

FOR CONTRACT NO.: 11-2348U4

# INFORMATIONAL HANDOUT

## AGREEMENTS

CALIFORNIA DEPARTMENT OF FISH AND GAME

NOTIFICATION NO. R5-2001-0201

UNITED STATES FISH AND WILDLIFE SERVICE (Biological Opinion)

## MATERIALS INFORMATION

FOUNDATION RECOMMENDATION

**ROUTE: 11-SD-15, 56-M29.7/M33.1, 13.7/15.1**



Edit listed contents to suit job. Eliminate note for extra copies for jobs with no piling.

Include this cover sheet with submittal to District at PS&E, and also include the submittal to HQOE at Expedite. Update as necessary.

**INFORMATION HANDOUT**  
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PROJECT: Tieback Retaining Walls and Barrier Upgrade at 56/15 Separation  
CONTRACT NO.: 11-2348U1 (Formerly 11-234801 and 11-064801)

SUBMITTAL TYPE:	PS&E (to District)	EXPEDITE (to HQOE with copy to District)	POST EXPEDITE (to HQOE with copy to District)
SUBMITTAL DATE:	<u>02-15-02</u>	<u>02-27-02</u>	

STRUCTURES SPEC ENGINEER: Mary E. Kopsa  
PHONE: CALNET 498-8407 or (916) 227-8407

Contents	Bridge Number(s)
<u>Final</u> Foundation Recommendations	Dated August 10, 2000 (Br No. 57-1087M and Br. No. 57-1086M)
<u>Amended</u> Foundation Recommendations	Dated August 11, 2000 (Br No. 57-1087M and Br. No. 57-1086M)
Foundation Reviews	Dated March 6, 2001 (Br. No. 57-1087M and Br. No. 57-1086M)
<u>Revised Final</u> Foundation Recommendations	Dated November 1, 2001 (Br No. 57-1087M and Br. No. 57-1086M)
<del>Materials Reports</del>	
<del>Pile Indicator Test Reports</del>	
<del>Driveability Analysis</del>	
<del>As Built Log of Test Borings (not in the contract plans)</del>	
<del>As Built Pile Driving Records</del>	

30 extra copies of information handout needed for piling subcontractors.

# Memorandum

To: MR. KEVIN ROSS  
Division of Structure Design  
Design Branch 12

Date: November 1, 2001

File: 11-SD-15-KP30.1  
11-234800

Attention: Mr. Javid Sharifi



Tie Back Walls W-1 & W-2  
Bridge No. 57-1087M & 57-1086M

From: DEPARTMENT OF TRANSPORTATION  
ENGINEERING SERVICE CENTER  
Geotechnical Design-South  
Branch B - MS 5

Subject: Revised Final Foundation Report

A request for a Revised Final Foundation Report was made by the Division of Structure Design (DSD), Structure Design Branch 12 dated October 1, 2000, was received by the Office of Geotechnical Design - South, Branch B on October 9, 2001. The original Final Foundation Recommendations were completed August 10, 2000 by Mike Rogers. Based on the Foundation Recommendations dated August 10, 2000, procedures outlined in FHWA-DP-68-1R, a General Plan Dated September 27, 2001, and recommendations for soil parameters provided with the request for revised final foundation recommendations made by Overcomer Hor dated October 1, 2000, we submit the following revised foundation recommendations for the proposed Tie-Back Walls W-1 and W-2.

The proposed Tie-Back Wall W-2 (#57-1086m) has been removed from this phase of the project. The proposed Tie-Back Wall W-1 (#57-1087m) will now be constructed as a temporary structure. The wall is still to be constructed adjacent to the face of the existing abutment, but the limits of wall W-1 have changed. The length of the wall has been modified from 39.64 meters as per the original request to 69.625 meters. Tie-Back tendons will probably be anchored into rock (Upper elevation of rock as per FR dated August 10, 2000, is approximately 165 m [544 feet]).

Based on recommendations by Overcomer Hor, values for the wall and soil have been modified as follows:

Soil shear Angle ( $\phi$ ) = 28°, old 34°  
Soil density = 18.85 kN/m<sup>3</sup> (120 pcf), old 19.6 kN/m<sup>3</sup> (125 pcf)  
Tension force = 260 kN  
Angle of tieback inclination = 20°, old 15°

This gives unbonded lengths as follows:

Top lift = 16.000 m (52.49 ft)  
Middle lift = 12.000 m (39.37 ft)  
Bottom lift = 7.000 m (22.97 ft)

Any questions regarding the above recommendations should be directed to Steven Sunding, (916) 227-5283, or Martha Merriam, (916) 227-7221 of the Geotechnical Design-South, Branch B.

Mr. Kevin Ross  
November 1, 2001  
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Structure No. 57-1086m & 57-1087m

Report by:

Supervised by:

STEVEN L. SUNDING  
Engineering Geologist  
Office of Geotechnical Design - South  
Branch B

MARTHA MERRIAM, C.E.G. NO. 1967  
Senior Engineering Geologist  
Office of Geotechnical Design - South  
Branch B

c: JChai, OGDS  
OGDS.31

# Memorandum

o: MR. ROBIN ROGERSON  
Division of Structure Design  
Office of Bridge Design C, Branch 12

Date: August 11, 2000

File: 11-SD-015-KP 30.1 / 33.0  
11-064800

• Attention: Javid Sharifi

Ted Williams Overcrossing  
Tieback Walls W-1 & W-2  
Bridge Nos. 57-1087m/57-1086m

From: DEPARTMENT OF TRANSPORTATION  
ENGINEERING SERVICE CENTER  
Division of Structural Foundations - MS 5  
Office of Structure Foundations

Subject: Amended Foundation Recommendations

This memo provides amendments to the original FR dated August 10, 2000.

The original FR mistakenly reported results of soil samples to be non-corrosive. Three soil samples were submitted to the lab and analyzed for corrosion. Results of the corrosion tests are shown below:

SIC No.	Sample From	Ph	Minimum Resistivity (ohm-cm)	Sulfate Content (ppm)	Chloride Content (ppm)	**Years to Perforation
C537201	00-01/s#5	7.9	375	98	505	17
C537202	00-01/S#7	8.1	505	49	223	19
C537203	00-02/S#3	8.1	510	226	262	19

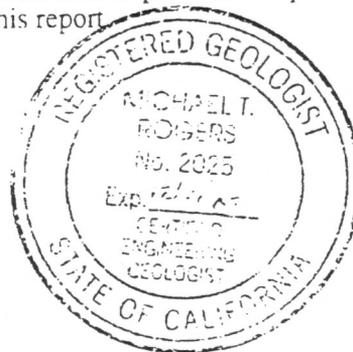
**\*\*Perforation standard is for 18 gauge galvanized steel culvert**

Caltrans currently defines a corrosive area as an area where the soil and/or water contains more than 500 ppm of chlorides, more than 2000 ppm of sulfates, has a minimum resistivity of less than 1000 ohm-centimeters, or has a pH of 5.5 or less. Therefore, this site is considered corrosive with respect to Caltrans standards.

## RECOMMENDATIONS

1. It is recommended the Contractor shall include a corrosion protection system with the tieback /anchor. The corrosion protection system should provide adequate protection from the corrosive indicators as characterized in this report.

MIKE ROGERS, C.E.G. No. 2025  
Associate Engineering Geologist



c: R.E. Pending File - Struc Const  
DBarlow - Specs & Estimates  
OAlcantara - Proj Mgmt  
District 11 (2)  
ELeivas - OSF  
RBuell - OSF

**Memorandum**

to: MR. ROBIN ROGERSON  
Division of Structure Design  
Office of Bridge Design C, Branch 12

Date: August 10, 2000

File: 11-SD-015-KP 30.1 / 33.0  
11-064800

Attention: Javid Sharifi

Ted Williams Overcrossing  
Tieback Walls W-1 & W-2  
Bridge Nos. 57-1087m/57-1086m

From: DEPARTMENT OF TRANSPORTATION  
ENGINEERING SERVICE CENTER  
Division of Structural Foundations - MS 5  
Office of Structure Foundations

Subject: Final Foundation Recommendations

Per your request dated July 19, 2000, a final Foundation Recommendations (FR) report for the subject project has been prepared. This FR is based on As-Built records, existing bridge file information, and a foundation investigation performed the week of June 26, 2000.

**OVERVIEW/ EXISTING FOUNDATIONS**

The project is to widen the existing Route 15 corridor by the reconstruction of the Ted Williams (State Route 56) Overcrossing, Br. No. 57-0945, at KP 31.1 of Interstate Route 15 in San Diego County. The project calls for removal of the toe of the existing slope paved embankments, and construction of tiebacks to support the soil beneath the abutments and accommodate widening of the I-15 corridor.

The draft General Plans (undated) indicate Tieback Wall W-1 (Br. No. 57-1087m) is to be constructed adjacent to the face of the existing west abutment, and Tieback Wall W-2 (Br. No. 57-1086m) is to be constructed adjacent to the east abutment.

**GEOLOGY**

The site is within the Penninsular Ranges geomorphic province of California. Original ground (OG) surface is approximately El. 167.0 m. Geologic maps of the area indicate the site is close to a contact between older (Mesozoic) granitic rocks and younger (Tertiary) volcanic rocks. Depth to bedrock is shallow. The existing grade of the overcrossing is approximately El. 177 m.

The proposed tieback walls will be used to support approximately 4.5 meters of engineered fill beneath the abutments of the overcrossing. The profiles show the walls extend vertically from the abutment footings (approximate El. 172 m) to the roadbed grade of I-15 (approximate El. 167.5 m). Soil behind the proposed tiebacks consists of engineered fill above OG at approximate El. 167 m.

A foundation geologic investigation was performed the week of June 26, 2000. This investigation consisted of three rotary sample borings. The foundation material encountered at the site is generally described in the following table:

Approximate Elevation (meters)		Description
<i>From</i>	<i>To</i>	
176	173	Medium dense clayey coarse sand and gravel with some cobble sized material (FILL)
173	167	Medium dense silty to clayey sand (FILL) consisting of imported weathered sandstone and siltstone fragments.
167	165	Very stiff dark brown organic clay with sand and gravel (original ground surface); root fragments.
165	164	Very dense sand (decomposed bedrock)
164	161.5	Bedrock consisting of moderately to slightly fractured granite at the east abutment, and intensely fractured (possibly contact metamorphic) rock at the west abutment.

## GROUND WATER

Slotted PVC pipe was installed in borehole 00-01 after completion, and the water level was periodically monitored during the investigation. All drilling mud/water had dissipated from the hole after 48-hours. No ground water was encountered in any of the boreholes.

## CORROSION

During the geologic investigation, soil samples from selected depths were obtained and submitted for corrosion analyses. Results indicate that none of the samples are corrosive according to Caltrans standards.

## FOUNDATION ANALYSIS

The procedures described in FHWA-DP-68-1R, Permanent Ground Anchors, March 1988, were used for determining the unbonded length of the tiebacks. An internal angle of soil friction ( $\phi$ ) of  $34^\circ$  was estimated for this analysis, based on the standard penetration tests performed during the soil investigation. The Rankine failure surface behind the tieback wall was constructed graphically as a plane extending from the toe of the tieback wall extending upward behind the abutment footing (pile cap) at an angle of  $28^\circ$  from vertical. The minimum unbonded length of the tieback anchors was determined by graphic analysis. A minimum setback distance of 4.6 meters (15 feet), as proscribed by this procedure, was determined to be controlling the design unbonded length. The setback was constructed graphically on the General Plan profile Typical Sections, and the unbonded lengths were measured to be 4.6 meters for each of the tieback rows (2 rows of tiebacks in Wall W-1, and 3 rows of tiebacks in Wall W-2).

A separate computer analysis of the theoretical failure plane was performed by Javid Sharifi of OSD and submitted to our office for review. Results of the analysis indicates the minimum setback distance of 4.6 meters controls the design unbonded length for each of the tieback rows in W-1, and the bottom 2 rows of W-2. However, the unbonded length of the uppermost tieback row in W-2, which is controlled by the theoretical failure plane, was determined to be 6.1 meters (20 feet).

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## FOUNDATION RECOMMENDATIONS

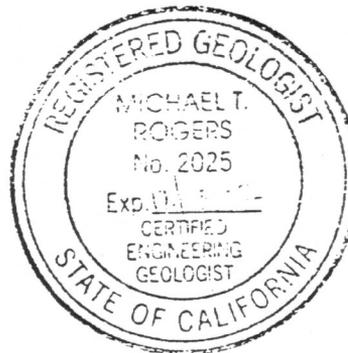
1. The design proposed tieback walls will anchor into medium dense engineered abutment fill to approximately El. 165 m (bottom of walls). Bedrock was encountered below El. 165m during the investigation and should be anticipated for any construction below this elevation.
2. Ground water was not encountered during the investigation, but may be present below El. 163 m.
3. The design unbonded length for the tiebacks in Wall W-1, and the bottom two rows of tiebacks in Wall W-2, is specified as 4.6 meters (15 feet). For the uppermost row of tiebacks in Wall W-2, the design unbonded length is specified as 6.1 meters (20 feet).
4. Precautions will need to be taken during excavation and installation of the tieback tendons not to damage the existing abutment footings and 410-mm diameter CIDH piles.
5. Simple corrosion protection methods, such as portland cement grout along the anchor length and grease filled sheathing over the unbonded length of the tiebacks are adequate for this project.

Recommendations for the proposed Type-I retaining walls, which are to be constructed adjacent to the abutment tieback walls will be provided by the Office of Roadway Geotechnical Engineering- South. Please contact Jeff Tesar at (858) 467-2716 if you have questions regarding foundation recommendations for the retaining walls.

Project LOTBs are in the process of being finalized and are available to you electronically via our Drafting Services Section. If you have any questions please call me at 227-7136.

  
MIKE ROGERS, C.E.G. No. 2025  
Associate Engineering Geologist

- c: R.E. Pending File – Struc Const  
DBarlow – Specs & Estimates  
OAlcantara - Proj Mgmt  
District 11 (2)  
ELeivas - OSF  
RBuell – OSF  
JTesar – Dist 11 ORGES



# FOUNDATION REVIEW

ENGINEERING SERVICE CENTER  
OFFICE OF STRUCTURE FOUNDATIONS

To: **Division of Structure Design**

1. Preliminary Report
2. R.E. Pending File
3. Specifications & Estimates
4. File

Date: 3/6/01

**Office of Structure Foundations**

1. SFB (Sacramento)
2. SFB (Los Angeles)

Route 56/15 Tieback Wall  
Structure Name W-1; W-2

11-50-56/15-30-1  
District County Route km Post

District/ Project Development

District Project Engineer

11-234801 57-1087M  
E.A. Number Structure Number

Foundation Report By: M. Rogers

Dated: 8/10/00; 8/11/00

Reviewed By: J. Sharifi (DSD)

R. Price (OSF)

General Plan Dated: 3/1/01

Foundation Plan Dated: 1/29/00

No changes.  The following changes are necessary.

## FOUNDATION CHECKLIST

- Pile Types and Design Loads
- Pile Lengths
- Predrilling
- Pile Load Test
- Substitution of H Piles For Concrete Piles  Yes  No

- Footing Elevations, Design Loads, and Locations
- Seismic Data
- Location of Adjacent Structures and Utilities
- Stability of Cuts or Fills
- Fill Time Delay

- Effect of Fills on Abutments and Benches
- Fill Surcharge
- Approach Paving Slabs
- Scour
- Ground Water
- Tremie Seals/Type D Excavation

[Signature]  
Division of Structure Design Design Branch No.

[Signature]  
Office of Structure Foundations