INFORMATION HANDOUT

For Contract No. 07-288024
At 07-Ven-210-R10.5/R15.7

Identified by
Project ID 0713000361

MATERIALS INFORMATION

Geotechnical Design Report for BMPs Devices in Los Angeles County on Route 210, dated January 6, 2015

Silicone Joint Sealant for Austin Vault Sand Filter

State of California **Business, Transportation and Housing Agency**

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: MR. OJI KALU,
Senior Transportation Engineer
District 7, Office of Design "B"

Date: January 6, 2015

File: 07-LA-210-PM/VAR
0713000361 (EA 07-288021)

Attention: Ms. VIVIAN NGUYEN

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design – South 1 MS # 18

Subject: Geotechnical Design Report for BMPs Devices in Los Angeles County on Route 210

1.0 Scope of Work

The Office of Geotechnical Design South 1 has prepared this Memorandum to provide the Geotechnical Design Report for one (01) GSRD #53 and three (03) Media Filters (MFs) including, MF53a, MF71 and MF72, on Route 210 between PM R9.7 to PM R16.1. This report is based on the information provided by your office including project information and draft plans provided by the District Design Office in. This report includes discussions of geology at the above locations.

2.0 Project Description

The work on this project will include the construction of infiltration/ detention basins, media filters, Gross Solid Removal Devices (GSRDs) and bio-infiltration swales/ strips.

Locations for the placement of devices are based on the recommendation of the Corridor Storm water Management Studies for Route 210. The layout plans indicating the proposed locations of the devices.

3.0 Geotechnical Investigation

Three (03) borings were conducted for four (04) locations (one boring was conducted at Location MF #53a, where MF #53a and GSRD #53 were proposed within 180 feet from the other). Borings were completed using hollow stem augers by an ACKER truck mounted drill rig. Samples were collected using the Standard Penetration Test method (ASTM D 1586 and ASTM D 6066) where a 1.4-inch diameter sampler was hammered into the ground by a 140-pound automatic hammer. The number of blows required to pound the sampler from 0.5 to 1.5 feet below the cleanout depth of each sample interval were recorded to determine the relative density of the soils. All borings were logged using the Caltrans Soil and Rock Logging Manual, 2010. The types of material

encountered were classified and the results are presented as Boring Records in Appendix A of this report. Summary of borings is presented in Table 1.

Table 1. Summary of Borings

Location No.	Plan Location	Type of Device	Boring No.	Latitude	Longitude	Top of Boring Elev. (ft)	Total Depth (ft)	Date
53a	NB 210	MF	A-14-053	34°16’10.6”	-118°20’22.4”	1182.5	40.5	10/29/14
71	SB 210 La Tuna Canyon Off-ramp	MF	A-14-071	34°14’3.95”	-118°17’32.3”	1673.0	35.5	10/28/14
72	SB 210 La Tuna Canyon Off-ramp	MF	A-14-072	34°14’4.38”	-118°17’30.0”	1683.5	47.5	10/18/14

4.0 Geologic Considerations

4.1 Regional Geology

The project is located within the Transverse Ranges Geologic Province which is characterized by east-west trending mountains and valleys. This area of the project lies within and adjacent to the Verdugo Hills. Faults associated with this area include the Verdugo Fault approximately 2.5 miles south of the project and the Sierra Madre Fault approximately 1.0 mile north of the project.

4.2 Site Geology

All three of the media filter sites lie within areas of gently sloping valleys. The valleys are mapped as being comprised of Quaternary age alluvium (Dibble T. W. and Ehrenspeck H. E., 1991). All borings conducted for this project encountered fill or alluvium to the total depth investigated. The fill and alluvium consisted of layers of medium dense to very dense gravely sand, sand, sand with clay or silty sand. Groundwater was not encountered during the investigation and will be discussed in Section 4.3, Groundwater.

4.3 Groundwater

Groundwater within the project area varies. In some areas the groundwater is very deep but in other areas the groundwater is near the surface and could be groundwater or perched water. Groundwater was not encountered during the current investigation. Groundwater was encountered nearby MF #53a at elevation 1162.8 feet during investigation for Bridge 53-2562 South Branch Big Tujunga Wash in February 1972. Review of As-Builts for Bridge 53-2187 La Tuna Canyon Rd. Undercrossing show that near MF#71 and MF #72 no groundwater was encountered during the 1968 investigation to the maximum depth drilled (approximately elevation 1632 feet). Seasonal or localized groundwater may be higher during and after heavy rainfall seasons which may lead to a condition of shallow groundwater. When this occurs during or prior to construction

of the project then precautions may need to be taken for dewatering of excavations at the MF locations.

4.4 Corrosion Evaluation

Composite soil samples from the exploratory borings at the MF locations were tested at the Headquarters Soils and Chemical Laboratory for corrosion potential. A summary of corrosion test results is presented in Table 2.

Table 2 - Corrosion Test Results

Location No.	Boring No.	Sample Depth (ft)	pH	Minimum Resistivity (Ohm-Cm)	Sulfate* Content (PPM)	Chloride* Content (PPM)
53a	A-14-053	0-40.5	7.79	1155	N/A	N/A
71	A-14-071	0-35.5	7.83	9618	N/A	N/A
72	A-14-072	0-47.5	7.96	10306	N/A	N/A

* The Corrosion Technology Section policy states that if the minimum resistivity is greater than 1000 Ohm-Cm the sample is considered to be non-corrosive and testing to determine sulfate and chloride is not performed.

Caltrans currently considers a site to be corrosive to foundation elements if one or more of the following conditions exist: Chloride concentration is greater than or equal to 500 ppm, sulfate concentration is greater than or equal to 2000 ppm, or the pH is 5.5 or less. Based on the results of corrosion tests, the site is considered non-corrosive to foundation elements.

5.0 Geotechnical Considerations for Media Filters

The following locations were selected for geotechnical considerations base on design plans provided by District 7 Design B on October 27th, 2014.

<u>Location # 53: MF and GSRD at Bottom of embankment on WB 210, P.M. R10.23</u>
The proposed MF locates on a flat surface at between bottom of road embankment and a concrete channel surrounded by SB I-101 and S Conejo School Rd. If 1:1 (V:H) slope cannot be maintained for back cut during excavation due to limited space, temporary shoring is required.
Cutting into existing embankment is not allowed.

<u>Location #71: MF at South end of the Off-ramp from EB 210 to La Tuna Canyon Rd, P.M. R14.10:</u>

The proposed MF locates on flat ground surface at the bottom of an embankment. If 1:1 (V:H) slope cannot be maintained for back cut during excavation due to limited space, temporary shoring is required.
Cutting into existing embankment is not allowed.

Location #72: at North end of the Off-ramp from EB 210 to La Tuna Canyon Rd, P.M. R14.13:

The proposed MF locates on flat ground surface at the bottom of an embankment. If 1:1 (V:H) slope cannot be maintained for back cut during excavation due to limited space, temporary shoring is required.
Cutting into existing embankment is not allowed.

6.4 Slope Stability

The slope stability analyses were performed to verify the overall stability using the computer program SLOPEW under both static and pseudo-static conditions. The slope stability analysis under pseudo-static condition was performed using a seismic coefficient equal to one-third of the horizontal ground acceleration and not exceeding 0.2g. The slope stability analyses were performed using the Morgenstern Price method for circular slip surfaces. Analyses indicate that these slopes meet the required minimum factors of safety, 1.5 for static condition and 1.1 for pseudo-static condition.

6.5 Seismicity

The seismicity in the area of the project is based on many different faults located in the Los Angeles area. The proposed MF sites are not within an Alquist-Priolo Earthquake Fault Zone. The Media Filter structures are based on Standard Plans and do not require input from Headquarters Structure Design. Therefore, no analysis has been performed to develop and recommend ground motion parameters for the seismic design of these structures. The MF locations are basically box shape cast-in-place reinforced concrete structures and are not critical structures that may be impacted by earthquakes. The main issue in an earthquake is ground shaking and deformation of the soils from settlement, ground rupture and liquefaction induced settlement and spreading. If these MFs are subjected to earthquakes they may expect to be damaged primarily by heavy ground shaking which could be expected to produce damage in the form of settlement and possibly broken connections to the hydraulic lines into or out of the MFs.

6.6 Liquefaction Potential

Liquefaction is a phenomenon in which loose and saturated, fine grained granular soils behave like a fluid when subjected to high intensity ground shaking. Liquefaction occurs when three general conditions exist: (1) shallow ground water (2) low-density, fine sandy soils and (3) high-intensity ground motion. Saturated, loose and medium dense, near surface cohesionless soils exhibit the liquefaction potential, while dense cohesionless soil and cohesive soil exhibit the lowest, negligible liquefaction potential. Effects of liquefaction on ground surface include sand boils, settlement and lateral spreading. Groundwater was not encountered during field investigation and historically therefore liquefaction potential at MF-71 and MF-72 sites are low. Groundwater was not encountered during the field investigation for MF-53a however historically groundwater was encountered at elevation 1162 feet (approximately 12-14 feet below the proposed invert of this MF

and medium dense cohesionless soils were encountered from approximate elevation 1172 to elevation 1162 feet therefore the liquefaction potential is considered moderate to low.

9.0 Construction Considerations

Construction Considerations for Media Filters

1. The back cut slope should not be steeper than 1:1 (V: H) during construction. If 1:1 (V:H) slope cannot be maintained due to limited space, temporary shoring is required.

2. Temporary shoring to protect the integrity of existing concrete channel at Location #53 is highly recommended.

3. If seasonal groundwater is encountered in any excavation for MF construction, dewatering will be necessary.

4. If loose or soft material is encountered in the base of any excavation for MF, over-excavation of the layer of loose or soft material up to 5', and replacement with granular material at 95% compaction is recommended to assure adequate bearing capacity for the footing.

If you have any questions or comments, please call Huy Ngo at (213) 620-2389, or Christopher Harris at (213) 620-2147.

Prepared by: Date: 01/06/2015

Huy Ngo, P.E., P.L.S.
Transportation Engineer
Office of Geotechnical Design – South 1
Branch C

Supervised by: Date: 01/06/2015

Chi-Tseng Ted Liu, Ph.D., P.E., G.E.
Senior Transportation Engineer
Office of Geotechnical Design – South 1
Branch C

Prepared by: Date: 01/06/2015

Christopher Harris, P.G.,C.E.G.
Engineering Geologist
Office of Geotechnical Design – South 1
Branch

c/c: District 7 Project Manager – Shahriar_Yadegari@dot.ca.gov
District 7 Environmental Manager – Minar_Dagher@dot.ca.gov

APPENDIX A

BORING RECORDS

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
HUY NGO	10-29-14	10-29-14	34° 16' 10.65" / -118° 30' 22.45" WGS84	A-14-053
DRILLING CONTRACTOR: CALTRANS			BOREHOLE LOCATION (Offset, Station, Line): 140' Rt Sta 540+50 Route 210	SURFACE ELEVATION: 1183 ft NAVD88
DRILLING METHOD: Solid-Stem Auger			DRILL RIG: Acker AD2	BOREHOLE DIAMETER: 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID): SPT 1.4 ID			SPT HAMMER TYPE: 140	HAMMER EFFICIENCY, ERi: 0.71%
BOREHOLE BACKFILL AND COMPLETION: Borehole Backfill with Cemt			GROUNDWATER READINGS: DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING: 40.5 ft

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0	Poorly graded SAND with GRAVEL (SP); light bluish gray; dry; few GRAVEL.												
1177.50	5	Poorly graded SAND (SP); very dense; yellowish brown; dry; trace GRAVEL.		1	18 35 69	104	100							
		Medium dense; light bluish gray; dry; few GRAVEL.												
1172.50	10			2	19 11 17	28	100							
1167.50	15	Poorly graded SAND with CLAY (SP-SC); medium dense; yellowish brown; moist.		3	15 13 12	25	100							
		CLAYEY SAND (SC); very dense; brown; moist; trace GRAVEL.												
1162.50	20			4	22 33 35	68	100							
		Poorly graded SAND (SP); dense; yellowish brown; moist.												
1157.50	25			5	23 20 24	44	100							
		CLAYEY SAND (SC); medium dense; brown; moist.												
1152.50	30			6	11 12 11	23	100							
		Lean CLAY (CL); very stiff; trace GRAVEL ; PP=3.0 TSF.												
1147.50	35			7	12 10 11	21	100							
1142.50	40	GRAVEL very dense; light gray; dry.		8	50/REF	REF	100							
		Bottom of borehole at 40.5 ft bgs												
1137.50	45	This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil ~~or Rock Legend or below.~~												

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - South 1

REPORT TITLE				HOLE ID
BORING RECORD				A-14-053
DIST. 07	COUNTY LA	ROUTE 210	POSTMILE R9.7/R16.1	PROJECT ID 07-288021
PROJECT OR BRIDGE NAME: BMP on Route 210				
BRIDGE NUMBER MF 53	PREPARED BY HUY NGO	DATE 10-29-14	SHEET 1 of 1	

5 BR - STANDARD LOG OF TEST BORING.GPJ CALTRANS LIBRARY (FEB 2013).GLB 1/6/15

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
HUY NGO	10-28-14	10-28-14	34° 14' 3.95" / -118° 17' 32.32" WGS84	A-14-071
DRILLING CONTRACTOR: CALTRANS			BOREHOLE LOCATION (Offset, Station, Line): 204' Rt Sta 744+50 Route 210	SURFACE ELEVATION: 1673 ft NAVD88
DRILLING METHOD: Solid-Stem Auger			DRILL RIG: Acker AD2	BOREHOLE DIAMETER: 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID): SPT 1.4 ID			SPT HAMMER TYPE: 140	HAMMER EFFICIENCY, ERi: 0.71%
BOREHOLE BACKFILL AND COMPLETION: Borehole Backfill with Cemt			GROUNDWATER READINGS: DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING: 35.5 ft

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0	Poorly graded SAND with GRAVEL (SP); light brown; dry.												
1668.00	5	Poorly graded SAND (SP); dense; light gray; dry; few GRAVEL.		1	16 16 14	30	100							
1663.00	10	Light brown; Very Thin Interbeded Layer of Gravel (2-3 inches).		2	22 17 16	33	100							
1658.00	15	Very dense; light brown; Very Thin Interbeded Layer of Gravel (2-3 inches).		3	27 24 32	56	100							
1653.00	20			4	33 85/REF	85/	100							
1648.00	25			5	66 80/REF	80/	100							
1643.00	30	Poorly graded SAND with SILT (SP-SM); very dense; yellowish brown; dry.		6	76 55/REF	55/	100							
1638.00	35	Poorly graded SAND (SP); very dense; dark gray to black; dry.		7	90/REF	REF	100							
		Bottom of borehole at 35.5 ft bgs												
1633.00	40	This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.												

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - South 1

REPORT TITLE				HOLE ID
BORING RECORD				A-14-071
DIST. 07	COUNTY LA	ROUTE 210	POSTMILE R9.7/R16.1	PROJECT ID 07-288021
PROJECT OR BRIDGE NAME: BMP on Route 210				
BRIDGE NUMBER MF 71	PREPARED BY HUY NGO		DATE 10-28-14	SHEET 1 of 1

5 BR - STANDARD LOG OF TEST BORING.GPJ CALTRANS LIBRARY (FEB 2013).GLB 1/6/15

LOGGED BY	BEGIN DATE	COMPLETION DATE	BOREHOLE LOCATION (Lat/Long or North/East and Datum)	HOLE ID
HUY NGO	10-28-14	10-28-14	34° 14' 4.38" / -118° 17' 30.05" WGS84	A-14-072
DRILLING CONTRACTOR: CALTRANS			BOREHOLE LOCATION (Offset, Station, Line): 120' Rt Sta 746+30 Route 210	SURFACE ELEVATION: 1684 ft NAVD88
DRILLING METHOD: Solid-Stem Auger			DRILL RIG: Acker AD2	BOREHOLE DIAMETER: 6 in
SAMPLER TYPE(S) AND SIZE(S) (ID): SPT 1.4 ID			SPT HAMMER TYPE: 140	HAMMER EFFICIENCY, ERi: 0.71%
BOREHOLE BACKFILL AND COMPLETION: Borehole Backfill with Cemt			GROUNDWATER READINGS: DURING DRILLING / AFTER DRILLING (DATE)	TOTAL DEPTH OF BORING: 46.5 ft

ELEVATION (ft)	DEPTH (ft)	DESCRIPTION	Sample Location	Sample Number	Blows per 6 in.	Blows per foot	Recovery (%)	RQD (%)	Moisture Content (%)	Dry Unit Weight (pcf)	Shear Strength (tsf)	Drilling Method	Casing Depth	Remarks
	0	SILTY SAND (SM); yellowish brown; dry.												
		Poorly graded SAND (SP); very dense; light gray; dry; trace GRAVEL.	X	1	19 36 34	70	100							
1678.50	5													
			X	2	27 37 49	86	100							
1673.50	10													
		Dense.	X	3	14 21 27	48	100							
1668.50	15													
		Very dense.	X	4	14 23 33	56	100							
1663.50	20													
		Dense.	X	5	7 21 18	39	100							
1658.50	25													
		Very dense; light brown; moist.	X	6	22 25 26	51	100							
1653.50	30	SILTY SAND (SM); dense; dark gray; moist; Very Thin Interbeded Layer of Gravel (03 inches).												
			X	7	26 20 16	36	100							
1648.50	35													
		Dark brown; trace GRAVEL.	X	8	11 15 27	42	100							
1643.50	40													
		Medium dense.	X	9	9 11 11	22	100							
1638.50	45													
		Poorly graded SAND (SP); very dense; grey; dry; fine SAND.	X	10	100/RE	REF	100/							
		Bottom of borehole at 46.5 ft bgs												
1633.50	50													

This Boring Record was developed in accordance with the Caltrans Soil & Rock Logging, Classification, and Presentation Manual (2010) except as noted on the Soil or Rock Legend or below.

Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - South 1

REPORT TITLE				HOLE ID
BORING RECORD				A-14-072
DIST. 07	COUNTY LA	ROUTE 210	POSTMILE R9.7/R16.1	PROJECT ID 07-288021
PROJECT OR BRIDGE NAME: BMP on Route 210				
BRIDGE NUMBER MF 72	PREPARED BY HUY NGO	DATE 10-28-14	SHEET 1 of 1	

5 BR - STANDARD LOG OF TEST BORING.GPJ CALTRANS LIBRARY (FEB 2013).GLB 1/6/15

SILICONE JOINT SEALANT APPROVED BY CALTRANS

The following silicone joint sealants have been tested and approved by the Transportation Laboratory. Silicone joint sealant must be a low modulus, one part silicone formulation. Typical uses are for sealing longitudinal and transervse joints in PCC pavement.

Refer to Section 40-1.02l(2) of the 2010 Standard Specifications

Manufacturer	Product	
Crafco, Inc.	RoadSaver, part number 34902	(800) 528-8242
D.S. Brown Co.	DSB 800	(419) 257-3561
Dow Corning	888 Silicone Joint Sealant	(303) 980-9614
Sika Corporation	Sikasil-728 NS	(800) 933-7452

PHONE NUMBERS LISTED ARE FOR THE HEADQUARTERS OF EACH COMPANY. THEY WILL PROVIDE ORDERING INFORMATION OR LOCATION OF THE NEAREST SUPPLIER.

Last revised 12/6/2012

For more information about this site, please contact Lisa Dobeck at (916) 227-7291, or lisa.dobeck@dot.ca.gov

(Please be aware that this list is **not** for Type A joint seal, the two component silicone sealant specified in section 51-2.02B of the 2010 Standard Specifications. There is no list for Type A joint seal, it is tested on a batch by batch basis.)