

DIAZ • YOURMAN

& ASSOCIATES

Geotechnical Services

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).

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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.

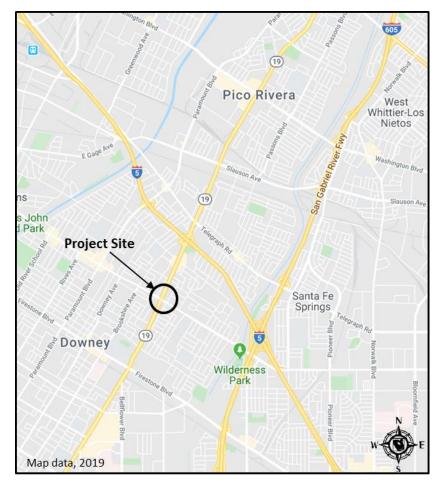


Figure 1 - VICINITY MAP

## 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

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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 revaluated 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 both 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.



		Α	C/PCC	В	ASE	
ID	LOCATION	Туре	Thickness (inches)	Description Type	Thickness (inches)	SUBGRADE
B-1 <sup>1</sup>	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 <sup>2</sup>	AB	6	Silty sand
C-4	Departure (#1 Lane) NB on Lakewood Blvd	AC	10/20 <sup>2</sup>	No Base		
C-5	Approach (#3 Lane) SB on Lakewood Blvd	AC	10/8 <sup>2</sup>	AB	$2^2$	Silty sand
C-6	Approach (#1 Lane) SB on Lakewood Blvd	AC	7/16 <sup>2</sup>	No Base		
C-7	Approach (#3 Lane) EB on Florence Ave	PCC	8.5/10 <sup>2</sup>	AB	$6^2$	Silty sand with grave
C-8	Departure (#1 Lane) SB on Lakewood Blvd	AC	7.5		Not Investigated	

# Table 1 - EXISTING PAVEMENT SECTIONS

Note(s):

1. Depth of exploration was terminated at 1.5 feet because of very dense drilling condition. The CTB section could be thicker than one inch.

2. Based on the investigation on January 13, 2020. These corings were performed next to the original coring locations.

• 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.



	Bond Br	RCP Course eaker (BB) ourse (LCB/HMA-A/AB) se Course (AS) ent Soil	Total Pavement Section			
		MINIMUM THICK	NESS (inches)			
	Florence Avenue	e and Lakewood Boulevard, So	uth Coast, Type II Subgrade Soil, TI =11.5			
		Caltrans Design Method		AASHTO Design Method		
COURSE	JPCP <sup>1</sup>	JPCP	$CRCP^2$	AASH I O Design Method		
JPCP	10.5	10.5		11		
CRCP			9.5			
BB <sup>3</sup>	yes					
HMA-A <sup>4</sup>		3.0	3.0			
$AB^5$				7		
LCB <sup>6</sup>	4.5					
$AS^7$	7.5	7.5	7.0			
Basement Soil <sup>8</sup>	, 10					

Notes:

1. JPCP = jointed plain concrete pavement. JPCP should satisfy the requirements of Section 40 (Caltrans, 2018b); JPCP are doweled.

2. CRCP = continuously reinforced concrete pavement should satisfy the requirements of Section 40 (Caltrans, 2018b).

3. BB = bond breaker. BB should be in accordance with Section 36-2 (Caltrans, 2018b).

4. HMA-A = HMA-A should satisfy the requirements of Section 39 (Caltrans, 2018b).

5. AB = Aggregate Base Course; Class 2 aggregate base in accordance Section 26 (Caltrans, 2018b); or crushed aggregate base (CAB) or crushed miscellaneous base (CMB) in accordance with Greenbook Sections 200-2.2 and 200-2.4 (Building News, 2018), respectively. The minimum relative compaction is 95%.

6. LCB = lean concrete base. LCB should satisfy the requirements of Section 28 (Caltrans, 2018b).

7. AS = Class 2 aggregate subbase. AS should satisfy the requirements of Section 26 (Caltrans, 2018b). The minimum relative compaction is 95%.

8. Basement soils compacted to a minimum of 95% relative compaction.

• Based on existing borings information from others study, current R-values test results and type of soils, subsurface soils are judged to be Type II soil.

# 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 compaction<sup>1</sup>.

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.

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

## Table 2 - IMPORT FILL CRITERIA

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<sup>&</sup>lt;sup>1</sup> 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.

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

## Table 3 - CORROSION POTENTIAL

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. Niranjanan, PE, GE Geotechnical Engineer

BH/SN:dr

Attachment 1: Existing Data

Attachment 2: Boring Logs

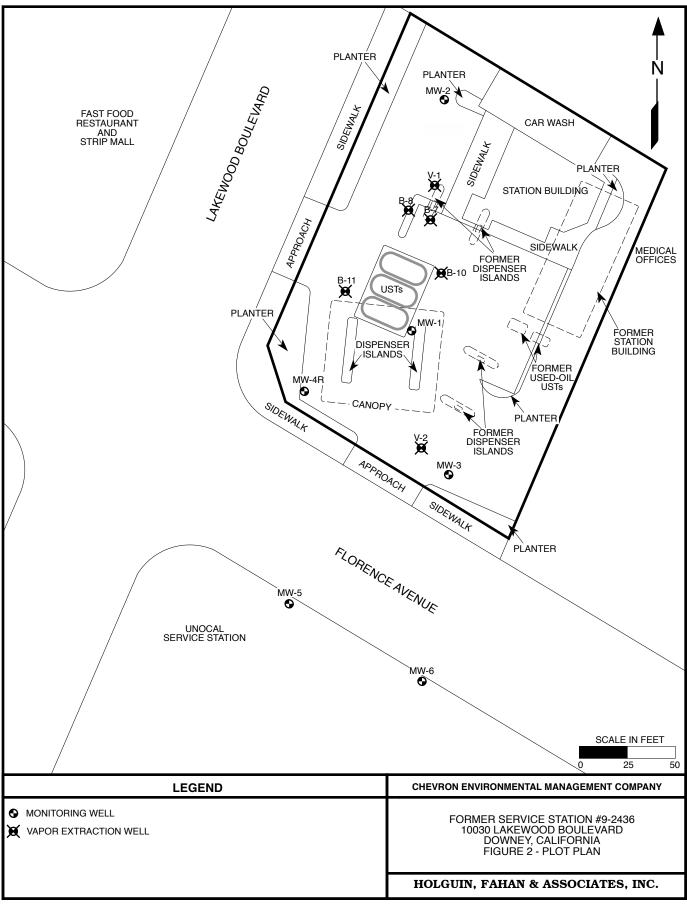
Attachment 3: Laboratory Testing



# **ATTACHMENT 1**

# EXISTING DATA





REVISION DATE: OCTOBER 7, 2009: MIR

SA	MPLE	CLIENT: Chevron Environmental Management Company				COMPLETION DETAIL	
		PROJECT: Former Service Station #9-2436	BLOWS PER 6 INCHES		(0	X VADOSE WELL SPARGE WELL	
INTERVAL	DEPTH (fbg)	LOCATION: 10030 Lakewood Boulevard, Downey, California		DID (hundd)	uscs	BORING	
NTE	DEF (ft	DESCRIPTION AND SOIL CLASSIFICATION	BI		_	CASING: <u>2" Sch 40 PVC</u> SLOT SIZE: 0.02	
-		NAME: %gravel/sand/fines, gradation/plasticity, color, angularity, maximum size (gravels), density/consistency, moisture, stain				FILTER PACK: #3 sand	
	— 0	4" Concrete					
		SILT: 0/0/100, nonplastic, light brown, moist, no stain.			ML		
	<u> </u>			0		5	
	_						
			9,10,10	0			
		SANDY SILT: 0/15/85, poorly graded, light brown,					
	— 15	fine-grained sand, very stiff, moist, no stain.	7,8,10	0		— 15	
	— 20	0/20/80	770	0		- 20	
			7,7,8	0			
$\bigtriangledown$	- 25						
μ							
		SAND: 0/100/0, poorly graded, light gray, fine grained,			SP		
		medium dense, moist, no stain.			0.		
	— — 30						
	30		12,14,16	0			
	- 35					35	
<u> </u>		METHOD: LAR 8" Hollow Stem Auger		LED: Apr		07	
		rype: Split Spoon		BY: Jeff N	-		
		RING DEPTH: 60 fbg	APPROVED BY: James Haslett, PG #5641 DRILLED BY: Cascade Drilling, Inc.				
		WATER: Not encountered		or: Casca	de Drillir		
-		_ HOLGUIN, _ FAHAN & I OG OF FYPI		ם עםר		_ V-1	
		ASSOCIATES, INC.	UNAIC			Page 1 of 2	

SAMPLE		CLIENT: Chevron Environmental Management Company	~			COMPLETION DETAIL	
		PROJECT: Former Service Station #9-2436	6 INCHES	2	0	X VADOSE WELL SPARGE WELL	
INTERVAL	DEPTH (fbg)	LOCATION: 10030 Lakewood Boulevard, Downey, California	6 INC	DID (vmqq)	nscs		
INTE	D⊟ E	DESCRIPTION AND SOIL CLASSIFICATION	B			CASING: <u>2" Sch 40 PVC</u> SLOT SIZE: 0.02	
		NAME: %gravel/sand/fines, gradation/plasticity, color, angularity, maximum size (gravels), density/consistency, moisture, stain				FILTER PACK: #3 sand	
			13,15,17			35	
			10,10,17				
		CLAY: 0/0/100, medium plasticity, light gray, hard, moist, no stain.	10.00.01	100	CL		
	<u> </u>	SILT: 0/0/100, low plasticity, brown, hard,	18,20,21	122	ML	40 E	
		moist, olive green stain.					
		SAND: 0/100/0, well graded, gray, fine to coarse grained,			SW		
	<u> </u>	dense, moist, no stain	18,20,21	0			
		GRAVELLY SAND: 15/85/0, subangular, gravel up to					
	— 50	2" diameter	18,20,21	0		50	
	55	SAND with GRAVEL: 5/95/0, subangular, gravel up to 1" diameter	18,20,21	0			
		SAND: 0/100/0, fine to medium grained					
	60	SAND. 0/100/0, line to medium grained	18,20,21	0			
		Boring terminated at 60 fbg				60	
	65					- 65	
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	—70					- 70	
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		rype: Split Spoon		BY: Jeff N	-		
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		ASSOCIATES, INC.				Page 2 of 2	

SA	AMPLE	CLIENT: Chevron Environmental Management Company	E.a			COMPLETION DETAIL	
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INTERVAL	DEPTH (fbg)	LOCATION: 10030 Lakewood Boulevard, Downey, California		Idd)	nscs	BORING CASING: 2" Sch 40 PVC	
INTE	E E	DESCRIPTION AND SOIL CLASSIFICATION				CASING: <u>2" Sch 40 PVC</u> SLOT SIZE: 0.02	
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	0	4" Concrete					
		SILT: 0/0/100, nonplastic, light brown, moist, no stain			ML		
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	<u> </u>	SANDY SILT: 0/15/85, poorly graded, fine-grained sand,					
	— 15	very stiff	9,10,12	0			
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	<u> </u>	CLAYEY SILT: 0/0/100, low plasticity, gray, moist, hydrocarbon odor, dark gray stain	10,12,14	116		<u> </u>	
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	25	SILTY SAND: 0/70/30, poorly graded, light brown,			014		
		fine-grained sand, medium dense, moist, no stain	8,10,2	0	SM		
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	<u> </u>						
		SAND: 0/100/0, poorly graded, light brown,					
	— 30	fine to medium grained, very dense, moist, no stain	32, 50	0	SP	30	
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	- 35		50 (6")			35	
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SA	MPLER	TYPE: Split Spoon	LOGGED BY: Jeff Nobriga				
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SA	MPLE	CLIENT: Chevron Environmental Management Company				COMPLETION DETAIL	
		PROJECT: Former Service Station #9-2436	BLOWS PER 6 INCHES	25		X VADOSE WELL SPARGE WELL	
<b>3VAL</b>	g)	LOCATION: 10030 Lakewood Boulevard, Downey, California	INC	(hundd) DIA	nscs	BORING	
INTERVAL	DEPTH (fbg)	DESCRIPTION AND SOIL CLASSIFICATION	BL			CASING: <u>2" Sch 40 PVC</u> SLOT SIZE: 0.02	
=		NAME: %gravel/sand/fines, gradation/plasticity, color, angularity, maximum size (gravels), density/consistency, moisture, stain				SLOT SIZE: 0.02 FILTER PACK: #3 sand	
	- 35					35	
		SILTY CLAY WITH SAND: 0/5/95, low plasticity, light			CL		
		gray, fine grain sand, hard, moist, no stain.					
		SILT: 0/0/100, low plasticity, brown, hard, moist, green					
	— — 40	stain.	16,22,33	145			
	— 40 —	SAND: 0/100/0, well graded, brown, fine to coarse					
		grained, hard, moist, no stain.					
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		fine to readium avaired	14,16,21	0			
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		Boring terminated at 60 fbg.					
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		TYPE: Split Spoon	LOGGED BY: Jeff Nobriga				
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					13					
					1.5					
			]		14					T (ML); olive brown, very fine grained, poorly
Blank	Sch.	damp	3.1	20	<sub>1</sub>			ML		nd toughness, yellow-orange oxidation stains,
40 PVC				1	15	1			no plasticity, 10% clay	
rv <u>C</u>						╎	ليقيقيها	1	<u>_</u>	4
		1			16					
					-	++				
		1			17	+				
					-	++				· · · · · · · · · · · · · · · · · · ·
			1		18	┼─┼				
			1		-	++		1		
					19	<u>+</u>	m	1		
		domen	0.7	23	-	+		ML	CANDY CILT (MAL) - 4	ark brown, very fine grained, poorly graded, low
		damp	0./	23	20	-			strength and toughness	
					-	$\mu\mu\mu$	ШШ		Suchgun and toughness	, JU /0 Salia, JU /0 Shi
		1		1	21	┥──┦		ł	L	
								ł		
		1	l	1	22			<u> </u>	L	

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Γ	$\overline{\wedge}$		Project N		C20435908-1			Client		ConocoPhillips		Well/Boring No: MW-2
			Logged E Driller:		Jozi del A Cascade I			Location: Date Drilled:		10208 S. Lakewood Blvd., Do 1/8/2006	wney, CA Location Map	Page 2 of 4
D	ELT	A	Drilling I		HSA CME				lole Diar		See Figure for	horin GEOL
Environmental		ental	Sampling		Split Spoon				lole Dep		See Figure to	S No
	Consultants		Casing T		Sch 40 P	vc	C Well Diameter:		Diameter	: 4"		AN BADIEL S
	Incorporated		Slot Size:		0.02"			Well Depth:		80.5' bgs		JALIL JAY BADIEL
			Gravel Pa		#3 Monterey				g Stickup			JALIL NO. 6744
				Elevation	Nor			thing		Easting		EXP D
We	ll Completior	1			u ()		Sar	nple	0		L	TEOF CALL
fill	Casing Backfill	Water	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	oth et)		1	Soil Type	ттт		/ DESCRIPTION
Backfill	Cas	Level	Aois Con	PID Readinį (ppm)	net	Depth (feet)	Recovery	Interval	, lio		norogi	/ DESCRIPTION
۵ ۵	<u> </u>		20	<u>нч</u>	Pe (t		Re	In				
						23						
						_						
						24				SILTY SAND (SP): oli	ve brown, verv	fine grained, poorly graded, low
	-		damp	7.3	28				SP			orange oxidation stains, 10% silt,
						25				90% sand		
			ļ			26						
								ļ				
						27						
	- 10											
						28	1			·····		
	Ben	ntonite				29						
		мt 				<i></i>						very fine grained, poorly graded,
			damp	10.1	37	30			ML			ninations, reddish brown root-
	- 12	_						ШШ		like organics, 30% sand	1, 70% siit	
						31				1	,,	
	-					32						
						52						
						33	<b>_</b>				instrum transmission and an advance of the second	ke evrekkon aktor men ar man aktor kanna kanna in an antar an
	-	_										
						34				SILTY SAND (SP): bro	wn and olive	brown mixed, very fine grained,
	-	-	damp	3.1	32				SP			iness, slight yellow-orange
			Î,			35				oxidation stains, 10% s		
						36						······································
	-					-						la Anna ann an ann ann an ann an ann an ann an a
						37				adama.com/wd		
	-					-	+			******		
						38	1					ייינער איז
						39						· · · · · · · · · · · · · · · · · · ·
	-		_			- <sup>-</sup>		_				nedium grained, poorly graded,
	Blai 40	uksch.	damp	1.7	27	40	-		SP	low strength and tought 10% silt, 90% sand	ness, slight yel	low-orange oxidation stains,
	40 PV(	-				-	1990	19989		1070 Sill, 9070 Salla		
		·				41	-					
	-		1			42						
						-						anna a an
						43						
	-					-	+	<u> </u>				
						44						

	A		Project N	ío:	C204359	08-1		Client	;	ConocoPhillips	Well/Boring No: MW-2	
			Logged E		Jozi del A			Locati		10208 S. Lakewood Blvd., Do	owney, CA Page 3 of 4	
	LTA		Driller:		Cascade	-			Drilled:	1/8/2006	Location Map ONAL GEO	
			Drilling 1		HSA CME				lole Dian		See Figures for boring locations	
	vironme		Sampling Casing T		Split Spo Sch 40 P				lole Dept Diameter			
	Consultants Incorporated		Slot Size		0.02"	vC		Well I				
	roorpord		Gravel Pa		#3 Monterey		Casing Stickup:				A NO. 6744	
				Elevation			North		Ì	Easting	EXP 12-15	
L							~	1				
1	Completion		ure at	- <u>1</u>	Penetration (blows/ft)			nple	pe		COFCALL	
kfil	Casing 3ackfill	Water	Moisture Content	PID Reading (ppm)	strat WS/	Depth (feet)	Ver	rval	Soil Type	LIT	HOLOGY / DESCRIPTION	
Backfill	Casing Backfill	Level	Co Wo	Re (F	benetration (blows/ft)		Recovery	Interval	Soi			
	Denton	ite	damp	0.9	31		lím	min	ML	SANDV SILT (ML): de	ark gray, very fine grained, poorly graded, low	
	Grout		uamp	0.9	51	45			14117		minor laminations, 30% sand, 70% silt	
						-		чш		<u></u>		
	Benton	ite				46				*****		
						47						
						· · · · · · · · · · · · · · · · · · ·	ļ					
	84					48	ļ					
	Blank											
	<u>Sch.</u> 40					49				·····		
	PVC		damp	31.8	27				SP	SAND (SP); gray, medi	ium grained, poorly graded, low strenght and	
					1	50					odor coming from boring, 100% sand	
						51	ļ					
						- <sup>51</sup>	ļ					
						52	<u> </u>					
	$\exists$ –									·····		
	0.020" Screen					53						
						-						
						54						
			damp	11.3	28	55			SP		ium grained, poorly graded, low stength and	
										toughness, trace subrou	inded gravel, <1% gravel, 100% sand	
	Ξ					56						
						-	+					
						57	+		1.11			
						58				·····		
	<b>=</b> #3-											
	Mont	erey				59	<u> </u>	સ્વતાન				
	Sand			28.9	21		9999		SP	CAND (CD), and mod	ium grained, poorly graded, low strength and	
			moist	28.9	21	60			or	toughness, 100% sand	ium grained, poorty graded, tow sitelight and	
		$\nabla Z$	Ground water at			-	1999	99999		Couginicss, 10070 suite		
			61' bgs			61				·····		
						62						
						- 02						
	8					63	ļ					
						-						
	EII					64						
			wet	40.1	37	-			SP	SAND (SP); gray, med	ium with some fine and coarse grained,	
	<b>H</b>				- '	65	1			poorly graded, low stre	ngth and toughness, 100% sand	
						66						
	Ħ			<u> </u>	<u> </u>			<u> </u>				

	Project No:	C204359	08-1	Client	3	ConocoPhillips Well/Boring No: MW-2
1	Logged By:	Jozi del	-	Locati	ion:	10208 S. Lakewood Blvd., Downey, CA Page 4 of 4
	Driller:	Cascade			Drilled:	1/8/2006 Location Map meter: 10" See Figure to both the footballing
	Drilling Method:	HSA CM			Iole Diar	
	Sampling Method: Casing Type:	Split Spo Sch 40 F			Iole Dep Diameter	
	Slot Size:	0,02"	, C		Depth:	ALL IN BADIEL IG
	Gravel Pack:	#3 Mont	erey		g Stickuj	
	Elevatio		T	Northing		Easting Q NO. 017
Well Completion	······	l e _		Sample		EXP-SEC
	Moisture Content PID Reading	Penetration (blows/ft)	4 <del>.</del>	1	Soil Type	COFCAL
Backfill Casing Fevel Backfill Fevel	oistu onter PID eadir	netration of the second	Depth (feet)	Recovery Interval	ii T	LITHOLOGY / DESCRIPTION
	ZO Z,	[b]		Recovery Interval	Š	
			67			
			68			
#3 Monterey			69			CDAVELLY CAND (CW), and heaven medium to your access
Sand	wet 30.7	32			SW	GRAVELLY SAND (SW); grayish brown, medium to very coarse grained, well graded, low strength and toughness, subrounded,
			70			pitted, gravel up to 20mm in diameter, a few silty clay lenses about
			71			10-20mm in diameter and 5mm thick, 10% gravel, 90% sand
			-			
			72			
			73	<u> </u>		
			74			
			/4			N Y
0.020"	un 10	-	75		-	No recovery
Screen			76			
			77			
			78			
			79			
			<sup>//</sup> _			GRAVELLY SAND (SW); grayish brown, medium to very coarse
End Cap	wet 15.7	38	80		SW	grained, well graded, low strength and toughness, subrounded,
						smooth, gravel up to 15mm in diameter, 10% gravel, 90% sand Boring terminated at 80.5 feet below ground surface (bgs).
	-		81			Groundwater was encountered at 61 feet bgs.
			82			
			-		2	
			83			1
			84			
			-			
- execution and a contract of the contract of			85			
			86			
				<u>                                      </u>		
a ha a march a			87			
			88			
			J			

	Project N	lo:	C204359	08-1	Clien	t:	ConocoPhillips Well/Boring No: MW-3
	Logged I		Jozi del A	ngel	Locat	tion:	10208 S. Lakewood Blvd., Downey, CA Page 1 of 4
	Driller:	-	Cascade I	-	Date	Drilled:	1/8/2006 Location Map
DELTA	Drilling	Method:	HSA CME		Borel	Hole Dia	imeter: 10" See Figure Conditing Seations
Environmenta	Samplin	g Method:	Split Spo	on	Borel	Hole Dep	pth: 80.5' bgs
Consultants	Casing T	ype:	Sch 40 P	VC	Well	Diameter	r: 4"
Incorporated	Slot Size	:	0.02"		Well	Depth:	78.5' bgs Q JALIL JAY BADIEI
	Gravel P	ack:	#3 Monte	rey	Casir	ng Sticku	np: 1.5' AC NO. 6744
		Elevation			Northing		
		T			1~ .		OS EXP.
Well Completion	ى ت	PID Reading (ppm)	E A		Sample	e	OF CALIFOR
E 알린 Wa	ter 1 1	m) ad	rati vs/f	Depth (feet)	ज्ञ दे	L <u>y</u>	LITHOLOGY / DESCRIPTION
Ma Backfill Backfill Backfill IIem Backfill	Moisture Content	) Readi (ppm)	Penetration (blows/ft)	Depth (feet)	Recovery Interval	Soil Type	LITHOLOGI / DESCRIPTION
m <u>o</u> m <sub>well</sub>		L III	Pe 6		Int	Ň	
Box		1	1	ļ		1	
						-	
				1		-	
				-	<u> </u>		Air Knife to 7 feet
				2		-	
						1	
				3		1	
						1	
				4		-	
					<b> </b>	ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low
				5		1	strength and toughness, slight yellow-orange oxidation stains
						4	1
				6	1 1	1	4
						1	
Bentopite				/		1	
						1	
		1		8		-	
						1	
				9		1	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low
	damp	0.3	15			ML	strength and toughness, slight yellow-orange oxidation stains,
				10	1		50% sand, 50% silt
					Π	1	
				11			
				12			\$
				12			· · · · · · · · · · · · · · · · · · ·
				12			
				13		]	
			l	14		1	
				· · · · · · · · · · · · · · · · · · ·			SANDY SILT (ML); olive brown, very fine grained, poorly graded, low
BlankSch.	damp	1.7	21	15		ML	
40 PV <u>C</u>				1			brown calcification nodules, 40% sand, 60% silt
		1		16		1	
				<b>_</b>		1	
		1		17	<b></b>		
				<sup>1</sup> _	<u>                                     </u>	4	· · · · · · · · · · · · · · · · · · ·
				18	<u> </u>	4	······
	ĺ			<u> </u>	ļ	4	
				19	<u> </u>	4	
			1	l~			SANDY SILT (SM); olive brown, medium grained, poorly graded, low
	damp	21.3	23	20		SP	strength and toughness, slight yellow-orange oxidation stains
				<u> </u>		4	15% silt, 85% sand
				21	<u>                                      </u>	_	
					ļļ	4	
				22			1

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	
Driller Cascade Drilling Date Drilled 1/8/2006 Location Map	
	ð 9
	公
Consultants Casing Type: Sch 40 PVC Well Diameter: 4"	181
Incorporated Slot Size: 0.02" Well Depth: 78.5' bes	
Gravel Pack: #3 Monterey Casing Stickup: 1.5'	
Elevation Northing Easting No. 01/21	1-1
CALEXP	<u>[\$]</u>
Well Completion 2 + 50 E E Sample 2	) V
Backfill       Backfill         Backfill       Backfill         Backfill       Backfill         Moisture       Penetration         Reading       PID         PID       PPID         Reading       PID         PiD       PPID         Reading       PPID         Reading       PPID         Reading       PPID         PiD       PPID      <	TION
Backfill     Backfill       Backfill     B	
m     m     m     m     m       N     N     N     N	
	······································
	madad lar-
damp 2.7 29 25 SM SILTY SAND (SM); olive brown, fine grained, poorly strength and toughness, slight yellow-orange oxidation	graded, iow
damp 2.7 29 25 SM strength and toughness, slight yellow-orange oxidation 35% silt, 65% sand	i siailis,
Bentopite	· · · · · · · · · · · · · · · · · · ·
Grout	
moist 2.1 28 30 SP SAND (SP); brown, medium grained, poorly graded, h	ow strength and
toughness, 100% sand	
SAND (SP); gray, tine grained, poorly graded, low str	ength and
wet 4.9 31 35 SP toughness, 100% sand	
	*
note: this is not a perched water table, rain from a few	days
earlier is working it's way down thrpugh the soil.	
39 SILTY SAND (SM); olive gray, fine grained, poorly g	
Blank Sch. wet 0.3 32 10 SM strength and toughness, dark reddish brown root-like of	
40	
note: this is not a perched water table, rain from a few	days
42 earlier is working it's way down thrpugh the soil.	
	****

	$\wedge$		Project N Logged I		C20435908-1 Jozi del Angel					ConocoPhillips Well/Boring No: MW-3 10208 S. Lakewood Blvd., Downey, CA Page 3 of 4			
			Driller:	зу.	Cascade								
DI	ΕĹΤΑ		Drilling	Method:	HSA CME				ole Dian	1/8/2006 Location Map neter: 10" See Figure for tracking locations			
Er	vironme	ntal	-	g Method:	Split Spo	on	BoreHole Depth: 80.5' bgs						
	Consultants Casing Type: Sch 40 PVC				VC	ν	Vell D	Diameter	4" 78.5' bgs JALIL JAY BADIEI				
1	ncorpora	ted	Slot Size	:	0.02ª		ν	Veil D	)epth:	78.5' bgs JALIL JALI DI MILL			
			Gravel P		#3 Monte				stickup				
ĺ				Elevation			Northin	ng		Easting			
	Completion		6	50	E D		Sam	ple	õ	COFCALIE			
Backfill	Casing Backfill	Water	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Recovery	al	Soil Type	LITHOLOGY / DESCRIPTION			
ack	Cas	Level		D (ea	lov net	e G	l S	Interval	oil	ETHOLOGI / DESCRIPTION			
ñ	Ğщ				Pe Pe		Å.	E	3				
~	Grout	nite	damp	1.7	33	45			SM	SILTY SAND (SM); olive gray, fine grained, poorly graded, low strength			
										and toughness, 35% silt, 65% sand			
	1 📖 🔤					46							
	Bento	bite				<sup>10</sup> _							
	▌▓					47	┟───┟						
							┝──┝						
<b>p</b>						48	$\left  \right $						
	Blank												
	<u>Sch.</u> 40		ļ			49							
	PVC		damp	0.1	29	<u>-</u>			SP	SAND (SP); gray, fine grained, poorly graded, low strength and toughness,			
			1			50				100% sand			
					1			الناط المالية					
						51							
						52	<b></b>						
	<b>=</b> _						<b>↓</b>						
	0.020" Screen			·		53	┥──┤						
	= -												
						54				SAND (SP); light brownish gray, medium and coarse grained, poorly			
			damp	0.3	31	-			SP	graded, low strength and toughness, trace subrounded gravel, <1% gravel,			
		-	r			55				100% sand			
		1				56							
	ΗΓ	]	1			J.							
				1		57	<u> </u>						
	日	-				58							
	#3	1				-							
	Mon Sand					59	+						
		1	moist	0.3	31				SP	SAND (SP); light brownish gray, medium grained, poorly graded, low			
		]	Ground			60				strength and toughness, trace subrounded gravel, <1% gravel, 100% sand			
	EL	1 🗸 -	water at			61							
	Ξ.	1	61' bgs				<u> </u>						
		1				62							
	Ξ. –	-				-	╉──╉						
		4				63	╉═╌┨						
	<b>   </b>   -	4				-	+						
		1	1			64	┼──╁	****		SAND (SW); grayish brown, medium to very coarse grained, moderately			
		1	wet	0.8	39	-			sw	coarse grained, moderately graded, low strength and toughness,			
		1				65				subrounded, <5% gravel, 95% sand			
	<b>B</b> L					66							
	H	1		1					[				

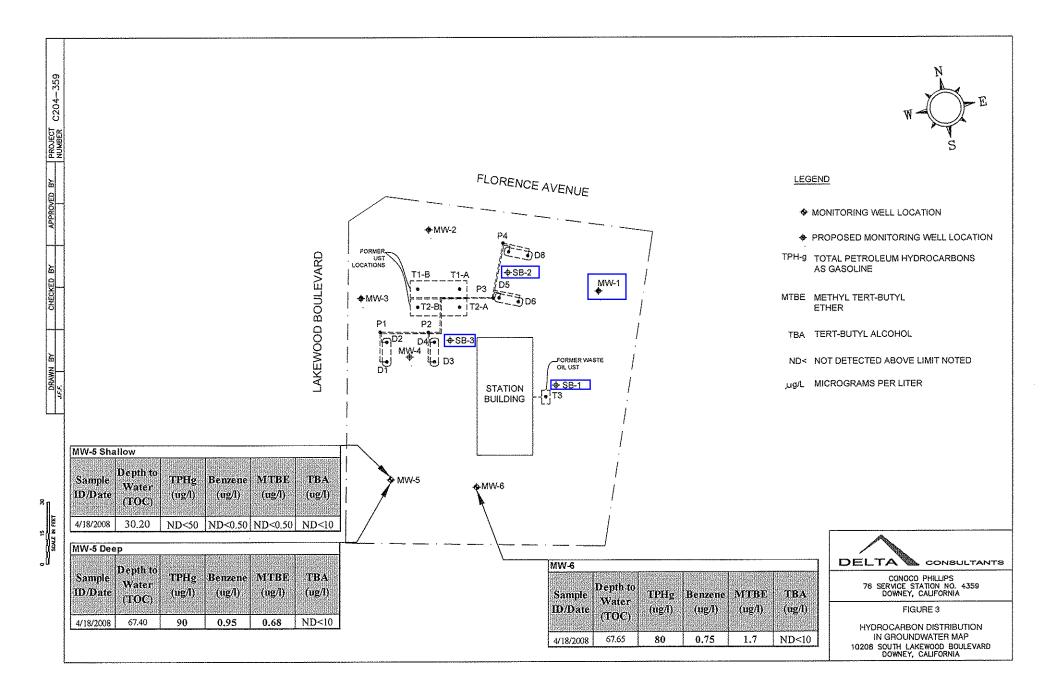
DELTA     Lorates     1008 S Latewood Bird, Deway, CA     Drage of 4       Delta     Clease Drilling Method     Bit Colling Method     Bit Colling Method     Bit Colling Method       Consultants     Sampling Method     Synth Synth     BootAdo Damotes     107       See Size     0.02*     Well Diametes:     1.5*     BootAdo Damotes     See Figure for low Calling Method       Well Completion     1.5*     BootAdo Damotes:     1.5*     BootAdo Damotes:     1.5*       Well Completion     1.5*     BootAdo Damotes:     1.5*     BootAdo Damotes:     1.5*       Well Completion     1.5*     BootAdo Damotes:     1.5*     BootAdo Damotes:     Not Reg       Well Completion     Nationary     Nationary     Nationary     Basting     Delta Signific Basting	1	······		Project 1	lo:	(^)D4950	08-1		Client		ConocoPhillips	Well/Boring No: MW-3
DELLTA     Differ:     Canada Driffing       Driffing Medde:     198.000     Bornhole Dimder:     1000       Consultantia     Site Size:     0.02°     Bornhole Dimder:     78.5 bg       Consultantia     Site Size:     0.02°     Well Comported     15.5       Brendron     Machines     Basing     Dimeter:     4       Well Comported     Brendron     Machines     Basing       Well Comported     Basing     Basing     Dimeter:     4       Well Comported     Basing     Basing     Basing     Dimeter:       Well Comported     Basing     Basing     Basing     Basing												
DELTA       Bunded Bis Cold 73       BortHele Dimenset 10"         Environmental Consultants Incorporated       Sample Monto: \$918 Start Start Simon       Sample Start Simon					y.							
Environmental Consultation Incorporated       Subjective Consultation	D	ELTA		1	Method							
Consultants Incorporated       Casing Syse Site Size (See Pack: 0.02 (See Pack: 0.02 (	Ι ε,	wironmo	ntal									S OPATE GEO
Incorporated       Stratic       0.07       Well Depth:       75 bys       Desing       Jule LL AV BADIE:       No. 6744         Well Completion       If and the strate in the strat					-	• •					-	
Catag Stackup       1.9         Well Completion         Well Completion       Northing       Basting       Colspan="2">Catag Stackup         Well Completion       Water       In the second state of t	1						, C					
Well Completion     Diversity     Diversity <th< td=""><th>  '</th><td>incorpora</td><td>neu</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>-</td><td>JALIL JAY BADIEI</td></th<>	'	incorpora	neu								-	JALIL JAY BADIEI
Well Completion       Water       Bit				Glaverra		#3 14101110	I I I I I I I I I I I I I I I I I I I	North				
High of the second s					Elevation		ĺ	14010	шg		Lusting	
High of the second s	Well	Completion		<u> </u>	1	-		Sar	nnle			- Carpana - Carp
Wet       1.2       37         Same       wet       1.2       37         To       SAND (SW); grayish brown, medium to very coarse grained, well         graded, low strength and toughness, subrounded, <5% gravel,			337	nt	8° ()	(ft)			- 1	/pe		NO DE DE OS
Wet       1.2       37         Same       wet       1.2       37         To       SAND (SW); grayish brown, medium to very coarse grained, well         graded, low strength and toughness, subrounded, <5% gravel,	kfi	sin kfi		istu	l di ig id	tra ws	eet eet	N N	Za	É	LIT	HOLOGY / DESCRIPTION
Wet       1.2       37         Same       wet       1.2       37         To       SAND (SW); grayish brown, medium to very coarse grained, well         graded, low strength and toughness, subrounded, <5% gravel,	3ac	3ac Ca	Level	မို လိ	L 2 0	blo		20	te	50		
Wet       1.2       37         Same       68         69       70         70       70         71       72         73       74         74       73         75       55% sand         76       55% sand         77       73         78       76         78       77         78       78         79       55% gravel         76       75% gravel         77       78         78       79         78       79         78       79         78       70         79       55% gravel         80       81         81       79         78       70         78       70         79       55% gravel         80       81         81       70         78       70         79       55% gravel         81       70         78       70         79       78         81       79         82       70         83 <t< td=""><th></th><td></td><td></td><td></td><td></td><td><u> </u></td><td></td><td>Į Ž</td><td></td><td><b>v</b>.</td><td></td><td></td></t<>						<u> </u>		Į Ž		<b>v</b> .		
Wet       1.2       37         Same       68         69       70         70       70         71       72         73       74         74       73         75       55% sand         76       55% sand         77       73         78       76         78       77         78       78         79       55% gravel         76       75% gravel         77       78         78       79         78       79         78       79         78       70         79       55% gravel         80       81         81       79         78       70         78       70         79       55% gravel         80       81         81       70         78       70         79       55% gravel         81       70         78       70         79       78         81       79         82       70         83 <t< td=""><th></th><td></td><td></td><td>1</td><td></td><td></td><td>67</td><td><u> </u></td><td></td><td></td><td></td><td></td></t<>				1			67	<u> </u>				
Wet       1.2       37       69       37         SAND (SW): grayish brown, medium to very coarse grained, well graded, low strength and toughness, subrounded, <5% gravel, 95% sand					1							
Wet       1.2       37       69       37         SAND (SW): grayish brown, medium to very coarse grained, well graded, low strength and toughness, subrounded, <5% gravel, 95% sand							68					
Summer       wet       1.2       37       70       70		E						1				
Summer       wet       1.2       37       70       70		H				1	60					
wet       1.2       37       70       37       70       37       70       37       37       70       37       37       70       37       37       70       37       37       70       37       37       71       71       71       71       71       72       73       74       73       74       73       74       73       74       73       74       73       74       73       74       74       74       74       74       74       74       74       74       74       74       75       76       76       76       76       76       76       77       76       77       76       77       78       77       78       77       78       <			егеу									
wet       0.9       39       71       72       73         73       74       73       74       74         74       74       74       74       74         74       75       76       76       76         76       76       77       76       77         78       78       78       78       78         78       78       78       78       78         79       SAND (SW); grayish brown, medium to very coarse grained, store subrounded to subangular, gravel is up to 30mm in diameter, 45% sand, 35% gravel       35% gravel         80       80       80       80       80         81       78       78       78         78       78       78       78         79       80       80       80       80         80       80       80       80       80         81       78       78       78       78         82       83       81       77       78         83       81       78       78       78         82       83       81       80       80       80         84       83       81				wet	1.2	37	70			SW		nd toughness, subrounded, <5% gravel,
Wet       0.9       39       72         73       74       73         74       74       74         75       55       55         76       76       77         76       77       78         78       78       78         78       78       78         79       55% gravel       55% gravel         SAND (SW); 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         79       58       58         78       78       78         79       58       58% gravel         78       78       78         79       58       58         79       58       58% gravel         78       78       78         79       58       58% gravel, 95% sand         80       81       81         81       68       82         82       83       84         83       84       85         86       87       86         86       87       87				ĺ			1/0				95% sand	
Wet       0.9       39       72         73       74       73         74       74       74         75       55       55         76       76       77         76       77       78         78       78       78         78       78       78         79       55% gravel       55% gravel         SAND (SW); 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         79       58       58         78       78       78         79       58       58% gravel         78       78       78         79       58       58         79       58       58% gravel         78       78       78         79       58       58% gravel, 95% sand         80       81       81         81       68       82         82       83       84         83       84       85         86       87       86         86       87       87				1			71					····
Wet       0.9       39       72       73         74       73       74       73         74       75       75       76         75       76       76       77         76       76       76       77         77       78       78       78         78       79       78       78         79       78       78       78         79       78       78       78         79       78       78       78         79       78       78       78         78       79       78       78         79       80       80       80       80         80       80       81       80       80         81       80       81       81       81         82       83       84       85       86         86       87       87       84       84         86       87       87       84       84							/1	1				
wet       0.9       39       73       74       73         74       74       74       74       74       74         75       5       5       6       75       5       5         76       76       76       76       76       77       74         76       76       76       76       76       77       74         76       76       76       76       77       74       77       74         76       76       76       76       76       77       74       77       74       77       74       76       77       74       77       76       77       77       77       77       77       77       77       78							-					· .
wet       0.9       39       74       Sweet       SW       SAND (SW); gravish brown, well graded sand         SNDY GRAVEL (GW); gravish brown, medium to very coarse       SAND (SW); gravish 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         Ref       79       SAND (SW); gravish brown, medium to very coarse grained, moderately graded, low strength and toughness, subrounded, <5% gravel, 95% sand							12					
wet       0.9       39       74       Sweet       SW       SAND (SW); gravish brown, well graded sand         SNDY GRAVEL (GW); gravish brown, medium to very coarse       SAND (SW); gravish 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         Ref       79       SAND (SW); gravish brown, medium to very coarse grained, moderately graded, low strength and toughness, subrounded, <5% gravel, 95% sand		$\square$ –					-	1	1		20000000000000000000000000000000000000	
Sevent       wet       0.9       39       75       SW       SAND (SW); grayish brown, well graded sand         SAND (SW); 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         wet       0.1       40       80       SW       SAND (SW); 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         wet       0.1       40       80       SW       SAND (SW); grayish brown, medium to very coarse grained, moderately graded, low strength and toughness, subrounded, <5% gravel						1	73	1				
Sevent       wet       0.9       39       75       SW       SAND (SW); grayish brown, well graded sand         SAND (SW); 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         wet       0.1       40       80       SW       SAND (SW); 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         wet       0.1       40       80       SW       SAND (SW); grayish brown, medium to very coarse grained, moderately graded, low strength and toughness, subrounded, <5% gravel								1				
wet       0.9       39       75       SW       SAND (SW); grayish brown, well graded sand         GW       SANDY GRAVEL (GW); grayish brown, medium to very coarse grained, noderately graded, low strength and toughness, subrounded to subangular, gravel is up to 30mm in diameter, 45% sand, 55% gravel       76       77         Image: Sw       SAND (SW); grayish brown, medium to very coarse grained, 77       78       78         Image: Sw       SAND (SW); grayish brown, medium to very coarse grained, 78       78         Image: Sw       SAND (SW); grayish brown, medium to very coarse grained, 78         Image: Sw       SAND (SW); grayish brown, medium to very coarse grained, 78         Image: Sw       SAND (SW); grayish brown, medium to very coarse grained, 78         Image: Sw       SAND (SW); grayish brown, medium to very coarse grained, 78         Image: Sw       SW         Image: Sw       SAND (SW); grayish brown, medium to very coarse grained, 78         Image: Sw       SW					1		74					
Image: Second system       1/3       Second system       SANDY GRAVEL (GW); grayish brown, medium to very coarse grained, noderately graded, low strength and toughness, subrounded to subangular, gravel is up to 30mm in diameter, 45% sand, 55% gravel         Image: Second system       76       77       78         Image: Second system       78       78       78         Image: Second system       79       SAND (SW); grayish brown, medium to very coarse grained, moderately graded, low strength and toughness, subrounded, <5% gravel		Screen		wet	0.9	39		<b>***</b>		sw	SAND (SW); gravish b	brown, well graded sand
Wet       0.1       40       76       76       76       76       76       77       77       77       77       78       77       78       78       78       78       78       78       78       78       78       78       78       78       78       78       78       78       79       SAND (SW); gravish brown, medium to very coarse grained, moderately graded, low strength and toughness, subrounded, <5% gravel, 95% sand					0.12		75	Ě	1.10	6	SANDY GRAVEL (G	W): gravish brown, medium to very coarse
wet       0.1       40       77       78       55% gravel is up to 30mm in diameter, 45% sand, 55% gravel         78       79       78       79       78       79         79       79       79       79       79       70         SAND (SW); gravish brown, medium to very coarse grained, moderately graded, low strength and toughness, subrounded, correst grained, moderately graded, low strength and toughness, subrounded, correst grained, moderately graded sand       70         81       81       81       81       60         82       83       84       85       86         84       85       86       87       87		$\blacksquare$ –										
Image: Bad Cape       77       78         Yead       79       SAND (SW); gravish brown, medium to very coarse grained, moderately graded, low strength and toughness, subrounded, <5% gravel, 95% sand			-				76	+				
Image: Sweet of the system		$\exists$ –	-						1		L	
wet       0.1       40       79       SW       SW       SAND (SW); gravish brown, medium to very coarse grained, moderately graded, low strength and toughness, subrounded, <5% gravel, 95% sand		$\exists$	ļ	1			77	+				
wet       0.1       40       79       SW       SW       SAND (SW); gravish brown, medium to very coarse grained, moderately graded, low strength and toughness, subrounded, <5% gravel, 95% sand							-	1			·····	
Cop       wet       0.1       40       79							78					
wet       0.1       40       79       SAND (SW); grayish brown, medium to very coarse grained, moderately graded, low strength and toughness, subrounded, <5% gravel, 95% sand		1977 - 1977	-					+		1		
wet       0.1       40       80       SW       moderately graded, low strength and toughness, subrounded,			-				79	- <u> </u>	8888		SAND (SW): gravich b	prown medium to very coarse grained
80       <5% gravel, 95% sand		—			0.1	40	-	-		ew		
81       Boring terminated at 80.5 feet below ground surface (bgs).         670undwater was encountered at 61 feet bgs.         83       83         84       84         85       86         86       87         87       87				wet	0.1	40	80	-888		5W		
61     61       82     82       83     83       84     85       85     86       86     87			1			1	-	_ <u>PXXX</u>	*****	1	No graver, 9570 salu	0.5 feet below ground curface (bgc)
	1		1				81					
	1		-		1					1		rumencu at 01 not 0gs.
	1	<u></u>	-			1	82	+		ł		
			-	1						ł		
			4			1	83	<b>_</b>		ļ		
										-		
			1	Į	1	1	84			1		
	1	*****	-						ļ	-		
		·····	-				85			-		
			4						<u> </u>	1		
		unan and a later	4			1	86	<b>_</b>	<u> </u>	4		
			1				<u> </u>			-	Arr3	
	1		1				87	_	ļ	4		
			1				´´ _		<u> </u>			
			]	1		-	88		_	1		
										<u> </u>		

	Project No: C20435908-1 Client:		ConocoPhillips	Well/Boring No: MW-4							
		•	Logged B		Jozi del A	ngel		ocatie		10208 S. Lakewood Blvd., Do	owney, CA Page 1 of 4
		Ą	Driller:		Cascade I		D	ate D	rilled:	1/9/2006	Location Map
DEL	.ТА		Drilling N		HSA LAR				ole Dian		See Figure for boring locations
Enviro			Sampling		Split Spo				ole Dept	-	ONAL GEON
	sultar		Casing Ty		Sch 40 P	VC			Diameter		637 101
Inco	rpora	ted	Slot Size:		0.02"				epth:	79.5' bgs	14
			Gravel Pa		#3 Monte	геу			stickup		JALIL JAY BADIEI
				Elevation			Northir	ng		Easting	2 No. 6744
Well Come	Tadiana				T		Com	10			
Well Comp			rt c	PID Reading (ppm)	Penetration (blows/ft)		Samp	ne	be		CILEXP. JE
1111 1112 1113	1111	Water	ter	) Readi (ppm)	rati vs/	et bt	CL )	val	Ty	LTT	HOLOGY DESCRIPTION
Backfill Casing Backfill	Well	Level	Moisture Content	a di	benetration (blows/ft)	Depth (feet)	Recovery	Interval	Soil Type		
	Well			IIId	Pe		Re	르ㅣ	S		
	Concre	te									
						_ ····					
						1					
										Air Knife to 7 feet	
						2					
										·	
						3					
					1	4	1 1				
							1 1		ML	SANDY SILT (ML); of	live brown, very fine grained, poorly graded,
						5	1-1-				ness, slight yellow-orange oxidation stains
			1							·	
						6					
					1						
	Bento Grout	nite				/					
						0					
						°					
						, <u> </u>		$\Pi\Pi$			live brown, very fine grained, poorly graded,
			damp	0.3	16	10			ML		ness, slight yellow-orange oxidation stains,
						10				50% sand, 50% silt	
						11					
						11					
						12					
			1			12					
						13					
						1.3					
						14					
					ļ	1-+		$\Pi$			T (ML); olive brown, very fine grained, poorly
	Blank	Seh.	damp	2.8	23	15			ML	graded, low strength ar	nd toughness, slight yellow-orange oxidation
-	40 PVC				1	1.5					ification nodules, no plasticity, 10% clay,
						16				30% sand, 60% silt	
				1		10					
					1	17					
						11/					
			1			18					
						10					
						19					
						17					
		1	damp	1.7	19	20			SP		rown, fine grained, poorly graded, low strengtl
		1				20				and toughness, 10% sil	lt, 90% sand
		]				21.					
		]	ĺ			21					
		1			1	22 -					
CREATER STREET	199 <sup>2</sup> 01	<b>.</b>									

		Project N	0:	C204359	08-1		Client	:	ConocoPhillips Well/Boring No: MW-4
		Logged B	By:	Jozi del A	-		Locati	on:	10208 S. Lakewood Blvd., Downey, CA Page 2 of 4
DELTA		Driller:		Cascade				Drilled:	1/9/2006 Location Map
		Drilling N		HSA LAR				lole Diar	meter: 10" See Figure for bothing locations
Environme		Sampling		Split Spo				lole Dept	th: 80.5' bgs
Consultan		Casing T Slot Size	-	Sch 40 P 0.02"	VC			Diameter	79.5' bgs
Incorpora	teu	Gravel Pa		#3 Monte			Well I	jepui: g Stickuj	79.5' bgs p: 0.5'
		Graver Pa	Elevation	#5 1410110		North	***	g Shekuj	th: 80.5' bgs r: 4" 79.5' bgs p: 0.5' Easting
			Dievation			110101			Easting
Well Completion				E _		San	nple	ø	ALEGECA
	Water	Moisture Content	PID Reading (ppm)	enetration (blows/ft)	<b>4</b> 💬		· 1	Soil Type	
Backfill Casing Backfill	Level	oist	PID teading (ppm)	ow	Depth (feet)	ove	Interval	11 T	LITHOLOGY / DESCRIPTION
		Σü	8	Penetration (blows/ft)		Recovery	Int	So	
				1		<u></u>			
					23				
					24				
		damp	21.3	23	25			SP	SAND (SP); brown, medium grained, poorly graded, low strength
									and toughness, slight yellow-orange oxidation stains, 100% sand
					26				
					27	L			
						Ļ			
					28	<b>_</b>			
						<b> </b>			
Benton Grout	nite				29				
		maint	19.8	29	-	4949		SP	SAND (SP); olive gray, medium grained, poorly graded, low strength
		moist	19.0	29	30	-		or	and toughness, 100% sand
					-	19999			and toughtiess, 100 /8 said
					31	<u>†</u>			
					-	<u> </u>			
			1		32	1			
					33	1			
					33				
					34				
					<u> </u>				CLAYEY SANDY SILT (ML); dark olive gray, very fine grained,
		wet	23.1	33	35			ML	poorly graded, low strength and toughness, slight yellow-orange
						ШШ	ШШ		oxidation stains, abundant dark red root-like organics, no plasticity,
					36	<b>_</b>			minor laminations, 15% clay, 25% sand, 60% silt
					-				notes this is not a manched water table usin for my a form dama and in-
					37	+			note: this is not a perched water table, rain frorm a few days earlier is working it's way down through the soil.
							<b> </b>		is working it's way down unough the soft.
					38				
					-		<b> </b>		
					39				
Blank	2.5	damp	28.7	30				SP	SAND (SP); olive gray, medium grained, poorly graded, low stength
40	9Uh				40				and toughness, 100% sand
PVC					41				
					42	<b>_</b>			
						<b>_</b>	ļ		
		İ			43	<u> </u>	<u> </u>		l
							<u> </u>		
					44		1000		·····
		1	L	1	L			l,	1

	Project N	0:	C204359	08-1	C	lient:		ConocoPhillips		Well/Boring No: MW-4
	Logged B		Jozi del A			ocatio		10208 S. Lakewood Blvd., Do		Page 3 of 4
	Driller:		Cascade I			ate Dr		1/9/2006	Location Map	NAL GEON
	Drilling N		HSA LAR Split Spo				le Dian le Dept	neter: 10" h: 80.5' bgs	Location Map See Figure 10	Dering to carlons
	Environmental         Sampling Method:         Split S           Consultants         Casing Type:         Sch 40						ameter	.н. 00.5 бда	80-1	× ( , ) ?
	<b>U U</b>					Vell De		79.5' bgs	151	LIL JAY BADIEI
	Gravel Pack: #3 Monterey				С	asing	Stickup	): 0.5'	AL SS	NO. 6744
	Elevation No				Northin	thing Easting				EXD. J. A.
Well Completion					Sam	ole			- K	
	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	t t			Type	~ ~~		SOFCAS
Backfill Backfill Backfill Forei	Cont	PID čeadinį (ppm)	low	Depth (feet)	Recovery	Interval	Soil J	LI	HOLOGY	/ DESCRIPTION
ă ă	N C	Å.	Pel (b		Rec	Ē				•
-Grout	damp	50.7	27	45				SAND (SP); light gray,		
					1340		SM			rained, poorly graded, low strength
Bento site				46	┼──┼			and toughness, laminate	a, 10% sill, 9	J% sand
Chips									<u>.</u>	
				47						
				48						
Blank				- 1	╞┈╞					
<u>Sch.</u> 40				49				······		
11111111111111111111111111111111111111	damp	43.8	26				SP	SAND (SP): grav, medi	um and coarse	e grained, poorly graded, low
	p			50				strength and toughness,		<u> </u>
				51					***	
					<u>     </u>					
				52	+					
0.020"					┼──┼				······	
Screen				53	+					
			1	54						
	I.						cn			-in-I and the second set to second the
	damp	13.1	23	55	-		SP			ained, poorly graded, low stength rel, <1% gravel, 100% sand
					100000			una tougimess, auce su	ciounada grai	
				56						
				57						
				- 1				·		
				58	+					
#3					╉┯╋					
Sand			}	59						
	moist	7.8	27	60			SP			lium grained, poorly graded, low
	Ground		1	1				strength and toughness.	, trace subrour	ided gravel, <1% gravel, 100% sand
	water at 61' bgs			61				``		
				-	+			·····		
				62				\		
				63						
				-						
				64	+			CRAVELLY SAND	W). gravich h	prown, medium to very coarse
	wet	1.4	30	-			SW			d toughness, subrounded, gravel
				65				is up to 45mm in diame		
				66					- <u>-</u>	
		<u> </u>	1					<u> </u>		

~	Duniant M		0204250	00.1	Client		ConocoPhillips Well/Boring No: MW-4
	Project No: C20435908-1 Clie Logged By: Jozi del Angel Loca						10208 S. Lakewood Blvd., Downey, CA Page 4 of 4
	Driller:	<i>у</i> ,	Cascade 1			Drilled:	1/9/2006 Location Map
DELTA	Drilling N	dethed.	HSA LAR			Hole Dia	
Environmental	Sampling		Split Spo			iole Dia	
	1					Diameter	
Consultants	Casing T		Sch 40 P	ν¢			
Incorporated	Slot Size		0.02"			Depth:	79.5' bgs
	Gravel Pa		#3 Monte	erey	****	g Sticku	79.5' bgs 0.5' Easting JALIL JAY BADIEI
		Elevation			Northing		Easting 2 JALIL 6744
							Nº ( Users
Well Completion	0	50	t on		Sample	é	a EXP
Backfill Backfill Mater Cassing Forder	Moisture Content	PID Reading (ppm)	enetration (blows/ft)	Depth (feet)	al	Soil Type	
by is y Level	ois	PID eadin ppm	o lett	le le	erv ove	Ē	LITHOLOGY/EDESCRIPTION
Ba D Ba	N Z		Penetration (blows/ft)	- m	Recovery Interval	Š	
		ļ					
		1		67			
				68			
				<sup>**</sup> _			
	1			69			
#3				09			
Momerey	wet	4.9	31			SP	SAND (SW); gray, medium and coarse grained, poorly graded, low
Sand				70	1	1	strength and toughness, 100% sand
	1			-		1	
				71		1	
						ļ	
				72	<u>                                      </u>		
		1			<u> </u>	l .	
				73			
				/ <sup>3</sup>			§
				74			
			1	74			SAND (GW); brownish gray, medium to very coarse grained, well
	wet	1.4	35			SW	graded, low strength and toughness, trace subrounded gravel,
0.020"				75	-10000000000000000000000000000000000000		Source of the second
Screen					<u> possedence</u>	1	
				76		1	
					<u> </u>	4	
				77	<u> </u>	ļ	
		ļ		_	ļ	-	
				78			
				<sup>70</sup> _			5.01/01/
	1			79-		]	
End				'9			SAND (GW); brownish gray, medium to very coarse grained, well
Сар	wet	2	31			SW	graded, low strength and toughness, trace subrounded gravel,
				80	-1000000		So gravel, 95% sand
				-	<u>- pxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx</u>	1	Boring terminated at 80.5 feet below ground surface (bgs).
	1			81		-	
					<u> </u>	-	Groundwater was encountered at 61 feet bgs.
		1		82	<u>   </u>	4	
				_		-	
*****	1	Ì		83		1	
			1				
			1	84		1	
		1		-	1	1	
				85	1	1	
			1	-	+	1	
	1			86		-	
vaamabu				-		4	
				87		4	
			1	· _		1	······································
				88			
August of Armenia P				00	T		



			Project N	0:	C204359	08-1	(	Client:		ConocoPhillips	Boring/Well No: SB-1	
		•	Logged B	iy:	Jozi del A	-		Locati		10208 S. Lakewood Blvd., Do		
	TA		Driller:		Cascade I				villed:	1/5/2007	Location Map	
			Drilling N		CME 75 H				ole Dian		See Figure 2 for portugiorations.	
	ronmei		Sampling		CA Mod.	SS			ole Dept	+		
	nsultan		Casing T		-		Well Diameter: - Well Depth: - Casing Stickup: - Northing Easting					
Inco	orpora	ted	Slot Size:		-			Well I	-	м	AN BAD	
			Gravel Pa				Casing Stickup				J JALL " GTAA S	
				Elevation			North	ing		Easting	JALL NO 6744	
Well Con	npletion		+	പ			Sam	mle			EXP	
Backfill	197001011	Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Recovery	Interval	Soil Type	LIT	HOLOGY / DESCRIPTION	
Concrete										Asphalt		
	ana mana baha mandana ba					1	t t			Air Knife to 7 feet		
								[				
						2						
			1			1 ~	T			***********************		
			1			3						
						4						
						-	1		ML	SANDY SILT (ML); of	live brown, very fine grained, poorly grade	e, low
	uniterent destadore					>				strength and toughness	ann an Anna an	
						6	1			••••••••••••••••••••••••••••••••••••••		
						/						
							1 1					
	sime destructions of					8						
										Annon 1997		
						9		ШП				
	amona ave		damp	17.1	16	10	ТП		ML	SANDY SILT (ML); o	live brown, very fine grained, poorly grade	e, low
te Grout						10				strength and toughness	, 50% sand, 50% silt	
6						11						
						11°						
						12				Constant		
Buntom						14						dan u media disendari dan edar
2			1			13						
						1.5						
		]				14						
						· · -	┟┯┯┥				live brown, very fine grained, poorly grade	
			damp	1.3	22	15	_		ML		, yellow-orange oxidation stains, light brow	wn
					1	<sup>1</sup>	ШЦ	ШЦ		calcification nodules, 4	10% sand, 60% silt	
	-					16	l					
											**************************************	
					1	17						
						-	<b>_</b>					
						18						
		4				19	╇╼╼┥	1.1.3				
		-				_	- 10-1-1				live brown, fine grained, poorly graded, lo	
		4	damp	7.1	23	20	-11		SM		, yellow-orange oxidation stains, 30% silt,	,
		-				-	18E	만한		70% sand		
		-				21				·		
	ananak									·····		
		-				22	╉──┥	┝				
		<u> </u>		<u> </u>			1	I	l	<u> </u>		

	Project N	√o:	C204359	08-1		Client		ConocoPhillips	Boring/Well No: SB-1
	Logged ]	By:	Jozi del A	-		Locati		10208 S. Lakewood Blvd., Do	
DELTA	Driller:		Cascade	_			Drilled:		Location Map See Figure 2 for both de Sations
Environmental	Drilling	Method: g Method:	CME 75 H CA Mod						See Figure 2 for both to sations
Consultants	Casing 1		- CA M00	. 55	BoreHole De Well Diamet			• •	
Incorporated	Slot Size		-			Well I		-	Q JALIL JAY BADIEI
	Gravel P		-				g Stick	up: -	
		Elevation			Northi	ing		Easting	
Well Completion		1	Г		lear	nple			CALEXPL F
	ja ie	a Bu (	Penetration (blows/ft)	4			Soil Type		COFCALLE
Wat Lev Casing fill		PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	ove:	Interval	ii T	LIT	HOLOGY / DESCRIPTION
C as Bao	Ϋ́ Ž O	2 U	(Fen		Recovery	Inte	So		
				22					
				23					
				24	ļ	1		umanau badan baanada aadada dabana buru duru aaraa	
	damma	3.1	31				CN /	CIL TV CANID (CM): or	angent brown fine grained nearly graded low
	damp	5.1	21	25			SIVI		angey brown, fine grained, poorly graded, low orangy red oxidation stains, 20% silt, 80% sand
				-	10.10			strongth and toughtess,	orangy rea oridation stants, 2070 sint, 0070 sand
				26					
				27		<u> </u>			
and the second					<b> </b>	<u> </u>			
				28					
				-	+				
				29				SILTY SAND (SM); br	own, medium grained, poorly graded, low
	damp	0.1	29	30			SM		minor orangey red oxidations stains, 20% silt,
								80% sand	
				31	-	-		ara mana ka maya ka sa sa ka sa ka sa ka sa mana sa	
-									
omite Grout				32		1			
				33	<u> </u>	ļ			
2 —				-		<b> </b>			
				34				SAND (SP): light gravi	sh brown, medium and coarse grained, poorly
	damp	0.7	27				SP		d toughness, minor yellow-orange oxidation
	F			35	-		-		d gravel, <1% gravel, 100% sand
	1			36					
						<b> </b>			
				37		+			
					-			#261/**1*2***	
				38					
				39					
	1			-	10500	-	an		medium and coarse grained, poorly graded,
	damp	3.2	21	40	-		SP	low strength and tough	ness, trace subrounded gravel, <1% gravel,
					1000	10000	1		
	1			41			1		
				42					
				-			4		
				43					
				44	1	1	1		
				44	1		[		

<b>A</b>	Project N	lo:	C204359	08-1		Client	, ,	ConocoPhillips	Boring/Well No: SB-1
	Logged E		Jozi del A			Locati		10208 S. Lakewood Blvd., Do	wney, CA Page 3 of 3
	Driller:		Cascade	Drilling		Date I	Drilled:	1/5/2007	Location Map
	Drilling I	Method:	CME 75 H	ISA		BoreE	lole Dian	neter: 8"	See Figure 2-for boling Deations.
Environmental			CA Mod.	SS		Borel	lole Dept	h: 65.5' bgs	63
Consultants	Casing T	ype:	-			Well I	Diameter	-	141 NO
Incorporated	Slot Size	:	-			Well I	Depth:	-	JALIL JAY BADIEI
	Gravel P	ack:	-			Casin	g Stickup	); <del>~</del>	
		Elevation			North	ning		Easting	( NO. 0744 / e
		1			1				CALEXP. CB
Well Completion	8 ts	50	Penetration (blows/ft)		E .	nple	be		VE CONTROL
Water Level C as: C as:	Moisture Content	PID Reading (ppm)	enetration (blows/ft)	Depth (feet)	Recovery	val	Soil Type	T.T.	HOLOGY DESCRIPTION
Water Level	lo loi	[] [] [] [] [] [] [] [] [] [] [] [] [] [	olo	l a e	S .	Interval	oil	271.1	
й С В		,	Pa E		Re	In	<u>s</u>		
	damp	0.1	43	45			ML		T (ML); olive brown, very fine grained, poorly
					ШЦ				d toughness, no plasticity, no laminations,
and the second se				46	ļ	L		yellow-orange oxidation	n stains, 10% clay, 10% sand, 80% silt
					ļ				
				47	<u> </u>				
				_	<b> </b>				
anareconductor				48	<b> </b>	ļ		******	
				49	<b> </b>	1			
				_	1				T (ML); cont. from 45', olive brown and gray
ana	damp	0.9	19	50	ЩIJ	ļĮĮĮĮ	ML	laminations	· · · · · · · · · · · · · · · · · · ·
							SP		um grained, poorly graded, low strength and
				51		<b>_</b>		toughness, 100% sand	
						Į			
alasta da serente				52					۰.
				-		┼───			
				53	+	<u> </u>			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
atonite Crout					+			······	
				54	1				
	damp	3.8	21			1	SP	SAND (SP); gray, coar	se grained, poorly graded, low strength and
	r			55	-			toughness, 100% sand	
				-	1	1			
				56	T	1			
<b>ä</b> –				57					
				58					······································
						ļ			
		1		59		<b> </b>			
						<b>_</b>	_		
	moist	7.1	22	60		10000	SP		se grained, poorly graded, low strength and
				_			ł	toughness, trace subrou	inded gravel, <1% gravel, 100% sand
				61		<b>_</b>	ļ		
					-		4	poor recovery	
				62			ł		
				-					
		1		63			ł	· · · · · · · · · · · · · · · · · · ·	
				-		+	4		
				64		11111	1	h	
	Ground water at	2.3	31			-	SP	SAND (SP): gray coar	se grained, poorly graded, low stength and
	65' bgs	<i>C.u.</i>		65	-		10	toughness, 100% sand	so framou, poorly fraued, for stongur and
						111111			at 65.5 feet below ground surface (bgs).
				66			1	Ground water was enco	

A	Project N	D'.	C2043590	)8-1	Clie	nt:	ConocoPhillips Boring/Well No: SB-2
	Logged B		Jozi del A		Loc	ation:	10208 S. Lakewood Blvd., Downey, CA Page 1 of 3
	Driller:		Cascade I	Drilling	Dat	e Drilled:	1/4/2007 Location Map
DELTA 🛸	Drilling N	1ethod:	CME 75 H	SA	Bor	eHole Dia	imeter: 8" See Figure 2 for 6 the to sations,
Environmental	Sampling		CA Mod.	SS	Bor	eHole Dej	pth: 50.5' bgs
Consultants	Casing Ty	/pe:	-		We	l Diamete	
Incorporated	Slot Size:		-		We	ll Depth:	- JALIL JAY BADIEI 5
	Gravel Pa	ick;	••		Cas	ing Stickı	
		Elevation		1	lorthing		Easting
			r		~ 1		
Well Completion	t e	PID Reading (ppm)	no E		Sampl	l ă	COF CALLED.
Wate Backfill Leve	Moisture Content	) Readi (ppm)	Penetration (blows/ft)	Depth (feet)	Recovery Interval	Soil Type	LITHOLOGY / DESCRIPTION
ອີ ບິ Leve	G doi:	A (pi	olov	l É D	cov ter	oil	
	20	Пď	Pe		r Re	S	
Concrete							Asphalt
						1	
							Air Knife to 7 feet
handra and a second							
				3			
				3			
				5		_ ML	
							strength and toughness, slight yellow-orange oxidation stains
				6		_	
						_	
				7		<u>.</u>	
				8			
						_	
				9		п	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low
		0.1	00			ml	
	damp	2.1	20	10			50% sand, 50% silt
						Щ	50% said, 50% sid
fe Growt				11			
				12			
Bentoni						-	
	1		1	13			
						-	
				14		Щ	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low
	damp	10.1	23			ML	
	r in the second s			15			brown calcification nodules, 50% sand, 50% silt
_	1					-	
				16			
				17			
				17			
				18			
				19			
					i i		
	damp	3.8	27	20		SM	
					ШЩШ	Щ МІ	
				21			strength and toughness, orange oxidation stains, minor laminations,
							50% sand, 50% silt
				22			
		<u> </u>		1		<u> </u>	

	~		Project No	o;	C2043590	)8-1	Clie	nt:	ConocoPhillips	Boring/Well No: SB-2	
			Logged B		Jozi del Angel				10208 S. Lakewood Blvd., Do		
			Driller:		Cascade Drilling			Drilled		Location Map	
			Drilling N		CME 75 HSA			Hole Di Hole Do	ameter: 8" epth: 50.5' bgs	See Figure 2 for boring acagoes	
	/ironmei onsultar		Sampling Casing Ty		CA Mod.		Diamet	-	50		
	corpora		Slot Size:	po.	-			Depth:	-	S PADIEI S	
			Gravel Pa	ick:				Casing Stickup: -		JALIL JAY BADIEI ST	
				Elevation			Northing		Easting	SOL JALIL JAY BAULT	
Wall C	amplation						Sample o			EXP STATE	
	Well Completion ⊟ 50 Water		ure ure	gu (i	Penetration (blows/ft)	ų (į	1		AFOECAL.		
kfil	Cabilly	Level	Moisture Content	PID Reading (ppm)	etra ows	Depth (feet)	Recovery Interval	II T	LI	THOLOGY / DESCRIPTION	
Backfill	ся С		ΣŬ	, R	Pen (bl	U )	Recovery Interval	So			
						22		-			
						23					
						24					
				10.5	0.0					ive brown, very fine grained, poorly graded, low	
			damp	12.7	26	25		5ivi	strength and toughness	yellow-orange oxidation stains, 40% silt, 60% sand	
								H	Shought und toughness,	Jene Crunge Channer Channer 1070 Change Co During	
					1	26		]			
						27					
							<b>_</b>	4			
						28		-			
								-			
						29		Ţ			
			damp	1.8	31	30		SM		ght olive brown, medium and coarse grained, poorly	
								1	graded, low strength an	d toughness, 20% silt, 80% sand	
						31	- <b>  </b>				
							+	-		***************************************	
181						32	<u> </u>	-	1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.		
onite Grout						33					
3											
3111		1				34		8		I show the second state and a large	
Bent			damp	7.3	33			SP		brown, medium grained, poorly graded, low	
, A			uamp	1.5	55	35	-	51	100% sand	, Singht follow of angle oxidation builds,	
		1				26					
						36					
						37—	┥──	_	A selection		
						38		-			
		-				20			·····		
		1				39				ht brownish gray, medium grained, poorly graded,	
		-	damp	29.3	27	40	-	SP			
		-				-		<u>ii</u>	Contains laminations of 70% sand	f SILTY SAND (SM); very fine grained, 30% silt,	
		-				41			1 v 70 Sallu		
						-		-			
		1				42					
		_				43					
		4				-					
		-				44					
					1	.		· 1			

	$\wedge$		Project N		C204359			Client		ConocoPhillips Boring/Well	No: <b>SB-2</b>
			Logged B	y:	Jozi del A	-		Locati	on: Drilled:	10208 S. Lakewood Blvd., Downey, CA         Page 3 of 3           1/4/2007         Location Map	
DELTA			Driller: Cascade Drilling Drilling Method: CME 75 HSA								ations.
Environmental									oreHole Diameter: 8" See Figure 2 for honding octions.		
Consultants			Casing Type: -						/ell Diameter: -		
Incorporated			Slot Size: -					Well I		D JALIL JAY BA	DIEL
			Gravel Pack: -						g Stickuj		
			Elevation				North	ing		Easting No. 674	$\sqrt{s}$
Well Comp	oletion		0	<b>F</b> 0	n a		San	nple	<u>ہ</u>	Contraction of the second seco	
Backfill Casing		Water Level	Moisture Content	PID Reading (ppm)	Penetration (blows/ft)	Depth (feet)	Recovery	Interval	Soil Type	LITHOLOGY DESCR	TTION
			damp	17.1	43	45			SM	SILTY SAND (SM); gray SILTY SAND (SM); brown, fine grained, poorly g	raded low strength
Ħ						46	0.2151	<u>1512P</u>		and toughness, yellow orange oxidations stains, 20	
Bentonite Grout						47					
lite						-	<u> </u>				
nto						48					
ř.						49					
			damp	2.8	31	50			SM SP	SILTY SAND (SM); dark gray, fine grained, 40% SAND (SP); brownish gray, coarse grained, poorly	
						51				and toughness, slight yellow-orange oxidation stair Boring was terminated at 50.5 feet below ground s	ns, 100% sand
						52				Groundwater was not encountered.	
						53					
	unuclear f					-					
		4 1				54					
						55	-				
						56					
						57					
						58		<b> </b>			
						59					
						60					
						61-					nu á su nachadh an stada an stada da chuid an bhail an stada an stada an stada an stada an stada an stada an st
						62	1		1		
						63				· · · · · · · · · · · · · · · · · · ·	
	<u></u>	-				64					
		-				65		<b> </b>	1		
						66		<b> </b>	1		
				l	1			1	<u> </u>		

	æ		Project No	D1	C2043590	)8-1		Client		ConocoPhillips Boring/Well No: SB-3
			Logged B	y:	Jozi del A	ngel		Locati	on:	10208 S. Lakewood Blvd., Downey, CA Page 1 of 3
			Driller:		Cascade Drilling			Date Drilled:		1/4/2007 Location Map
			Drilling N	lethod:	CME LAR HSA			BoreHole Dian		meter: 8" See Figure 2 for builde logations.
Environmental			Sampling	Method:	CA Mod.	SS		BoreH	lole Dept	th: 65.5' bgs
Consultants			Casing Ty	/pe:	-			Well Diameter:		
Incorporated			Slot Size:		•			Well Depth:		JALIL JAY BADIEI
			Gravel Pa	ck:	•			Casing	g Stickup	P. CTAA JOI
				Elevation	Nor		North	orthing		Easting 0 No. 6744
										(0) EXP. (1)
Well Com	pletion		L C	PID Reading (ppm)	u di		San	nple	, əc	COF CAULOS
sackfill Casing		Water	ten	ead m)	rati vs/f	et) pth	ery	al	Iyı	LITHOLOGY / DESCRIPTION
Backfill Casing		Level	Moisture Content	) Readi (ppm)	Penetration (blows/ft)	Depth (feet)	Recovery	Interval	Soil Type	LITHOLOGI / DESCRIPTION
- H-4				IId	Pe.		Rec	Ē	Š	
Concrete										Asphalt
					1	1				Air Knife to 7 feet
	· ····					2				
					1	3				
							ļ			
						4	ļ			
						5			ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low
									2	strength and toughness
			ĺ			6				
						-				
	and the second se		1			7				
						8	1			
	above.org						<b> </b>	<u> </u>		
						9	1		,	
			damp	213.0	14	10	İΠΠ		ML	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low
Grout						10	]]]]]			strength and toughness, 50% sand, 50% silt
ċ		]				11				
2	venetitor						<b>_</b>			
						12	ļ	ļ		
							<u> </u>	ļ	-	
Bentoni						13	<b>_</b>	ļ	ł	
							<b> </b>	<u> </u>	ł	
						14	—	$\frac{1}{1}$	J	SANDY SILT (ML); olive brown, very fine grained, poorly graded, low
	exected or	1	damp	8.6	16		$\frac{1}{1111}$		ML	
	e)www.tetature	1	aamp	0.0	10	15			IVIL	brown calcification nodules, 40% sand, 60% silt
							μш	μιμ	1	orown calonication notatios, 4070 saila, 0070 shi
						16	+	+	1	
		1					1	<u>†</u>	1	
		1				17	1	1	1	
	<del></del>	1				10		1	]	
	Manager and a second	1				18			]	
		]				19-		I		
		]		1		<b>1</b> –	<u> </u>			SILTY SAND (SM); brown, fine grained, poorly graded, low stength
		-	damp	8.0	27	20			SM	
		-			1	-	<u>per</u>	ųш	1	80% sand
	sections in the					21			4	
		4				-		<b>_</b>	$\mathbf{I}$	
				1		22			-	
		L	1	<u> </u>			1	1	1	

A			Project N		C20435908-1			ient: ConocoPhillips Boring/Well No: SB-3			
			Logged B					ation:			
DELTA			Driller:		Cascade Drilling			te Drille			
			Drilling Method: CME LAR HSA								
			Sampling Method: CA Mod. SS Casing Type: -					ll Diam	e Depth: 65.5' bgs meter:		
			Slot Size: -					li Depti	the INTERNET		
-			Gravel Pa	ick:		Ca	sing Sti	tickup: Easting			
			Blevation				Northing		Easting		
Well Co	mpletion				Carl Sar		Sampl	0	- ENVE OF		
	-	Water	Moisture Content	, <sup>ng</sup> (	Penetration (blows/ft)	4 0		+ 0	e Veorente		
Backfill Casing	)	Level	Moisture Content	PID Reading (ppm)	<sup>2</sup> enetration (blows/ft)	Depth (feet)	Recovery Interval	1 L	LITHOLOGY / DESCRIPTION		
Backfill Casing			C M	₹,	Pen (bl		Recovery	i   S	õ		
						22	ΤĒΤ				
						23					
						24					
				000.0					SAND (SM); light olive brown, medium grained, poorly graded, low		
			damp	282.0	22	25	-	51	SP strength and toughness, slight yellow-orange oxidation stains, 100% sand		
							10000000				
						26					
						27					
						28					
						29			SILTY SAND (SM); dark gray, fine and medium grained, poorly		
			damp	183.0	29	30		S	M graded, low strength and toughness, slight orange oxidation stains,		
									dark reddish brown root-like organics, 30% silt, 70% sand		
						31					
						-					
181						32	┼╌┼╴				
10						33					
anite Grout											
). Atti						34					
Bent			damp	30.4	32	-			CLAYEY SILT (OL); dark gray, dark reddish brown root-like organics, Some laminations		
13			damp	30.4	34	35			SP SAND (SM); brown, medium grained, poorly graded, low strength and		
						26		<u> </u>	toughness, 100% sand		
						36					
						37					
	l					-					
	and and more services					38	+				
						20 -					
						39					
			damp	5	47	40		[]  SI	SM SILTY SAND (SM); olive gray, coarse grained, poorly graded, low		
	-					-		Ш	strength and toughness, 15% silt, 85% sand		
				1		41					
						-					
		1				42					
						43					
						-					
		-				44					
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	Driller:		Cascade I	Drilling	Date 1	Drilled:	11/2/2006	Location Map	TAL G			
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and the second second					ENTER	£	strength and toughness	, 20% sift, 80% sand
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	Grout	are -	damp	21.3	23	45			ML			fine grained, poorly graded,			
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	Driller:	Cascade 1		Date I		11/2/2006	Location Map					
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	Casing Type:	Sch 40 P						15/13				
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City of Downey

FUTURE UNLIMITED

# FAX/E-MAIL TRANSMITTAL

То:	Bill Grider, Senior Estimator/Project Manager Sully-Miller Contracting Company bgrider@sully-miller.com	Phone No: Fax No:	(714) 449-2292 (714) 578-9672
From:	Desi Gutierrez, Senior Civil Engineer/Project Engineer, City of Downey dgutierr@downeyca.org	Phone No: Fax No:	(562) 622-3468 (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  $\pm 8^{\circ}$ -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 =  $14^{\circ} - 9^{\circ} = 5^{\circ}$ ).

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).



\_FUTURE UNLIMITED

# City of Downey FUTURE 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

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

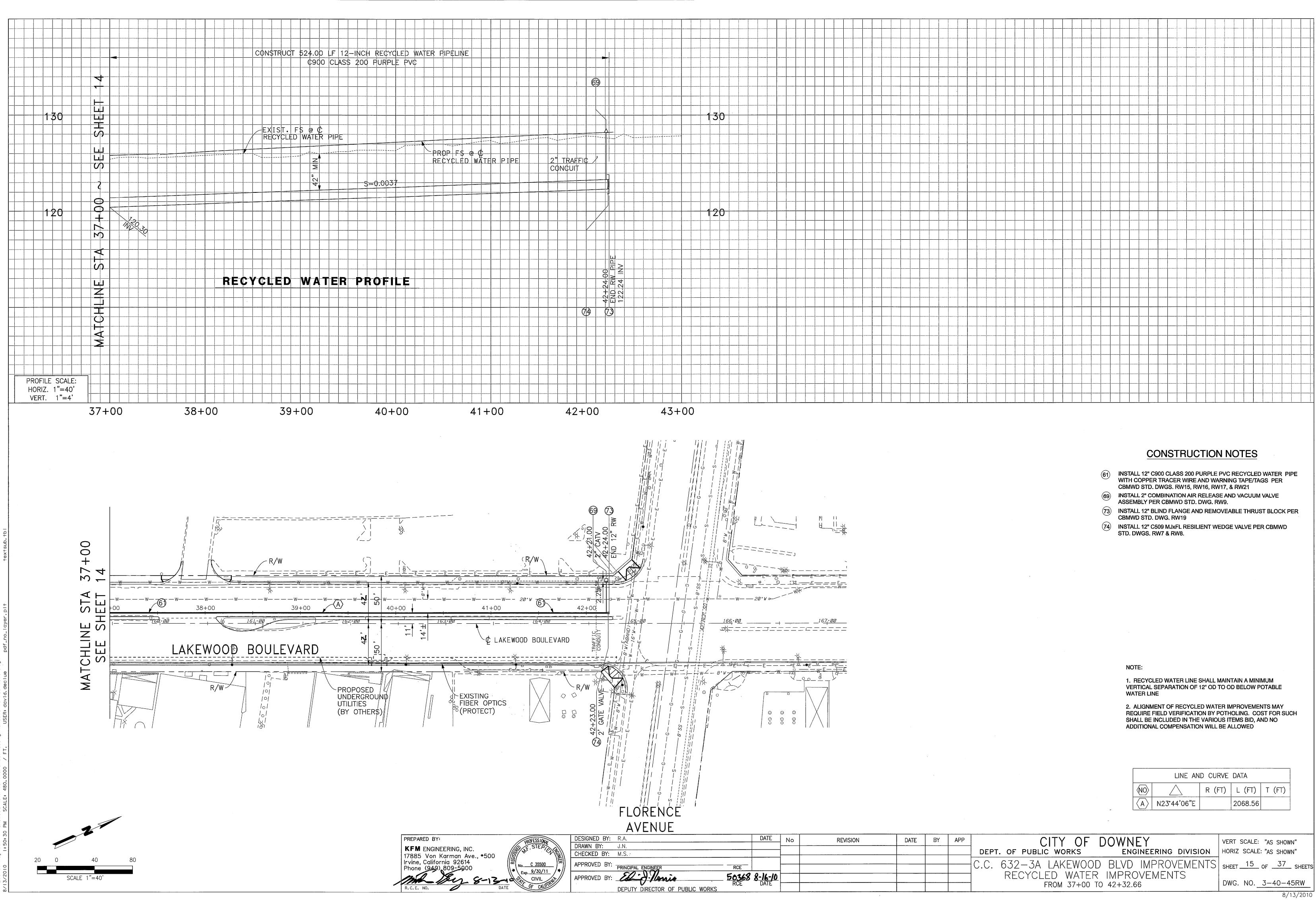
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### Cash Contract No. 632-3A Lakewood Boulevard Improvement Project - Phase 3A RFQ 2.1 – Extra Thick AC Pavement Page 4

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Cash Contract No. 632-3A Lakewood Boulevard Improvement Project - Phase 3A RFQ 2.1 - Extra Thick AC Pavement Page 5

HyPubworks/CAPINkPICC632-3A Lakewood/Contractor Documents/RFOS/RFO2 Pyrat Thickness Estimate xts



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ATTACHMENT 2

### **EXPLORATION PLAN AND BORING LOGS**



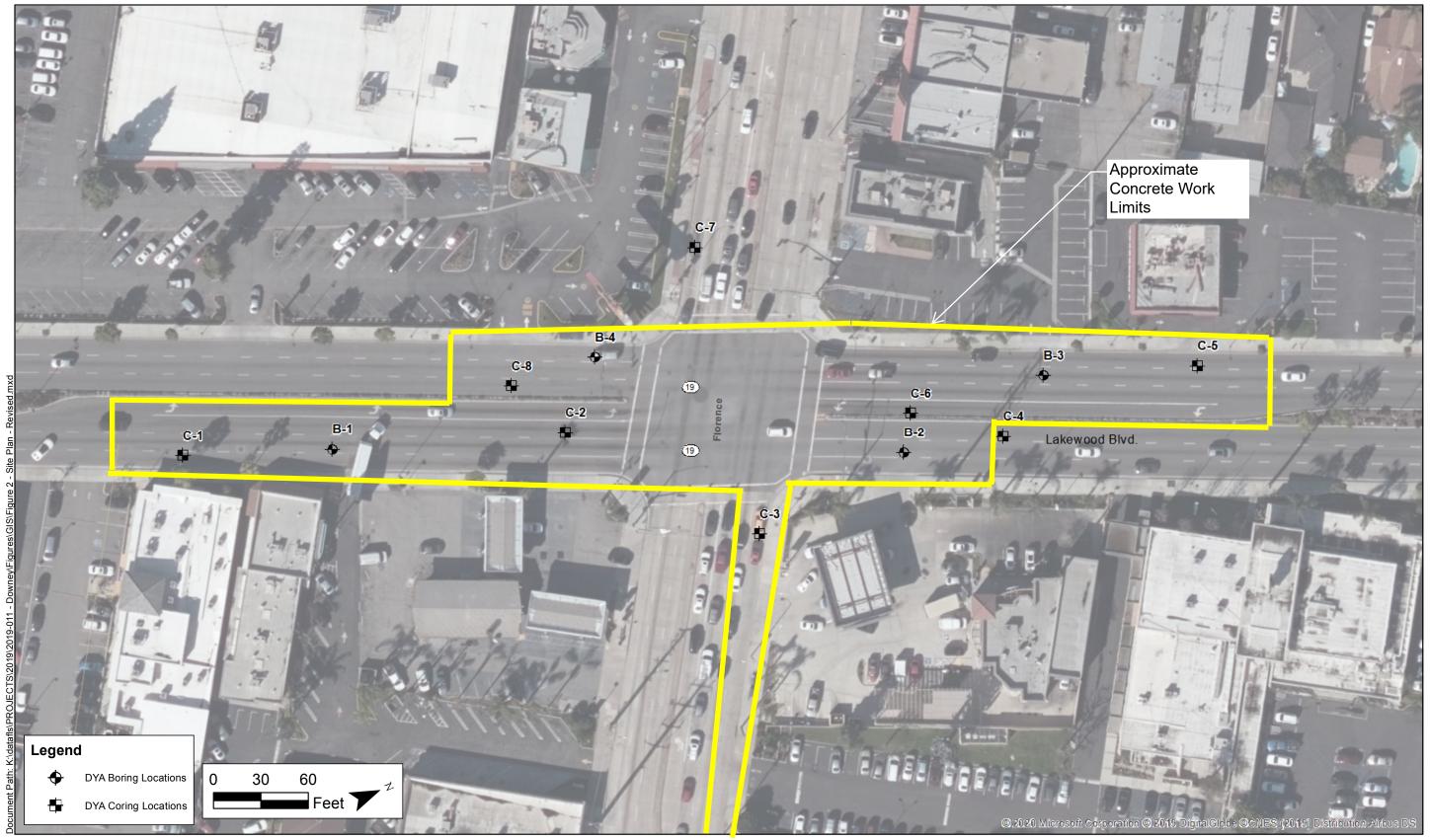


Figure 2 - SITE PLAN

BORING LOCATION: See Figu	ıre No. 2	ELEVATION (feet):			127					
LATITUDE: 33.9468	79	LONGITUDE: -1	18.117	7453						
DRILLING EQUIPMENT: H	and Auger	DRILLING METHOD:		Han	id Aug	er				
BORING DIAMETER (inches):	4	BORING DEPTH (feet):		1.	5					
<b>DATE STARTED</b> : 10/24/19		<b>DATE COMPLETED:</b> 10/28/19								
LOGGED BY: AA		СНЕСКЕД ВУ: ВН								
Elevation (feet) Depth (feet) Sampler Symbol Field Unc. Comp. Str. (tsf)		IPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	ASPHALT CONCRETE (AC): Cement Treated Base (CTB) = POORLY GRADED SAND wit moist; dense; coarse to fine GRAVEL; cemented materia Refusal at 1.5 due to gravelly No groundwater encountered. Boring backfilled with pea grav Surface patched with rapid set Elevation based on Google Ea *CTB could be thicker than on	- 1 inch* h GRAVEL (SP): light brown; SAND; coarse to fine al; micaceous ayer. //el. concrete and dyed black. irth.					# E			

Page 1 of 1 City of Downey - Lakewood Boulevard at Florence Intersection Improvement Project No. 2019-011

PLATE

BORING LOCATION: See Figur	re No. 2	ELEVATION (feet):			129			
LATITUDE: 33.94781	5	LONGITUDE:	118.11	6912				
DRILLING EQUIPMENT: Ha	nd Auger	DRILLING METHOD:		Han	id Aug	er		
BORING DIAMETER (inches):	4	BORING DEPTH (feet):		5.	5			
<b>DATE STARTED:</b> 10/24/19		DATE COMPLETED:	10/24/19	9				
LOGGED BY: AA		CHECKED BY: BH						
			_					
Elevation (feet) Depth (feet) Sampler Symbol Field Unc. Comp. Str. (tsf)	DESCR		Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
<u> <u> <u> </u> /u></u>	ASPHALT CONCRETE (AC): POORLY GRADED SAND with (SP-SM): dark yellowish brow fine SAND; coarse to fine G CLAYEY SAND with GRAVEL moist; loose; coarse to fine S GRAVEL; micaceous SILTY SAND (SM): dark yellow coarse GRAVEL; micaceous olive brown; no trace coarse G End of boring at 5.5 feet. No groundwater encountered. Boring backfilled with pea graw Surface patched with rapid set Elevation based on Google Ea	n SILT and GRAVEL wn; moist; loose; coarse to RAVEL; micaceous (SC): dark yellowish brown; SAND; coarse to fine vish brown; moist; soft; trace		<u>₹ŏ</u> 7 13			8 16	RV

Page 1 of 1 City of Downey - Lakewood Bouelvard at Florence Intersection Improvement Project No. 2019-011

PLATE

BOR	ING L	.00/	ΑΤΙΟ	ON:	Se	e Figu	re No. 2	ELEVATION (feet):		129	9			
LATI	TUDE	:			33	.94304	1	LONGITUDE:	-118.11	700				
DRIL	LING	EQ	UIPI	MENT:	Ha	and Au	ger	DRILLING METHOD:	Hand A	uger				
BOR	ING [	DIAN	IETE	ER (ind	ches):	4		BORING DEPTH (feet):	5.5					
DATE	E ST/	ARTE	ED:	10-2	4-19	С	OMPLETED: 10-24-19	HAMMER TYPE:						
DRIL	LING	CO	NTR	ACTO	R:	Strong	arm Environmental Inc	HAMMER DROP: inch	es	١	WEIGH	T:	lbs	
LOG	GED	BY:	AA			С	HECKED BY: BH	DRIVE SAMPLER DIAMET	ER (inc	hes)	<b>ID:</b> 2.4	0	<b>):</b> 3	
Elevation (feet)	Depth (feet)	Sampler	Symbol	Blows per 6 Inches	SPT N60 Blows per Foot	Field Unc. Comp. Str. (tsf)	DESCR	IPTION	Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
ш ч <u>с</u> - 125- - 120- -	<u> </u>						ASPHALT CONCRETE (AC): SILTY SAND (SM): dark olive coarse to fine SAND; trace of micaceous trace coarse GRAVEL End of boring at 5.5 feet. No groundwater encountered. Boring backfilled with pea grav Surface patched with rapid set Elevation based on Google Ea	brown; moist; medium dense; coarse to fine GRAVEL; ////////////////////////////////////		9 8 9	NP	NP	<u>40</u> 40	CA MD SA RV

Page 1 of 1 City of Downey - Lakewood Bouelvard at Florence Intersection Improvement A3 Project No. 2019-011



PLATE

BORING LOCATION: See Figu	ire No. 2	ELEVATION (feet):			128			
LATITUDE: 33.9473	5	LONGITUDE:	118.11	7402				
DRILLING EQUIPMENT: H	and Auger	DRILLING METHOD: Hand Auger						
BORING DIAMETER (inches):	4	BORING DEPTH (feet):		5.	5			
DATE STARTED: 10/28/19	1	DATE COMPLETED:	10/28/1	9				
LOGGED BY: AA		CHECKED BY: BH						
	1							
Elevation (feet) Depth (feet) Sampler Symbol Frield Unc. Comp. Str. (tsf)	DESCR		Dry Density (pcf)	Moisture Content (%)	Liquid Limit (%)	Plasticity Index (%)	Percent Passing #200 Sieve	Other Tests [PID]
	ASPHALT CONCRETE (AC): POORLY GRADED GRAVEL moist; loose; coarse to fine S GRAVEL; Base = 10 inches SILTY SAND with GRAVEL (S medium dense; coarse to fin End of boring at 5.5 feet. No groundwater encountered. Boring backfilled with pea grav Surface patched with rapid set Elevation based on Google Ea	with SAND (GP): dark gray; SAND; coarse to fine SM): dark olive brown; moist; le SAND; micaceous		5 7			17 13	SA RV

Page 1 of 1 City of Downey - Lakewood Bouelvard at Florence Intersection Improvement A4 Project No. 2019-011

PLATE

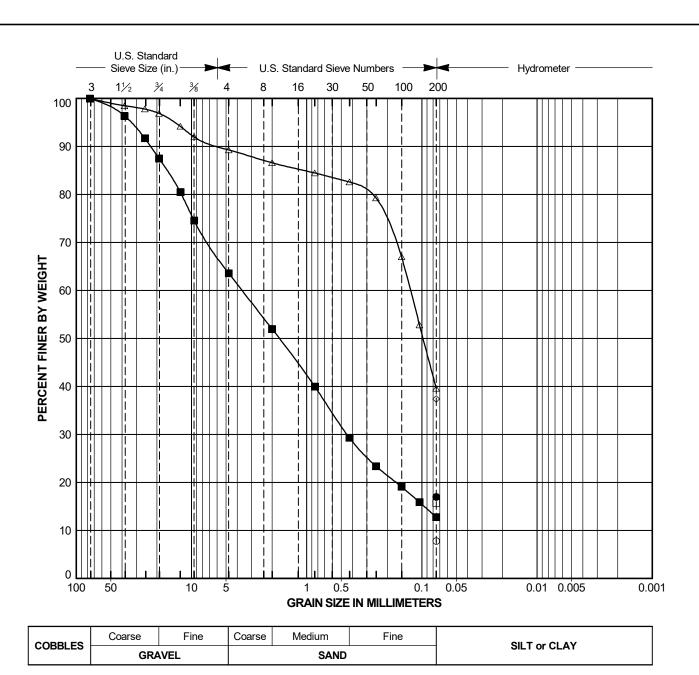
# Template: DYLG HAND AUGER; Prj ID: 2019-011.GPJ

### **ATTACHMENT 3**

### LABORATORY TESTING



Template: DY\_SIEVE\_WIN



Laboratory Testing by: Hushmand Associates, Incorporated

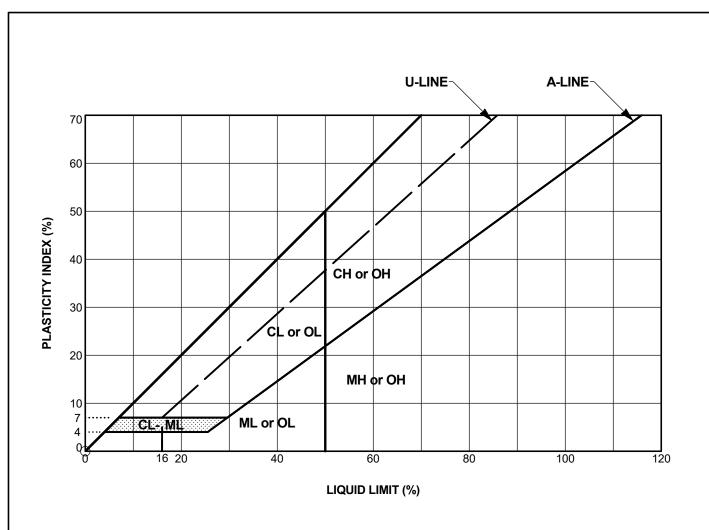
Symbol	Source	Depth (feet)	Classification	Natural M. C. (%)	Liquid Limit (%)	Plasticity Index (%)	% Passing #200 Sieve
$\odot$	B-2	1.0	POORLY GRADED SAND WITH SILT AND GRAVEL	7			8
	B-2	5.0	SILTY SAND (SM)				16
	B-3	2.5	SILTY SAND (SM)		NP	NP	40
$\diamond$	B-3	4.0	SILTY SAND (SM)	9			37
•	B-4	2.0	SILTY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

### PARTICLE SIZE ANALYSIS

City of Downey - Lakewood Bouelvard at Florence Intersection Improvement

Project No. 2019-011





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
$\odot$	B-3	2.5	SILTY SAND (SM)		NP	NP	NP	
						I		I

### PLASTICITY CHART

PLATE

City of Downey - Lakewood Bouelvard at Florence Intersection Improvement

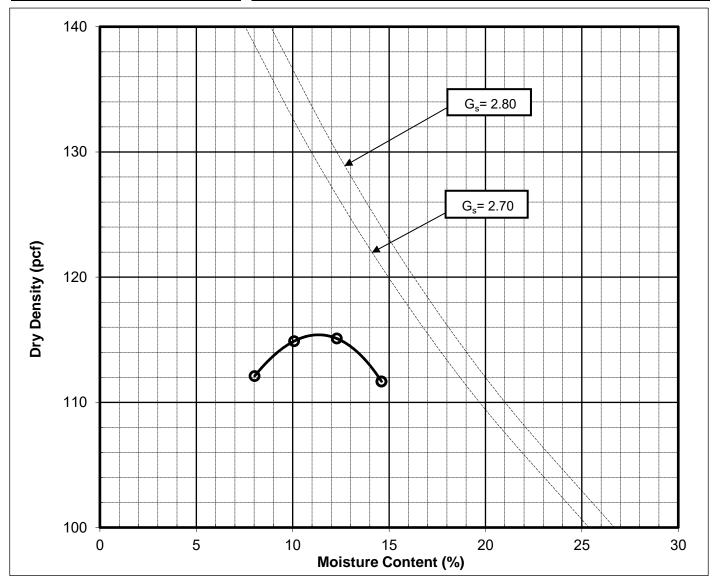
Project No. 2019-011



### **Compaction Characteristics of Soils Using Modified Effort**

### **ASTM D1557**

Client:	Diaz Yourman & Associates		HAI Project No.	: DYAL-19-020
Project:	Downey		Tested by	: GA
Project No.:	2019-011		Checked by	: KL
Boring Number:	B-3		Date	: 11/05/19
Sample Number:	Bulk			
Depth (ft) :	0-5			
Soil Description:	Brown, Silty Sand	(SM)		
Mold size (in)	4"		Maximum Dry Density (pcf)	115.4
Procedure	В	C	Pptimum Moisture Content (%)	11.3
% Ret. on 3/8"	8.4	Corr	ected Maximum Dry Density (pcf)	118.0
Remarks:		Correc	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		Chlorides		Resistivity		pН
		$SO_4^{2-}$		Cl		As Rec'd	Minimum	
	( <b>ft</b> )	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(Ohm-cm)	(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 ANALYSISDESIGN



A CALIFORNIA CORPORATION

 SOILS, ASPHALT TECHNOLOGY

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.

DYAL-19-020 / 2019-011
Downey
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.



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

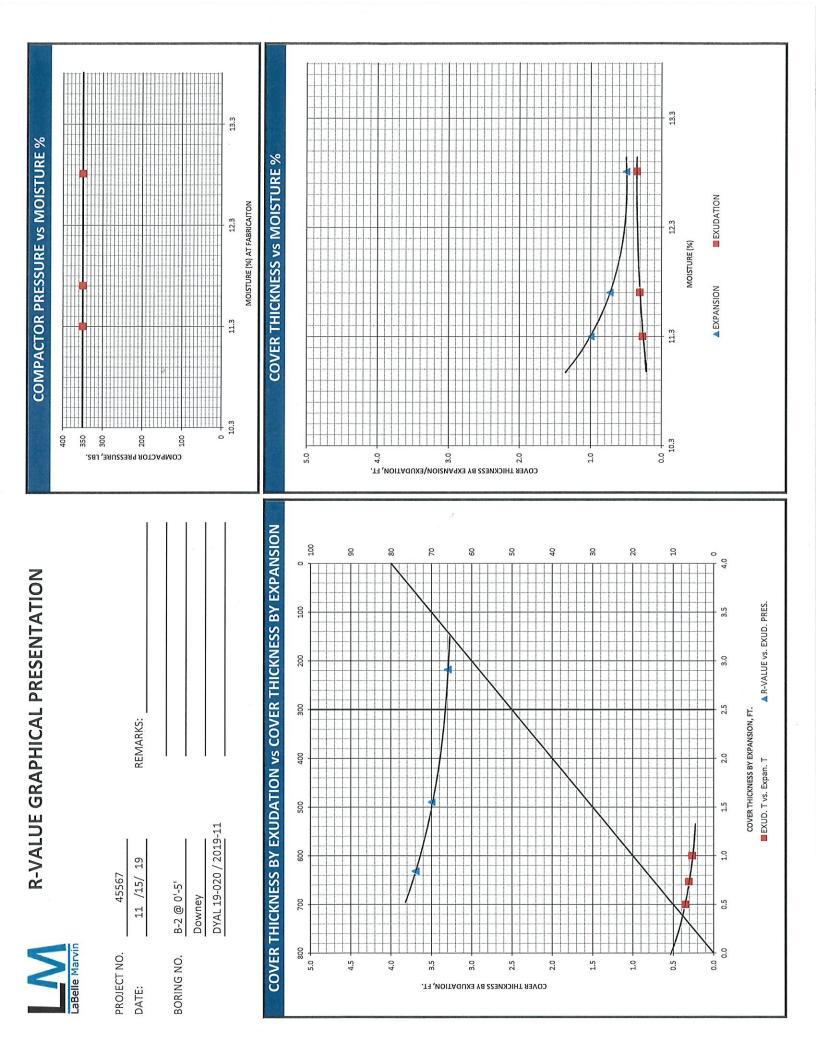
R-VALUE TESTING DATA   CA TEST 301							
	SPECIMEN ID						
	а	b	С				
Mold ID Number	13	14	15				
Water added, grams	49	45	60				
Initial Test Water, %	11.7	11.3	12.8				
Compact Gage Pressure,psi	350	350	350				
Exudation Pressure, psi	490	632	218				
Height Sample, Inches	2.55	2.55	2.58				
Gross 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

		62	Examined & Checked: 11 /15/ 19
Equilibrium R-Value		by	
		EXPANSION	
	Gf =	1.25	
	1.9% Retained o	n the	
REMARKS:	3/4" Sieve.		
	Partial Free Drai	nage.	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 DATA SHEET**



45567 PROJECT No. DATE: 11/15/2019

BORING NO.

B-3 @ 0'-5' Downey DYAL 19-020 / 2019-11

SAMPLE DESCRIPTION: Brown Silty Fine Sand

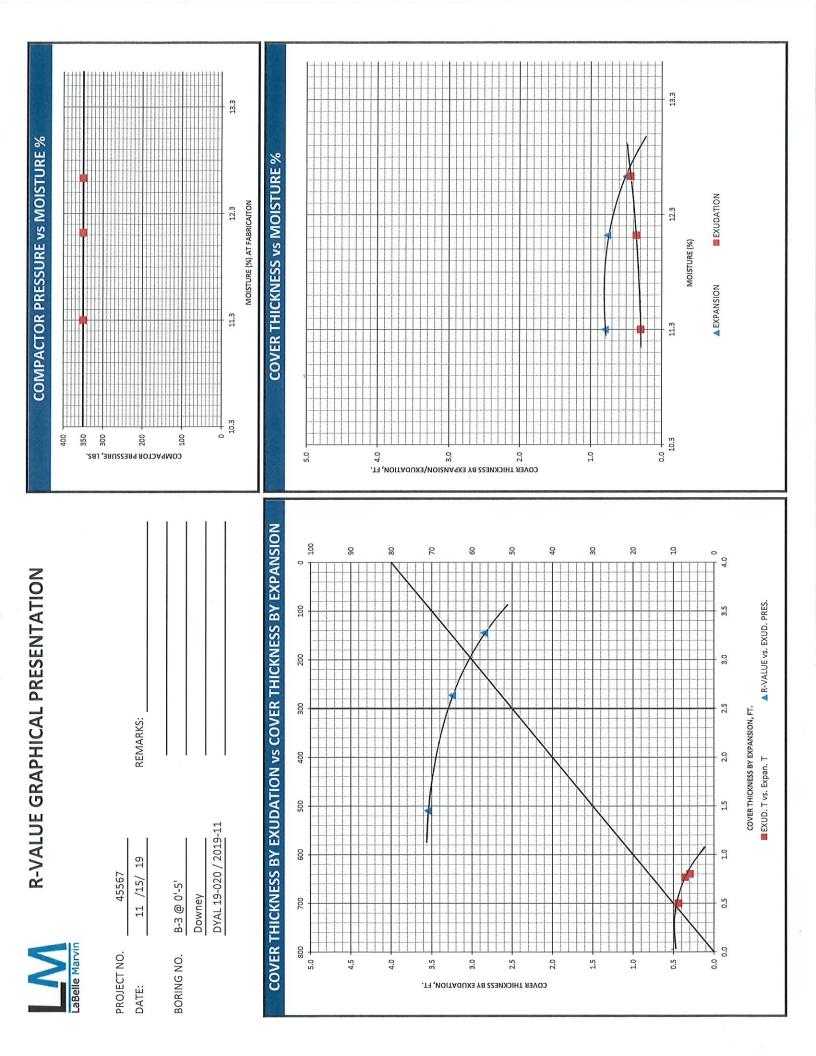
R-VALUE TESTING DATA   CA TEST 301							
		SPECIMEN ID					
	а	b	С				
Mold ID Number	16	17	18				
Water added, grams	75	80	67				
Initial Test Water, %	12.1	12.6	11.3				
Compact Gage Pressure, psi	350	350	350				
Exudation Pressure, psi	273	145	510				
Height Sample, Inches	2.53	2.53	2.50				
Gross 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	Examined & Checked: 11 /15	/ 19
		by		
		EXPANSION		
	Gf =	1.25		
	0.0% Retained on the			
REMARKS:	3/4" Sieve.			
			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 DATA SHEET**



PROJECT No.	45567		
DATE:	11/15/2019		
BORING NO.	B-4 @ 0'-5'		

B-4 @ 0'-5' Downey DYAL 19-020 / 2019-11

SAMPLE DESCRIPTION: Brown Gravelly Slightly Silty Sand

R-VA	LUE TESTING DATA   CA	TEST 301	
		SPECIMEN ID	
	а	b	С
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	Examined & Checked:	11 /15/ 19
		by		
		EXUDATION		
	Gf =	1.25		
	10.6% Retained on the			
REMARKS:	3/4" Sieve.			
é	Partial Free Drainage.		Steven R. Marvin, RCE 30659	
	-		õ	

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.

