INFORMATION HANDOUT

For Contract No. 07-3X8704
At 07-LA-105, 405-R2.5, 20.5/R21.1

Identified by
Project ID 0713000241

MATERIALS INFORMATION

Foundation Report for Retaining Wall No. 95 Near Route 405 and Route 105 Connector, dated March 10, 2016

Revised Geotechnical Design Report for NB 405 to E/B and W/B 105 Connectors-Approach, Departure, and General Embankment Roadway Distress Repair, dated October 28, 2015

Fiber Optic System As-Built Drawings

List of the preconstruction operational status-check results

State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

Memorandum

Serious drought.
Help save water!

To: MRS. TRACI MENARD, Branch Chief
Office of Structure Design, Branch 15

Attn.: Jose Higareda

Date: March 10, 2016
File: 07-LA-405-PM 20.5/21.0
EA 07-3X8701
Project ID: 0713000241
Retaining Wall No. 95
Bridge No. 53E0358

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design South, Branch C

Subject: FOUNDATION REPORT FOR RETAINIG WALL NO. 95 NEAR ROUTE 405 AND ROUTE 105 CONNECTOR

1.0 INTRODUCTION

In response to the request of Office of Structure Design (OSD) Branch 15, Office of Geotechnical Design South (OGDS) has prepared a Foundation Report (FR) for the proposed Retaining Wall No. 95 (Bridge No. 53E0358) located next to a proposed Austin Vault Sand Filters (Location 31) near northbound 405 to 105 connector at postmile 20.5 to 21.0. This FR includes recommendations for foundation design of subject wall which will be ground anchored wall system. The recommendations provided in this report are based on the project plans provided by OSD, dated January 28 to March 8, 2016, and cross sections provided by District 7 Office of Design dated August 2015.

2.0 SCOPE OF WORK

The following tasks were performed for the preparation of this report:

1. Review of pertinent information from previous geotechnical reports in the subject area.
2. Drilling, logging, and sampling of two hollow stem auger borings and one hand auger boring at the subject site to characterize the subsurface conditions.
3. Laboratory testing of selected soil samples for mechanical analysis, corrosivity, direct shear, unit weight, and Atterberg Limits testing.
4. Performing geotechnical analysis and providing geotechnical recommednations.

3.0 PROJECT DESCRIPTION

Proposed Retaining Wall No. 95 (RW 95) will be a ground anchored pile system and will be constructed at the toe of NB I-405/105 Connector shoulder embankment fill to provide space for construction of an Austin Vault Sand Filter (Location 31). The embankment fill to be retained is

an approximately 2.5 H:1V slope and is about 40 ft. high. RW 95 will be 152 feet long (Sta. 95+02 to Sta. 96+55 Centerline I-405) and approximately 27 ft. high for temporary condition during Austin Vault Location 31 construction. Upon completion of Vault construction, RW 95 section next to Vault will be buried and resultant wall height will be approximately 12 ft. high (permanent condition).

The soldier pile system for RW 95 will have up to two rows of anchors and 6X12 timber lagging. Based on OSD first row of ground anchors will be 6 feet below the top of the wall. Second row of anchors will be 11 feet below the first row for Pile Nos. 7 to 14, and 9 feet for piles 5, 6, 15. The end piles are cantilevered with no anchors. OGDS understands that anchors will be placed at 15 degrees inclination.

Proposed Austin Vault Locations 31 will be constructed in accordance to Water Pollution Control Details for Austin Vault Sand Filter (Sheets WD-XX, dated 04-12-13 provided to OGDS by D07 Office of Design). Foundation design recommendations for Austin Vault Location 31 is provided in a separate Geotechnical Design Report (GDR) by OGDS to District 7 Design. An existing 72 inch Reinforced Concrete Pipe (RCP) is located north of the proposed Retaining Wall No. 95.

Table 1- Summary of Proposed Retaining Wall No. 95 Information

Pile No.	Pile Size	No. of Ground Anchors	Profile Grade Elev. ft.	Temp. Wall Design Height (Temp. H) ft.	Top of Drilled 42 in Dia. Hole Elev. (with concrete backfill) ft.	Final Finish. Grade Elev. ft.	Wall Design Height (H) ft.
1	Double HP 12X53	0	100.62	9.12	91.5	88.0	12.62
2-4	Double HP 12X53	1	100.56-100.60	14.1-15.6	85.5-86.5	88.0	12.56-12.60
5-15	Double HP 12X53	2	100.30-100.53	19.3-27.97	78.5-81.5	88.0	12.30-12.53
16-17	Double HP 12X53	1	100.26-100.28	14.76-15.78	84.5-85.5	88.0	12.26-12.28
18	Double HP 12X53	0	100.24	9.74	90.5	88.0	12.24

Table 2- Summary of Proposed Austin Vaults Location 31 Information

Location	Approx. Begin and End Station	Length ft.	Width ft.	Depth ft.	Invert Elevation ft.	Boring No.
31	Sta. 395+45 to Sta. 396+20 (Centerline NB 405 to WB 105 CON.)	71	15	12-16	74.82	A-15-001

4.0 FIELD INVESTIGATION AND TESTING PROGRAM

A field exploration was conducted on November 17 and 18, 2015. A total of two (2) Hollow Stem Auger borings (A-15-001 and A-15-003) were drilled at the toe of Route 405 embankment near proposed Austin Vault locations 31 and 32, respectively (See District 7 AVSF Plans, dates 9/3/14). A Hand Auger boring, A-15-002, was also advanced within the embankment fill to a depth of 5 feet. Both hollow stem auger borings were drilled to a depth of 51.5 feet. A summary of boring data for the current exploration is presented in Table 3 below.

All borings were drilled by the Caltrans Office of Drilling Services and logged by OGDS personnel. All borings were drilled utilizing Hollow Stem Auger method. Soil samples were collected using Standard Penetration Test (SPT) sampler and Modified California Sampler (MCS) typically at 5-foot depth intervals. The samplers were driven a total of 18 inches using a 140-pound hammer falling for 30 inches. The MCS is a 2.0-inch inside-diameter split-barrel type sampler lined with thin brass tubes. The MCS was used to collect relatively undisturbed samples of fine-grained or cohesive soils. Field investigation data is presented in the Log of Testing Boring (LOTB). It should be noted that all elevations used in this report are NAVD88 datum based unless otherwise specified.

Table 3 – Summary of Boring Information

Boring No.	**Drill Date**	**Station[1] ft. (NB405/105 Con.)**	**Offset[1] ft. (NB405/105 Con.)**	**Surface Elevation[2] ft.**	**Bottom Elevation[2] ft.**	**Drilled Depth, ft.**
A-15-001	11/17/16	397+25.0	170.0 Rt.	+88.1	+36.6	51.5
A-15-002	11/17/16	397+25	146.0 Rt.	+100.0	+95.0	5.0
A-15-003	11/18/16	383+50.0	155.0 Lt.	+97.3	+45.8	51.5

Notes:
1. Stationing and Offsets was estimated based on GPS coordination taken in the field.
2. Elevations are above Mean Sea Level (MSL) based on NAVD88 datum.

5.0 LABORATORY TESTING PROGRAM

Laboratory testing was performed on selected SPT and undisturbed (MCS) samples from the borings. Laboratory testing included Unit weight, Moisture Content, Mechanical Analysis, Direct Shear, and Corrosion. Geotechnical testing was performed in accordance with California Test Methods, or ASTM procedures (listed in Table 4 below). A complete set of geotechnical laboratory results is presented in Appendix I -Laboratory Data.

Table 4 – Laboratory Test Methods

Test	Standard
Unit Weight	ASTM D 4767
Moisture Content	ASTM D 2216
Particle Size Analysis	ASTM D 422
Atterberg Limits	AASHTO T89 and T190
Direct Shear	ASTM D3080
Corrosion – Resistivity, pH	CTM 643
Corrosion – Chloride Content	CTM 422
Corrosion – Sulfate Content	CTM 417

6.0 REGIONAL GEOLOGY AND SUBSURFACE CONDITIONS

6.1 Regional Geology

The site lies within the Los Angeles Coastal Plain, which consists of a thick deposition of marine and continental sediments that at times has been inundated by the sea and at other times exposed to erosion and deposition.

6.2 Site geology

Beneath the embankment fill the site has been mapped as being underlain by Quaternary age alluvium designated as the Lakewood Formation, comprised of marine and continental deposits of gravel, sand, silt and clay (DWR, 1961). The alluvium encountered at this site consists of primarily unconsolidated deposits within the Torrance Plain (DWR, 1961).

6.3 Subsurface Soil

Based on the subsurface exploration program conducted for this project, the native materials at proposed RW 95 (below the embankment fill) are generally composed of very stiff to hard clays to an elevation of about +52 feet. Medium stiff to stiff lean clays and silts are located to the full depth explored to maximum depth drilled (Elevation +36.6 feet).

Based on the "405/105 Embankment Distress Project" GDR dated June 20, 2014 (EA 07-3X8701), the NB 405 to 105 connector embankment fill at Location 31 is composed of 50 feet of mainly medium dense to dense silty sands and clayey sands with some stiff clays closer to the connector travel way area.

6.4 Groundwater

Groundwater was encountered at elevation +43 feet in boring A-15-001. Groundwater was not encountered at boring A-15-003 to depth of 51.5 feet drilled (elevation +45.8).

7.0 SCOUR EVALUATION

Scour potential is negligible at the subject site.

8.0 CORROSION EVALUATION

Representative composite bulk samples were tested for corrosion potential of soils. Based on these results soils at the subject are considered non-corrosive.

Table 5 – Corrosion Test Results

Boring	Depth (ft)	Minimum Resistivity (Ohm-cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)
A-15-001	0-25	616	8.02	147	428
A-15-001	25-50	730	8.61	135	285

Note: 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.

9.0 SEISMIC EVALUATION

9.1 Faulting and Seismicity

The Newport Inglewood Fault Zone (N. Los Angeles Basin Section) is the nearest known seismic source for this site. This fault is a right lateral strike slip fault dipping 88 degrees to the northeast. The closest distance from the site to the active portion of the fault trace is 2.9 miles. Caltrans ARS Online Version 2.3.06 was used to obtain some of the fault information for the nearest seismic sources provided in Table 6.

Table 6– Fault Information

Fault Name	Type	M_{max}	Dip direction (Dip angle)	R_X	R_{JB}	R_{RUP}
Newport Inglewood Fault Zone (N. Los Angeles Basin Section)	RLSS	7.2	Northeast (88 degrees)	2.9 mile	2.9 mile	2.9 mile
Compton Fault	R	6.9	Northwest (20 degrees)	5.3 miles	0.0 mile	5.0 miles
Palos Verdes	R	7.2	Vertical (90 degrees)	7.8 miles	7.8 miles	7.8 miles

Notes: R_X = Horizontal distance to the fault trace
R_{JB} = Shortest horizontal distance to the surface projection of the rupture area
R_{RUP} = Closest distance to the fault rupture plane

The design ARS curve is an envelope of deterministic and probabilistic acceleration response spectrum curve. The probabilistic ARS curve was developed with a ground motion return period of 975 year which is corresponding with 5% probability to be exceeded in 50 years and the Next Generation Attenuation (NGA) was used for the deterministic ARS curve. The design Peak Ground Acceleration (PGA) has been determined to be 0.53g for the subject site.

9.2 Surface Fault Rupture Hazard

The project site is not located within any CGS designated Earthquake Fault Zone (EFZ). The nearest segment of the San Andreas Fault (Mojave section) is located 1.8 miles southwest of the site. Therefore, the possibility of surface fault rupture hazard at the site is considered low.

9.3 Seismically Induced Ground Settlement

Because of cohesive materials encountered in the upper native materials at the subject site (Elevation +88 to 36.6 feet) seismically-induced ground settlement is estimated to be negligible under the design ground motion.

10.0 LIQUEFACTION EVALUATION

Based on the previous subsurface exploration results, liquefaction has a negligible potential of occurring during a seismic event. This is due to the relative depth of groundwater, measured about 45 ft below native surface, (Elevation +43 feet MSL) and the cohesive soils encountered below this depth (Elevation 36.6 feet).

11.0 FOUNDATION RECOMMENDATIONS

Retaining Wall No. 95 will be a ground anchored pile system wall with an approximately 27 foot exposed height (during construction of the wall and adjacent Austin Vault) and 152 feet long (Sta. 95+02 to Sta. 96+55 Centerline I-405) with two rows of anchors and 6X12 timber lagging. The final exposed height of the Retaining Wall will be 12 feet high with the Austin Vault placed 5 feet in front of it. The 5 feet width will be backfilled with structural fill or with a material such as pea gravel. The recommendations provided in this report are based on the project plans provided by OSD, dated January 28 to March 8, 2016, and cross sections provided by District 7 Office of Design dated August 2015.

11.1 Design Soil Strength Parameters

Soil strength parameters for design of the proposed RW 95 are summarized in Table 7. These parameters are based on subsurface data obtained from the current investigation, and GDR prepared by OGDS1, dated June 20, 2014. The soil strength parameters were conservatively estimated due to lack of soil bore hole at the exact location of the proposed wall.

Table 7 – Summary of Soil Strength Parameters

Location	Subsurface Elevation ft.	Soil Type	Unit Weight pcf	Friction Angle degrees	Cohesion PSF
RW 95	136-88	SM (Fill)	120	33	--
	88-72	CH	115	--	600
	72-52	CH	115	-	1250

11.2 Ground Anchored System Design

Lateral earth pressure should be estimated in accordance to AASSHTO Bridge Design Specifications Section 3.11.5.7, “Apparent Earth Pressure (AEP) for Anchored Walls”. For design of soldier piles, minimum pile embedment depth based on global stability considerations are shown in Table 8 below. Local stability of the anchored wall was calculated by OSD utilizing CT-FLEX program.

OGDS understands that tolerable lateral deflection criteria for static condition is 1 inch at the top of the pile. Total and differential settlement of the retained zone as a result of lateral deflection will be negligible.

Appropriate drainage system should be considered to prevent hydrostatic pressure on the proposed wall and lagging.

Table 8- Foundation Recommendations for Proposed Retaining Wall No. 95 Design

Pile No.	No. of Piles	Pile Size	No. of Ground Anchors	Profile Grade Elev. ft.	Temp. Wall Design Height (Temp. H) ft.	Top of Drilled 42 in Dia. Hole Elev. (with concrete backfill) ft.	Bottom of Drilled 42 in Dia. Hole Elev. ft.	Final Finish. Grade Elev. ft.	Wall Design Height (H) ft.
1	1	Double HP 12X53	0	100.62	9.12	91.5	81.5	88.0	12.62
2-4	3	Double HP 12X53	1	100.56-100.60	14.1-15.1	85.5-86.5	75.5-76.5	88.0	12.56
5-15	11	Double HP 12X53	2	100.30-100.53	19.3-27.97	72.5-81.5	62.5-71.5	88.0	12.30
16-17	2	Double HP 12X53	1	100.26-100.28	14.76-15.78	84.5-85.5	74.5-75.5	88.0	12.26-12.28
18	1	Double HP 12X53	0	100.24	9.74	90.5	80.5	88.0	12.24

Table 9 – Summary of Ground Anchors Information

Ground Anchor Row No.	Depth from Top of the wall ft.	Minimum Unbonded Length ft.	Angle of Inclination degree
1	6	35	15
2	17	25	15

11.3 Global Slope Stability

A typical cross section of the RW 95 where the planned temporary wall height is approximately 27 feet, was used to analyze slope stability factor of safety. The soil parameters for the analysis were used based on Table 7 above. Anchor loads of 146 kips and 129 kips (SD Pile Data Table dated 3/8/2016) were used in slope stability analysis for the first and second row, respectively.

The stability analysis was conducted using computer program SLOPE/W utilizing the limit equilibrium method. Slope stability was run for a temporary and permanent condition. The temporary condition consisted of the 27 foot high retaining wall in place with a 1:1 temporary backut

on the side of the Austin Vault opposite the RW 95. The results of slope stability analysis (Bishop Method) meets the required safety factor of 1.2 under static condition. Factor of safety for permanent wall condition (12 feet high) also meets the safety factor criteria of 1.5 for static condition, and 1.1 under seismic (k_h=0.18) design conditions

CONSTRUCTION CONSIDERATIONS

1. Earthwork should be performed in compliance with Section 19 of the Caltrans Standards Specifications (2010).

2. Moderate caving may be anticipated during drilling for soldier piles and ground anchors.

3. Performance testing should be done on minimum 3 anchors and proof testing should be conducted on all anchors that are not performance tested in accordance to Section 46-2.01 Ground Anchors of the Caltrans Standard Specifications (2010).

If you have any questions or comments, please call Sam Sukiasian at (213) 620-2135 or Christopher Harris at (213) 620-2147.

Prepared by: Date: 3/10/2016

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cc: David Yan, District 7 Project Management
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Attachments: Appendix A – Laboratory Results

Appendix I
Laboratory Results

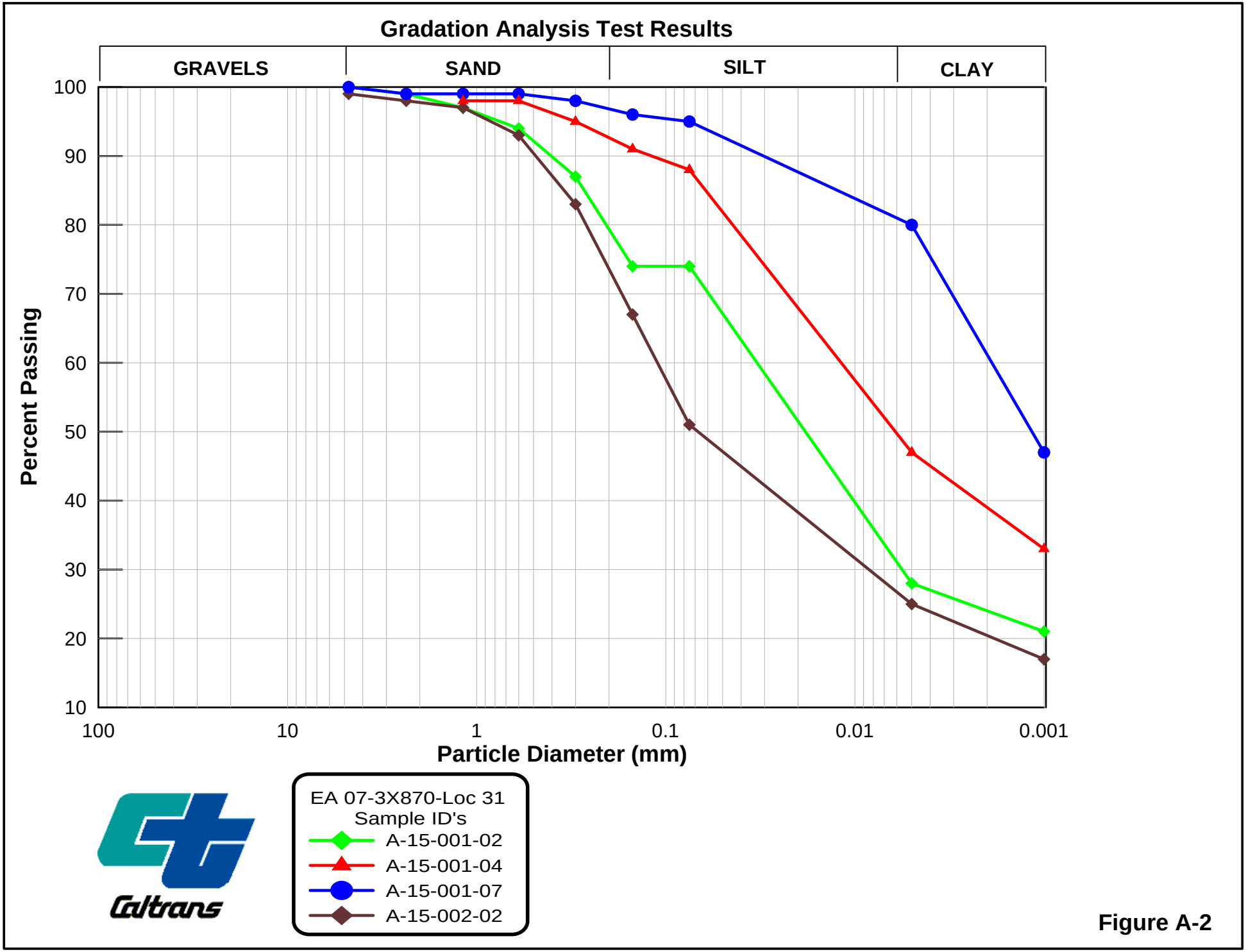
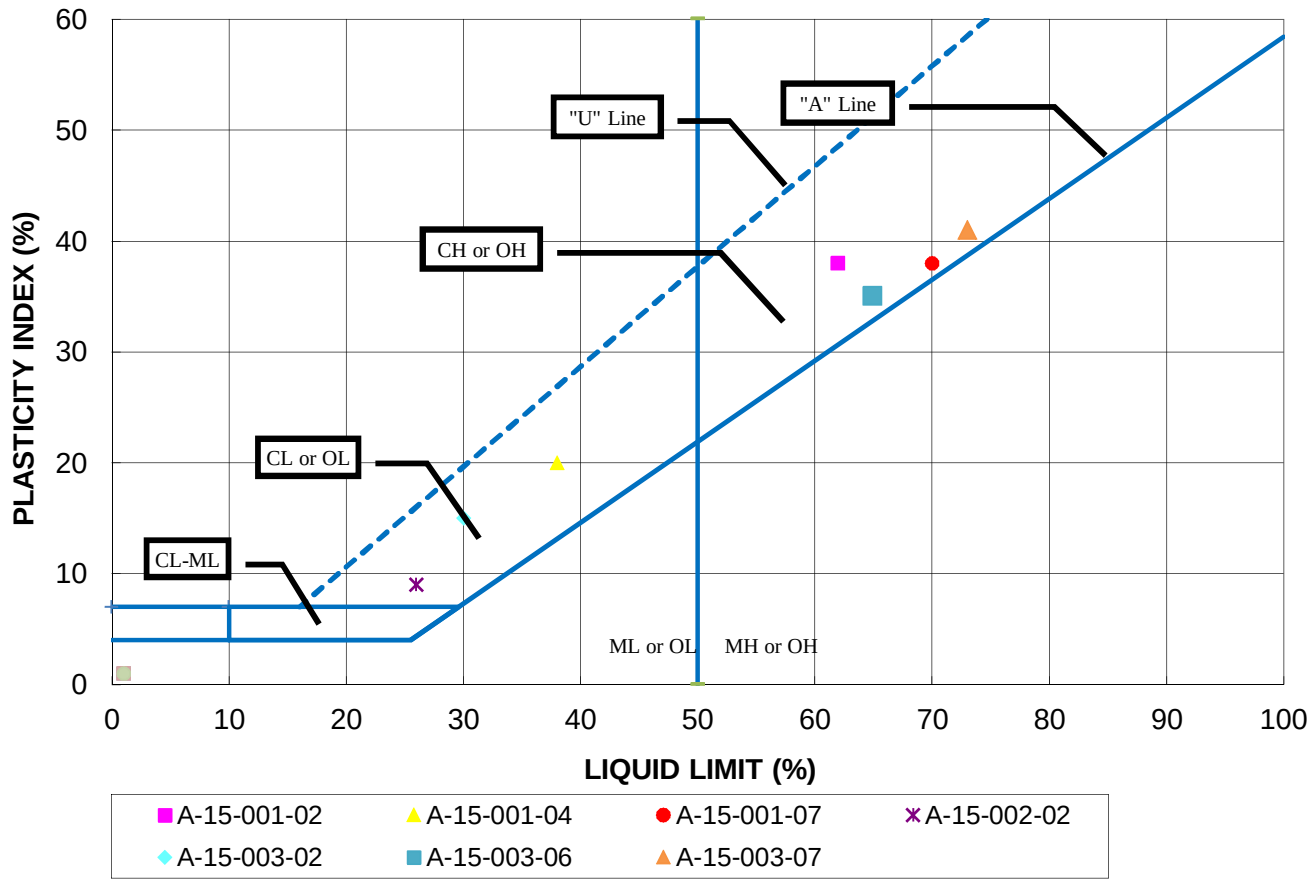

Gradation Analysis Test Results
GRAVELS
SAND
SILT
CLAY
Percent Passing
100
90
80
70
60
50
40
30
20
10
100
10
1
0.1
0.01
0.001
Particle Diameter (mm)
EA 07-3X870-Loc 31
Sample ID's
A-15-001-02
A-15-001-04
A-15-001-07
A-15-002-02
Caltrans

Figure A-2

Atterberg Limits Test Results



Boring No.	Sample No.	Depth (ft)	LL	PI	PL	Classification
A-15-001	2	10'	62	38	24	CH
A-15-001	4	20'	38	20	18	CL
A-15-001	7	35'	70	38	32	CH
A-15-002	2	5'	26	9	17	ML
A-15-003	2	10'	30	15	15	CL
A-15-003	6	30'	65	35	30	CH
A-15-003	7	35'	73	41	32	CH

Caltrans

Engineering Services
Division of Geotechnical Services
Office of Geotechnical
Design - South 1
(Location in parenthesis)

Project:	405-105 Austin Vaults
EA:	07-3X8701
Dist-Co-Rte-PM:	07-LA-405-20.5/21.0

State of California
DEPARTMENT OF TRANSPORTATION

California State Transportation Agency

M e m o r a n d u m

Serious drought.
Help save water!

To: MR. ASADOUR TERTERIAN Branch Chief
District 07 Design, Branch A

Date: October 28, 2015

File: 07-LA-405-PM 20.58/21.08
07-LA-105-PM 2.5
EA 07-3X8701
Project ID: 0713000241
Roadway Distress Repair
NB 405 to E/B and W/B
Connector Embankments

Attn: Mr. Medardo De La Cruz, Project Engineer

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services
Office of Geotechnical Design South-1 Branch C

Subject: REVISED GEOTECHNICAL DESIGN REPORT (GDR) FOR NB 405 TO E/B AND W/B 105 CONNECTORS – APPROACH, DEPARTURE, AND GENERAL EMBANKMENT ROADWAY DISTRESS REPAIR

This Revised GDR replaces the original June 20, 2014 GDR. Per your original request dated September 9, 2013, Geotechnical Design-South 1, Branch C has prepared this Revised Geotechnical Design Report (GDR) for the N/B 405 to E/B and W/B 105 Connector Approach, Departure, and General Roadway Embankments in the City of Hawthorne, California, (see Figures 1). This study was based on soil boring (Including Slope Inclinometers) and Cone Penetration Tests (CPT's) conducted between December 2013 and March 2014. Laboratory test results from the soil borings were also used for evaluation in this study. This study provides detailed design recommendations. This report follows a Preliminary Geotechnical Assessment Report dated November 5, 2013 which provided a summary of observed distress of the embankment areas. This Revised report summarizes changes to the recommendations for Location 5 in Section 9.4.

1.0 INTRODUCTION

The general site is located in the City of Hawthorne, Los Angeles County, California. Per the Latest Project Plans provided to our Office, the site is composed of five areas where embankment distress was observed. The distressed locations are summarized below in terms of stationing and are shown on Figures 2 through 5.

Table 1 – Summary of Distress Locations

Location No.	Description	Stations (1)	Lanes Distressed
1	N/B 405 to 105 Connector at Bridge No. 53-1238G - Departure	372+95 to 374+00	Right and Left shoulders, both lanes
2	N/B 405 to 105 Connector up to 120th Street Approach.	372+95 to 385+70	Right and Left shoulders, both lanes
3	N/B 405 to W/B 105 Connector Approach	388+60 to 401+80	Right and Left shoulders, both lanes
4	N/B 405 to E/B 105 Connector Approach	PI 94+16.67 to 101+80	Right and Left shoulders, both lanes
5	N/B 405 to E/B 105 Connector Departure – Route 105	121+25 to 123+75	Right Shoulder, Number 2-4 lanes

Notes: (1) Stationing per the Project Plans (3/6/14). Locations 1 through 3 based on alignment NB 405/105 CON. Locations 3-4 NB 405/WB 105 CON. Location 5 was based on Route 105 alignment.

As discussed in the Preliminary Geotechnical Assessment Report, the distress to the roadway areas consists of settlement of the departure and approach slabs and settlement of the right shoulder and number 2 Lane in Location 2. Some settlement was also observed on the retaining wall guard rails adjacent to the slabs in Locations 3, and 4. Additional significant settlement was observed on the E/B 105 shoulder and two right lanes adjacent to a drainage inlet located on the shoulder near Station 122+50 (per Route 105 Alignment). Additional description of the observed distress is discussed in the Section 2.0.

The geotechnical site investigation for this project consisted of 37 CPT's and 17 soil borings with 4 slope inclinometers (SI's) installed in the areas of distress and in some adjacent areas. Slope Inclinometers (SI) were installed to monitor movement of the embankment slopes. The CPT and boring locations are shown on Figures 2 through 5. Detailed information of our site investigation and monitoring program is summarized in Section 4.0: Exploration and Instrumentation. A summary of laboratory test results of the soil samples taken during the investigation is summarized in Section 5.0.

The purpose of this report is to:

- Summarize subsurface geotechnical findings from our investigations.
- Provide an analyses and assessment of the cause of distress based on the findings
- Provide design recommendations for the distress embankments.

2.0 EXISTING CONDITIONS

The existing embankments for Locations 1 and 2 are generally composed of about 38 to 40 foot high fill embankments with slope grades of at least 2:1 (H:V) or flatter. Locations 3 and 4 are composed of embankment fill heights of 50 feet on the west side and 60 feet on the east side, respectively, with slope grades at least 2:1 (H:V) or flatter. Location 5 has an embankment height of about 30 feet on the south side with a slope grade of at least 2:1 (H:V). The N/B 405 Connector to the 105 is a two-lane connector with 12 feet wide lanes and shoulders with widths varying from 5 to 10 feet. The 105 Section as part of Location 5 is composed of 4 travel lanes at 12 foot widths each and shoulders varying in width of 5 to 10 feet. The departure and approach slabs at Locations 1 through 3 are bounded by wing-walls on the east sides of the embankment. The travel lanes and shoulders are covered by Portland Cement Concrete (PCC) surfacing. The slope surfaces are generally covered by vegetation.

2.1 Observed Distress

Based on field visits between December 2012 and September 2013, roadway distress was observed at the following five locations, listed in Table 1. Based on previous reports the distress was initially observed at least by 1998, when a Geotechnical Investigation was conducted (Between 1998 to 1999) and report issued on September 2001 by the Office of Geotechnical Services. In response to the settlement of the departure slab at Location 1 and the approach slabs in Locations 3 and 4 a slab-jacking program was performed by Maintenance in June 2013. The slab-jacking was performed to lift the slabs and improve near surface soil density. A summary of the observed distress is summarized below:

Location 1 (N/B 405 to 105 Connector at Bridge 53-1238G)

1-2 inches of settlement was observed on the departure slab within both lanes at this location. Guard rails of the wing walls were also observed to have settled by 1-2 inches relative to the bridge structure. The departure slab is about 30 feet in length. Evidence of ponding of water around the inlet drain on the right shoulder indicates improper drainage (likely a result of settlement of the slab).

Location 2 (N/B 405 to 105 Connector south of 120th Street Bridge)

Settlement of about 1-inch of the right shoulder and Number 2 lane was observed at this location. Settlement was observed to be intermittent between Stations 374+00 to about 385+70 (end of 120th Street Approach slab). Settlement also appears to have affected the grade of the connector where runoff appears to be re-directed over east facing embankment slope face. About 257 feet south of the 120th street bridge abutment runoff appears to be flowing over the right shoulder and causing erosion of the slope face, which was documented in the Preliminary Assessment Report dated

November 12, 2013. The AC dike beneath the guard rail ends about 335 feet south of the 120th Street abutment.

Additionally, at Station 374+70 (per the 405-105 Connector Alignment), tension cracks were observed in the right shoulder area, about 60 feet in length. The tension cracks were indicative of slope distress. Some minor bulging was observed on the slope face just below the tension cracks as well. An SI was installed within the tension cracks zone to monitor slope movement (See Section 4.1 for a discussion on slope inclinometer results).

Location 3 (N/B 405 to W/B 105 Connector Approach)

Observed distress in this location consisted of settlement of 1-2 inches of the approach slab (for the N/B 405 to 105 W/B Connector Bridge) on both travel lanes. Some cracking was observed on the approach slab as well. Settlement of 1-2 inches of was observed on the guard rail top of the wing-wall relative to the bridge deck guard rail. Cavities below the guard rail and slab were also observed, on the outside of the slab area on the west side. As mentioned previously, this area was filled with injection foam from the slab-jacking operation performed in June 2013.

Location 4 (N/B 405 to E/B 105 Connector Approach)

1-2 inches of settlement was also observed in the approach slab at this location. Similar to Location 3, the settlement was observed to involve both travel lanes with some cracking of the approach slab. Some horizontal separation (about 1-2 inches) of the guard rails was also observed. No vertical settlement of the barrier guard rails was observed here. As in Location 3, this slab area was also injected with foam for a slab-jacking operation performed in 2013.

Location 5 (N/B 405 to E/B 105 Departure Area)

This Location was observed to have significant settlement of about 2-4 inches for about a 25 foot width within the EB 105 right shoulder and adjacent Number 3 and 4 lanes, with less settlement observed in Lanes 1 and 2 and the HOV Lane. It was noted that this depression area is adjacent to an inlet drain located on the right shoulder. This depression area is located at about Station 122+50 (per the 105 alignment). In addition, severe signs of erosion were observed adjacent to the right shoulder area from about Station 122+37 to 122+62. The depth of erosion was observed to be about up to 6-8 feet deep. A detached 4-inch PVC pipe was observed coming out of the structural section just above the cavity area with the remainder of the PVC adjacent to the shoulder area. In November 2013, Maintenance had this cavity area filled with loose aggregate base material.

The abutment slope underneath the bridge abutment of the departure area N/B 405 to E/B 105 Connector was seen to have significant erosion gullies up to 5 feet deep within the slope face. The erosion starts about 8 feet below the top of the slope and extends within a few feet from the toe of the slope. The overall height of the slope is about 30 feet and is at a 2:1 (H:V) grade.

3.0 PERTINENT REPORTS AND DOCUMENTS

The following documents were reviewed for this study:

- Caltrans, Preliminary Assessment Report of Embankment Repair at N/B 405 to E/B and W/B 105 Connector Embankments. November 12, 2013.
- Caltrans, Embankment Distress at Route 405 Northbound Connector to Eastbound 105. January 24, 2012.
- Caltrans, Project Plans for Construction, 07-LA-405-20.58/21.08. Last Revised March 5, 2014.

4.0 EXPLORATION AND INSTRUMENTATION

Between December 4 and 12, 2013, 37 CPT's were conducted within the 5 identified Distress Locations. The CPT's were sounded to a typical depth of up to 40 to 50 feet below roadway elevation. This CPT program was followed by drilling 17 hollow stem auger borings within the five locations between January 29 and February 25th. Among the borings, 4 Slope Inclinometers were installed to monitor embankment slope movement. The borings were drilled to generally 50 feet depth below roadway elevation. A summary of the CPT and Hollow Stem Auger borings is found in Appendix A. Log of Test Borings (LOTB's) are provided separately.

Soil samples from the Hollow Stem Auger borings were logged and sampled using either a Standard Penetration Test (SPT) sampler or 2-inch Modified California sampler at 5-foot intervals. The SPT samples were driven using a 140-pound hammer falling freely for 30 inches for a total penetration of 18 inches. The Modified California samplers were pushed 12-inches into the soil to obtain the undisturbed brass-tube samples. 2-inch undisturbed samples were taken at depths of low tip resistance (as indicated on CPT results). Areas of low tip resistance are typically 20 tsf or less. These results indicate zones of soft to medium stiff clay or loose sandy materials, which could contribute to the distress observed. The Cone Penetration Test (CPT) is performed by pushing a steel rod fitted with a cone at the tip through the soil. As the rod is pushed tip and side friction resistance is measured and electronically sent to a computer inside the CPT truck. The data is then processed and analyzed for subsurface conditions.

4.1 Slope Inclinometer Monitoring

A total of four slope inclinometers (SI) were installed to monitor the embankment slope movement at Locations 2, 3 and 4 which had shown signs of embankment distress.

Taken twice-monthly since March 2014, the amount of slope movement detected in the SI's of the embankments locations was observed to be negligible. Some localized deflection was detected at 40 to 50 feet in SI's RC-13-003 and 009, however these are likely caused by settling of the PVC inside the surrounding backfilled annulus (unrelated to slope movement). The graphical results of the slope inclinometers are summarized in Appendix B.

5.0 LABORATORY TESTING

Laboratory testing was performed on collected soil samples from the investigation program. The material is representative of the backfill material used for the embankment and native alluvium soil underneath the fill embankment. Laboratory testing includes the following; grain size analysis, Atterberg limits, direct shear strength, unconfined compression strength, consolidation, and corrosion. Geotechnical testing was performed in accordance with California Test Methods and/or ASTM procedures as indicated by Table 2. The lab results are provided in Appendix C.

Table No. 2 – Laboratory Test Methods

Test	Standard
Grain Size Analysis	ASTM D 422
Atterberg Limits	AASHTO T 90 & 89
Direct Shear Strength	ASTM D 3080
Unconfined Compression Strength	ASTM D 2166
Consolidation	ASTM D 2435
Corrosion	CTM 643, CTM 422, CTM 417

Composite bulk samples from Boring A-14-001 and A-14-002, in location 1 and 2, respectively were tested for corrosion potential. The results show that the fill soils in these areas are not corrosive. However, due to the variable nature of the embankment fill soils encountered, it is recommended that all fill soils to be used for fill placement after excavation (See Section 9.5.2) be tested for Expansion Index and Corrosion Potential.

Table No. 3 – Corrosion Test Results

Boring	Depth (ft)	Minimum Resistivity (Ohm-cm)	pH	Chloride Content (ppm)	Sulfate Content (ppm)
A-14-001	10	2990	8.2	N/A	N/A
A-14-008	15	2138	8.13	N/A	N/A

Note: 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.

6.0 REGIONAL GEOLOGY AND SEISMICITY

6.1 Regional Geology

The site lies within the Los Angeles Coastal Plain, generally a thick deposition of marine and continental sediments that at times has been inundated by the sea and at other times exposed to erosion and deposition.

6.2 Seismicity

The Newport Inglewood Fault Zone (N. Los Angeles Basin Section) is the nearest known seismic source for this site. This fault is a right lateral strike slip fault dipping 88 degrees to the northeast. The closest distance from the site to the active portion of the fault trace is 2.9 miles. Caltrans ARS Online Version 2.3.06 was used to obtain some of the fault information for the nearest seismic sources provided in Table No. 4.

Table No. 4 – Fault Information

Fault Name	Type	M_{max}	Dip direction (Dip angle)	R_X	R_{JB}	R_{RUP}
Newport Inglewood Fault Zone (N. Los Angeles Basin Section)	RLSS	7.2	Northeast (88 degrees)	2.9 mile	2.9 mile	2.9 mile
Compton Fault	R	6.9	Northwest (20 degrees)	5.3 miles	0.0 mile	5.0 miles
Palos Verdes	R	7.2	Vertical (90 degrees)	7.8 miles	7.8 miles	7.8 miles

Notes: R_X = Horizontal distance to the fault trace
R_{JB} = Shortest horizontal distance to the surface projection of the rupture area
R_{RUP} = Closest distance to the fault rupture plane

The design ARS curve is an envelope of deterministic and probabilistic acceleration response spectrum curve. The probabilistic ARS curve was developed with a ground motion return period of 975 year which is corresponding with 5% probability to be exceeded in 50 years and the Next Generation Attenuation (NGA) was used for the deterministic ARS curve. The design Peak Ground Acceleration (PGA) has been evaluated as 0.53g from the design ARS curve.

7.0 GEOTECHNICAL CONDITIONS

7.1 Site geology

Beneath the embankment fill the site has been mapped as being underlain by quaternary age alluvium designated as the Lakewood Formation, comprised of marine and continental deposits of gravel, sand, silt and clay (DWR, 1961). The alluvium encountered at this site consists of primarily unconsolidated deposits within the Torrance Plain (DWR, 1961).

7.2 Subsurface Conditions

Subsurface soil conditions encountered in the soil borings and CPT's for distress locations 1 through 5 are summarized below. Log of Test Borings can also be provided at a later date. Soil descriptions in this section were based on results of hollow stem auger borings and CPT results. Pavements in the distress locations generally consisted of 9-11-inch thick concrete sections underlain by about 2-inches of asphalt covered aggregate base over sub-grade material.

Location 1: N/B 405 to 105 Connector at Bridge 53-1238G

According to soil borings and CPT results, the embankment fill in this location is generally composed of 20 feet of medium dense sands and silty sands with some sporadic stiff clay layers. Underlying this fill was generally stiff to very stiff clayey soils of alluvial origin to the full depth explored (about 50 -55 feet deep).

Location 2: N/B 405 to 105 Connector south of 120th Street Bridge

The embankment at Location 2 as found to generally consist of 30 to 40 feet dense silty sands and sands and stiff to very stiff silty clays. The fill was found to be underlain by medium dense to dense silty sands and stiff to very stiff clays to the full depth explored (about 50 feet below roadway elevation).

At Station 374+70, where evidence of slope distress was observed, hollow stem auger boring A-14-003 revealed about 40 feet of fill composed of 13 feet of very stiff clay overlying 11 feet of medium dense sands and 16 feet of medium stiff to stiff clayey soils. This fill is underlain by stiff to very stiff clayey soils of alluvial origin.

Location 3: N/B 405 to W/B 105 Connector Approach

Based on hollow stem auger boring A-14-009 and nearby CPT data, subsurface conditions at Location 3 generally consisted of about 35 to 45 feet of fill consisting of 23 feet medium dense to dense sandy silts/silty sands overlying 12 to 22 feet of stiff clayey soils. This fill material was underlain by stiff to very stiff clayey soils of alluvial origin.

Location 4: N/B 405 to E/B 105 Connector Approach

Based on hollow stem auger boring A-14-010 and nearby CPT data, subsurface conditions at Location 4 generally consisted of about 35 to 47 feet of fill consisting of stiff to very stiff sandy clays with some dense sandy zones. This fill material was found to be underlain by stiff to very stiff clayey soils of alluvial origin.

Location 5: N/B 405 to E/B 105 Departure

Based on CPT and hollow stem auger data, the subsurface conditions at this location were generally composed of 25 to 30 foot fills consisting of medium stiff to stiff clayey soils and medium dense sandy silts to silty sands overlying dense sandy silts to silty sands with some gravel. The soils adjacent to the drainage inlet at Station 122+50 (per alignment Route 105) were found to be composed of 27 feet of very soft to medium stiff clayey soils overlying stiff to very stiff alluvial silty clay with some organic materials.

7.3 Ground water

Ground water was not encountered in any of the borings drilled to an elevation of approximately 60.4 feet above Mean Sea Level (MSL). This finding corresponds with historic data obtained: based on As-Built Log of Test Borings of the El Segundo UC (Bridge No. 53-1239) the ground water elevation was measured at 56.8 feet MSL on July 10, 1969. This bridge is adjacent to areas 1 through 4. Adjacent to the Location 5 area, at the Inglewood Avenue UC (Bridge No. 53-2435) groundwater was measured at an elevation of 37.0 feet above MSL on April 8, 1987.

8.0 LIQUEFACTION

Based on subsurface data from hollow stem auger borings and historic groundwater research based on as-built log of test borings in the area, the embankment soils are determined to be well above the known groundwater elevation. Furthermore, based on these LOTB's, granular soils below the known groundwater level were determined to be generally dense to very dense. Therefore, the effects from liquefaction are considered to be negligible for this project area.

9.0 GEOTECHNICAL ANALYSES AND DESIGN

Geotechnical analysis and design was performed to assess the cause of distress to the five embankment locations outlined in Table 1 of this report and provide detailed recommendations for repair. As discussed in this report, analysis was based on soil borings, CPT's, SI results, and laboratory results obtained for this study. Soil borings and CPT's were taken at regularly spaced intervals within the designated distress locations to obtain a comprehensive subsurface soil profile within the distressed and adjacent areas. Slope inclinometers were installed in various soil borings to determine potential slope movement of the embankment areas in Locations 2 through 4. The following sections summarize our analysis of the subsurface data and recommendations for repair.

9.1 Location 1: N/B 405 to 105 Connector at Bridge No. 53-1238G

Based on CPT's and hollow stem soil boring results performed, (see Section 7), no soft or loose soils were observed underlying the distressed slab in this location. Furthermore, inspection camera program reported no evidence of breaks within the drainage line which would potentially cause

settlement of the slab. Therefore, it is our opinion that a majority of the settlement of the slab has already occurred and thus negligible additional settlement is anticipated.

Recommendations:

It is recommended that the area of Location 1 (Stations 372+95 to 374+00 on the N/B 405 to 105 Connector) for a width of about 40 feet, comprising the left and right shoulders and both travel lanes have the structural section, including 2 feet over-excavation of the subgrade removed and replaced. Original roadway surface gradient lines should be re-established to allow proper drainage to the gutters and inlet drain. District 7 Pavement Design should be consulted regarding design of the structural section.

9.2 Location 2: N/B 405 to 105 Connector at 120th Street Bridge.

As in Location 1, the borings and CPT's for this Location did not reveal any soft or loose embankment fill which would explain the observed surface distress on the roadway (see Section 7). Due to the absence of loose or soft soils in this Location, it is likely that any settlement that would have caused the distress to the roadway would have already occurred. Erosion of the slope face at station 383+13 (257 feet south of 120th Street bridge south abutment), was likely cause by excessive runoff flowing over the right shoulder. Without proper AC dike construction, this erosion was particularly excessive at this location.

For Station 374+70, where evidence of embankment slope distress was observed, the embankment fill materials were found to be composed of 10 feet of stiff clayey soils overlying medium dense sands. Although Slope inclinometer data from A-14-003 does not show any present movement occurring, observed distress on the shoulder along with some bulging of the slope face about 20 feet below the top of slope suggest that slope instability has occurred in the past and may occur again from future water infiltration.

Recommendations:

It is recommended that the area of Location 2 (Stations 37+00 to 385+70 on the N/B 405 to 105 Connector) for a width of about 40 feet which includes the right and left shoulders have the structural sections removed and replaced along with 2 feet of subgrade overexcavation. The original roadway gradient should be re-established and AC dikes on the right shoulder be built or replaced for Stations 368+52 to 385+70. As in Location 1, District 7 Pavement Design should be consulted regarding structural section design.

For slope distress at Station 374+70 we recommend excavation of the embankment from Station 373+70 to 375+45 of the shoulder and adjacent lane and slope face. The excavation should cover about 17.25 feet width of roadway (comprising the shoulder and adjacent lane) and the slope for a height of about 30 feet. The base of the excavation should be about 30 feet width. The backfill

material should be primarily granular with an expansion index less than 50. The replacement material should be reinforced with geogrid material placed at about 6 foot vertical spacing within the 30 foot excavation area. The geogrid should have a minimum long term design strength of 8300 plf and a minimum width of 15 feet. Secondary geogrid will not be needed if the slope face is properly covered with vegetation. The temporary embankment backut should be no steeper than 1:1 (H:V). Benching widths should be no less than 3 feet. A detail of this recommendation will be provided at a later date.

9.3 Locations 3 and 4: N/B 405 to E/B and W/B 105 Approaches.

Subsurface conditions at these locations revealed predominantly medium stiff to stiff clayey embankment fills below the approach slabs 9see Section 7 for a complete subsurface description). Furthermore, CPT's revealed tip resistances of at least 40 tsf (correlated to greater than 4,000 psf undrained shear strength) underneath the structural sections at both Locations. As was determined in Locations 1-2, any settlement that could have caused the distress to the approach slabs has most likely already occurred. Similarly, based on the same subsurface data, vertical offsets observed at concrete barriers at both approach locations, are likely to have negligible additional settlement.

Recommendations:

It is recommended that the areas of Location 3 and 4 (Stations 388+60 to 402+10) for Location 3 and Stations 94+17 to 102+19 for Location 4 on the N/B 405 to 105 Connector) for a width of about 40 feet which includes the right and left shoulders have the structural sections removed and replaced along with 2 feet of subgrade overexcavation. District 7 Pavement Design should be consulted regarding structural section design. Structural Design should be consulted regarding repairs to the concrete barriers.

Slope inclinometer data results from A-14-009 and A-14-010 for Locations 3 and 4 respectively, revealed that the approach embankments for these two locations do not have slope instability. Therefore the recommendations may be limited to those given in the previous paragraph of this Section.

9.4 Location 5: N/B 405 to E/B 105 Departure.

Based on hollow stem auger borings and CPT's drilled in Location 5, the fill soils were found to be soft in the upper 6 feet in the right shoulder area from Stations 122+10 to 122+30. It should also be noted that extensive voids about 10 feet deep were also observed adjacent to the right shoulder underneath the concrete barrier within these same station limits.

These clayey fill soils were also found to be soft to medium stiff for a depth of about 27 feet within 25 feet of the drainage inlet located on the EB 105 right shoulder at Station 122+50. The soft subsurface zone was found to extend to Lanes 3 and 4. Observed surface distress was also observed

predominantly within Lanes 3 and 4 and to a lesser extent on Lanes 1 and 2. Furthermore, drainage inspection reports revealed the inlet box to have panel separation of about 1-3 inches, which would likely cause piping of soil materials in the directions of the encountered soft fill materials. It is likely that this piping has caused the fill soils to decrease in density and shear strength and result in distress similar to that observed.

Recommendations:

It is recommended that the right shoulder from Stations 122+00 to 122+30 have the structural section and 2 feet over-excavation of the subgrade removed and replaced. Also, the unpaved area off the shoulder should be excavated to the depth of the voids (presently filled with gravel, about 10 feet deep, approximately between Stations 122+10 to 122+30) and backfilled with properly compacted fill material or slurry. Temporary shoring will probably be required along the shoulder area. Assuming a cantilever shoring system would be sufficient for excavation depths of about 10 feet, the earth pressure diagram from Figure 3.11.5.6-5 of the AASHTO LRFD Manual, 4th Ed should be used. Soil parameters for design of a shoring system are summarized in the Table 5 below.

Table 5 – Soil Parameters

Depth, ft (1)	Unit Weight, pcf	Undrained Shear, S_u, psf	Friction Angle, degrees
0-10	110	750	0
10-50	115	1500	0

Note: (1) Depth below freeway elevation.

The eroded portion of the slope face underneath the departure west abutment should be excavated leaving a temporary 1:1 backut. The backut should be benched at no less than 3 foot wide bench widths and replaced with compacted fill material graded to the original slope grade. The fill material should be placed and compacted per the Caltrans Latest Standard Specifications. The grading should extend to the full height of the slope with a 2 foot wide keyway at the toe. The width of the grading should be about 40-50 feet wide with the identified erosion gullies serving as the center of the grade width. A detail is shown on Figure 6.

At the inlet drain location, located on the EB 105 right shoulder station at Station 122+50, it is recommended that the inlet drain box be repaired or replaced. For the depression area adjacent to the inlet drain, including the right shoulder and the 4 travel lanes observed to be spanning from Stations 122+37 to 122+62, recommendations are provided below:

It is recommended that this depression area be excavated about 5 feet deep from the bottom of the structural section, from 122+27 to 122+72 (an additional 10 feet added on either side of the depressed area to insure complete coverage of the settled area). The average bottom of excavation would be at approximately elevation 105-108 feet Mean Sea Level (MSL).

Once the bottom of excavation is reached, a geotextile mat should be placed over the excavated area. This geotextile should have a minimal tensile strength of 4,800 plf at 10 percent strain (HP 570 or equivalent). In addition, 2-inches of fine grained clean sand should be placed on top of the geotextile mat before placement of fill. Lastly a non-woven filter fabric should be placed on the 2-inch layer of clean sand and the geotextile. The backfill material should have a composition consistent with and be placed in accordance with Section 19 of the latest standard specifications. On-site material is not suitable for placement.

A temporary shoring system, such as soldier piles or slurry walls should be implemented in order to stabilize the sides of the excavation. The earth pressure diagram should be based on a temporary wall retaining cohesive material and embedded in cohesive material. The retained material is estimated to have an undrained shear strength of 400 psf and the embedded portion would have an undrained shear strength of 600 psf at the edges of the station limits (Station 122+27 to 122+72) and 250 and 400 psf within the depressed area, respectively.

10.0 CONSTRUCTION CONSIDERATIONS

Earthwork

- All subgrade areas exposed during excavation should be inspected for loose and/or unsuitable materials, such as debris, oversized rocks/boulders (greater than 3 inches in size) and removed. The bottom of the prepared exposed subgrade should be compacted to 95 percent relative compaction (per Section 19-5 of the 2010 Standard Specifications) for a depth of 12-inches. Backfill material should be predominantly granular with a Sand Equivalent of 20 or greater and compacted per Section 19 of the Latest Standard Specifications.

- Backfill materials for the slope repair at Station 374+40 (Location 2) should be backfilled with predominantly granular material (less than 35 percent fines) with an expansion index of less than 50. The material should be compacted per Section 19 of the latest Standard Specifications.

- Re-built slopes should match the surrounding embankment slope grades.

- Landscaping Division should be consulted to revegetate the re-built slope areas at Station 374+40. A fiber mesh (jute mesh) should be placed initially over the re-built slopes in order to minimize erosion.

Other Considerations

- All utilities should be marked and/or relocated as necessary before the start of excavation.

- Temporary slopes during construction may be no steeper than 1:1 (Vertical: Horizontal). If any temporary slopes need to be steeper than 1:1 a temporary shoring system must be used and devised by the Contractor.

- It is highly recommended that our office review a set of the plans and specifications prior to finalization.

If you have any questions or comments, please call Sam Sukiasian at (213) 620-2135 or Christopher Harris at (213) 620-2147.

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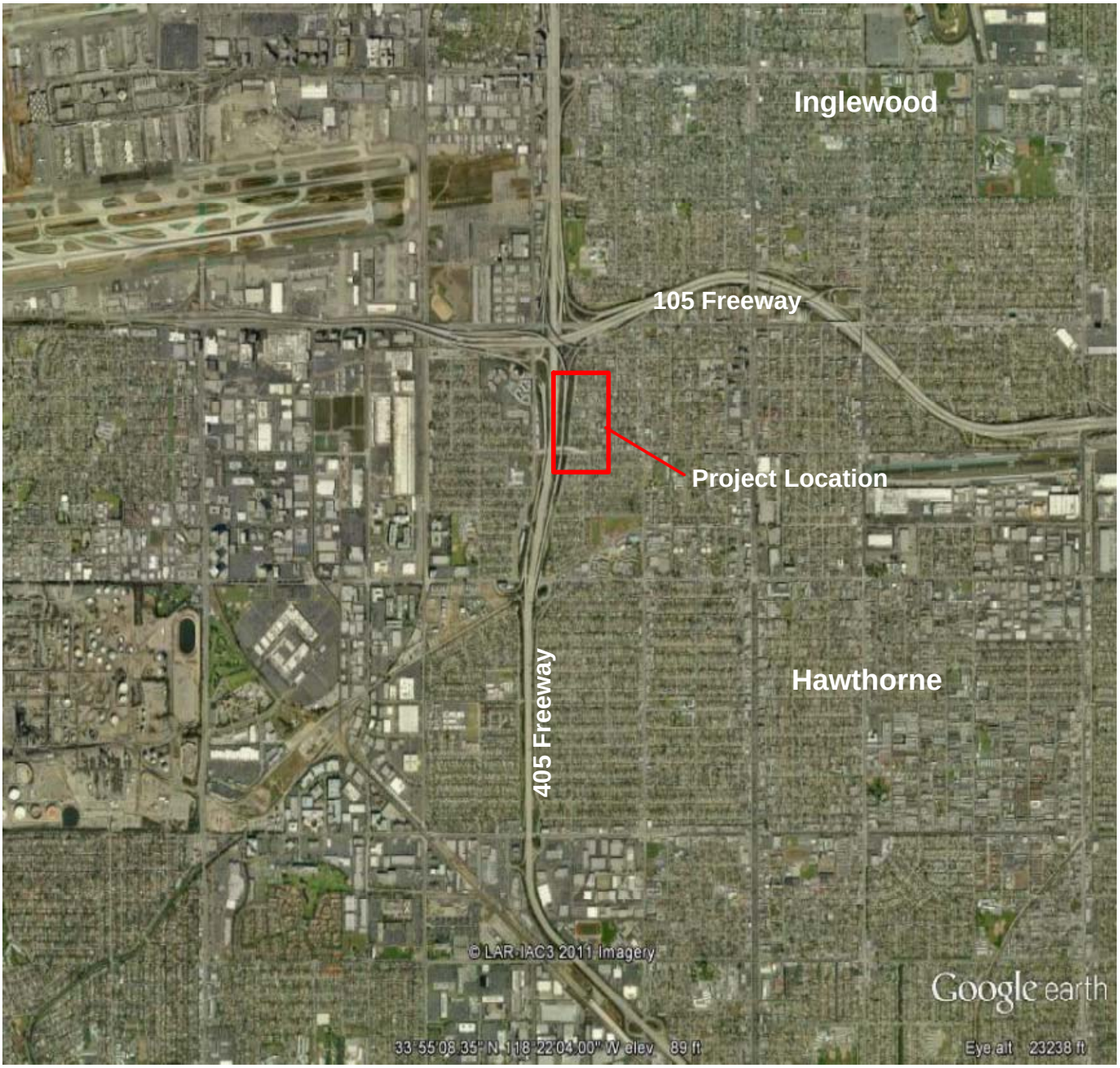
Attachments:

Figures 1 through 6
Appendix A – CPT and Soil borings and Summary Table
Appendix B – Slope Monitoring Results
Appendix C – Laboratory Test Results



Vicinity Map

Figure 1

405-105 Embankment Distress
(07-3X8700)

Location 1 - Investigation Plan
N/B 405 to 105 Connector at 53-1238G St Bridge

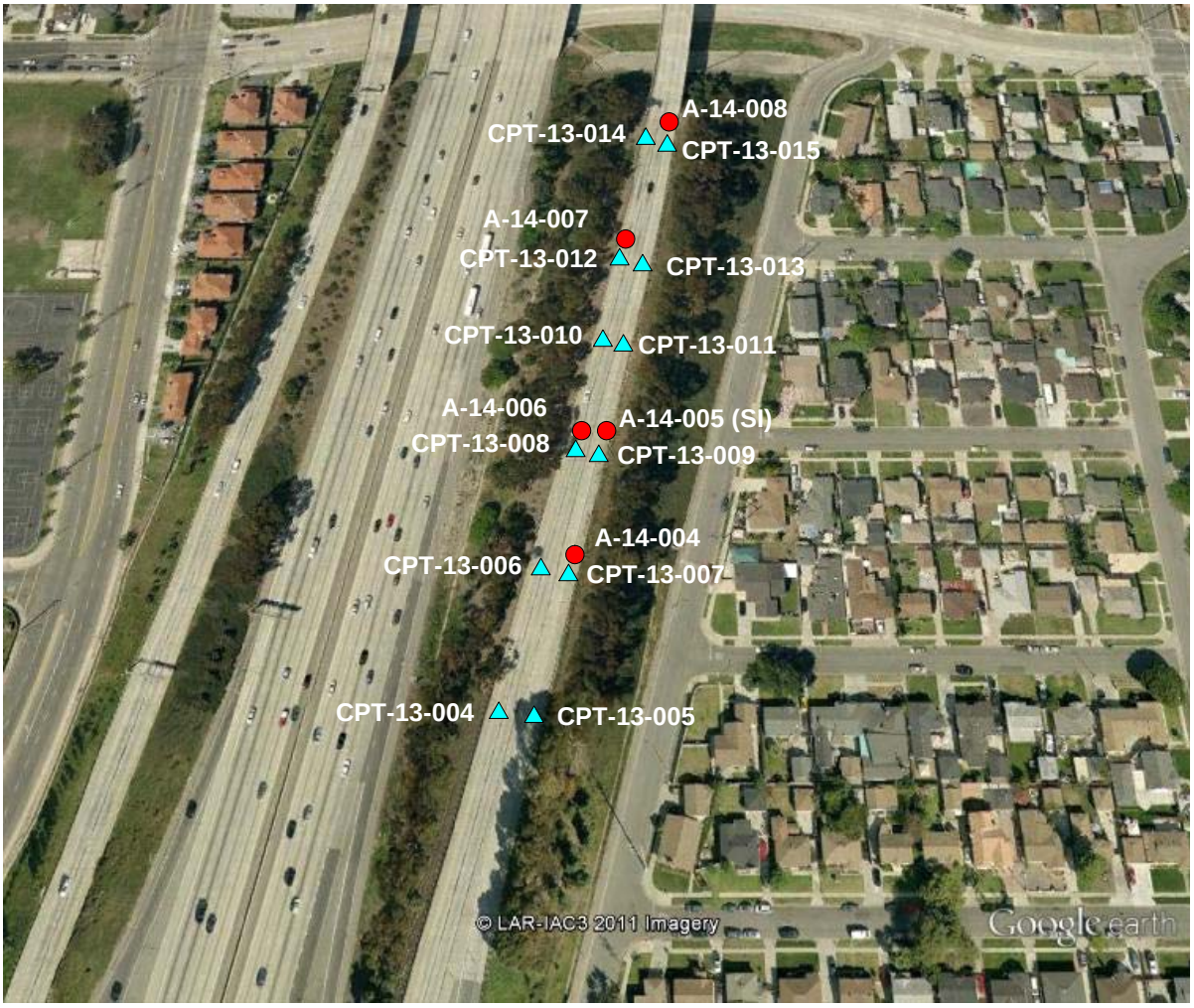
Legend:

- CPT-13-001 (3 CPT's)
- A-14-002 (2 Borings)

Area of ditress/Investigation box:
approximately 30 ft wide and 105 ft long
LA-07-405-PM 20.59

Figure 2

405-105 Embankment Distress
(07-3X8700)



Location 2 - Investigation Plan
(N/B 405 to 105 Connector)

Legend:

- CPT-13-005 (12 CPT's)
- A-14-002 (5 Borings, one SI at A-14-005)

Area of ditress/Investigation box:
approximately 30 ft wide and 1275 ft long
LA-07-405-PM 20.68/20.85

Figure 3

405-105 Embankment Distress
(07-3X8700)

Location 3 and 4 - Investigation Plan
N/B 405 to W/B and E/B 105 Connector Approach

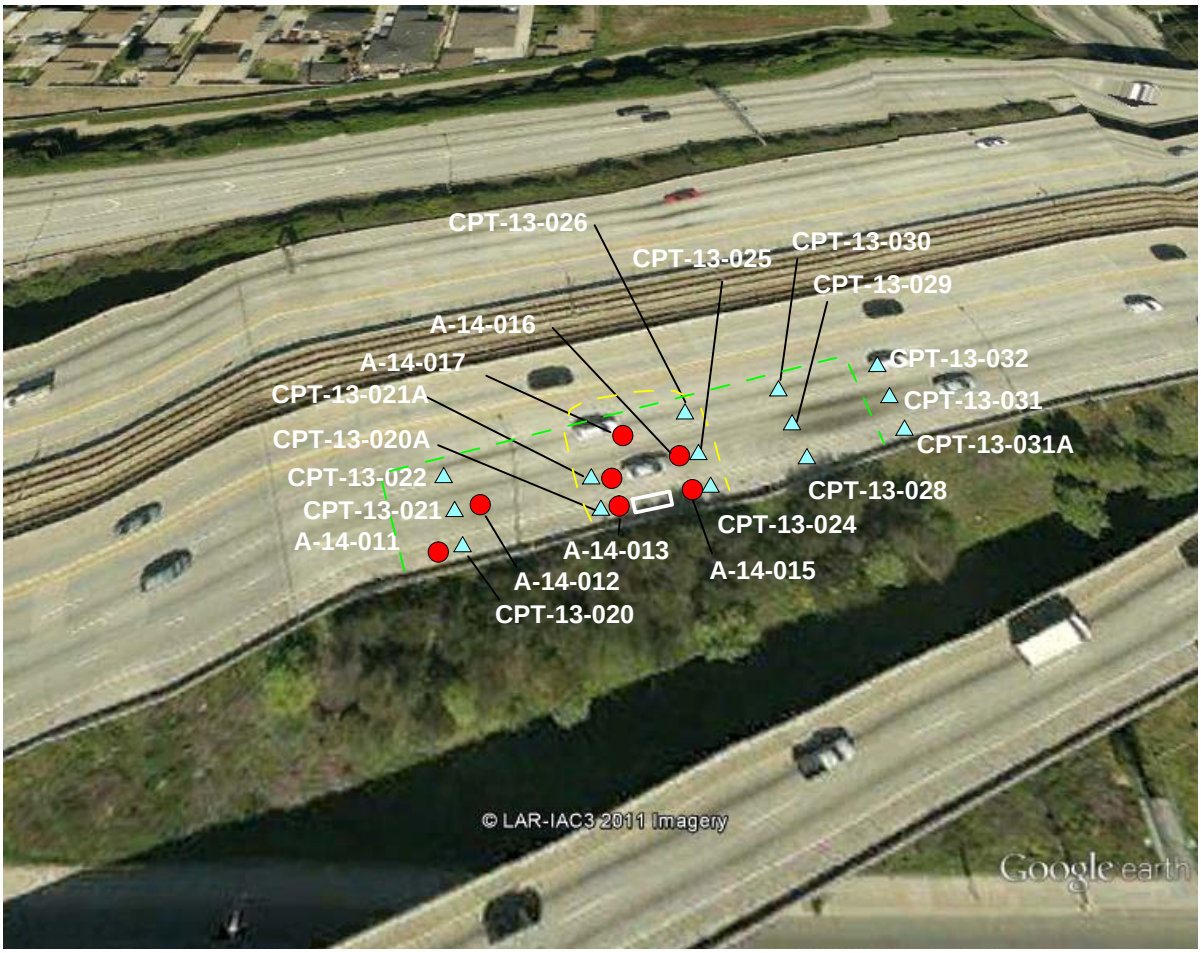
Legend:

- CPT-13-016 (6 CPT's)
- A-14-002 (2 Boringsand SI's)

Area of ditress/Investigation box:
approximately 30 ft wide and 800 ft long
LA-07-405-PM 20.59

Figure 4

405-105 Embankment Distress
(07-3X8700)

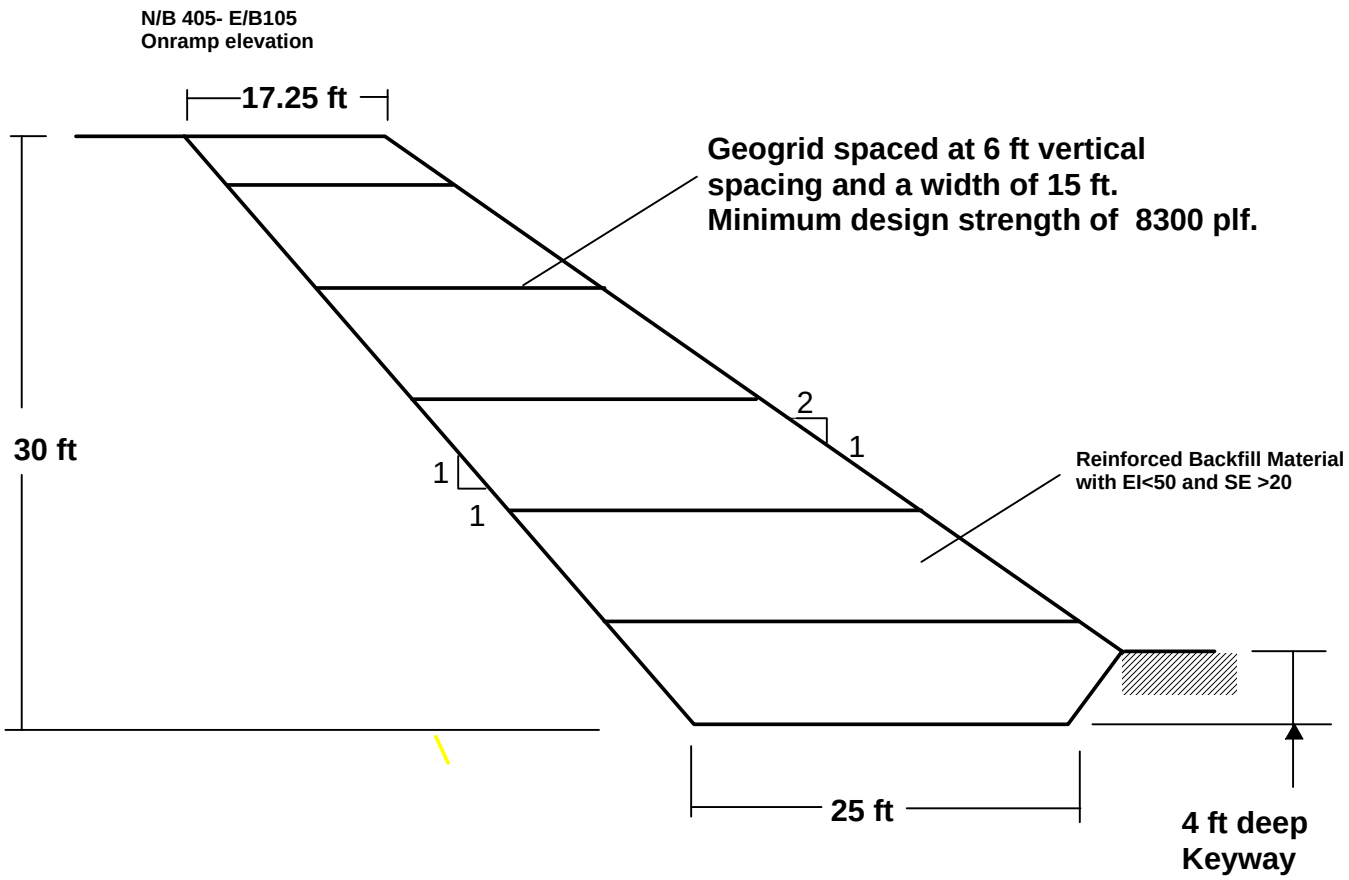


Location 5 - Investigation Plan
N/B 405 to E/B 105 Connector
Departure (Right shoulder and
Adjacent two lanes to be drilled).

Legend:

- CPT-13-020 (14 CPT's)
- A-14-013 (6 Borings)
- Area of Roadway Settlement: approximately 25 ft wide (Adjacent to Inlet Drain - Marked by white box)
- Approximate Limits of Distress (250 feet long by 30 ft wide)

Figure 5



Embankment Slope Regrading Plan
Station 373+70 to 375+45
(Right Shoulder and Adjacent Lane)
Location 2

Note:
Drawing not to scale
1:1 minimum backut
2:1 finished slope
backut bench width should
be a minimum of 3 feet.

Figure 6

Appendix A
CPT and Soil Borings, Summary Table

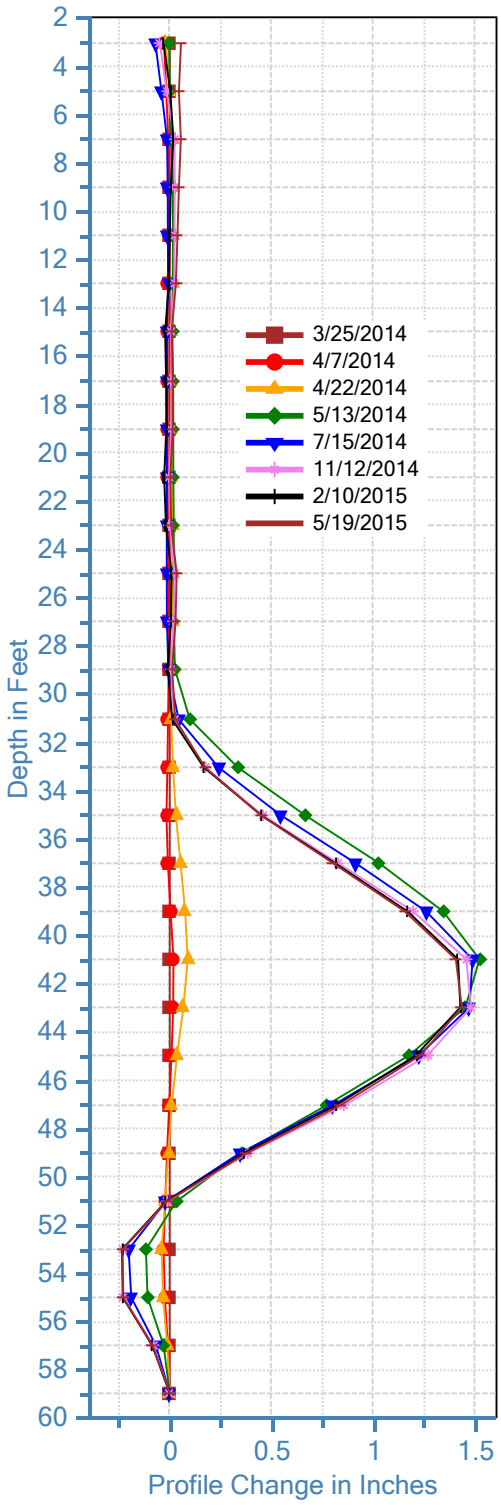
Table - Summary of Borings and CPT's

Borings/CPT's	Location	Date Perfomed	Stations	Offset	Elevation, ft	Alignment	Depth Drilled, ft	SI	Notes
CPT-001	1	12/3/2013	373+75	5.5R	129	NB405/105 CON	40.9		
CPT-002	1	12/3/2013	373+75	36R	129	NB405/105 CON	40.18		
CPT-003	1	12/3/2013	374+00	27R	129	NB405/105 CON	14.6		
CPT-004	2	12/4/2013	378+10	11R	128.6	NB405/105 CON	16.4		
CPT-005	2	12/4/2013	378+10	33R	128.2	NB405/105 CON	11.25		
CPT-006	2	12/4/2013	379+40	5.5R	128	NB405/105 CON	18.9		
CPT-007	2	12/4/2013	379+40	32R	127.2	NB405/105 CON	10.8		
CPT-008	2	12/4/2013	380+70	5.5R	127	NB405/105 CON	20.1		
CPT-009	2	12/4/2013	380+70	27.2R	126.7	NB405/105 CON	12.8		
CPT-010	2	12/4/2013	382+25	5.5R	126.5	NB405/105 CON	13.7		
CPT-011	2	12/4/2013	382+25	27R	126.3	NB405/105 CON	12.5		
CPT-012	2	12/4/2013	383+60	5.5R	126.1	NB405/105 CON	14.5		
CPT-012A	2	12/5/2013	383+25	5.5R	126.3	NB405/105 CON	10.8		
CPT-013	2	12/5/2013	383+60	27R	126	NB405/105 CON	17.7		
CPT-013A	2	12/5/2013	383+25	27R	126	NB405/105 CON	17.6		
CPT-014	2	12/5/2013	385+15	5.5R	126.2	NB405/105 CON	2.2		
CPT-015	2	12/5/2013	385+15	27R	126	NB405/105 CON	6.8		
CPT-015A	3	12/10/2013	398+52	12R	142	NB405/W105 CON	12		
CPT-015B	4	12/11/2013	398+52	38R	142	NB405/W105 CON	29.7		
CPT-016	3	12/11/2013	401+75	5.5R	153	NB405/W105 CON	10.4		
CPT-017	3	12/10/2013	401+30	16R	153	NB405/W105 CON	22.4		
CPT-018	4	12/11/2013	401+70	49R	148	NB405/W105 CON	14.5		
CPT-019	4	12/11/2013	401+30	54.5R	148	NB405/W105 CON	18.9		
CPT-020	5	12/11/2013	121+60	98R	111.5	Route 105	34.2		
CPT-020A	5	12/11/2013	122+30	98R	110	Route 105	25		
CPT-021	5	12/11/2013	121+60	82R	111.5	Route 105	35.1		
CPT-021A	5	12/11/2013	122+30	82R	111	Route 105	37.8		
CPT-022	5	12/11/2013	121+60	65R	112	Route 105	35		
CPT-024	5	12/11/2013	122+80	93R	108	Route 105	36.7		
CPT-025	5	12/11/2013	122+80	78R	108.5	Route 105	12.5		
CPT-026	5	12/11/2013	122+80	60R	107.5	Route 105	24.1		
CPT-028	5	12/11/2013	123+65	93R	106.5	Route 105	36.7		
CPT-029	5	12/12/2013	123+65	78R	106.6	Route 105	37.6		
CPT-030	5	12/12/2013	123+65	60R	107	Route 105	37.2		
CPT-031	5	12/12/2013	124+10	78R	105.3	Route 105	44.6		
CPT-031A	5	12/12/2013	124+10	93R	105	Route 105	47.7		
CPT-032	5	12/12/2013	124+10	60R	106	Route 105	40.9		
A-14-001	1	1/29/2014	373+75	25.5R	129	NB405/105 CON	51.5		
A-14-002	1	1/29/2014	374+00	12.5R	129	NB405/105 CON	51.5		
A-14-003	2	2/5/2014	375+10	44R	128	NB405/105 CON	61.5	yes	SI installed
A-14-004	2	2/6/2014	379+45	32R	127.2	NB405/105 CON	51.5		
A-14-005	2	2/6/2014	380+80	27.2R	126.7	NB405/105 CON	51.5	yes	SI installed
A-14-006	2	2/4/2014	380+75	5.5R	127	NB405/105 CON	51.5		
A-14-007	2	2/13/2014	383+55	5.5R	126.1	NB405/105 CON	45		
A-14-008	2	2/6/2014	385+15	23R	126	NB405/105 CON	51.5		
A-14-009	3	2/13/2014	401+65	5.5R	152	NB405/W105 CON	61.5	yes	SI installed
A-14-010	4	2/13/2014	401+50	65R	146	NB405/105 CON	61.5	yes	SI installed
A-14-011	5	2/19/2014	121+45	93R	111.5	Route 105	51.5		
A-14-012	5	2/19/2014	121+90	78.5R	112	Route 105	51.5		
A-14-013	5	2/20/2014	122+55	98R	113	Route 105	51.5		
A-14-014	5	2/20/2014	122+55	82R	112	Route 105	51.5		
A-14-015	5	2/15/2014	122+55	67.5R	112	Route 105	51.5		
A-14-016	5	2/25/2014	122+85	98R	115	Route 105	51.5		
A-14-017	5	2/26/2014	122+85	82R	114	Route 105	51.5		

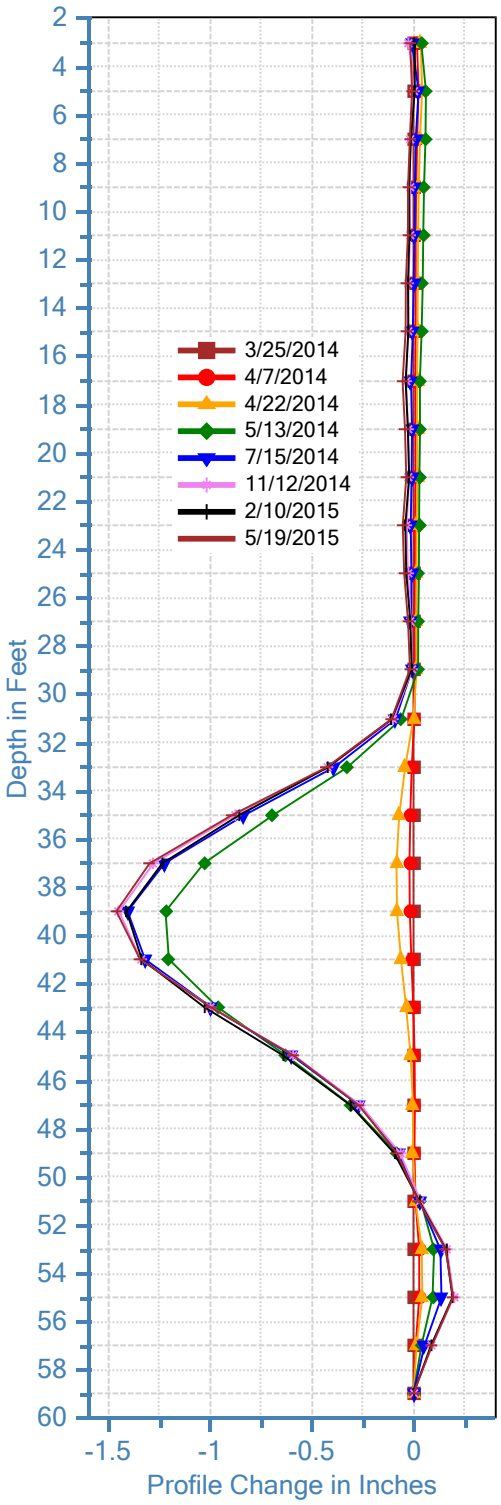
Note: CPT's 023 and 027 eliminated.

Appendix B
Slope Monitoring Results

105E-W RC1303 A



105E-W RC1303 B

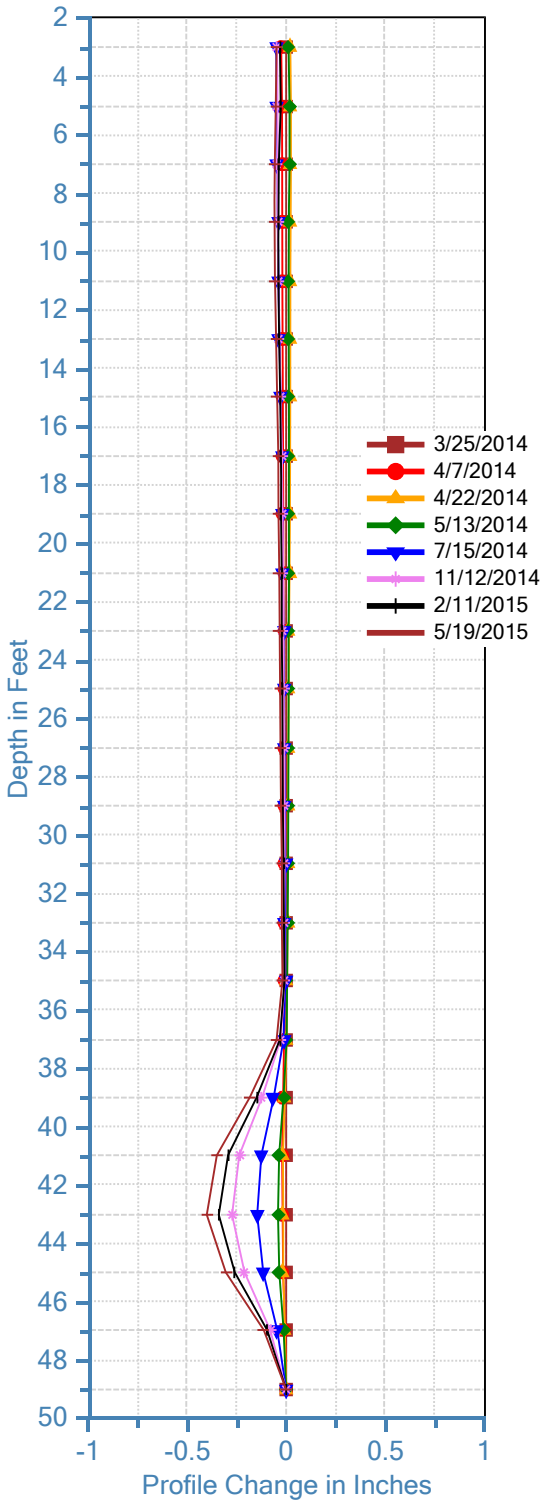


RESULT OF SI MONITORING

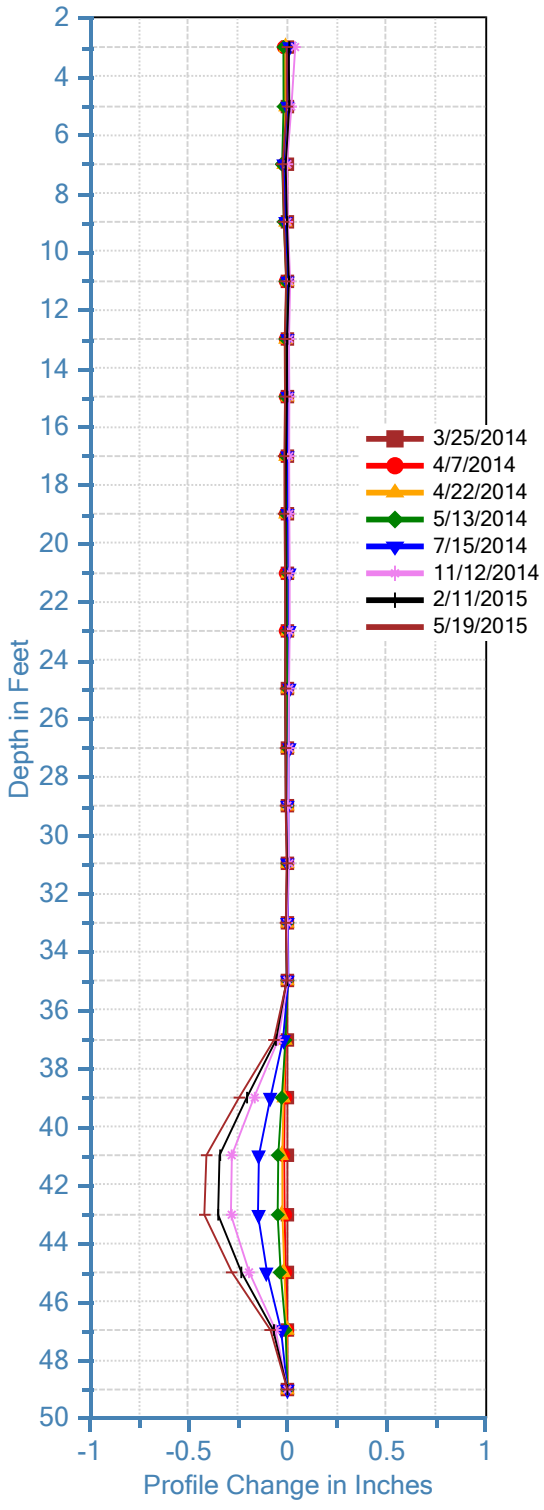
07-LA-405-PM20.58
Site: 405-105 Distress, RC-13-03
E.A.: 071300024

Depth of Casing: 59.90 ft
A0 Direction (Magnetic North): 65 deg.
Location: N33°55.230',W118°22.114'

105E-W RC1305 A



105E-W RC1305 B

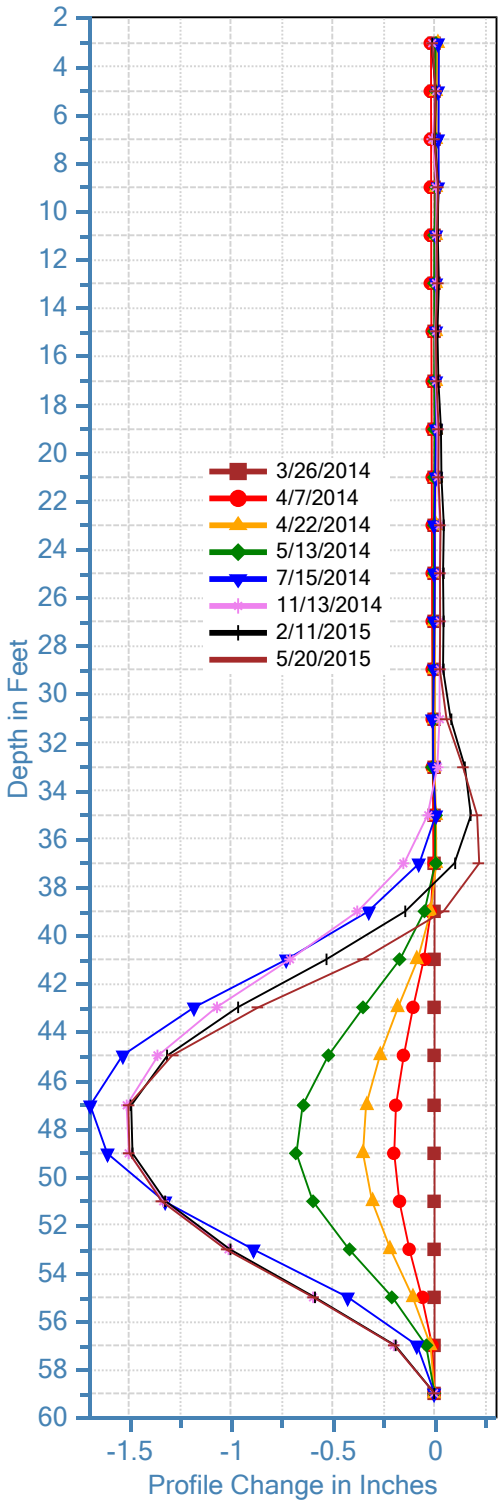


RESULT OF SI MONITORING

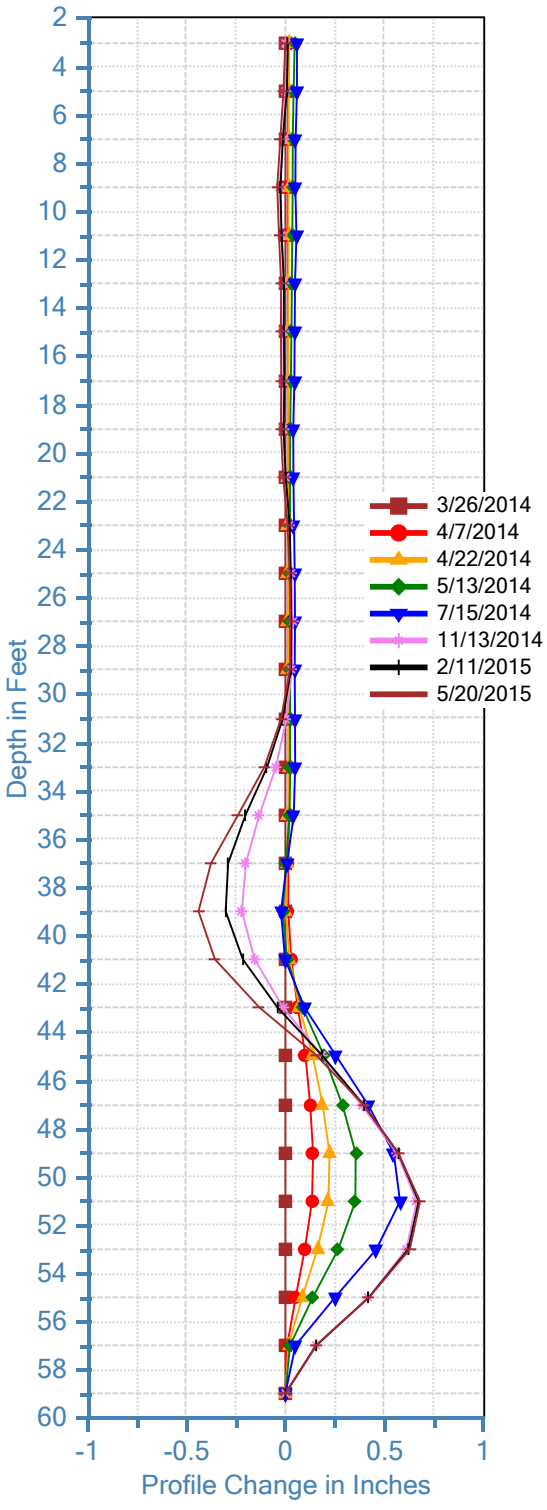
07-LA-405-PM20.58
Site: 405-105 Distress, RC-13-05
E.A.: 071300024

Depth of Casing: 50 ft
A0 Direction (Magnetic North): 75 deg.
Location: N33°55.314',W118°22.097'

105E-W RC1309 A



105E-W RC1309 B

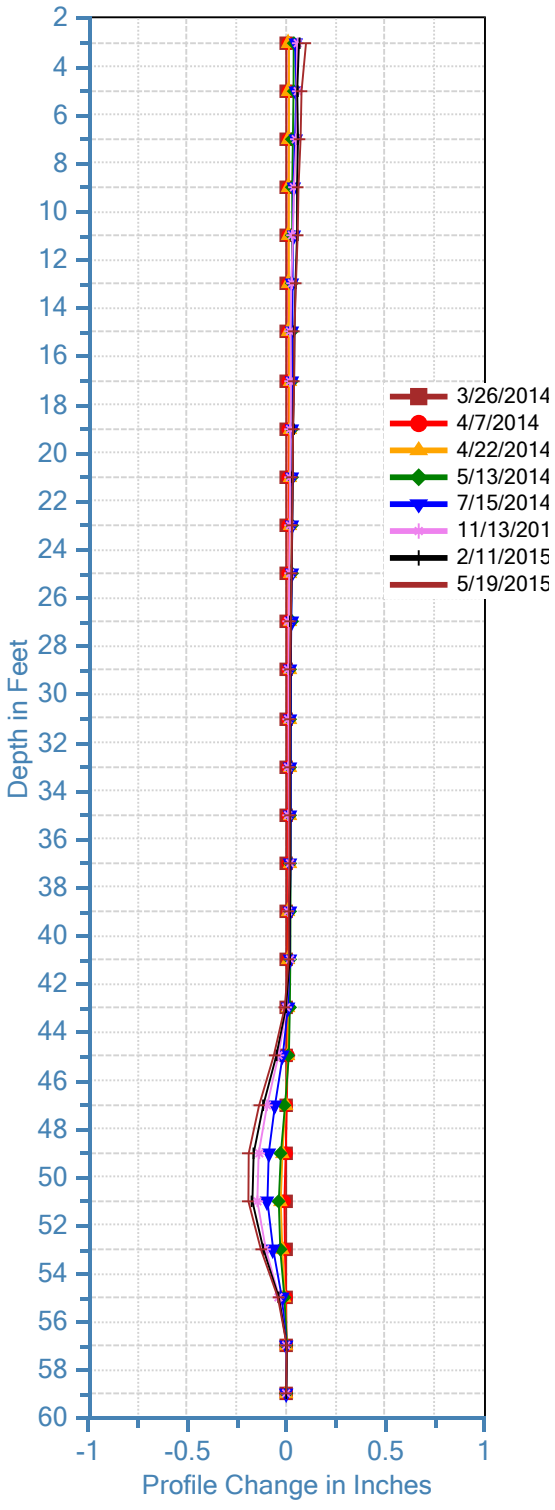


RESULT OF SI MONITORING

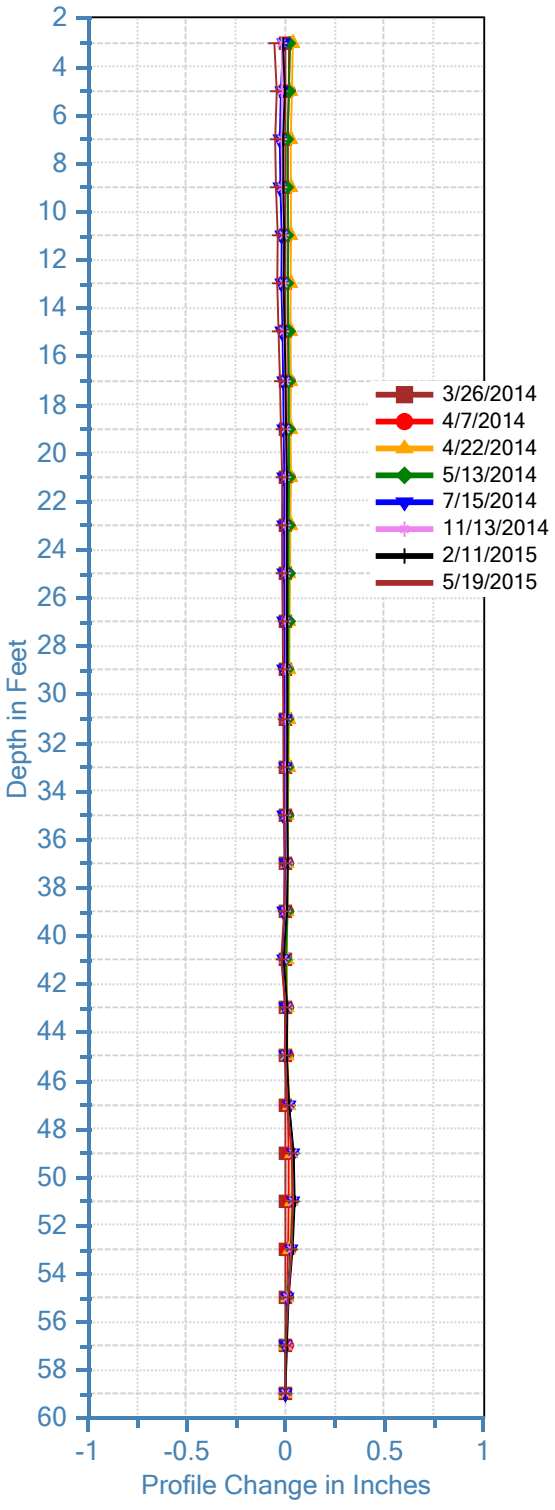
07-LA-405-PM20.58
Site: 405-105 Distress, RC-13-09
E.A.: 071300024

Depth of Casing: 59.80 ft
A0 Direction (magnetic north): 260 deg.
Location: N33°55.659',W118°22.045'

105E-W RC1310 A



105E-W RC1310 B



RESULT OF SI MONITORING

07-LA-405-PM20.58
Site: 405-105 Distress, RC-13-10
E.A.: 071300024

Depth of Casing: 60.25 ft.
A0 Direciton (magnetic north): 90 deg.
Location: N33°55.654',W118°22.042'

Appendix C
Laboratory Results

Direct Shear Tests

(ASTM D3080)

Boring/ Sample No.	Location	Depth, ft	Soil Description	Initial Dry Density, pcf (1)	Initial Water Content, % (1)	Normal Stress Range, psf	Ultimate Shear Strength Values	
							Friction Angle	Undrained Shear, psf
A-14-007/1A	2	5	ML (fill)	100.9	8.1	500-1500	37.6	6.9

Note: (1) Average of three samples.

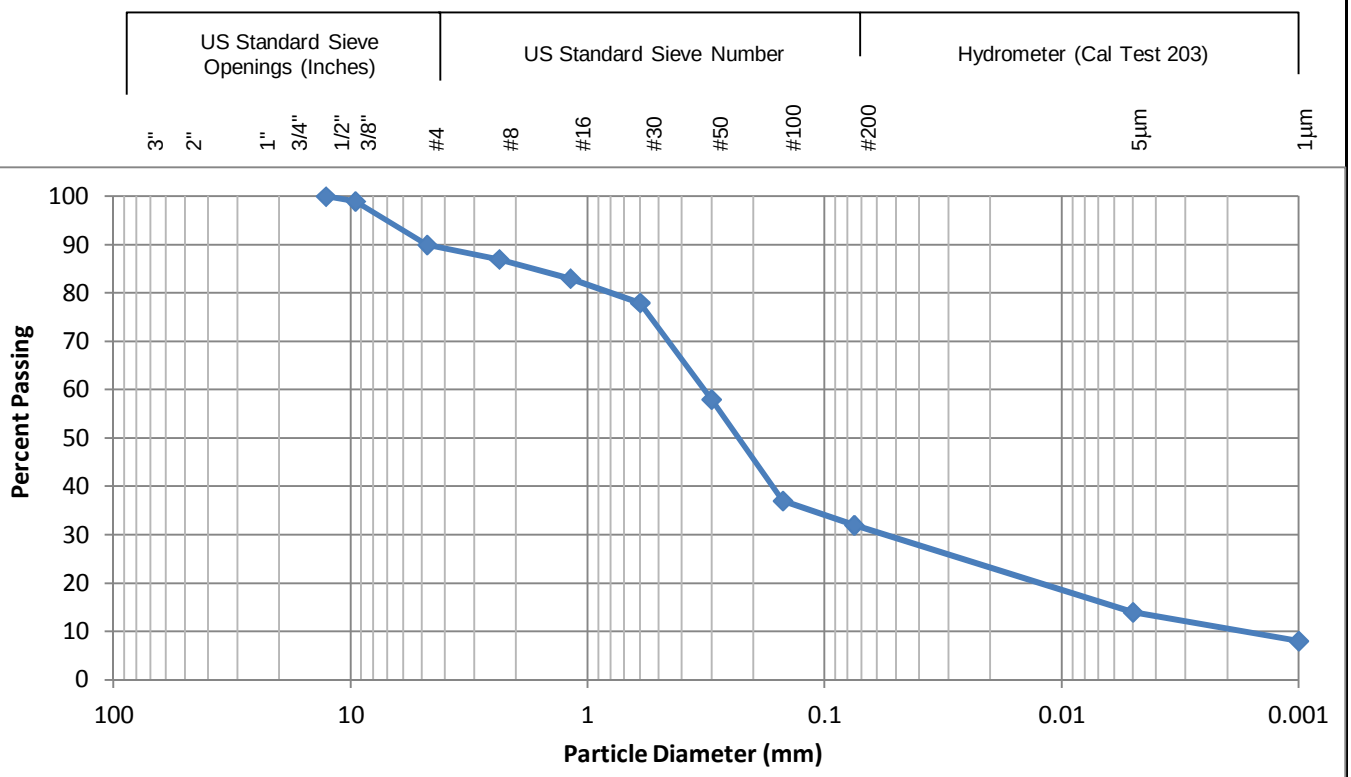
Unconfined Compression Test Results

(ASTM D2166)

Boring/ Sample No.	Location	Depth, ft	Soil Description	Initial Dry Density, pcf	Initial Water Content, %	Unconfined Compressive Strength, psi	Shear Strength, psf
A-14-003/7C	2	35	ML	98.3	7.3	9.7	700
A-14-013/9A	5	45	CL	111.6	11.8	13.5	970

Notes: Based on Strain Rate of 1%/min.

Gradation Analysis Test Results

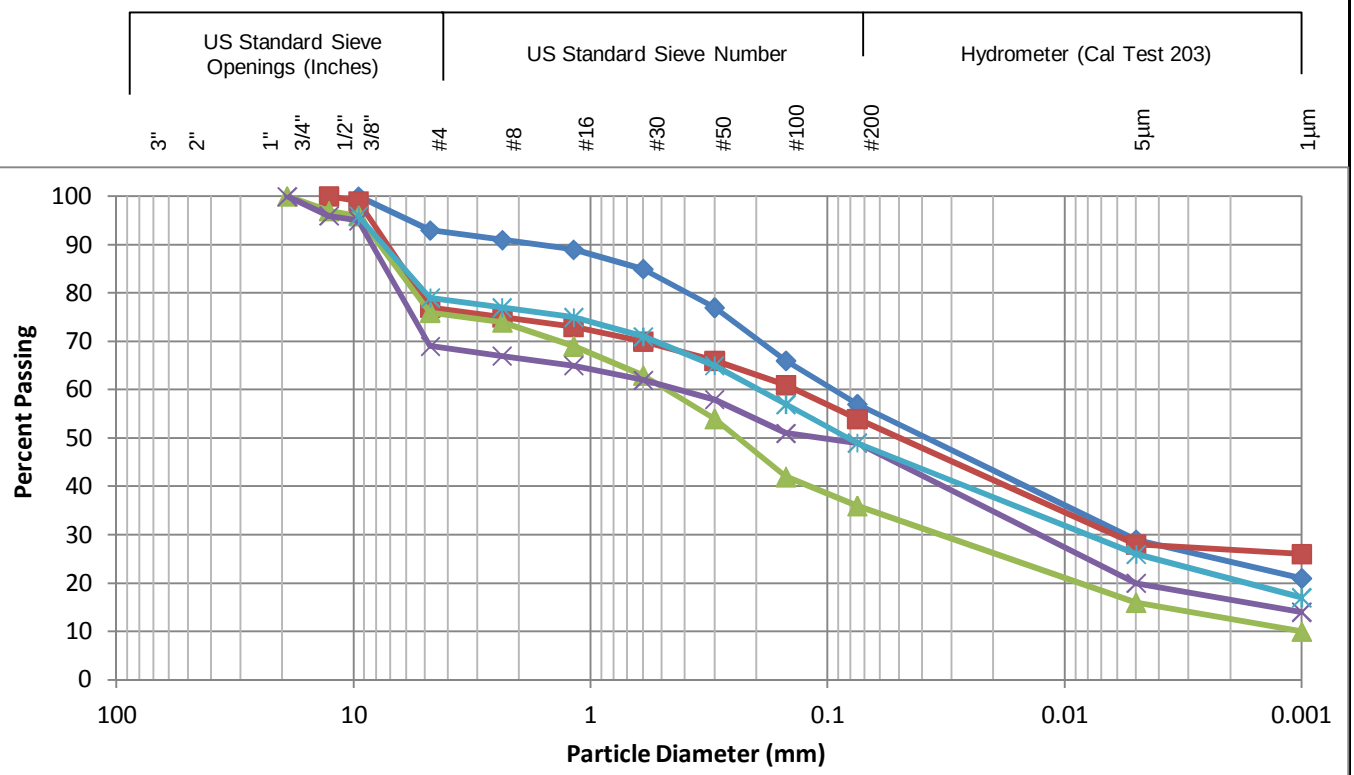


COBBLES	GRAVELS		SANDS			SILT	CLAY
	Coarse	Fine	Crse.	Medium	Fine		

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

Project:	405-105 Distress (Loc 1)
EA:	07-3X8701
Dist-Co-Rte-PM:	07-LA-405-20.58/21.08

Gradation Analysis Test Results

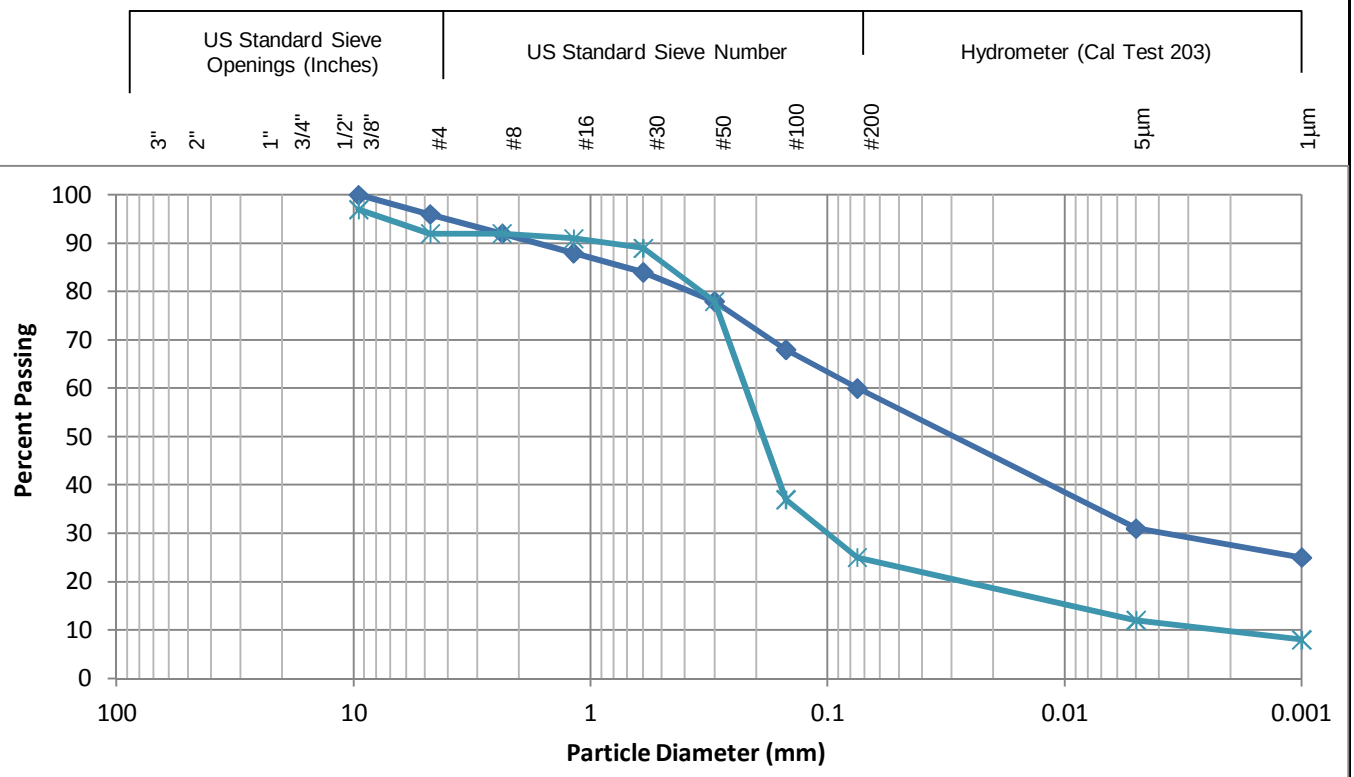


COBBLES	**GRAVELS**		**SANDS**			**SILT**	**CLAY**
	Coarse	Fine	Crse.	Medium	Fine		

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

Project:	405-105 Distress (Location 2)
EA:	07-3X8701
Dist-Co-Rte-PM:	07-LA-405-20.58/21.8

Gradation Analysis Test Results

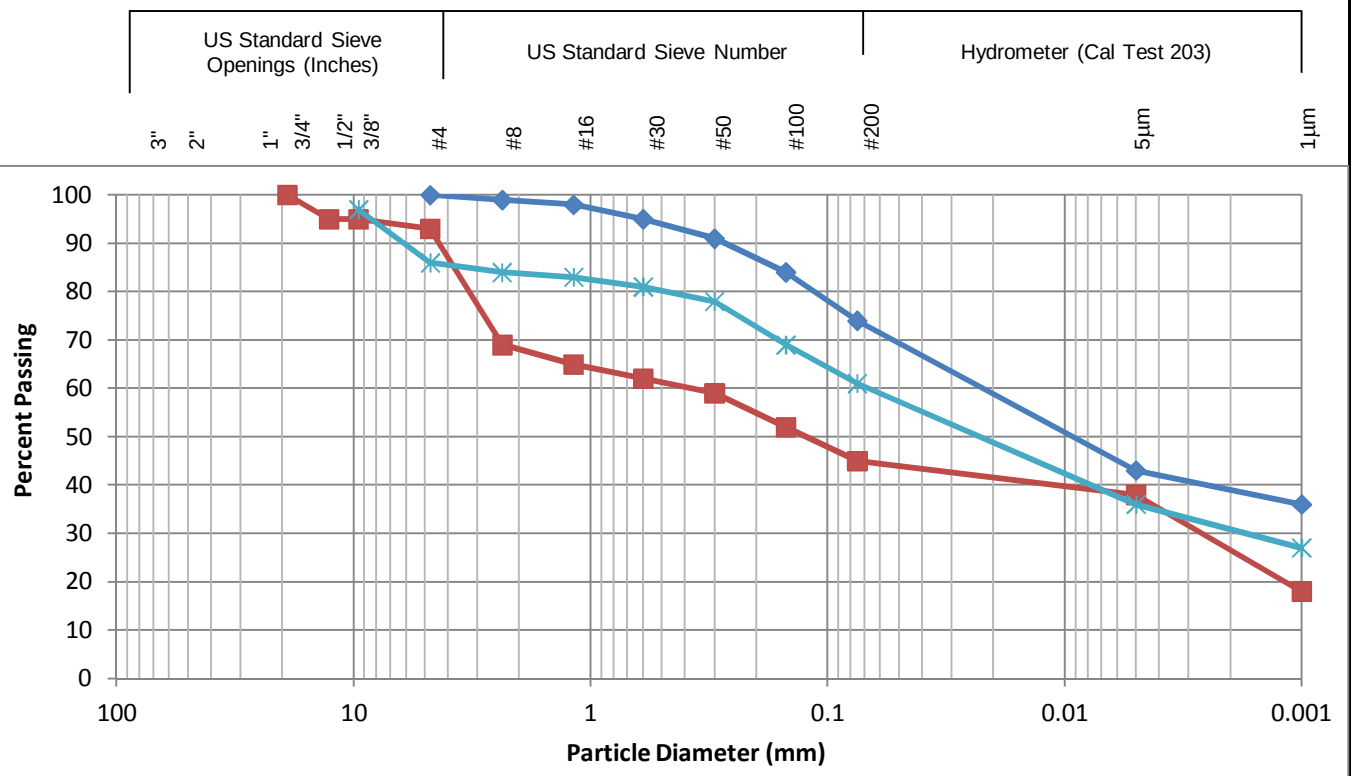


COBBLES	**GRAVELS**		**SANDS**			**SILT**	**CLAY**
	Coarse	Fine	Crse.	Medium	Fine		

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

Project:	405-105 Distress (Location 2)
EA:	07-3X8701
Dist-Co-Rte-PM:	07-LA-405-20.58/21.08

Gradation Analysis Test Results

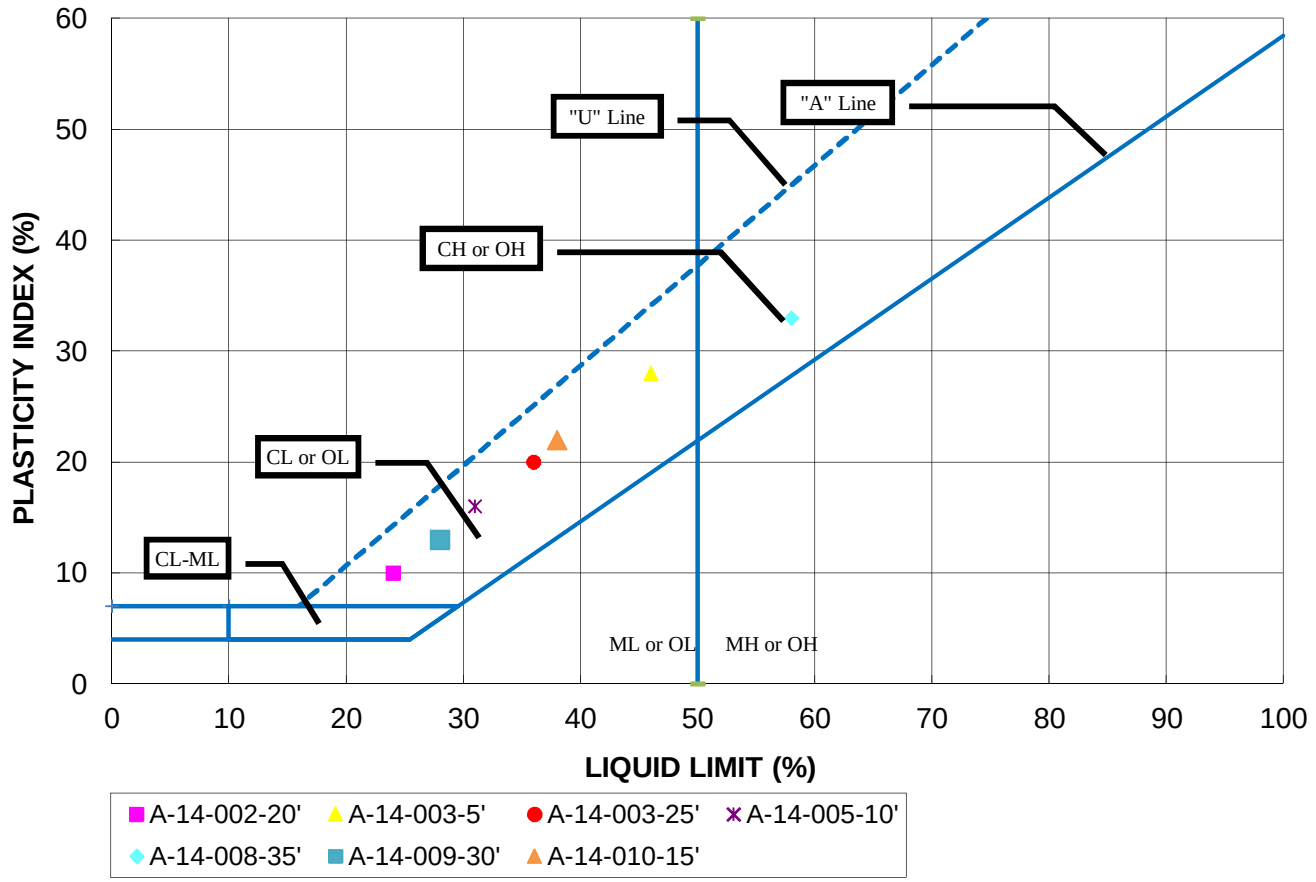


COBBLES	**GRAVELS**		**SANDS**			**SILT**	**CLAY**
	Coarse	Fine	Crse.	Medium	Fine		

Engineering Services
Division of Geotechnical Services
Office of Geotechnical
Design - South 1
Location 3 and 4

Project:	405-105 Distress (Location 3 and 4)
EA:	07-3X8701
Dist-Co-Rte-PM:	07-LA-405-20.58/21.08

Atterberg Limits Test Results



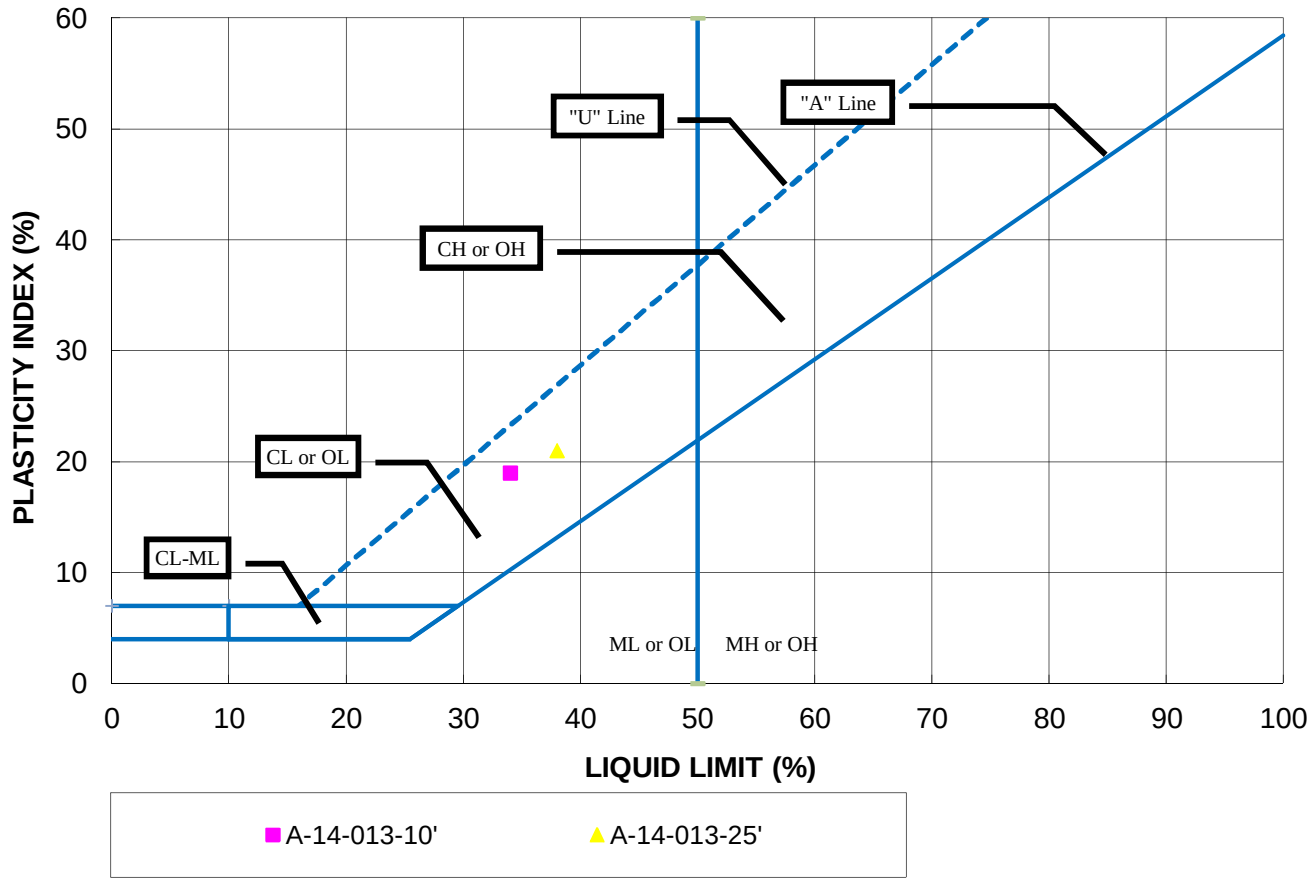
Boring No.	Sample No.	Depth (ft)	LL	PI	PL	Classification
A-14-002	4	20'	24	10	14	CL
A-14-003	1	5'	46	28	18	CL
A-14-003	5	25'	36	20	16	CL
A-14-005	2	10'	31	16	15	CL
A-14-008	7	35'	58	33	25	CH
A-14-009	6	30'	28	13	15	CL
A-14-010	3	15'	38	22	16	CL

Caltrans

Engineering Services
Division of Geotechnical Services
Office of Geotechnical
Design - South 1
(Location in parenthesis)

Project:	405-105 Distress (Locations 1-4)
EA:	07-3X8701
Dist-Co-Rte-PM:	07-LA-405-20.58/21.08

Atterberg Limits Test Results



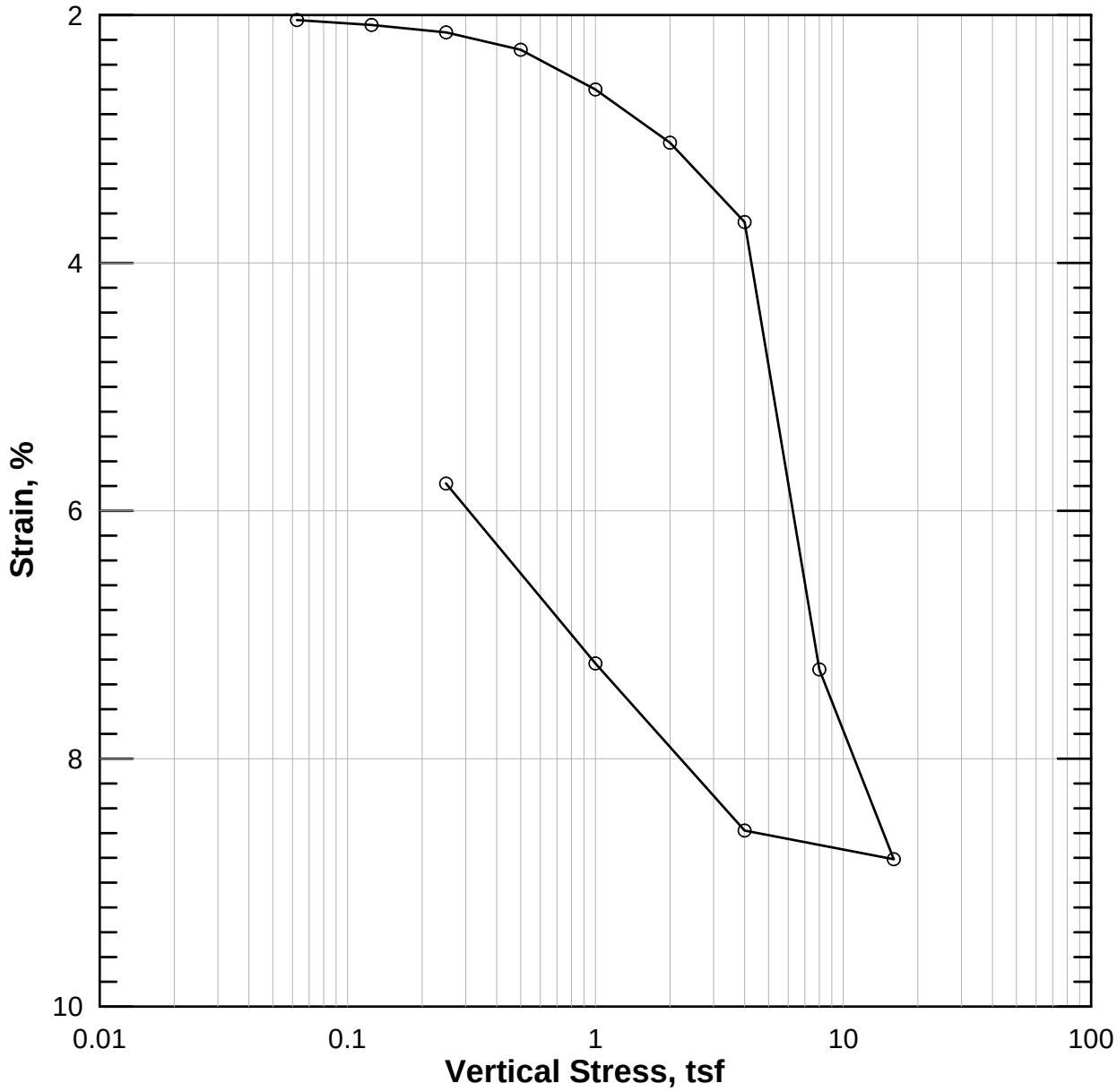
Boring No.	Sample No.	Depth (ft)	LL	PI	PL	Classification
A-14-013	2	10'	34	19	15	CL
A-14-013	5	25'	38	21	17	CL

Caltrans

Engineering Services
Division of Geotechnical Services
Office of Geotechnical
Design - South 1
(Location in parenthesis)

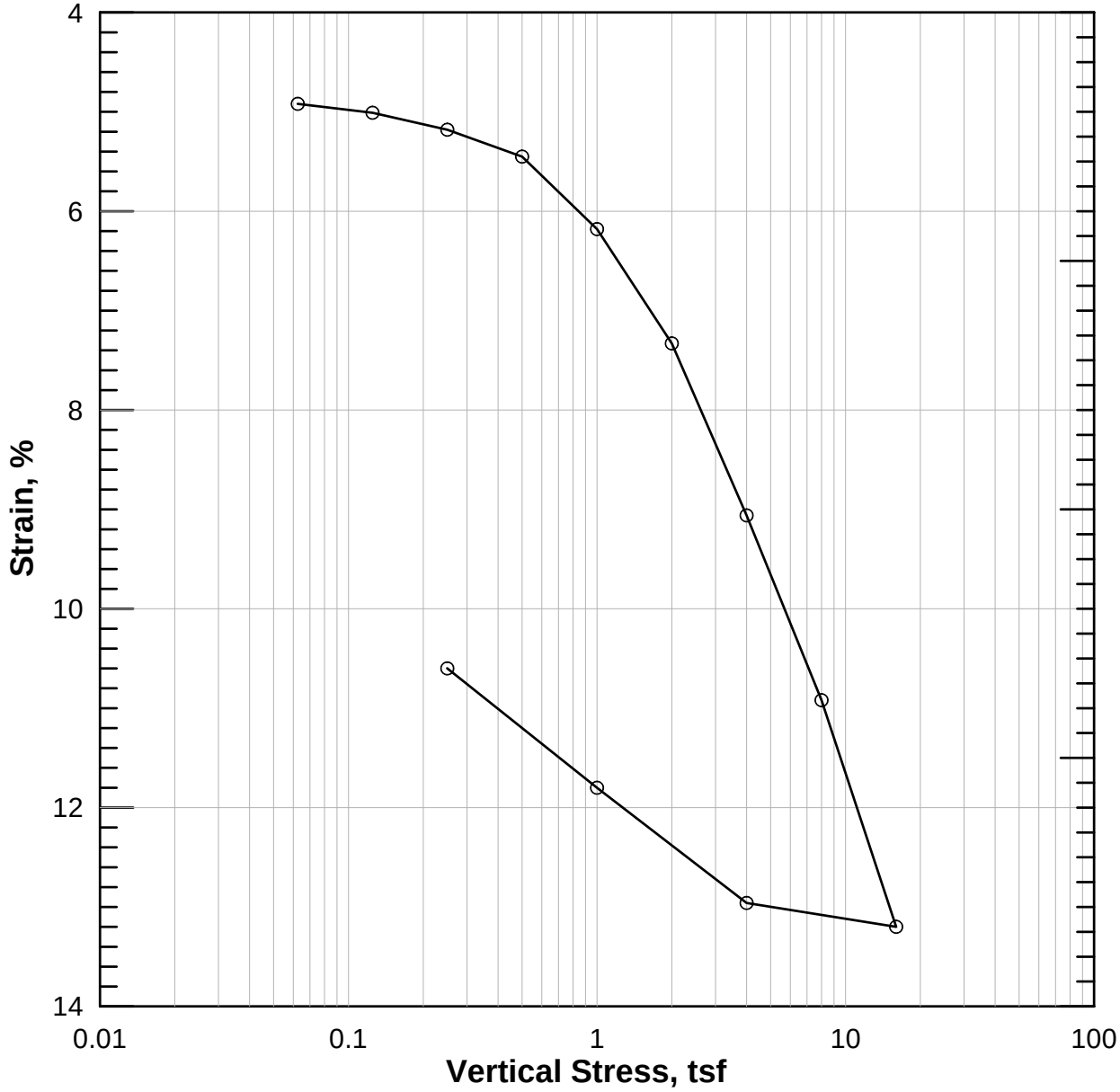
Project:	405-105 Distress (Location 5)
EA:	07-3X8701
Dist-Co-Rte-PM:	07-LA-405-20.58/21.08

Consolidation Test Result
(ASTM D2435)



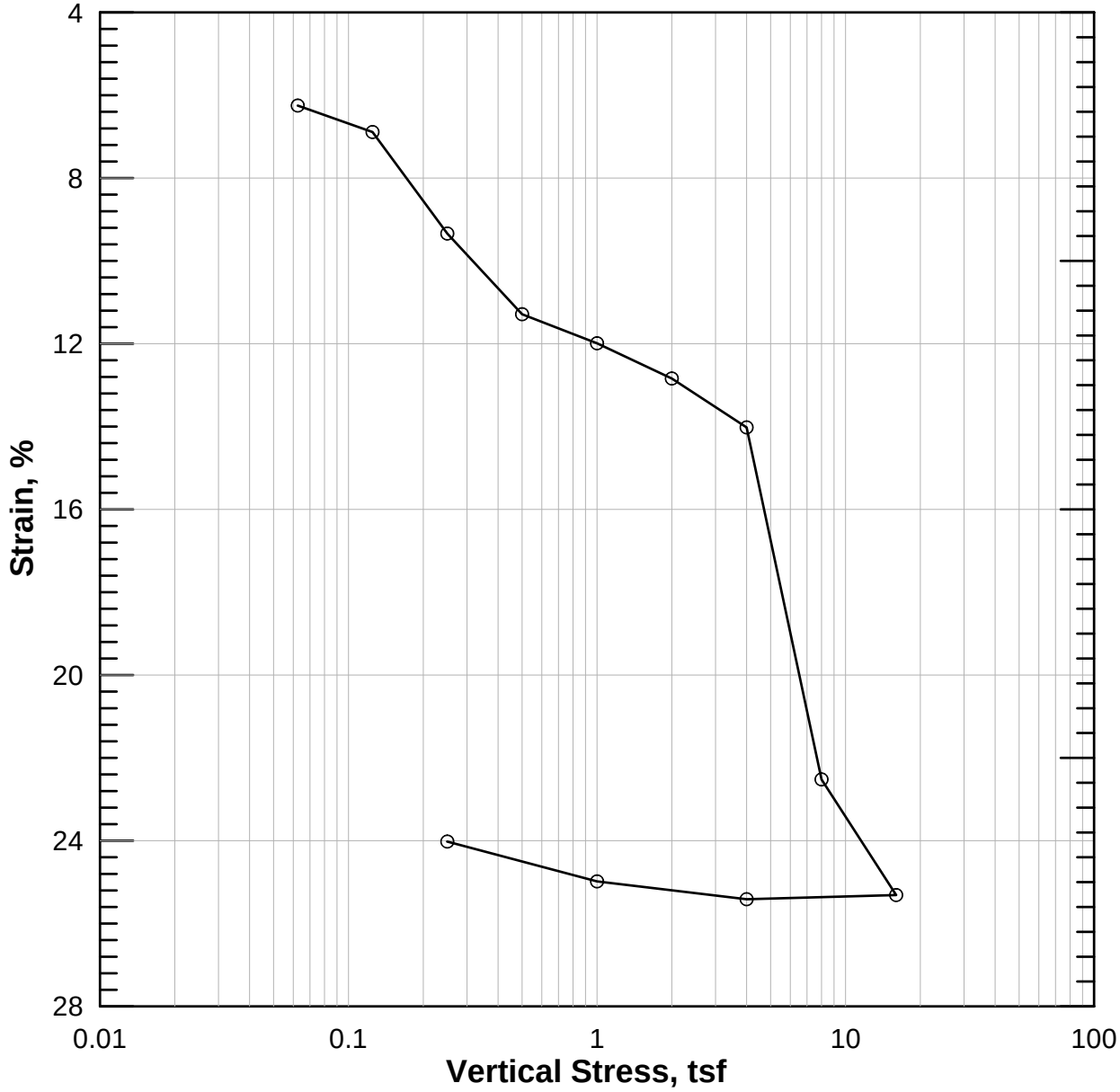
Notes:
Boring/Sample No : A-14-008/7C
Depth: 40 feet
Soil Type: Lean Clay
Location: 2
Average C_v : 1.4×10^{-4} in²/sec

Consolidation Test Result
(ASTM D2435)



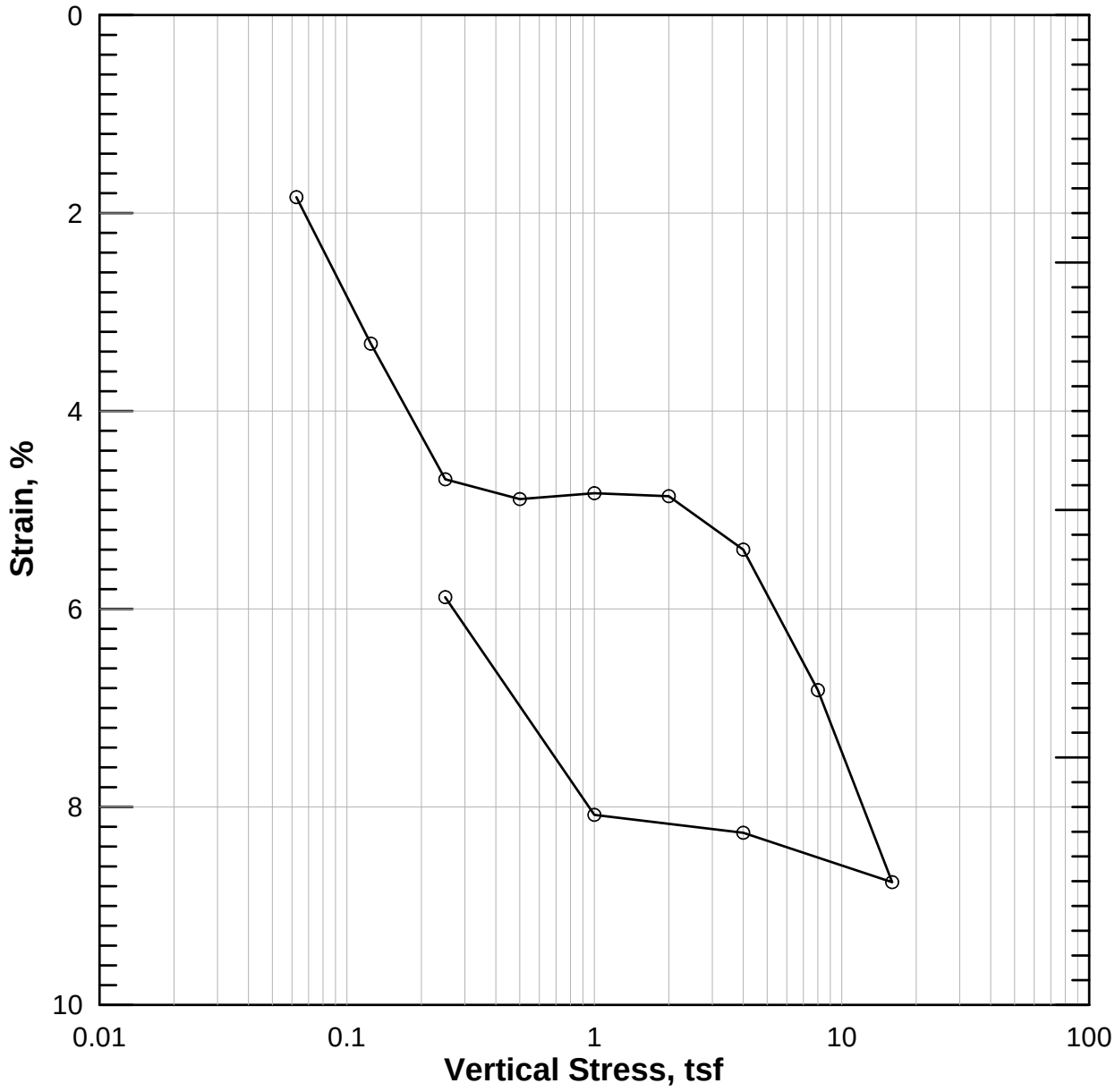
Notes:
Boring/Sample No : A-14-009/6A
Depth: 25 feet
Soil Type: Lean Clay with Gravel
Location: 2
Average C_v : 1.0×10^{-3} in^2/sec

Consolidation Test Result
(ASTM D2435)



Notes:
Boring/Sample No : A-14-013/7B
Depth: 30 feet
Soil Type: Silty clay with Sand
Location: 5
Average C_v : 1.4×10^{-3} in^2/sec

Consolidation Test Result
(ASTM D2435)



Notes:
Boring/Sample No : A-14-013/9B
Depth: 40 feet
Soil Type: Silty Clay with Gravel
Location: 5
Average C_v : 2.9x10^{-3} in^2/sec

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	105	R0.5/17.8	20	92

Kenneth D. Camp 3/23/93
REGISTERED ELECTRICAL ENGINEER

4-26-93
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — KENNETH D CAMP — No. E012917 — Exp. 3/31/93 — ELECTRICAL — STATE OF CALIFORNIA

DKS ASSOCIATES
1055 WEST SEVENTH ST., SUITE 2850
LOS ANGELES, CA 90017

IN ASSOCIATION WITH:

KDC ARCHITECTS • ENGINEERS
1055 WEST SEVENTH ST., SUITE 2890
LOS ANGELES, CA 90017

PROJECT NOTES:

1. TERMINATE 50P22 CABLE AND COIL IN SPLICE VAULT.
2. TRENCH CONDUIT UNDER HIGHWAY WALL STRUCTURE.
3. MOUNTING CONDUIT ON VIADUCT STRUCTURE AND COLUMN. SEE SHEET C-4 OR C-5 FOR DETAILS
4. INSTALL COMMUNICATIONS TERMINAL BLOCK TELEPHONE BRIDGE IN EXISTING CONTROLLER CABINET. SEE SHEET E-49 FOR DETAILS.
5. USE EXISTING TELEPHONE BRIDGE AND CONNECT ASSIGNED CONTROLLER CABINETS.
6. PULL EXTRA 50 FEET OF SMFO AND COIL IN SPLICE VAULT TO BE CONNECTED LATER.
7. JACK 2" GALVANIZED STEEL CONDUIT BENEATH ROADWAY. SEE SHEET E-42, DETAIL A.
8. TRENCH NEW CONDUIT IN SOIL.
9. REPLACE EXISTING PB WITH A NEW NO.6(E) PB AND REPLACE EXISTING 90° BEND IN COUNDUIT WITH 45° BEND. SEE SHEET E-44, DETAIL B.
10. REPLACE EXISTING PB WITH NEW SPLICE VAULT.
11. REPLACE EXISTING PB WITH NEW SPLICE VAULT AND REPLACE 90° BEND WITH 45° BEND. SEE SHEET E-44, DETAIL A.

GENERAL NOTES:

1. ALL CONDUIT IS EXISTING UNLESS INDICATED NEW.
2. BEFORE REMOVING OR MODIFYING ANY EXISTING ELECTRICAL FACILITIES, THE CONTRACTOR SHALL GIVE 72 HOURS ADVANCE NOTICE IN WRITING TO THE ENGINEER.
3. SERVICE EQUIPMENT ENCLOSURE SHALL BE LOCATED 10' MINIMUM FROM THE POWER POLE OR VAULT.
4. ELECTRICAL SERVICE INSTALLATION SHALL MEET THE REQUIREMENTS OF EITHER SOUTHERN CALIFORNIA EDISON COMPANY (SCE) OR LOS ANGELES DEPARTMENT OF WATER AND POWER (DWP).
5. CONDUCTORS FROM POWER POLE (OR VAULT) TO SERVICE ENCLOSURE WILL BE INSTALLED BY UTILITY COMPANY.
6. TRENCH FOR CONDUIT INSTALLATION BETWEEN POWER POLE (OR VAULT) AND SERVICE ENCLOSURE SHALL BE LEFT OPEN FOR INSPECTION AND APPROVAL BY SCE OR DWP INSPECTOR BEFORE BACKFILL.
7. STENCIL CAMERA IDENTIFICATION NUMBER ON POLE IN 3" CHARACTERS 10 FEET ABOVE BASE. SEE SHEET K1 AND K2.
8. EXISTING COMMUNICATION CONDUIT SHOWN OUTSIDE OF THE ROADWAY MIGHT BE UNDER THE PAVED SHOULDER.

ABBREVIATIONS:

DWP	- LOS ANGELES DEPARTMENT OF WATER AND POWER
SCWC	- SOUTHER CALIFORNIA WATER COMPANY
SCGC	- SOUTHERN CALIFORNIA GAS COMPANY
GTE	- GENERAL TELEPHONE AND ELECTRIC
PAC BELL	- PACIFIC BELL
SCE	- SOUTHER CALIFORNIA EDISON
CCTV	- CLOSED CIRCUIT TELEVISION
COMM	- COMMUNICATION
GA	- GLENN ANDERSON
VX	- VIDEO TRANSMITTER
CCR	- CAMERA CONTROL RECEIVER
VMX	- VIDEO MULTIPLEXIER
OW	- ORDER WIRE
FXO	- FOREIGN EXCHANGE OFFICE

LEGEND (SHEET E-2 TO E-41)

	CCTV ASSEMBLY CAMERA AND POLE
	SPLICE VAULT SEE SHEET E-43
V	EXISTING SPLICE VAULT INSTALLATION SHOWN ON SHEETS E-2 TO E-23
	EXISTING CONTROLLER TO BE TIED TO COMMUNICATION SYSTEM
	NEW CCTV 334 CABINET
——E——	PROPOSED POWER SERVICE CONDUIT
——e——	EXISTING POWER SERVICE CONDUIT
	MANHOLE
	EXISTING MAGNETOMETERS (100 SCALE)
	EXISTING DETECTOR LOOPS (100 SCALE)
PP#XXX	POWER POLE NUMBER
XX SMFO	SINGLE MODE FIBER OPTIC CABLE SEE SHEET E-66 FOR ASSIGNMENT
XX MMFO	MULTIMODE FIBER OPTIC CABLE SEE SHEET E-66 FOR ASSIGNMENT
XX P22	XX PAIR COPPER TELEPHONE CABLE SEE SHEET E-61, E-62, E-63 AND E-64 FOR ASSIGNMENT
——SD——	STORM DRAIN
GA XXX	CCTV INDENTIFICATION NUMBER: (XXX = POST MILE DESIGNATOR TO ONE DECIMAL PLACE)

AS BUILT 119904
Contract No. 07-
Resident Engineer: Hillel Amos
Completion Date: October 3, 1997

LEGEND AND NOTES

E-1

LAST REVISION 03-23-93

DATE	REVISED BY
3/93	RL
3/93	RS

CALCULATED/DESIGNED BY
CHECKED BY

DESIGN OVERSIGHT — GLORIA GWYNNE

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION — Caltrans

/usr/richard/PS7/7119904.01 06-MAY-1993 12:53 richard

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

CU 07374 | EA 119900

FORM DC-OE-92-PF (REV. 3/88)

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	105	R0.5/17.8	23	92

Kenneth D. Camp 3/8/93
REGISTERED ELECTRICAL ENGINEER

4-26-93
PLANS APPROVAL DATE

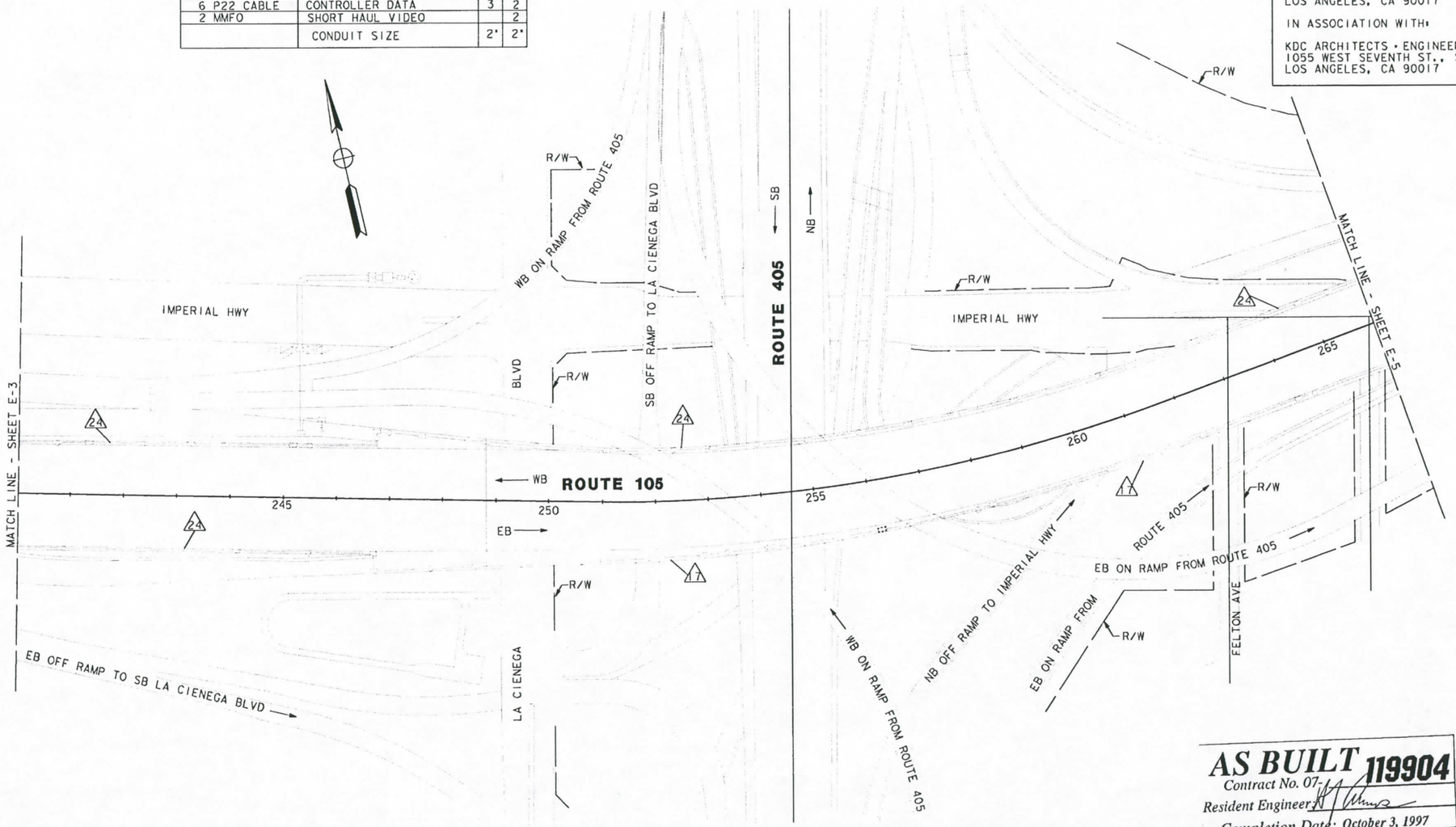
REGISTERED PROFESSIONAL ENGINEER
KENNETH D CAMP
No. E012917
Exp. 3/31/93
ELECTRICAL
STATE OF CALIFORNIA

DKS ASSOCIATES
1055 WEST SEVENTH ST., SUITE 2850
LOS ANGELES, CA 90017

IN ASSOCIATION WITH:

KDC ARCHITECTS • ENGINEERS
1055 WEST SEVENTH ST., SUITE 2890
LOS ANGELES, CA 90017

CONDUCTOR SCHEDULE			
CONDUCTOR TYPE	FUNCTION	RUN 1	RUN 24
6 P22 CABLE	CONTROLLER DATA	3	2
2 MMFO	SHORT HAUL VIDEO		2
	CONDUIT SIZE	2"	2"



AS BUILT 119904
Contract No. 07-
Resident Engineer:
Completion Date: October 3, 1997

CCTV AND COMMUNICATIONS SYSTEM ROUTING

SCALE: 1" = 100'

NOTE: THIS PLAN ACCURATE FOR ELECTRICAL ONLY.
SEE SHEET E-1 FOR LEGEND AND PROJECT NOTES.

E-4

LAST REVISION 03-23-93

CALCULATED/ DESIGNED BY	RL	DATE 3/93	REVISED BY
CHECKED BY	RS	3/93	DATE REVISED

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

DESIGN OVERSIGHT
GLORIA GWYNNE

/usr/richard/PS7/119900d04. 06-MAY-1993 12:54 richard

FORM DC-OE-92-PF (REV. 3/88)

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

CU 07374

EA 119900

USERID: t7acruz@NODE FILE: /project/119901_ua/ab/t7aauach/711990u05.dan DATE: Wed Jul 15 1998 TIME: 10:24

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	105	R0.5/17.8	24	92

Kenneth D. Camp 3/23/93
REGISTERED ELECTRICAL ENGINEER

4-26-93
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — KENNETH D CAMP — No. E012917 — Exp. 3/31/93 — ELECTRICAL — STATE OF CALIFORNIA

DKS ASSOCIATES
1055 WEST SEVENTH ST., SUITE 2850
LOS ANGELES, CA 90017

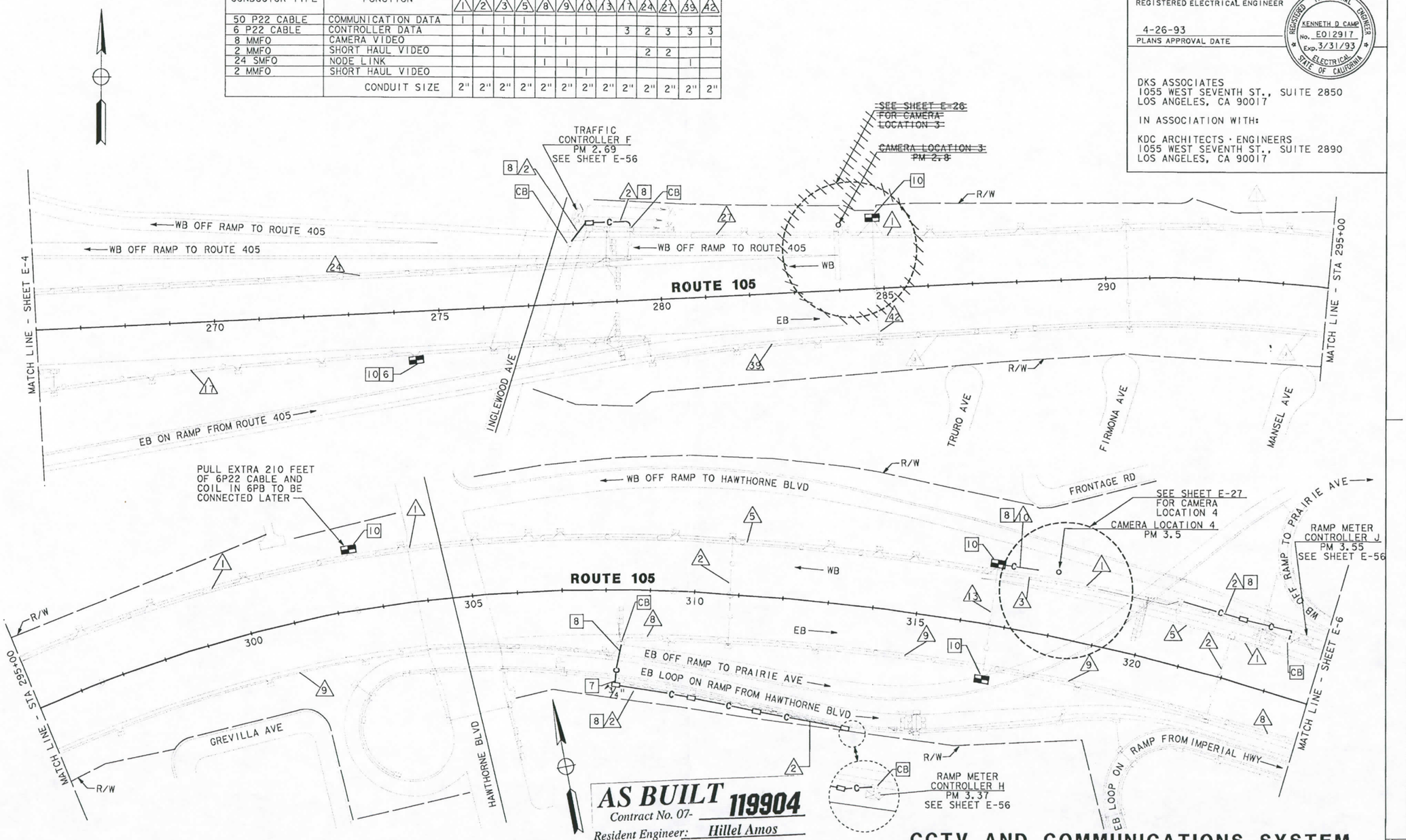
IN ASSOCIATION WITH:

KDC ARCHITECTS · ENGINEERS
1055 WEST SEVENTH ST., SUITE 2890
LOS ANGELES, CA 90017

CCO #3

CONDUCTOR SCHEDULE

CONDUCTOR TYPE	FUNCTION	RUN 1	2	3	5	8	9	10	13	17	24	27	39	42
50 P22 CABLE	COMMUNICATION DATA	1		1	1									
6 P22 CABLE	CONTROLLER DATA		1	1	1	1		1		3	2	3	3	3
8 MMFO	CAMERA VIDEO					1	1							1
2 MMFO	SHORT HAUL VIDEO			1					1		2	2		
24 SMFO	NODE LINK					1	1						1	
2 MMFO	SHORT HAUL VIDEO							1						
	CONDUIT SIZE	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"	2"



AS BUILT 119904
Contract No. 07-
Resident Engineer: Hillel Amos
Completion Date: October 3, 1997

NOTE: THIS PLAN ACCURATE FOR ELECTRICAL ONLY.
SEE SHEET E-1 FOR LEGEND AND PROJECT NOTES.

CCTV AND COMMUNICATIONS SYSTEM ROUTING

SCALE: 1"=100'

E-5

LAST REVISION 03-23-93

DATE	REVISED BY
3/93	DATE REVISED

CALCULATED/DESIGNED BY: RL
CHECKED BY: RS

DESIGN OVERSIGHT
GLORIA GWYNNE

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans

FORM DC-OE-92-PF (REV. 3/88)

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

CU 07374 EA 119900

USERID: t7acruz@NODE FILE: /project/119901_ua/ab/t7aauach/711990u05.dan DATE: Wed Jul 15 1998 TIME: 10:24

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	405	15.4/31.0	43	151

1

Kenneth D. Camp 3/15/94
REGISTERED ELECTRICAL ENGINEER

11-28-94
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — KENNETH D CAMP — No. E012917 — Exp. 3/31/97 — ELECTRICAL — STATE OF CALIFORNIA

DKS ASSOCIATES
1055 WEST SEVENTH ST., SUITE 2850
LOS ANGELES, CA 90017

IN ASSOCIATION WITH:

KDC ARCHITECTS • ENGINEERS
1055 WEST SEVENTH ST., SUITE 2890
LOS ANGELES, CA 90017

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PROJECT NOTES: (FOR SHEETS E-2 THRU E-19)

1. TRENCH AND INSTALL CONDUIT IN ASPHALT.
2. TRENCH AND INSTALL CONDUIT IN CONCRETE.
3. TRENCH AND INSTALL CONDUIT IN SOIL.
4. ATTACH CONDUIT TO STRUCTURE. SEE SHEET C-4 FOR BRIDGE ATTACHMENT TYPE AND DETAILS.
5. JACK RIGID STEEL CONDUIT BENEATH ROADWAY.
6. COIL 30 FEET OF 6P22 CABLE IN NEW PULL BOX FOR FUTURE COUNT STATION CONTROLLER.
7. TERMINATE TWISTED PAIR CABLE AND COIL 60 FEET IN SPLICE VAULT.
8. CONNECT 6P22 TO CONTROLLER. USE CONDUIT FROM PB INTO CABINET. IF NEW TELEPHONE BRIDGE CONNECT OTHER 6P22 TO BLOCK SEE SHEET E-55.
9. TERMINATE 12SMFO CABLE AND COIL 60 FEET IN SPLICE VAULT.
10. TERMINATE 48SMFO CABLE AND COIL 60 FEET IN SPLICE VAULT.

10A. TERMINATE 72SMFO CABLE AND COIL 60 FEET IN SPLICE VAULT.

11. COIL 100 FEET 75P22 CABLE IN SPLICE VAULT FOR ANTICIPATED HOV EXPANSION.
12. COIL 100 FEET 12SMFO CABLE IN SPLICE VAULT FOR ANTICIPATED HOV EXPANSION.
13. COIL 100 FEET OF 48SMFO AND 24SMFO CABLES IN SPLICE VAULT FOR ANTICIPATED HOV EXPANSION.
14. LOCATE SPLICE VAULT 15 FEET FROM EXISTING SHOULDER FOR ANTICIPATED HOV EXPANSION.
15. LOCATE 6(T) PB AS CLOSE TO SOUND WALL BASE AS POSSIBLE FOR FOR ANTICIPATED HOV EXPANSION.
16. COIL 25 FEET OF 6P22 CABLE IN NEW PULL BOX FOR IRRIGATION CONTROLLER CONNECTION.
17. COIL 25 FEET OF 6P22 CABLE IN NEW PULL BOX FOR TRAFFIC SIGNAL CONTROLLER.

GENERAL NOTES:

1. BEFORE REMOVING OR MODIFYING ANY EXISTING ELECTRICAL FACILITIES, THE CONTRACTOR SHALL GIVE 72 HOURS ADVANCE NOTICE IN WRITING TO THE ENGINEER.
2. SERVICE EQUIPMENT ENCLOSURE SHALL BE LOCATED 10' MINIMUM FROM THE POWER POLE OR VAULT.
3. ELECTRICAL SERVICE INSTALLATION SHALL MEET THE REQUIREMENTS OF EITHER SOUTHERN CALIFORNIA EDISON COMPANY(SCE)OR LOS ANGELES DEPARTMENT OF WATER AND POWER(DWP).
4. CONDUCTORS FROM POWER POLE(OR VAULT)TO SERVICE ENCLOSURE WILL BE INSTALLED BY UTILITY COMPANY.
5. TRENCH FOR CONDUIT INSTALLATION BETWEEN POWER POLE(OR VAULT) AND SERVICE ENCLOSURE SHALL BE LEFT OPEN FOR INSPECTION AND APPROVAL BY SCE OR DWP INSPECTOR BEFORE BACKFILL.
6. STENCIL CAMERA IDENTIFICATION NUMBER ON POLE IN 3" CHARACTERS 10 FEET ABOVE BASE. SEE SHEET K1 AND K2.
7. GIVEN STATIONS ARE APPROXIMATE, EXACT EQUIPMENT AND POLE LOCATIONS TO BE DETERMINED BY ENGINEER.

ABBREVIATIONS: (NOT LISTED IN CALTRANS STANDARD PLANS)

B/O	- BREAK OUT
CCK	- CAMERA CONTROL KEYPAD
CCTV	- CLOSED CIRCUIT TELEVISION
COMM	- COMMUNICATION
DACCS	- DIGITAL ACCESS CROSS CONNECTION SYSTEM
DEMARC	- DEMARCATION
DEMUX	- DEMULTIPLEX
DWP	- LA DEPARTMENT OF WATER AND POWER
FDF	- FIBER DISTRIBUTION FRAME
FRX	- FIBER VIDEO RECEIVER
GTE	- GENERAL TELEPHONE AND ELECTRIC
HAR	- HIGHWAY ADVISORY RADIO
HID	- HIGH INTENSITY DISCHARGE
JKFD	- JACKFIELD
MUX	- MULTIPLEX
OW	- ORDER WIRE (MULTIPLE VOICE CIRCUIT)
OC	- OPTICAL CARRIER
O/E	- OPTICAL TO ELECTRIC
PAC BELL	- PACIFIC BELL TELEPHONE COMPANY
PT&T	- PACIFIC TELEPHONE AND TELEGRAPH
RX	- RECEIVER
SD	- SAN DIEGO
SCE	- SOUTHERN CALIFORNIA EDISON
SCGS	- SOUTHERN CALIFORNIA GAS COMPANY
SCWC	- SOUTHERN CALIFORNIA WATER COMPANY
SM	- SINGLEMODE
SMFO	- SINGLEMODE FIBER OPTIC
SONET	- SYCHRONOUS OPTICAL NETWORK
T	- TERMINATE
TX	- TRANSMITTER
VMX	- VIDEO MULTIPLEXER
VSK	- VIDEO SWITCH KEYPAD
VX	- VIDEO TRANSMITTER
WFM	- WAVEFORM MONITOR

LEGEND (SHEET E-2 TO E-20)

	CCTV ASSEMBLY CAMERA AND POLE
	SPLICE VAULT (SEE SHEET E-43)
	EXISTING SPLICE VAULT
	EXISTING CONTROLLER TO BE TIED TO COMMUNICATION SYSTEM
	NEW CCTV 334 TV CABINET
15	15 PULL BOX
——E——	PROPOSED POWER SERVICE CONDUIT
——e——	EXISTING POWER SERVICE CONDUIT
	EXISTING MAGNETOMETERS
	EXISTING DETECTOR LOOPS
PP=XXX	POWER POLE NUMBER
XXSMFO	SINGLE MODE FIBER OPTIC CABLE SEE SHEET E-84 THROUGH E-87 FOR ASSIGNMENT
XXP22	XX PAIR COPPER TELEPHONE CABLE SEE SHEET E-72 THROUGH E-80 FOR ASSIGNMENT
SDXXX	CCTV IDENTIFICATION NUMBER: (SD = SAN DIEGO; XXX = POST MILE DESIGNATOR TO ONE DECIMAL PLACE)

AS-BUILT
Contract No. 07- 120814
Resident Engineer: AMOS, H.
Completion Date: 08/16/1999

1 REVISED PER ADDENDUM NO. 1 DATED JANUARY 20, 1995

LEGEND AND NOTES

E-1

DATE	REVISED BY	DATE	CALCULATED/ DESIGNED BY	DESIGN OVERSIGHT
3/94	REVISED	RL	PAT SULLIVAN	
3/94	DATE REVISED	RS	CHECKED BY	

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION — Caltrans

LAST REVISION 00-00-00 — TIME PLOTTED => 14-JAN-1995 11:53

FORM DC-OE-92-PF (REV. 3/88)

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USERNAME => jimt
DGN FILE => /usr/jimt/PO/71208iu01.dgn

CU 07374

EA 120811

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	405	15.4/31.0	48	151

Kenneth D. Camp 3/15/94
REGISTERED ELECTRICAL ENGINEER

11-28-94
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — KENNETH D CAMP — No. E012917 — Exp. 3/31/97 — ELECTRICAL — STATE OF CALIFORNIA

DKS ASSOCIATES
1055 WEST SEVENTH ST., SUITE 2850
LOS ANGELES, CA 90017

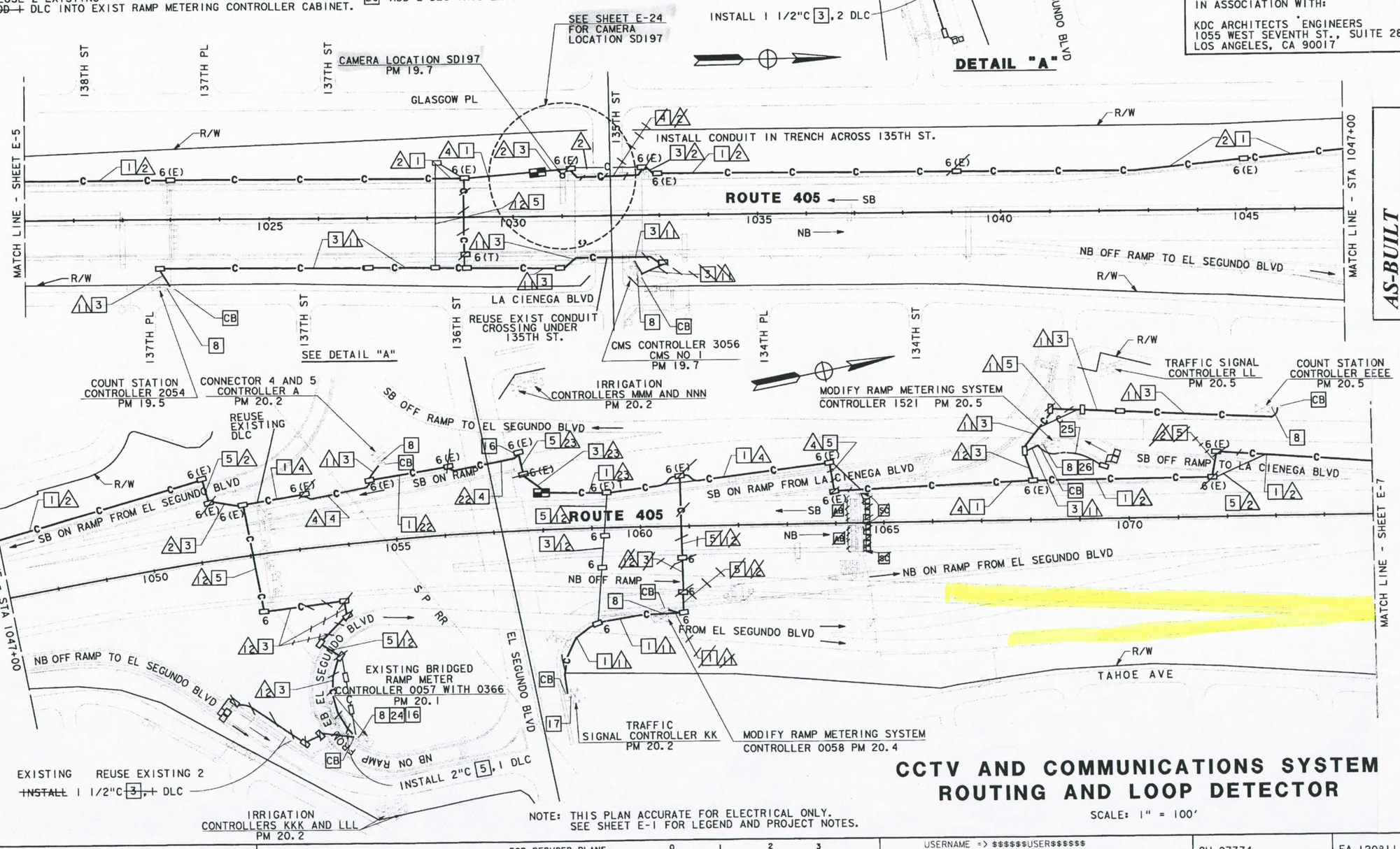
IN ASSOCIATION WITH:

KDC ARCHITECTS ENGINEERS
1055 WEST SEVENTH ST., SUITE 2890
LOS ANGELES, CA 90017

CONDUCTOR SCHEDULE

CONDUCTOR TYPE	FUNCTION	RUN 2	RUN 4	RUN 11/12	RUN 21	RUN 22	RUN 23
75P22 CABLE	COMMUNICATION DATA	1	1		1	1	1
6P22 CABLE	CONTROLLER DATA		2	1 2		3	4
72SMFO	DATA/VIDEO NODE TO HUB 2: I-605	1	1		1	1	1
~~8MMFO~~ 12SMFO	CCTV CAMERA TO VIDEO DISTRIBUTION	1	1		1	1	1
	INNERDUCT	1 1/4" 1/4"	1 1/4" 1/4"		1 1/4" 1/4"	1 1/4" 1/4"	1 1/4" 1/4"
	CONDUIT SIZE	4"	4"	2" 2"	4"	4"	4"

PROJECT NOTES: (THIS SHEET ONLY)
24 ~~ADD 1~~ REUSE 2 EXISTING DLC INTO EXIST RAMP METERING CONTROLLER CABINET.
25 INSTALL 1 1/2"C [3], 2 DLC
26 ADD 2 DLC INTO EXISTING RAMP METERING CONTROLLER CABINET.



NOTE: THIS PLAN ACCURATE FOR ELECTRICAL ONLY. SEE SHEET E-1 FOR LEGEND AND PROJECT NOTES.

CCTV AND COMMUNICATIONS SYSTEM ROUTING AND LOOP DETECTOR

SCALE: 1" = 100'

E-6

AS-BUILT
Contract No. 07- 120814
Resident Engineer: AMOS, H.
Completion Date: 08/16/1999

DATE	REVISED BY
RL 3/94	RS 3/94
AD 9/94	JKB

CALCULATED/DESIGNED BY
CHECKED BY
DESIGN OVERSIGHT
PAT SULLIVAN

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
TRAFFIC DESIGN

LAST REVISION 00-00-00 TIME PLOTTED => $$$$$$$SYSTIME$$$$$$

FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

USERNAME => $$$$$$USER$$$$$$
DGN FILE => $$$$$$$$$$DGNSPEC$$$$$$$$$$

CU 07374 EA 120811

FORM DC-OE-92-PF (REV. 3/88)

CONDUCTOR SCHEDULE																					
CONDUCTOR TYPE	FUNCTION	RUN																			
		1	2		6	9	2			25			26			27			64	
75P22 CABLE	COMMUNICATION DATA																				
6P22 CABLE	CONTROLLER DATA	1	2		2	1				4			5			4			3	
72SMFO	DATA/VIDEO NODE TO HUB 2: I-605																				
12 ~~8~~SMFO	TUNNEL CAMERA TRUNK LINE																				
2SMFO	CONNECTOR 5 TUNNEL TRUNK LINE																				
~~8MMFO~~ 12SMFO	CCTV CAMERA TO VIDEO DISTRIBUTION																				
~~2MMFO B/G~~ CABLE	SHORT HAUL VIDEO																				
2SMFO	INNERDUCT						1¼"	1¼"		1¼"	1¼"		1¼"	1¼"		1¼"	1¼"				
	CONDUIT SIZE	2"	2"		2"	2"	4"			4"			4"			4"			2"		

AS-BUILT
Contract No. 07- 120814
Resident Engineer:
Completion Date: 08/16/1999

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	405	15.4/31.0	49	151

Kenneth D. Camp 3/15/94
REGISTERED ELECTRICAL ENGINEER

PROFESSIONAL ENGINEER — KENNETH D CAMP No. E012917 Exp. 3/31/97 — ELECTRICAL — STATE OF CALIFORNIA

11-28-94
PLANS APPROVAL DATE

DKS ASSOCIATES
1055 WEST SEVENTH ST., SUITE 2850
LOS ANGELES, CA 90017

IN ASSOCIATION WITH:

KDC ARCHITECTS • ENGINEERS
1055 WEST SEVENTH ST., SUITE 2890
LOS ANGELES, CA 90017

PROJECT NOTES: (THIS SHEET ONLY)

12
[24] ROUTE 8SMFO AND 6P22 INTO VENTILATION BUILDING. CONNECT 8SMFO TO CABLE FROM TUNNEL CAMERAS ON PANEL "H" COIL 50 FEET OF 6P22 AT PANEL "H" FOR FUTURE CONNECTION BY OTHERS.

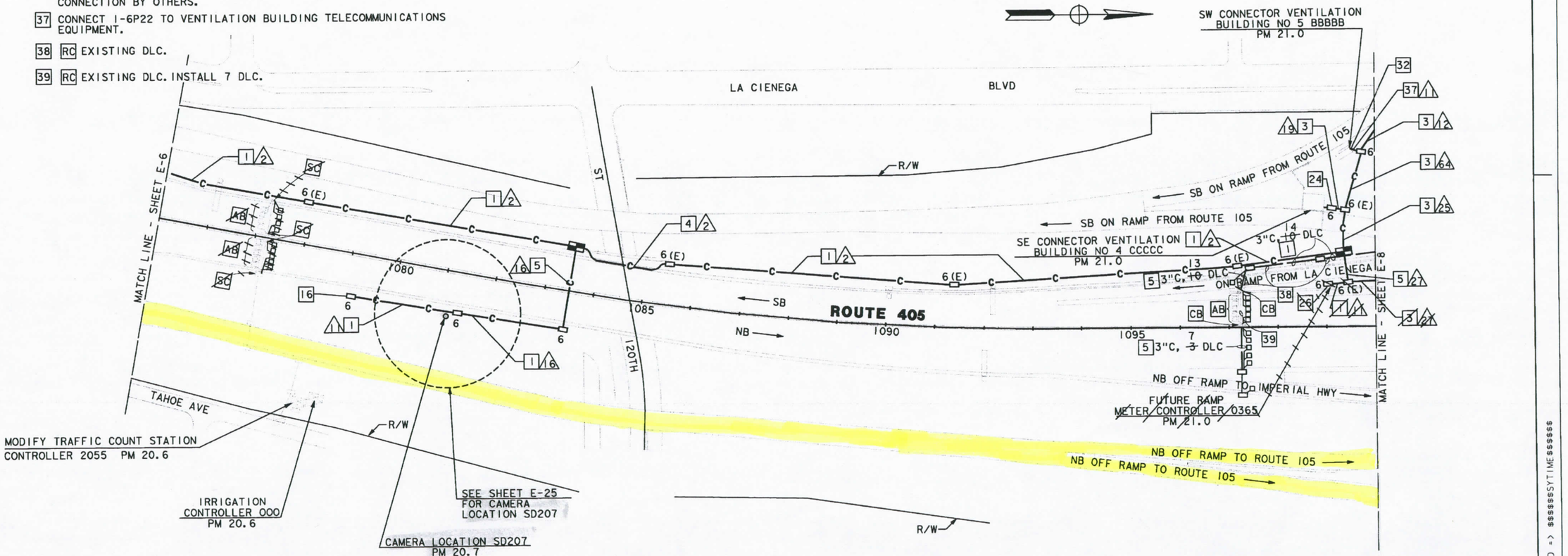
[26] COIL 25 FEET OF 6P22 CABLE IN NEW PULL BOX FOR NEW RAMP METER CONTROLLER.

[32] ROUTE 2SMFO AND 6P22 INTO VENTILATION BUILDING. CONNECT 2SMFO TO CABLE FROM TUNNEL CAMERAS ON PANEL "HI" COIL 50 FEET OF 6P22 AT PANEL "HI" FOR FUTURE CONNECTION BY OTHERS.

[37] CONNECT 1-6P22 TO VENTILATION BUILDING TELECOMMUNICATIONS EQUIPMENT.

[38] [RC] EXISTING DLC.

[39] [RC] EXISTING DLC. INSTALL 7 DLC.



CCTV AND COMMUNICATIONS SYSTEM ROUTING AND LOOP DETECTOR

SCALE: 1" = 100'

E-7

NOTE: THIS PLAN ACCURATE FOR ELECTRICAL ONLY.
SEE SHEET E-1 FOR LEGEND AND PROJECT NOTES.

DESIGNED BY	CALCULATED/ DESIGNED BY	CHECKED BY	DRAWN BY	CHECKED BY	DATE	REVISED BY	DATE REVISED
RL			RS		3/94	AD	9/94

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
DESIGN OVERSIGHT: PAT SULLIVAN

LAST REVISION 00-00-00 TIME PLOTTED => $$$$$$$SYTIME$$$$$$$

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USERNAME => $$$$$$USER$$$$$$
DGN FILE => $$$$$$$$$$DGNSPEC$$$$$$$$$$

CU 07374 EA 120811

FORM DC-OE-92-PF (REV. 3/88)

USERID: t7ksamar@NODE FILE: /project/120811_ua/ab/t7ksamar/712081u08.dgn DATE: Mon Jun 26 2000 TIME: 09:36

CONDUCTOR SCHEDULE

CONDUCTOR TYPE	FUNCTION	RUN	10	11	12	13	14	15	19	27	28	29	30	33	35	36	40	42	63	99
75P22 CABLE	COMMUNICATION DATA									1		1	1				1	1		
6P22 CABLE	CONTROLLER DATA		7	1	2	3	4	1	1	4	1	3	4	3	10	4e		2	2	
48SMFO	SONET/CCTV TRUNKS													4	11		1	1		
72SMFO	DATA/VIDEO; NODE TO HUB 2: I-605									1										
24SMFO	HUB TO TMC																			
24SMFO	DATA/VIDEOS 105 FREEWAY															1e				
12 ~~8SMFO~~	TUNNEL CAMERA TRUNK LINE							1		1	1									
2SMFO	CONNECTOR 5 TUNNEL TRUNK									1										
~~8MMFO~~ 12SMFO	CCTV CAMERA TO VIDEO DISTRIBUTION									1		1	1				1	1		
~~2MMFO B/O~~ CABLE	SHORT HAUL VIDEO							1						1	1					
2SMFO	INNERDUCT									1¼"1¼"	1¼"1¼"	1¼"1¼"	1¼"1¼"				1¼"1¼"	1¼"1¼"		
	CONDUIT SIZE		2e"	2"	2"	2"	2"	4"	2"	4"	4"	4"	4"	2" (e)	4"	2" (e)	4"	4"	2" (e)	4"

"e" EXISTING CONDUITS AND CABLES.

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
07	LA	405	15.4/31.0	50	151

Kenneth D. Camp 3/15/94
REGISTERED ELECTRICAL ENGINEER

REGISTERED PROFESSIONAL ENGINEER — KENNETH D CAMP — No. E012917 — Exp. 3/31/97 — ELECTRICAL — STATE OF CALIFORNIA

11-28-94
PLANS APPROVAL DATE

DKS ASSOCIATES
1055 WEST SEVENTH ST., SUITE 2850
LOS ANGELES, CA 90017

IN ASSOCIATION WITH:

KDC ARCHITECTS • ENGINEERS
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LOS ANGELES, CA 90017

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AS-BUILT
Contract No. 07- 120814
Resident Engineer: AMOS, H.
Completion Date: 08/16/1999

NW CONNECTOR VENTILATION BUILDING NO 8 DDDDD PM 21.0

SB CONNECTOR FROM ROUTE 105

MATCH LINE SHEET E-40

SEE CONTRACT 07-119904 FOR CONDUIT CONNECTION FROM VIADUCT TO HUB BUILDING

EB

TRAFFIC SIGNAL CONTROLLER 00 PM 21.0

WB

ROUTE 105

250

RW

2- FUTURE BRIDGED IRRIGATION CONTROLLERS TTT AND UUU PM 21.0

SE CONNECTOR PUMP PLANT NO 1 PM 21.0

3C", ~~10~~ 14 DLC [1]

MATCH LINE - SHEET E-7

MODIFY RAMP METERING SYSTEM METER CONTROLLER 0365, PM 21.0 [25]

WB CONNECTOR FROM ROUTE 405

NW CONNECTOR PUMP PLANT NO 2 PM 21.2

NB OFF RAMP TO IMPERIAL HWY

EB CONNECTOR FROM ROUTE 405

COUNT STATION CONTROLLER AAAA PM 21.1

FUTURE IRRIGATION CONTROLLERS PPP AND QQQ R/W PM 21.0

INSTALL 2"C [5], 2 DLC

LA CIENEGA BLVD

HWY

IMPERIAL

SB CONNECTOR FROM ROUTE 105

TRAFFIC SIGNAL CONTROLLER NN PM 21.1

WB CONNECTOR FROM ROUTE 405

R/W

FUTURE RAMP METER CONTROLLER 0364 PM 21.3

SB OFF RAMP TO LA CIENEGA BLVD

NB ON RAMP FROM LA CIENGA BLVD

EB CONNECTOR FROM ROUTE 405

SB ON RAMP TO ROUTE 405

SB ROUTE 405

NB

1105 1110 1115 1120 1125

ADD 2 DLC

RAMP METER CONTROLLER 0352 PM 21.1

INSTALL 1 1/2"C [1], 2 DLC

NB ON RAMP FROM IMPERIAL HWY

REPLACE EXISTING PULL BOX

CAMERA LOCATION SD214 PM 21.4

FUTURE IRRIGATION CONTROLLERS RRR AND SSS PM 21.2

EXISTING BRIDGED RAMP METER CONTROLLER 0353 WITH 0352 PM 21.3

TRAFFIC SIGNAL CONTROLLER MM PM 21.0

NB CONNECTOR FROM ROUTE 105

IMPERIAL HWY ON RAMP PUMP PLANT NO 3 PM 21.2

MATCH LINE - SHEET E-19

BRIDGED FUTURE IRRIGATION CONTROLLERS VVV & WWW PM 21.3

INSTALL 2" C [5], 1 DLC

ADD 2 DLC TO EXISTING RAMP METERING CONTROLLER CABINET

SEE SHEET E-26 FOR CAMERA LOCATION SD214

NB CONNECTOR FORM ROUTE 105

MATCH LINE - SHEET E-9

NOTE: THIS PLAN ACCURATE FOR ELECTRICAL ONLY. SEE SHEET E-1 FOR LEGEND AND PROJECT NOTES.

PROJECT NOTES: (THIS SHEET ONLY)

24 ROUTE 8SMFO AND 6P22 TO EXISTING TELECOMMUNICATIONS CONDUIT AT VENTILATION BUILDING.

25 COIL 25 FEET OF 6P22 CABLE IN PULL BOX FOR ~~FUTURE~~ PUMP PLANT CONNECTION. CONNECTION BY OTHERS.

26 COIL 25 FEET OF 6P22 CABLE IN NEW PULL BOX FOR NEW RAMP METER CONTROLLER.

27 ~~USE~~ EXISTING 2"GALVANIZED STEEL CONDUIT AND PULL BOXES IN STRUCTURE FOR EQUIPMENT CONNECTION FROM 105 TO COMMUNICATIONS HUB. ~~1 6P22 FOR 405/105 CONNECTOR METERING ON I-105.~~ SEE CONTRACT NO. 07-119904

28 USE EXISTING 2"GALVANIZED STEEL CONDUIT AND PULL BOXES.

29 1-4" GALVANIZED STEEL CONDUIT SERVICING EQUIPMENT SOUTH OF COMMUNICATIONS HUB, ALONG ROUTE 405.

30 2-4" GALVANIZED STEEL CONDUIT SERVICING EQUIPMENT NORTH OF COMMUNICATIONS HUB, ALONG ROUTE 405.

31 4-4" GALVANIZED STEEL CONDUIT SERVICING INCOMING CABLES TO COMMUNICATIONS HUB.

33 TRENCH MAIN LINE CONDUIT SOUTH OF POWER POLE.

38 RC EXISTING DLC.

CCTV AND COMMUNICATIONS SYSTEM ROUTING AND LOOP DETECTOR

SCALE: 1" = 100'

E-8

DATE	REVISED BY	CALCULATED/ DESIGNED BY	CHECKED BY
3/94	RL	RS	
3/94	DATE REVISED		
7/94	9/94		
JKB	AD		

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
Caltrans
TRAFFIC DESIGN
DESIGN OVERSIGHT
PAT SULLIVAN

LAST REVISION 00-00-00
TIME PLOTTED => $$$$$$$SYTIME$$$$$$$

FORM DC-OE-92-PF (REV. 3/88)
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DGN FILE => $$$$$$$$$$DGNSPEC$$$$$$$$$$
CU 07374
EA 120811

USERID: t7ksamar@NODE FILE: /project/120811_ua/ab/t7ksamar/712081u08.dgn DATE: Mon Jun 26 2000 TIME: 09:36

07-3X8704 List of Preconstruction Operational Status-Check Results

CCTV STATUS

CCTV #	CO.	FWY	DIR	PM	CROSS STREET NAME	PROBLEMS
352	LA	405	N	20.70	120th St	NO PROBLEMS

TMS STATUS

VDS #	CO.	FWY	DIR	PM	CROSS STREET NAME	PROBLEMS
767838	LA	105	EB	2.5	FM 405 NB	NO PROBLEMS
767839	LA	105	EB	2.5	FM 405 NB	NO PROBLEMS
767840	LA	105	EB	2.5	FM 405 NB	NO PROBLEMS
716694	LA	405	NB	20.6	122ND	NO PROBLEMS
762561	LA	405	NB	20.6	122ND	NO PROBLEMS
761468	LA	405	NB	R21.1	IMPERIAL EB	CARD OFF
716693	LA	405	SB	20.6	125TH	NO PROBLEMS
761548	LA	405	SB	20.6	125TH	NO PROBLEMS
761552	LA	405	SB	20.6	125TH	NO PROBLEMS
764735	LA	405	SB	20.6	125TH	NO PROBLEMS
718055	LA	405	SB	R21.08	IMPERIAL EB	NO PROBLEMS
764596	LA	405	SB	R21.08	IMPERIAL EB	NO PROBLEMS
764598	LA	405	SB	R21.08	IMPERIAL EB	NO PROBLEMS