects of delivery and construction equipment adjacent to the shoring, as appropriate.

3.9. Pavement Design

The following preliminary design for asphalt concrete pavement is to be confirmed with R-value, in-place density, sand equivalent and gradation tests.

Proposed pavement sections:

The upper 12 inches of the pavement sub-grade should be compacted to at minimum 95% of relative compaction per ASTM D-1557. The required R-Value of the finish sub-grade elevation soils is to be established prior to completion of rough grading and placement of the class 2 aggregate base material (sub-base).

The upper 6 to 12 inches of sub-base materials below finish grade should be compacted to at minimum 95% relative compaction per ASTM D-1557. The sub-base will be Class 2 Aggregate Base Materials conforming to a minimum R-Value of 78 and Sand Equivalent of 30.

Immediately prior to applying prime coat or immediately prior to placing the asphalt concrete (AC) when a prime coat or tack coat is not required, the sub-grade and sub-base to receive AC shall conform to the compaction requirement. Sub-grade and Sub-base courses shall be free of loose or extraneous material. Aggregate base should be rolled smooth to provide a uniform surface for AC placement.

AC mix should contain an AR 4000 to AR 8000 asphalt grade and a minimum aggregate size of 1/2 inch. The AC mix design procedures should be based on the Asphalt Institute Manual Series No. 2 (MS-2) for medium to heavy traffic. The AC pavement should not be compacted less than 92% and not more than 96% of the laboratory density with air voids ranging from 3 to 5%.

The design of the AC pavement section based on an average R-Value of 20 for sub-grade soils and T.I. of 5, 6, 7 and 8 are:

Traffic Index	AC Min. Thickness	AB Min. Thickness
5.0	3”	4”’
6.0	3”	4”
7.0	4”	4”
8.0	4”	6”

Compacted Class 2 aggregate base (AB) over 12 inches of compacted sub-grade soils.

Final pavement design should be based on the Traffic Index determined by the project civil engineer.

If the pavement is to be constructed prior to construction of the structures, we recommend that the full depth of the pavement section be placed in order to support heavy construction traffic.

3.10. Liqefaction Evaluation

An evaluation of the liquefaction potential at the site was performed using a recently developed computer program (LIQUEFY2, Blake, 1986).

The purpose of this study was to assess and evaluate the site-specific subsurface field conditions to see whether they are conducive to liquefaction potentials as discussed above. This evaluation was performed on data from the deepest Exploratory Boring B-5. Although groundwater was not encountered at explored depths across the site, the shallowest level of 5 feet was selected for this analysis. In addition, since the subsurface sediments encountered locally were generally uniform, each SPT sample obtained was chosen to be representative for that particular 5-foot layer, with the sample in the center of that layer.

Liquefaction can be defined as the transformation of a granular material from a solid into a liquefied state as a consequence of increased pore-water pressures caused by strong ground accelerations during an earthquake. In general, it is a phenomenon that occurs where there is a loss of strength or stiffness in the soils that can result in the settlement of buildings, ground failures, or other hazards. The main factors contributing to this phenomenon are 1) cohesionless, granular soils having relatively low densities, 2) shallow ground water (generally less than 50 feet); and 3) moderate-high seismic ground shaking.

While nearby moderate to high seismic sources exist (North Frontal Fault Zone located 12.8 kilometers to Southeast), and possible shallow groundwater (5± feet used for calculation), the underling soils are medium dense and dense subsoil. The liquefaction potential at the site is considered to be low to moderate for ground motions resulting from the maximum credible earthquake that could conceivably occur and affect the site. In the unlikely event of liquefaction at the site, it is expected to be localized and would have minor impact on the development.

References

Blake, T.F., 1986, LIQUEFY2, A computer program for the empirical prediction of earthquake-induced liquefaction potential, User Manual, 87 pp.

Blake, T.F. 1998-2000, FRISKSP, A computer program for the probabilistic estimation of peak acceleration and uniform hazard spectra using 3-D faults as earthquake sources, Version 4.0.

Mojave Water Agency, Inventory of Groundwater Stored in the Mojave River Basins, May 1990, Subsurface Surveys, Inc.

Seed, H.B., and Idriss, I.M., 1982, Ground Motion and Soil Liquefaction During Earthquakes, Earthquake Engineering Research Institute Monograph Series, 134 pp.

California Department of Conservation Division of Mines and Geology, Maps of Known Active Fault Near-sours Zones in California and Adjacent portions of Nevada, International Conference of Building Officials, February, 1998, Page O-31

4. LIMITATIONS AND ADDITIONAL SERVICES

4.1. Limitations

The recommendations given in this report are based on results of field and laboratory investigations, combined with interpolation of subsurface conditions between exploration locations for only this project. The nature and extent of variations between the explorations may not become evident until construction. If variations are exposed during construction, this office should be notified so the variations can be reviewed and the recommendations of this report modified or verified in writing.

If changes in the nature, design or action of the structure are planned, the recommendations contained in this report shall not be considered valid unless the changes are reviewed and the recommendations of this report modified or verified in writing.

This report has been prepared only to aid in the evaluation of this site and to provide geotechnical recommendations for the design of this project. ***Any person using this report for bidding or construction purposes should be aware of the limitations of this report as mentioned above and should conduct an independent investigation as he deems necessary to satisfy themselves as to the surface and subsurface conditions to be encountered, and the procedures to be used in the performance of work on this project.***

Our professional services have been performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineering consultants practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has not been prepared for use by other parties, and may not contain sufficient information for purposes of other parties or other uses.

This report is issued with the understanding that the owner has the responsibility to bring the information and recommendations contained herein to the attention of the designers and builders of this project. The owner also has the responsibility to verify that the contractors/builders follow such recommendations. It is understood that the owner is responsible for submittal of the report to the appropriate governing agencies.

This report is based on the assumption that adequate client consultation, construction monitoring, and testing will be performed during the final design and construction to be incompliant with the recommendations of this report.

4.2. Additional Testing

Maintaining Merrell Engineering Company, Inc. as the soils engineering consultant from beginning to end of the project will provide continuity of services. ***The engineering firm providing testing and observations shall assume the responsibility of Soils Engineer of Record***.

Construction monitoring and testing would be additional services provided by this firm. The costs of these services are not included in our present professional service agreement or part of our current scope of work. It is recommended that this firm be contacted to perform additional earthwork and materials observation and testing during the following phases of the project:

- Foundation / Footing Excavation
- Utility Trench Backfill
- Retaining Wall Construction and/or Backfill
- Sub-grade Preparation in New Pavement Areas
- Unusual Conditions Encountered

CLOSURE

We appreciate the opportunity to be of service. Should you have any questions or need further assistance, please do not hesitate to contact this office.

Sincerely,

Merrell Engineering Company, Inc.

REGISTERED PROFESSIONAL ENGINEER
BRAD S. MERRELL
NO. C-49423
EXP. 9/30/06
CIVIL
STATE OF CALIFORNIA

Brad S. Merrell, PE
President
R.C.E. 49423 Exp. 09/30/06

Jeff S. Burns
Project Manager

APPENDIX A

EXPLORATORY LOGS

SOIL CLASSIFICATION CHART
(Unified Soil Classification System)

Major Divisions			Graphic	Letter	Typical Descriptions
Coarse Grained Soils More Than 50% Of Material Is Larger Than No. 200 Sieve Size	Gravel And Gravelly Soils More Than 50% Of Coarse Fraction Retained On No. 4	Clean Gravels Little Or No Fines		GW	Well-Graded Gravels, Gravel-Sand Mixtures Little Or No Fines
				GP	Poorly-Graded Gravels, Gravel-Sand Mixtures Little Or No Fines
		Gravels w/ Fines Appreciable Amount Of Fines		GM	Silty Gravels, Gravel-Sand-Silt Mixtures
				GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	Sand And Sandy Soils More Than 50% Of Coarse Fraction Passing No. 4	Clean Sand Little Or No Fines		SW	Well-Graded Sands, Gravelly Sands, Little Or No Fines
				SP	Poorly-Graded Sands, Gravelly Sands Little Or No Fines
		Sands w/ Fines Appreciable Amount Of Fines		SM	Silty-Sands, Sand-Silt Mixtures
				SC	Clayey Sands, Sand-Clay Mixtures
Fine Grained Soils More Than 50% Of Material Is Smaller Than No. 200 Sieve Size	Silts and Clays	Liquid Limit Less Than 50		ML	Inorganic Silts And Very Fine Sands, Rock Flour, Silty Or Clayey Fine Sands Or Clayey Silts
				CL	Inorganic Clays Of Low To Medium Plasticity Gravelly Clays, Sandy Clays, Silty Clays
				OL	Organic Silts And Organic Silty Clays Of Low Placticity
	Silts and Clays	Liquid Limit Greater Than 50		MH	Inorganic Silts, Micaceous Or Diatomaceous Fine Sand Or Silty Soils
				CH	Inorganic Clays Of High Plasticity, Fat Clays
				OH	Organic Clays Of Medium To High Plasticity, Organic Silts
Highly Organic Soils				PT	Peat, Humus, Swamp Soils With High Organic Contents

Relationship of SPT to Relative Denisty of Sand

Description	SPT N Blows/ft.	Relative Density %
Very Loose	4	0-15
Loose	4-10	15-35
Medium Dense	10-30	35-65
Dense	30-50	65-85
Very Dense	50	85-100

Unified Soil Classification System

Boulders		>300mm	>11.8in
Cobbles		75-300mm	2.9-11.8in
Gravel	*Coarse*	75-19mm	2.9-.75in
	Fine	19-4.8mm	.75-.19in
Sand	*Coarse*	4.8-2.0mm	.19-.08in
	Medium	2.0-.43mm	.08-.02in
	Fine	.43-.08mm	.02-.003in
Fines	*Silts*	<.08mm	<.003in
	Clays	<.08mm	<.003in

Merrell Engineering Company, Inc.
128 E. Fredricks St.
Barstow, CA 92311
(760) 256-2068

Project: 29.9
Exhibit: A-1

EXPLORATORY BORING FIELD LOG

ASTM D1452 (ASTM D 1586)

Date:	04/28/05	Boring Diameter:	8"	Drilling Rig:	CME-55
Conducted By:	JB/JH	Surface Elevation:	Unk	Drive Weight:	140 lb

Depth	Description (USCS)	Sample	SPT	Density	Moisture
0'	Surface consists of desert vegetation and some deliterious materials. SM Silty-sands, sand-silt mixtures. Brown (5/4)7.5YR (Some clay present.)		4 5 7		5.9%
5'	SM Silty-sands, sand-silt mixtures. (Some gravel.) Dark Olive Brown (3/3) 2.5YR. No difficulty driving auger.		7 12 18		6.2%
10'			7 10 14		6.4%
15'			6 8 16		7.2%
	BORING TERMINATED AT 20'				
20'					
25'					

Client:	JW Faherty
Project:	Soils Investigation, Bear Valley Rd. Victorville, CA. APN 3091-221-02
Boring Location:	As indicated on Boring Location / Topographic Map
Remarks:	No free ground water or bedrock encountered, some caving of boring occurred.

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Project: 29.9
Loc. No. 1
Exhibit: A-2
Sheet: 1 of 12

EXPLORATORY BORING FIELD LOG

ASTM D1452 (ASTM D 1586)

Date:	04/28/05	Boring Diameter:	8"	Drilling Rig:	CME-55
Conducted By:	JB/JH	Surface Elevation:	Unk	Drive Weight:	140 lb

Depth	Description (USCS)	Sample	SPT	Density	Moisture
0'	Surface consists of desert vegetation and some deliterious materials. SM Silty-sands, sand-silt mixtures. Brown (5/4)7.5YR				
5'	SM Silty-sands, sand-silt mixtures. Brown (5/4) 7.5YR. No difficulty driving auger.		3 4 7		5.8%
10'	SM Silty-sands, sand-silt mixtures. Brown (5/4) 7.5YR. (Medium sand). No difficulty driving auger.		8 14 19		5.6%
15'	ML Inorganic silts and very fine sands. Brown (5/4) 7.5YR. No difficulty driving auger.		6 9 14		5.7%
20'			5 8 11		5.4%
25'	SM Silty-sands, sand-silt mixtures. (Medium coarse sand). Yellowish Brown (6/4) 10YR. No difficulty driving auger. BORING TERMINATED AT 30'		7 14 20		2.6%

Client:	JW Faherty
Project:	Soils Investigation, Bear Valley Rd. Victorville, CA. APN 3091-221-02
Boring Location:	As indicated on Boring Location / Topographic Map
Remarks:	No free ground water or bedrock encountered, some caving of boring occurred.

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Project: 29.9
Loc. No. 2
Exhibit: A-2
Sheet: 2 of 12

EXPLORATORY BORING FIELD LOG

ASTM D1452 (ASTM D 1586)

Date:	04/28/05	Boring Diameter:	8"	Drilling Rig:	CME-55
Conducted By:	JB/JH	Surface Elevation:	Unk	Drive Weight:	140 lb

Depth	Description (USCS)	Sample	SPT	Density	Moisture
0'	Surface consists of desert vegetation and some deliterious materials. SM Silty-sands, sand-silt mixtures. Brown (4/4)7.5YR	Bulk Tube	16 17 30		9.0%
5'	SM Silty-sands, sand-silt mixtures. Brown (4/4) 7.5YR. No difficulty driving auger.	Tube	15 17 25		8.8%
10'	SM Silty-sands, sand-silt mixtures. Brown (4/4) 7.5YR. (Some clays). No difficulty driving auger.	Tube	24 33 38		5.5%
15'	SM Silty-sands, sand-silt mixtures. (Some gravel) Grayish Brown. (5/2) 2.5Y. No difficulty driving auger.	Tube	15 21 29		1.5%
20'	ML Inorganic silts and very fine sands. Yellowish Brown (5/4) 10YR. No difficulty driving auger.	Tube	8 17 26		2.0%
25'	ML Inorganic silts and very fine sands. (Portions of SM Silty-Sands, Sand-Silt Mixtures.) Pinkish Gray (7/2) 7.5YR BORING TERMINATED AT 30'		15 19 27		2.0%

Client:	JW Faherty
Project:	Soils Investigation, Bear Valley Rd. Victorville, CA. APN 3091-221-02
Boring Location:	As indicated on Boring Location / Topographic Map
Remarks:	No free ground water or bedrock encountered, some caving of boring occurred.

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Project:	29.9
Loc. No.	3
Exhibit:	A-2
Sheet:	3 of 12

EXPLORATORY BORING FIELD LOG

ASTM D1452 (ASTM D 1586)

Date:	04/29/05	Boring Diameter:	8"	Drilling Rig:	CME-55
Conducted By:	JB/JH	Surface Elevation:	Unk	Drive Weight:	140 lb

Depth	Description (USCS)	Sample	SPT	Density	Moisture
0'	Surface consists of desert vegetation and some deliterious materials. SM Silty-sands, sand-silt mixtures. (Some Clay) Brown (5/4)7.5YR	Bulk	8 10 11		7.8%
5'	SM Silty-sands, sand-silt mixtures. Brown (5/4) 7.5YR. No difficulty driving auger. (Some 1/2" to 3/4" cobble present.)		10 15 19		7.7%
10'	SM Silty-sands, sand-silt mixtures. Brown (5/4) 7.5YR. No difficulty driving auger.		8 11 14		8.0%
15'			20 28 30		7.9%
	BORING TERMINATED AT 20'				
20'					
25'					

Client:	JW Faherty
Project:	Soils Investigation, Bear Valley Rd. Victorville, CA. APN 3091-221-02
Boring Location:	As indicated on Boring Location / Topographic Map
Remarks:	No free ground water or bedrock encountered, some caving of boring occurred.

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Project:	29.9
Loc. No.	4
Exhibit:	A-2
Sheet:	4 of 12

EXPLORATORY BORING FIELD LOG
ASTM D1452 (ASTM D 1586)

Date:	04/29/05	Boring Diameter:	8"	Drilling Rig:	CME-55
Conducted By:	JB/JH	Surface Elevation:	Unk	Drive Weight:	140 lb

Depth	Description (USCS)	Sample	SPT	Density	Moisture
0'	Surface consists of desert vegetation and some deliterious materials. SM Silty-sands, sand-silt mixtures. Brown (4/4)7.5YR	Bulk Tube	3 4 6		7.8%
5'	SM Silty-sands, sand-silt mixture. Brown (4/4) 7.5YR. No difficulty driving auger.	Tube	12 18 18		8.0%
10'		Tube	5 9 12		8.2%
15'	SM Silty-sands, sand-silt mixture. (Medium to coarse sand.) Yellowish Brown (5/4) 10YR No difficulty driving auger.	Tube	8 14 19		3.3%
20'	SP Poorly-graded sands, gravelly sands. Pale Brown (6/3) 10YR. No difficulty driving auger.	Tube	10 14 19		0.8%
25'	SM Silty-sands, sand-silt mixtures. Pale Brown (6/3) 10YR. No difficulty driving auger.	Tube	14 25 34		3.4%

Client: JW Faherty
Project: Soils Investigation, Bear Valley Rd. Victorville, CA. APN 3091-221-02
Boring Location: As indicated on Boring Location / Topographic Map
Remarks: No free ground water or bedrock encountered, some caving of boring occurred.

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Project: 29.9
Loc. No. 5
Exhibit: A-2

EXPLORATORY BORING FIELD LOG

ASTM D1452 (ASTM D 1586)

Date:	04/29/05	Boring Diameter:	8"	Drilling Rig:	CME-55
Conducted By:	JB/JH	Surface Elevation:	Unk	Drive Weight:	140 lb

Depth	Description (USCS)	Sample	SPT	Density	Moisture
30'	SM Silty-sands, sand-silt mixture. (Some medium gravel present.) Very Pale Brown (8/3) 10YR. No difficulty driving auger.	Tube	15 38 50x4		3.4%
35'		Tube	15 25 38		2.2%
40'		Tube	15 30 50x4		1.0%
45'	SM Silty-sands, sand-silt mixture. (Fine sand) Very Pale Brown (8/2) 10YR. No difficulty driving auger. BORING TERMINATED AT 50'	Tube	14 22 28		1.0%
50'					
55'					

Client: JW Faherty

Project: Soils Investigation, Bear Valley Rd. Victorville, CA. APN 3091-221-02

Boring Location: As indicated on Boring Location / Topographic Map

Remarks: No free ground water or bedrock encountered, some caving of boring occurred.

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Project: 29.9

Loc. No. 5

Exhibit: A-2

Sheet: 6 of 12

EXPLORATORY BORING FIELD LOG

ASTM D1452 (ASTM D 1586)

Date:	04/28/05	Boring Diameter:	8"	Drilling Rig:	CME-55
Conducted By:	JB/JH	Surface Elevation:	Unk	Drive Weight:	140 lb

Depth	Description (USCS)	Sample	SPT	Density	Moisture
0'	Surface consists of desert vegetation and some deliterious materials. SM Silty-sands, sand-silt mixtures. Brown (5/3)7.5YR	Tube	9 11 13		5.8%
5'	SP Poorly-graded sands, gravelly sands. Brown (5/3) 7.5YR. No difficulty driving auger.	Tube	6 11 19		4.2%
10'	SM Silty-sands, sand-silt mixtures. Yellowish Brown (5/4) 10YR. No difficulty driving auger.	Tube	24 29 36		4.0%
15'	ML Inorganic silts and very fine sands. Olive Brown (4/3) 2.5Y. No difficulty driving auger.	Tube	23 32 39		2.8%
20'		Tube	25 33 44		2.2%
25'	SM Silty-sands, sand-silt mixtures. Pinkish Gray (7/2) 7.5YR. No difficulty driving auger.	Tube	24 33 39		1.8%
	BORING TERMINATED AT 30'				

Client: JW Faherty

Project: Soils Investigation, Bear Valley Rd. Victorville, CA. APN 3091-221-02

Boring Location: As indicated on Boring Location / Topographic Map

Remarks: No free ground water or bedrock encountered, some caving of boring occurred.

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Project: 29.9
Loc. No. 6
Exhibit: A-2

EXPLORATORY BORING FIELD LOG

ASTM D1452 (ASTM D 1586)

Date:	04/29/05	Boring Diameter:	8"	Drilling Rig:	CME-55
Conducted By:	JB/JH	Surface Elevation:	Unk	Drive Weight:	140 lb

Depth	Description (USCS)	Sample	SPT	Density	Moisture
0'	Surface consists of desert vegetation and some deliterious materials. SM Silty-sands, sand-silt mixtures. Brown (5/4)7.5YR		8 10 14		5.8%
5'	SM Silty-sands, sand-silt mixtures. Brown (8/4) 7.5YR. No difficulty driving auger.		8 12 17		5.7%
10'	SM Silty-sands, sand-silt mixtures. (Some clay.) Brown (8/4) 7.5 YR. No difficulty driving auger.		20 27 32		4.0%
15'			9 12 22		0.5%
20'			8 18 19		1.0%
25'	ML Inorganic silts and very fine sands. Olive Brown (4/3) 2.5Y		8 8 14		2.8%
	BORING TERMINATED AT 30'				

Client: JW Faherty

Project: Soils Investigation, Bear Valley Rd. Victorville, CA. APN 3091-221-02

Boring Location: As indicated on Boring Location / Topographic Map

Remarks: No free ground water or bedrock encountered, some caving of boring occurred.

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Project: 29.9
Loc. No. 7
Exhibit: A-2

EXPLORATORY BORING FIELD LOG

ASTM D1452 (ASTM D 1586)

Date:	04/28/05	Boring Diameter:	8"	Drilling Rig:	CME-55
Conducted By:	JB/JH	Surface Elevation:	Unk	Drive Weight:	140 lb

Depth	Description (USCS)	Sample	SPT	Density	Moisture
0'	Surface consists of desert vegetation and some deliterious materials. SM Silty-sands, sand-silt mixtures. Brown (4/4)7.5YR (Some clay).	Bulk Tube	11 20 27		3.5%
5'	SM Silty-sands, sand-silt mixtures. Light Brown (6/3) 7.5YR. No difficulty driving auger. (Some clay.)	Tube	8 11 13		2.0%
10'	ML Inorganic silts and very fine sands. Brown (4/4) 7.5YR. (Some small gravel present.) No difficulty driving auger.	Tube	24 32 43		5.3%
15'	SM Silty-sands, sand-silt mixtures. Grayish Brown (5/2) 2.5Y. No difficulty driving auger.		13 19 31		5.2%
20'	ML Inorganic silts and very fine sands. Olive Brown (4/3) 2.5Y. No difficulty driving auger.		15 25 36		5.4%
25'			15 23 31		1.0%
	BORING TERMINATED AT 30'				

Client: JW Faherty

Project: Soils Investigation, Bear Valley Rd. Victorville, CA. APN 3091-221-02

Boring Location: As indicated on Boring Location / Topographic Map

Remarks: No free ground water or bedrock encountered, some caving of boring occurred.

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Project: 29.9
Loc. No. 8
Exhibit: A-2
Sheet: 9 of 12

EXPLORATORY BORING FIELD LOG
ASTM D1452 (ASTM D 1586)

Date:	04/28/05	Boring Diameter:	8"	Drilling Rig:	CME-55
Conducted By:	JB/JH	Surface Elevation:	Unk	Drive Weight:	140 lb

Depth	Description (USCS)	Sample	SPT	Density	Moisture
0'	Surface consists of desert vegetation and some deliterious materials. SM Silty-sands, sand-silt mixtures. Brown (5/3)7.5YR (Some clay present.)	Tube	8 19 28		12.0%
5'		Tube	8 12 18		6.2%
10'	SM Silty-sands, sand-silt mixtures. Olive Brown (4/4) 7.5YR. (Some small to medium cobble.) No difficulty driving auger.	Tube	11 16 25		6.5%
15'	ML Inorganic silts and very fine sands. Pinkish Gray (7/2) 5YR. No difficulty driving auger.	Tube	9 12 18		1.4%
20'		Tube	8 14 21		1.0%
25'		Tube	14 21 29		1.0%
	BORING TERMINATED AT 30'				

Client: JW Faherty
Project: Soils Investigation, Bear Valley Rd. Victorville, CA. APN 3091-221-02
Boring Location: As indicated on Boring Location / Topographic Map
Remarks: No free ground water or bedrock encountered, some caving of boring occurred.

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Project: 29.9
Loc. No. 9
Exhibit: A-2

EXPLORATORY BORING FIELD LOG
ASTM D1452 (ASTM D 1586)

Date:	04/28/05	Boring Diameter:	8"	Drilling Rig:	CME-55
Conducted By:	JB/JH	Surface Elevation:	Unk	Drive Weight:	140 lb

Depth	Description (USCS)	Sample	SPT	Density	Moisture
0'	Surface consists of desert vegetation and some deliterious materials. SM Silty-sands, sand-silt mixtures. Brown (5/4)7.5YR (Some clay present.)	Bulk	3 3 5		6.2%
5'	SM Silty-sands, sand-silt mixtures. (Some gravel.) Dark Olive Brown (3/3) 2.5YR. No difficulty driving auger.		7 10 12		7.2%
10'			5 7 10		8.4%
15'			6 11 14		5.8%
	BORING TERMINATED AT 20'				
20'					
25'					

Client: JW Faherty
Project: Soils Investigation, Bear Valley Rd. Victorville, CA. APN 3091-221-02
Boring Location: As indicated on Boring Location / Topographic Map
Remarks: No free ground water or bedrock encountered, some caving of boring occurred.

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Project: 29.9
Loc. No. 10
Exhibit: A-2
Sheet: 11 of 12

EXPLORATORY BORING FIELD LOG

ASTM D1452 (ASTM D 1586)

Date:	04/28/05	Boring Diameter:	8"	Drilling Rig:	CME-55
Conducted By:	JB/JH	Surface Elevation:	Unk	Drive Weight:	140 lb

Depth	Description (USCS)	Sample	SPT	Density	Moisture
0'	Surface consists of desert vegetation and some deliterious materials. SM Silty-sands, sand-silt mixtures. Brown (5/4)7.5YR (Some clay present.)	Tube	3 3 5		5.4%
5'	SM Silty-sands, sand-silt mixtures. (Some gravel.) Brown (5/4) 7.5YR. No difficulty driving auger.	Tube	5 6 9		5.3%
10'		Tube	7 10 15		7.8%
15'			8 12 16		8.1%
	BORING TERMINATED AT 20'				
20'					
25'					

Client:	JW Faherty
Project:	Soils Investigation, Bear Valley Rd. Victorville, CA. APN 3091-221-02
Boring Location:	As indicated on Boring Location / Topographic Map
Remarks:	No free ground water or bedrock encountered, some caving of boring occurred.

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Project:	29.9
Loc. No.	11
Exhibit:	A-2
Sheet:	12 of 12

APPENDIX B

LABORATORY TESTING

LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT

ASTM D 1557

Sample No: B8 Surface
Sample Date: 04/28/05
Sampled By: JB /JH

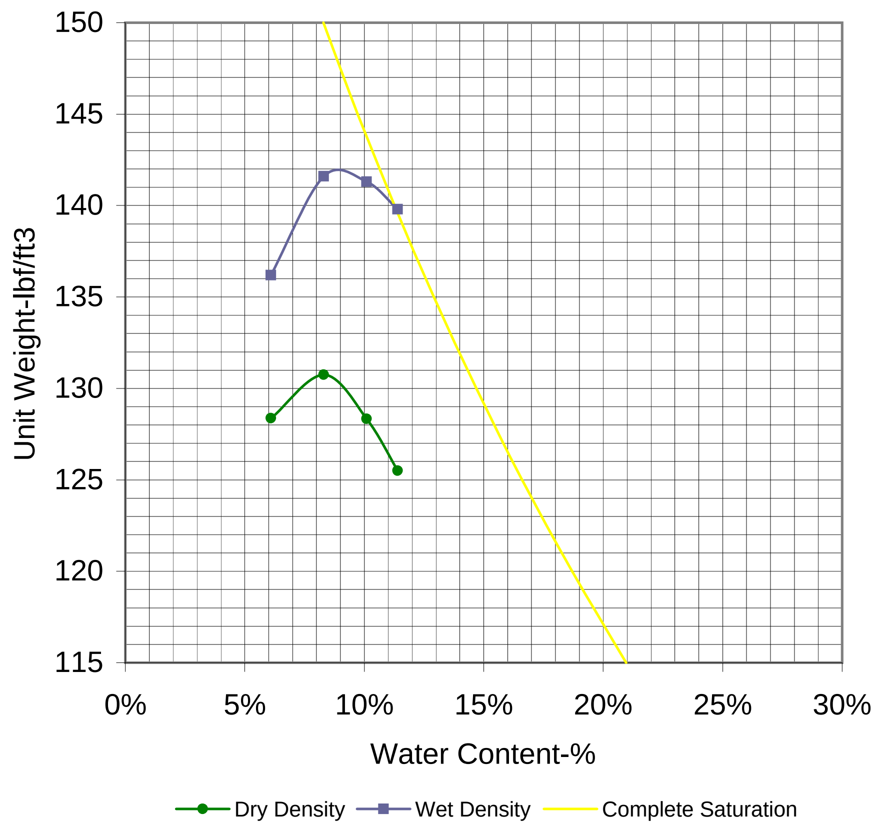
Test No: B8 Surface
Test Date: 05/24/05
Tested By: FR

As-Rec. Moisture: Not Determined
Preparation: Moist

Fraction on No. 4: Not Recorded
Fraction on 3/8": Not Recorded
Fraction on 3/4": Not Recorded

Procedure Used: B
Volume of Mold: 30.00
Rammer Used: Manual

Specific Gravity: Not Determined
Spe. G. Method: N/A



Optimum Dry Unit Weight (pcf): 130.7
Corrected Dry Unit Weight (pcf): N/A

Optimum Moisture Content (%): 8.3
Corrected Moisture Content (%): N/A

Laboratory Data

Test by Moisture Content	1	2	3	4	5	6
Weight of Soil and Tare	9.52	9.70	9.69	9.64		
Weight of Tare	4.98	4.98	4.98	4.98		
Weight of Soil	4.54	4.72	4.71	4.66		
Wet Density	136.2	141.6	141.3	139.8		
Moisture Content	6.1%	8.3%	10.1%	11.4%		
Dry Unit Weight	128.4	130.7	128.3	125.5		

Description: SM Silty sands, poorly graded sand-silt mixture. (Traces of clay.)
Origin: Boring number 8 at surface.
Client: J.W. Faherty
Project: Soils Investigation, Bear Valley Rd., Victorville, CA. APN 3091-221-02
Remarks:

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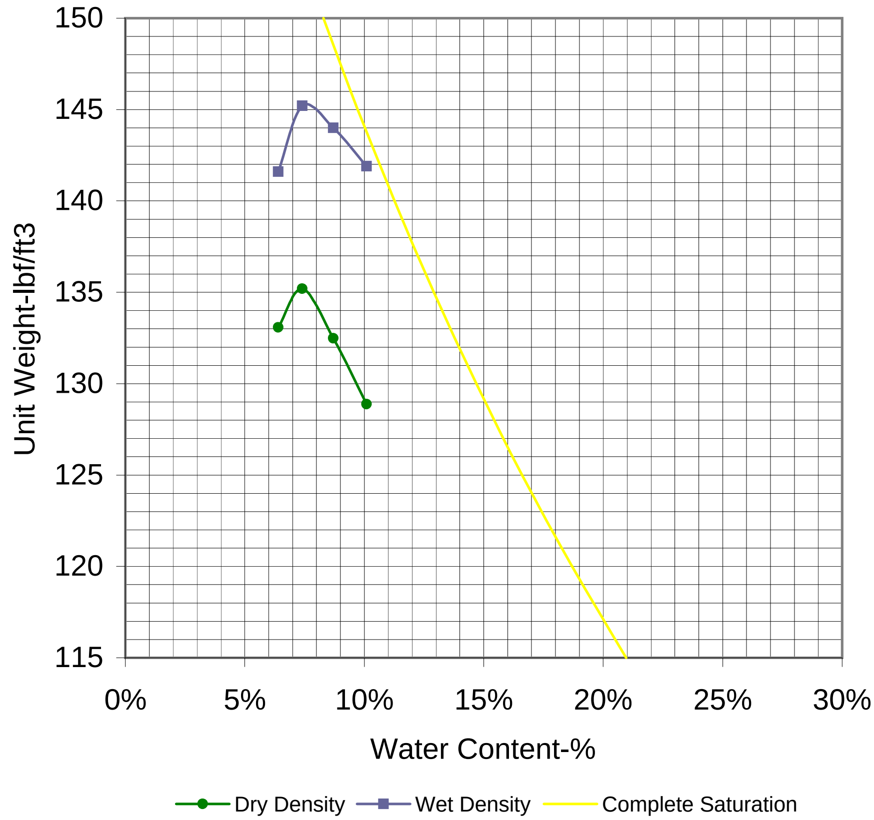
Project: 29.9
Lab No: NA
Exhibit: B-1
Sheet: 1 of 2

LABORATORY COMPACTION CHARACTERISTICS OF SOIL USING MODIFIED EFFORT

ASTM D 1557

Sample No:	B9 Surface
Sample Date:	04/28/05
Sampled By:	JB /JH
Test No:	B9 Surface
Test Date:	05/24/05
Tested By:	FR
As-Rec. Moisture:	Not Determined
Preparation:	Moist
Fraction on No. 4:	Not Recorded
Fraction on 3/8":	Not Recorded
Fraction on 3/4":	Not Recorded
Procedure Used:	B
Volume of Mold:	30.00
Rammer Used:	Manual
Specific Gravity:	Not Determined
Spe. G. Method:	N/A



Optimum Dry Unit Weight (pcf): 135.1
Corrected Dry Unit Weight (pcf): N/A

Optimum Moisture Content (%): 7.4
Corrected Moisture Content (%): N/A

Laboratory Data

Test by Moisture Content	1	2	3	4	5	6
Weight of Soil and Tare	9.70	9.82	9.78	9.71		
Weight of Tare	4.98	4.98	4.98	4.98		
Weight of Soil	4.72	4.84	4.80	4.73		
Wet Density	141.6	145.2	144.0	141.9		
Moisture Content	6.4%	7.4%	8.7%	10.1%		
Dry Unit Weight	133.1	135.2	132.5	128.9		

Description:	SM Silty sands, poorly graded sand-silt mixture. (Traces of clay.)
Origin:	Boring number 9 at surface.
Client:	J.W. Faherty
Project:	Soils Investigation, Bear Valley Rd., Victorville, CA. APN 3091-221-02
Remarks:	

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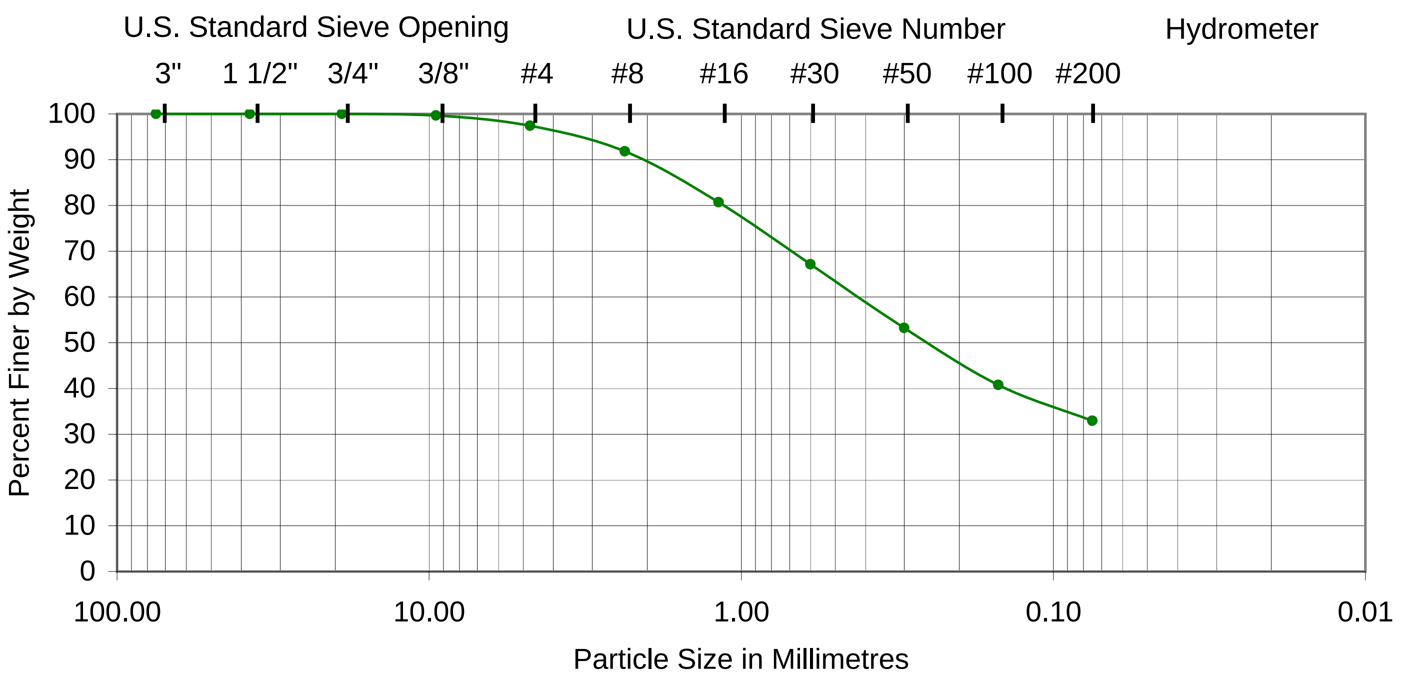
Project: 29.9
Lab No: NA
Exhibit: B-1
Sheet: 2 of 2

SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES
ASTM C 136 (ASTM C 117)

Sample No:	B3 @ 5-10
Sample Date:	04/28/05
Sampled By:	JB / JH
Test No:	B3 @ 5-10
Test Date:	05/18/05
Tested By:	FR
Sand Equivalent:	
Date Tested:	
Tested By:	
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	100
#4	97
#8	92
#16	81
#30	67
#50	53
#100	41
#200	32.9



USCS	Gravel		Sand			Fines
	Coarse	Fine	Coarse	Medium	Fine	Silts / Clays

Description:	SM Silty-sands, sand-silt mixtures. Brown (4/4) 7.5YR
Origin:	Boring # 3 @ 5-10
Client:	JW Faherty
Project Title:	Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:	

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Project: 29.9
Lab No: NA
Exhibit: B-2
Sheet: 1 of 20

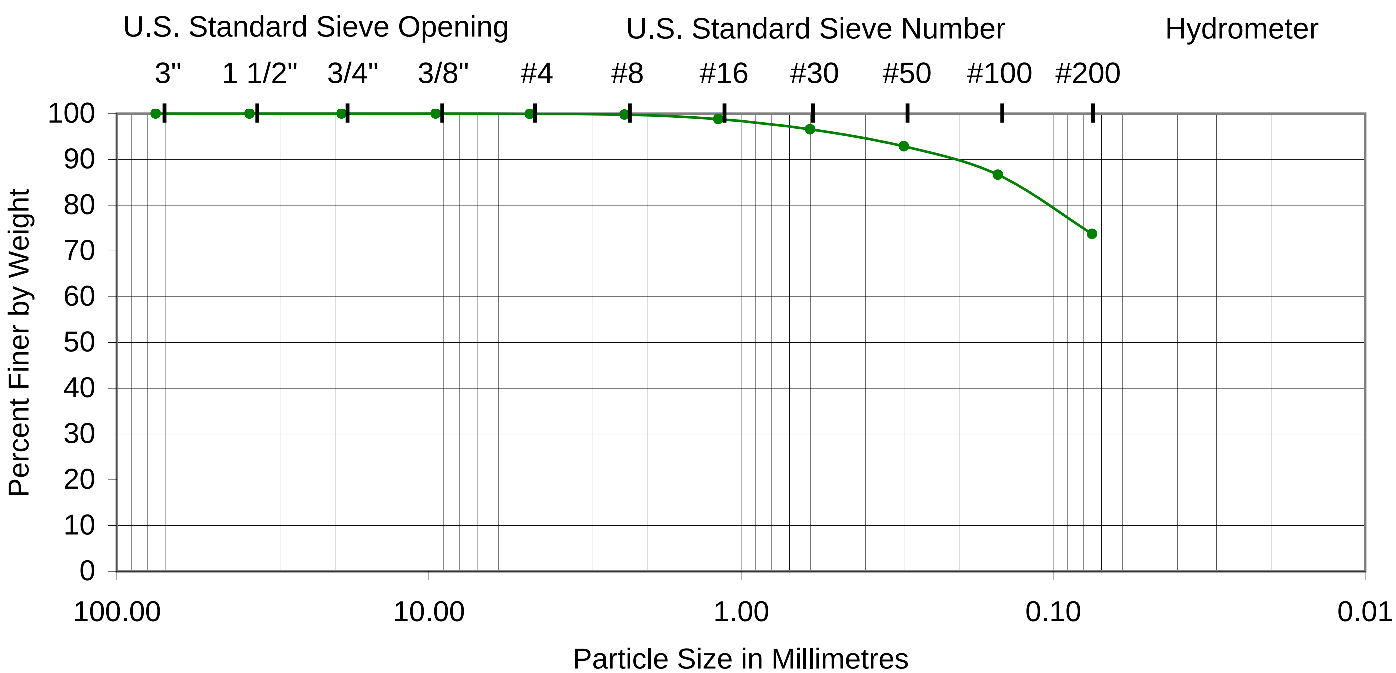
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B3 @ 20-25'
Sample Date:	04/28/05
Sampled By:	JB / JH
Test No:	B3 @ 20-25'
Test Date:	05/18/05
Tested By:	FR
Sand Equivalent:	
Date Tested:	
Tested By:	
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	100
#4	100
#8	100
#16	99
#30	97
#50	93
#100	87
#200	73.7



USCS	Gravel		Sand			Fines
	Coarse	Fine	Coarse	Medium	Fine	Silts / Clays

Description:	ML Inorganic silts and very fine sands. Yelowish Brown (5/4) 10YR.
Origin:	Boring # 3 @ 20-25'
Client:	JW Faherty
Project Title:	Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:	

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Project:	29.9
Lab No:	NA
Exhibit:	B-2
Sheet:	2 of 20

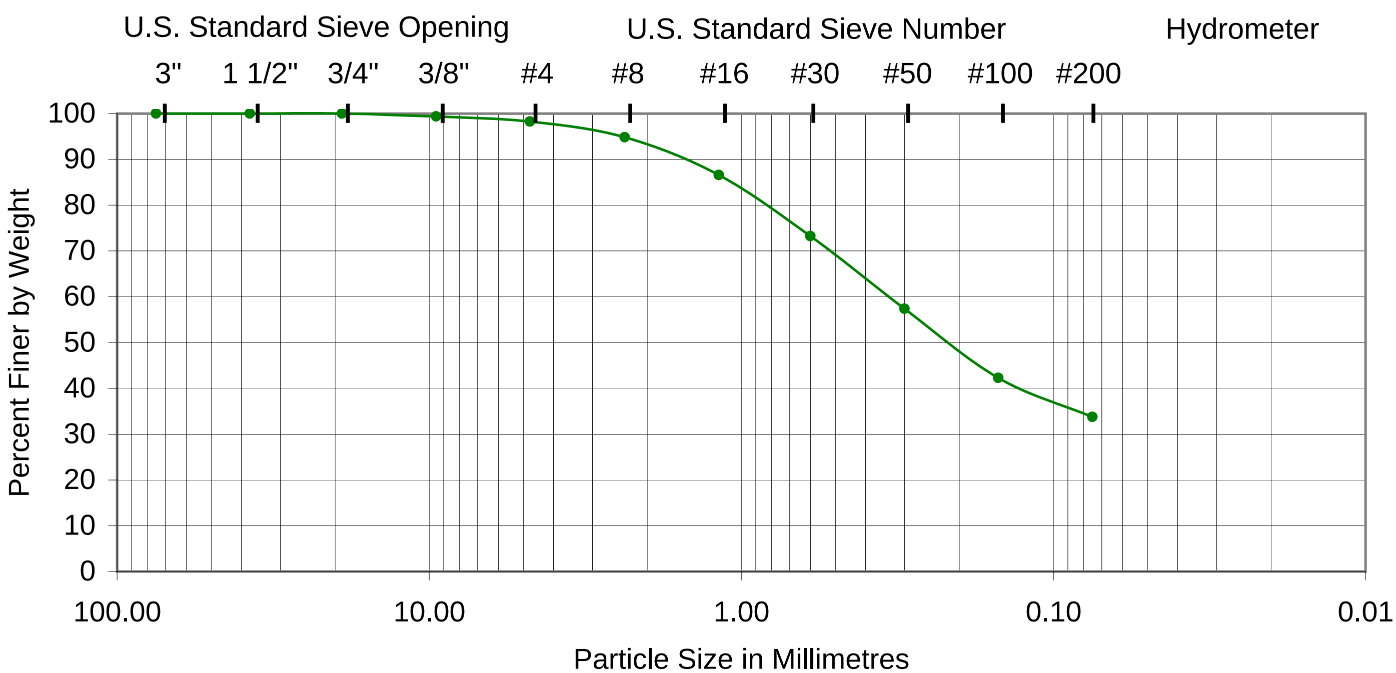
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B4 @ Surface
Sample Date:	04/28/05
Sampled By:	JB / JH
Test No:	B4 @ Surface'
Test Date:	05/24/05
Tested By:	FR
Sand Equivalent:	24
Date Tested:	05/24/05
Tested By:	FR
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	99
#4	98
#8	95
#16	87
#30	73
#50	57
#100	42
#200	33.7



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<tr><td rowspan="2">USCS</td><td colspan="2">Gravel</td><td colspan="3">Sand</td><td>Fines</td></tr>
<tr><td>Coarse</td><td>Fine</td><td>Coarse</td><td>Medium</td><td>Fine</td><td>Silts / Clays</td></tr>
</table>

Description:	SM Silty-sands, sand-silt mixtures. Brown (5/4) 7.5YR.
Origin:	Boring # 5 @ Surface
Client:	JW Faherty
Project Title:	Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:	

Merrell Engineering Company, Inc.
128 E. Fredricks St.
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(760) 256-2068

Project:	29.9
Lab No:	NA
Exhibit:	B-2
Sheet:	3 of 20

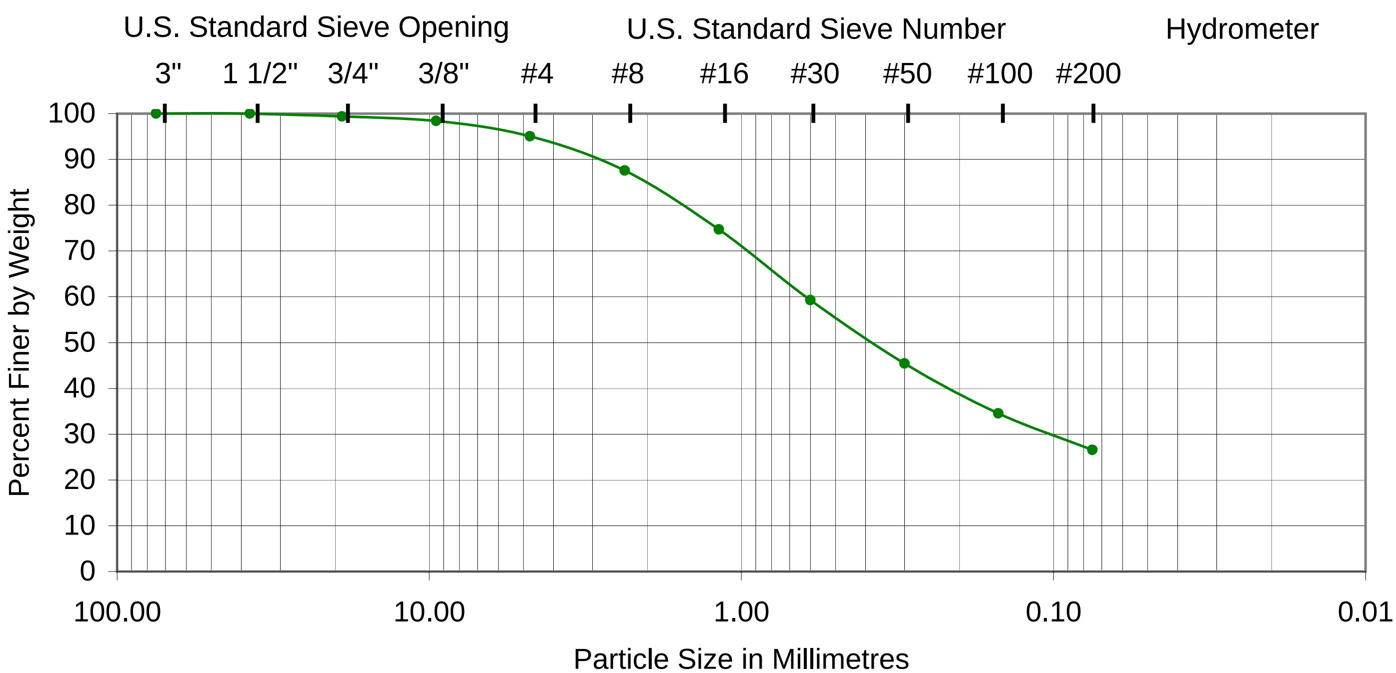
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B5 @ Surface
Sample Date:	04/29/05
Sampled By:	JB / JH
Test No:	B5 @ Surface'
Test Date:	05/19/05
Tested By:	FR
Sand Equivalent:	21
Date Tested:	05/19/05
Tested By:	FR
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	99
3/8"	98
#4	95
#8	88
#16	75
#30	59
#50	45
#100	35
#200	26.6



<table>
<tr><td rowspan="2">USCS</td><td colspan="2">Gravel</td><td colspan="3">Sand</td><td>Fines</td></tr>
<tr><td>Coarse</td><td>Fine</td><td>Coarse</td><td>Medium</td><td>Fine</td><td>Silts / Clays</td></tr>
</table>

Description:	SM, Silty-sand, sand silt mixtures. Brown (4/4) 7.5YR.
Origin:	Boring # 5 @ Surface
Client:	JW Faherty
Project Title:	Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:	

Merrell Engineering Company, Inc.
128 E. Fredricks St.
Barstow, CA 92311
(760) 256-2068

Project:	29.9
Lab No:	NA
Exhibit:	B-2
Sheet:	4 of 20

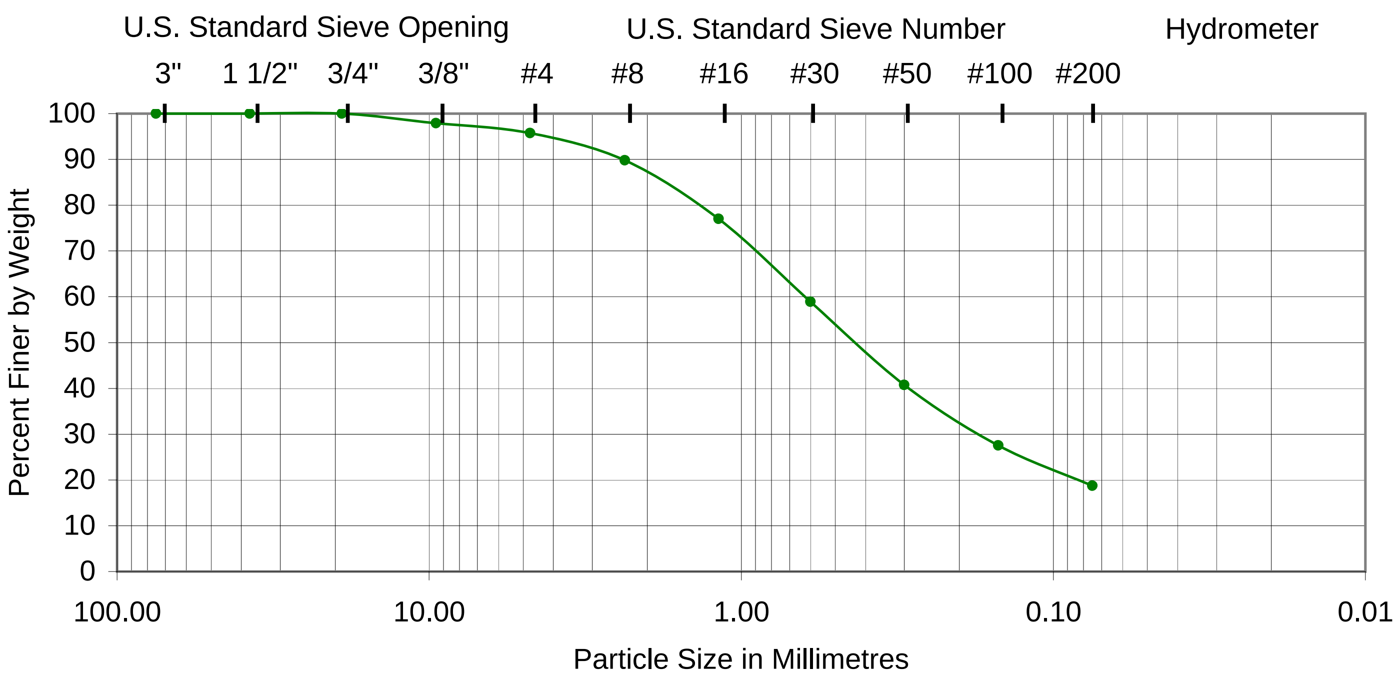
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B5 @ 0-5'
Sample Date:	04/29/05
Sampled By:	JB / JH
Test No:	B5 @ 0-5'
Test Date:	05/12/05
Tested By:	FR
Sand Equivalent:	
Date Tested:	
Tested By:	
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	98
#4	96
#8	90
#16	77
#30	59
#50	41
#100	28
#200	18.7



USCS	Gravel		Sand			Fines
	Coarse	Fine	Coarse	Medium	Fine	Silts / Clays

Description: SM, Silty-sand, sand-silt mixtures. Brown (4/4) 7.5YR.
Origin: Boring # 5 @ 0-5'
Client: JW Faherty
Project Title: Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:

Merrell Engineering Company, Inc.
128 E. Fredricks St.
Barstow, CA 92311
(760) 256-2068

Project: 29.9
Lab No: NA
Exhibit: B-2
Sheet: 5 of 20

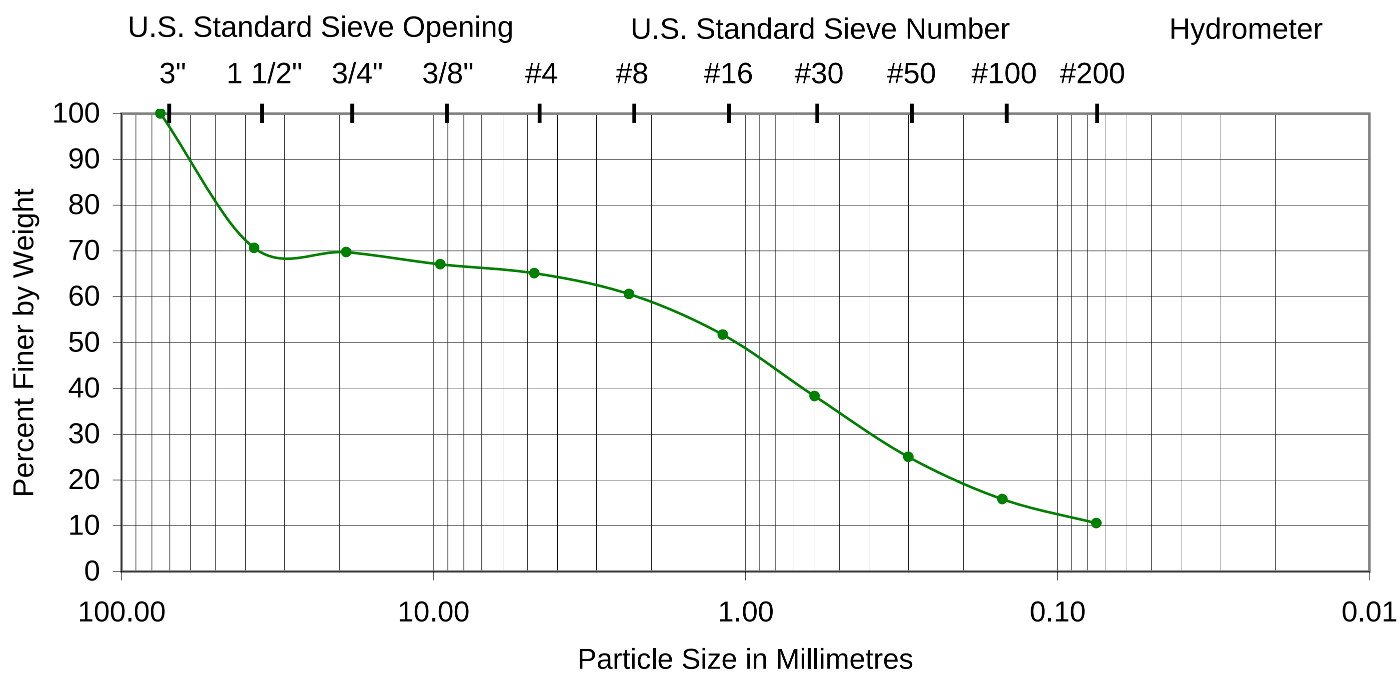
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B5 @ 5-10'
Sample Date:	04/29/05
Sampled By:	JB / JH
Test No:	B5 @ 5-10'
Test Date:	05/12/05
Tested By:	FR
Sand Equivalent:	
Date Tested:	
Tested By:	
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	71
3/4"	70
3/8"	67
#4	65
#8	61
#16	52
#30	38
#50	25
#100	16
#200	10.5



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<tr><td>Coarse</td><td>Fine</td><td>Coarse</td><td>Medium</td><td>Fine</td><td>Silts / Clays</td></tr>
</table>

Description:	SM Silty-sands, sand-silt mixtures. Brown (4/4) 7.5YR.
Origin:	Boring # 5 @ 5-10'
Client:	JW Faherty
Project Title:	Soils Investigation Bear Valley Rd, Victorville Ca.
Remarks:	

Merrell Engineering Company, Inc.
128 E. Fredricks St.
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(760) 256-2068

Project:	29.9
Lab No:	NA
Exhibit:	B-2
Sheet:	6 of 20

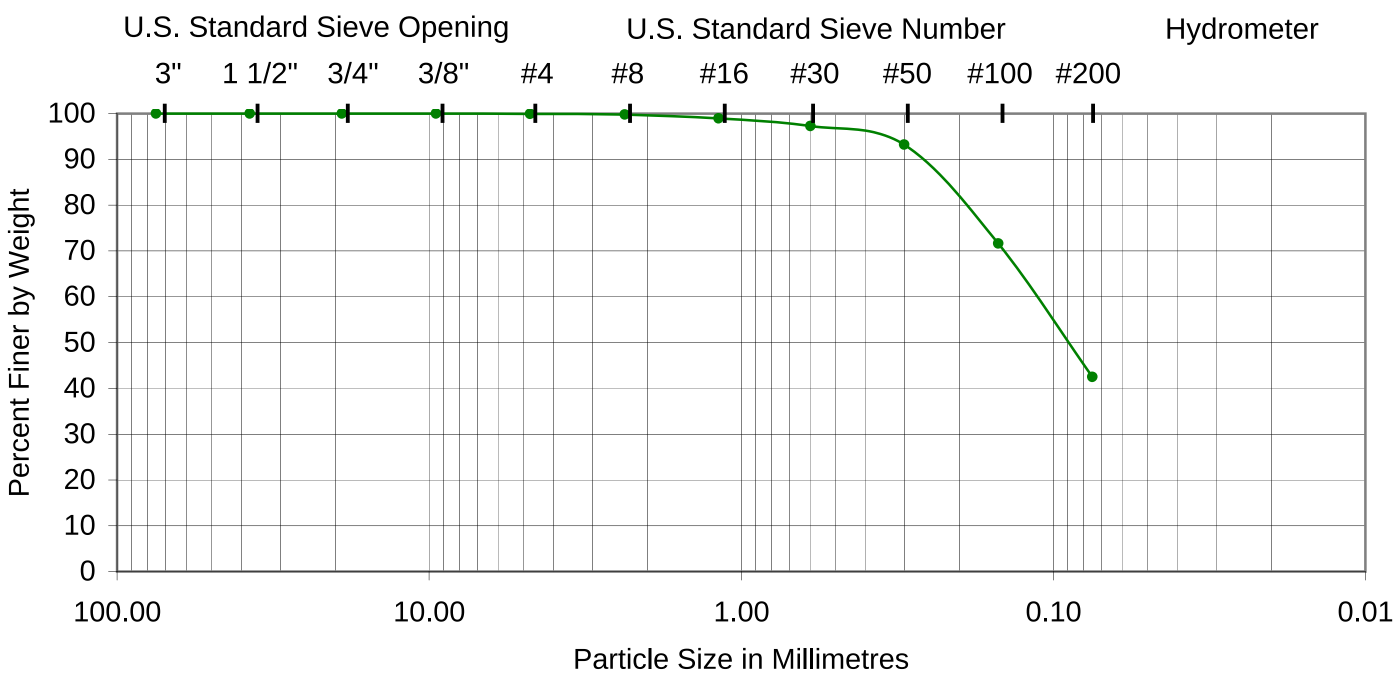
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B5 @ 10-15'
Sample Date:	04/29/05
Sampled By:	JB / JH
Test No:	B5 @ 10-15'
Test Date:	05/16/05
Tested By:	FR
Sand Equivalent:	
Date Tested:	
Tested By:	
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	100
#4	100
#8	100
#16	99
#30	97
#50	93
#100	72
#200	42.5



USCS	Gravel		Sand			Fines
	Coarse	Fine	Coarse	Medium	Fine	Silts / Clays

Description:	SM Silty-sands, sand-silt mixtures. Brown (4/4) 7.5YR.
Origin:	Boring # 5 @ 10-15'
Client:	JW Faherty
Project Title:	Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:	

Merrell Engineering Company, Inc.
128 E. Fredricks St.
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(760) 256-2068

Project:	29.9
Lab No:	NA
Exhibit:	B-2
Sheet:	7 of 20

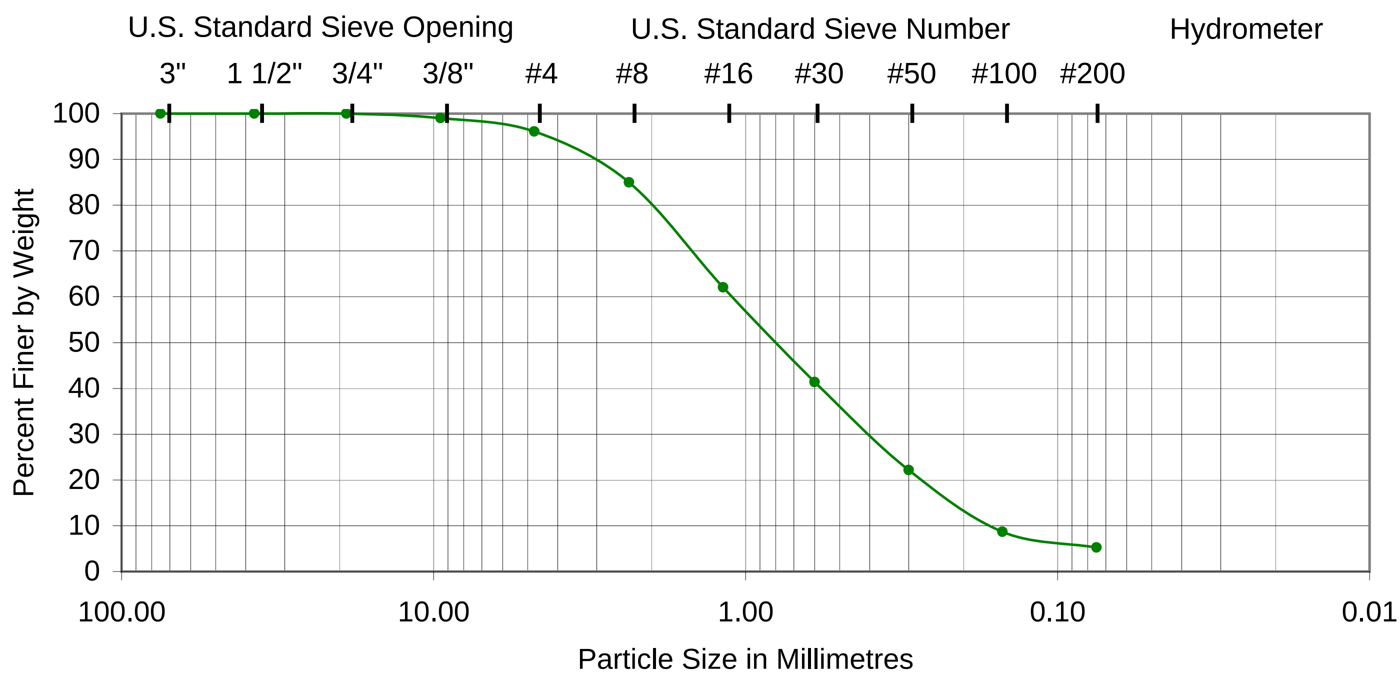
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B5 @ 15-20'
Sample Date:	04/29/05
Sampled By:	JB / JH
Test No:	B5 @ 15-20'
Test Date:	05/16/05
Tested By:	FR
Sand Equivalent:	
Date Tested:	
Tested By:	
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	99
#4	96
#8	85
#16	62
#30	41
#50	22
#100	9
#200	5.2



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<tr><td>Coarse</td><td>Fine</td><td>Coarse</td><td>Medium</td><td>Fine</td><td>Silts / Clays</td></tr>
</table>

Description:	SM Silty-sand, sand-silt mixtures. (Medium to coarse) Yellowish Brown (5/4) 10YR.
Origin:	Boring # 5 @ 15-20'
Client:	JW Faherty
Project Title:	Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:	

Merrell Engineering Company, Inc.
128 E. Fredricks St.
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(760) 256-2068

Project:	29.9
Lab No:	NA
Exhibit:	B-2
Sheet:	8 of 20

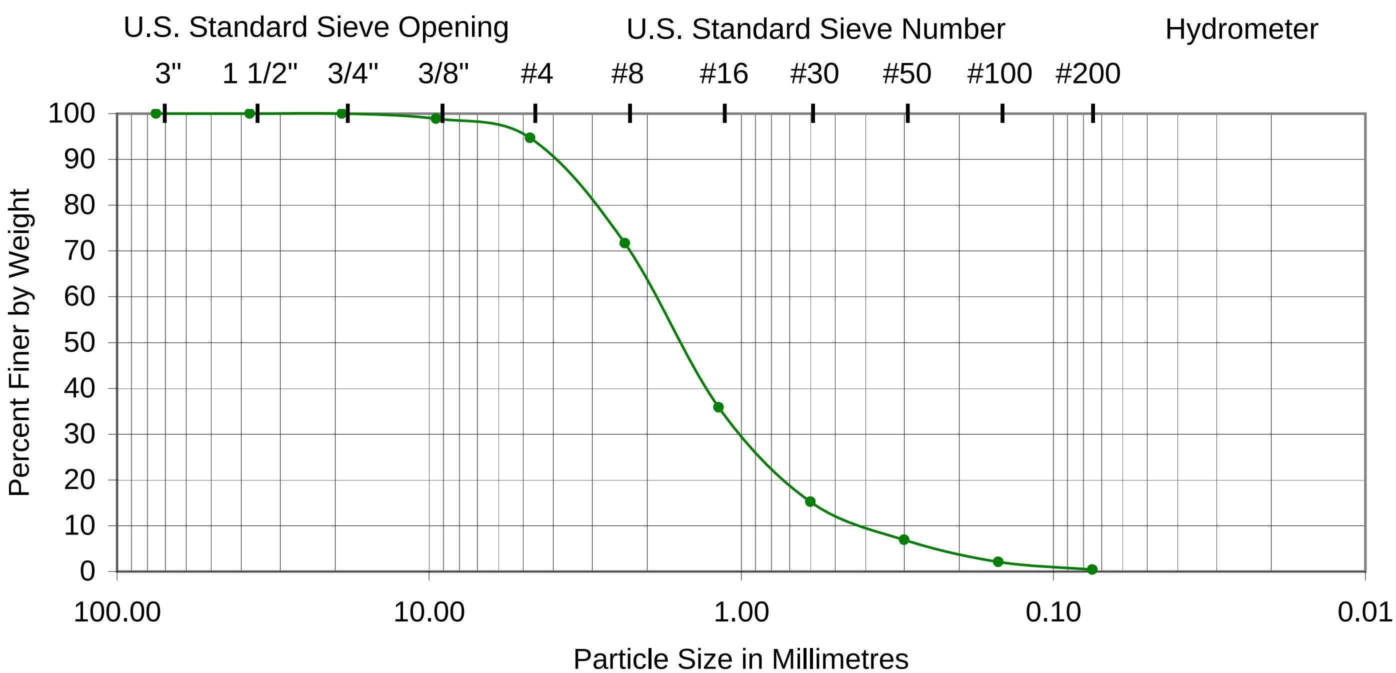
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B5 @ 20-25'		
Sample Date:	04/29/05		
Sampled By:	JB / JH		
Test No:	B5 @ 20-25'		
Test Date:	05/16/05		
Tested By:	FR		
Sand Equivalent:			
Date Tested:			
Tested By:			
Fineness Mod:	Not Determined		

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	99
#4	95
#8	72
#16	36
#30	15
#50	7
#100	2
#200	0.4



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<tr><td>Coarse</td><td>Fine</td><td>Coarse</td><td>Medium</td><td>Fine</td><td>Silts / Clays</td></tr>
</table>

Description: SP Poorly-graded sands, gravelly sands. Pale Brown (6/3) 10YR

Origin: Boring # 5 @ 20-25'

Client: JW Faherty

Project Title: Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02

Remarks:

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(760) 256-2068

Project: 29.9

Lab No: NA

Exhibit: B-2

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SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

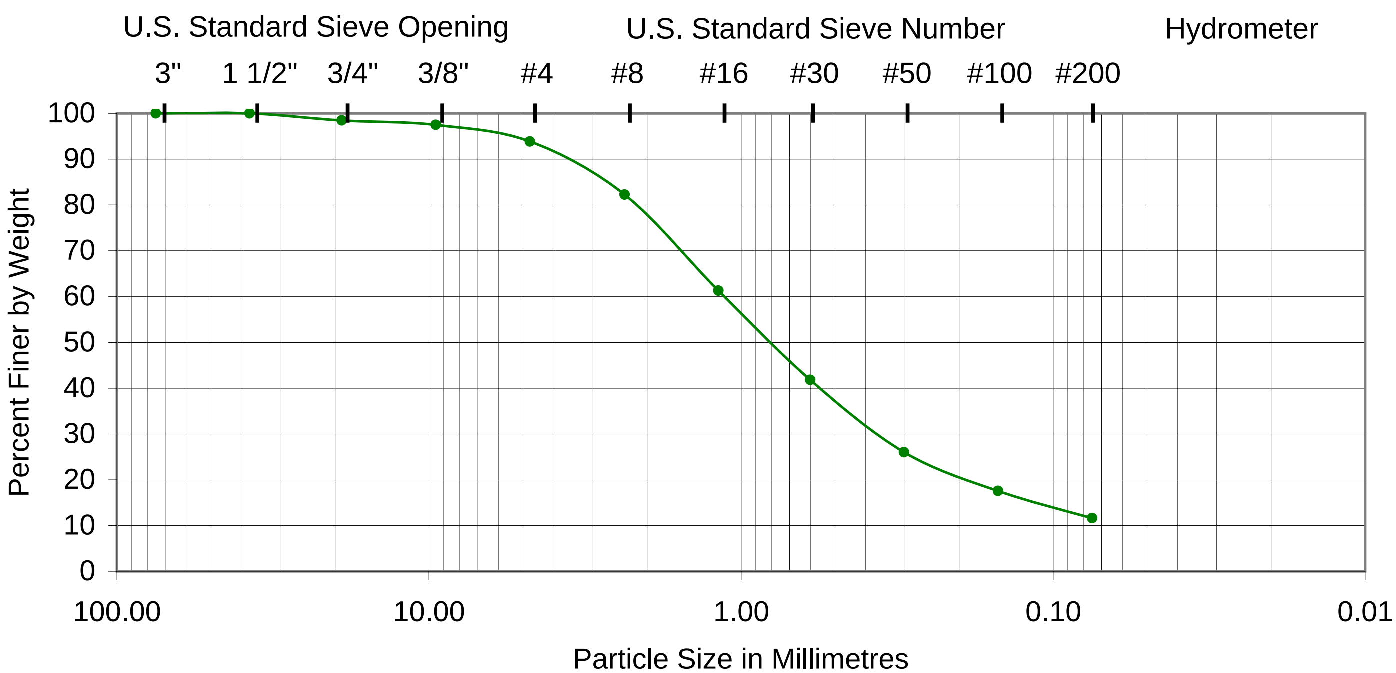
Sample No: B5 @ 25-30'
Sample Date: 04/29/05
Sampled By: JB / JH

Test No: B5 @ 25-30'
Test Date: 05/16/05
Tested By: FR

Sand Equivalent:
Date Tested:
Tested By:
Fineness Mod: Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	98
3/8"	98
#4	94
#8	82
#16	61
#30	42
#50	26
#100	18
#200	11.6



USCS	Gravel		Sand			Fines
	Coarse	Fine	Coarse	Medium	Fine	Silts / Clays

Description: SM Silty-sands, sand-silt mixtures. Pale Brown (6/3) 10YR.
Origin: Boring # 5 @ 25-30'
Client: JW Faherty
Project Title: Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:

Merrell Engineering Company, Inc.
128 E. Fredricks St.
Barstow, CA 92311
(760) 256-2068

Project: 29.9
Lab No: NA
Exhibit: B-2
Sheet: 10 of 20

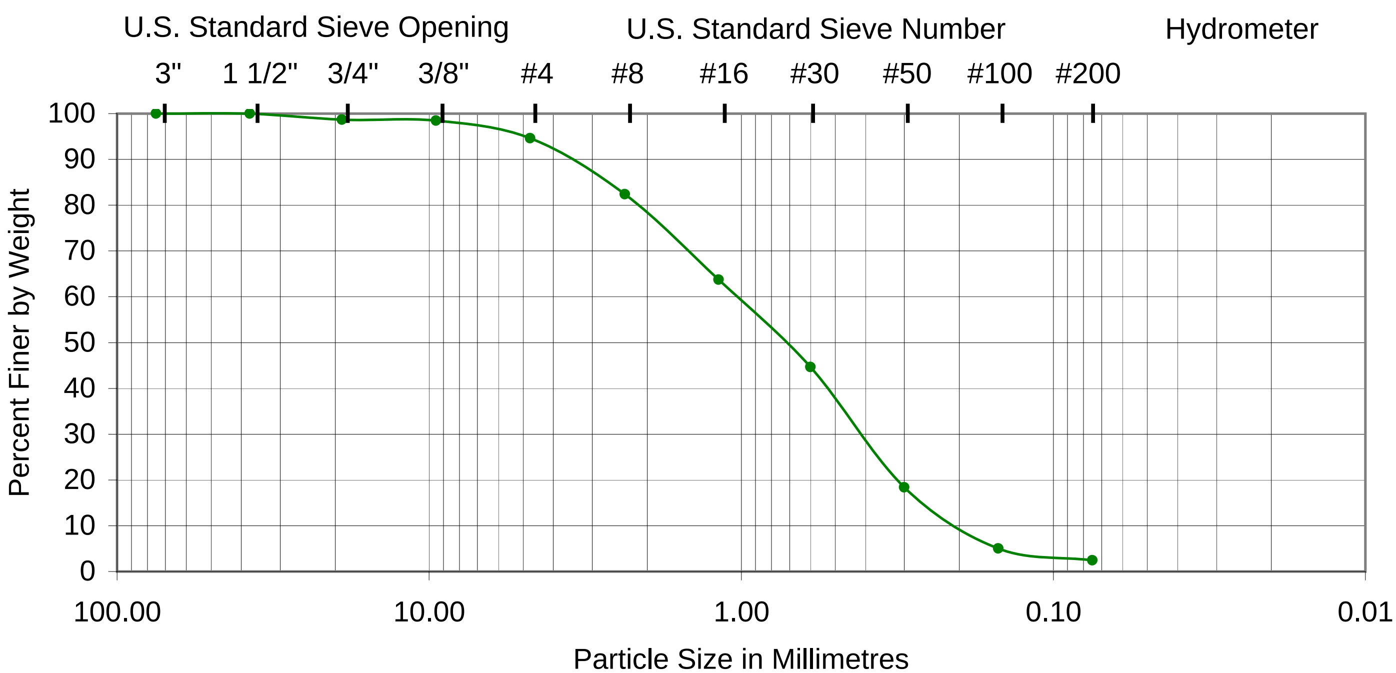
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B5 @ 30-35'
Sample Date:	04/29/05
Sampled By:	JB / JH
Test No:	B5 @ 30-35'
Test Date:	05/16/05
Tested By:	FR
Sand Equivalent:	
Date Tested:	
Tested By:	
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	99
3/8"	98
#4	95
#8	82
#16	64
#30	45
#50	18
#100	5
#200	2.4



USCS	Gravel		Sand			Fines
	Coarse	Fine	Coarse	Medium	Fine	Silts / Clays

Description: SM Silty-sand, sand-silt mixtures. Very Pale Brown (8/3) 10YR.
Origin: Boring # 5 @ 30-35'
Client: JW Faherty
Project Title: Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:

Merrell Engineering Company, Inc.
128 E. Fredricks St.
Barstow, CA 92311
(760) 256-2068

Project: 29.9
Lab No: NA
Exhibit: B-2
Sheet: 11 of 20

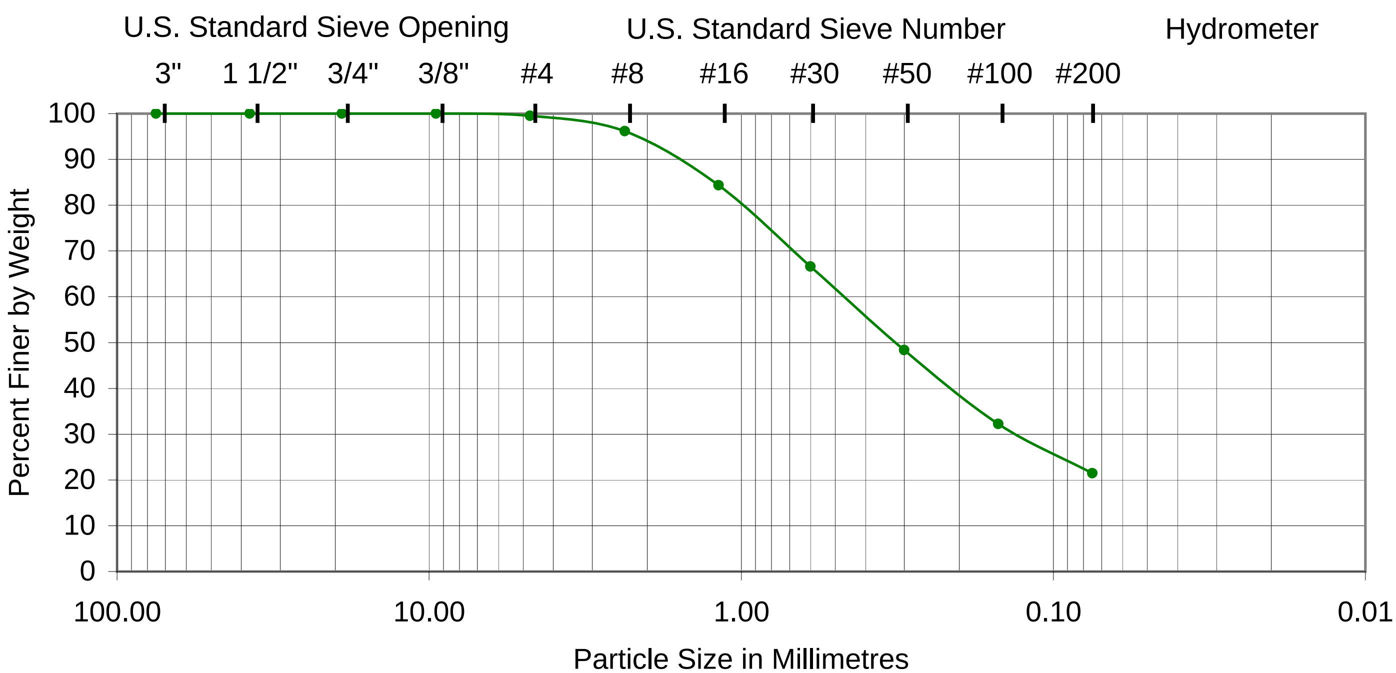
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B5 @ 35-40'
Sample Date:	04/29/05
Sampled By:	JB / JH
Test No:	B5 @ 35-40'
Test Date:	05/16/05
Tested By:	FR
Sand Equivalent:	
Date Tested:	
Tested By:	
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	100
#4	99
#8	96
#16	84
#30	67
#50	48
#100	32
#200	21.4



USCS	Gravel		Sand			Fines
	Coarse	Fine	Coarse	Medium	Fine	Silts / Clays

Description:	SM Silty-sand, sand-silt mixtures. Very Pale Brown (8/3) 10YR.
Origin:	Boring # 5 @ 35-40'
Client:	JW Faherty
Project Title:	Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:	

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(760) 256-2068

Project:	29.9
Lab No:	NA
Exhibit:	B-2
Sheet:	12 of 20

SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

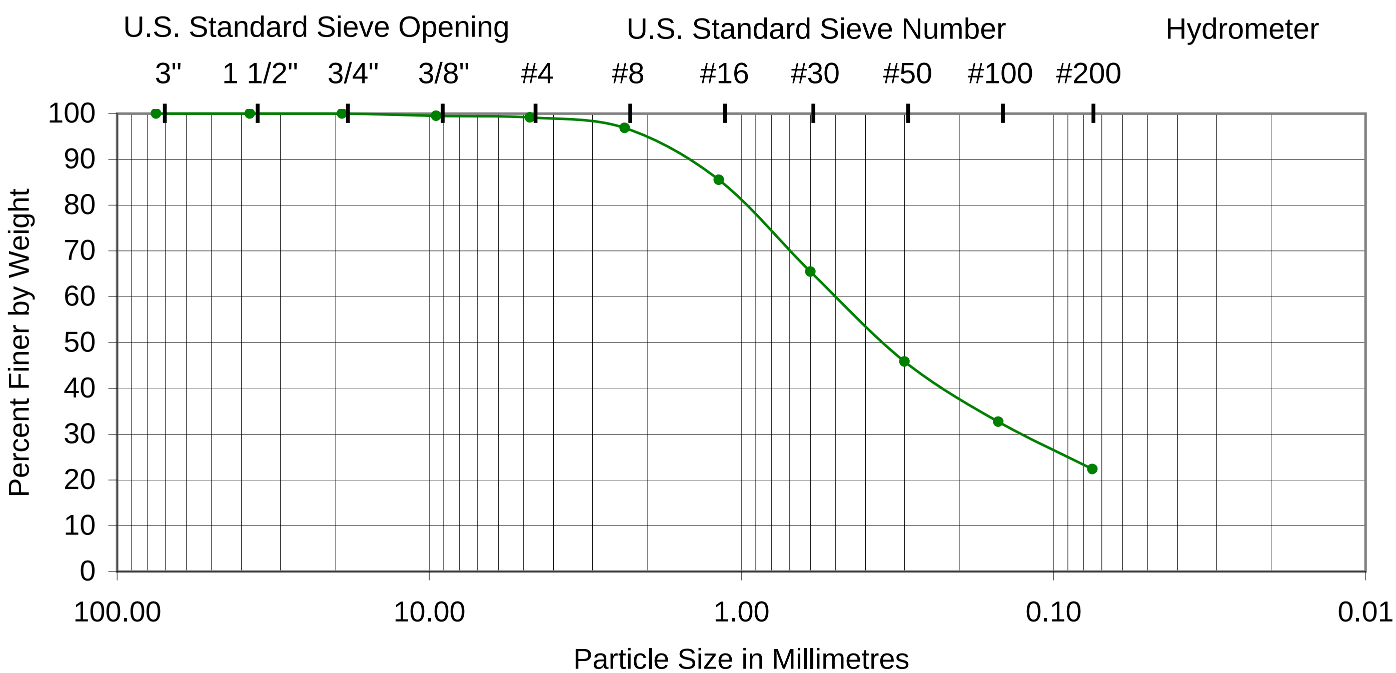
Sample No: B5 @ 40-45'
Sample Date: 04/29/05
Sampled By: JB / JH

Test No: B5 @ 40-45'
Test Date: 05/16/05
Tested By: FR

Sand Equivalent:
Date Tested:
Tested By:
Fineness Mod: Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	100
#4	99
#8	97
#16	86
#30	65
#50	46
#100	33
#200	22.3



USCS	Gravel		Sand			Fines
	Coarse	Fine	Coarse	Medium	Fine	Silts / Clays

Description: SM Silty-sand, sand-silt mixtures. Very Pale Brown (8/3) 10YR.
Origin: Boring # 5 @ 40-45'
Client: JW Faherty
Project Title: Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:

Merrell Engineering Company, Inc.
128 E. Fredricks St.
Barstow, CA 92311
(760) 256-2068

Project: 29.9
Lab No: NA
Exhibit: B-2
Sheet: 13 of 20

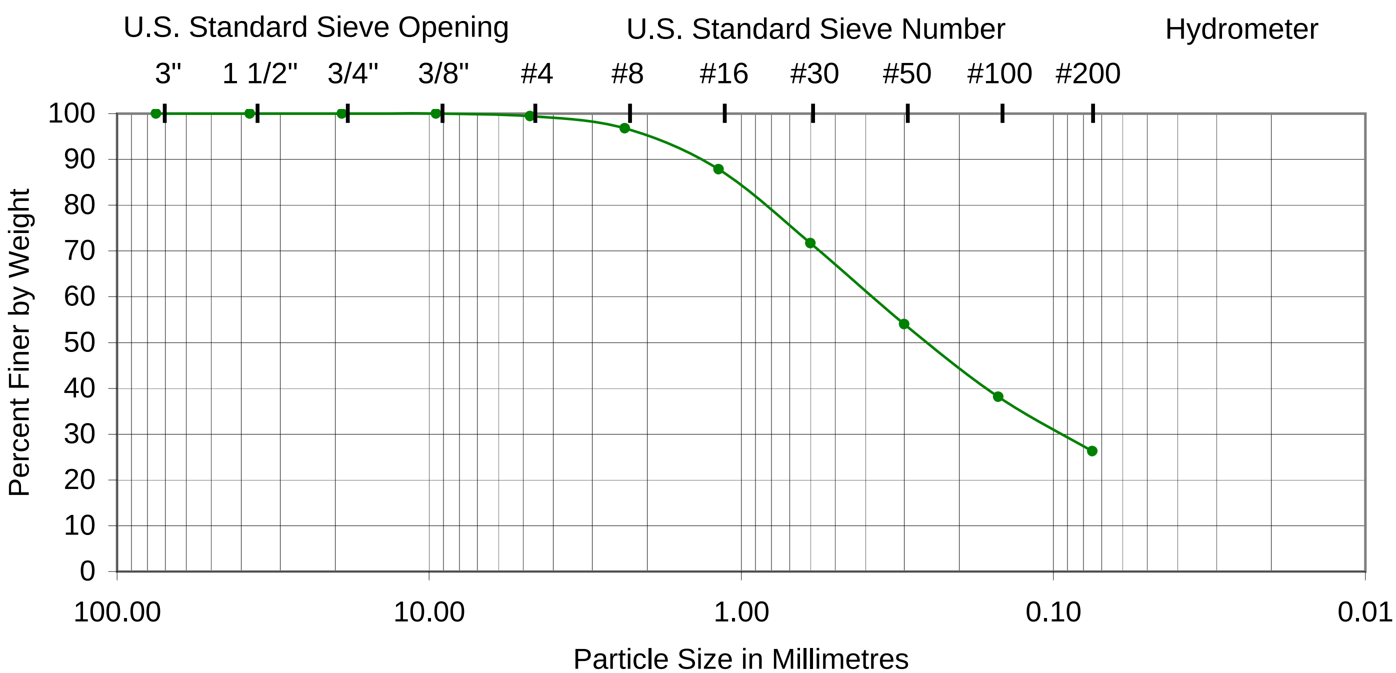
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B5 @ 45-50'
Sample Date:	04/29/05
Sampled By:	JB / JH
Test No:	B5 @ 45-50'
Test Date:	05/16/05
Tested By:	FR
Sand Equivalent:	
Date Tested:	
Tested By:	
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	100
#4	99
#8	97
#16	88
#30	72
#50	54
#100	38
#200	26.3



USCS	Gravel		Sand			Fines
	Coarse	Fine	Coarse	Medium	Fine	Silts / Clays

Description:	SM Silty-sand, sand-silt mixtures. Very Pale Brown (8/3) 10YR.
Origin:	Boring # 5 @ 45-50'
Client:	JW Faherty
Project Title:	Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:	

Merrell Engineering Company, Inc.
128 E. Fredricks St.
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(760) 256-2068

Project:	29.9
Lab No:	NA
Exhibit:	B-2
Sheet:	14 of 20

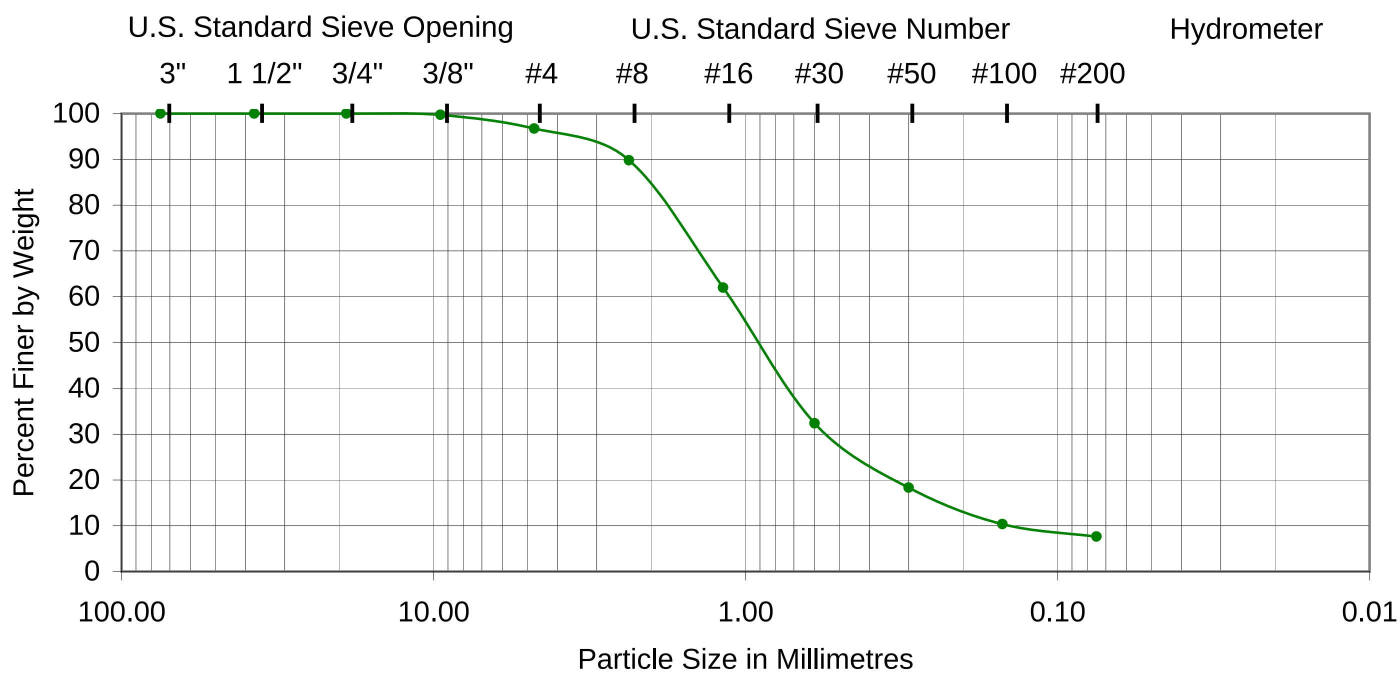
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B6 @ 25-30'
Sample Date:	04/28/05
Sampled By:	JB / JH
Test No:	B6 @ 25-30'
Test Date:	05/18/05
Tested By:	FR
Sand Equivalent:	
Date Tested:	
Tested By:	
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	100
#4	97
#8	90
#16	62
#30	32
#50	18
#100	10
#200	7.6



USCS	Gravel		Sand			Fines
	Coarse	Fine	Coarse	Medium	Fine	Silts / Clays

Description:	SM Silty-sands, sand-silt mixture. Pinkish Gray (7/2) 7.5YR.
Origin:	Boring # 6 @ 25-30'
Client:	JW Faherty
Project Title:	Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:	

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(760) 256-2068

Project:	29.9
Lab No:	NA
Exhibit:	B-2
Sheet:	15 of 20

SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

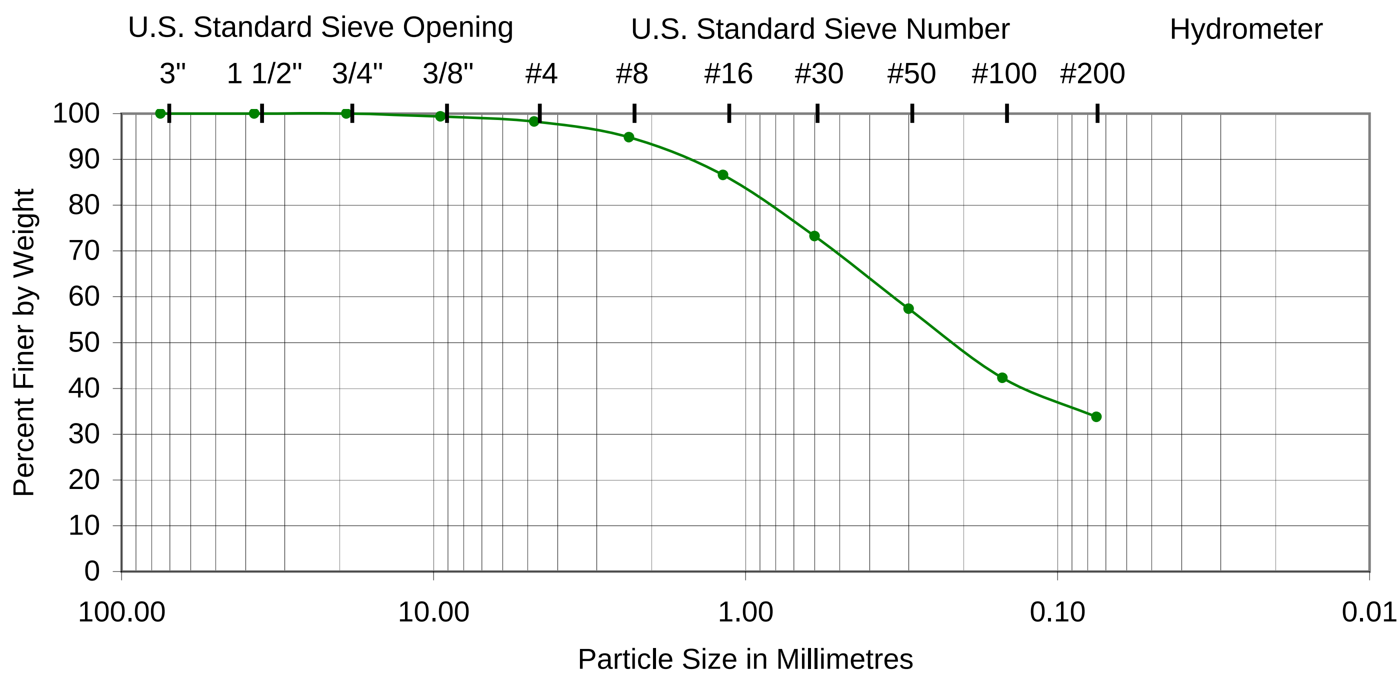
Sample No: B4 @ Surface
Sample Date: 04/27/05
Sampled By: JB / JH

Test No: B4 @ Surface
Test Date: 05/24/05
Tested By: FR

Sand Equivalent:
Date Tested:
Tested By:
Fineness Mod: Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	99
#4	98
#8	95
#16	87
#30	73
#50	57
#100	42
#200	33.7



<table>
<tr><td rowspan="2">USCS</td><td colspan="2">Gravel</td><td colspan="3">Sand</td><td>Fines</td></tr>
<tr><td>Coarse</td><td>Fine</td><td>Coarse</td><td>Medium</td><td>Fine</td><td>Silts / Clays</td></tr>
</table>

Description: SM Silty-sands, sand-silt mixtures. (Some clay) Brown (4/4) 7.5Yr.
Origin: Boring # 8 @ Surface.
Client: JW Faherty
Project Title: Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:

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128 E. Fredricks St.
Barstow, CA 92311
(760) 256-2068

Project: 29.9
Lab No: NA
Exhibit: B-2

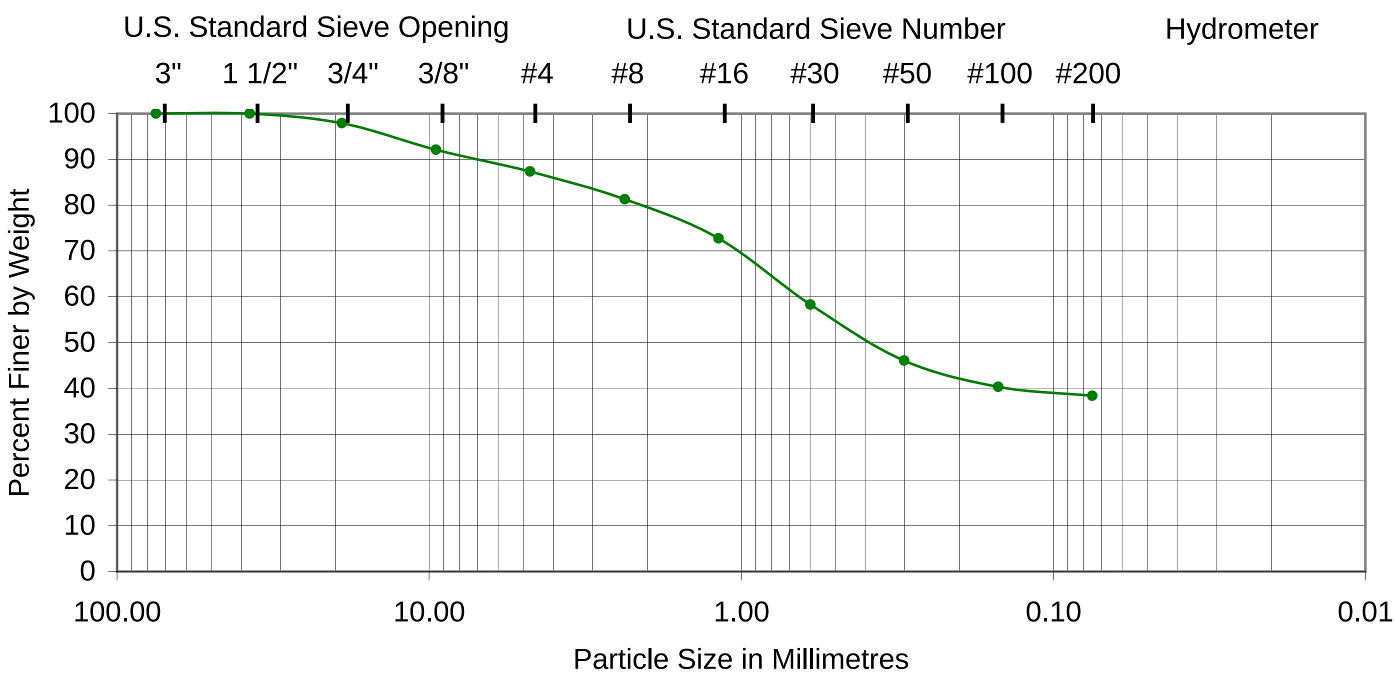
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B8 @ 5-10'
Sample Date:	04/28/05
Sampled By:	JB / JH
Test No:	B8 @ 5-10'
Test Date:	05/18/05
Tested By:	FR
Sand Equivalent:	
Date Tested:	
Tested By:	
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	98
3/8"	92
#4	87
#8	81
#16	73
#30	58
#50	46
#100	40
#200	38.4



USCS	Gravel		Sand			Fines
	Coarse	Fine	Coarse	Medium	Fine	Silts / Clays

Description:	SM Silty-sand, sand-silt mixtures. (Some clay.) Light Brown (6/3)7.5Yr.
Origin:	Boring # 8 @ 5-10'
Client:	JW Faherty
Project Title:	Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:	

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128 E. Fredricks St.
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(760) 256-2068

Project:	29.9
Lab No:	NA
Exhibit:	B-2
Sheet:	17 of 20

SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

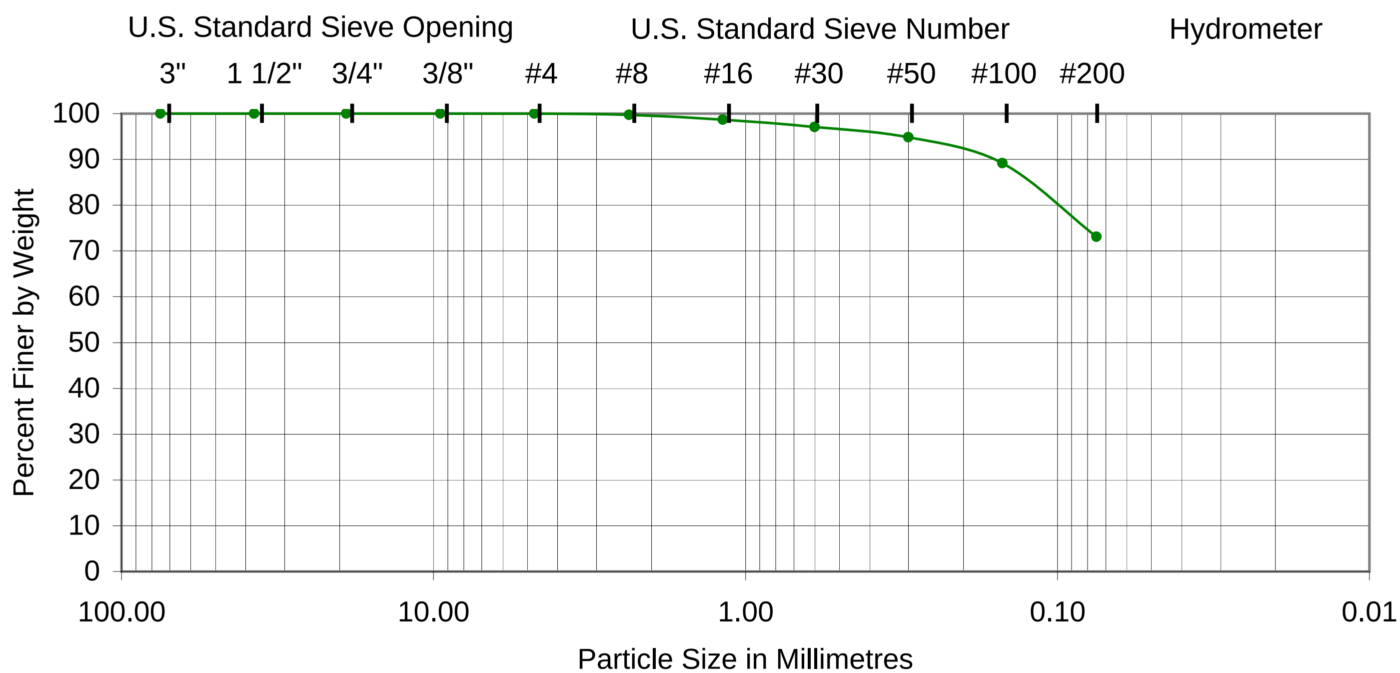
Sample No: B8 @ 20-25'
Sample Date: 04/28/05
Sampled By: JB / JH

Test No: B8 @ 20-25'
Test Date: 05/18/05
Tested By: FR

Sand Equivalent:
Date Tested:
Tested By:
Fineness Mod: Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	100
#4	100
#8	100
#16	99
#30	97
#50	95
#100	89
#200	73.1



USCS	Gravel		Sand			Fines
	Coarse	Fine	Coarse	Medium	Fine	Silts / Clays

Description: ML Inorganic silts and very fine sands. Olive Brown (4/3) 2.5Y
Origin: Boring # 8 @ 20-25'
Client: JW Faherty
Project Title: Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:

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Barstow, CA 92311
(760) 256-2068

Project: 29.9
Lab No: NA
Exhibit: B-2
Sheet: 18 of 20

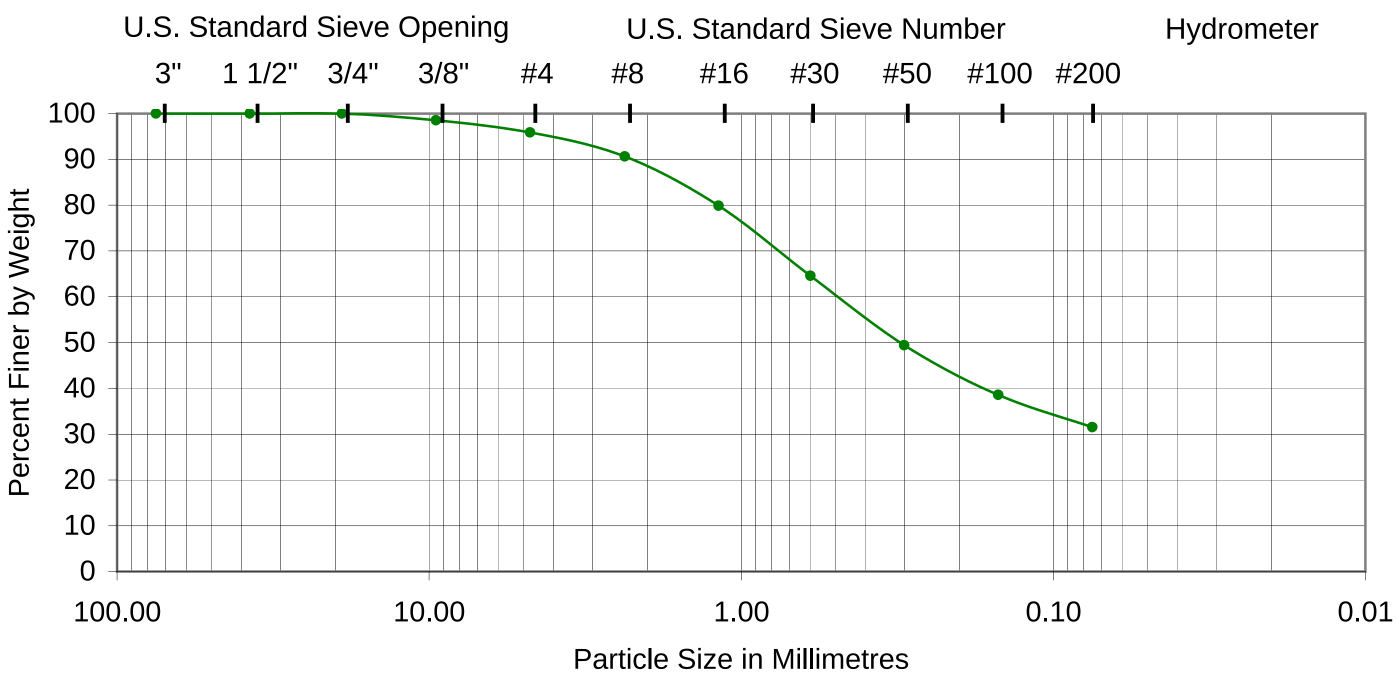
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B9 @ Surface
Sample Date:	04/27/05
Sampled By:	JB / JH
Test No:	B9 @ Surface'
Test Date:	05/18/05
Tested By:	FR
Sand Equivalent:	25
Date Tested:	05/18/05
Tested By:	FR
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	99
#4	96
#8	91
#16	80
#30	65
#50	49
#100	39
#200	31.5



<table>
<tr><td rowspan="2">USCS</td><td colspan="2">Gravel</td><td colspan="3">Sand</td><td>Fines</td></tr>
<tr><td>Coarse</td><td>Fine</td><td>Coarse</td><td>Medium</td><td>Fine</td><td>Silts / Clays</td></tr>
</table>

Description:	SM Silty-sand, sand-silt mixtures. (Some clay.) Brown (5/3) 7.5YR
Origin:	Boring # 5 @ Surface
Client:	JW Faherty
Project Title:	Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:	

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Project:	29.9
Lab No:	NA
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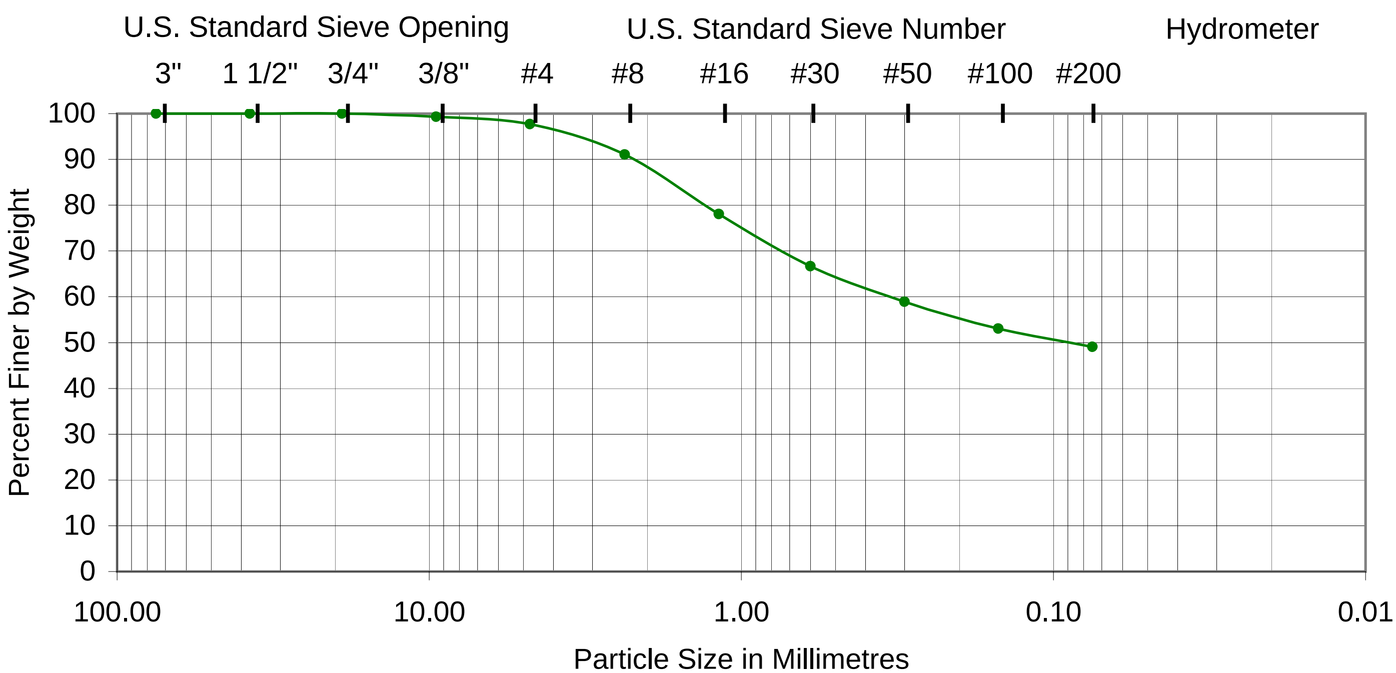
SIEVE ANALYSIS OF FINE AND COARSE AGGREGATES

ASTM C 136 (ASTM C 117)

Sample No:	B9 @ 15-20'
Sample Date:	04/28/05
Sampled By:	JB / JH
Test No:	B9 @ 15-20'
Test Date:	05/18/05
Tested By:	FR
Sand Equivalent:	
Date Tested:	
Tested By:	
Fineness Mod:	Not Determined

Sieve Analysis

Sieve	Passing (%)
3"	100
1 1/2"	100
3/4"	100
3/8"	99
#4	98
#8	91
#16	78
#30	67
#50	59
#100	53
#200	49.0



<table>
<tr><td rowspan="2">USCS</td><td colspan="2">Gravel</td><td colspan="3">Sand</td><td>Fines</td></tr>
<tr><td>Coarse</td><td>Fine</td><td>Coarse</td><td>Medium</td><td>Fine</td><td>Silts / Clays</td></tr>
</table>

Description:	ML Inorganic silts and very fine sands. Pinkish Gray (7/2) 5YR
Origin:	Boring # 9 @ 15-20'
Client:	JW Faherty
Project Title:	Soils Investigation Bear Valley Rd, Victorville Ca. APN 3091-221-02
Remarks:	

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Project:	29.9
Lab No:	NA
Exhibit:	B-2
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DIRECT SHEAR

John R. Byerly INCORPORATED

DIRECT SHEAR TESTS

Test Boring No.	Depth of Sample (Ft.)	Angle of Internal Friction (°)	Cohesion (PSF)
B-3	10.0-15.0	41.0	25
B-6	15.0-20.0	33.5	50
B-8	15.0-20.0	34.5	100

GEOTECHNICAL ENGINEERS • TESTING AND INSPECTION
2257 South Lilac Ave., Bloomington, CA 92316-2907
Bloomington (909) 877-1324 Riverside (909) 783-1910 Fax (909) 877-5210

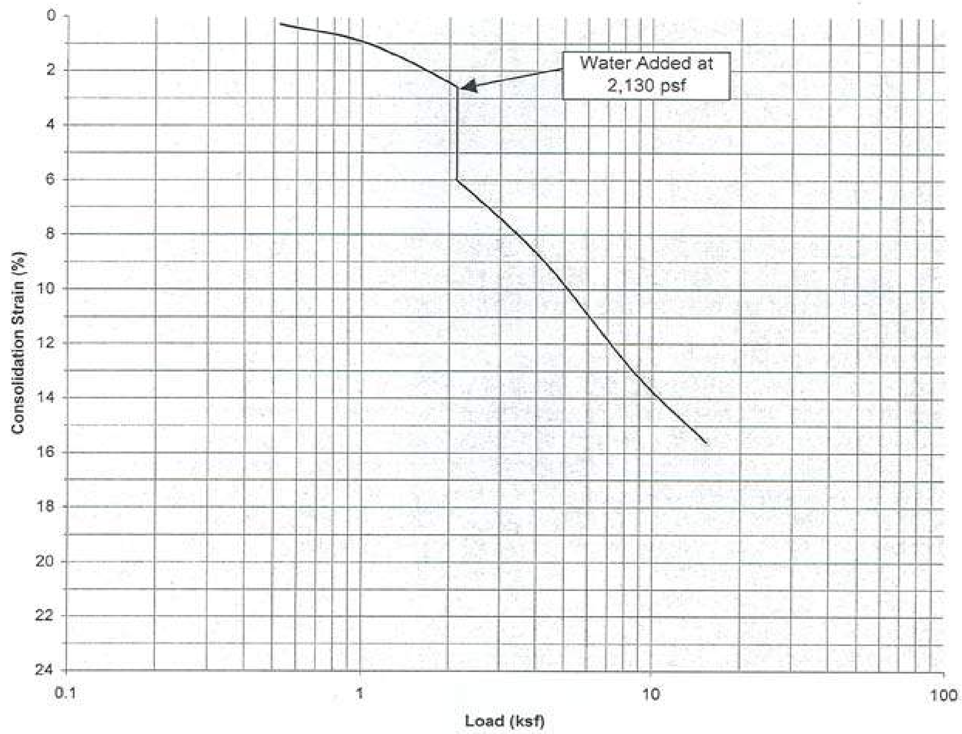
Enclosure 2
Lab No.: 5265
File No.: P-4382

Merrell Engineering Company, Inc.
128 E. Fredricks St.
Barstow, CA 92311
(760) 256-2068

Project: 29.9
Lab No: NA
Exhibit: B-3
Sheet: 1 of 1

CONSOLIDATION

John R. Byerly
INCORPORATED



Classification:

Boring Number:	B-3	Initial Moisture Content (%)	---
Depth (ft)	20-25	Final Moisture Content (%)	28.7
Specimen Diameter (in)	2.4	Initial Dry Density (pcf)	---
Specimen Thickness (in)	1.0		

Enclosure 3, Page 1
Rpt. No.: 5265
File No.: P-4382

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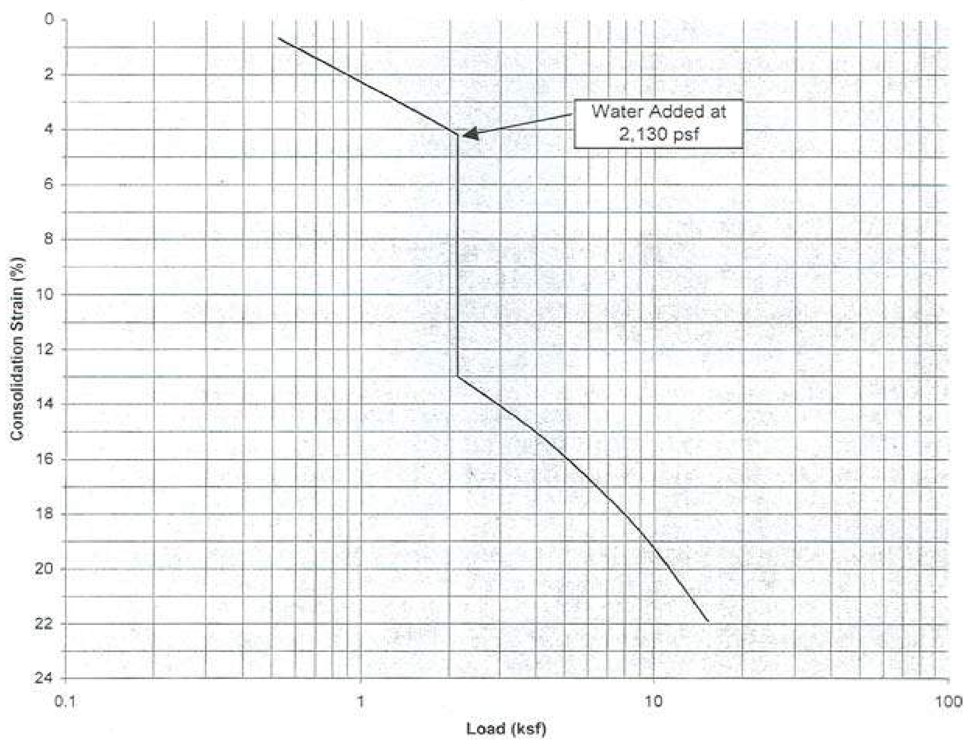
128 E. Fredricks St.
Barstow, CA 92311
(760) 256-2068

Project: 29.9
Lab No: NA
Exhibit: B-4
Sheet: 1 of 3

CONSOLIDATION

John R. Byerly INCORPORATED

Consolidation Test Results



Classification:

Boring Number:	B-8	Initial Moisture Content (%)	---
Depth (ft)	15-20	Final Moisture Content (%)	14.2
Specimen Diameter (in)	2.4	Initial Dry Density (pcf)	---
Specimen Thickness (in)	1.0		

Enclosure 3, Page 2
Rpt. No.: 5265
File No.: P-4382

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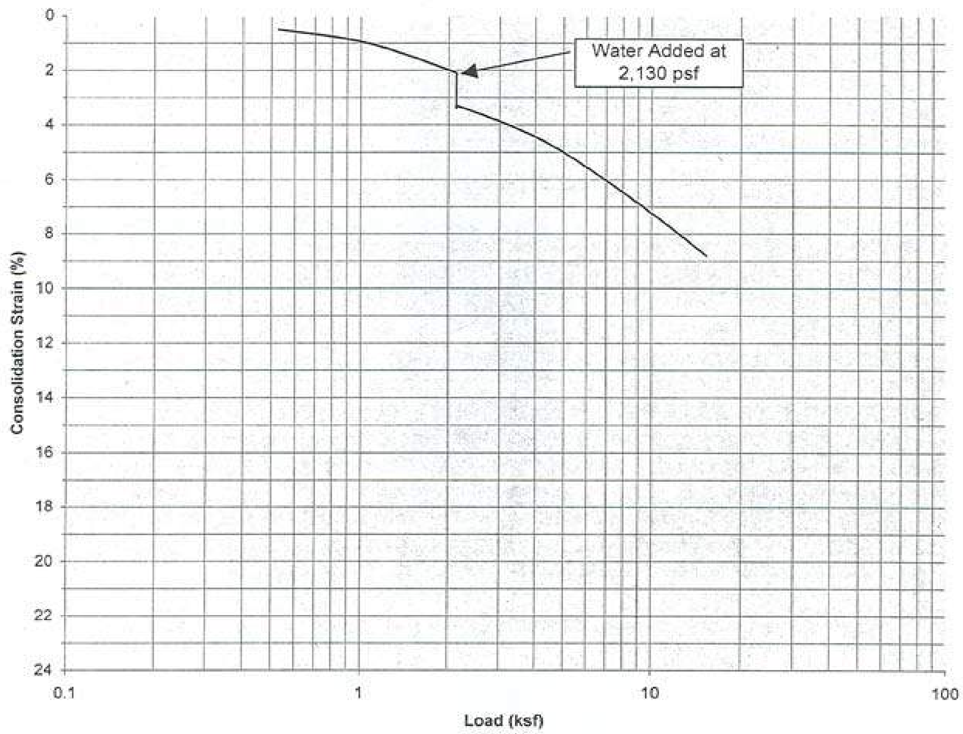
CONSOLIDATION

John R. Byerly
INCORPORATED

Consolidation Test Results



Classification:

Boring Number:	B-11	Initial Moisture Content (%)	---
Depth (ft)	10.0	Final Moisture Content (%)	14.4
Specimen Diameter (in)	2.4	Initial Dry Density (pcf)	---
Specimen Thickness (in)	1.0		

Enclosure 3, Page 3
Rpt. No.: 5265
File No.: P-4382

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RESISTIVITY

E.S. BABCOCK & SONS, INC.
Established 1906

NELAP #02101CA ELAP#1156
6100 Quail Valley Court Riverside, CA 92507-0704
P.O. Box 432 Riverside, CA 92502-0432
PH (951) 653-3351 FAX (951) 653-1662
www.babcocklabs.com

Client Name: Merrell Engineering Co., Inc.
Contact: Jeff Burns
Address: 128 E. Fredricks St.
Barstow, CA 92311

Report Date: 31-May-2005

Analytical Report: Page 5 of 7
Project Name: No Project
Project Number: No Project
Work Order Number: A5E2114

Received on Ice (Y/N): No Temp: °C

Laboratory Reference Number
A5E2114-04

Sample Description	Matrix	Sampled Date/Time	Received Date/Time
MEC Proj. No.29.9 Sample No. B9@0-5'	Soil	05/24/05 00:00	05/24/05 13:40

Analyte(s)	Result	RDL	Units	Method	Analysis Date	Analyst	Flag
Saturated Paste							
pH	8.0	0.1	pH Units	S-1.10 W.S.	05/27/05 16:13	era	
Redox Potential	230	1.0	mV	SM 2580	05/27/05 16:13	era	
Saturated Extract							
Saturated Resistivity	1000	5	ohm-cm	SM 2520B	05/27/05 16:13	era	
Sulfide	NEG		N/A	Water Elution	05/27/05 16:13	era	
Water Extract							
Sulfate	26	10	ppm	Ion Chromat.	05/28/05 01:39	kos	N-SAG, N_WEX

ACCREDITED IN ACCORDANCE WITH nelac

STABILOMETER "R" VALUE

STABILOMETER "R" VALUE

California Department of Transportation Test Method 301

Sample No.		B-4	
Moisture Content (%)	7.2	7.7	8.5
Dry Density (lbs./cu. ft.)	132.4	132.0	131.0
Exudation Pressure (psi)	565	374	239
Expansion Pressure (psf)	51.96	34.64	12.99
"R" Value	58	37	20
"R" Value at 300 PSI Exudation		30	

Sample No.		B-5	
Moisture Content (%)	7.1	7.6	8.0
Dry Density (lbs./cu. ft.)	130.3	126.3	129.2
Exudation Pressure (psi)	525	382	143
Expansion Pressure (psf)	0	0	0
"R" Value	72	67	57
"R" Value at 300 PSI Exudation		63	

Sample No.		B-9	
Moisture Content (%)	7.4	7.8	8.2
Dry Density (lbs./cu. ft.)	132.3	131.1	129.6
Exudation Pressure (psi)	358	271	159
Expansion Pressure (psf)	0	0	0
"R" Value	74	63	43
"R" Value at 300 PSI Exudation		65	

Enclosure 1
Lab No.: 5265
File No.: S-4382

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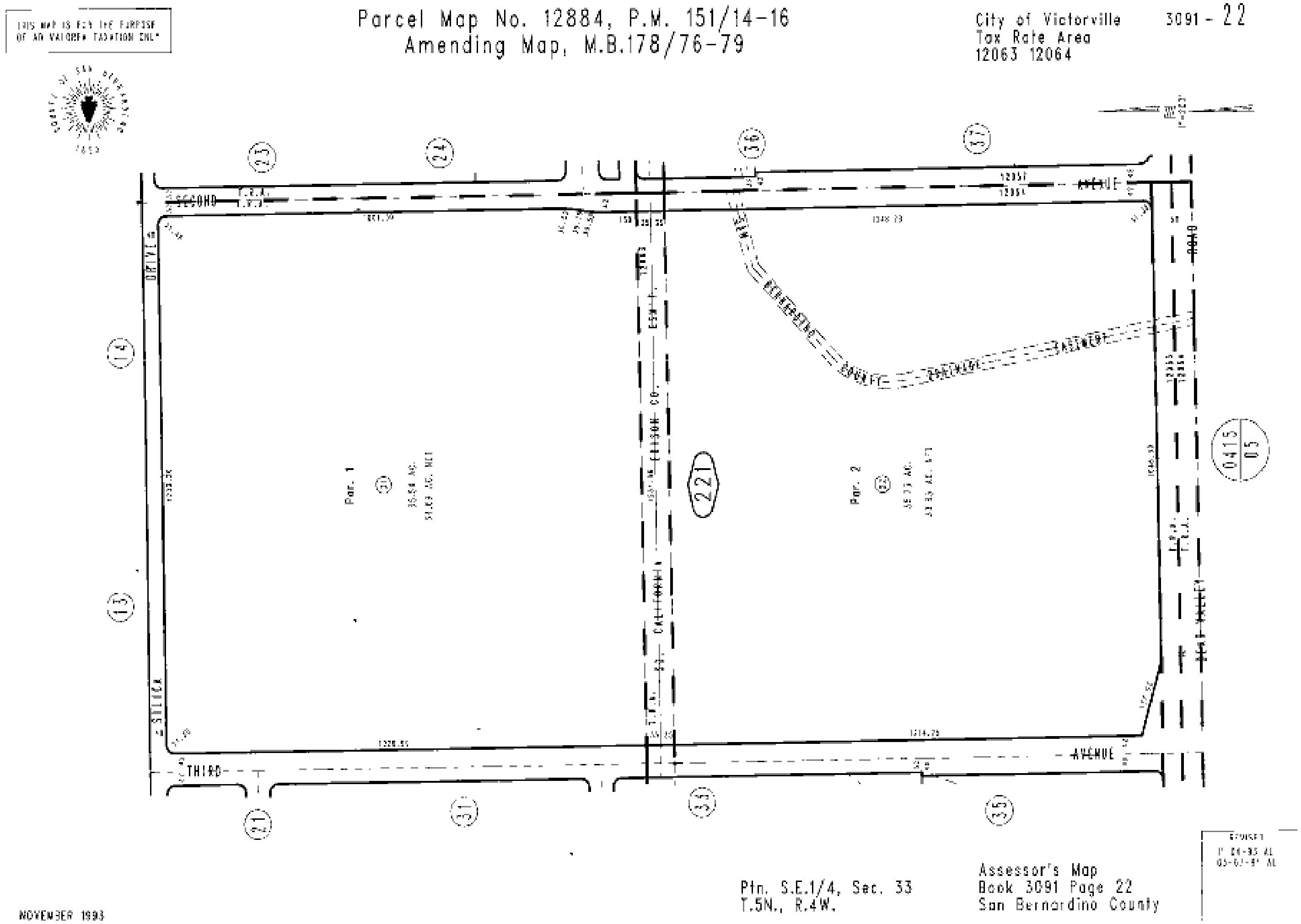
Barstow, CA 92311
(760) 256-2068

APPENDIX C

REFERENCE MAPS

ASSESSORS PARCEL MAP



Project: 29.9
Exhibit: C-1

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ACTIVE FAULT NEAR-SOURCE ZONES MAP

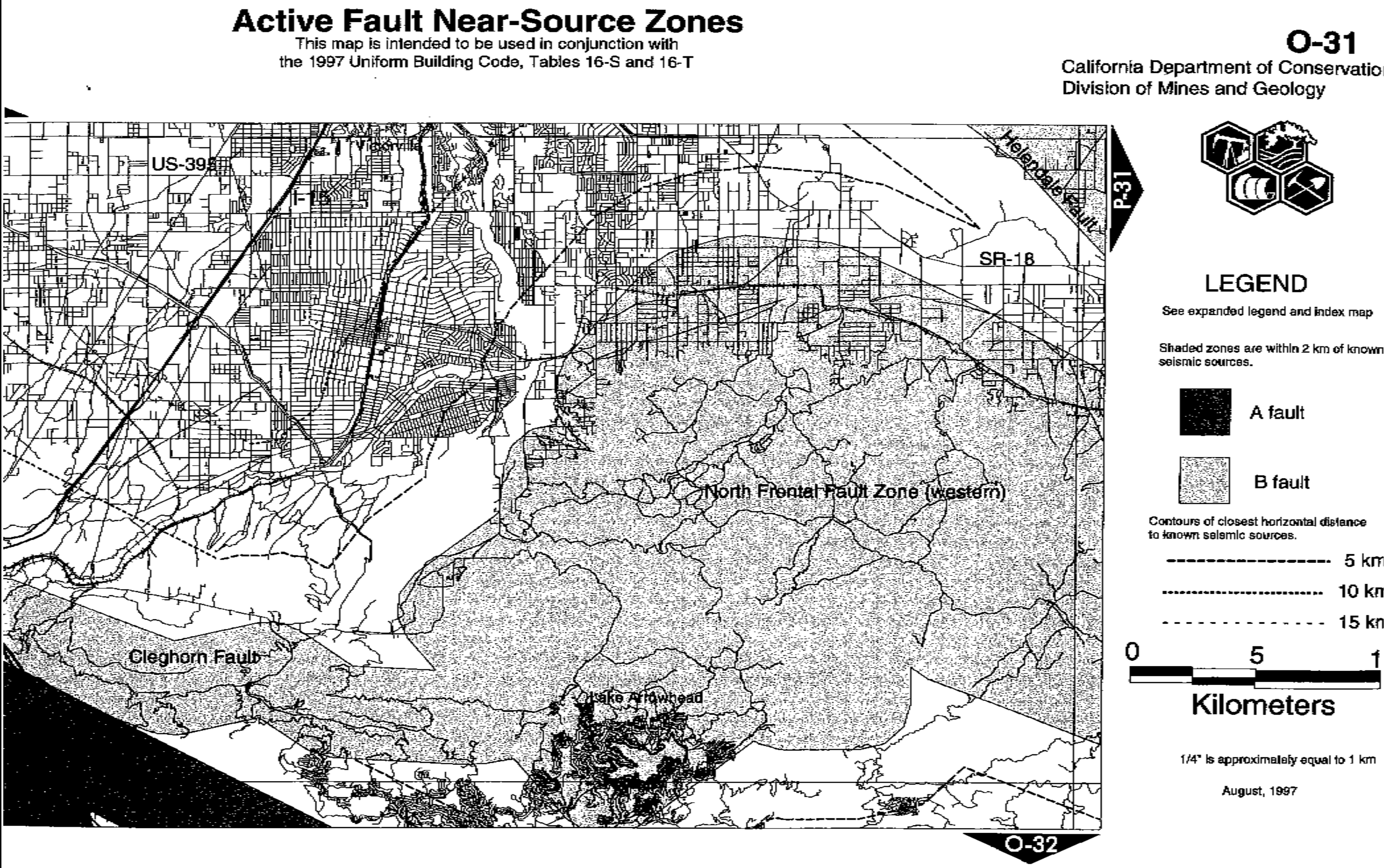

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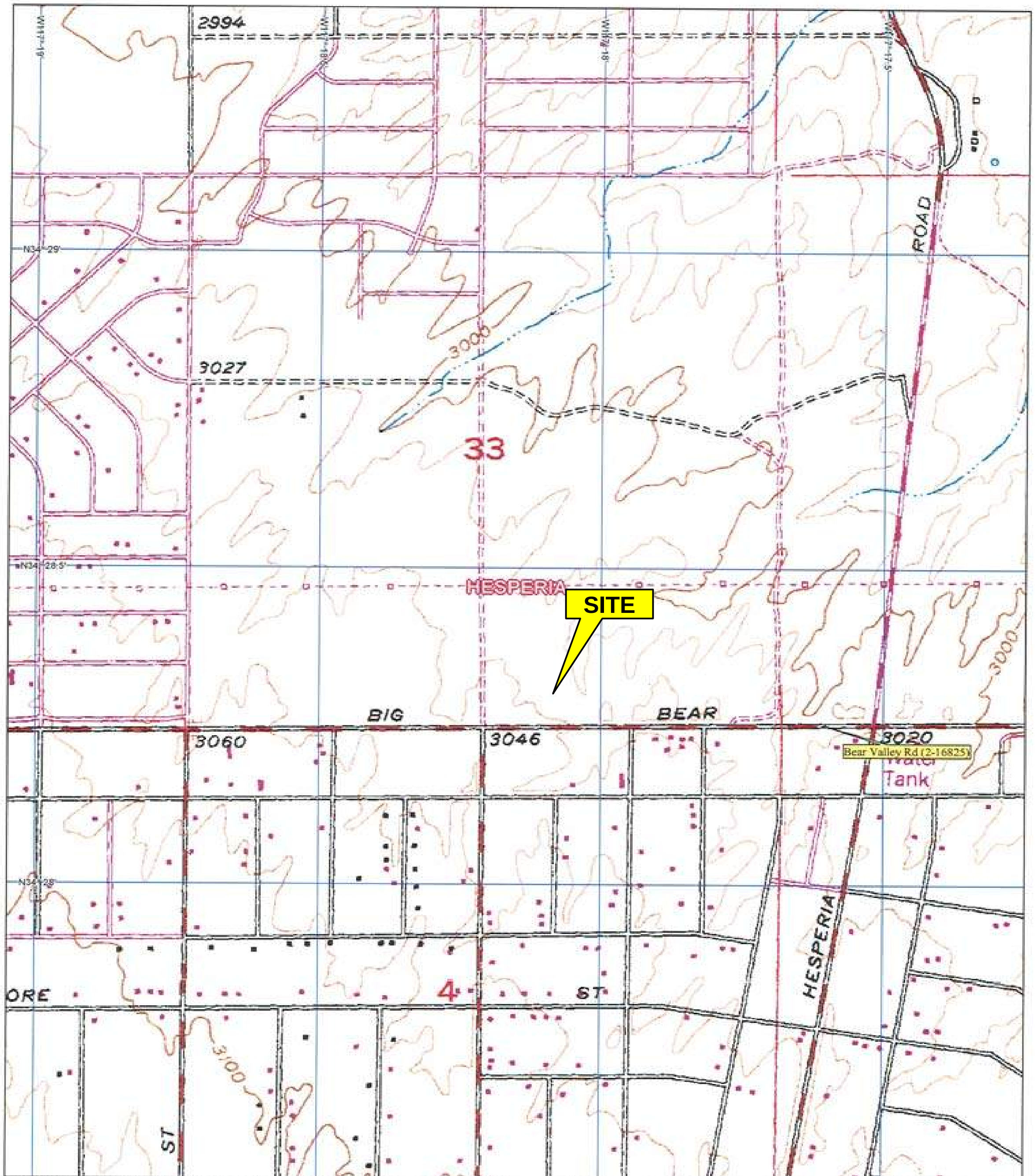
Exhibit: C-2

TOPOGRAPHIC MAP



 550 ft Scale: 1 : 14,400 Detail: 13-7 Datum: WGS84

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Exhibit: C-3

SITE VICINITY MAP

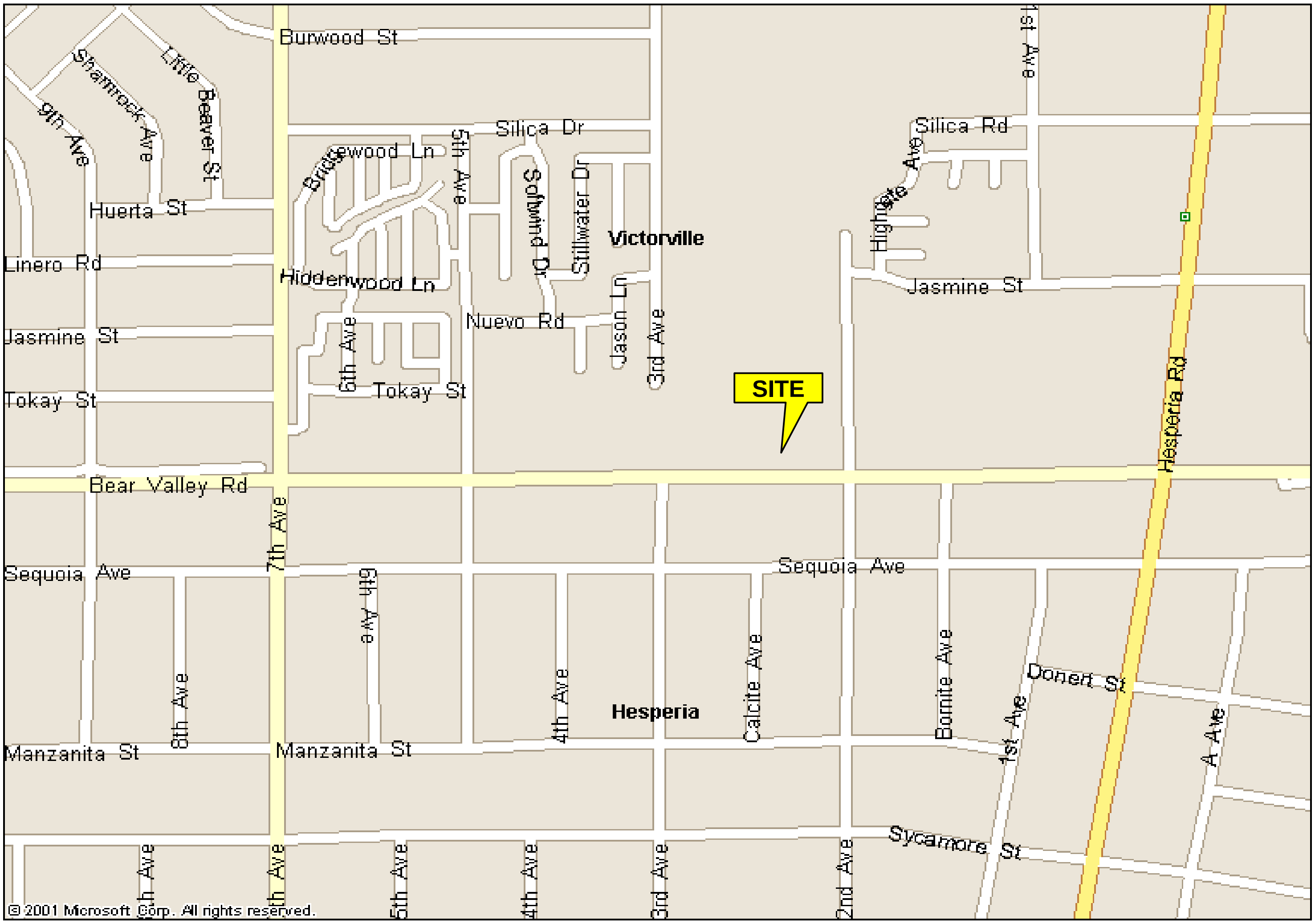

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Exhibit: C-4

AERIAL VIEW

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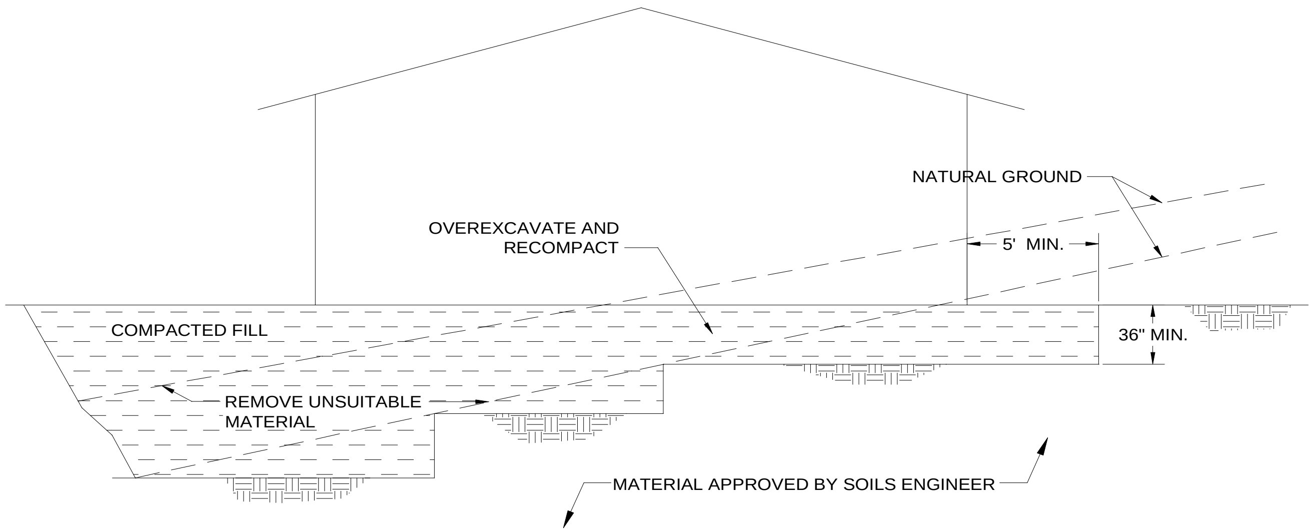
Project:	29.9
Exhibit:	C-5
Sheet	1 of 1


APN: 3091-221-01 VACANT
LOT 184
LOT 185
LOT 186
LOT 187
LOT 188
LOT 189
LOT 177
LOT 176
LOT 174
LOT 175
TRACT 12666-3
MB 220/45
℄ THIRD AVENUE
PARCEL 4
PM 10559
PMB 118/89-91
VACANT
PARCEL 2
PM 13742
PMB 161/24
HOSPITAL
PARCEL 1
PM 13742
PMB 161/24
HOSPITAL
PARCEL 1
PM 9412
PMB 137/71-72
HOSPITAL
PARCEL 2
PM 9992
PMB 120/97
℄ SECOND AVENUE
℄ BEAR VALLEY ROAD
TRACT 5104
MB 61/7-11
B7
B8
B9
B10
B4
B5
B6
B11
B1
B2
B3
SCALE: 1" = 80'
BENCHMARK:
BENCHMARK V-54, SOUTHEAST CORNER OF NISQUALLI ROAD & THIRD AVENUE IN THE CITY OF VICTORVILLE, CA
ELEV= 2985.74
BASIS OF BEARINGS:
TAKEN FROM THE CENTERLINE OF THIRD AVENUE PER PM 12884 PMB 178/76-79
BEING: S01°33'02"E
LEGEND:
CONC CONCRETE
PP POWER POLE
FH FIRE HYDRANT
ANC POWER POLE ANCHOR
TELE RSR TELEPHONE RISER
TMH TELEPHONE MANHOLE
SMH SEWER MANHOLE
WMH WATER MANHOLE
TS POLE TRAFFIC SIGNAL POLE
TSB TRAFFIC SIGNAL BOX
WV WATER VALVE
WM WATER METER
FD MONUMENT FOUND AS NOTED
IP IRON PIPE
EXISTING CONTOURS
EXISTING FENCE
BORING LOCATION
NO. REVISION DATE BY
Merrell-Johnson Engineering, Inc.
12138 INDUSTRIAL BLVD. #240
VICTORVILLE, CALIFORNIA 92392
(760) 241-6146
(760) 241-0566 FAX
128 E. FREDRICKS STREET
BARSTOW, CALIFORNIA 92311
(760) 256-2068
DRAWN BY: MM DATE: 02/09/05
DESIGNED BY: CLJ DATE: 02/09/05
APPROVED BY:
TOPOGRAPHIC SURVEY
APN: 3051-221-02
FOR:
SCALE: AS SHOWN
JOB NO. 2232-5
SHEET

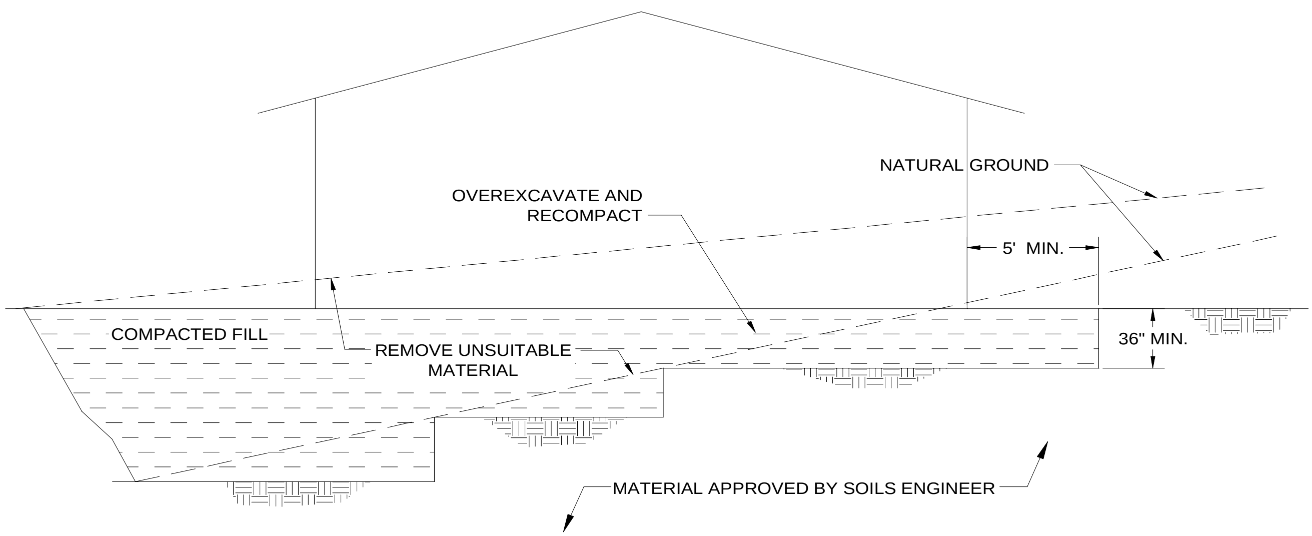
APPENDIX D

DETAIL ILLUSTRATIONS

TRANSITION LOT DETAILS



CUT-FILL LOT



CUT LOT

NOTE:

DEEPER OVEREXCAVATION AND RECOMPACTION SHALL BE
PERFORMED IF DETERMINED NECESARY BY SOILS ENGINEER.

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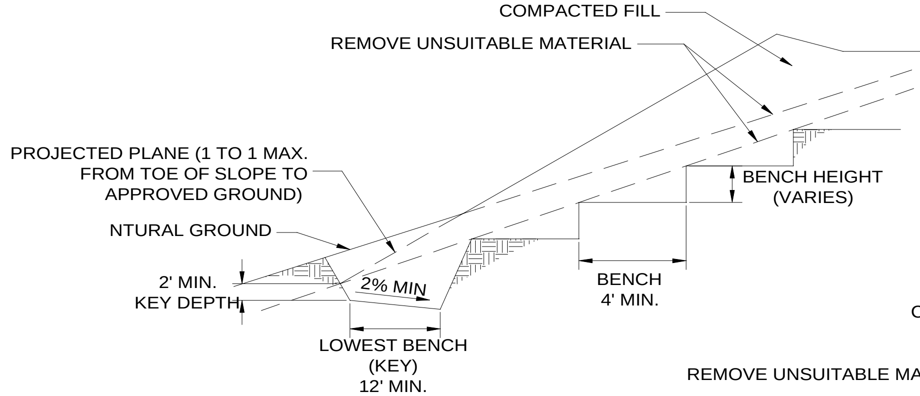
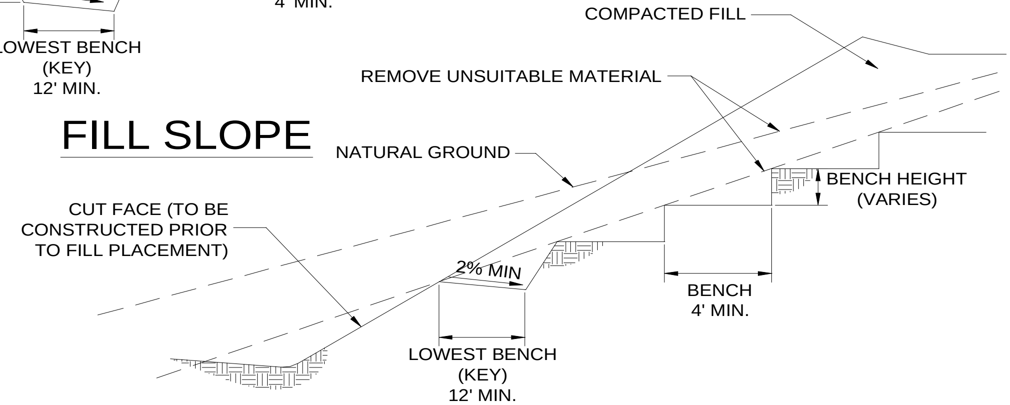
Project: 29.9
Exhibit: D-1

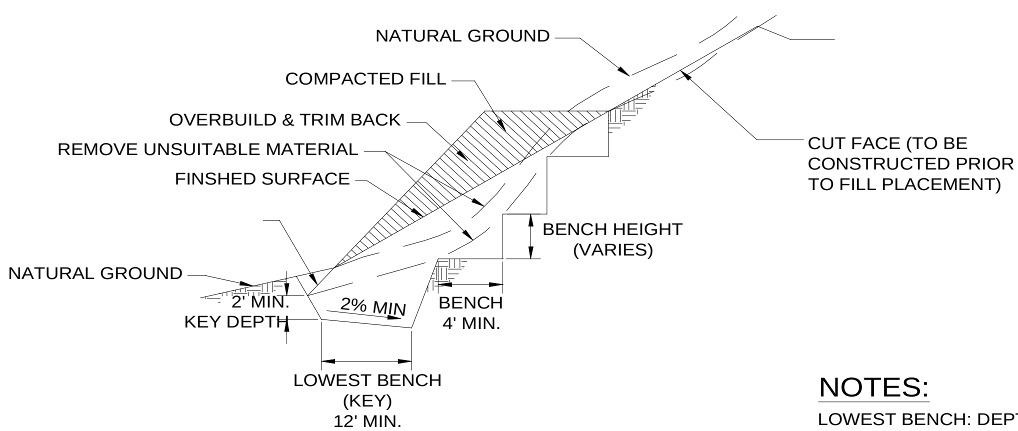
BENCHING DETAILS



FILL SLOPE



FILL-OVER-CUT SLOPE



CUT-OVER-FILL SLOPE

NOTES:

LOWEST BENCH: DEPTH AND WIDTH SUBJECT TO FIELD CHANGE BASED ON SOILS ENGINEER'S INSEPCTION.

SUBDRAINAGE: BACK DRAINS MAY BE REQUIRED AT THE DISCRETION OF THE SOILS ENGINEER.

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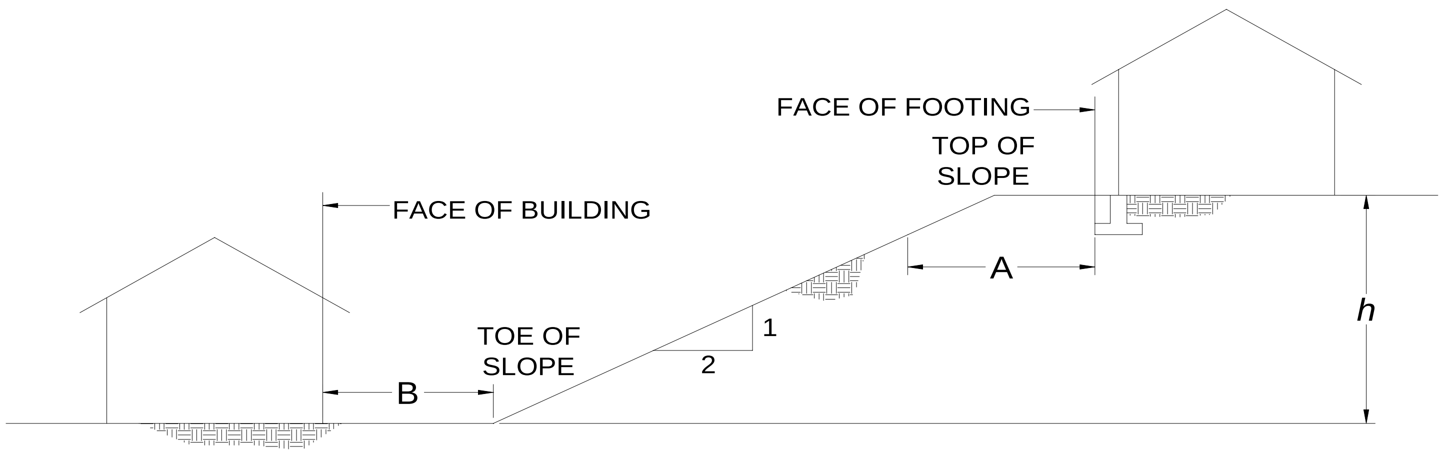
Exhibit: D-2

BUILDING SETBACK REQUIREMENTS



TOP OF SLOPE

SLOPE HEIGHT (*h*) (feet)	SETBACK (A) (feet)
0 - 10'	5' MIN.
10' - 20'	*h*/2 MIN.
20'+	10'

TOE OF SLOPE

SLOPE HEIGHT (*h*) (feet)	SETBACK (B) (feet)
0 - 10'	5' MIN.
10' - 30'	*h*/2 MIN.
30'+	15'

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Project: 29.9
Exhibit: D-3

APPENDIX E

GENERAL GRADING SPECIFICATIONS

GENERAL GRADING SPECIFICATIONS

Grading of the subject site should be performed in accordance with the provisions of the Uniform Building Code and/or applicable ordinances. The following is presented for your assistance in establishing proper grading criteria:

1. GENERAL INTENT

These specifications present the general procedure and requirements for grading and earthwork as shown on the approved grading plans, including preparation of areas to be filled, placement of fill, installation of sub-drains, and excavations. The recommendations contained in this geotechnical report are a part of the earthwork and grading specifications and shall supersede the provisions contained hereinafter in the case of conflict. Evaluations performed by the consultant during the course of grading may result in new recommendations, which could supersede these specifications, or the recommendations of this geotechnical report.

2. CONSTRUCTION INSPECTION

A representative of this firm should inspect all grading operations, including site clearing and stripping. The presence of our field representative will be for the purpose of providing observation and field testing, and will not include any supervising or directing of the actual work of the Contractor, his employees or agents. Neither the presence of our field representative nor the observations and testing by our firm shall excuse the Contractor in any way for defects discovered in this work. It is understood that our firm will not be responsible for job or site safety on this project, which will be the sole responsibility of the Contractor.

3. EARTHWORK OBSERVATION & TESTING

Prior to the commencement of grading, a representative of this firm or a qualified geotechnical consultant (soils engineer, engineering geologist, or their representatives) shall be employed for the purpose of observing earthwork procedures and testing the fills for conformance with recommendations of the geotechnical report and these specifications. It will be necessary that the consultant provide adequate testing and observation so that they may determine that the work was accomplished as specified. It shall be the responsibility of the contractor to assist the consultant and keep the consultant apprised of work schedules and changes so that the consultant may schedule personnel accordingly.

It shall be the sole responsibility of the contractor to provide adequate equipment and methods to accomplish the work in accordance with applicable grading codes and/or agency ordinances, these specifications and the approved grading plans. If, in the opinion of the consultant, unsatisfactory conditions, such as questionable soils, poor moisture condition, inadequate compaction, adverse weather, etc. are resulting in a quality of work less than required in these specifications, the consultant will be empowered to reject the work and recommend that construction be stopped until the conditions are rectified.

4. FILL PLACEMENT AND COMPACTION

4.1. Fill Lifts

Approved fill material shall be placed in areas prepared to receive fill in near-horizontal layers not exceeding eight (8) inches in compacted thickness. The consultant may approve thicker lifts if testing indicates the grading procedures are such that adequate compaction is being achieved with lifts of greater thickness. Each layer shall be spread evenly and shall be thoroughly mixed during spreading to attain uniformity of material and moisture in each layer.

Fill must be inorganic, granular sands or gravel, free from rocks, or lumps greater than four (4) inches in maximum dimension. Each fill lift should be brought to near optimum moisture content and compacted to at least 95 percent (ASTM D1557, D1556, D2922).

4.2. Fill Moisture

Fill layers at a moisture content less or more than +/- 2 % of optimum shall be watered and mixed, and over saturated / wet fill layers shall be aerated by scarification or shall be blended with drier material to obtain a moisture content of +/- 2% of the optimum moisture. Moisture-conditioning and mixing of fill layers shall continue until the fill material is at uniform moisture content at or near optimum moisture but within +/- 2% of the optimum moisture.

4.3. Compaction of Fill

After each layer has been evenly spread, moisture conditioned, and mixed, it shall be uniformly compacted to not less than 90 percent of the maximum dry density (ASTM D1557). Compaction equipment shall be adequately sized and shall be either specifically designed for soil compaction or have proven reliability, to efficiently achieve the specified degree of compaction. In general, the compaction criteria specified below shall be followed unless otherwise noted.

- Footing Subgrade — 95% or Greater at +/- 2% Optimum Moisture
- Concrete Slab Subgrade — 95% or Greater at +/- 2% Optimum Moisture
- Aggregate Base for Paved Areas — 95% or Greater at +/- 2% Optimum Moisture
- Upper 1' of Subgrade, Paved Areas — 95% or Greater at +/- 2% Optimum Moisture
- Matt Foundation Subgrade — 95% or Greater at +/- 2% Optimum Moisture
- Cross Gutter Subgrade — 95% or Greater at +/- 2% Optimum Moisture
- Structural Fill — 90% or Greater at +/- 2% Optimum Moisture
- Curb and Gutter Subgrade — 90% or Greater at +/- 2% Optimum Moisture
- Sidewalk Subgrade — 90% or Greater at +/- 2% Optimum Moisture
- Retaining Wall Backfill — 90% or Greater at +/- 2% Optimum Moisture
- Trench Backfill — 90% or Greater at +/- 2% Optimum Moisture

5. FILL SLOPES AND SLOPE CONSTRUCTION

Permanent cut or fill slopes should be constructed with no slopes steeper than 2 horizontal to 1 vertical.

Compacting of slopes shall be accomplished by one of the following procedures:

- By bankrolling of slopes with sheepsfoot roller at frequent increments of 1 to 2 feet in fill elevation gain, or by other methods producing satisfactory results.

- Fill slopes should be overfilled during construction and then cut back to expose fully compacted soil. The relative compaction of the slopes on to the slope face shall be at least 90 percent.

Where fills slopes are to be placed on existing slopes the ground should be benched. Any fills placed on slopes shall be benched and keyed per details of this report

If the fill is properly compacted, fill embankments may constructed at 2:1 (horizontal to vertical) of flatter. Fill slopes should be overfilled and trimmed back to the desired grade to provide a firm surface. All slopes should be provided with adequate drainage and should be planted immediately with erosion-resistant vegetation.

6. BENCHING

The existing surface shall be benched at least 12 feet wide at the lowest bench and shall be at least 2 feet deep into firm materials compacted to 95%. The lowest bench should be tilted in the slope at a 2% slope into the embankment. Other benches should be excavated into firm material for a minimum width of 4 feet, and all benches should be approximately 2 feet in height. Deeper removal and re-compaction may be required.

The existing slopes shall be benched to key the fill material to the underlying ground. A minimum of 2 feet normal to the slope shall be removed and re-compacted, as the fill is brought up in layers, to ensure that the new work is constructed on a firm foundation fill. Benching may vary based on field conditions and will be verified/confirmed by our field representative.

In no case will horizontal benching be less than 4 feet and vertical lifts more than 2 feet.

7. COMPACTION TESTING

Field-tests to check the fill moisture and degree of compaction will be performed by the consultant. The location and frequency of tests shall be at the consultant's discretion. In general, the tests will be taken at an interval not exceeding two feet in vertical rise and/or 1,000 cubic yards of embankment. Compaction testing will be in performed in accordance with the American Society for Testing and Materials Standards (ASTM), test methods ASTM D1556 and/or D2922 or other applicable standards.

Maximum dry density tests used to determine the degree of compaction will be performed in accordance with the American Society for Testing and Materials Standards (ASTM), test method ASTM D1557.

8. EXCAVATION

Excavations and cut slopes will be examined during grading. If directed by the consultant, further excavation or over excavation and refilling of cut areas shall be performed, and/or remedial grading of cut slopes shall be performed. Where fill-over-cut slopes are to be graded, unless otherwise approved, the cut portion of the slope shall be made and approved by the consultant prior to placement of materials for construction of the fill portion of the slope.

9. TRENCH BACKFILL

Trench excavations for utility pipes shall be backfilled under engineering supervision. After the utility pipe has been laid, the space under and around the pipe shall be backfilled with clean sand or approved granular soil to a depth of at least one foot over the top of the pipe. The sand backfill shall be uniformly jetted into place before the controlled backfill is placed over the sand.

The on-site materials, or other soils approved by the consultant, shall be watered and mixed as necessary prior to placement in lifts over the sand backfill.

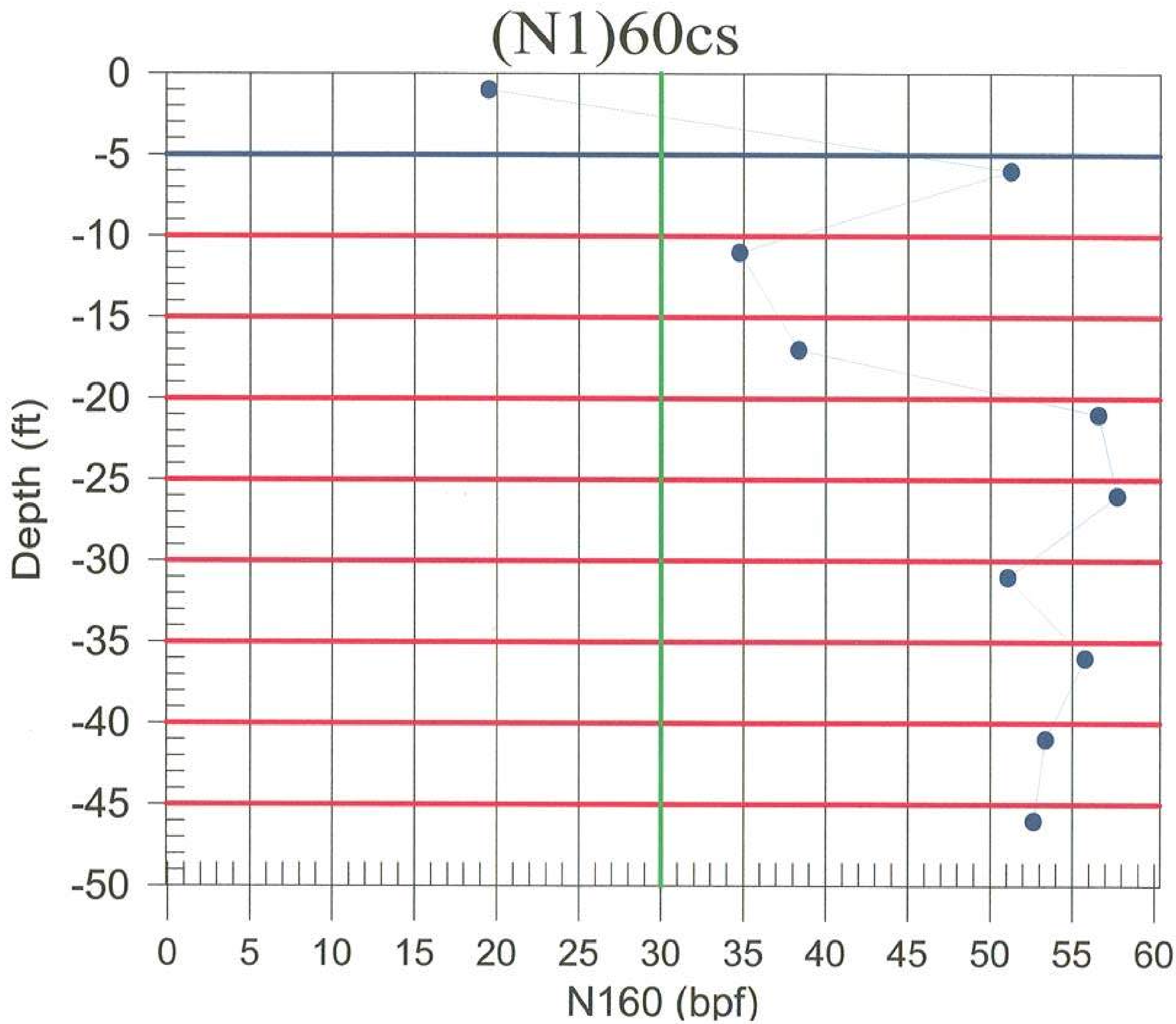
The controlled backfill shall be compacted to at least 90 percent of the maximum laboratory density as determined by the ASTM compaction method described above.

Field density tests and inspection of the backfill procedures shall be made by the consultant during backfilling to see that proper moisture content and uniform compaction is being maintained. The contractor shall provide test holes and exploratory pits as required by the consultant to enable sampling and testing.

APPENDIX F

LIQUEFACTION ANALYSIS & UBC SEISMIC DESIGN PARAMETERS

EMPIRICAL PREDICTION OF EARTHQUAKE-INDUCED LIQUEFACTION POTENTIAL



Project: 29.9
Exhibit: F-1
Sheet 1 of 5

Merrell Engineering Company, Inc.
128 E. Fredricks St.
Barstow, CA 92311
(760) 256-2068

JWFAH.OUT

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*                            *
*     L I Q U E F Y 2        *
*                            *
*       Version 1.50         *
*                            *
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EMPIRICAL PREDICTION OF
EARTHQUAKE-INDUCED LIQUEFACTION POTENTIAL

JOB NUMBER: 9842-0000 DATE: 09-11-2005

JOB NAME: Sample Problem

SOIL-PROFILE NAME: jwfah.LDW

BORING GROUNDWATER DEPTH: None Found

CALCULATION GROUNDWATER DEPTH: 5.00 ft

DESIGN EARTHQUAKE MAGNITUDE: 6.50 Mw

SITE PEAK GROUND ACCELERATION: 0.550 g

BOREHOLE DIAMETER CORRECTION FACTOR: 1.00

SAMPLER SIZE CORRECTION FACTOR: 1.00

N60 HAMMER CORRECTION FACTOR: 1.00

MAGNITUDE SCALING FACTOR METHOD: Idriss (1997, in press)

Magnitude Scaling Factor: 1.442

rd-CORRECTION METHOD: Seed (1985)

FIELD SPT N-VALUES ARE CORRECTED FOR THE LENGTH OF THE DRIVE RODS.

Rod Stick-Up Above Ground: 3.0 ft

CN NORMALIZATION FACTOR: 1.044 tsf

MINIMUM CN VALUE: 0.6

NCEER [1997] Method LIQUEFACTION ANALYSIS SUMMARY PAGE 1

File Name: jwfah.OUT

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EMPIRICAL PREDICTION OF EARTHQUAKE-INDUCED LIQUEFACTION POTENTIAL

SOIL NO.	CALC. DEPTH (ft)	TOTAL STRESS (tsf)	EFF. STRESS (tsf)	FIELD N (B/ft)	FC DELTA N1_60	C N	CORR. (N1)60 (B/ft)	LIQUE. RESIST RATIO	r d	INDUC. STRESS RATIO	LIQUE. SAFETY FACTOR
1	0.25	0.015	0.015	10	4.53	*	*	*	*	*	**
1	0.75	0.044	0.044	10	4.53	*	*	*	*	*	**
1	1.25	0.073	0.073	10	4.53	*	*	*	*	*	**
1	1.75	0.102	0.102	10	4.53	*	*	*	*	*	**
1	2.25	0.132	0.132	10	4.53	*	*	*	*	*	**
1	2.75	0.161	0.161	10	4.53	*	*	*	*	*	**
1	3.25	0.190	0.190	10	4.53	*	*	*	*	*	**
1	3.75	0.219	0.219	10	4.53	*	*	*	*	*	**
1	4.25	0.249	0.249	10	4.53	*	*	*	*	*	**
1	4.75	0.278	0.278	10	4.53	*	*	*	*	*	**
2	5.25	0.307	0.299	36	2.50	1.807	51.3	Infin	0.990	0.363	NonLiq
2	5.75	0.336	0.313	36	2.50	1.807	51.3	Infin	0.989	0.380	NonLiq
2	6.25	0.366	0.327	36	2.50	1.807	51.3	Infin	0.987	0.395	NonLiq
2	6.75	0.395	0.340	36	2.50	1.807	51.3	Infin	0.986	0.409	NonLiq
2	7.25	0.424	0.354	36	2.50	1.807	51.3	Infin	0.985	0.422	NonLiq
2	7.75	0.453	0.368	36	2.50	1.807	51.3	Infin	0.984	0.434	NonLiq
2	8.25	0.483	0.381	36	2.50	1.807	51.3	Infin	0.983	0.445	NonLiq
2	8.75	0.512	0.395	36	2.50	1.807	51.3	Infin	0.982	0.455	NonLiq
2	9.25	0.541	0.409	36	2.50	1.807	51.3	Infin	0.981	0.464	NonLiq
2	9.75	0.570	0.422	36	2.50	1.807	51.3	Infin	0.980	0.473	NonLiq
3	10.25	0.600	0.436	21	9.88	1.513	34.8	Infin	0.979	0.481	NonLiq
3	10.75	0.629	0.449	21	9.88	1.513	34.8	Infin	0.978	0.489	NonLiq
3	11.25	0.658	0.463	21	9.88	1.513	34.8	Infin	0.977	0.496	NonLiq
3	11.75	0.687	0.477	21	9.88	1.513	34.8	Infin	0.976	0.503	NonLiq
3	12.25	0.717	0.490	21	9.88	1.513	34.8	Infin	0.974	0.509	NonLiq
3	12.75	0.746	0.504	21	9.88	1.513	34.8	Infin	0.973	0.515	NonLiq
3	13.25	0.775	0.518	21	9.88	1.513	34.8	Infin	0.972	0.520	NonLiq
3	13.75	0.804	0.531	21	9.88	1.513	34.8	Infin	0.971	0.526	NonLiq
3	14.25	0.834	0.545	21	9.88	1.513	34.8	Infin	0.970	0.531	NonLiq
3	14.75	0.863	0.559	21	9.88	1.513	34.8	Infin	0.969	0.535	NonLiq
4	15.25	0.892	0.572	33	0.05	1.298	38.4	Infin	0.968	0.539	NonLiq
4	15.75	0.921	0.586	33	0.05	1.298	38.4	Infin	0.967	0.544	NonLiq
4	16.25	0.951	0.600	33	0.05	1.298	38.4	Infin	0.966	0.547	NonLiq
4	16.75	0.980	0.613	33	0.05	1.298	38.4	Infin	0.965	0.551	NonLiq
4	17.25	1.009	0.627	33	0.05	1.298	38.4	Infin	0.964	0.555	NonLiq
4	17.75	1.038	0.641	33	0.05	1.298	38.4	Infin	0.963	0.558	NonLiq
4	18.25	1.068	0.654	33	0.05	1.298	38.4	Infin	0.961	0.561	NonLiq
4	18.75	1.097	0.668	33	0.05	1.298	38.4	Infin	0.960	0.564	NonLiq
4	19.25	1.126	0.682	33	0.05	1.298	38.4	Infin	0.959	0.566	NonLiq
4	19.75	1.155	0.695	33	0.05	1.298	38.4	Infin	0.958	0.569	NonLiq
5	20.25	1.185	0.709	50	0.07	1.196	56.6	Infin	0.956	0.571	NonLiq
5	20.75	1.214	0.722	50	0.07	1.196	56.6	Infin	0.955	0.574	NonLiq
5	21.25	1.243	0.736	50	0.07	1.196	56.6	Infin	0.954	0.576	NonLiq

NCEER [1997] Method

LIQUEFACTION ANALYSIS SUMMARY

File Name: jwfah.OUT

SOIL	CALC. DEPTH	TOTAL STRESS	EFF. STRESS	FIELD N	FC DELTA	C	CORR. (N1)60	LIQUE. RESIST	r	INDUC. STRESS	LIQUE. SAFETY

Merrell Engineering Company, Inc.
128 E. Fredricks St.
Barstow, CA 92311
(760) 256-2068

JWFAH.OUT

NO.	(ft)	(tsf)	(tsf)	(B/ft)	N1_60	N	(B/ft)	RATIO	d	RATIO	FACTOR
5	21.75	1.272	0.750	50	0.07	1.196	56.6	Infin	0.952	0.578	NonLiq
5	22.25	1.302	0.763	50	0.07	1.196	56.6	Infin	0.951	0.580	NonLiq
5	22.75	1.331	0.777	50	0.07	1.196	56.6	Infin	0.949	0.581	NonLiq
5	23.25	1.360	0.791	50	0.07	1.196	56.6	Infin	0.948	0.583	NonLiq
5	23.75	1.389	0.804	50	0.07	1.196	56.6	Infin	0.946	0.584	NonLiq
5	24.25	1.419	0.818	50	0.07	1.196	56.6	Infin	0.945	0.586	NonLiq
5	24.75	1.448	0.832	50	0.07	1.196	56.6	Infin	0.943	0.587	NonLiq
6	25.25	1.477	0.845	50	3.27	1.098	57.7	Infin	0.941	0.588	NonLiq
6	25.75	1.506	0.859	50	3.27	1.098	57.7	Infin	0.939	0.589	NonLiq
6	26.25	1.536	0.873	50	3.27	1.098	57.7	Infin	0.938	0.590	NonLiq
6	26.75	1.565	0.886	50	3.27	1.098	57.7	Infin	0.936	0.591	NonLiq
6	27.25	1.594	0.900	50	3.27	1.098	57.7	Infin	0.934	0.591	NonLiq
6	27.75	1.623	0.914	50	3.27	1.098	57.7	Infin	0.931	0.592	NonLiq
6	28.25	1.653	0.927	50	3.27	1.098	57.7	Infin	0.929	0.592	NonLiq
6	28.75	1.682	0.941	50	3.27	1.098	57.7	Infin	0.927	0.592	NonLiq
6	29.25	1.711	0.955	50	3.27	1.098	57.7	Infin	0.925	0.593	NonLiq
6	29.75	1.740	0.968	50	3.27	1.098	57.7	Infin	0.922	0.593	NonLiq
7	30.25	1.770	0.982	50	0.06	1.021	51.1	Infin	0.920	0.593	NonLiq
7	30.75	1.799	0.995	50	0.06	1.021	51.1	Infin	0.917	0.592	NonLiq
7	31.25	1.828	1.009	50	0.06	1.021	51.1	Infin	0.914	0.592	NonLiq
7	31.75	1.857	1.023	50	0.06	1.021	51.1	Infin	0.912	0.592	NonLiq
7	32.25	1.887	1.036	50	0.06	1.021	51.1	Infin	0.909	0.591	NonLiq
7	32.75	1.916	1.050	50	0.06	1.021	51.1	Infin	0.906	0.591	NonLiq
7	33.25	1.945	1.064	50	0.06	1.021	51.1	Infin	0.903	0.590	NonLiq
7	33.75	1.974	1.077	50	0.06	1.021	51.1	Infin	0.899	0.589	NonLiq
7	34.25	2.004	1.091	50	0.06	1.021	51.1	Infin	0.896	0.588	NonLiq
7	34.75	2.033	1.105	50	0.06	1.021	51.1	Infin	0.893	0.587	NonLiq
8	35.25	2.062	1.118	50	7.91	0.957	55.8	Infin	0.889	0.586	NonLiq
8	35.75	2.091	1.132	50	7.91	0.957	55.8	Infin	0.886	0.585	NonLiq
8	36.25	2.121	1.146	50	7.91	0.957	55.8	Infin	0.882	0.584	NonLiq
8	36.75	2.150	1.159	50	7.91	0.957	55.8	Infin	0.878	0.582	NonLiq
8	37.25	2.179	1.173	50	7.91	0.957	55.8	Infin	0.874	0.581	NonLiq
8	37.75	2.208	1.187	50	7.91	0.957	55.8	Infin	0.871	0.579	NonLiq
8	38.25	2.238	1.200	50	7.91	0.957	55.8	Infin	0.866	0.578	NonLiq
8	38.75	2.267	1.214	50	7.91	0.957	55.8	Infin	0.862	0.576	NonLiq
8	39.25	2.296	1.228	50	7.91	0.957	55.8	Infin	0.858	0.574	NonLiq
8	39.75	2.325	1.241	50	7.91	0.957	55.8	Infin	0.854	0.572	NonLiq
9	40.25	2.355	1.255	50	8.14	0.905	53.4	Infin	0.849	0.570	NonLiq
9	40.75	2.384	1.268	50	8.14	0.905	53.4	Infin	0.845	0.568	NonLiq
9	41.25	2.413	1.282	50	8.14	0.905	53.4	Infin	0.840	0.565	NonLiq
9	41.75	2.442	1.296	50	8.14	0.905	53.4	Infin	0.836	0.563	NonLiq
9	42.25	2.472	1.309	50	8.14	0.905	53.4	Infin	0.831	0.561	NonLiq
9	42.75	2.501	1.323	50	8.14	0.905	53.4	Infin	0.826	0.558	NonLiq
9	43.25	2.530	1.337	50	8.14	0.905	53.4	Infin	0.822	0.556	NonLiq

NCEER [1997] Method　　LIQUEFACTION ANALYSIS SUMMARY　　PAGE 3

File Name: jwfah.OUT

SOIL NO.	CALC. DEPTH (ft)	TOTAL STRESS (tsf)	EFF. STRESS (tsf)	FIELD N (B/ft)	FC DELTA N1_60	C N	CORR. (N1)60 (B/ft)	LIQUE. RESIST RATIO	r d	INDUC. STRESS RATIO	LIQUE. SAFETY FACTOR
9	43.75	2.559	1.350	50	8.14	0.905	53.4	Infin	0.817	0.553	NonLiq

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EMPIRICAL PREDICTION OF EARTHQUAKE-INDUCED LIQUEFACTION POTENTIAL

9	44.25	2.589	1.364	50	8.14	0.905	53.4	Infin	0.812	0.551	NonLiq
9	44.75	2.618	1.378	50	8.14	0.905	53.4	Infin	0.807	0.548	NonLiq
10	45.25	2.647	1.391	50	9.66	0.860	52.7	Infin	0.802	0.545	NonLiq
10	45.75	2.676	1.405	50	9.66	0.860	52.7	Infin	0.797	0.543	NonLiq
10	46.25	2.706	1.419	50	9.66	0.860	52.7	Infin	0.792	0.540	NonLiq
10	46.75	2.735	1.432	50	9.66	0.860	52.7	Infin	0.787	0.537	NonLiq
10	47.25	2.764	1.446	50	9.66	0.860	52.7	Infin	0.782	0.534	NonLiq
10	47.75	2.793	1.460	50	9.66	0.860	52.7	Infin	0.776	0.531	NonLiq
10	48.25	2.823	1.473	50	9.66	0.860	52.7	Infin	0.771	0.528	NonLiq
10	48.75	2.852	1.487	50	9.66	0.860	52.7	Infin	0.766	0.525	NonLiq
10	49.25	2.881	1.501	50	9.66	0.860	52.7	Infin	0.761	0.522	NonLiq
10	49.75	2.910	1.514	50	9.66	0.860	52.7	Infin	0.756	0.519	NonLiq

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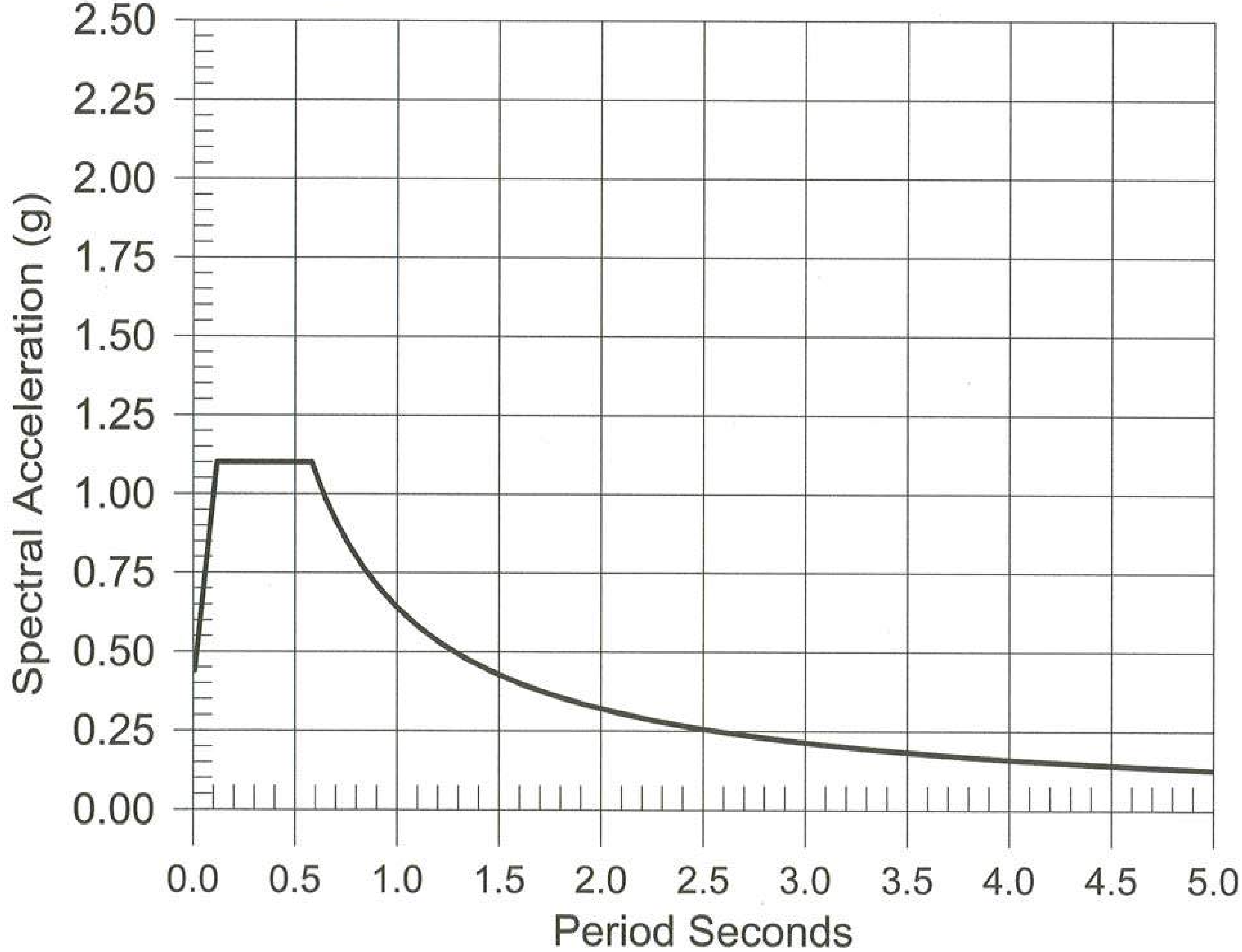
COMPUTATION OF 1997 UBC SEISMIC DESIGN PARAMETERS

DESIGN RESPONSE SPECTRUM

Seismic Zone: 0.4 Soil Profile: SD



Project: 29.9
Exhibit: F-2
Sheet 1 of 3

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COMPUTATION OF 1997 UBC SEISMIC DESIGN PARAMETERS

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*                    *
*    U B C S E I S   *
*                    *
*    Version  1.03   *
*                    *
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  COMPUTATION OF 1997
 UNIFORM BUILDING CODE
SEISMIC DESIGN PARAMETERS

JOB NUMBER: 29.9                                  DATE: 09-03-2005

JOB NAME: J.W. Faherty

FAULT-DATA-FILE NAME: C:\Program Files\Project1\Cdmgubcr.dat

SITE COORDINATES:
   SITE LATITUDE:  34.4716
   SITE LONGITUDE:  117.3035

UBC SEISMIC ZONE:  0.4

UBC SOIL PROFILE TYPE:  SD

NEAREST TYPE A FAULT:
   NAME:  SAN ANDREAS - Southern
   DISTANCE:  26.0  km

NEAREST TYPE B FAULT:
   NAME:  NORTH FRONTAL FAULT ZONE (West)
   DISTANCE:  12.8  km

NEAREST TYPE C FAULT:
   NAME:
   DISTANCE:  99999.0  km

SELECTED UBC SEISMIC COEFFICIENTS:
   Na:  1.0
   Nv:  1.0
   Ca:  0.44
   Cv:  0.64
   Ts:  0.582
   To:  0.116

   *******************************************************************
   * CAUTION:  The digitized data points used to model faults are    *
   *           limited in number and have been digitized from small- *
   *           scale maps (e.g., 1:750,000 scale).  Consequently,    *
   *           the estimated fault-site-distances may be in error by *
   *           several kilometers.  Therefore, it is important that  *
   *           the distances be carefully checked for accuracy and   *
   *           adjusted as needed, before they are used in design.   *
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COMPUTATION OF 1997 UBC SEISMIC DESIGN PARAMETERS

SUMMARY OF FAULT PARAMETERS

Page 1

ABBREVIATED FAULT NAME	FAULT TYPE (SS,DS,BT)	APPROX. DISTANCE (km)	SOURCE TYPE (A,B,C)	MAX. MAG. (Mw)	SLIP RATE (mm/yr)
NORTH FRONTAL FAULT ZONE (West)	DS	12.8	B	7.0	1.00
CLEGHORN	SS	20.1	B	6.5	3.00
HELENDALE - S. LOCKHARDT	SS	22.7	B	7.1	0.60
SAN ANDREAS - Southern	SS	26.0	A	7.4	24.00
CUCAMONGA	DS	26.0	A	7.0	5.00
SAN ANDREAS - 1857 Rupture	SS	27.4	A	7.8	34.00
SAN JACINTO-SAN BERNARDINO	SS	31.4	B	6.7	12.00
LENWOOD-LOCKHART-OLD WOMAN SPRGS	SS	46.2	B	7.3	0.60
SIERRA MADRE (Central)	DS	46.9	B	7.0	3.00
NORTH FRONTAL FAULT ZONE (East)	DS	48.5	B	6.7	0.50
SAN JACINTO-SAN JACINTO VALLEY	SS	50.9	B	6.9	12.00
SAN JOSE	DS	53.0	B	6.5	0.50
LANDERS	SS	54.8	B	7.3	0.60
GRAVEL HILLS - HARPER LAKE	SS	56.0	B	6.9	0.60
CLAMSHELL-SAWPIT	DS	56.0	B	6.5	0.50
JOHNSON VALLEY (Northern)	SS	56.7	B	6.7	0.60
CHINO-CENTRAL AVE. (Elsinore)	DS	63.4	B	6.7	1.00
CALICO - HIDALGO	SS	66.4	B	7.1	0.60
BLACKWATER	SS	66.8	B	6.9	0.60
PINTO MOUNTAIN	SS	70.4	B	7.0	2.50
EMERSON So. - COPPER MTN.	SS	70.5	B	6.9	0.60
RAYMOND	DS	72.7	B	6.5	0.50