INFORMATION HANDOUT

For Contract No. 06-0M0204
Route 168-Fresno-PM R36.0

Identified by
Project ID 0600020389

MATERIALS INFORMATION

Foundation Report Dated October 25, 2012

M e m o r a n d u m

Flex your power!
Be energy efficient!

To: JOE ESFANDIARY
BRANCH CHIEF
Structure Design Branch 1
Office of Transportation Architecture
Structure Design Services &
Earthquake Engineering

Attention: Bill Rocha
Project Structure Engineer

Date: October 25. 2012

File: 06-FRE-168-PM R36.0
Maynard Munger Vista Point
EA: 06-0M0201
Project No. 0600020389

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES – MS 5

Subject: Foundation Report

1.0 Scope of Work

The Office of Geotechnical Design North (OGDN) has prepared this Foundation Report (FR) for the proposed Maynard Munger Vista Point project located along eastbound State Route (SR) 168 near Pineridge in Fresno County as shown in Figure 1 Site Vicinity Map in the Appendix.

The purpose of this report is to document and discuss geotechnical conditions pertaining to the site and to provide geotechnical recommendations for foundation design and construction of the project. Work performed by OGDN includes review of pertinent reports, investigations and publications, performance of site subsurface investigations, performance of laboratory testing, performance of engineering studies, and preparation of this report.

2.0 Project Description

Maynard Munger Vista Point was constructed in 1971. The existing facilities consist of asphalt concrete (AC) covered access roads and parking areas and a 5-foot wide sidewalk with a short section for scenery viewing. An about 3-foot-high masonry/rock wall, serving as a barrier, is located between the parking areas and the short section of scenery viewing sidewalk. The vista point is heavily used year-round by visitors. The parking area is also used as a chain-control staging area as well as snow storage.

The proposed project will construct a concrete cantilever viewing deck to provide an unobscured view and add interpretive displays and seating areas. The viewing deck will be supported by a

reinforced concrete retaining wall. The retaining wall will be a modified Standard Type 1A wall with a 12-foot wall height. The slope in front of the wall will be graded to 2 to 1 (horizontal to vertical) slope. A spread footing foundation with a conceptual width of 7-foot and 2-inch has been proposed to support the retaining wall with an allowable bearing pressure of 2500 pounds per square foot (psf) under an Ultimate Strength Design (USD). A conceptual plan of the proposed construction is provided in the Appendix.

3.0 Field Investigation and Testing Program

The site was investigated by one soil testing boring/rock coring, RC-12-001, on July 12, 2012. The boring/coring was performed at the existing parking area near the middle of the masonry wall. The boring/coring was extended to a depth of 65 feet below the AC surface. The boring/coring was advanced with a self-casing wireline drilling method using Caltrans Acker drill rig. At suitable depths, Standard Penetration Test (SPT) was performed using a 1.4-inch (ID) standard split spoon sampler driven by a 140-pound automatic hammer falling a distance of 30-inch. Corresponding blow counts were recorded as the sampler was driven and samples were collected afterward. Both SPT samples and rock coring samples were visually classified onsite. Upon completion, the bore hole was backfilled with lean concrete.

Sheet of Log of Test Boring (LOTB) for RC-12-001, including a location plan, is being prepared by Geotechnical Services, Office of Geotechnical Support, Branch D, Contracts, Graphics & Records. The LOTB will be forwarded upon completion to be incorporated into the project plans. Mrs. Irma Gamarra-Remmen of the Contracts, Graphics & Records Branch may be contacted directly for information on the LOTB. A draft LOTB is provided in the Appendix.

4.0 Laboratory Testing Program

The laboratory testing program was directed towards an evaluation of physical and mechanical properties of the onsite soils. One sample at depths of about 5 to 10 feet was selected for Mechanical (Particle Size) Analysis and Atterberg Limits determination. The Mechanical Analysis and the Atterberg Limits were performed in accordance with ASTM Test Designations D422 and D4318, respectively. The test results are provided in the Appendix.

5.0 Site Topography and Geology

5.1 Topography and Drainage

The vista point is on the western slope of Sierra Nevada Mountains and is bound to the north by SR 168 and to the east, south, and west by slopes. The slopes incline downward southerly and southwesterly with an apparent ratio of about 1 to 1 (horizontal to vertical) or flatter. The immediate area in the parking lot is generally flat with an average surface elevation on the order of

4000 feet above mean sea level. No apparent surface drainage is observed in the project site. A Topographic Map is provided in Figure 2 in the Appendix.

5.2 Geology

The project site is located within the Sierra Nevada Mountain geomorphic province of California. The Sierra is a tilted fault block nearly 400 miles long with high, rugged, multiple scarps on its east side and relatively gentle slopes on its western side. According to the Geologic Map of California, Mariposa Sheet, (Olaf P. Jenkins Edition, CDMG, 1967), the site is underlain by Mesozoic Granitic Rocks (**gr**) consisting of granite, adamellite, granodiorite, tonalite and diorite. A Geologic Map is provided in Figure 3 in the Appendix.

6.0 Subsurface Conditions

6.1 Soils and Rock

The subsurface materials encountered in RC-12-001 consisted of clays, silts, sands, gravels, soil-like decomposed rock materials (sands), and rock.

Immediately beneath the AC pavement section, a less than 5-foot thin-layer of clay and sand mixture with varying gravel contents was encountered. The clays exhibited stiff to very stiff consistencies. Below the clay mixture, sands with varying silt and gravel contents were encountered to a depth of about 17 feet. The sands appeared to be medium dense. Below the sands, very soil-like decomposed rock consisting of sands with varying silts, gravels and cobbles were encountered to a depth of about 56 feet. The sands of decomposed rock appeared to be very dense. Below the soil-like decomposed rock, fresh rock was encountered to the maximum depth explored. The fresh rock was extremely hard and moderately fractured.

6.2 Groundwater

Groundwater was not encountered in RC-12-001. No water well of Department of Water Resource (DWR) is located in the vicinity of the project site. Based on the local geology, topography and drainage conditions, it is our opinion that a permanent groundwater condition is not anticipated at the site. Minor or localized groundwater condition, primarily due to seepage, may present. If encountered, temporary dewatering using pump and sump may be used.

7.0 Scour Evaluation

Based on the site conditions, scour is judged not applicable for the proposed project.

8.0 Corrosion Evaluation

One representative soil sample was collected from the site during site surface exploration. The sample was tested for corrosion evaluation and the results of the test are shown in the following table.

Table 1 Result of Corrosion Test

SIC Number (TL 101)	Sample Location	Sample Type	Sample Depth (ft)	Minimum Resistivity[1] (ohm-cm)	pH[2]	Chloride Content[3] (ppm)	Sulfate Content[4] (ppm)
C837031	RC-12-001	Soil	15 - 20	22640	7.04	n/a	n/a

Notes:
1, 2 – CTM 643; 3 – CTM 422; 4 – CTM 417

The Department considers a site to be corrosive to foundation elements if one of more of the following conditions exist for the representative soil samples taken at the site:

> "*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 test results, the site is considered non-corrosive to foundation/concrete elements.

9.0 Seismic Conditions

Based on the Caltrans Seismic Design Procedure, the nearest active fault to the site is the Round Valley fault, fault ID 174, with a maximum magnitude (MMax) of 7.0, which is located northeast of the site with a closest distance of 8.1 miles to the fault rupture plane. Based on Caltrans ARS online and the result of a probabilistic spectrum analysis from the "USGS 2008 Interactive Deaggregation (Beta)" model, a peak ground acceleration (PGA) of 0.20g is estimated for the site based on a shear wave velocity (V_{S30}) of 2500 feet per second determined based on the LOTB.

Liquefaction potential at the site is considered insignificant due to low groundwater condition. Potential for surface rupture at the site due to fault movement is also considered insignificant since there is no known fault projecting towards or passing directly through the project site.

10.0 Global Slope Stability Analysis

Global slope stability analysis of the proposed retaining wall was performed using Slope/W, a commercialized software published by Geo-Slope International Ltd. A two-dimension model was developed representing the proposed wall and the 2:1 (H:V) slope in front of the wall. Both static and seismic loading conditions were analyzed. The static loading included a 2500 psf uniform load applied at the footing elevation and the seismic loading included a horizontal acceleration of one third of the PGA of 0.20g. Groundwater is not anticipated to affect the proposed construction and therefore is not considered in the analysis.

Table 2 below summarizes the results of the global slope stability analysis. Based on the result, the proposed retaining wall satisfied the global stability requirements specified in Caltrans Bridge Design Specification (BDS), Section 5 Retaining Wall, 5.2.3 Overall Stability.

Table 2 Result of Global Stability Analysis

Conditions	Static Loading	Seismic Loading
Minimum FS Against Global Stability	= 2.0 >1.5*	= 1.5 > 1.3**

* Minimum FS required under static loading condition per BDS, Section 5.
** Minimum FS required under seismic loading condition per BDS, Section 5.

11.0 Geotechnical Recommendation

11.1 Spread Footing Foundation

Based on the subsurface condition, the proposed spread footing foundation is judged suitable and the allowable bearing pressure of 2500 psf is available at the site. We recommend that the footing be founded on the soil-like decomposed rock (sands with varying silts and gravels) or rock. Deepened footing/over-excavation may be needed.

In the area where LOTB RC-12-001 was performed, the soil-like decomposed rock materials were encountered at a depth of about 17 feet below the AC surface. As such, with the proposed wall height of 12 feet, the footing excavation may need to be deepened or over-excavated to about 5 feet beyond the proposed footing bottom elevation to reach the soil-like decomposed rock. We recommend that the actual footing excavation depth be determined by the Engineer onsite based on the subsurface condition encountered at the time of excavation. The plan-view dimensions of over-excavation should be no less than the plan-view dimensions of the proposed footing.

Hard fresh rock was encountered in RC-12-001 at depths deeper than 56 feet below the AC surface. However, outcropped rock was observed on the slopes in the project area, which suggests that the presence of rock can be erratic and unpredictable. Depending on the actual location, hard rock may be encountered in the footing excavation/over-excavation. Isolated boulder or boulder-sized and smaller rock should be removed from the excavation. Competent mass rock may remain in the excavation to provide structural support. If encountered, such conditions should be investigated and evaluated by the Engineer onsite at the time of construction.

To achieve a consistent and uniform structural support to the footing, we recommend that the over-excavation be backfilled with lean concrete to the proposed footing bottom elevation and the proposed footing be constructed on top of the lean concrete.

Settlement of the footing design and constructed as recommended above is estimated to be on the order of 0.5 inch or less.

11.2 CIDH Pile Foundation

As an alternative, Cast-In-Drilled-Hole (CIDH) pile foundation may be used to support the proposed retaining wall. OGDN can provide recommendations for CIDH pile foundation if desired.

11.3 Landscaping and Erosion Control

We recommend that the soil slope in front of the retaining wall be properly landscaped, erosion controlled, and routinely maintained. Design and construction of erosion control and landscaping on the retained slope is typically implemented by the Office of Landscape Architecture and therefore is out of the scope of this report.

12.0 Construction Considerations

12.1 Excavation

Excavation will be required for construction of the retaining wall and its footing foundation. Excavation shall be conducted in accordance with all regulations and specifications including Caltrans Standard Specifications.

Shoring may be required to facilitate the excavation. Contractor is solely responsible for design and construction of shoring. Shoring design shall be reviewed and approved by the Engineer prior to construction.

Excavation in soils and soil-like decomposed rock materials should be able to achieve by using conventional heavy excavation equipments. Cobbles and boulders may be encountered and difficulty in excavation due to these materials should be prepared. Blasting is not anticipated.

Although hard rock was encountered at depths deeper than 56 feet below the existing AC surface, outcropped rock was observed on the slopes in the project area. Therefore, it is a potential that hard rock will be encountered in excavation at the site. Isolated boulder or boulder-sized and smaller rock should be removed from the excavation. Competent mass rock may remain in the excavation to provide structural support. Such conditions should be investigated and evaluated by the Engineer onsite at the time of construction. To remove hard rock, air tools, such as chiseling and rock splitting, will be required. Blasting is not anticipated.

All footing excavation shall be inspected and approved by the Engineer prior to the placement of concrete. The bottoms of the footing excavations shall be relatively level, smooth, and clear of loose materials, water, and other debris.

12.2 Groundwater

Groundwater is not anticipated to affect the proposed excavation. Localized groundwater condition may exist primarily due to precipitation and seepage. If encountered, localized groundwater condition can be treated sufficiently with temporary dewatering including sump and pump.

The discussions, analyses, and recommendations contained in the report are based on specific project information regarding location, design, and construction that have been provided. If any changes are proposed during final project design and/or construction, OGDN should review the changes to determine if the discussions and recommendations contained herein are still applicable.

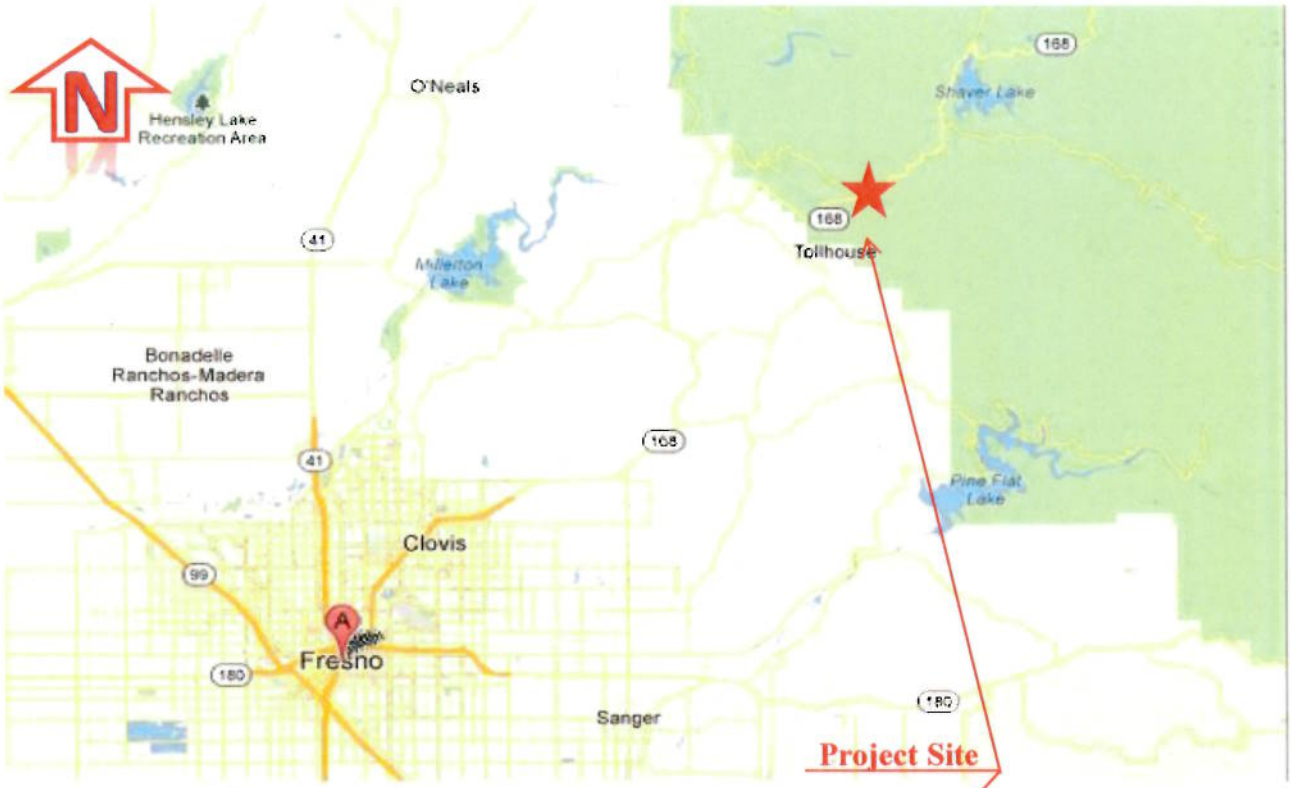
If you have any questions, please call Thomas Song at (916) 227-1057 or John Huang at (916) 227-1037.

REGISTERED PROFESSIONAL ENGINEER
THOMAS NAXIN SONG
No. C 69325
Exp. 6/30/2014
CIVIL
STATE OF CALIFORNIA

Thomas Song, PE
Transportation Engineer – Civil
Geotechnical Design – North
Geotechnical Services
Division of Engineering Services

C: District Project Manager, Suzie Holdrige
Strcuture Construction R.E. Pending File
DES Office Engineer, Office of PS&E, John Stayton
District Material Engineer, Doug Lambert
GS Corporate, Shira Rajendra

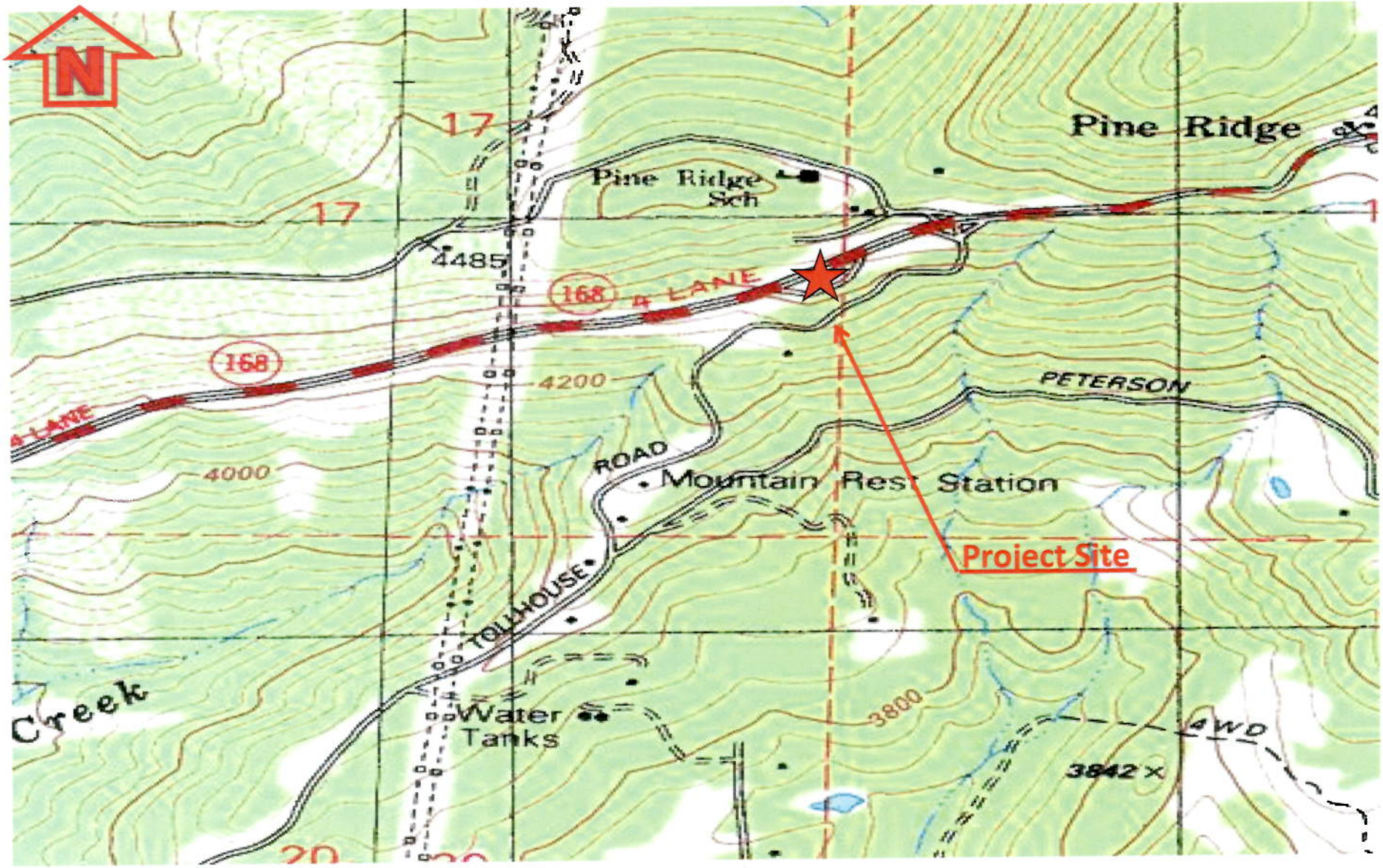
Appendix



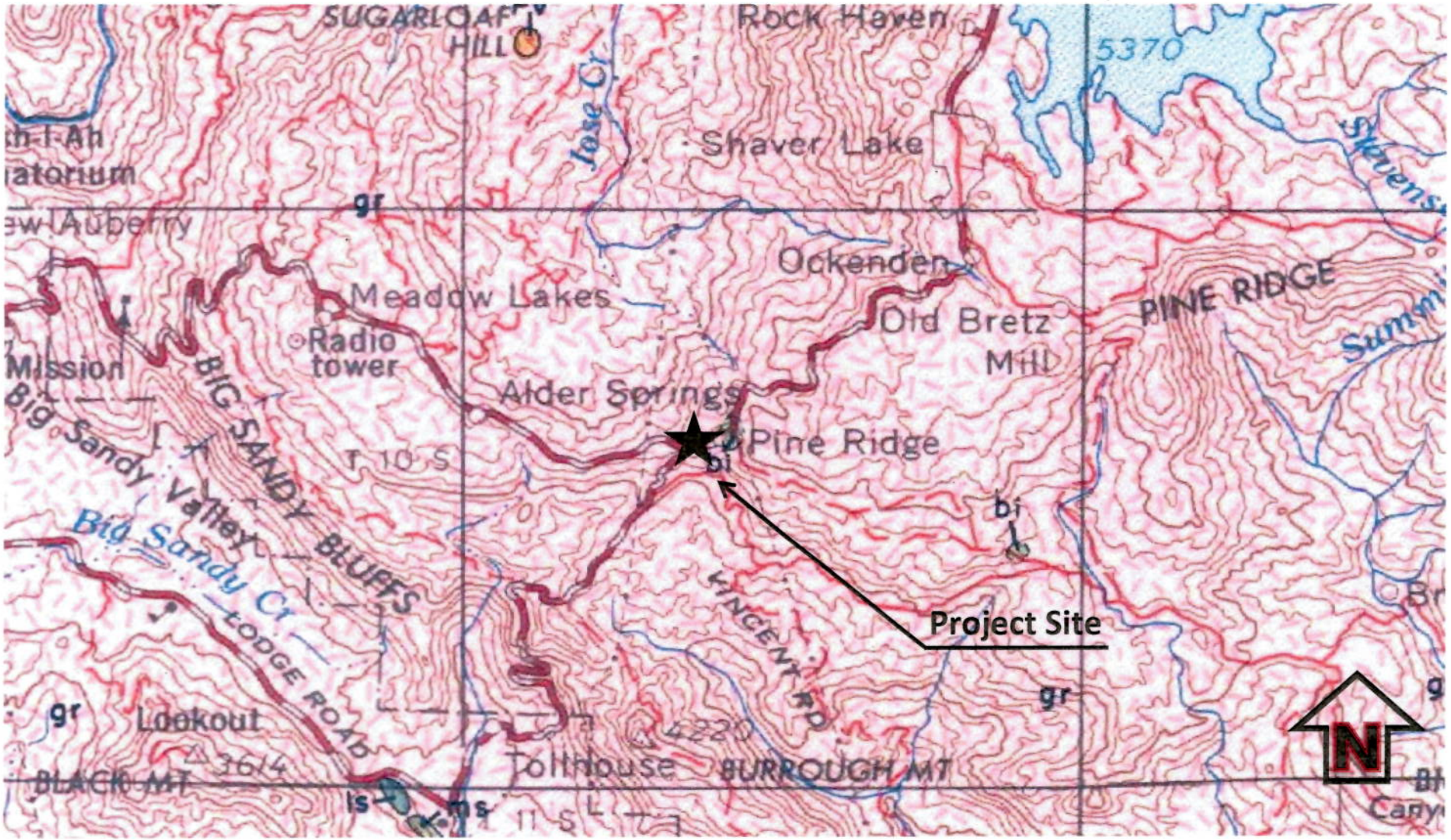
EA/ EFIS No.	0-0M020 0600020389	**SITE VICINITY MAP** 06-FRE-168-PM 36.0 Maynard Munger Vista Point
DATE:	10/25/2012	

DEPARTMENT OF TRANSPORATION
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North (OGDN)

Figure 1



Caltrans	DEPARTMENT OF TRANSPORTATION Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North (OGDN)	EA: 06-0M020 0600020389 DATE: 10/25/2012	**TOPOGRAPHIC MAP**
		06-FRE-168-PM R36.0 Maynard Munger Vista Point	Figure 2



gr -- Mesozoic Granitic Rock consisting of granite, adamellite, granodiorite, tonalite and diorite

Map Source: CDMG

Caltrans	DEPARTMENT OF TRANSPORTATION Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North (OGDN)	EA: 06-0M020 0600020389 DATE: 10/25/2012	GEOLOGY MAP
		06-FRE-168-PM R36.0 Maynard Munger Vista Point	Figure 3

DIST	COUNTY	Rte	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
06	Fre	168			

REGISTERED CIVIL ENGINEER DATE

PLANS APPROVAL DATE

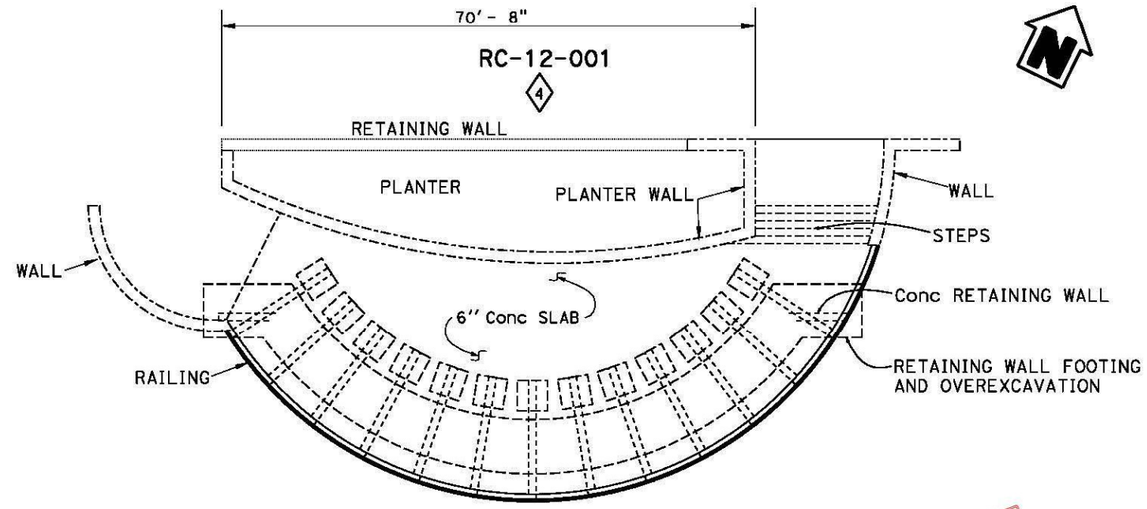
REGISTERED PROFESSIONAL ENGINEER Thomas Song No. C69325 Exp. 6-30-14 CIVIL STATE OF CALIFORNIA

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

This LOTB sheet was prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).
See 2010 Standard Plans A10F and A10G for Soil Legend, and A10H for Rock Legend.

BENCH MARK

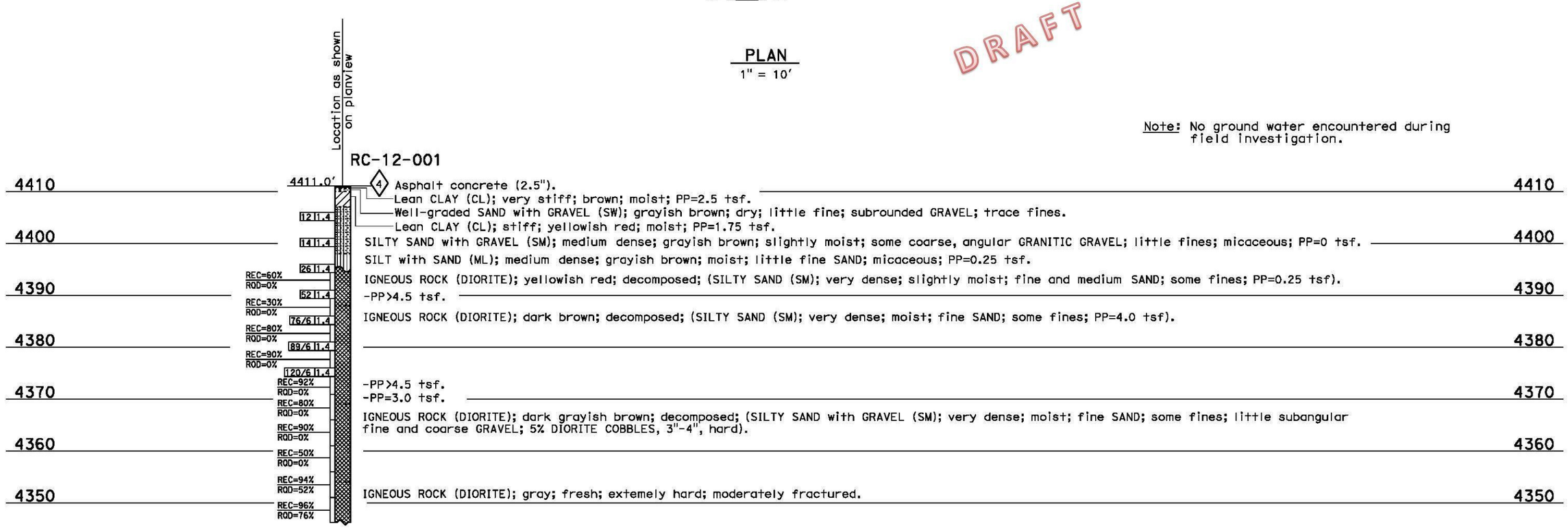
Top of boring elevation estimated from Maynard Munger Memorial Vista Point retaining wall deck Layout Sheet L-4.



PLAN
1" = 10'

DRAFT

Note: No ground water encountered during field investigation.



PROFILE
Horiz: 1" = 10'
Vert: 1" = 10'

ENGINEERING SERVICES	MATERIALS AND GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN	BRIDGE NO.	MAYNARD MUNGER MEMORIAL VISTA POINT
FUNCTIONAL SUPERVISOR	DRAWN BY: W. Tang 09/12	FIELD INVESTIGATION BY:	DESIGN BRANCH X	POST MILE	LOG OF TEST BORINGS
NAME: Q. Huang	CHECKED BY:	T. Alderman		R36.0	

OGS CIVIL LOG OF TEST BORINGS SHEET

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT: 3643
PROJECT NUMBER & PHASE: 06000203891 CONTRACT NO.: 06-0M0201

DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES 10-18-12 SHEET X OF X

FILE => maynard-munger.dgn

USERNAME => s116982 DATE PLOTTED => 19-OCT-2012 TIME PLOTTED => 07:38

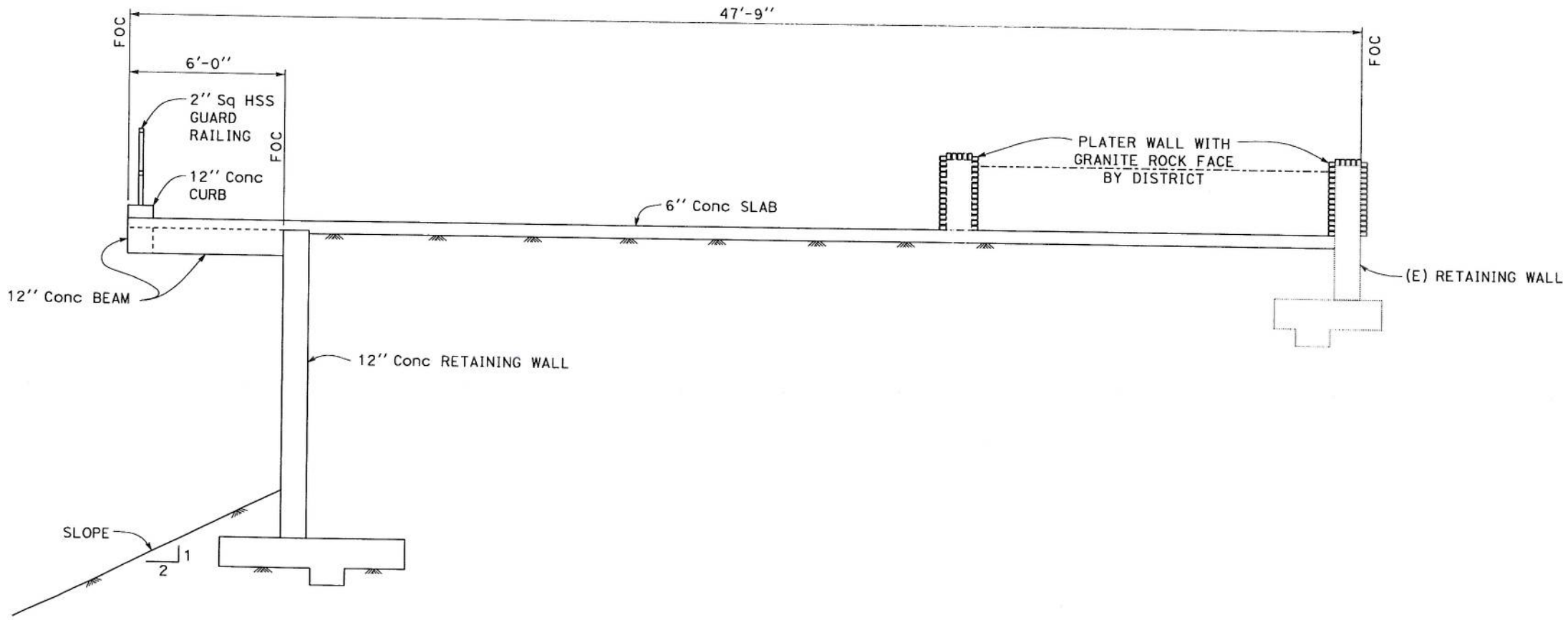
DIST.	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS
06	Fre	168	R36.0		

REGISTERED CIVIL ENGINEER — DATE - -12

REGISTERED PROFESSIONAL ENGINEER William Rocha, Jr. No. 59791 Exp. 12-31-13 CIVIL STATE OF CALIFORNIA

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of scanned copies of this plan sheet.



1 MAIN SECTION
Scale 3/8" = 1' - 0"

FOR FOUNDATION REPORT REQUEST ONLY

DESIGN	BY Bill Rocha	CHECKED	
DETAILS	BY Aleksey Serin	CHECKED Bill Rocha	
QUANTITIES	BY	CHECKED	

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES ARCHITECTURAL AND STRUCTURAL DESIGN

BRIDGE NO.

POST MILE

MAYNARD MUNGER MEMORIAL VISTA POINT

OBSERVATION DECK

MAIN SECTION

SHEET ST1-2

TAEMWW Imperial Rev. 7/10

ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3

UNIT 3581

PROJECT NUMBER & PHASE 06000203890

DISREGARD PRINTS BEARING EARLIER REVISION DATES → 05-06-11 06-13-12

REVISION DATES (PRELIMINARY STAGE ONLY)

SHEET OF

4-JUN-2012 13:31