

INFORMATION HANDOUT

MATERIALS INFORMATION

GEOTECHNICAL DESIGN REPORT FOR TWO CMS DATED JANUARY 2012

ROUTE: RIV 10-106.6 & 155.3
CONTRACT NO. 08-0N9804
PROJECT ID: 0800020359

Memorandum

*Flex your power!
Be energy efficient!*

To: Sergio Avila - 08
Design E.

Date: January 19, 2012

Attn: Michael Jacob

File: 08-Riv-10-PM 106.6&155.3
0800020359
Two CMS

From: **DEPARTMENT OF TRANSPORTATION**
Division of Engineering Services
Geotechnical Services

Subject: Geotechnical Design Report for Two CMS

As requested, our Office presents foundation recommendations for Changeable Message Signs (CMS) at two locations along Route 10 in Riverside County at the following locations: PM R106.6, and R155.2. One CMS at PM 34.2 was originally proposed, but later eliminated as per your Office, which was not included in our investigation and recommendation in this report. Our Office conducted a site investigation and is providing our recommendations for the two subjected CMS sites: Desert Center and Blythe site. This project scope proposes installation of a Changeable Message Sign (Model 500) at both locations, construction of Maintenance Vehicle Pullouts (MVP), and protective Metal Beam Guard Railing (MBGR). The District later moved the Blythe CMS about 0.1 miles to the east.

General Geology

The Desert Center is located in a very arid region in the middle of the Mojave Desert. It is characterized by steep isolated mountains separated by nearly flat valleys. Drainages are shallow and ephemeral. This sign location is in a valley adjacent to a drainage channel, Coxcomb Ditch.

Blythe sits next to the Colorado River Basin at the eastern edge of the Mojave Desert. The freeway is on a 5 ft embankment which flattens out to the right-of-way fence. An irrigation ditch lies nearby. The area is mainly agricultural.

There are no active faults in the Desert Center location. Twelve miles northwest of Blythe is the Blythe Graben Fault (BGN). It is a small normal fault of Late Quaternary age and capable of generating a MCE (Maximum Credible Earthquake) of Moment magnitude, $M_w=6.0$. According to the 1996 California Seismic Hazard Map the site is subject to a horizontal Peak Bedrock Acceleration of about 0.35g at the Blythe site.

Subsurface Soil Conditions

Our subsurface investigation was conducted on December 6 and 7, 2011, with a CS-2000 drilling rig. Two exploratory borings were conducted at these two subject locations. For the Desert

Center site, Boring A-11-001 was drilled to a depth of 46.5 feet. The material consisted of well-graded SAND with gravels in a medium dense to very dense condition. No groundwater was encountered during our investigation.

For the Blythe site, Boring A-11-002 was drilled to a depth of 36.5 feet. The material consisted of poorly-graded SAND in a medium dense condition near the surface, then grades to a loose condition at a depth of about 13 ft. The loose SAND was underlain by soft SILT at the depth of about 18 ft to the depth of about 26 ft. This SILT layer was underlain by very loose fine to medium SAND with trace of clay nodules and gravels. Groundwater was encountered at 13 ft below the surface. Some possible artesian pressure was observed during our site investigation within or below the SILT soil layer.

Recommendations

At both Desert Center and Blythe locations, our Office concurs with the proposed standard CMS Model 500 design and construction. The CMS should be constructed with CIDH pile foundation in cohesionless soil type with a design pile length of 18.5 ft from the top of the finish grade.

Based on our understanding, the existing grade at Blythe location will be raised by about 2 feet for constructing MVP area. The newly proposed CMS will be constructed on top of the raised MVP area.

Construction Considerations

At the Blythe location, groundwater was encountered at an elevation of 256 ft during our site investigation as shown in the LOFB. The actual groundwater elevation may be different during construction due to seasonal rainfall, surface runoff and other man-made conditions.

The CIDH should not be extended deeper than designed 18.5 feet. The bottom of CIDH hole should be expected to be in wet condition during construction. There is a potential for the loose granular soil caving. If necessary, slurry, temporary steel casing or other methods may be used to prevent the CIDH hole from caving.

If slurry is used, it must be appropriate for the soil and environment. It must also be cleaned and filtered in accordance with the manufacture's specifications. It must be noted that some slurries are classified as hazardous materials and must be disposed of properly.

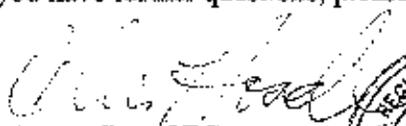
If temporary steel casing is used, concrete placed under slurry shall be maintained at a level at least 5 feet above the bottom of the casing. The withdrawal of casings shall not cause contamination of the concrete with slurry.

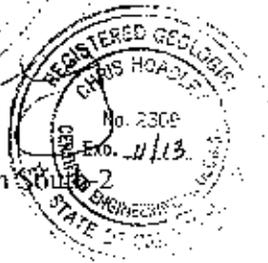
The contractor will need to use care while drilling the shafts for the CIDH piles. Rapid insertion and removal of the drilling tools during the drilling process can cause excessive scouring and caving of the walls of the drilled shaft.

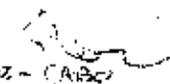
Sergio Avila
Jan. 19, 2012
Page 3

The recommendations contained in this report are based on specific project information regarding design loads and structure locations that has been provided by District for standard CMS designs.

If you have further questions, please contact us at 916-227-4515.


Chris Hoadley, CEG
Engineering Geologist
Office of Geotechnical Design Studio 2
Branch C



cc: SWei 
APerez - (A/B/C)
AAbghari

BENCH MARK

PN178.0
 2"IP W/C/T BRASS CAP STAMPED "BM SB1 15-178.0 -1960"
 LOCATED AT 3M 178.0 ON SLY SIDE OF FREEWAY, 0.5m SLY
 OF ETW, 15m NE'LY CALL BOX #15-178.2 IN AC SHOULDER.
 METRIC STATION 28m RT 2681+27 CLIMP
 N = 2,375,948.78
 E = 7,325,886.42
 Elev = 3010.938'

CHLID BMOCKO DITCH

A-11-001

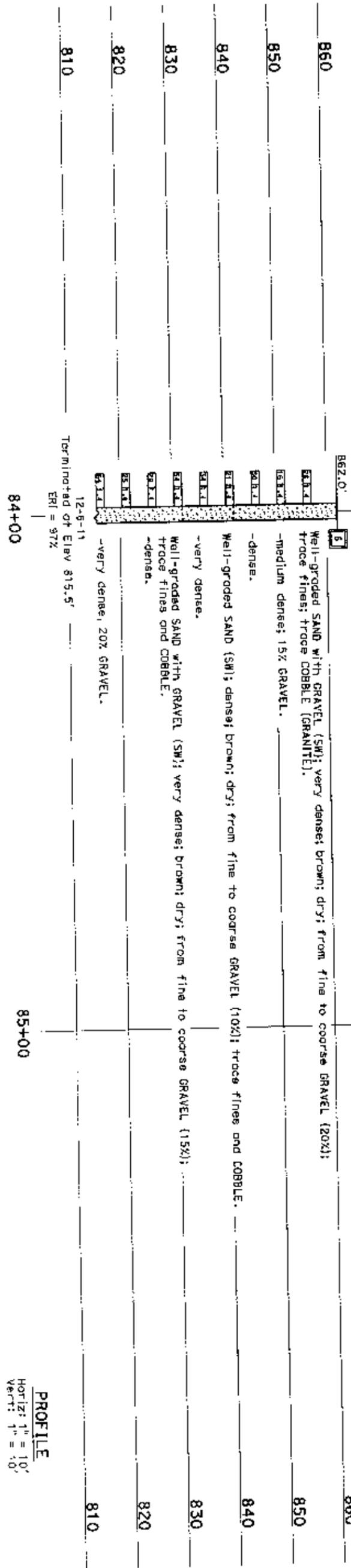
Desert Center

"SR10" LINE



PLAN
 1" = 20'

Note: No groundwater 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
DESIGN BRANCH X

CMS DESERT CENTER
LOG OF TEST BORINGS 1 OF 3

FUNCTIONAL SUPERVISOR: NAME: S. Mei
 DRAWN BY: W. Tong 12/11
 CHECKED BY: M. Willson
 FIELD INVESTIGATION BY: C. Hoodley
 DATE: 3/6/13
 PROJECT NUMBER & PHASE: DB000203590
 CONTRACT NO.: DB-098901
 SHEET NO.: 106.6

DIST: 08 COUNTY: RIV ROUTE: 10 POST MILES: SHEET TOTAL: 106.6

DATE: 3/6/13
 PROJECT: DB-098901
 SHEET: 106.6

PLANS APPROVAL DATE: 3-24-13

CERTIFIED ENGINEER/GEOTECHNICALIST: [Signature]

CERTIFICATE NO.: 11-36-11

EXPIRES: 11-30-15

STATE OF CALIFORNIA

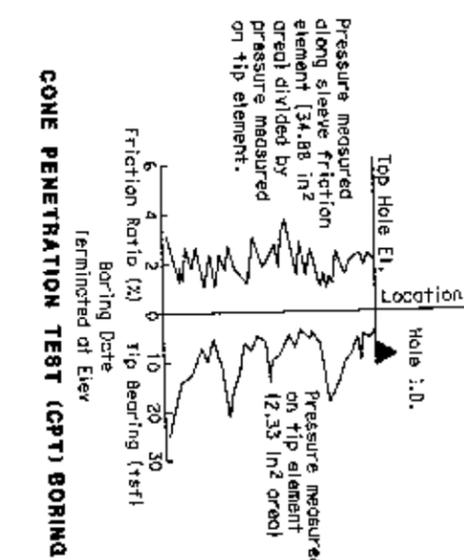
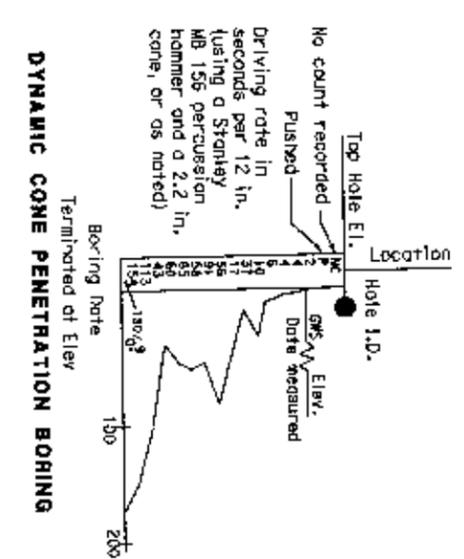
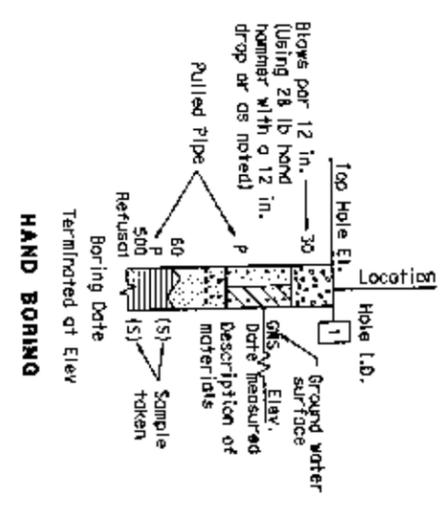
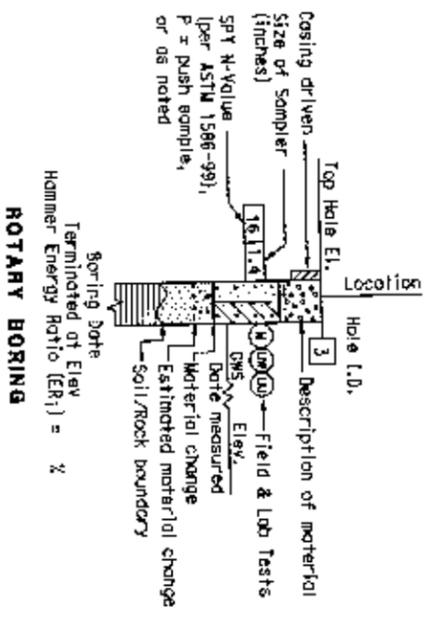
This LOGB sheet was prepared in accordance with the California Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).

CEMENTATION	
Criterion	Description
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

BOREHOLE IDENTIFICATION	
Symbol	Description
	Auger Boring (hollow or solid stem bucket)
	Rotary drilled boring (conventional)
	Rotary drilled with self-casing wire-line
	Rotary core with continuously-sampled, self-casing wire-line
	Rotary percussion boring (air)
	Rotary drilled diamond core
	Hand driven (1-inch soil tube)
	Hand Auger
	Dynamic Cone Penetration Boring
	Cone Penetration Test (ASTM D 5778)
	Other (note on LOTB)

Note: Size in inches.

CONSISTENCY OF COHESIVE SOILS				
Description	Shear Strength (tsf)	Pocket Penetration Measurement, pp, (tsf)	Torque Measurement, T _v , (tsf)	Vane Shear Measurement, V _s , (tsf)
Very Soft	Less than 0.12	Less than 0.25	Less than 0.12	Less than 0.12
Soft	0.12 - 0.25	0.25 - 0.5	0.12 - 0.25	0.12 - 0.25
Medium Stiff	0.25 - 0.5	0.5 - 1	0.25 - 0.5	0.25 - 0.5
Stiff	0.5 - 1	1 - 2	0.5 - 1	0.5 - 1
Very Stiff	1 - 2	2 - 4	1 - 2	1 - 2
Hard	Greater than 2	Greater than 4	Greater than 2	Greater than 2



DIST COUNTY ROUTE POST MILES SHEET TOTALS
08 Riv 10 TOTAL PROJECT SHEETS

3-24-12
CERTIFIED ENGINEER/NO. 0000000151
Dr. [Signature]
Soil Engineer

PLANS APPROVAL DATE
The State of California or the officers or agents shall not be responsible for the accuracy or completeness of information supplied by this plan sheet.

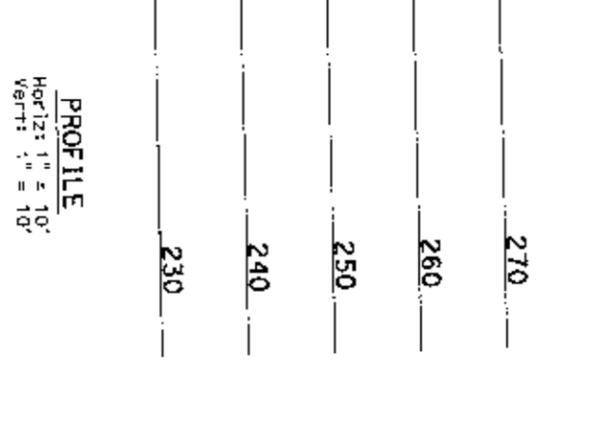
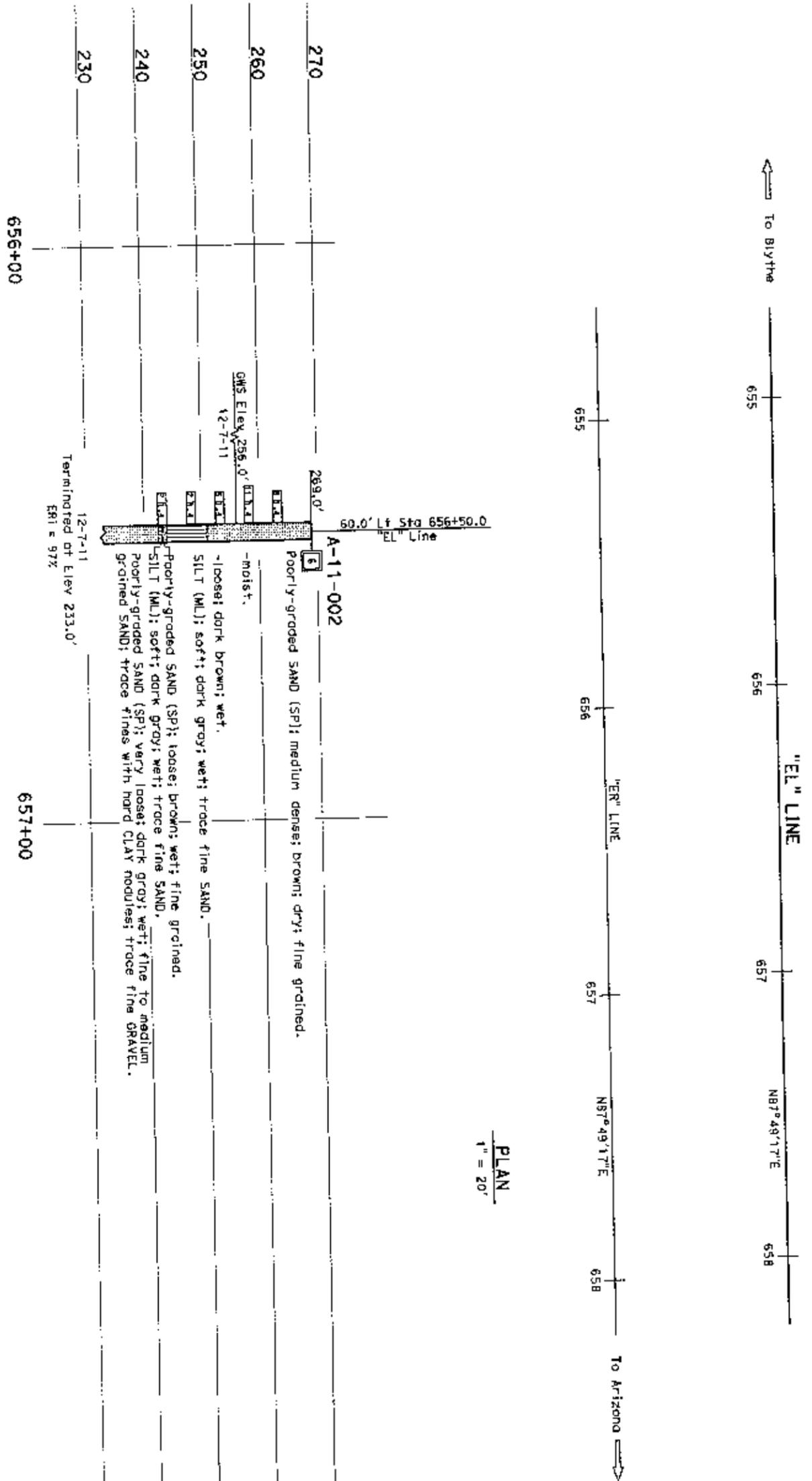
PROJECT NO. 06-09801
SHEET NO. 2 OF 3

ENGINEERING SERVICES
MATERIALS AND GEOTECHNICAL SERVICES
DESIGNED BY: W. Tang 12/11

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH X

CMS DESERT CENTER
LOG OF TEST BORINGS 2 OF 3
PROJECT NUMBER & PHASE: 0600203591
CONTRACT NO.: 06-09801

BENCH MARK
 PND 53
 N 661,105.6221
 E 2,157,568.1134
 Description: 650+00.00 2"JP
 Elev 271.77'



DIST	COUNTY	ROUTE	POST MILES	SHEET TOTAL
08	RIV	10	TOTAL PROJECT	NO SHEETS

01-24-12
 CERTIFIED ENGINEERING FRODOUST
 PLANS APPROVAL DATE
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PROJECT NO. 08-09801
 DESIGNER: [Signature]
 DATE: 01-24-12
 SCALE: 1" = 20'

This LOTB sheet was prepared in accordance with the California Soil & Rock Logging, Classification, & Presentation Manual (2010 Edition).

ENGINEERING SERVICES
 FUNCTIONAL SUPERVISOR: [Name]
 CHECKED BY: N. NELSON

MATERIALS AND GEOTECHNICAL SERVICES
 FIELD INVESTIGATION BY: C. HOODLEY

STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
 STRUCTURE DESIGN
 DESIGN BRANCH X

LOG OF TEST BORINGS 1 OF 3

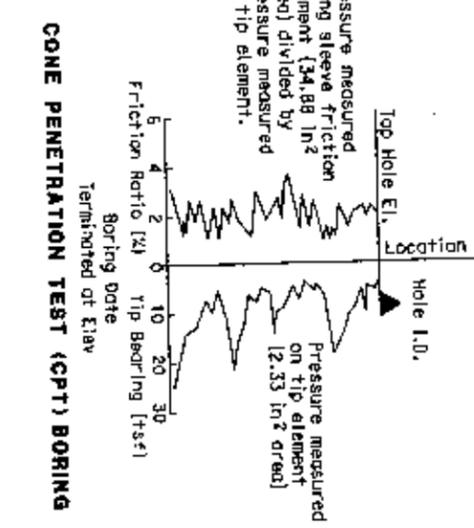
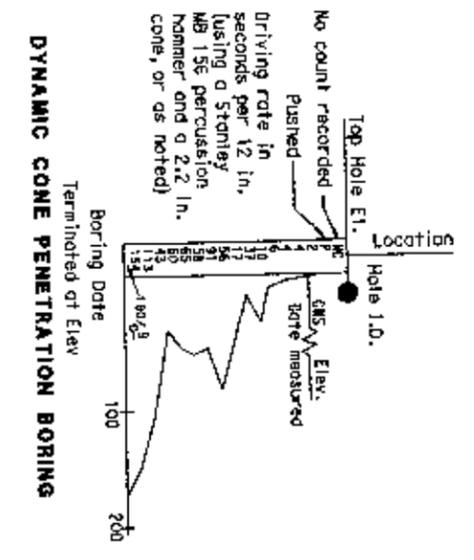
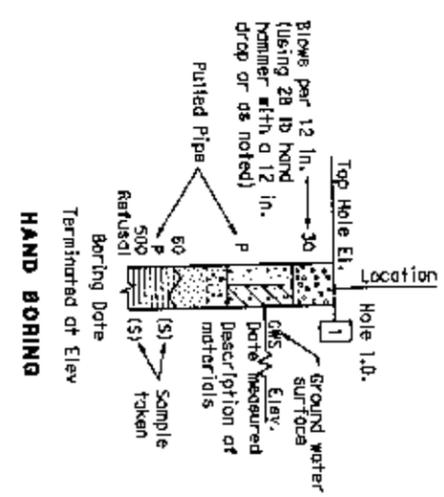
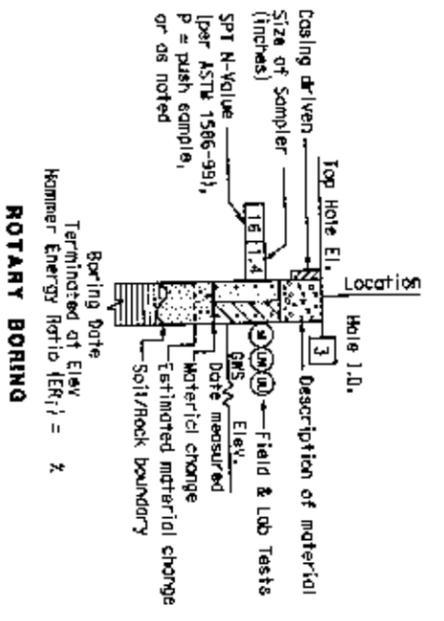
NAME: S. WEI
 DATE PLOTTED: 02-MAR-2012
 TIME PLOTTED: 11:14

CEMENTATION	
Description	Criteria
Weak	Crumbles or breaks with handling or little finger pressure.
Moderate	Crumbles or breaks with considerable finger pressure.
Strong	Will not crumble or break with finger pressure.

BOREHOLE IDENTIFICATION	
Symbol	Description
A	Auger Boring (hollow or solid stem bucket)
R	Rotary drilled boring (conventional)
RM	Rotary drilled with self-casing wire-line
RC	Rotary core with continuously-sampled, self-casing wire-line
P	Rotary percussion boring (air)
R	Rotary drilled diamond core
RC	Rotary drilled rock core
HA	Hand driven (1-inch soil tube)
HA	Hand Auger
D	Dynamic Cone Penetration Boring
CPT	Cone Penetration Test (ASTM D 5778)
○	Other (note on LOTB)

Notes Size in Inches.

CONSISTENCY OF COHESIVE SOILS				
Description	Shear Strength (tsf)	Pocket Penetration Measurement, PP, (tsf)	Torvane Measurement, T _v , (tsf)	Vane Shear Measurement, V _s , (tsf)
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Medium Stiff	0.25 - 0.5	0.5 - 1	0.25 - 0.5	0.25 - 0.5
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Very Stiff	1 - 2	2 - 4	1 - 2	1 - 2
Hard	Greater than 2	Greater than 4	Greater than 2	Greater than 2



08 COUNTY ROUTE TOTAL PROJECT SHEET TOTAL
 DIST 91V 10

01-24-12
 CERTIFIED ENGINEER/INDEPENDENT
 [Signature]
 PLANS APPROVAL DATE
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DRYLAND ENGINEERING
 155 S. 11th St.
 Stockton, CA 95210
 (209) 943-1111
 License No. 5188
 Exp. 11-30-13

ENGINEERING SERVICES

MATERIALS AND GEOTECHNICAL SERVICES

PREPARED BY: **N. Tong 12/7/11**

STATE OF CALIFORNIA
 DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
 STRUCTURE DIVISION
DESIGN BRANCH X

PROJECT NO.: 3643
 PROJECT NUMBER & PHASE: 06000203991
 CONTRACT NO.: 06-09001

CMS BLYTHE

LOG OF TEST BORINGS 2 OF 3

DATE PLOTTED => 02-MAR-2012

GROUP SYMBOLS AND NAMES

Graphic/Symbol	Group Names	Graphic/Symbol	Group Names
GW	Well-graded GRAVEL with SAND	CL	Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY GRAVELLY lean CLAY
GP	Poorly-graded GRAVEL with SAND	CL-WL	SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY GRAVELLY SILTY CLAY
GW-GM	Well-graded GRAVEL with SILT and SAND		
GM	SILTY GRAVEL with SAND	OL	ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY with SAND
GP-GC	Poorly-graded GRAVEL with SILT and SAND	ML	SILT with SAND SILT with GRAVEL SANDY SILT with GRAVEL GRAVELLY SILT with SAND
GC-GM	SILTY, CLAYEY GRAVEL with SAND	OH	ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT with SAND
DC	CLAYEY GRAVEL with SAND	MH	Elastic SILT with SAND Elastic SILT with GRAVEL SANDY elastic SILT with GRAVEL GRAVELLY elastic SILT with SAND
SW	Well-graded SAND with SILT and GRAVEL	CH	Fat CLAY with SAND Fat CLAY with GRAVEL SANDY fat CLAY with GRAVEL GRAVELLY fat CLAY with SAND
SW-SM	Well-graded SAND with SILT and GRAVEL		
SP	Poorly-graded SAND with SILT and GRAVEL		
SP-SM	Poorly-graded SAND with SILT and GRAVEL		
SW-SC	Well-graded SAND with SILT and GRAVEL		
SC	CLAYEY SAND with GRAVEL		
SC-SM	SILTY, CLAYEY SAND with GRAVEL		
PT	PEAT		
	COBBLES and BOULDERS		

FIELD AND LABORATORY TESTING

- (C) Consolidation (ASTM D 2435)
- (CL) Collapse Potential (ASTM D 5333)
- (CP) Compaction Curve (CTM 216)
- (CR) Corrosivity Testing (CTM 643, CTM 422, CTM 417)
- (CU) Consolidated Undrained Triaxial (ASTM D 4767)
- (DS) Direct Shear (ASTM D 3080)
- (EI) Expansion Index (ASTM D 4829)
- (M) Moisture Content (ASTM D 2216)
- (OC) Organic Content-% (ASTM D 2974)
- (P) Permeability (CTM 220)
- (PA) Particle Size Analysis (ASTM D 422)
- (PI) Plasticity Index (AASHTO T 90)
Liquid Limit (AASHTO T 89)
- (PL) Point Load Index (ASTM D 5731)
- (PM) Pressure Meter
- (R) R-value (CTM 301)
- (SE) Sand Equivalent (CTM 217)
- (SG) Specific Gravity (AASHTO T 100)
- (SL) Shrinkage Limit (ASTM D 427)
- (SW) Swell Potential (ASTM D 4546)
- (UC) Unconfined Compression-Soil (ASTM D 2166)
Unconfined Compression-Rock (ASTM D 2938)
- (UU) Unconsolidated Undrained Triaxial (ASTM D 2850)
- (UM) Unit Weight (ASTM D 4767)

APPARENT DENSITY OF COHESIONLESS SOILS

Description	SPT N ₆₀ (Blows / 12 in.)
Very Loose	0 - 5
Loose	5 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Greater than 50

MOISTURE

Description	Criteria
Dry	No discernible moisture
Moist	Moisture present, but no free water
Wet	Visible free water

PERCENT OR PROPORTION OF SOILS

Description	Criteria
Trace	Particles are present but estimated to be less than 5%
Few	5% - 10%
Little	15% - 25%
Some	30% - 45%
Mostly	50% - 100%

PARTICLE SIZE

Description	Size (in.)	
Boulder	Greater than 12	
Cobble	3 - 12	
Gravel	Coarse	3/4 - 3
	Fine	1/5 - 3/4
Sand	Coarse	1/16 - 1/5
	Medium	1/64 - 1/16
	Fine	1/300 - 1/64
Silt and Clay	Less than 1/300	

06 1 RIV 10 10

POST MILES TOTAL PROJECT NO SHEETS

06 1 RIV 10 10

01-24-12

IDENTIFIED ENGINEER/REGISTERED

PLANS APPROVAL DATE

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DR. [Signature]

REGISTERED PROFESSIONAL ENGINEER

NO. 2208

EXPIRES 12-31-13

ENGINEERING SERVICES

MATERIALS AND GEOTECHNICAL SERVICES

PREPARED BY: W. Tong 12/11

STATE OF CALIFORNIA

DESIGN BRANCH X

CMS BLYTHE

LOG OF TEST BORINGS 3 OF 3