



February 25, 2020

Project No. 2019-011

Ms. Sheila Amparo, PE
BKF Engineers
4675 MacArthur Court, Suite 400
Newport Beach, CA 92660

Subject: Pavement Design Memorandum
Lakewood Boulevard and Florence Avenue Intersection Improvement
Downey, California

Dear Ms. Amparo:

INTRODUCTION

This memorandum summarizes the results of geotechnical services performed by Diaz•Yourman & Associates (DYA) for the proposed improvements along Lakewood Boulevard and Florence Avenue at its intersection in the City of Downey, California (Project). The purpose of this Project is to reduce the traffic congestion, which will lead to decreasing the air pollution, noise pollution, and the high number of accidents. Particularly, improving traffic circulation and mobility within Interstate (I-)605 Freeway Corridor will minimize congestion along the Lakewood Boulevard and Florence Avenue Corridors.

The Project is located at the intersection of Lakewood Boulevard and Florence Avenue, with the limits of work extending approximately 100 feet on departure sides and 300 feet on the approach sides. The Project location is shown on Figure 1.

PROPOSED IMPROVEMENTS

The Project will improve the capacity and operation of the intersection by providing the following improvements:

- Adding dual left-turn lanes on both approaches to Lakewood Avenue.
- Adding a dedicated right-turn lane on westbound of Florence Avenue.
- Reconstructing the pavement to concrete pavement.
- Redesigning the signing and striping.
- Modifying the traffic signals.
- Modifying the storm drain system.

We understand that the proposed pavement reconstruction will use Portland Cement Concrete (PCC).

The purpose of our geotechnical services was to provide geotechnical input for pavement design and to investigate the pavement thickness on Lakewood Boulevard and Florence Avenue. Geotechnical services consisted of conducting a field exploration and performing laboratory testing and engineering analyses to develop conclusions and recommendations regarding new rigid pavements sections and grading operations.

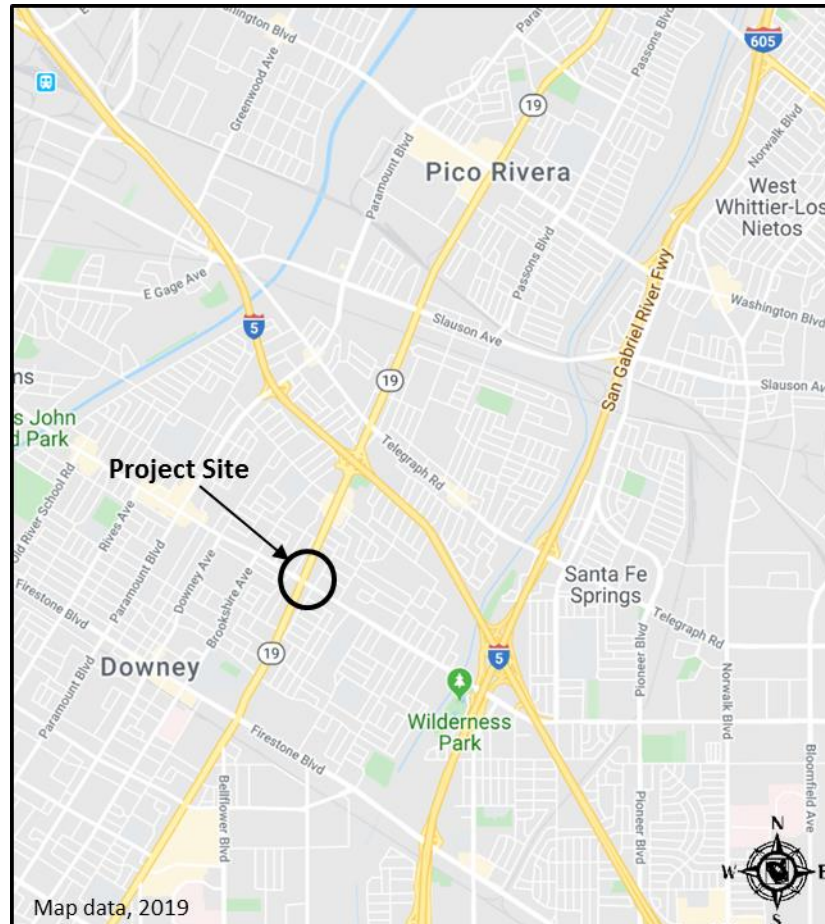


Figure 1 - VICINITY MAP

DATA REVIEW

Project plans as part of Lakewood Boulevard Improvements – Recycled Water Improvements were provided by the City for review. In addition to this, the City provided a contractors change condition claim letter (City of Downey Fax/Email Transmittal, 2011). The project plans and change condition letter were included in Attachment 1. We also reviewed some boring logs from GeoTracker database to substantiate our subsurface characterization. Those boring logs are also included in the Attachment 1.

FIELD EXPLORATION

The exploration plan (boring and coring) was developed by the City. The field exploration, conducted on October 24 and 28, 2019, consisted of hand-augering four soil borings to a depth of 1½ feet to 5½ feet



and collecting eight pavement core samples at the locations shown on the site plan in Attachment 2. Based on our scope, hand-augering to a maximum depth of 5 feet was selected as the exploration technique. Soil samples were collected at various depths. In addition, based on the discussions with the City and BKF, on January 13, 2020, the following cores were reevaluated to determine the thickness of the base material: C-3, C-4, C-5, C-6 and C-7. The boring logs are presented in Attachment 2.

LABORATORY TESTING

Soil samples collected from the borings were re-examined in the laboratory to substantiate field classifications. Selected soil samples were tested for moisture content, percent passing the No. 200 sieve, sieve analysis, Atterberg limits, compaction characteristics, R-value, and corrosion potential (pH, electrical resistivity, soluble chlorides, and soluble sulfates). The soil samples tested are identified on the boring logs. Laboratory test data are summarized on the boring logs in Attachment 2 and presented on individual test reports in Attachment 3.

SITE CONDITIONS

The Project site was located in commercial and residential zones. Florence Avenue runs in a predominately east-west direction, while Lakewood Boulevard runs in a north-south direction. Florence Avenue and Lakewood Boulevard each have three traveling lanes with a left-turn lane. The existing surface pavement on Florence Avenue is PCC. On Lakewood Boulevard and the intersection, surface pavement consisted of AC. Concrete curbs and gutters were present along both streets. The PCC pavement surface condition within our Project limits along Florence Avenue was observed to be in predominately fair condition. The distresses included longitudinal cracks, transverse cracks, corner cracks, joint faulting, and spalling. The AC pavement surface condition within our Project limits along Lakewood Boulevard was in fair to good condition with transverse and longitudinal cracks. At some locations, bleeding and significant raveling were witnessed.

Based on our borings, the existing structural sections at Lakewood Boulevard consisted of approximately 3 to 16 inches of AC and 0 to 10 inches of aggregate base (AB). However, at one location (Lane #2 northbound Lane on the approach side, cement-treated base (CTB) was encountered beneath the AC (Boring B-1). The thickness of this CTB could not be measured at the field during the exploration; however, we suspect this is thicker than an inch. A detailed investigation can be performed to better characterize this layer's vertical and lateral extent if this information is considered necessary during the construction. The existing pavement structural sections at Florence Avenue consisted of approximately 8.5 to 10 inches of PCC and 6 inches of AB. Refer Table 1 for details of the existing pavement sections and subgrades.



Table 1 - EXISTING PAVEMENT SECTIONS

ID	LOCATION	AC/PCC		BASE		SUBGRADE
		Type	Thickness (inches)	Description Type	Thickness (inches)	
B-1 ¹	Approach (#2 Lane) NB on Lakewood Blvd	AC	8.5	1-inch or thicker CTB	--	Silty Sand with Gravel
B-2	Departure (#2 Lane) NB on Lakewood Blvd	AC	7	No Base	--	Silty Sand with Gravel
B-3	Approach (#2 Lane) SB on Lakewood Blvd	AC	5	No Base	--	Silty sands
B-4	Departure (#3 Lane) SB on Lakewood Blvd	AC	14	AB	10	Silty Sand with Gravel
C-1	Approach (#3 Lane) NB on Lakewood Blvd	AC	8.5	--	Not Investigated	--
C-2	Approach (#1 Lane) NB on Lakewood Blvd	AC	3	--	Not Investigated	--
C-3	Approach (#3 Lane) WB on Florence Ave	PCC	9.5/9.5 ²	AB	6	Silty sand
C-4	Departure (#1 Lane) NB on Lakewood Blvd	AC	10/20 ²	No Base	--	--
C-5	Approach (#3 Lane) SB on Lakewood Blvd	AC	10/8 ²	AB	2 ²	Silty sand
C-6	Approach (#1 Lane) SB on Lakewood Blvd	AC	7/16 ²	No Base	--	--
C-7	Approach (#3 Lane) EB on Florence Ave	PCC	8.5/10 ²	AB	6 ²	Silty sand with gravel
C-8	Departure (#1 Lane) SB on Lakewood Blvd	AC	7.5	--	Not Investigated	--
<p>Note(s):</p> <ol style="list-style-type: none"> Depth of exploration was terminated at 1.5 feet because of very dense drilling condition. The CTB section could be thicker than one inch. Based on the investigation on January 13, 2020. These corings were performed next to the original coring locations. <ul style="list-style-type: none"> NB= Northbound; SB= Southbound; PCC = Portland cement concrete; AB = Aggregate Base; AC = asphalt concrete; CTB = cement treated base. See Site Plan in Attachment 2 for boring and coring locations. 						



SUBSURFACE CONDITIONS

Based on reviewing four hand-auger boring logs and previous boring logs obtained from GeoTracker, the subsurface soils consisted of silty sands, silty sand with gravels, clayey sands, poorly graded sand with gravel, and silt. The in situ moisture content ranged from 5% to 13%. The material passing Sieve No. 200 ranged from 8% to 40%. Based on one compaction test (ASTM 1557), the maximum dry density was determined as 118 pcf with optimum moisture content of 10.5%. California R-values of the subgrade soils ranged from 55 to 78. Groundwater was not encountered in the borings to the depths explored.

CONCLUSIONS AND RECOMMENDATIONS

Based on the existing pavement distresses, the existing pavement sections (non-existence of base materials at some locations), and anticipated traffic, the City's desired PCC replacement is feasible from a geotechnical perspective. The existing pavement sections, including a portion of the subgrade soils, can be excavated to construct the new PCC pavements within the Project limits. As noted in the previous sections, the contractor needs to be aware of the CTB layer and select the appropriate equipment.

PAVEMENT DESIGN

The recommended minimum PCC pavement thicknesses are presented on Figure 2 and are based on the following:

- Caltrans Type II soil – Based on the soils encountered below the pavement sections, the soils can be considered Type I. However, the soils encountered in the northeast and southeast corners of the intersection show silt and sandy silt soil types. Therefore, we judge that pavement design for the section should be based on Caltrans Soil Type II.
- Caltrans and AASHTO design methods.
- Traffic index (TI) of 11.5 provided by BKF Engineers.



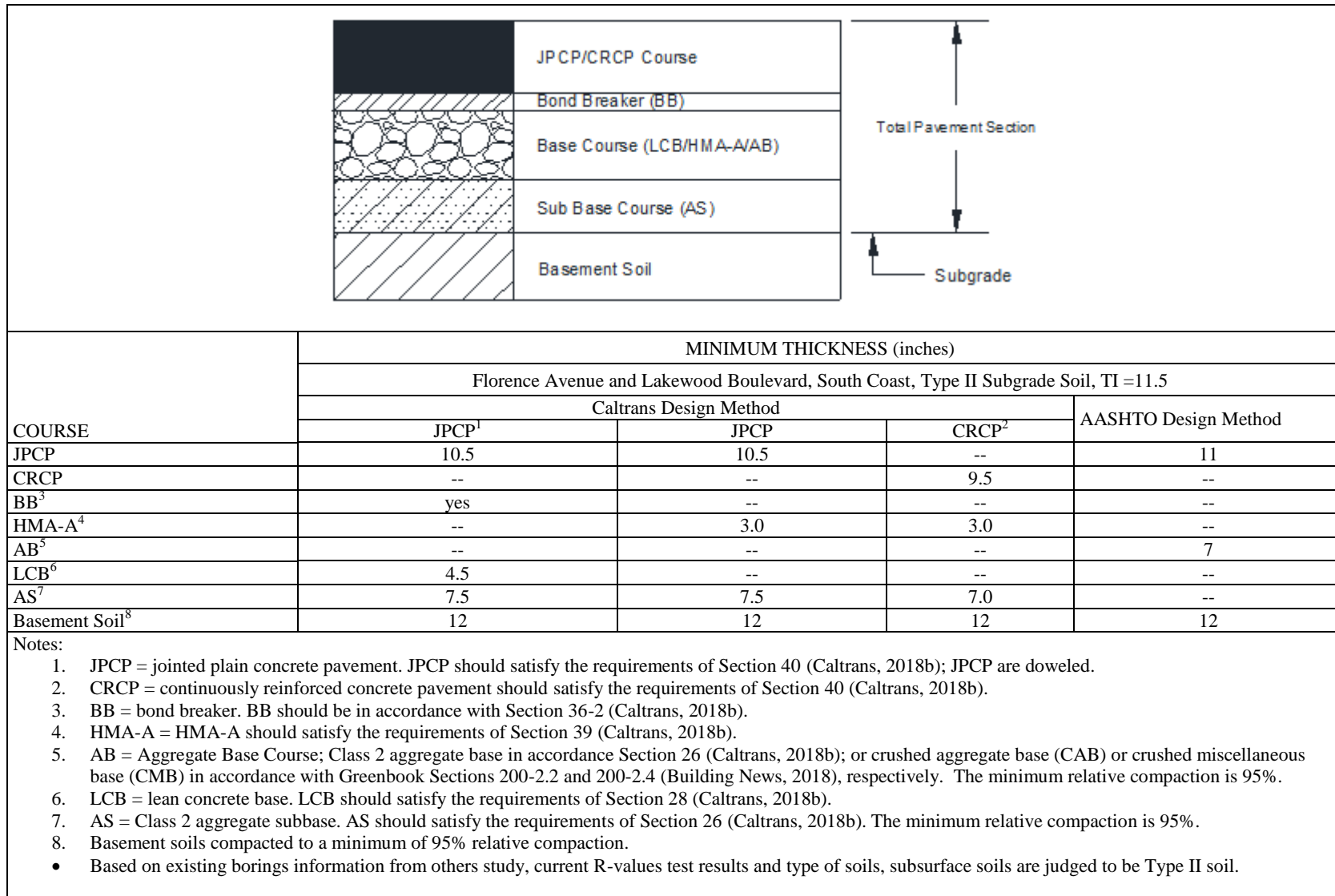


Figure 2 – NEW RIGID PAVEMENT STRCUTURAL SECTION



EARTHWORK

Prior to start of construction, all utilities should be located in the field and rerouted, removed, abandoned, or protected. The areas should be excavated to the planned subgrade elevation. Pavement and concrete should be separated for recycling. In areas where fill is required to achieve subgrade elevations, the stripped area should be:

- Scarified to a minimum depth of 8 inches.
- Moisture-conditioned to near optimum moisture content.
- Compacted to at least 95% relative compaction¹.

Fill and backfill should be compacted by:

- Placing in loose layers less than 8 inches thick.
- Moisture-conditioning to near optimum moisture content.
- Compacting to at least 95% relative compaction.

The basement soil of the pavement sections, aggregate subbase (AS), and AB should be compacted to at least 95% relative compaction. Proper moisture-conditioning will be required during the grading operations.

If unanticipated subgrade soils that preclude compaction are encountered during construction, they should be overexcavated to a sufficient depth that a firm and unyielding surface is achieved at the planned bottom of the excavation or the base of fill. Overexcavation limits, if required, are best and most accurately determined in the field after the subgrade is exposed and proof rolled. Using geogrids and/or easily compacted material, such as crushed rock, can reduce the depth of excavation. Import embankment materials for fill should meet Caltrans criteria as specified in Section 19 of Caltrans Standard Specifications (Caltrans, 2018b).

Import fill material if required should meet the criteria in Table 2.

Table 2 - IMPORT FILL CRITERIA

CRITERIA	IMPORT FILL
Maximum particle size (inches)	2
Maximum liquid limit (%)	30
Maximum plasticity index (%)	10
Maximum percentage passing the #200 sieve (%)	30
Minimum California R-value	40

¹ Relative compaction refers to the in-place dry density of soil expressed as a percentage of the maximum dry density of the same material, as determined by ASTM International (ASTM) D1557 test method. Optimum moisture content is the moisture content corresponding to the maximum dry density, as determined by the ASTM D1557 test method.

SOIL CORROSION POTENTIAL

One soil sample was tested for pH, soluble chloride and soluble sulfate, and soil electrical resistivity for corrosion potential. The test values are summarized in Table 3.

Analytical chemical test results indicated 42.8 parts per million (ppm) soluble sulfate concentrations in the near-surface soils. Also presented in Table 3 are Caltrans (2018a) and County of Los Angeles (2013) corrosion criteria. Based on Caltrans standards and the chemical test results, the on-site soils are classified as non-corrosive to buried metal pipes.

Table 3 - CORROSION POTENTIAL

CONSTITUENT	CRITERIA FOR CORROSIVE MATERIALS	VALUES
pH ¹	<5.5	9.8
Soluble sulfate content ¹ (ppm)	>2,000	42.8
Soluble chloride content ¹ (ppm)	>500	6.2
Electrical resistivity ² (ohm-cm)	<1,000	7,303
Note(s): 1. Caltrans (2018a) 2. County of Los Angeles (2013) • ppm = parts per million		

Borrow soils imported to the Project site should be tested for corrosion potential.

LIMITATIONS

This memorandum has been prepared for the Project based on a scope provided by BKF Engineers. The data, opinions, and recommendations contained in this memorandum are applicable to the specific design element(s) and location(s) that are the subject of this memorandum. They have no applicability to any other design elements or to any other locations, and any and all subsequent users accept any and all liability resulting from any use or reuse of the data, opinions, and recommendations without the prior written consent of DYA.

Services performed by DYA have been conducted in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions. No other representation, expressed or implied, and no warranty or guarantee is included or intended.

This memorandum is intended for use only for the Project described. In the event that any changes in the nature, design, or location of the facilities are planned, the conclusions and recommendations contained in this memorandum should not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by DYA. We are not responsible for any claims, damages, or liability associated with the interpretation of subsurface data obtained from limited boring and nearby geotechnical data or reuse of the subsurface data or engineering analyses without our express written authorization.

REFERENCES

ASTM International, 2010, Annual Book of Standards, Vol. 4.08 and 4.09, Soil and Rock.

Building News, 2018, "Greenbook," Standard Specifications for Public Works Construction.

Caltrans, 2017a, California Highway Design Manual, Chapter 600, Pavement Engineering, November 20, 2017.

Caltrans, 2017b, California Highway Design Manual, Chapter 630, Flexible Pavement, November 20, 2017.

Caltrans, 2018a, Corrosion Guidelines, Material Engineering and Testing Services, Corrosion Technology Branch, November 2012.

Caltrans, 2018b, Standard Specifications.

City of Downey, 2010, Lakewood Blvd. Improvements, Recycled Water Improvement Plans.

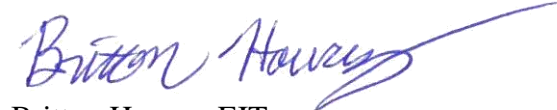
County of Los Angeles, 2013, Manual for Preparation of Geotechnical Reports, Geotechnical and Material, Engineering Division, July 1, 2013.

Sully-Miller Contracting Company, 2011, City of Downey Fax/E-mail Transmittal, RFQ 2.1 – Extra Thick AC Pavement.

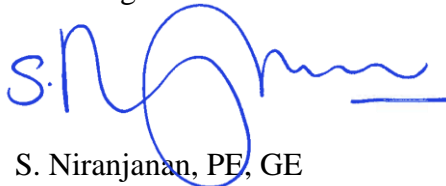
We appreciate the opportunity to work with you on this Project. Please call if you have any questions.

Sincerely,

DIAZ•YOURMAN & ASSOCIATES



Britton Howay, EIT
Staff Engineer



S. Niranjan, PE, GE
Geotechnical Engineer



BH/SN:dr

Attachment 1: Existing Data

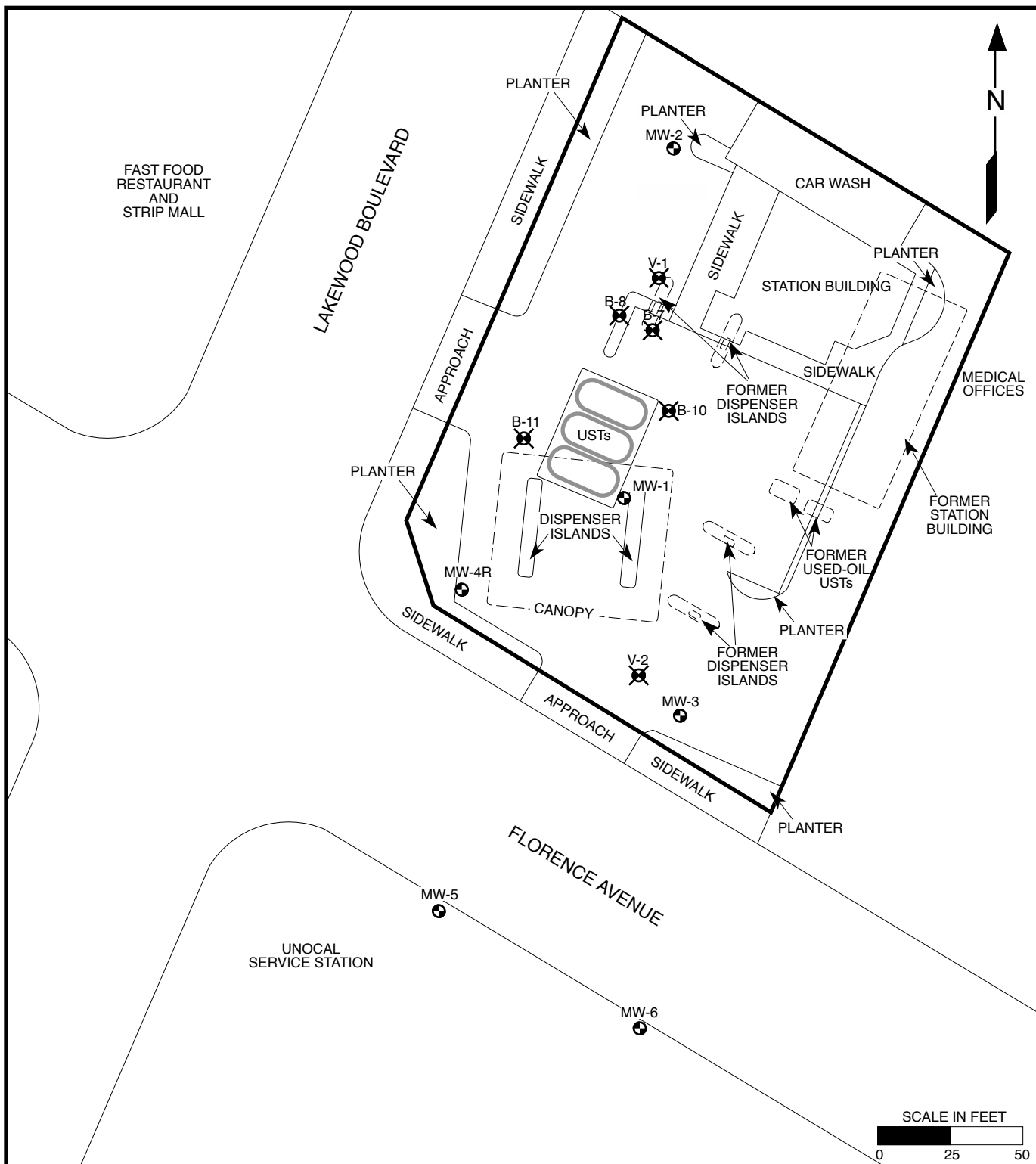
Attachment 2: Boring Logs

Attachment 3: Laboratory Testing

ATTACHMENT 1

EXISTING DATA






LEGEND


- MONITORING WELL
- VAPOR EXTRACTION WELL


CHEVRON ENVIRONMENTAL MANAGEMENT COMPANY


FORMER SERVICE STATION #9-2436
10030 LAKEWOOD BOULEVARD
DOWNEY, CALIFORNIA
FIGURE 2 - PLOT PLAN

HOLGUIN, FAHAN & ASSOCIATES, INC.

SAMPLE		CLIENT: Chevron Environmental Management Company		BLOWS PER 6 INCHES	PID (ppmv)	USCS	COMPLETION DETAIL	
INTERVAL	DEPTH (fbg)	PROJECT: Former Service Station #9-2436 LOCATION: 10030 Lakewood Boulevard, Downey, California DESCRIPTION AND SOIL CLASSIFICATION NAME: %gravel/sand/fines, gradation/plasticity, color, angularity, maximum size (gravels), density/consistency, moisture, stain					<input type="checkbox"/> GROUNDWATER WELL <input checked="" type="checkbox"/> VADOSE WELL <input type="checkbox"/> SPARGE WELL <input type="checkbox"/> BORING	CASING: 2" Sch 40 PVC SLOT SIZE: 0.02 FILTER PACK: #3 sand
	0	4" Concrete						
		SILT: 0/0/100, nonplastic, light brown, moist, no stain.				ML		
	5				0			
	10			9,10,10	0			
	15	SANDY SILT: 0/15/85, poorly graded, light brown, fine-grained sand, very stiff, moist, no stain.		7,8,10	0			
	20	0/20/80		7,7,8	0			
	25							
	30	SAND: 0/100/0, poorly graded, light gray, fine grained, medium dense, moist, no stain.		12,14,16	0	SP		
	35							
DRILLING METHOD: LAR 8" Hollow Stem Auger				DATE DRILLED: April 24, 2007				
SAMPLER TYPE: Split Spoon				LOGGED BY: Jeff Nobriga				
TOTAL BORING DEPTH: 60 fbg				APPROVED BY: James Haslett, PG #5641				
DEPTH TO WATER: Not encountered				DRILLED BY: Cascade Drilling, Inc.				
 HOLGUIN, FAHAN & ASSOCIATES, INC.		LOG OF EXPLORATORY BORING				V-1 Page 1 of 2		

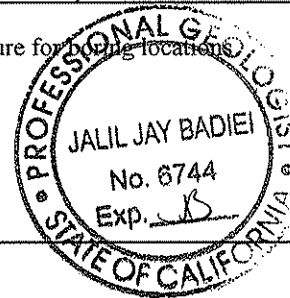
SAMPLE		CLIENT: Chevron Environmental Management Company		BLOWS PER 6 INCHES	PID (ppmv)	USCS	COMPLETION DETAIL	
INTERVAL	DEPTH (fbg)	PROJECT: Former Service Station #9-2436 LOCATION: 10030 Lakewood Boulevard, Downey, California DESCRIPTION AND SOIL CLASSIFICATION NAME: %gravel/sand/fines, gradation/plasticity, color, angularity, maximum size (gravels), density/consistency, moisture, stain					<input type="checkbox"/> GROUNDWATER WELL <input checked="" type="checkbox"/> VADOSE WELL <input type="checkbox"/> SPARGE WELL <input type="checkbox"/> BORING	CASING: 2" Sch 40 PVC SLOT SIZE: 0.02 FILTER PACK: #3 sand
	35			13,15,17				
	40	CLAY: 0/0/100, medium plasticity, light gray, hard, moist, no stain.		18,20,21	122	CL		
		SILT: 0/0/100, low plasticity, brown, hard, moist, olive green stain.				ML		
	45	SAND: 0/100/0, well graded, gray, fine to coarse grained, dense, moist, no stain		18,20,21	0	SW		
	50	GRAVELLY SAND: 15/85/0, subangular, gravel up to 2" diameter		18,20,21	0			
	55	SAND with GRAVEL: 5/95/0, subangular, gravel up to 1" diameter		18,20,21	0			
	60	SAND: 0/100/0, fine to medium grained		18,20,21	0			
		Boring terminated at 60 fbg						
	65							
	70							
DRILLING METHOD: LAR 8" Hollow Stem Auger				DATE DRILLED: April 24, 2007				
SAMPLER TYPE: Split Spoon				LOGGED BY: Jeff Nobriga				
TOTAL BORING DEPTH: 60 fbg				APPROVED BY: James Haslett, PG #5641				
DEPTH TO WATER: Not encountered				DRILLED BY: Cascade Drilling, Inc.				
 HOLGUIN, FAHAN & ASSOCIATES, INC.		LOG OF EXPLORATORY BORING				V-1 Page 2 of 2		

SAMPLE		CLIENT: Chevron Environmental Management Company		BLOWS PER 6 INCHES	PID (ppmv)	USCS	COMPLETION DETAIL	
INTERVAL	DEPTH (ftg)	PROJECT: Former Service Station #9-2436 LOCATION: 10030 Lakewood Boulevard, Downey, California DESCRIPTION AND SOIL CLASSIFICATION NAME: %gravel/sand/fines, gradation/plasticity, color, angularity, maximum size (gravels), density/consistency, moisture, stain					<input type="checkbox"/> GROUNDWATER WELL <input checked="" type="checkbox"/> VADOSE WELL <input type="checkbox"/> SPARGE WELL <input type="checkbox"/> BORING	CASING: 2" Sch 40 PVC SLOT SIZE: 0.02 FILTER PACK: #3 sand
	0	4" Concrete						
		SILT: 0/0/100, nonplastic, light brown, moist, no stain				ML		
	5			--	--			
	10			7,7,8	0			
	15	SANDY SILT: 0/15/85, poorly graded, fine-grained sand, very stiff		9,10,12	0			
	20	CLAYEY SILT: 0/0/100, low plasticity, gray, moist, hydrocarbon odor, dark gray stain		10,12,14	116			
	25	SILTY SAND: 0/70/30, poorly graded, light brown, fine-grained sand, medium dense, moist, no stain		8,10,2	0	SM		
	30	SAND: 0/100/0, poorly graded, light brown, fine to medium grained, very dense, moist, no stain		32, 50	0	SP		
	35			50 (6")				
DRILLING METHOD: LAR 8" Hollow Stem Auger				DATE DRILLED: April 24, 2007				
SAMPLER TYPE: Split Spoon				LOGGED BY: Jeff Nobriga				
TOTAL BORING DEPTH: 60 ftg				APPROVED BY: James Haslett, PG #5641				
DEPTH TO WATER: Not encountered				DRILLED BY: Cascade Drilling, Inc.				
 HOLGUIN, FAHAN & ASSOCIATES, INC.		LOG OF EXPLORATORY BORING				V-2 Page 1 of 2		

SAMPLE		CLIENT: Chevron Environmental Management Company		BLOWS PER 6 INCHES	PID (ppmv)	USCS	COMPLETION DETAIL	
INTERVAL	DEPTH (fbg)	PROJECT: Former Service Station #9-2436 LOCATION: 10030 Lakewood Boulevard, Downey, California DESCRIPTION AND SOIL CLASSIFICATION NAME: %gravel/sand/fines, gradation/plasticity, color, angularity, maximum size (gravels), density/consistency, moisture, stain					<input type="checkbox"/> GROUNDWATER WELL <input checked="" type="checkbox"/> VADOSE WELL <input type="checkbox"/> SPARGE WELL <input type="checkbox"/> BORING	CASING: 2" Sch 40 PVC SLOT SIZE: 0.02 FILTER PACK: #3 sand
	35							
		SILTY CLAY WITH SAND: 0/5/95, low plasticity, light gray, fine grain sand, hard, moist, no stain.				CL		
	40	SILT: 0/0/100, low plasticity, brown, hard, moist, green stain.		16,22,33	145			
		SAND: 0/100/0, well graded, brown, fine to coarse grained, hard, moist, no stain.						
	45			12,14,16	0			
	50			10,12,17	0			
	55	fine to medium grained		14,16,21	0			
	60			15,22,34	0			
		Boring terminated at 60 fbg.						
	65							
	70							
DRILLING METHOD: LAR 8" Hollow Stem Auger				DATE DRILLED: April 24, 2007				
SAMPLER TYPE: Split Spoon				LOGGED BY: Jeff Nobriga				
TOTAL BORING DEPTH: 60 fbg				APPROVED BY: James Haslett, PG #5641				
DEPTH TO WATER: Not encountered				DRILLED BY: Cascade Drilling, Inc.				
 HOLGUIN, FAHAN & ASSOCIATES, INC.		LOG OF EXPLORATORY BORING				V-2 Page 2 of 2		



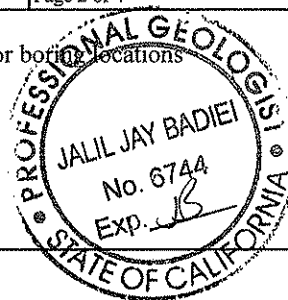
Project No:	C20435908-1	Client:	ConocoPhillips	Well/Boring No:	MW-2
Logged By:	Jozi del Angel	Location:	10208 S. Lakewood Blvd., Downey, CA	Page 1 of 4	
Driller:	Cascade Drilling	Date Drilled:	1/8/2006	Location Map	
Drilling Method:	HSA CME 75	BoreHole Diameter:	10"	See Figure for Boring Locations	
Sampling Method:	Split Spoon	BoreHole Depth:	80.5' bgs		
Casing Type:	Sch 40 PVC	Well Diameter:	4"		
Slot Size:	0.02"	Well Depth:	80.5' bgs		
Gravel Pack:	#3 Monterey	Casing Stickup:	-		



Well Completion		Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Elevation		Northing		Easting		Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing Backfill					Depth (feet)	Recovery Interval						
Concrete						1							
						2							Air Knife to 7 feet
						3							
						4							
						5						ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains
						6							
						7							
						8							
						9							
			damp	0.1	17	10						ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, 50% sand, 50% silt
						11							
						12							
						13							
						14							
			damp	3.1	20	15						ML	CLAYEY SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, yellow-orange oxidation stains, no plasticity, 10% clay, 30% sand, 60% silt
						16							
						17							
						18							
						19							
			damp	0.7	23	20						ML	SANDY SILT (ML); dark brown, very fine grained, poorly graded, low strength and toughness, 50% sand, 50% silt
						21							
						22							



Project No: C20435908-1	Client: ConocoPhillips	Well/Boring No: MW-2
Logged By: Jozi del Angel	Location: 10208 S. Lakewood Blvd., Downey, CA	Page 2 of 4
Driller: Cascade Drilling	Date Drilled: 1/8/2006	Location Map See Figure for boring locations
Drilling Method: HSA CME 75	BoreHole Diameter: 10"	
Sampling Method: Split Spoon	BoreHole Depth: 80.5' bgs	
Casing Type: Sch 40 PVC	Well Diameter: 4"	
Slot Size: 0.02"	Well Depth: 80.5' bgs	
Gravel Pack: #3 Monterey	Casing Stickup: -	



Well Completion		Water Level	Elevation			Northing		Easting		Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing Backfill		Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval				
			damp	7.3	28	23				SP	
						24					
						25					SILTY SAND (SP); olive brown, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, 10% silt, 90% sand
						26					
						27					
						28					
						29					
			damp	10.1	37	30				ML	SANDY SILT (ML); dark olive gray, very fine grained, poorly graded, low strength and toughness, minor laminations, reddish brown root-like organics, 30% sand, 70% silt
						31					
						32					
						33					
			damp	3.1	32	34				SP	SILTY SAND (SP); brown and olive brown mixed, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, 10% silt, 90% sand
						35					
						36					
						37					
						38					
						39					
			damp	1.7	27	40				SP	SILTY SAND (SP); brown, fine and medium grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, 10% silt, 90% sand
						41					
						42					
						43					
						44					

Bentonite Grout

Blank Sch. 40 PVC



Project No: C20435908-1
 Logged By: Jozi del Angel
 Driller: Cascade Drilling
 Drilling Method: HSA CME 75
 Sampling Method: Split Spoon
 Casing Type: Sch 40 PVC
 Slot Size: 0.02"
 Gravel Pack: #3 Monterey

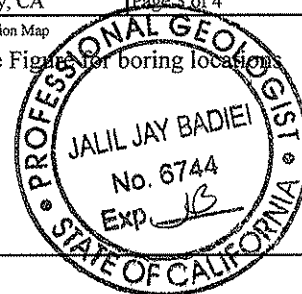
Client: ConocoPhillips
 Location: 10208 S. Lakewood Blvd., Downey, CA
 Date Drilled: 1/8/2006
 BoreHole Diameter: 10"
 BoreHole Depth: 80.5' bgs
 Well Diameter: 4"
 Well Depth: 80.5' bgs
 Casing Stickup: -

Well/Boring No: MW-2

Page 3 of 4

Location Map

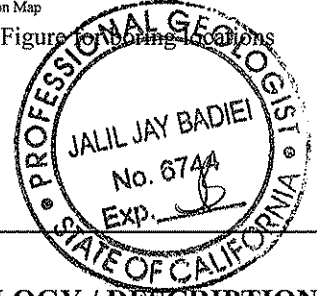
See Figure for boring locations



Well Completion			Elevation			Northing		Easting	Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing	Backfill	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval			
		Bentonite GROUT	damp	0.9	31	45		ML	SANDY SILT (ML); dark gray, very fine grained, poorly graded, low strength and toughness, minor laminations, 30% sand, 70% silt	
		Bentonite Chips				46				
						47				
						48				
		Blank Sch. 40 PVC	damp	31.8	27	49		SP	SAND (SP); gray, medium grained, poorly graded, low strength and toughness, hydrocarbon odor coming from boring, 100% sand	
						50				
						51				
						52				
		0.020" Screen				53				
			damp	11.3	28	54		SP	SAND (SP); gray, medium grained, poorly graded, low strength and toughness, trace subrounded gravel, <1% gravel, 100% sand	
						55				
						56				
						57				
						58				
		#3 Monterey Sand	moist	28.9	21	59		SP	SAND (SP); gray, medium grained, poorly graded, low strength and toughness, 100% sand	
						60				
						61				
						62				
						63				
			wet	40.1	37	64		SP	SAND (SP); gray, medium with some fine and coarse grained, poorly graded, low strength and toughness, 100% sand	
						65				
						66				



Project No:	C20435908-1	Client:	ConocoPhillips	Well/Boring No:	MW-2
Logged By:	Jozi del Angel	Location:	10208 S. Lakewood Blvd., Downey, CA	Page 4 of 4	
Driller:	Cascade Drilling	Date Drilled:	1/8/2006	Location Map	
Drilling Method:	HSA CME 75	BoreHole Diameter:	10"	See Figure for Boring Locations	
Sampling Method:	Split Spoon	BoreHole Depth:	80.5' bgs		
Casing Type:	Sch 40 PVC	Well Diameter:	4"		
Slot Size:	0.02"	Well Depth:	80.5' bgs		
Gravel Pack:	#3 Monterey	Casing Stickup:	-		



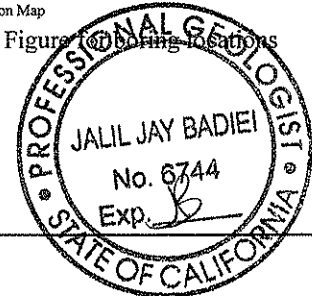
Elevation			Northing			Easting		
-----------	--	--	----------	--	--	---------	--	--

Well Completion Backfill Casing Backfill	Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
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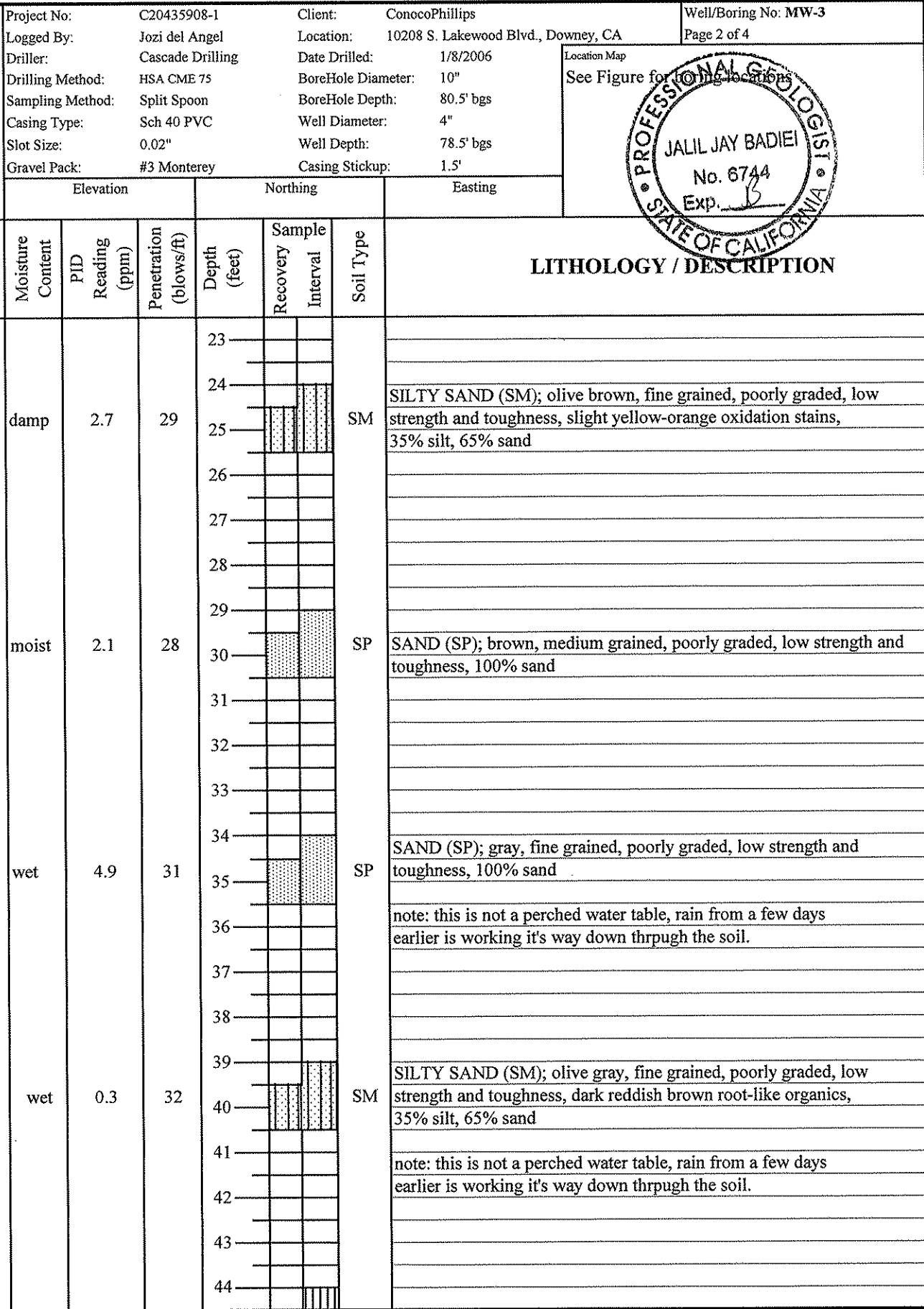
		wet	30.7	32	67		SW	
					68			
					69			
					70			GRAVELLY SAND (SW); grayish brown, medium to very coarse
					71			grained, well graded, low strength and toughness, subrounded,
					72			pitted, gravel up to 20mm in diameter, a few silty clay lenses about
					73			10-20mm in diameter and 5mm thick, 10% gravel, 90% sand
					74			
					75	X		No recovery
					76			
					77			
					78			
					79			GRAVELLY SAND (SW); grayish brown, medium to very coarse
					80			grained, well graded, low strength and toughness, subrounded,
					81			smooth, gravel up to 15mm in diameter, 10% gravel, 90% sand
					82			Boring terminated at 80.5 feet below ground surface (bgs).
					83			Groundwater was encountered at 61 feet bgs.
					84			
					85			
					86			
					87			
					88			

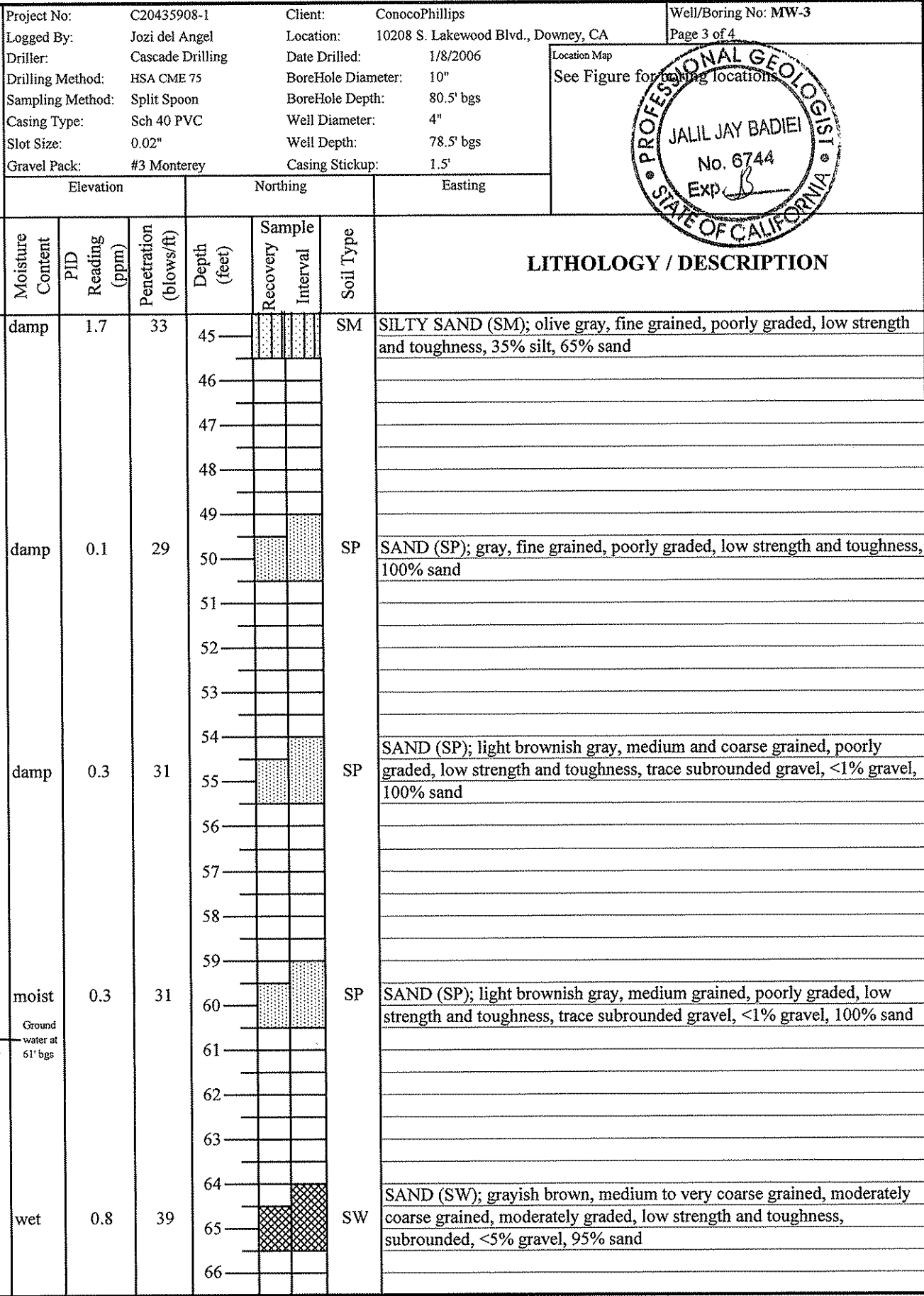


Project No:	C20435908-1	Client:	ConocoPhillips	Well/Boring No:	MW-3
Logged By:	Jozi del Angel	Location:	10208 S. Lakewood Blvd., Downey, CA	Page 1 of 4	
Driller:	Cascade Drilling	Date Drilled:	1/8/2006	Location Map	
Drilling Method:	HSA CME 75	BoreHole Diameter:	10"	See Figure 1 for Boring Locations	
Sampling Method:	Split Spoon	BoreHole Depth:	80.5' bgs		
Casing Type:	Sch 40 PVC	Well Diameter:	4"		
Slot Size:	0.02"	Well Depth:	78.5' bgs		
Gravel Pack:	#3 Monterey	Casing Stickup:	1.5'		



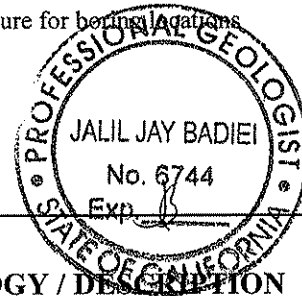
Well Completion		Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing Backfill								
						1			Air Knife to 7 feet
						2			
						3			
						4			
			damp	0.3	15	5		ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains
						6			
						7			
						8			
						9			
						10		ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, 50% sand, 50% silt
						11			
						12			
						13			
						14			
			damp	1.7	21	15		ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, light brown calcification nodules, 40% sand, 60% silt
						16			
						17			
						18			
			damp	21.3	23	19			
						20		SP	SANDY SILT (SM); olive brown, medium grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains 15% silt, 85% sand
						21			
						22			







Project No:	C20435908-1	Client:	ConocoPhillips	Well/Boring No:	MW-3
Logged By:	Jozi del Angel	Location:	10208 S. Lakewood Blvd., Downey, CA	Page 4 of 4	
Driller:	Cascade Drilling	Date Drilled:	1/8/2006	Location Map	
Drilling Method:	HSA CME 75	BoreHole Diameter:	10"	See Figure for boring locations	
Sampling Method:	Split Spoon	BoreHole Depth:	80.5' bgs		
Casing Type:	Sch 40 PVC	Well Diameter:	4"		
Slot Size:	0.02"	Well Depth:	78.5' bgs		
Gravel Pack:	#3 Monterey	Casing Stickup:	1.5'		



Well Completion		Water Level	Elevation			Northing		Easting		Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing Backfill		Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval				
						67					
						68					
						69					
				wet	1.2	37	70			SW	SAND (SW); grayish brown, medium to very coarse grained, well graded, low strength and toughness, subrounded, <5% gravel, 95% sand
						71					
						72					
						73					
						74					
				wet	0.9	39	75			SW GW	SAND (SW); grayish brown, well graded sand SANDY GRAVEL (GW); grayish brown, medium to very coarse grained, moderately graded, low strength and toughness, subrounded to subangular, gravel is up to 30mm in diameter, 45% sand, 55% gravel
						76					
						77					
						78					
						79					
				wet	0.1	40	80			SW	SAND (SW); grayish brown, medium to very coarse grained, moderately graded, low strength and toughness, subrounded, <5% gravel, 95% sand
						81					Boring terminated at 80.5 feet below ground surface (bgs). Groundwater was encountered at 61 feet bgs.
						82					
						83					
						84					
					85						
					86						
					87						
					88						



Project No:	C20435908-1	Client:	ConocoPhillips	Well/Boring No:	MW-4
Logged By:	Jozi del Angel	Location:	10208 S. Lakewood Blvd., Downey, CA	Page 1 of 4	
Driller:	Cascade Drilling	Date Drilled:	1/9/2006	Location Map	
Drilling Method:	HSA LAR	BoreHole Diameter:	10"	See Figure for boring locations	
Sampling Method:	Split Spoon	BoreHole Depth:	80.5' bgs		
Casing Type:	Sch 40 PVC	Well Diameter:	4"		
Slot Size:	0.02"	Well Depth:	79.5' bgs		
Gravel Pack:	#3 Monterey	Casing Stickup:	0.5'		

Well Completion		Water Level	Elevation		Northing		Easting		Soil Type	LITHOLOGY DESCRIPTION
Backfill	Casing Backfill		Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery	Interval		
Backfill	Casing Backfill					1				
Concrete	Well Box					2				Air Knife to 7 feet
						3				
						4				
						5			ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains
						6				
						7				
						8				
						9				
			damp	0.3	16	10			ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, 50% sand, 50% silt
						11				
						12				
						13				
						14				
			damp	2.8	23	15			ML	CLAYEY SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, light brown calcification nodules, no plasticity, 10% clay, 30% sand, 60% silt
						16				
						17				
						18				
						19				
			damp	1.7	19	20			SP	SANDY SILT (SM); brown, fine grained, poorly graded, low strength and toughness, 10% silt, 90% sand
						21				
						22				



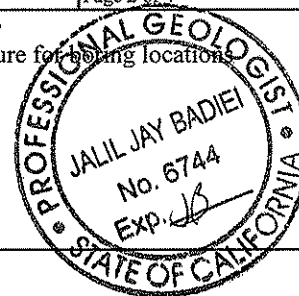
Project No: C20435908-1 Client: ConocoPhillips
 Logged By: Jozi del Angel Location: 10208 S. Lakewood Blvd., Downey, CA
 Driller: Cascade Drilling Date Drilled: 1/9/2006
 Drilling Method: HSA LAR BoreHole Diameter: 10"
 Sampling Method: Split Spoon BoreHole Depth: 80.5' bgs
 Casing Type: Sch 40 PVC Well Diameter: 4"
 Slot Size: 0.02" Well Depth: 79.5' bgs
 Gravel Pack: #3 Monterey Casing Stickup: 0.5'

Well/Boring No: MW-4

Page 2 of 4

Location Map

See Figure for boring locations



Well Completion			Elevation			Northing		Easting		LITHOLOGY / DESCRIPTION	
Backfill	Casing Backfill	Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval	Soil Type			
			damp	21.3	23	23		SP	SAND (SP); brown, medium grained, poorly graded, low strength and toughness,slight yellow-orange oxidation stains, 100% sand		
						24					
						25					
						26					
						27					
						28					
						29					
			moist	19.8	29	30		SP	SAND (SP); olive gray, medium grained, poorly graded, low strength and toughness, 100% sand		
						31					
						32					
						33					
						34					
			wet	23.1	33	35		ML	CLAYEY SANDY SILT (ML); dark olive gray, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, abundant dark red root-like organics, no plasticity, minor laminations, 15% clay, 25% sand, 60% silt		
						36					
						37			note: this is not a perched water table, rain from a few days earlier is working it's way down through the soil.		
						38					
						39					
			damp	28.7	30	40		SP	SAND (SP); olive gray, medium grained, poorly graded, low stength and toughness, 100% sand		
						41					
						42					
						43					
						44					

Bentonite Grout

Blank Sch. 40 PVC

note: this is not a perched water table, rain from a few days earlier is working it's way down through the soil.

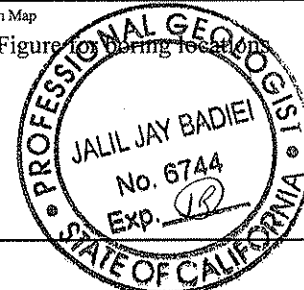


Project No: C20435908-1
 Logged By: Jozi del Angel
 Driller: Cascade Drilling
 Drilling Method: HSA LAR
 Sampling Method: Split Spoon
 Casing Type: Sch 40 PVC
 Slot Size: 0.02"
 Gravel Pack: #3 Monterey

Client: ConocoPhillips
 Location: 10208 S. Lakewood Blvd., Downey, CA
 Date Drilled: 1/9/2006
 BoreHole Diameter: 10"
 BoreHole Depth: 80.5' bgs
 Well Diameter: 4"
 Well Depth: 79.5' bgs
 Casing Stickup: 0.5'

Well/Boring No: MW-4
 Page 3 of 4

Location Map
 See Figure 10 for boring location



Elevation Northing Easting

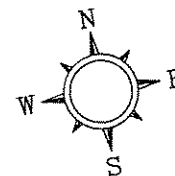
Well Completion			Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing	Backfill								
		Bentonite Grout	damp	50.7	27	45			SP	SAND (SP); light gray, medium grained sand
		Bentonite Chips				46			SM	SILTY SAND (SM); dark gray, fine grained, poorly graded, low strength and toughness, laminated, 10% silt, 90% sand
						47				
						48				
		Blank Sch. 40 PVC	damp	43.8	26	49			SP	SAND (SP); gray, medium and coarse grained, poorly graded, low strength and toughness, 100% sand
						50				
						51				
						52				
		0.020" Screen				53				
			damp	13.1	23	54			SP	SAND (SP); brownish gray, coarse grained, poorly graded, low strength and toughness, trace subrounded gravel, <1% gravel, 100% sand
						55				
						56				
						57				
						58				
		#3 Monterey Sand	moist	7.8	27	59			SP	SAND (SP); light brownish gray, medium grained, poorly graded, low strength and toughness, trace subrounded gravel, <1% gravel, 100% sand
						60				
						61				
						62				
						63				
			wet	1.4	30	64			SW	GRAVELLY SAND (GW); grayish brown, medium to very coarse grained, well graded, low strength and toughness, subrounded, gravel is up to 45mm in diameter, 15% gravel, 85% sand
						65				
						66				

Ground water at 61' bgs



Project No:	C20435908-1	Client:	ConocoPhillips	Well/Boring No:	MW-4
Logged By:	Jozi del Angel	Location:	10208 S. Lakewood Blvd., Downey, CA	Page 4 of 4	
Driller:	Cascade Drilling	Date Drilled:	1/9/2006	Location Map	
Drilling Method:	HSA LAR	BoreHole Diameter:	10"	See Figure for boring locations	
Sampling Method:	Split Spoon	BoreHole Depth:	80.5' bgs		
Casing Type:	Sch 40 PVC	Well Diameter:	4"		
Slot Size:	0.02"	Well Depth:	79.5' bgs		
Gravel Pack:	#3 Monterey	Casing Stickup:	0.5'		
Elevation		Northing		Easting	

Well Completion		Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample		Soil Type	LITHOLOGY/DESCRIPTION
Backfill	Casing Backfill						Recovery	Interval		
						67				
						68				
						69				
			wet	4.9	31	70			SP	SAND (SW); gray, medium and coarse grained, poorly graded, low strength and toughness, 100% sand
						71				
						72				
						73				
						74				
			wet	1.4	35	75			SW	SAND (GW); brownish gray, medium to very coarse grained, well graded, low strength and toughness, trace subrounded gravel, <5% gravel, 95% sand
						76				
						77				
						78				
						79				
			wet	2	31	80			SW	SAND (GW); brownish gray, medium to very coarse grained, well graded, low strength and toughness, trace subrounded gravel, <5% gravel, 95% sand
						81				Boring terminated at 80.5 feet below ground surface (bgs). Groundwater was encountered at 61 feet bgs.
						82				
						83				
						84				
						85				
						86				
						87				
						88				

**LEGEND**

◆ MONITORING WELL LOCATION

◆ PROPOSED MONITORING WELL LOCATION

TPH-g TOTAL PETROLEUM HYDROCARBONS
AS GASOLINEMTBE METHYL TERT-BUTYL
ETHER

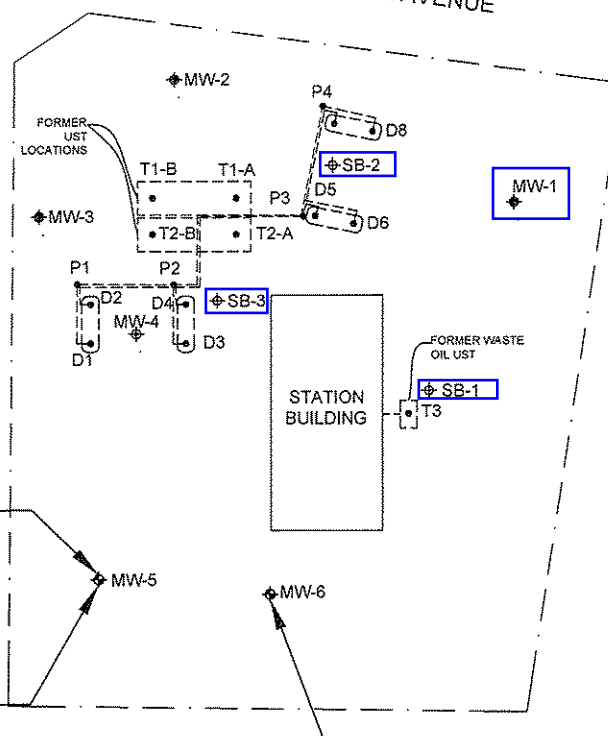
TBA TERT-BUTYL ALCOHOL

ND< NOT DETECTED ABOVE LIMIT NOTED

μg/L MICROGRAMS PER LITER

LAKEWOOD BOULEVARD

FLORENCE AVENUE

**MW-5 Shallow**

Sample ID/Date	Depth to Water (TOC)	TPHg (ug/l)	Benzene (ug/l)	MTBE (ug/l)	TBA (ug/l)
4/18/2008	30.20	ND<50	ND<0.50	ND<0.50	ND<10

MW-5 Deep

Sample ID/Date	Depth to Water (TOC)	TPHg (ug/l)	Benzene (ug/l)	MTBE (ug/l)	TBA (ug/l)
4/18/2008	67.40	90	0.95	0.68	ND<10

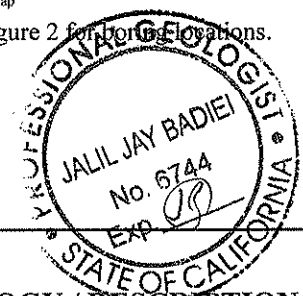
MW-6

Sample ID/Date	Depth to Water (TOC)	TPHg (ug/l)	Benzene (ug/l)	MTBE (ug/l)	TBA (ug/l)
4/18/2008	67.65	80	0.75	1.7	ND<10

CONOCO PHILLIPS
76 SERVICE STATION NO. 4359
DOWNEY, CALIFORNIA**FIGURE 3**HYDROCARBON DISTRIBUTION
IN GROUNDWATER MAP
10208 SOUTH LAKEWOOD BOULEVARD
DOWNEY, CALIFORNIA



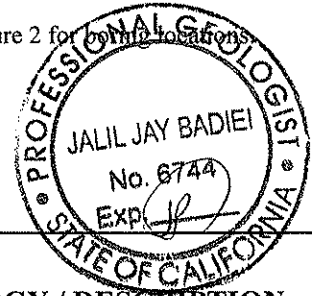
Project No:	C20435908-1	Client:	ConocoPhillips	Boring/Well No:	SB-1
Logged By:	Jozi del Angel	Location:	10208 S. Lakewood Blvd., Downey, CA	Page 1 of 3	
Driller:	Cascade Drilling	Date Drilled:	1/5/2007	Location Map	
Drilling Method:	CME 75 HSA	BoreHole Diameter:	8"	See Figure 2 for Borehole Elevations.	
Sampling Method:	CA Mod. SS	BoreHole Depth:	65.5' bgs		
Casing Type:	-	Well Diameter:	-		
Slot Size:	-	Well Depth:	-		
Gravel Pack:	-	Casing Stickup:	-		



Well Completion		Water Level	Elevation		Northing		Easting		Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing		Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Recovery Interval			
Concrete										Asphalt
Bentonite Grout						1				Air Knife to 7 feet
						2				
						3				
						4				
						5			ML	SANDY SILT (ML); olive brown, very fine grained, poorly grade, low strength and toughness
						6				
						7				
						8				
						9				
			damp	17.1	16	10			ML	SANDY SILT (ML); olive brown, very fine grained, poorly grade, low strength and toughness, 50% sand, 50% silt
						11				
						12				
						13				
						14				
			damp	1.3	22	15			ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, yellow-orange oxidation stains, light brown calcification nodules, 40% sand, 60% silt
						16				
						17				
						18				
						19				
			damp	7.1	23	20			SM	SILTY SAND (SM); olive brown, fine grained, poorly graded, low strength and toughness, yellow-orange oxidation stains, 30% silt, 70% sand
						21				
						22				



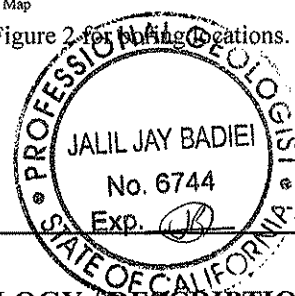
Project No:	C20435908-1	Client:	ConocoPhillips	Boring/Well No:	SB-1
Logged By:	Joji del Angel	Location:	10208 S. Lakewood Blvd., Downey, CA	Page 2 of 3	
Driller:	Cascade Drilling	Date Drilled:	1/5/2007	Location Map	
Drilling Method:	CME 75 HSA	BoreHole Diameter:	8"	See Figure 2 for boring locations	
Sampling Method:	CA Mod. SS	BoreHole Depth:	65.5' bgs		
Casing Type:	-	Well Diameter:	-		
Slot Size:	-	Well Depth:	-		
Gravel Pack:	-	Casing Stickup:	-		













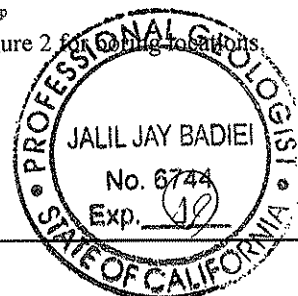
Well Completion		Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing								
Bentonite Grout			damp	3.1	31	23			
						24			
						25		SM	SILTY SAND (SM); orangey brown, fine grained, poorly graded, low strength and toughness, orangey red oxidation stains, 20% silt, 80% sand
						26			
						27			
						28			
			damp	0.1	29	29		SM	SILTY SAND (SM); brown, medium grained, poorly graded, low strength and toughness, minor orangey red oxidations stains, 20% silt, 80% sand
						30			
						31			
						32			
						33			
			damp	0.7	27	34		SP	SAND (SP); light grayish brown, medium and coarse grained, poorly graded, low strength and toughness, minor yellow-orange oxidation stains, trace subrounded gravel, <1% gravel, 100% sand
						35			
						36			
						37			
						38			
			damp	3.2	21	39		SP	SAND (SP); light gray, medium and coarse grained, poorly graded, low strength and toughness, trace subrounded gravel, <1% gravel, 100% sand
						40			
						41			
						42			
						43			
						44			



Project No:	C20435908-1	Client:	ConocoPhillips	Boring/Well No:	SB-1
Logged By:	Jozi del Angel	Location:	10208 S. Lakewood Blvd., Downey, CA	Page 3 of 3	
Driller:	Cascade Drilling	Date Drilled:	1/5/2007	Location Map	
Drilling Method:	CME 75 HSA	BoreHole Diameter:	8"	See Figure 2 for boring locations.	
Sampling Method:	CA Mod. SS	BoreHole Depth:	65.5' bgs		
Casing Type:	-	Well Diameter:	-		
Slot Size:	-	Well Depth:	-		
Gravel Pack:	-	Casing Stickup:	-		



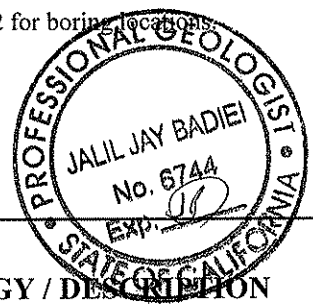
		Elevation			Northing		Easting		<div>No. 6744 Exp.  STATE OF CALIFORNIA</div>		
Well Completion	Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION			
<div>Bentonite Grout</div>		damp	0.1	43	45		ML	CLAYEY SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, no plasticity, no laminations, yellow-orange oxidation stains, 10% clay, 10% sand, 80% silt			
					46						
					47						
					48						
					49		ML	CLAYEY SANDY SILT (ML); cont. from 45', olive brown and gray laminations			
		damp	0.9	19	50		SP	SAND (SP); gray, medium grained, poorly graded, low strength and toughness, 100% sand			
					51						
					52						
					53						
					54		SP	SAND (SP); gray, coarse grained, poorly graded, low strength and toughness, 100% sand			
		damp	3.8	21	55		SP	SAND (SP); gray, coarse grained, poorly graded, low strength and toughness, 100% sand			
					56						
					57						
					58						
					59						
			moist	7.1	22	60		SP	SAND (SP); gray, coarse grained, poorly graded, low strength and toughness, trace subrounded gravel, <1% gravel, 100% sand		
						61			poor recovery		
						62					
						63					
						64		SP	SAND (SP); gray, coarse grained, poorly graded, low strength and toughness, 100% sand		
		 Ground water at 65' bgs	2.3	31	65		SP	SAND (SP); gray, coarse grained, poorly graded, low strength and toughness, 100% sand			
						66			Boring was terminated at 65.5 feet below ground surface (bgs). Ground water was encountered at 65' bgs.		



		Elevation			Northing		Easting	<div>NO. 0147 Exp. 12 STATE OF CALIFORNIA</div>		
Well Completion Backfill Casing	Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION		
Concrete								Asphalt		
Bentonite Grout					1			Air Knife to 7 feet		
					2					
					3					
					4					
					5		ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains		
					6					
					7					
					8					
					9					
			damp	2.1	20	10		ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, 50% sand, 50% silt	
						11				
						12				
						13				
						14				
			damp	10.1	23	15		ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, light brown calcification nodules, 50% sand, 50% silt	
						16				
						17				
						18				
						19				
			damp	3.8	27	20		SM ML	SILTY SAND (SM); olive brown, fine grained, 20% silt, 80% sand SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, orange oxidation stains, minor laminations, 50% sand, 50% silt	
						21				
						22				



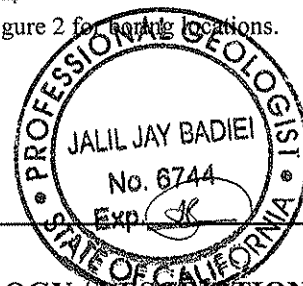
Project No:	C20435908-1	Client:	ConocoPhillips	Boring/Well No:	SB-2
Logged By:	Jozi del Angel	Location:	10208 S. Lakewood Blvd., Downey, CA	Page 2 of 3	
Driller:	Cascade Drilling	Date Drilled:	1/4/2007	Location Map	
Drilling Method:	CME 75 HSA	BoreHole Diameter:	8"	See Figure 2 for boring locations	
Sampling Method:	CA Mod. SS	BoreHole Depth:	50.5' bgs		
Casing Type:	-	Well Diameter:	-		
Slot Size:	-	Well Depth:	-		
Gravel Pack:	-	Casing Stickup:	-		
Elevation		Northing		Easting	

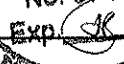





Well Completion		Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing								
Bentonite Grout			damp	12.7	26	23			
						24			
						25		SM	SILTY SAND (SM); olive brown, very fine grained, poorly graded, low strength and toughness, yellow-orange oxidation stains, 40% silt, 60% sand
						26			
						27			
						28			
			damp	1.8	31	29		SM	SILTY SAND (SM); light olive brown, medium and coarse grained, poorly graded, low strength and toughness, 20% silt, 80% sand
						30			
						31			
						32			
						33			
			damp	7.3	33	34		SP	SAND (SP); light olive brown, medium grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, 100% sand
						35			
						36			
						37			
						38			
			damp	29.3	27	39		SP	SILTY SAND (SP); light brownish gray, medium grained, poorly graded, low strength and toughness, 100% sand
						40			Contains laminations of SILTY SAND (SM); very fine grained, 30% silt, 70% sand
						41			
						42			
						43			
						44			



Project No:	C20435908-1	Client:	ConocoPhillips	Boring/Well No:	SB-2
Logged By:	Jozi del Angel	Location:	10208 S. Lakewood Blvd., Downey, CA	Page 3 of 3	
Driller:	Cascade Drilling	Date Drilled:	1/4/2007	Location Map	
Drilling Method:	CME 75 HSA	BoreHole Diameter:	8"	See Figure 2 for boring locations.	
Sampling Method:	CA Mod. SS	BoreHole Depth:	50.5' bgs		
Casing Type:	-	Well Diameter:	-		
Slot Size:	-	Well Depth:	-		
Gravel Pack:	-	Casing Stickup:	-		



Well Completion		Elevation			Northing			Easting		<div><div>No. 6744 Exp. </div><div>STATE OF CALIFORNIA</div></div> LITHOLOGY / DESCRIPTION
Backfill Casing	Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval	Soil Type			
Bentonite Grout		damp	17.1	43	45		SM	SILTY SAND (SM); gray		
					46			SILTY SAND (SM); brown, fine grained, poorly graded, low strength and toughness, yellow orange oxidations stains, 20% silt, 80% sand		
					47					
					48					
					49					
		damp	2.8	31	50		SM SP	SILTY SAND (SM); dark gray, fine grained, 40% silt, 60% sand		
					51			SAND (SP); brownish gray, coarse grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, 100% sand		
					52			Boring was terminated at 50.5 feet below ground surface (bgs). Groundwater was not encountered.		
					53					
					54					
					55					
					56					
					57					
					58					
					59					
					60					
					61					
					62					
					63					
					64					
					65					
					66					

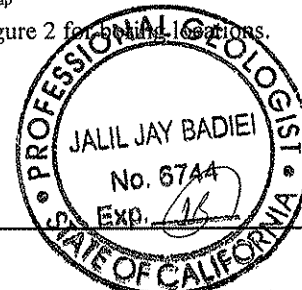


Project No: C20435908-1 Client: ConocoPhillips
 Logged By: Jozi del Angel Location: 10208 S. Lakewood Blvd., Downey, CA
 Driller: Cascade Drilling Date Drilled: 1/4/2007
 Drilling Method: CME LAR HSA BoreHole Diameter: 8"
 Sampling Method: CA Mod. SS BoreHole Depth: 65.5' bgs
 Casing Type: - Well Diameter: -
 Slot Size: - Well Depth: -
 Gravel Pack: - Casing Stickup: -

Boring/Well No: SB-3
 Page 1 of 3

Location Map

See Figure 2 for boring locations.



		Elevation			Northing		Easting		<div><div>No. 6144 EXP. 16 STATE OF CALIFORNIA</div></div>		
Well Completion Backfill Casing	Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION			
Concrete								Asphalt			
Bentonite Grout					1			Air Knife to 7 feet			
					2						
					3						
					4						
					5		ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness			
					6						
					7						
					8						
					9						
			damp	213.0	14	10		ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, 50% sand, 50% silt		
						11					
						12					
						13					
						14					
			damp	8.6	16	15		ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, light brown calcification nodules, 40% sand, 60% silt		
						16					
						17					
						18					
						19					
			damp	8.0	27	20		SM	SILTY SAND (SM); brown, fine grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, 20% silt, 80% sand		
						21					
						22					

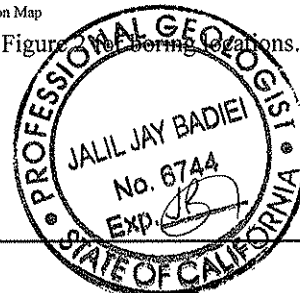


Project No: C20435908-1 Client: ConocoPhillips
 Logged By: Jozi del Angel Location: 10208 S. Lakewood Blvd., Downey, CA
 Driller: Cascade Drilling Date Drilled: 1/4/2007
 Drilling Method: CME LAR HSA BoreHole Diameter: 8"
 Sampling Method: CA Mod. SS BoreHole Depth: 65.5' bgs
 Casing Type: - Well Diameter: -
 Slot Size: - Well Depth: -
 Gravel Pack: - Casing Stickup: -

Boring/Well No: SB-3
 Page 2 of 3

Location Map

See Figure 2 for Boring Locations.



Well Completion		Elevation		Northing		Easting		LITHOLOGY / DESCRIPTION	
Backfill	Casing	Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval	Soil Type	
Bentonite Grout			damp	282.0	22	23		SP	
						24			
						25			SAND (SM); light olive brown, medium grained, poorly graded, low strength and toughness, slight yellow-orange oxidation stains, 100% sand
						26			
						27			
						28			
			damp	183.0	29	29		SM	
						30			SILTY SAND (SM); dark gray, fine and medium grained, poorly graded, low strength and toughness, slight orange oxidation stains, dark reddish brown root-like organics, 30% silt, 70% sand
						31			
						32			
						33			
			damp	30.4	32	34		OL	CLAYEY SILT (OL); dark gray, dark reddish brown root-like organics, some laminations
						35			
						36		SP	SAND (SM); brown, medium grained, poorly graded, low strength and toughness, 100% sand
						37			
						38			
			damp	5	47	39		SM	
						40			SILTY SAND (SM); olive gray, coarse grained, poorly graded, low strength and toughness, 15% silt, 85% sand
						41			
						42			
						43			
						44			



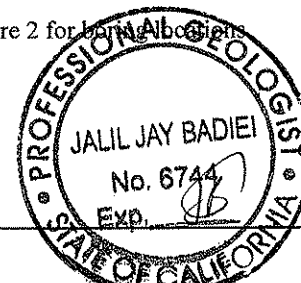
Project No: C20435908-1 Client: ConocoPhillips
 Logged By: Jozi del Angel Location: 10208 S. Lakewood Blvd., Downey, CA
 Driller: Cascade Drilling Date Drilled: 1/4/2007
 Drilling Method: CME LAR HSA BoreHole Diameter: 8"
 Sampling Method: CA Mod. SS BoreHole Depth: 65.5' bgs
 Casing Type: - Well Diameter: -
 Slot Size: - Well Depth: -
 Gravel Pack: - Casing Stickup: -

Boring/Well No: SB-3

Page 3 of 3

Location Map

See Figure 2 for boring locations



Elevation

Northing

Easting

Well Completion

Backfill
Casing

Water
Level

Moisture
Content

PID
Reading
(ppm)

Penetration
(blows/ft)

Depth
(feet)

Sample
Recovery
Interval

Soil Type

LITHOLOGY / DESCRIPTION

Bentonite Grout			damp	70.1	50	45		SM	SILTY SAND (SM); dark gray, fine grained, poorly graded, low strength and toughness, slight laminations, 30% silt, 70% sand
						46			
						47			
						48			
						49			
			damp	13.7	43	50		SP	SAND (SP); gray, medium grained, poorly graded, low strength and toughness, 100% sand
						51			
						52			
						53			
			damp	11.2	47	54		SP	SAND (SP); gray, coarse grained, poorly graded, low strength and toughness, 100% sand
						55			
						56			
						57			
						58			
			moist	2.3	49	59		SP	SAND (SP); gray, coarse grained, poorly graded, low strength and toughness, 100% sand
						60			
						61			
						62			
						63			
						64			
						65		SM	SILTY SAND (SM); gray, coarse grained, poorly graded, low strength and toughness, 10% silt, 90% sand
						66			



Ground
water at
65' bgs

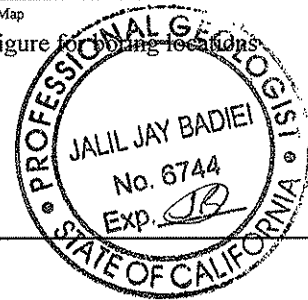
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43

Boring was terminated at 65.5 feet below ground surface (bgs).
 Groundwater was encountered at 65' bgs.



Project No:	C20435908-1	Client:	ConocoPhillips	Well/Boring No:	MW-1
Logged By:	Jozi del Angel	Location:	10208 S. Lakewood Blvd., Downey, CA	Page 1 of 4	
Driller:	Cascade Drilling	Date Drilled:	11/2/2006	Location Map	
Drilling Method:	HSA CME 75	BoreHole Diameter:	10"	See Figure for boring locations	
Sampling Method:	Split Spoon	BoreHole Depth:	80' bgs		
Casing Type:	Sch 40 PVC	Well Diameter:	4"		
Slot Size:	0.02"	Well Depth:	80' bgs		
Gravel Pack:	#3 Monterey	Casing Stickup:	-		



					Elevation		Northing		Easting		<div>NO. 000</div>	
--	--	--	--	--	-----------	--	----------	--	---------	--	--	--



Project No: C20435908-1
 Logged By: Jozi del Angel
 Driller: Cascade Drilling
 Drilling Method: HSA CME 75
 Sampling Method: Split Spoon
 Casing Type: Sch 40 PVC
 Slot Size: 0.02"
 Gravel Pack: #3 Monterey

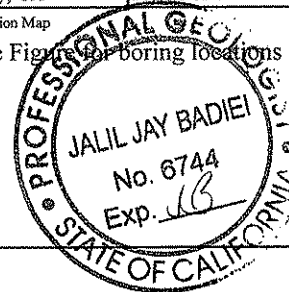
Client: ConocoPhillips
 Location: 10208 S. Lakewood Blvd., Downey, CA
 Date Drilled: 11/2/2006
 BoreHole Diameter: 10"
 BoreHole Depth: 80' bgs
 Well Diameter: 4"
 Well Depth: 80' bgs
 Casing Stickup: -

Well/Boring No: MW-1

Page 2 of 4

Location Map

See Figure for boring locations



Well Completion		Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing Backfill								
			damp	0.9	27	23			
						24			
						25		SM	SILTY SAND (SM); olive brown, very fine grained, poorly graded, low strength and toughness, minor orangy red oxidation stains, minor laminations, 30% silt, 70% sand
						26			
						27			
						28			
						29			
			damp	13.3	21	30		SM	SILTY SAND (SM); light olive gray, fine grained, poorly graded, low strength and toughness, 20% silt, 80% sand
						31			
						32			
						33			
						34			
			damp	7.2	19	35		SP	SAND (SP); light brownish gray, coarse grained, poorly graded, low strength and toughness, minor yellow-orange oxidations stains, trace subrounded gravel, <1% gravel, 100% sand
						36			
						37			
						38			
						39			
						40	X		No recovery
						41			
						42			
						43			
						44			

Bentonite Grout

Blank Sch. 40 PVC



Project No: C20435908-1	Client: ConocoPhillips	Well/Boring No: MW-1
Logged By: Jozi del Angel	Location: 10208 S. Lakewood Blvd., Downey, CA	Page 3 of 4
Driller: Cascade Drilling	Date Drilled: 11/2/2006	Location Map See Figure for borehole location
Drilling Method: HSA CME 75	BoreHole Diameter: 10"	
Sampling Method: Split Spoon	BoreHole Depth: 80' bgs	
Casing Type: Sch 40 PVC	Well Diameter: 4"	
Slot Size: 0.02"	Well Depth: 80' bgs	
Gravel Pack: #3 Monterey	Casing Stickup: -	

Elevation	Northing	Easting
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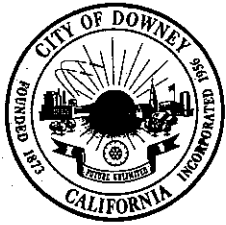
Well Completion			Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
Backfill	Casing	Backfill								
		Bentonite Grout		damp	21.3	23	45		ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low strength and toughness, minor root-like organics, yellow-orange oxidation stains, 50% sand, 50% silt
		Bentonite Chips					46			
							47			
							48			
		Blank Sch. 40 PVC		damp	1.3	20	49		SP	SILTY SAND (SP); brown, medium grained, poorly graded, low strength and toughness, trace subrounded gravel, <1% gravel, 100% sand
							50			
							51			
							52			
		0.020" Screen					53			
				damp	1.7	19	54		SP	SILTY SAND (SP); brown, coarse grained, poorly graded, low strength and toughness, trace subrounded gravel, <1% gravel, 100% sand
							55			
							56			
							57			
							58			
		#3 Monterey Sand		moist	0.1	28	59		SP	SILTY SAND (SP); brown, coarse grained, poorly graded, low strength and toughness, trace subrounded gravel, <1% gravel, 100% sand
							60			
							61			
							62			
							63			
							64		SP	SILTY SAND (SP); brown, coarse grained, poorly graded, low strength and toughness, trace subrounded gravel, <1% gravel, 100% sand
				wet	0.2	29	65			
							66			

Ground water at 61' bgs



Project No:	C20435908-1	Client:	ConocoPhillips	Well/Boring No:	MW-1
Logged By:	Jozi del Angel	Location:	10208 S. Lakewood Blvd., Downey, CA	Page 4 of 4	
Driller:	Cascade Drilling	Date Drilled:	11/2/2006	Location Map	
Drilling Method:	HSA CME 75	BoreHole Diameter:	10"	See Figure for boring locations	
Sampling Method:	Split Spoon	BoreHole Depth:	80' bgs		
Casing Type:	Sch 40 PVC	Well Diameter:	4"		
Slot Size:	0.02"	Well Depth:	80' bgs		
Gravel Pack:	#3 Monterey	Casing Stickup:	-		
Elevation		Northing		Easting	

Well Completion Backfill Casing Backfill	Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Sample Recovery Interval	Soil Type	LITHOLOGY DESCRIPTION
					67			
					68			
					69			
					70		GM	SILTY GRAVEL (GM); brown, well graded, low strength and toughness, subrounded, pitted, gravel up to 45mm in diameter, 40% silt, 60% gravel
					71			
					72			
					73			
					74			
					75			No recovery
					76			
					77			
					78			
					79			
					80			No recovery
					81			Boring terminated at 80 feet below ground surface (bgs). Groundwater was encountered at 61 feet bgs.
					82			
					83			
					84			
					85			
					86			
					87			
					88			



City of Downey

FUTURE UNLIMITED

FAX/E-MAIL TRANSMITTAL

To: Bill Grider, Senior Estimator/Project Manager
Sully-Miller Contracting Company
bgrider@sully-miller.com
Phone No: (714) 449-2292
Fax No: (714) 578-9672

From: Desi Gutierrez, Senior Civil Engineer/Project Engineer,
City of Downey
dgutierr@downeyca.org
Phone No: (562) 622-3468
Fax No: (562) 904-7296

Subject: Cash Contract No. 632-3A
Lakewood Boulevard Improvement Project - Phase 3A
RFQ 2.1 – Extra Thick AC Pavement

Date: January 7, 2011

Pages: 5 (including this cover sheet)

Bill,

On Monday, October 25, 2010 5:51 PM, the City received an email informing us of the changed condition of extra thick AC pavement ($\pm 18.0''$ thick) in the southbound #1 lane on Lakewood Blvd.

On Thursday, November 4, 2010, the City responded that we were assessing and documenting the existing AC pavement thickness and the specific areas where the extra thick AC pavement exists as Sully Miller crews are digging the trench for the new recycled water main.

Attached for your use (on pages 3 and 4) are the existing AC pavement thicknesses as measured on the westerly side of the recycled water main trench. Per previous discussions with Sully-Miller field crews, from past experience, average pavement thickness on arterial street is $\pm 8''$ - $10''$ thick.

Therefore, the City used a thickness of $9''$ for the average pavement thickness and determined that the excess pavement thickness was the difference between the existing pavement thickness and the average thickness of $9''$ (i.e. If the existing pavement = $14''$, then the excess pavement thickness = $14'' - 9'' = 5''$).

On page 5 of this email is a spreadsheet that the City used to determine the volume of AC pavement removed on the project up to November 24, 2010. The volume calculations for the AC pavement used field measurements taken by myself and our Inspector, Tom White. The volumes of AC pavement removed were separated into two volume calculations. Using the field measurements, the first volume calculation was the volume of AC pavement for the average pavement thickness of $9''$ which totaled 387.22 tons (say 387 tons). The second volume calculation was the volume of AC pavement for the excess pavement thickness (depth beyond $9''$) which totaled 226.82 tons (say 227 tons).



City of Downey

FUTURE UNLIMITED

FAX/E-MAIL TRANSMITTAL

We are aware that Sully Miller has incurred additional costs due to the excess pavement thickness such as additional sawcutting costs. Please provide the additional costs incurred by Sully Miller with all back-up documentation to support how the additional costs were determined. Once received, these costs will be reviewed. If these costs are acceptable, the City will incorporate these additional costs into a future Contract Change Order.

If you have any questions regarding this issue, please feel free to give me a call.

Desi Gutierrez

Pg. 1 of 2

11.29.10
T&W

AC PAV'T THICKNESS ALONG 12" Ø R.W. TRENCH

PIPE STATION	AC PAV'T THICKNESS
10+00	10"
10+57	10"
11+00	10.5"
12+00	11.5"
13+00	11"
14+00	9"
15+00	9"
16+00	9.5"
17+00	8"
17+46	TRANSITION FROM 8" TO 14"
18+00	15"
19+00	14"
21+00	14"
22+00	14.5"
23+00	14.5"
24+00	15"
25+00	17"
26+00	15.5"
27+00	15"
28+00	16.5"
29+00	16"
30+00	14"
31+00	18"
32+00	14"
33+00	16"
34+00	17"

Page 4

PG. 2 OF 2

H:\Pubworks\CAPIMP\CC632-3A Lakewood\Contractor Documents\RFQs\RFQ 2.1 Extra Thick AC (01-07-11).doc

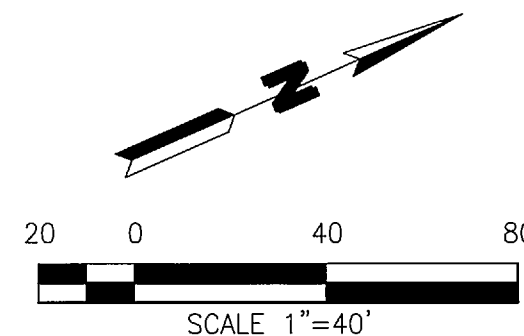
Cash Contract No. 632-3A
 Lakewood Boulevard Improvement Project - Phase 3A
 Pavement Removal Quantities thru November 24, 2010

REMOVAL
ITEMS

Station	to	Station	Average Pavement Thickness (inches)	Pavement Width ↓	9" Thick Pavement					Excess Thickness of Pavement (CY)														
					l (ft.)	w (ft.)	t (ft.)	(1CY/27CF)	(CY)	l (ft.)	w (ft.)	t (ft.)	(1CY/27CF)	(CY)										
1000	to	1017	10	3 T	17	x	3	x	0.037037	= 1.42	17	x	3	x	0.08	x	0.037037	= 0.16						
1023	to	1046	10	3 T	23	x	3	x	0.037037	= 1.92	23	x	3	x	0.08	x	0.037037	= 0.21						
1046	to	1177	10.75	2.6 T	131	x	2.6	x	0.037037	= 9.46	131	x	2.6	x	0.15	x	0.037037	= 1.84						
1177	to	1675	9	5 TPM	498	x	5.75	x	0.037037	= 79.54	498	x	5.75	x	0.00	x	0.037037	= 0.00						
1675	to	1742	11	4 T	67	x	4	x	0.037037	= 7.44	67	x	4	x	0.17	x	0.037037	= 1.65						
1742	to	1830	15	3 T	88	x	3	x	0.037037	= 7.33	88	x	3	x	0.50	x	0.037037	= 4.89						
1830	to	1947	14	3.25 T	117	x	3.25	x	0.037037	= 10.56	117	x	3.25	x	0.42	x	0.037037	= 5.87						
1947	to	1976	14	5.75 TPM	29	x	6.5	x	0.037037	= 5.24	29	x	6.5	x	0.42	x	0.037037	= 2.91						
1976	to	2055	14	4.5 TPM	79	x	5.25	x	0.037037	= 11.52	79	x	5.25	x	0.42	x	0.037037	= 6.40						
2055	to	2440	14.75	4.2 TPM	385	x	4.95	x	0.037037	= 52.94	385	x	4.95	x	0.48	x	0.037037	= 33.82						
2440	to	2490	15	4 TP	50	x	4.75	x	0.037037	= 6.60	50	x	4.75	x	0.50	x	0.037037	= 4.40						
2490	to	2545	17	4 TP	55	x	4.75	x	0.037037	= 7.26	55	x	4.75	x	0.67	x	0.037037	= 6.45						
2545	to	2606	16.75	3 T	61	x	3	x	0.037037	= 5.08	61	x	3	x	0.65	x	0.037037	= 4.38						
2606	to	2614.5	15.5	3 T	8.5	x	3	x	0.037037	= 0.71	8.5	x	3	x	0.54	x	0.037037	= 0.51						
2614.5	to	2659	15.25	3.8 TPM	44.5	x	4.55	x	0.037037	= 5.62	44.5	x	4.55	x	0.52	x	0.037037	= 3.91						
2659	to	3058	15.75	3.8 TPM	399	x	4.55	x	0.037037	= 50.43	399	x	4.55	x	0.56	x	0.037037	= 37.82						
3058	to	3132	16	2.75 T	74	x	2.75	x	0.037037	= 5.65	74	x	2.75	x	0.58	x	0.037037	= 4.40						
3132	to	3640	17	3.65 TPM	508	x	4.4	x	0.037037	= 62.09	508	x	4.4	x	0.67	x	0.037037	= 55.19						
3640	to	3745	17	4 TPM	105	x	4.75	x	0.037037	= 13.85	105	x	4.75	x	0.67	x	0.037037	= 12.31						
3745	to	3825	16.75	2.5 T	80	x	2.5	x	0.037037	= 5.56	80	x	2.5	x	0.65	x	0.037037	= 4.78						
3825	to	3943	17.5	4.5 TPM	118	x	5.25	x	0.037037	= 17.21	118	x	5.25	x	0.71	x	0.037037	= 16.25						
3943	to	3961	18	2.5 T	18	x	2.5	x	0.037037	= 1.25	18	x	2.5	x	0.75	x	0.037037	= 1.25						
3961	to	4180	17.5	2.5 T	219	x	2.5	x	0.037037	= 15.21	219	x	2.5	x	0.71	x	0.037037	= 14.36						
4180	to	4228	17.25	2.5 T	48	x	2.5	x	0.037037	= 3.33	48	x	2.5	x	0.69	x	0.037037	= 3.06						
					Total =					387.22					Total =					226.92				
															Grand Total =					614.05				

LEGEND
 T = TRENCH PAVEMENT
 P = ADDL PAVT. (BETWEEN TRENCH & MEDIAN)
 M = MEDIAN CONCRETE IMPROVEMENTS

K:\203-downey\007 - Lakewood (5th to Florence)\design\sheet\15 Rec Water.dgn 8/13/2010 1:50:30 PM SCALE: 480,0000 / FT. USER: david.d. declue pdf_no_10yer.dlt textsub.tbl



PROFILE SCALE:
HORIZ. 1"=40'
VERT. 1"=4'

MATCHLINE STA 37+00 ~ SEE SHEET 14

RECYCLED WATER PROFILE

CONSTRUCT 524.00 LF 12-INCH RECYCLED WATER PIPELINE
C900 CLASS 200 PURPLE PVC

EXIST. FS @ C
RECYCLED WATER PIPE

PROP FS @ C
RECYCLED WATER PIPE

2" TRAFFIC
CONDUIT

S=0.0037

42" MIN

1/20.30
INV

42+24.00
END RW PIPE
122.24 INV

MATCHLINE STA 37+00
SEE SHEET 14

LAKEWOOD BOULEVARD

PROPOSED UNDERGROUND
UTILITIES
(BY OTHERS)

EXISTING
FIBER OPTICS
(PROTECT)

FLORENCE
AVENUE

CONSTRUCTION NOTES

- 61 INSTALL 12" C900 CLASS 200 PURPLE PVC RECYCLED WATER PIPE WITH COPPER TRACER WIRE AND WARNING TAPE/TAGS PER CBMWD STD. DWGS. RW15, RW16, RW17, & RW21
- 69 INSTALL 2" COMBINATION AIR RELEASE AND VACUUM VALVE ASSEMBLY PER CBMWD STD. DWG. RW9.
- 73 INSTALL 12" BLIND FLANGE AND REMOVEABLE THRUST BLOCK PER CBMWD STD. DWG. RW19
- 74 INSTALL 12" C509 MJFL RESILIENT WEDGE VALVE PER CBMWD STD. DWGS. RW7 & RW8.

- NOTE:
- RECYCLED WATER LINE SHALL MAINTAIN A MINIMUM VERTICAL SEPARATION OF 12" OD TO OD BELOW POTABLE WATER LINE
 - ALIGNMENT OF RECYCLED WATER IMPROVEMENTS MAY REQUIRE FIELD VERIFICATION BY POT-HOLING. COST FOR SUCH SHALL BE INCLUDED IN THE VARIOUS ITEMS BID, AND NO ADDITIONAL COMPENSATION WILL BE ALLOWED

LINE AND CURVE DATA				
(NO)		R (FT)	L (FT)	T (FT)
(A)	N23°44'06"E		2068.56	

PREPARED BY:
KFM ENGINEERING, INC.
17885 Van Karman Ave., #500
Irvine, California 92614
Phone (949) 809-5900
Mike J. J. 8-13-10
R.C.E. NO. DATE

REGISTERED PROFESSIONAL ENGINEER
M.F. STEPIEN
No. C 35500
Exp. 9/30/11
CIVIL
STATE OF CALIFORNIA

DESIGNED BY: R.A.
DRAWN BY: J.N.
CHECKED BY: M.S.
APPROVED BY: PRINCIPAL ENGINEER RCE
APPROVED BY: *Ed J. J. 8-16-10* RCE DATE
DEPUTY DIRECTOR OF PUBLIC WORKS

DATE	No	REVISION	DATE	BY	APP

CITY OF DOWNEY
DEPT. OF PUBLIC WORKS ENGINEERING DIVISION
C.C. 632-3A LAKEWOOD BLVD IMPROVEMENTS
RECYCLED WATER IMPROVEMENTS
FROM 37+00 TO 42+32.66

VERT SCALE: "AS SHOWN"
HORIZ SCALE: "AS SHOWN"
SHEET 15 OF 37 SHEETS
DWG. NO. 3-40-45RW

ATTACHMENT 2

EXPLORATION PLAN AND BORING LOGS



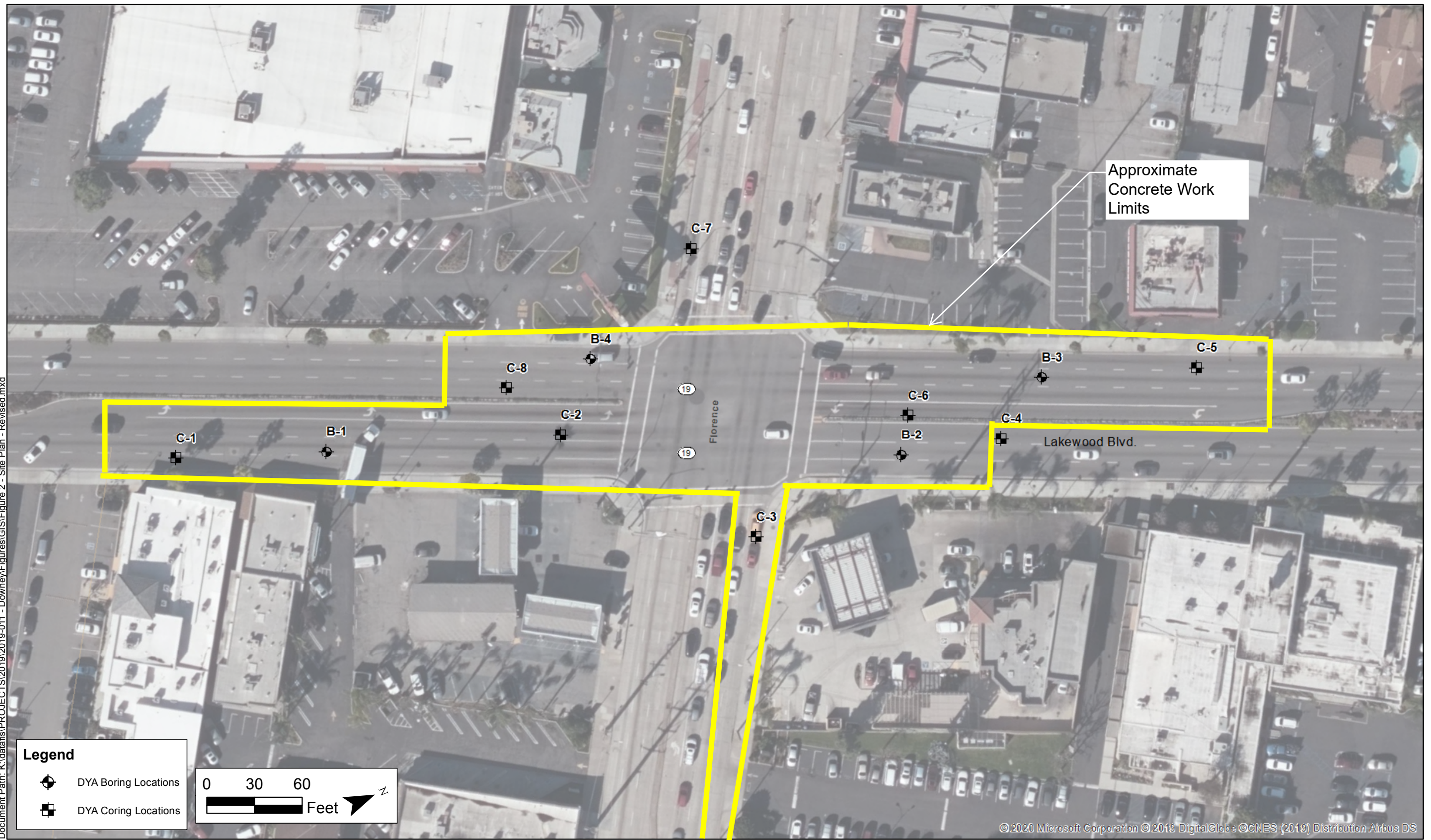




Figure 2 - SITE PLAN

BORING LOCATION: See Figure No. 2				ELEVATION (feet): 127									
LATITUDE: 33.946879				LONGITUDE: -118.117453									
DRILLING EQUIPMENT: Hand Auger				DRILLING METHOD: Hand Auger									
BORING DIAMETER (inches): 4				BORING DEPTH (feet): 1.5									
DATE STARTED: 10/24/19				DATE COMPLETED: 10/28/19									
LOGGED BY: AA				CHECKED BY: BH									
Elevation (feet)	Depth (feet)	Sampler	Symbol			Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
125							ASPHALT CONCRETE (AC): 8.5 inches						
							Cement Treated Base (CTB) = 1 inch*						
							POORLY GRADED SAND with GRAVEL (SP): light brown; moist; dense; coarse to fine SAND; coarse to fine GRAVEL; cemented material; micaceous						
							Refusal at 1.5 due to gravelly layer. No groundwater encountered. Boring backfilled with pea gravel. Surface patched with rapid set concrete and dyed black. Elevation based on Google Earth. *CTB could be thicker than one inch.						
5													
120													
10													

LOG OF BORING B-1

Page 1 of 1

City of Downey - Lakewood Boulevard at Florence Intersection Improvement
Project No. 2019-011

PLATE



A1

BORING LOCATION: See Figure No. 2				ELEVATION (feet): 129									
LATITUDE: 33.947815				LONGITUDE: -118.116912									
DRILLING EQUIPMENT: Hand Auger				DRILLING METHOD: Hand Auger									
BORING DIAMETER (inches): 4				BORING DEPTH (feet): 5.5									
DATE STARTED: 10/24/19				DATE COMPLETED: 10/24/19									
LOGGED BY: AA				CHECKED BY: BH									
Elevation (feet)	Depth (feet)	Sampler	Symbol			Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
125	5						ASPHALT CONCRETE (AC): 7 inches		7			8	RV
		✕			POORLY GRADED SAND with SILT and GRAVEL (SP-SM): dark yellowish brown; moist; loose; coarse to fine SAND; coarse to fine GRAVEL; micaceous								
		✕			CLAYEY SAND with GRAVEL (SC): dark yellowish brown; moist; loose; coarse to fine SAND; coarse to fine GRAVEL; micaceous								
		✕			SILTY SAND (SM): dark yellowish brown; moist; soft; trace coarse GRAVEL; micaceous								
		✕			olive brown; no trace coarse GRAVEL								
120	10	✕				End of boring at 5.5 feet. No groundwater encountered. Boring backfilled with pea gravel. Surface patched with rapid set concrete and dyed black. Elevation based on Google Earth.					16		

LOG OF BORING B-2

Page 1 of 1

City of Downey - Lakewood Boulevard at Florence Intersection Improvement
Project No. 2019-011**PLATE****A2**

BORING LOCATION: See Figure No. 2				ELEVATION (feet): 129									
LATITUDE: 33.94304				LONGITUDE: -118.11700									
DRILLING EQUIPMENT: Hand Auger				DRILLING METHOD: Hand Auger									
BORING DIAMETER (inches): 4				BORING DEPTH (feet): 5.5									
DATE STARTED: 10-24-19 COMPLETED: 10-24-19				HAMMER TYPE:									
DRILLING CONTRACTOR: Strongarm Environmental Inc				HAMMER DROP: inches		WEIGHT: lbs							
LOGGED BY: AA CHECKED BY: BH				DRIVE SAMPLER DIAMETER (inches) ID: 2.4 OD: 3									
Elevation (feet)	Depth (feet)	Sampler	Symbol	Blows per 6 Inches	SPT N60 Blows per Foot	Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
125	5						ASPHALT CONCRETE (AC): 5 inches		9	NP	NP	40	CA MD SA RV
							SILTY SAND (SM): dark olive brown; moist; medium dense; coarse to fine SAND; trace coarse to fine GRAVEL; micaceous						
							trace coarse GRAVEL						
							End of boring at 5.5 feet. No groundwater encountered. Boring backfilled with pea gravel. Surface patched with rapid set concrete and dyed black. Elevation based on Google Earth.						
120	10												

LOG OF BORING B-3

Page 1 of 1

City of Downey - Lakewood Boulevard at Florence Intersection Improvement
Project No. 2019-011**PLATE****A3**

BORING LOCATION: See Figure No. 2						ELEVATION (feet): 128							
LATITUDE: 33.94735						LONGITUDE: -118.117402							
DRILLING EQUIPMENT: Hand Auger						DRILLING METHOD: Hand Auger							
BORING DIAMETER (inches): 4						BORING DEPTH (feet): 5.5							
DATE STARTED: 10/28/19						DATE COMPLETED: 10/28/19							
LOGGED BY: AA						CHECKED BY: BH							
Elevation (feet)	Depth (feet)	Sampler	Symbol			Field Unc. Comp. Str. (tsf)	DESCRIPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
							ASPHALT CONCRETE (AC): 14 inches						
							POORLY GRADED GRAVEL with SAND (GP): dark gray; moist; loose; coarse to fine SAND; coarse to fine GRAVEL; Base = 10 inches		5				
							SILTY SAND with GRAVEL (SM): dark olive brown; moist; medium dense; coarse to fine SAND; micaceous		7			17	
125												13	SA RV
	5								6				
							End of boring at 5.5 feet. No groundwater encountered. Boring backfilled with pea gravel. Surface patched with rapid set concrete and dyed black. Elevation based on Google Earth.						
120													
10													

LOG OF BORING B-4

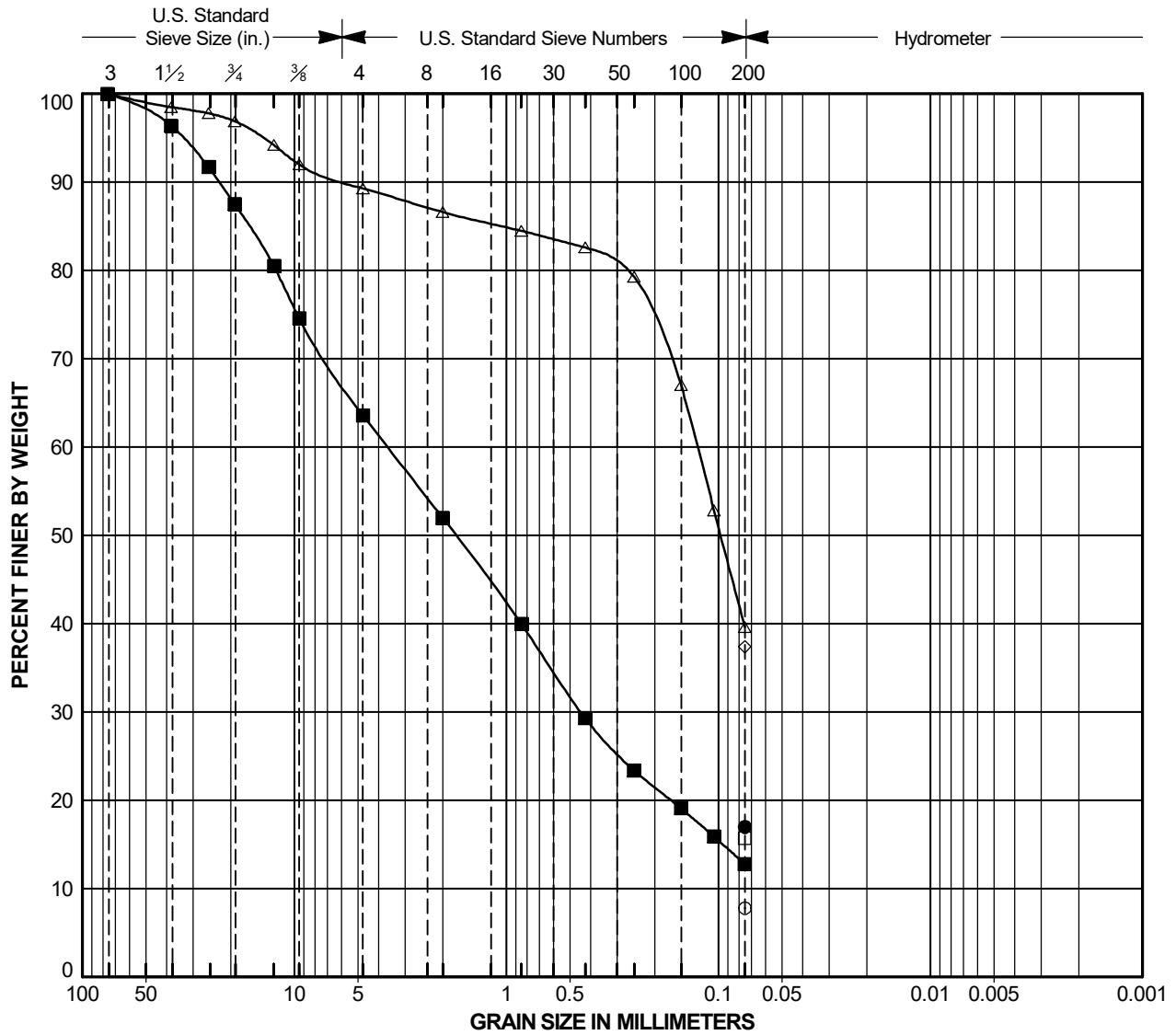
Page 1 of 1

City of Downey - Lakewood Boulevard at Florence Intersection Improvement
Project No. 2019-011**PLATE****A4**

ATTACHMENT 3

LABORATORY TESTING





COBBLES	Coarse	Fine	Coarse	Medium	Fine	SILT or CLAY
	GRAVEL		SAND			

Laboratory Testing by: Hushmand Associates, Incorporated

Symbol	Source	Depth (feet)	Classification	Natural M. C. (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing #200 Sieve
○	B-2	1.0	POORLY GRADED SAND WITH SILT AND GRAVEL	7	NP	NP	8
□	B-2	5.0	SILTY SAND (SM)				16
△	B-3	2.5	SILTY SAND (SM)				40
◇	B-3	4.0	SILTY SAND (SM)	9			37
●	B-4	2.0	SILTY SAND WITH GRAVEL (SM)	7			17
■	B-4	2.5	SILTY SAND WITH GRAVEL (SM)				13

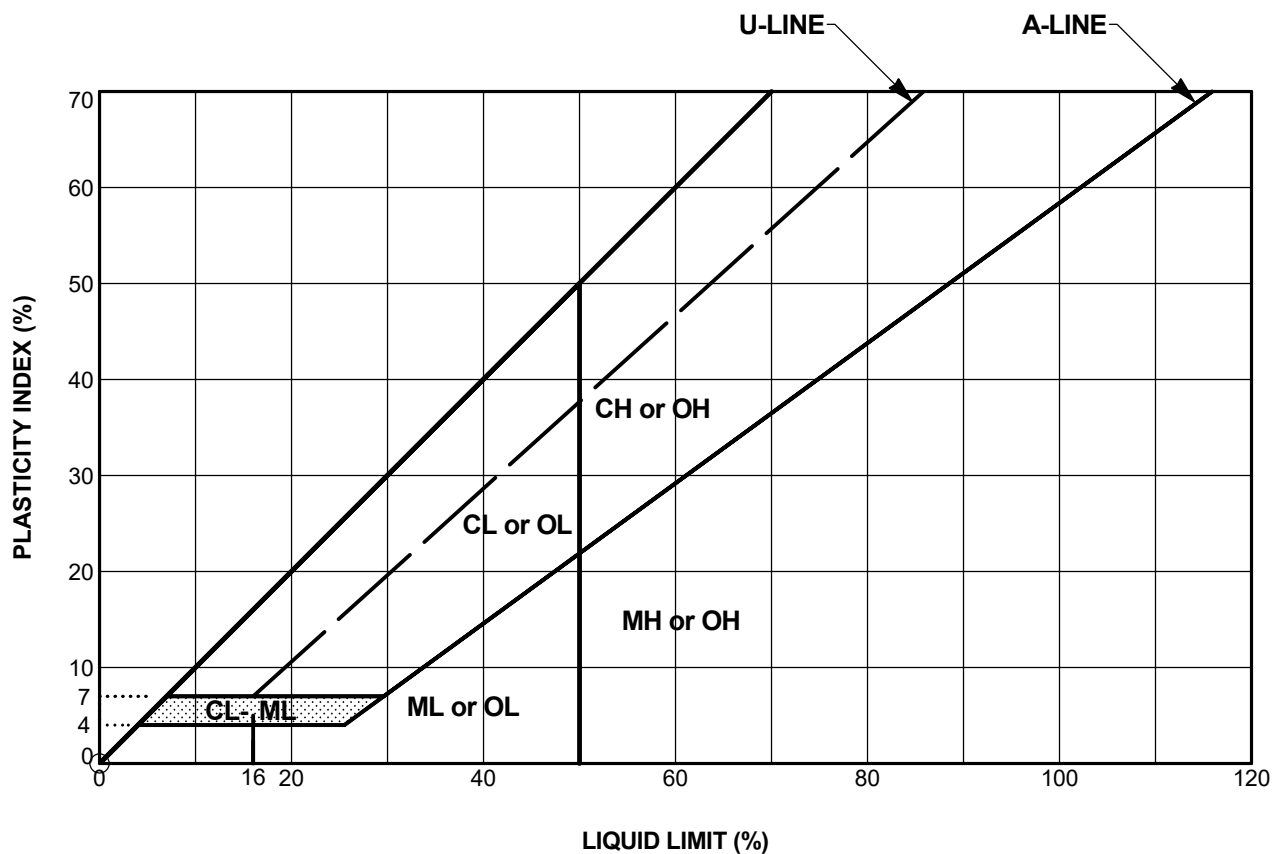
PARTICLE SIZE ANALYSIS

City of Downey - Lakewood Boulevard at Florence Intersection Improvement

Project No. 2019-011

PLATE

1



Laboratory Testing by: Hushmand Associates, Incorporated

Test Method: ASTM D4318

Symbol	Source	Depth (feet)	Classification	Natural M. C. (%)	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)	% Passing #200 Sieve
⊙	B-3	2.5	SILTY SAND (SM)		NP	NP	NP	

PLASTICITY CHART

City of Downey - Lakewood Bouelvard at Florence Intersection Improvement

Project No. 2019-011

PLATE

1



Compaction Characteristics of Soils Using Modified Effort

ASTM D1557

Client: Diaz Yourman & Associates
 Project: Downey
 Project No.: 2019-011
 Boring Number: B-3
 Sample Number: Bulk
 Depth (ft) : 0-5
 Soil Description: Brown, Silty Sand (SM)

HAI Project No.: DYAL-19-020

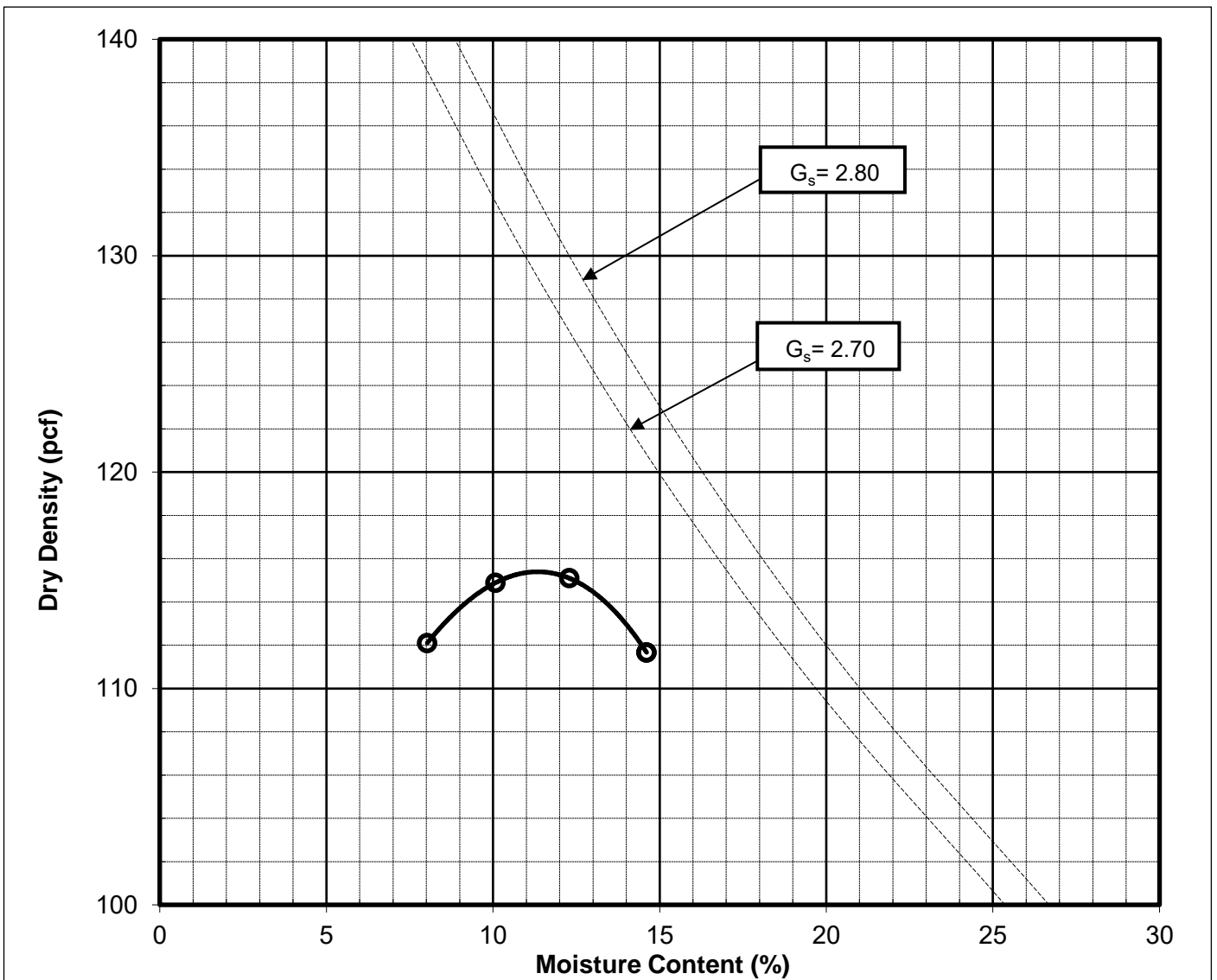
Tested by: GA

Checked by: KL

Date: 11/05/19

Mold size (in)	4"
Procedure	B
% Ret. on 3/8"	8.4
Remarks:	

Maximum Dry Density (pcf)	115.4
Optimum Moisture Content (%)	11.3
Corrected Maximum Dry Density (pcf)	118.0
Corrected Optimum Moisture Content (%)	10.4





Soil Analysis Lab Results

Client: HAI

Job Name: Downey

Client Job Number: DYAL-19-020 / 2019-011

Project X Job Number: S191107A

November 12, 2019

	Method	ASTM D4327		ASTM D4327		ASTM G187		ASTM G51
Bore# / Description	Depth	Sulfates SO ₄ ²⁻		Chlorides Cl ⁻		Resistivity		pH
	(ft)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	As Rec'd (Ohm-cm)	Minimum (Ohm-cm)	
B-3 Bulk	0.0-5.0	42.8	0.0043	6.2	0.0006	14,740	7,303	9.8

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography

mg/kg = milligrams per kilogram (parts per million) of dry soil weight

ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown

Chemical Analysis performed on 1:3 Soil-To-Water extract

November 11, 2019

Kang Chieh Lin
Hushmand Associates, Inc.
250 Goddard
Irvine, California 92618

Project No. 45567

Attention: Kang Chieh Lin

Testing of the bulk soil samples delivered to our laboratory on 11/11/2019 has been completed.

Project No.: DYAL-19-020 / 2019-011
Reference: Downey
Samples: B-2 Bulk @ 0'-5'
B-3 Bulk @ 0'-5'
B-4 Bulk @ 0'-5'

Data sheets are attached for your use and file. Any untested portion of the sample will be retained for a period of 60 days prior to disposal. The opportunity to be of service is sincerely appreciated and should you have any questions, kindly call.

Very truly yours,



Steven R. Marvin
RCE 30659

SRM:tw
Enclosure



R - VALUE DATA SHEET

PROJECT No. 45567

DATE: 11/15/2019

BORING NO. B-2 @ 0'-5'

Downey

DYAL 19-020 / 2019-11

SAMPLE DESCRIPTION: Brown Silty Fine Sand

R-VALUE TESTING DATA CA TEST 301			
	SPECIMEN ID		
	a	b	c
Mold ID Number	13	14	15
Water added, grams	49	45	60
Initial Test Water, %	11.7	11.3	12.8
Compact Gage Pressure, psi	350	350	350
Exudation Pressure, psi	490	632	218
Height Sample, Inches	2.55	2.55	2.58
Gross Weight Mold, grams	3052	3023	3039
Tare Weight Mold, grams	1967	1938	1943
Sample Wet Weight, grams	1085	1085	1096
Expansion, Inches x 10exp-4	22	30	15
Stability 2,000 lbs (160psi)	16 / 29	15 / 26	20 / 36
Turns Displacement	4.77	4.55	4.88
R-Value Uncorrected	70	74	64
R-Value Corrected	70	74	66
Dry Density, pcf	115.4	115.9	114.1

DESIGN CALCULATION DATA

Traffic Index	Assumed:	4.0	4.0	4.0
G.E. by Stability		0.31	0.27	0.35
G. E. by Expansion		0.73	1.00	0.50

Equilibrium R-Value		62 by EXPANSION	Examined & Checked: 11 /15/ 19
REMARKS:			
	<hr/>		
	Gf = 1.25		
	<hr/>		
	1.9% Retained on the		
	<hr/>		
	3/4" Sieve.		
	<hr/>		
	Partial Free Drainage.		
	<hr/>		
			<hr/>
			Steven R. Marvin, RCE 30659

The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301.



R-VALUE GRAPHICAL PRESENTATION

PROJECT NO.

45567

DATE:

11 /15/ 19

BORING NO.

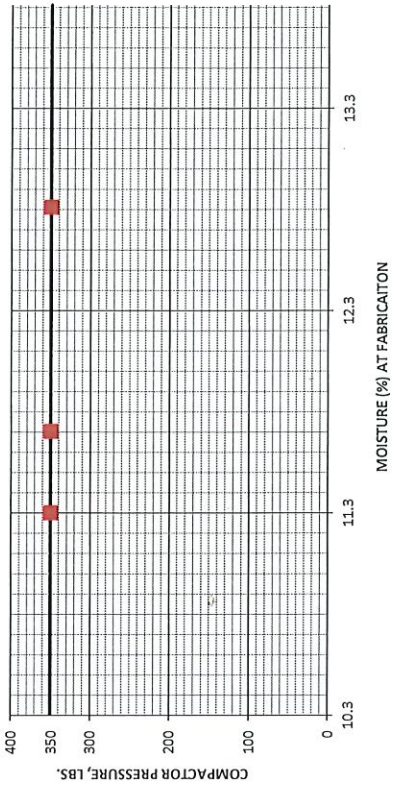
B-2 @ 0'-5'

Downey

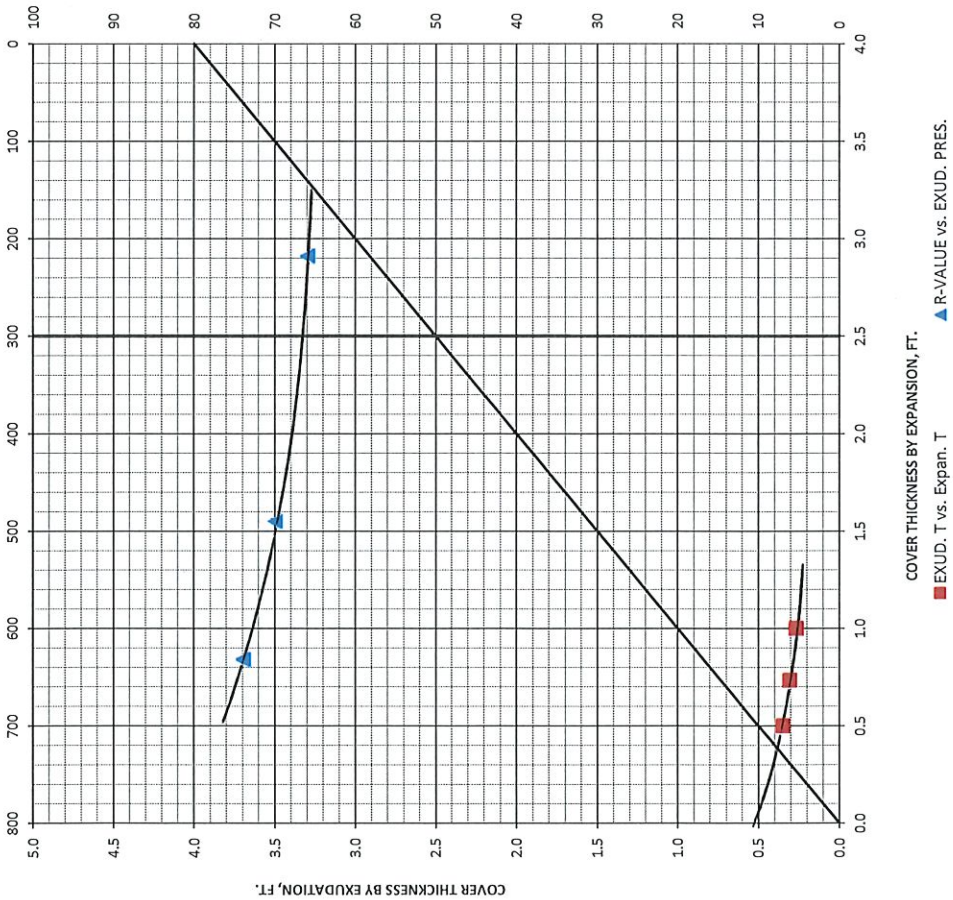
DYAL 19-020 / 2019-11

REMARKS:

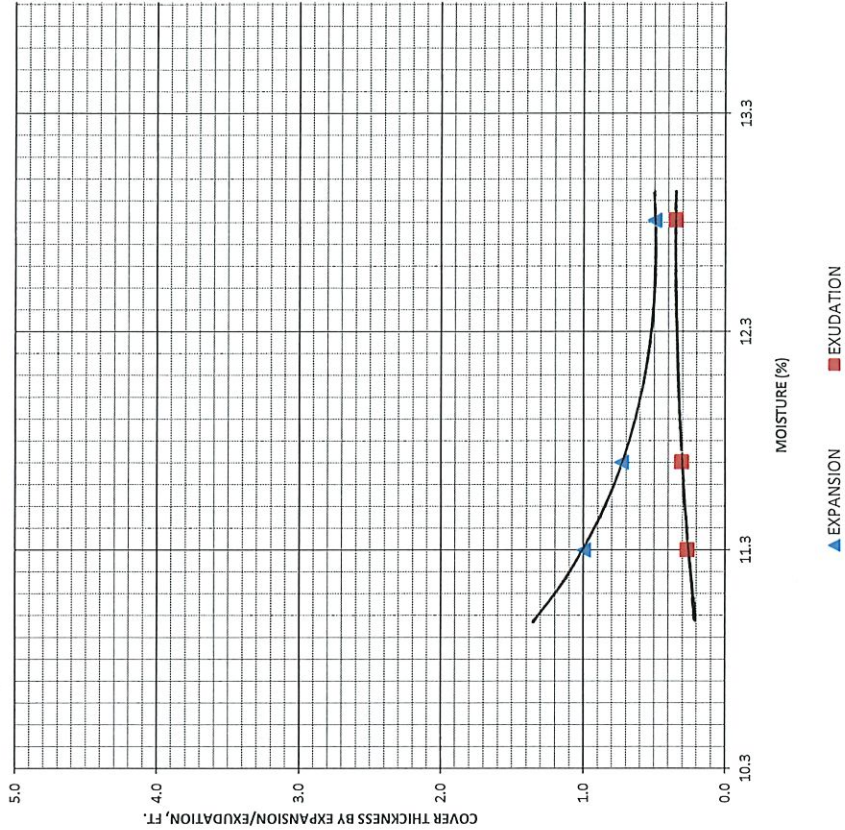
COMPACTOR PRESSURE vs MOISTURE %



COVER THICKNESS BY EXUDATION vs COVER THICKNESS BY EXPANSION



COVER THICKNESS vs MOISTURE %





R - VALUE DATA SHEET

PROJECT No. 45567

DATE: 11/15/2019

BORING NO. B-3 @ 0'-5'

Downey

DYAL 19-020 / 2019-11

SAMPLE DESCRIPTION: Brown Silty Fine Sand

R-VALUE TESTING DATA CA TEST 301			
	SPECIMEN ID		
	a	b	c
Mold ID Number	16	17	18
Water added, grams	75	80	67
Initial Test Water, %	12.1	12.6	11.3
Compact Gage Pressure, psi	350	350	350
Exudation Pressure, psi	273	145	510
Height Sample, Inches	2.53	2.53	2.50
Gross Weight Mold, grams	3031	3026	3028
Tare Weight Mold, grams	1946	1940	1955
Sample Wet Weight, grams	1085	1086	1073
Expansion, Inches x 10exp-4	23	15	24
Stability 2,000 lbs (160psi)	19 / 35	24 / 43	17 / 29
Turns Displacement	4.83	5.08	4.56
R-Value Uncorrected	65	57	71
R-Value Corrected	65	57	71
Dry Density, pcf	115.9	115.5	116.9

DESIGN CALCULATION DATA

Traffic Index	Assumed:	4.0	4.0	4.0
G.E. by Stability		0.36	0.44	0.30
G. E. by Expansion		0.77	0.50	0.80

Equilibrium R-Value		55 by EXPANSION	Examined & Checked: 11 /15/ 19 <
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The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301.



R-VALUE GRAPHICAL PRESENTATION

PROJECT NO.

45567

DATE:

11 /15/ 19

BORING NO.

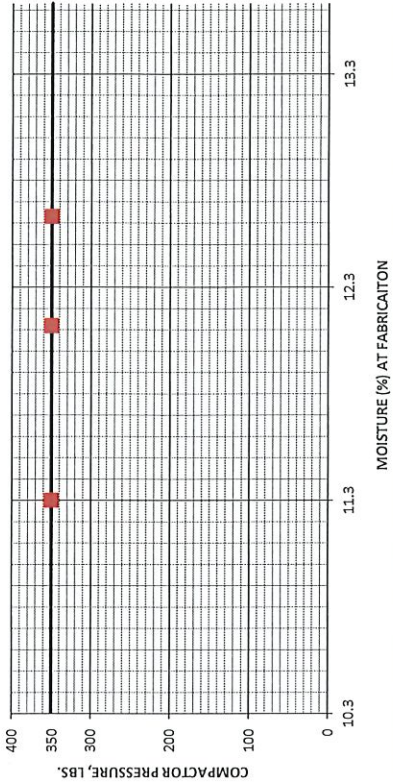
B-3 @ 0'-5'

Downey

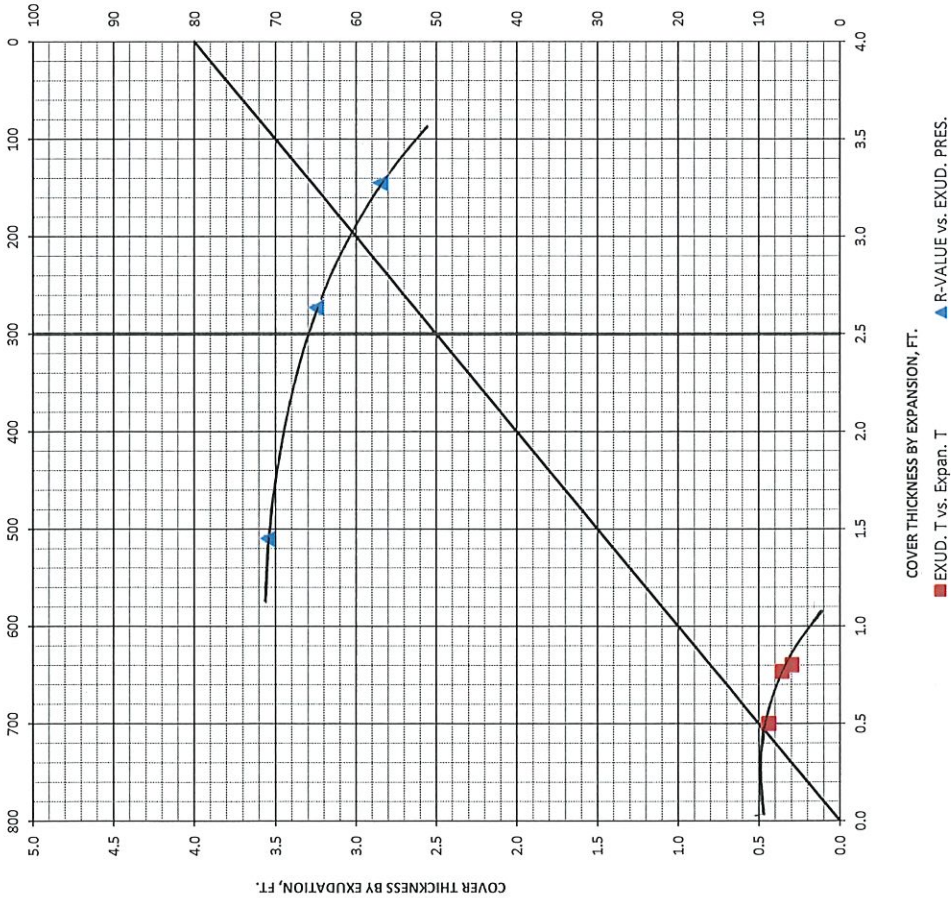
DYAL 19-020 / 2019-11

REMARKS:

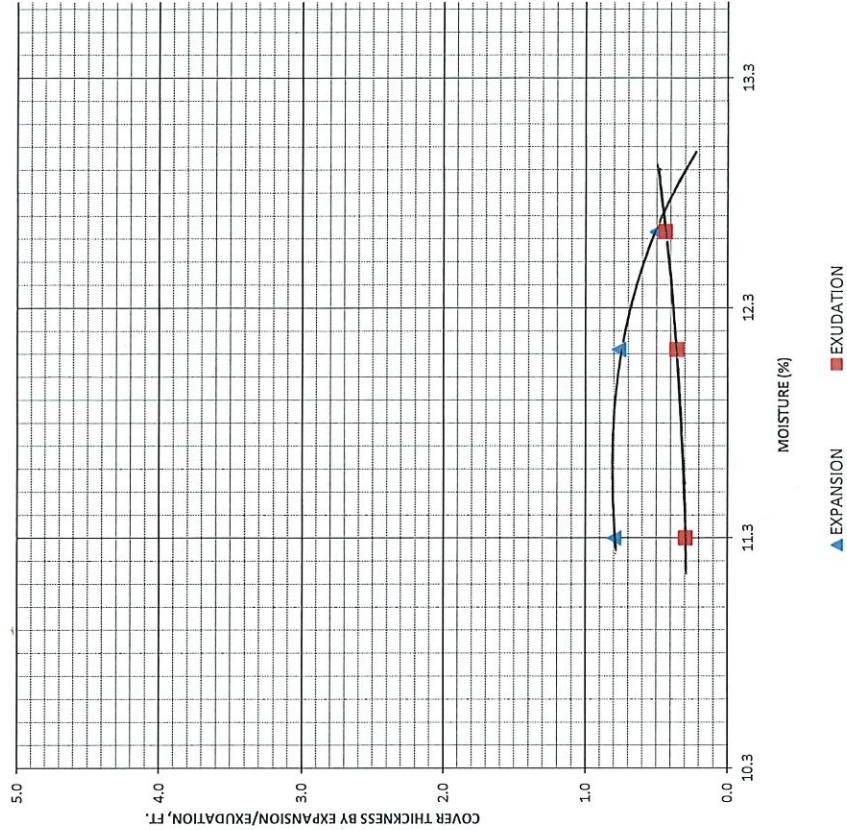
COMPACTOR PRESSURE vs MOISTURE %



COVER THICKNESS BY EXUDATION vs COVER THICKNESS BY EXPANSION



COVER THICKNESS vs MOISTURE %





R - VALUE DATA SHEET

PROJECT No. 45567

DATE: 11/15/2019

BORING NO. B-4 @ 0'-5'

Downey

DYAL 19-020 / 2019-11

SAMPLE DESCRIPTION: Brown Gravelly Slightly Silty Sand

R-VALUE TESTING DATA CA TEST 301			
	SPECIMEN ID		
	a	b	c
Mold ID Number	4	5	6
Water added, grams	60	55	70
Initial Test Water, %	10.3	9.8	11.2
Compact Gage Pressure, psi	350	350	350
Exudation Pressure, psi	491	684	230
Height Sample, Inches	2.58	2.59	2.56
Gross Weight Mold, grams	3103	3089	3108
Tare Weight Mold, grams	1957	1944	1955
Sample Wet Weight, grams	1146	1145	1153
Expansion, Inches x 10exp-4	0	2	0
Stability 2,000 lbs (160psi)	12 / 20	10 / 18	14 / 23
Turns Displacement	4.42	4.37	4.47
R-Value Uncorrected	80	82	77
R-Value Corrected	81	83	78
Dry Density, pcf	122.1	122.0	122.7

DESIGN CALCULATION DATA

Traffic Index	Assumed:	4.0	4.0	4.0
G.E. by Stability		0.19	0.17	0.23
G. E. by Expansion		0.00	0.07	0.00

Equilibrium R-Value		78 by EXUDATION	Examined & Checked: 11 /15/ 19 <
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The data above is based upon processing and testing samples as received from the field. Test procedures in accordance with latest revisions to Department of Transportation, State of California, Materials & Research Test Method No. 301.



R-VALUE GRAPHICAL PRESENTATION

PROJECT NO.

45567

DATE:

11 /15/ 19

BORING NO.

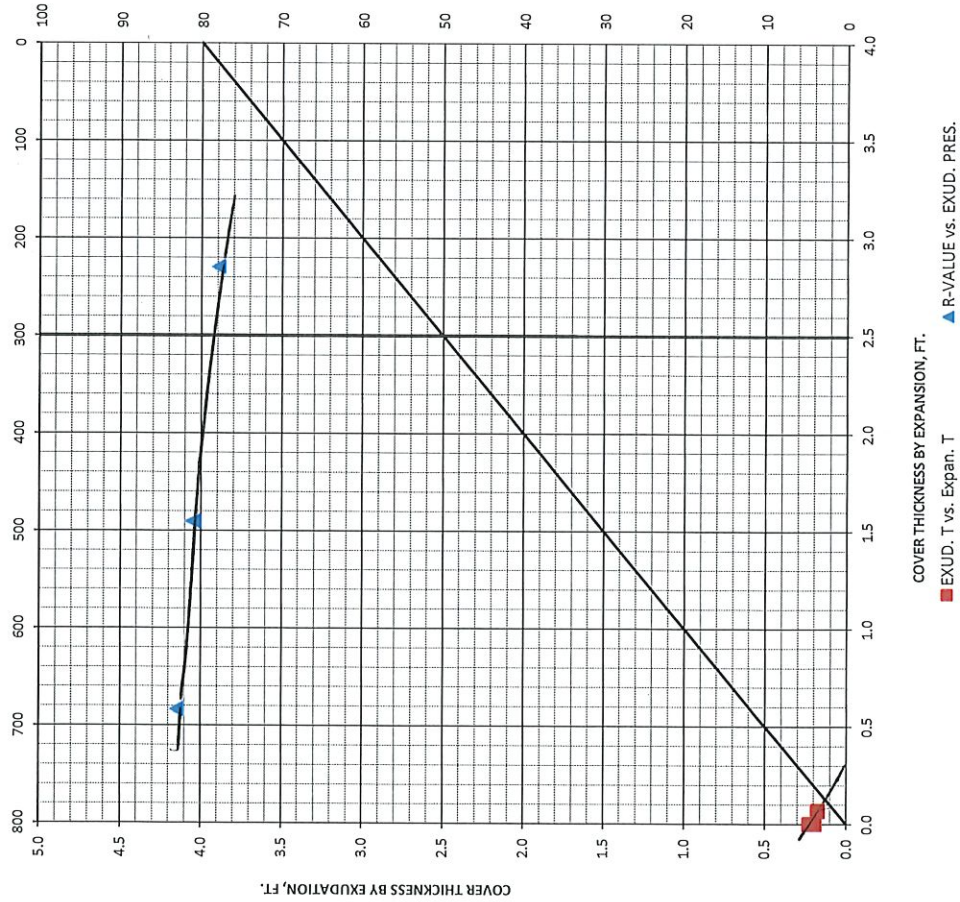
B-4 @ 0'-5'

Downey

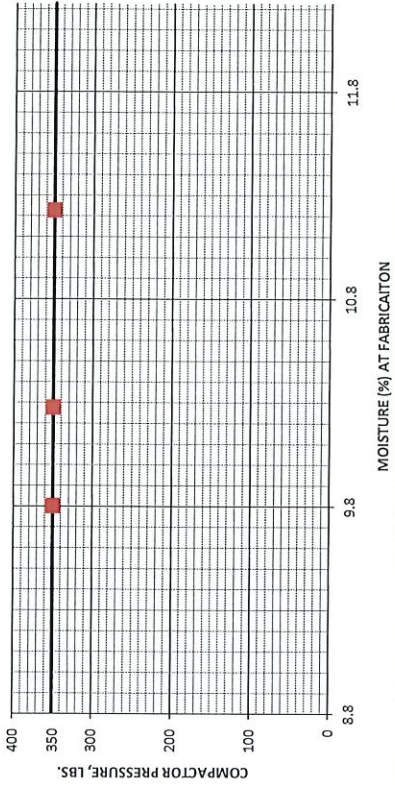
DYAL 19-020 / 2019-11

REMARKS:

COVER THICKNESS BY EXUDATION vs COVER THICKNESS BY EXPANSION



COMPACTOR PRESSURE vs MOISTURE %



COVER THICKNESS vs MOISTURE %

