

**FOR CONTRACT NO.: 06-447704**

# **INFORMATION HANDOUT**

## **MATERIALS INFORMATION**

**INSTALLATION DETAILS FOR  
BATTERY BACKUP SYSTEM  
(BBS Cabinet mounting details and wiring details)**

**ROUTE: 06-Fre-41-PM R29.6/R30.4**

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
**Caltrans**  
 FUNCTIONAL SUPERVISOR  
 CALCULATED-DESIGNED BY  
 CHECKED BY  
 REVISED BY  
 DATE REVISED

**LEGEND: (THIS SHEET ONLY)**

- PTS = POWER TRANSFER SWITCH
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- Cntl = CONTROL
- Gnd = GROUND
- Temp = TEMPERATURE
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**NOTES: (THIS SHEET ONLY)**

1. TYPE A REFERS TO THE BBS EQUIPMENT FROM MANUFACTURER A.
2. CASE-1 REFERS TO THE SITUATION WHEN THE ENTIRE BBS EQUIPMENT INCLUDING THE BATTERIES ARE INSTALLED IN THE BBS CABINET.
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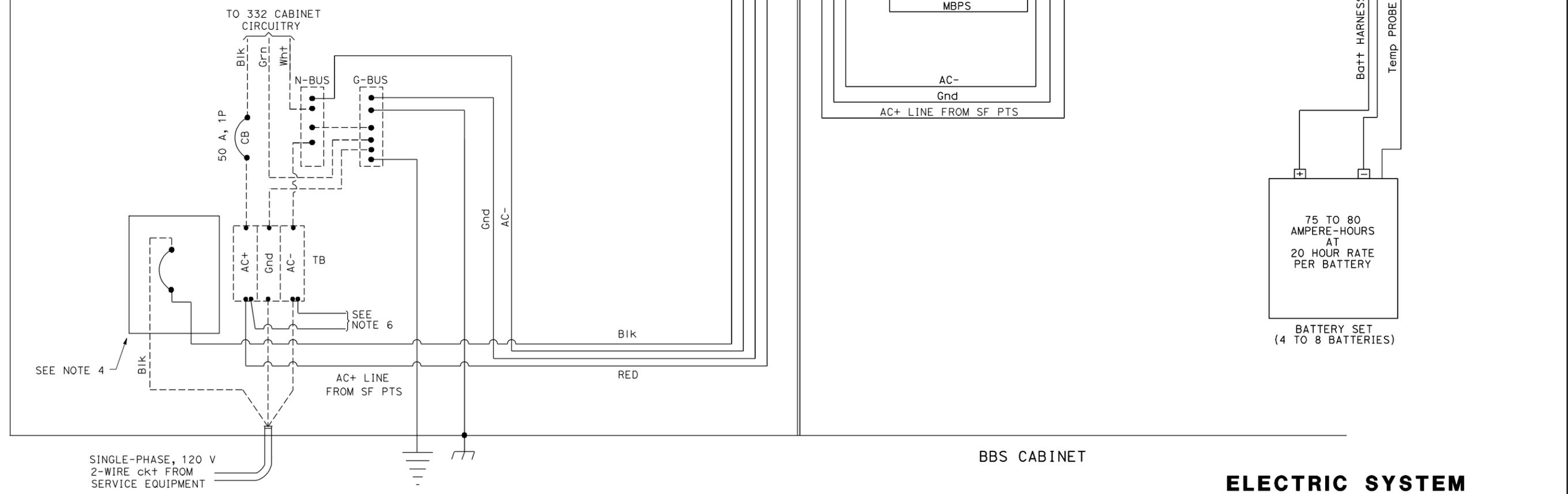
Dist	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS

Theresa Gabriel  
 REGISTERED CIVIL ENGINEER  
 DATE 12-20-07

PLANS APPROVAL DATE

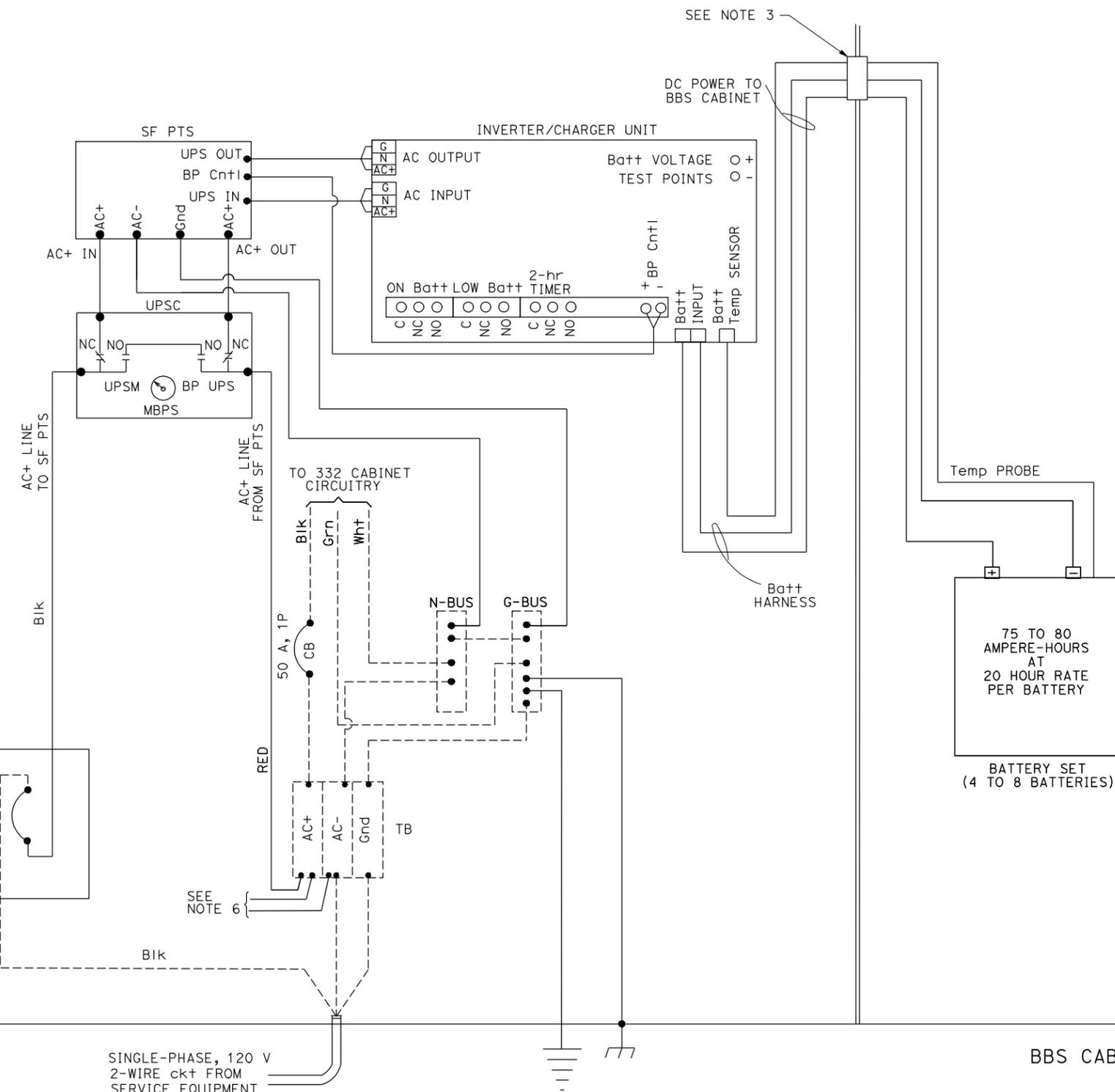
Theresa A. Gabriel  
 No. E15129  
 Exp. 6-30-10  
 ELECT  
 STATE OF CALIFORNIA

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**ELECTRIC SYSTEM  
 (BBS POWER CONNECTION DIAGRAM,  
 TYPE A, CASE-1)**

Dist	COUNTY	LOCATION CODE	POST MILES TOTAL PROJECT	SHEET No.	TOTAL SHEETS
<i>Theresa Gabriel</i> REGISTERED CIVIL ENGINEER			12-20-07 DATE	REGISTERED PROFESSIONAL ENGINEER Theresa A. Gabriel No. E15129 Exp 6-30-10 ELECT STATE OF CALIFORNIA	
PLANS APPROVAL DATE					
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2. CASE-2 REFERS TO THE SITUATION WHEN ONLY THE BATTERIES ARE INSTALLED IN THE BBS CABINET. THE REMAINING EQUIPMENT IS PLACED IN THE 332 CONTROLLER CABINET.
3. THE LOCATION OF THE 2" C NIPPLE WILL BE DETERMINED BY THE ENGINEER IN THE FIELD.
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STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 Functional Supervisor  
 Calculated-Designed By  
 Checked By  
 Revised By  
 Date Revised  
 Theresa Gabriel  
 REGISTERED CIVIL ENGINEER  
 No. E15129  
 Exp 6-30-10  
 ELECT  
 STATE OF CALIFORNIA

**ELECTRICAL SYSTEMS**  
**(BBS POWER CONNECTION DIAGRAM, TYPE A, CASE-2)**

NO SCALE

LAST REVISION: 2-2-09  
 DATE PLOTTED => 13-MAR-2009  
 TIME PLOTTED => 09:07

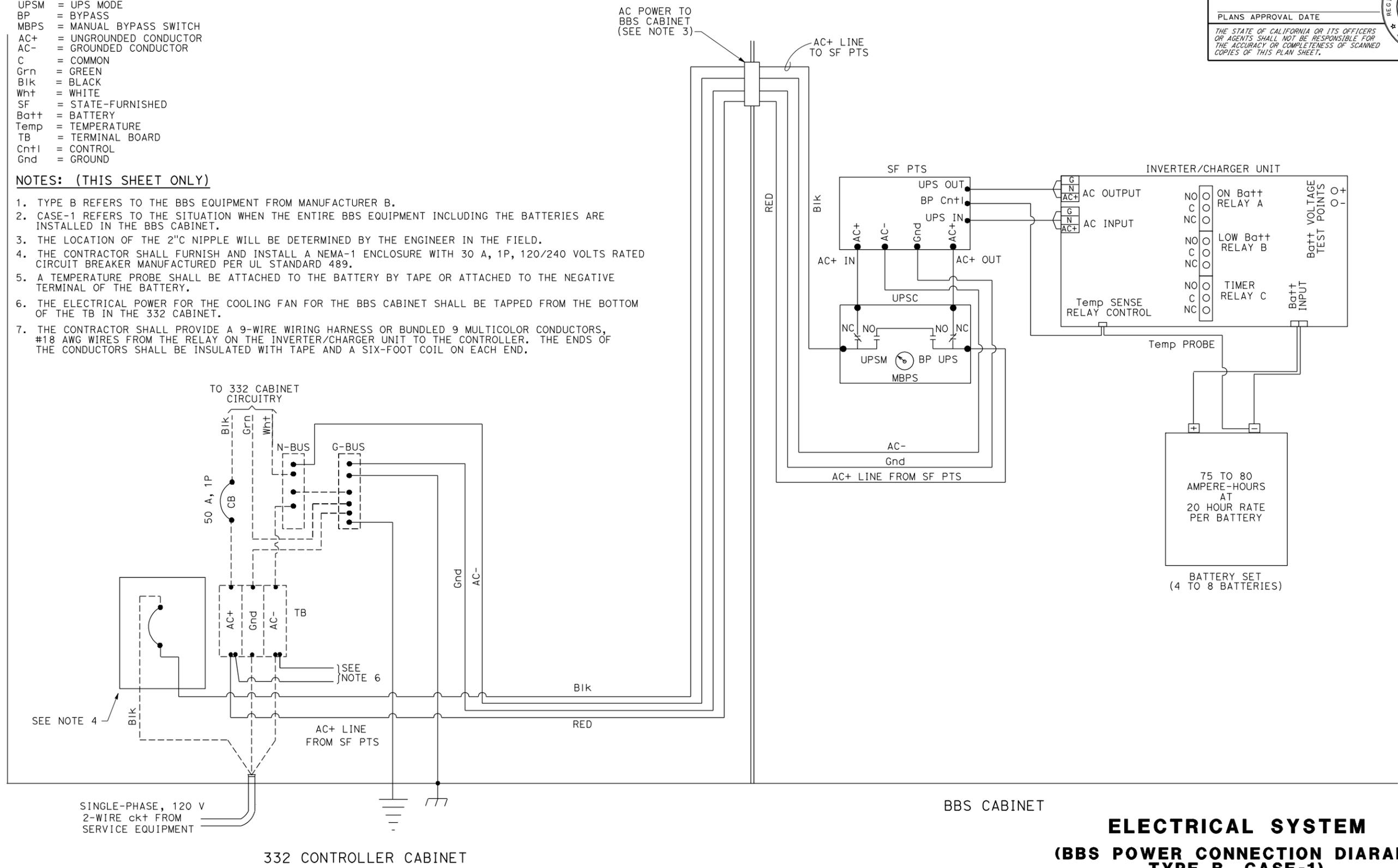
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No. E15129			Exp 6-30-10		
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**ELECTRICAL SYSTEM  
(BBS POWER CONNECTION DIARAM.  
TYPE B, CASE-1)**

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
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 Date Revised  
 3-11-09  
 13-MAR-2009  
 09:09

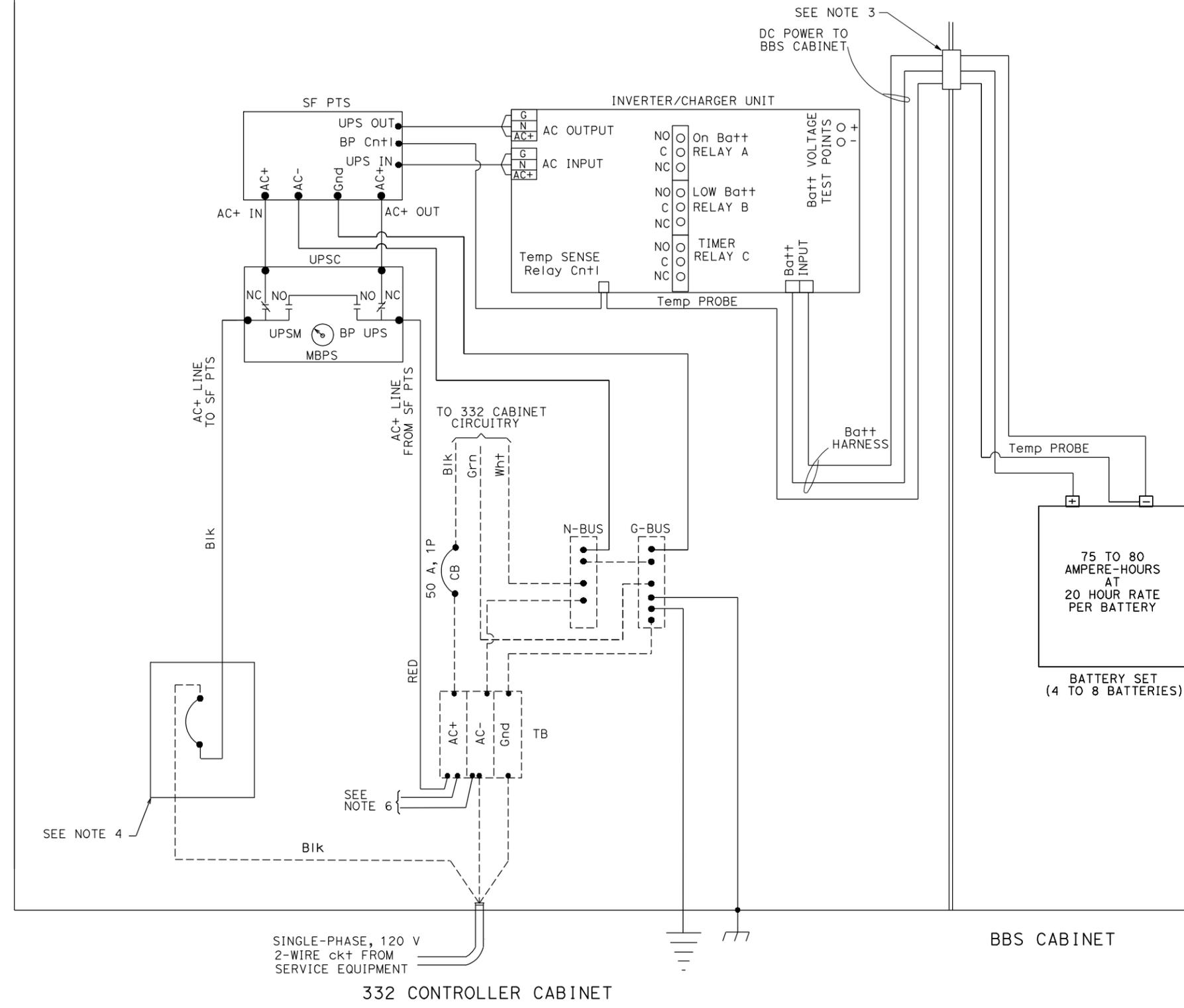
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 REGISTERED CIVIL ENGINEER DATE 12-20-07  
 Theresa A. Gabriel  
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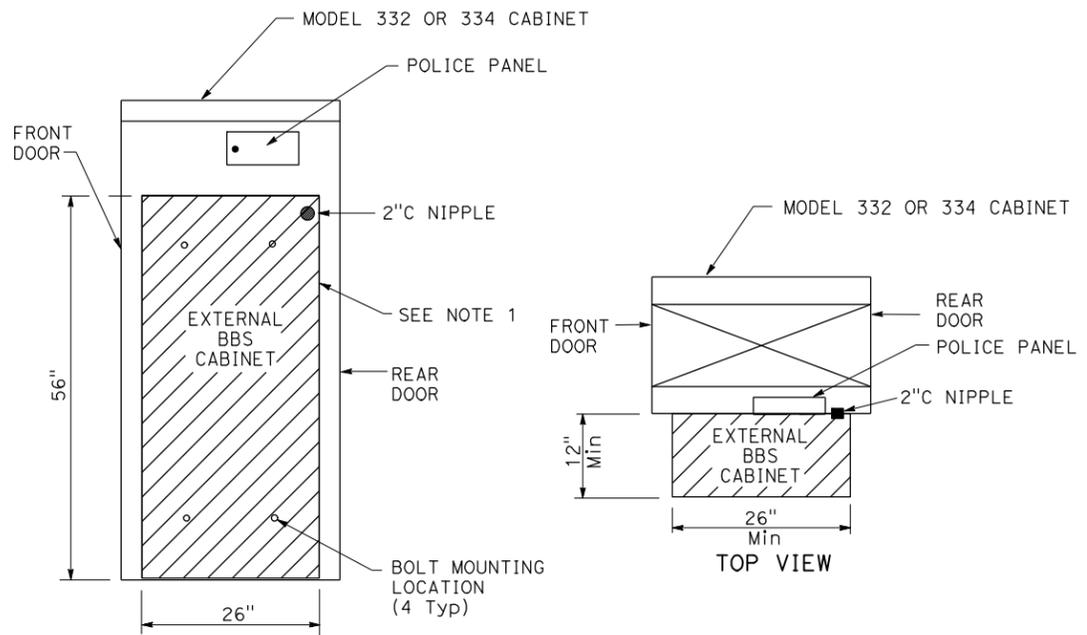
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**ELECTRICAL SYSTEM  
 (BBS POWER CONNECTION DIAGRAM,  
 TYPE B, CASE-2)**

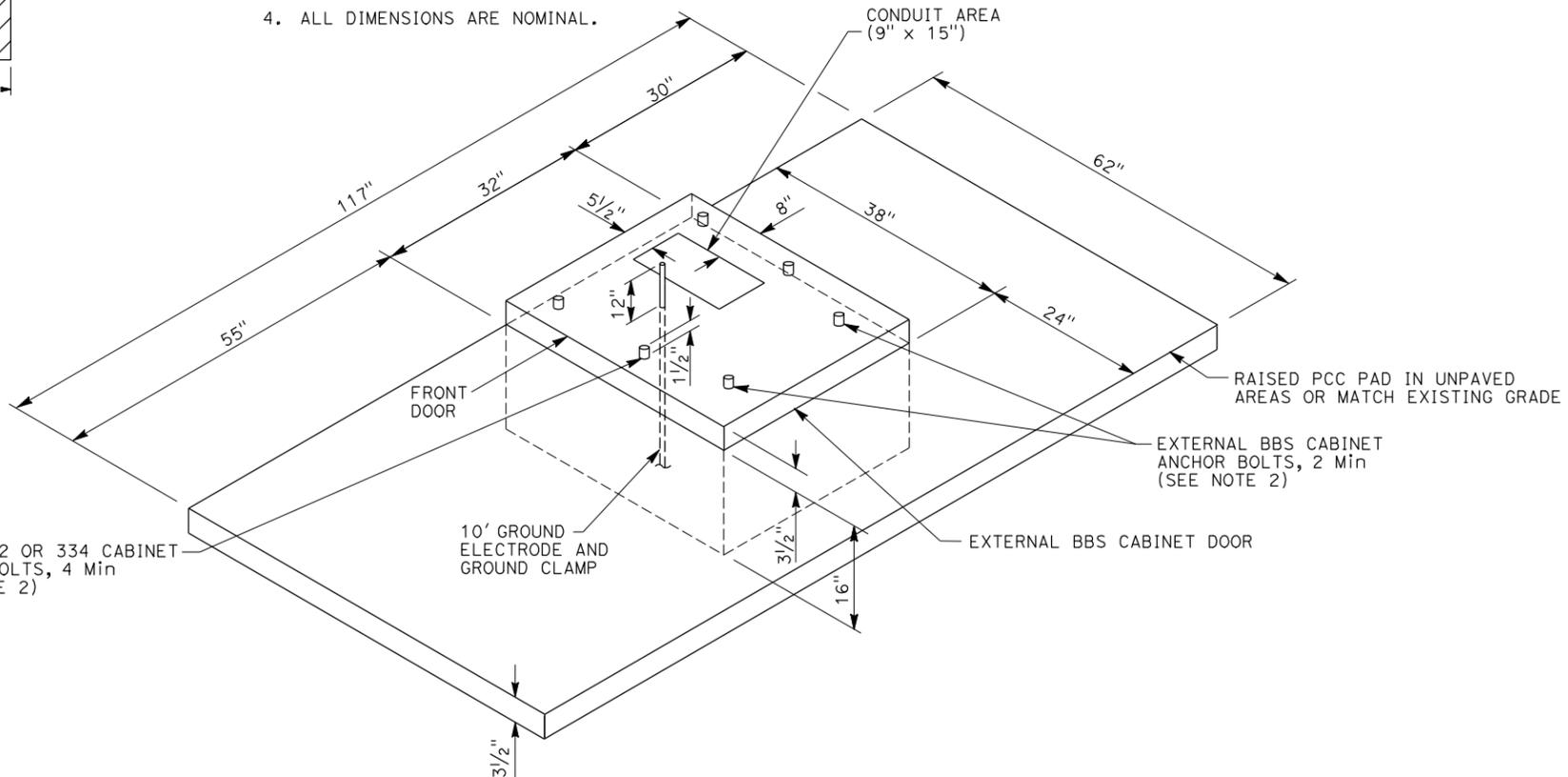
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**NOTE: (THIS SHEET ONLY)**

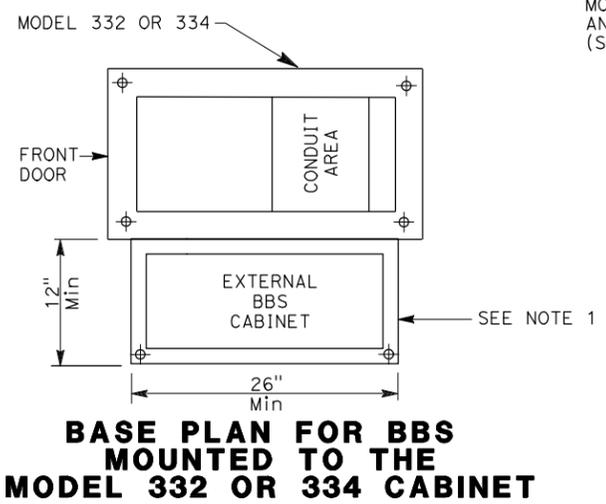
1. THE EXTERNAL BBS CABINET SHALL BE MOUNTED TO THE MODEL 332 OR 334 CABINET WITH FOUR 18-8 STAINLESS STEEL HEX HEAD, FULLY-THREADED, 3/8"-16 X 1" BOLTS; TWO WASHERS PER BOLT, DESIGNED FOR 3/8" BOLTS AND ARE 18-8 STAINLESS STEEL, 1" OUTSIDE DIAMETER, ROUND, AND FLAT; AND ONE K-LOCK NUT PER BOLT THAT IS 18-8 STAINLESS STEEL AND A HEX-NUT. THE ENGINEER WILL HAVE TO APPROVE THE BOLT MOUNTING LOCATION PRIOR TO INSTALLATION.
2. THE ANCHOR BOLTS SHALL BE 3/4" Dia X 15" WITH A 2"-90° BEND. THE CABINET MANUFACTURER'S SPECIFICATION SHALL DETERMINE THE LOCATION OF THE ANCHOR BOLTS IN THE FOUNDATION. THE ENGINEER WILL HAVE TO APPROVE THE ANCHOR BOLTS AND ITS LOCATION IN THE FOUNDATION PRIOR TO CONSTRUCTION.
3. THE CONTRACTOR SHALL VERIFY THE DIMENSIONS OF THE BBS CABINET PRIOR TO CONSTRUCTING THE FOUNDATION OF THE MODIFIED PORTION OF THE Std MODEL 332 AND 334 CABINET FOUNDATION. THE ENGINEER WILL HAVE TO APPROVE ANY NECESSARY DEVIATIONS PRIOR TO CONSTRUCTION.
4. ALL DIMENSIONS ARE NOMINAL.

**EXTERNAL BBS CABINET MOUNTED TO THE MODEL 332 OR 334 CABINET**



**MODIFIED MODEL 332 AND 334 CABINET FOUNDATION DETAIL FOR BATTERY BACKUP SYSTEM (BBS)**

(FOR DIMENSIONS AND DETAILS NOT SHOWN AND ADDITIONAL NOTES, SEE SHEET ES-3C OF THE STANDARD PLANS FOR MODEL 332 AND 334 CABINETS)



**BASE PLAN FOR BBS MOUNTED TO THE MODEL 332 OR 334 CABINET**

(FOR DIMENSIONS AND DETAILS NOT SHOWN, SEE SHEET A6-1 TO A6-4, CABINET HOUSING DETAILS OF THE TRANSPORTATION ELECTRICAL EQUIPMENT SPECIFICATION (TEES))

**ELECTRICAL SYSTEMS (BBS FOUNDATION DETAILS)**

NO SCALE

THIS PLAN IS ACCURATE FOR ELECTRICAL WORK ONLY.

RELATIVE BORDER SCALE IS IN INCHES



USERNAME => trcarol  
DGN FILE => BBS Foundation.dgn

CU 00000

EA 00000

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION  
 FUNCTIONAL SUPERVISOR  
 CALCULATED-DESIGNED BY  
 CHECKED BY  
 REVISOR BY  
 DATE REVISED



DATE PLOTTED => 13-MAR-2009  
TIME PLOTTED => 09:11  
LAST REVISION: 2-2-09

**INFORMATION HANDOUT**  
**TABLE OF CONTENTS**

PROJECT:  
CONTRACT NO.: 06-447701

SUBMITTAL TYPE: SUBMITTAL DATE:	PS&E (to District)	EXPEDITE (to HQOE with copy to District) <u>2/26/09</u>	POST EXPEDITE (to HQOE with copy to District)
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STRUCTURES SPEC ENGINEER: James Corrado  
PHONE: CALNET (916) 227-8993

Contents	Bridge Number(s)
Foundation Recommendations	<u>Preliminary Foundation Report, dated April 20, 2007.</u> <u>Final Foundation Recommendations, dated February 21, 2008.</u>
Foundation Reviews	<u>N/A</u>
Materials Reports	<u>N/A</u>
Pile Indicator Test Reports	<u>N/A</u>
Driveability Analysis	<u>N/A</u>
As Built Log of Test Borings ( not in the contract plans)	<u>N/A</u>
As Built Pile Driving Records	<u>N/A</u> <u>N/A</u>

30 extra copies of information handout needed for piling subcontractors.

## Memorandum

*Flex your power!  
Be energy efficient!*

To: MR. KEVIN KEADY  
Chief  
Structure Design Branch 17  
Office of Bridge Design Central  
Attention: Mr. Rod Simmons

Date: February 21, 2008

File: 06-FRE-41-R29.5  
06-447701  
42-0304  
Herndon Aūx. Lane  
(Abut. 3 tieback wall)

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

Subject: Final Foundation Recommendations

This report has been prepared to provide final foundation recommendations for the proposed project referenced above.

A memorandum titled "Preliminary Foundation Report for tieback Retaining Wall" dated April 20, 2007, was provided to your office.

The recommendations given in that preliminary memorandum remain valid for the final project design.

If any significant changes to the project are proposed during final project design, this Office should review those changes to determine if these foundation recommendations are still applicable.

### **Project Information**

Standard Special Provision S5-280, "Project Information", discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the Information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

*Data and information attached with the project plans are:*

- 1) LOTB completed June-July, 1985 for Sierra Av OC (42-0304).
- 2) LOTB for borings B-06-03 and B-06-04 dated August 2006.

*Data and information included in the Information Handout provided to the bidders and contractors are:*

None

*Data and information available for inspection at the District Office:*

None.

*Data and information available for inspection at the Transportation Laboratory are:*

- 1) Preliminary Foundation Report for Tieback Retaining Wall, dated April 20, 2007, prepared by the Office of Geotechnical Design – North.

If you have any questions, please contact Christopher Koepke at (916) 227-1040.

Report by:



Christopher Koepke, C.E.G.  
Engineering Geologist  
Office of Geotechnical Design – North  
Branch E

cc: R.E., Pending  
Structures OE (E-copy)  
GDN File

# Memorandum

*Flex your power!  
Be energy efficient!*

**To:** KEVIN KEADY  
Chief, Bridge Design Branch 17  
Office of Bridge Design Central  
  
Attention: Rod Simmons

**Date:** April 20, 2007

**File:** 06-FRE-41-PM R29.5/R30.5  
EA: 06-447701  
Herndon Auxiliary Lane

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

**Subject:** Preliminary Foundation Report for tieback Retaining Wall

## Introduction

Per your request, we are providing a Preliminary Foundation Report (PFR) for a tieback Retaining Wall at Sierra Avenue OC (Br. No. 42-0304) on State Route 41 located in the city of Fresno, California. This structure is to be constructed as part of the Herndon Auxiliary Lane project on State Route 41 from the Bullard Ave on-ramp to the Herndon Ave off-ramp and to widen the off-ramp with an additional lane. In general, this memorandum summarizes and presents our conceptual recommendations for a proposed tieback retaining wall only. A Location Map is presented as Plate 1.

## Pertinent Reports and Investigations

The following documents, reports and maps were reviewed to assist in the assessment of site conditions:

- *California Seismic Hazard Map 1996*, Caltrans, dated 1966, by Lalliana Mualchin.
- *Geologic Map of California, Fresno Sheet*, compilation by Robert A. Matthews and John L. Burnett, dated 1965, published by CDMG.
- Memorandum of Foundation Investigation dated June 12 1986 and As Built LOTB dated February 2 1987 prepared by the Geotechnical Branch- Transportation Laboratory for Sierra Avenue OC (Br. No. 42-0304)
- As Built General and Foundation Plans dated February 2 1987 for Br. 42-0304 provided by Structure Design.
- Bridge Inspection Report dated March 29, 2006 for the Sierra Avenue OC Bridge No. 42-0304 by the Office of the Structure Maintenance and Investigation.
- Memorandum of Geotechnical Design Report dated December 8, 2006 for the Herndon

Auxiliary Lane prepared by the Office of Geotechnical Design North.

- Project Layout L-2 dated August 16, 2006 for the Herndon Auxiliary Lane prepared by the District.

### **Existing Facilities and Proposed Improvements**

According to the bridge inspection report for Br. No 42-0304 dated March 29, 2006 of the Structure Maintenance and Investigations the existing structure is a two span bridge with total length of 217 feet (66.1 m) and a width of 82 feet (25.0 m). The structure, which was built in 1988, consists of continuous CIP/PS RC box girder on RC column (3) bents, open-end seated abutments and concrete slope paving at abutments. The bents and abutments are founded on spread footings.

In order to improve the traffic operation of northbound SR 41 between Bullard Avenue and Herndon Avenue, Structure Design proposes a tieback retaining wall to construct the Auxiliary Lane on SR 41 beneath the bridge that requires the slope to be cut back at Abutment 3. This proposal will be incorporated into the District plans, which propose a retaining wall Type 5 within the limits between "A" line Sta. 06+00 and Sta. 33+00.

### **Regional Geology**

This project is located on the southern part of the Great Valley geomorphic province of California. The Geologic Map of California, Fresno Sheet (1966), indicates that the soil present in the entire area is Quaternary age sediments consisting of fan deposits (Qf), and nonmarine sedimentary deposits (Qc). Pleistocene nonmarine sedimentary deposits (Qc) consisting of granitic sand, silt, and clay underlie the majority of the project site. The "Qc" unit normally underlies the "Qf" unit. The eastern areas beyond the project limits are founded on Mesozoic granitic rocks, Mesozoic ultrabasic intrusive rocks, and Pre-Cretaceous metasedimentary rocks and/or metavolcanic rocks. (See Plate 2)

### **Seismicity**

Based upon the Department's California Seismic Hazard Map, dated 1996, the controlling fault is the Coast Ranges-Sierran Block Boundary Zone (CSB, Reverse including thrust) with a maximum credible earthquake moment magnitude of  $M_w = 7$ . The CSB is located about 50 miles southwest of the site. The Peak Horizontal Bedrock Acceleration is estimated to be 0.2g. The potential for surface rupture at the site due to fault movement is considered

insignificant since there are no known faults projecting towards or passing directly through the project site. (See Plate 3)

### **Groundwater**

Groundwater was not encountered within the maximum-drilled depth of 94 feet during the previous field investigations completed in July 1985 and August 2006. Based on the DWR historical well data within the period of 1971 and 2005, the average groundwater elevation within the project site is approximately 210 feet which would correspond to approximately 100 feet below the ground surface.

### **Subsurface Conditions**

Based on the subsurface investigations performed in June/July 1985 and August 2006, the soil present at the site is composed of interbedded layers of medium dense to very dense sand, medium dense to dense silty sand, and stiff to hard silt. Bedrock was not encountered within the maximum depth drilled during these investigations. As-Built LOTB dated February 1987, and boring logs of B-06-03 and B-06-04 dated August 2006 are presented in Appendix.

### **Preliminary Geotechnical Recommendations**

The preliminary geotechnical recommendations for a tieback retaining wall structure under the Sierra Avenue OC (Br. No. 42-0304) discussed in this section are referenced to the regional geologic map, as built LOTB of Br. No. 42-0304, boring logs of B-06-03 and B-06-04, and Structure Design APS sheet (Rev. 3/1/99).

The Office of Structure Design (OSD) is designing a concrete tieback retaining wall at the existing Sierra OC abutment slope location (Abut. 3) between "A" line Sta. 21+45.93 and Sta. 22+64.04. The OSD special design proposed for a tieback wall is based on a height of approximately 11.5 feet and a length of approximately 118 feet (Area 1357 sq ft). The design consists of the twenty ground anchors in two levels each anchor with a design stabilizing force of 50 tons (445 kN).

Design of the bonded length is the responsibility of the contractor and is verified by pullout load testing each ground anchor. The minimum unbonded length for soil ground anchors is 15 feet for strand tendons and 10 feet for bar tendons. Additionally, we recommend

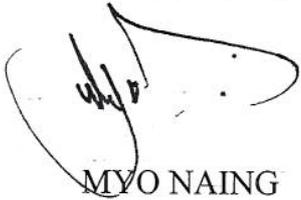
providing weep holes in retaining wall or sub-drainage system behind the wall to relieve the excess moisture from soil. The backfill placed behind the wall should meet the structure backfill requirements in accordance with the standard specifications and standard plans. It is anticipated that temporary excavation will be required for the retaining-wall and temporary cut and/or temporary shoring may be required. Design of temporary cut and/or installation of temporary shoring should be the responsibility of the contractor.

### Future Investigation

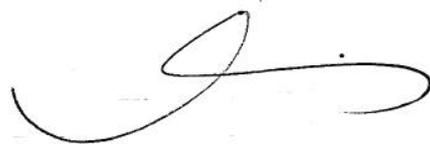
The above-mentioned recommendations are intended for preliminary design and estimating purpose only. Once the OSD completes final design, we will evaluate the needs in final design and prepare the final Foundation Report (FR). Based on the Structure Design APS sheet and existing boring data, additional field investigation may not be required during the final design stage if tieback retaining wall is still used.

If any conceptual changes to the structure, location, and loading are proposed, the Office of Geotechnical Design North should review those changes to determine whether the foundation recommendations contained herein need to be revised.

If you have any questions or comments, please contact Myo Naing at (916) 227-7233 or John Huang at (916) 227-7237.



MYO NAING  
Engineering Geologist  
Office of Geotechnical Design – North  
Branch E



JOHN (QIANG) HUANG, PE  
Senior Material & Research Engineer  
Office of Geotechnical Design – North  
Branch E

### Attachments

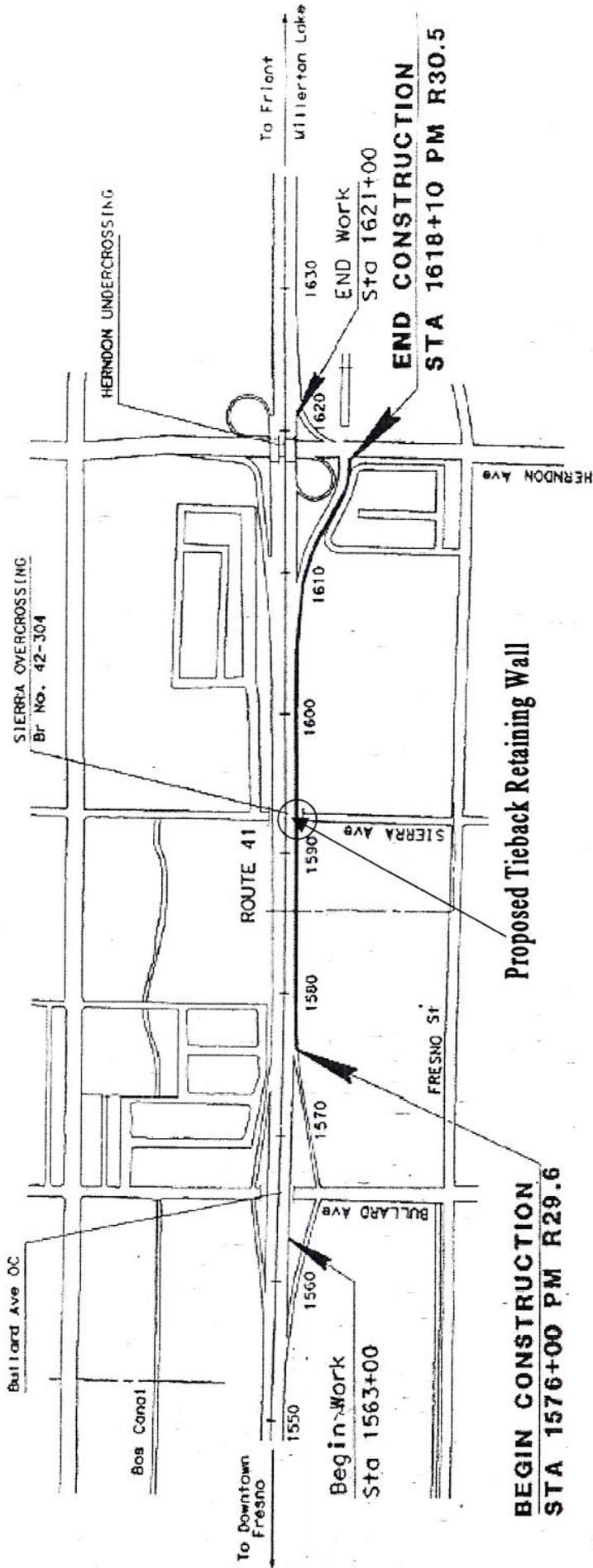
- Plate 1 to 3
- Appendix

c: GDN File  
GS file room





**FRESNO**



NO SCALE



CALTRANS  
 Division of Engineering Services  
 Geotechnical Services  
 Office of Geotechnical Design -North

EA: 06-447701

April 2007

**LOCATION MAP**  
 HERNDON AUXILIARY LANE

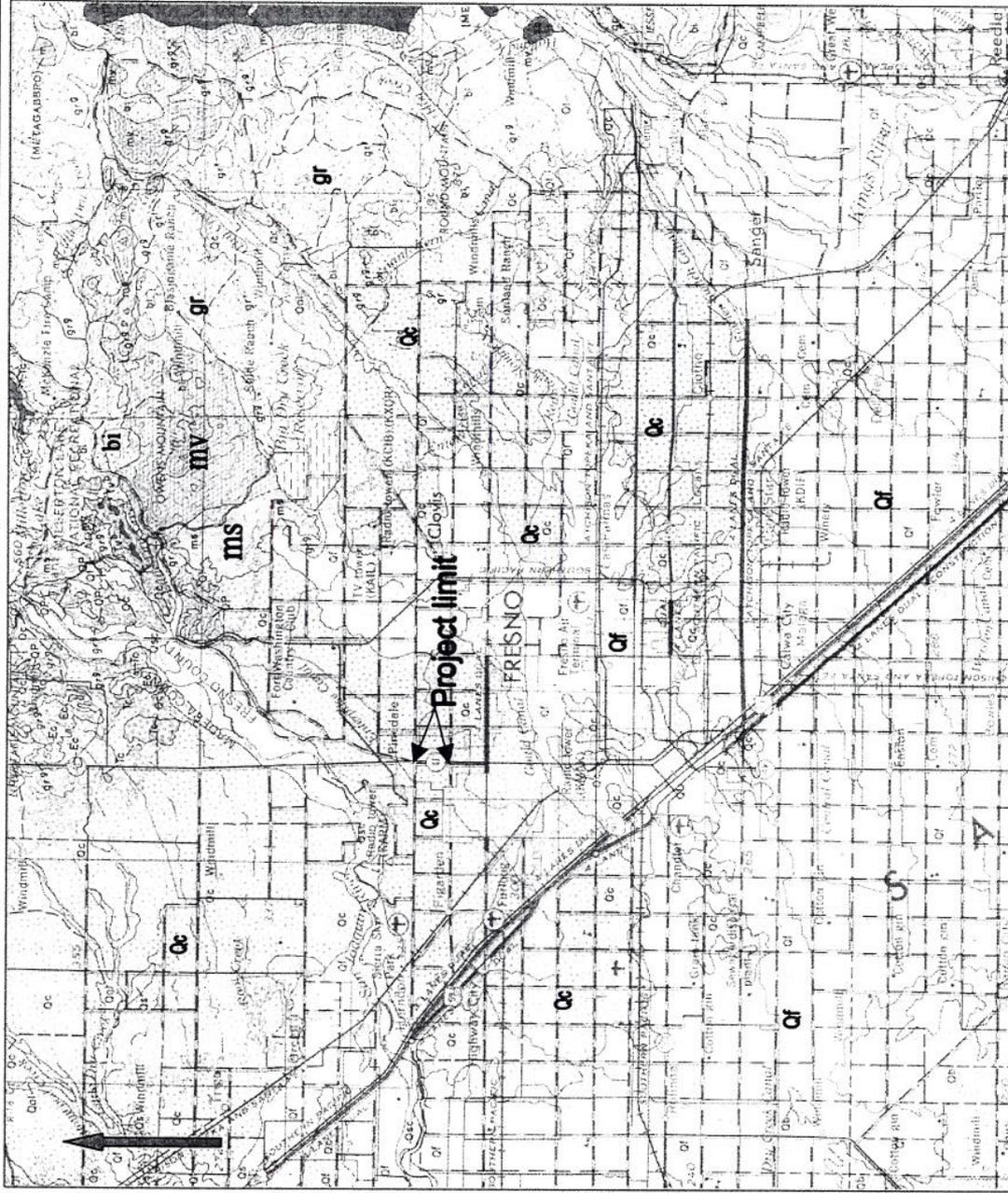
**06-FRE-41-PM R29.5/R30.5**  
**GEOTECHNICAL DESIGN REPORT**

Plate 1

EXPLANATION

- Qf Fan deposits
- Qc Pleistocene nonmarine sedimentary deposits
- gr Mesozoic granitic rocks
- bi Mesozoic basic intrusive rocks
- my Pre-Cretaceous metavolcanic rocks
- ms Pre-Cretaceous metasedimentary rocks

Scale: 1:250,000



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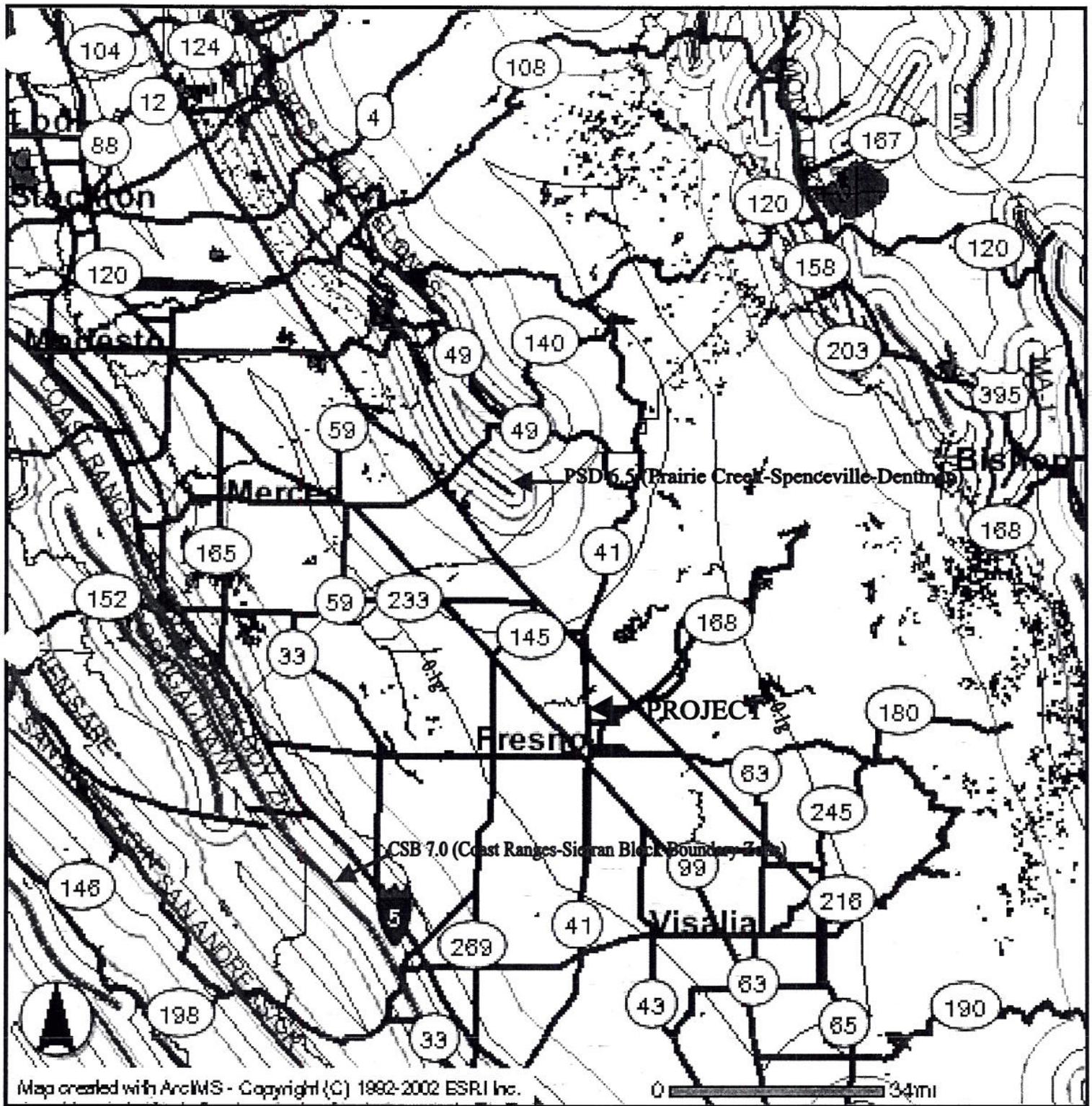
EA: 06-447700

April 2007

REGIONAL GEOLOGIC MAP  
 HERNDON AUXILIARY LANE

06-FRE-41-PM R29.5/R30.5  
 GEOTECHNICAL DESIGN REPORT

Plate 2



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April 2007

SEISMIC HAZARD MAP  
 HERNDON AUXILIARY LANE

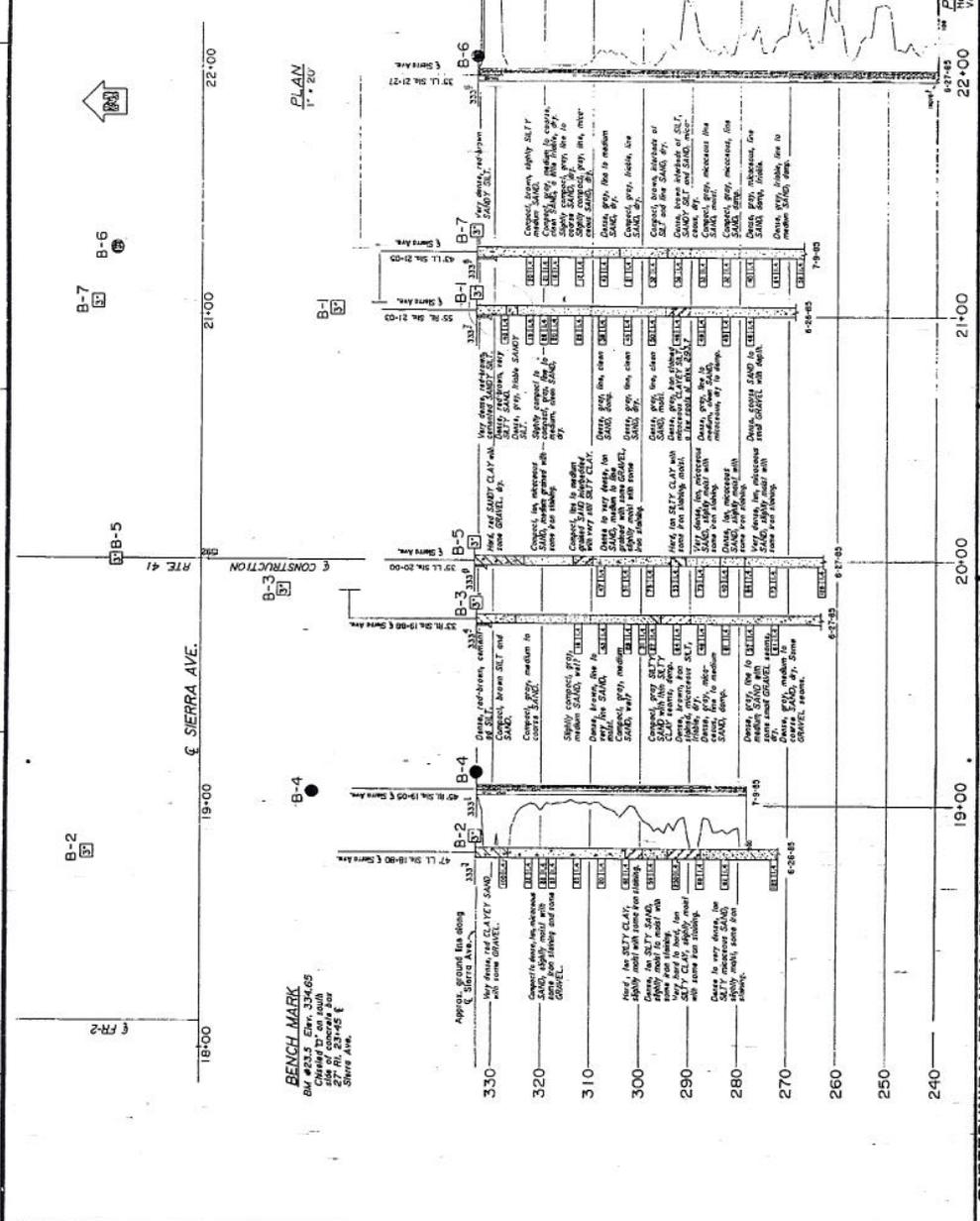
06-FRE-41-PM R29.5/R30.5  
 GEOTECHNICAL DESIGN REPORT

Plate 3

## **APPENDIX**

- **As Built LOTB for Br. No. 42-0304 (February 1987)**
- **Logs of Borings (August 2006)**

SHEET NO. 41  
 PROJECT NO. 11-27-87  
 DATE: 11-27-87  
 ENGINEER: G. J. ...  
 CHECKED: ...  
 APPROVED: ...



**LEGEND OF BORING NOTATIONS**

**SOIL CLASSIFICATION**

**TEST RESULTS**

**NOTES**

**GEOTECHNICAL BRANCH - TRANSPORTATION LABORATORY**  
 STATE OF CALIFORNIA  
 DEPARTMENT OF TRANSPORTATION  
 STRUCTURES - DESIGN 1  
 PROJECT NO. 11-27-87  
 SHEET NO. 41

**SIERRA AVENUE OVERCROSSING**  
**LOG OF TEST BORINGS**

DATE: 11-27-87  
 ENGINEER: G. J. ...  
 CHECKED: ...  
 APPROVED: ...

**AS BUILT PLANS**  
 Contract No. 06-025654  
 Date Completed 11-27-87  
 Document No.

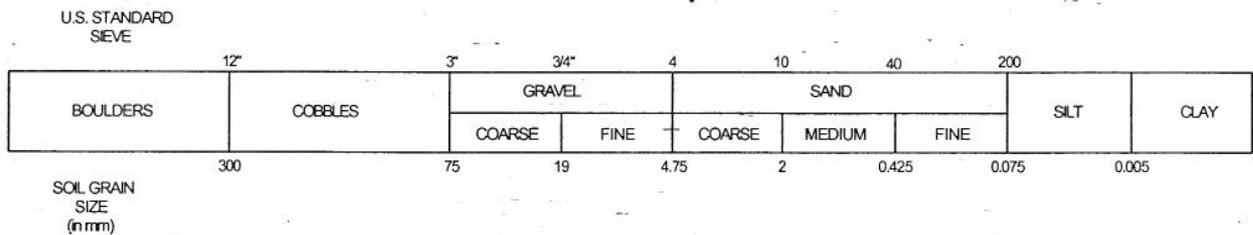
**GRAPHIC SYMBOLS**

	Bulk Sample		Auger
	Rock Core		Diamond Core
	Modified California Sampler		Rotary
	Standard Penetration Sampler		California Sampler
	Shelby Tube		Water Level - 1st Reading
	Vane Shear		Water Level - 2nd Reading
			Water Level - 3rd Reading

**TESTING**

CONS	Consolidation (Cal Test 219)	ROD	Rock Quality Designation (ASTM D6032)
UU	Unconsolidated Undrained Triaxial (Cal Test 230)	CP	Compaction Test (Cal Test 216)
CU	Consolidated Undrained Triaxial (Cal Test 230)	PERM	Permeability (Cal Test 220)
DS	Direct Shear (ASTM D3080)	COR	Corrosivity Testing (Cal Test 532/643)
UC	Unconfined Compression (Cal Test 221)	GRAD	Gradation Analysis (Cal Tests 202/203)
LL	Liquid Limit-% (Cal Test 204)	EP	Expansion Pressure (Cal Test 354)
PI	Plasticity Index-% (Cal Test 204)	OC	Organic Content-% (ASTM D2974)
PP	Pocket Penetrometer	SE	Sand Equivalent (Cal Test 217)
TV	Pocket Torvane		

**SOIL GRAIN SIZE**



**GENERAL NOTES**

1. Logs represent general subsurface conditions observed at the point of exploration on the date indicated.
2. In general, USCS designations presented on logs were established by visual methods only; therefore, actual designations (based on laboratory tests) may vary.
3. No warranty is provided as to the continuity of soil conditions between individual sample locations.
4. Lines separating strata on the logs represent approximate boundaries only; actual transitions may be different or gradual.
5. Pocket penetrometer values reported on the logs under shear strength are actual values as recorded in the field. (To be used in analysis, the pocket penetrometer value should be divided by two)



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**BORING LOG LEGEND**

06-FRE-41 / KP 47.48/49.08 (PM 29.5/30.5)

Geotechnical Design Report

MAJOR DIVISIONS			SYMBOLS		TYPICAL DESCRIPTIONS		
			GRAPH	LETTER			
COARSE GRAINED SOILS  MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS  MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS  (LITTLE OR NO FINES)		<b>GW</b>	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES		
				<b>GP</b>	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES		
		GRAVELS WITH FINES  (APPRECIABLE AMOUNT OF FINES)		<b>GM</b>	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES		
				<b>GC</b>	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES		
	SAND AND SANDY SOILS  MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS  (LITTLE OR NO FINES)		<b>SW</b>	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES		
				<b>SP</b>	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES		
		SANDS WITH FINES  (APPRECIABLE AMOUNT OF FINES)		<b>SM</b>	SILTY SANDS, SAND - SILT MIXTURES		
				<b>SC</b>	CLAYEY SANDS, SAND - CLAY MIXTURES		
		FINE GRAINED SOILS  MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS  LIQUID LIMIT LESS THAN 50			<b>ML</b>	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
						<b>CL</b>	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				<b>OL</b>	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY		
SILTS AND CLAYS  LIQUID LIMIT GREATER THAN 50				<b>MH</b>	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS		
				<b>CH</b>	INORGANIC CLAYS OF HIGH PLASTICITY		
				<b>OH</b>	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS		
HIGHLY ORGANIC SOILS				<b>PT</b>	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS		



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### SOIL CLASSIFICATION SYSTEM

06-FRE-41 / KP 47.48/49.08 (PM 29.5/30.5)

Geotechnical Design Report

Equipment CME 750	Station/KP: ~1587+35	Boring ID: B-06-03
Hammer: Safety automatic drop (140#/ 30")	Offset Distance/Line: 55'RT./"A" Line	Date Completed: 8-30-06
Drilling Method: 6.5-inch hollow stem auger	North/East:	Hole Diameter: 6.5in
Sampling Method: SPT, Bulk	Ground Surface Elevation: ~335.0ft	Total Depth: 61.5ft
Notes:	Depth to GW/date measured: No groundwater encountered on 8-30-06	Logged By: Myo Naing

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	Graphic Log	Description	Sample Type	Sample Number	Sample Blows	Blows per Foot	Recovery (%)	RQD (%)	w/c (%)	Dry Density (pcf)	Shear Strength (tsf)	Drilling Method/Casing	Remarks
101.80	0.30	1		SILTY SAND (SM): medium dense, light brown, dry, fine sand, nonplastic.											
101.50	0.61	2													
101.19	0.91	3													
100.89	1.22	4													
100.58	1.52	5													
100.28	1.83	6				1	3 5 7	12							
99.97	2.13	7		Well-graded SAND (SW): loose, light brown, dry, fine to coarse sand, nonplastic.											
99.67	2.44	8													
99.36	2.74	9													
99.06	3.05	10													
98.76	3.35	11				2	2 3 5	8							
98.45	3.66	12		Well-graded SAND (SW): loose, yellowish brown, dry, fine to coarse sand, nonplastic.											
98.15	3.96	13													
97.84	4.27	14													
97.54	4.57	15													
97.23	4.88	16				3	6 4 4	8							
96.93	5.18	17		Well-graded SAND (SW): loose, yellowish brown, dry, fine to coarse sand, nonplastic.											
96.62	5.49	18													
96.32	5.79	19													
96.01	6.10	20													
95.71	6.40	21				4	3 4 4	8							
95.40	6.71	22		Poorly graded SAND (SP): loose, yellowish brown, dry, fine to medium sand, nonplastic.											
95.10	7.01	23													
94.79	7.32	24													
94.49	7.62	25													
94.18	7.92	26				5	5 7 7	14							
93.88	8.23	27		Poorly graded SAND (SP): medium dense, yellowish brown, dry, fine to medium sand but excess of fine grained, nonplastic.											
93.57	8.53	28													
93.27	8.84	29													
92.96	9.14	30													

Adjustment factor of 1.36 was used for correction of field N-values shown in column "Blows per Foot". (Reference to Memo "Drill Rig Evaluation" dated Dec. 2005.)

(continued)



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Drafted By: Myo Naing

B-06-03

06-FRE-41 / KP 47.48/49.08 (PM 29.5/30.5)

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Geotechnical Design Report

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ELEVATION (m)	DEPTH (m)	DEPTH (ft)	Graphic Log	Description	Sample Type	Sample Number	Sample Blows	Blows per Foot	Recovery (%)	RQD (%)	w/c (%)	Dry Density (pcf)	Shear Strength (tsf)	Drilling Method/Casing	Remarks
92.66	9.45	31		Poorly graded SAND (SP); medium dense, light grey, dry, fine to medium sand, nonplastic.	X	6	7	13							
92.35	9.75	32	7												
92.05	10.06	33	6												
91.74	10.36	34		Poorly graded SAND (SP); medium dense, light grey, dry, fine to medium sand, nonplastic.	X	7	7	24							
91.44	10.67	35	7												
91.14	10.97	36	12												
90.83	11.28	37		Poorly graded SAND (SP); medium dense, light grey, dry, fine to medium sand, nonplastic.			12								
90.53	11.58	38													
90.22	11.89	39													
89.92	12.19	40		Poorly graded SAND (SP); medium dense, light grey, dry, fine to medium sand, nonplastic.	X	8	4	19							
89.61	12.50	41	8												
89.31	12.80	42	11												
89.00	13.11	43		Well-graded SAND (SW); medium dense, light grey, dry, fine to coarse sand, nonplastic.											
88.70	13.41	44													
88.39	13.72	45													
88.09	14.02	46		Well-graded SAND (SW); medium dense, light grey, dry, fine to coarse sand, nonplastic.	X	9	5	19							
87.78	14.33	47	11												
87.48	14.63	48	8												
87.17	14.94	49		Well-graded SAND (SW); medium dense, light grey, dry, fine to coarse sand, nonplastic.											
86.87	15.24	50													
86.56	15.54	51													
86.26	15.85	52		Well-graded SAND with GRAVEL (SW); medium dense, light grey, dry, fine to coarse sand, nonplastic.	X	10	5	16							
85.95	16.15	53	8												
85.65	16.46	54	8												
85.34	16.76	55		Well-graded SAND with GRAVEL (SW); medium dense, light grey, moist, fine to coarse sand, nonplastic.	X	11	9	23							
85.04	17.07	56	10												
84.73	17.37	57	13												
84.43	17.68	58		Well-graded SAND with GRAVEL (SW); medium dense, light grey, moist, fine to coarse sand, nonplastic.											
84.12	17.98	59													
83.82	18.29	60													
83.52	18.59	61		Well-graded SAND with GRAVEL (SW); medium dense, light grey, moist, fine to coarse sand, nonplastic.	X	12	9	22							
83.21	18.90	62	12												
82.91	19.20	63	10												
82.60	19.51	64		Well-graded SAND with GRAVEL (SW); medium dense, light grey, moist, fine to coarse sand, nonplastic.											
82.30	19.81	65													
81.99	20.12	66													



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B-06-03

06-FRE-41 / KP 47.48/49.08 (PM 29.5/30.5)

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Geotechnical Design Report

5b

Equipment: CME 750	Station/KP: ~1596+86	Boring ID.: B-06-04
Hammer: Safety automatic drop (140#/ 30")	Offset Distance/Line: 56' Rt. "A" Line	Date Completed: 8-30-06
Drilling Method: 6.5-inch hollow stem auger	North/East:	Hole Diameter: 6.5in
Sampling Method: SPT, Bulk	Ground Surface Elevation: ~336.0ft	Total Depth: 61.5ft
Notes:	Depth to GW/date measured: No groundwater encountered on 8-30-06	Logged By: Myo Naing

ELEVATION (m)	DEPTH (m)	DEPTH (ft)	Graphic Log	Description	Sample Type	Sample Number	Sample Blows	Blows per Foot	Recovery (%)	RQD (%)	w/c (%)	Dry Density (pcf)	Shear Strength (tsf)	Drilling Method/Casing	Remarks
102.11	0.30	1		SANDY SILT (ML): hard, yellowish brown, dry, nonplastic.		1A									Corrosion test sample
101.80	0.61	2													Adjustment factor of 1.36 was used for correction of field N-values shown in column "Blows per Foot". (Reference to Memo "Drill Rig Evaluation" dated Dec. 2005.)
101.50	0.91	3													
101.19	1.22	4													
100.89	1.52	5													
100.58	1.83	6					1	11 24 15	39						
100.28	2.13	7		Well-graded SAND (SW): loose, reddish brown, dry, nonplastic.											
99.97	2.44	8													
99.67	2.74	9													
99.36	3.05	10													
99.06	3.35	11					2	4 5 4	9						
98.76	3.66	12		Well-graded SAND (SW): loose, yellowish brown, dry, nonplastic.											
98.45	3.96	13													
98.15	4.27	14													
97.84	4.57	15													
97.54	4.88	16					3	2 3 3	6						
97.23	5.18	17		Well-graded SAND (SW): medium dense, yellowish brown, dry, nonplastic.											
96.93	5.49	18													
96.62	5.79	19													
96.32	6.10	20													
96.01	6.40	21					4	6 7 9	16						
95.71	6.71	22		Well-graded SAND (SW): medium dense, yellowish brown, dry, nonplastic, clean.											
95.40	7.01	23													
95.10	7.32	24													
94.79	7.62	25													
94.49	7.92	26					5	5 8 10	18						
94.18	8.23	27													
93.88	8.53	28													
93.57	8.84	29													
93.27	9.14	30													

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B-06-04

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Geotechnical Design Report

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ELEVATION (m)	DEPTH (m)	DEPTH (ft)	Graphic Log	Description	Sample Type	Sample Number	Sample Blows	Blows per Foot	Recovery (%)	RQD (%)	w/c (%)	Dry Density (pcf)	Shear Strength (tsf)	Drilling Method/ Casing	Remarks
92.96	9.45	31		SILT (ML): stiff, yellowish brown, dry, low plasticity.	6	5 6 6	12								
92.66	9.75	32		SANDY SILT (ML): very stiff, yellowish brown, dry, low plasticity.											
92.35	10.06	33													
92.05	10.36	34													
91.74	10.67	35													
91.44	10.97	36			7	5 11 11	22								
91.14	11.28	37	SILT (ML): very stiff, light grey, dry, low plasticity.												
90.83	11.58	38													
90.53	11.89	39													
90.22	12.19	40													
89.92	12.50	41			8	5 15 15	30						P = 1.00		
89.61	12.80	42	Poorly graded SAND (SP): medium dense, yellowish brown, dry, nonplastic.												
89.31	13.11	43													
89.00	13.41	44													
88.70	13.72	45													
88.39	14.02	46			9	4 8 13	21								
88.09	14.33	47													
87.78	14.63	48													
87.48	14.94	49													
87.17	15.24	50													
86.87	15.54	51			10	5 10 15	25								
86.56	15.85	52	SANDY SILT (ML): very stiff, light grey, dry, low plasticity.												
86.26	16.15	53													
85.95	16.46	54													
85.65	16.76	55													
85.34	17.07	56			11	4 8 13	21						P = 1.00		
85.04	17.37	57	SILT (ML): stiff, yellowish brown, moist, low plasticity.												
84.73	17.68	58													
84.43	17.98	59													
84.12	18.29	60													
83.82	18.59	61			12	3 6 9	15						P = 1.25		
83.52	18.90	62	Bottom of Hole at 18.75 m (61.5 ft) on 8-30-06												
83.21	19.20	63													
82.91	19.51	64													
82.60	19.81	65													
82.30	20.12	66													



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Geotechnical Design Report

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