DEPARTMENT OF TRANSPORTATION - District 4 Toll Bridge Program
333 Burma Rd.
Oakland, CA 94607
(510) 622-5660, (510) 286-0550 fax

CC Myers - YBI
51 Macalla Road
San Francisco, CA 94130

Attn: Mr. Bob Coupe

Ref: 215-STL.00253

September 26, 2006

Contract No. 04-0120R4
04-SF-80-12.6, 13.2
South – South Detour

Letter No. 05.03.01-000744

Subject: Deck Drainage forthcoming CCO 54

Dear Mr. Coupe,

Enclosed are the deck drainage barrier rail and scupper design drawings for your use to redesign the barrier rail and incorporate into the deck drainage design as part of the Viaduct Superstructure submittal. The Department has eliminated the Class 1 Drainage requirement from the contract (see Design Criteria No. 8). Please refer to State Letter 05.03.01-000722 for scupper spacing and locations.

Please proceed with the redesign of the barrier rail under Extra Work at Force Account. Contract Change Order No 54 will be forthcoming.

Please submit Lump Sum costs for hydro-seeding (Erosion Control Type 'D'), rock protection at station limits listed below, as well as Open Graded AC (OGAC). Plastic sheeting cover will be an item work.

OGAC will replace the 32 mm Dense Graded AC wearing surface with 32mm OGAC for both the WB upper deck and EB lower deck. Paint binder shall be applied over the concrete bridge deck in accordance with enclosed specification SSP 39-010. The Department will be taking a credit for deck drain design and the construction portion of the drainage inlets under Contract Bid Item No. 91.

If you have any questions, please contact me at (510) 622-5183.

Enclosures:

Sincerely,

M. U. Anigol

Resident Engineer
Mahantesh Anigol

cc: G. Lai, T. Lai, D. Quintana, S. Hulsebus, A. Yan, M. Anigol, J. Tom

file: 05.03.01, 49.54.02, 62.02.09

From Station WD1 52+20 to 54+20, a 5-meter wide rock protection shall be installed north of the USCG fence or as directed by the Engineer. Rocks shall conform to the material quality requirements in Section 72-2.02, "Materials," of the Standard Specifications for shape and for apparent specific gravity, absorption, and durability index. Rocks used for the temporary entrance shall conform to the following sizes:

Square Screen Size (inch)	Percentage Passing	Percentage Retained
150	100	0
75	0	100

Estimate of Quantities:

OGAC WITH PBA-6A BINDER	860 TONN
PLASTIC COVER SHEETING	800 M2
USCG ROAD ROCK PROTECTION	1000 M2

ASPHALT CONCRETE

Asphalt concrete shall be Type Open Graded and shall conform to the provisions in Section 39, "Asphalt Concrete," of the Standard Specifications and these special provisions.

Open graded asphalt concrete may be placed when the atmospheric temperature is below 20°C, but above 10°C, provided the following requirements are met:

A. The aggregate grading shall be 12.5-mm maximum.
B. Open graded asphalt concrete shall not be placed in stockpile. Open graded asphalt concrete shall be transferred directly from the hauling vehicle to the asphalt paver hopper.
C. Open graded asphalt concrete shall be not less than 30 mm in compacted thickness.
D. Immediately prior to adding the asphalt binder to the open graded asphalt concrete mixture, the temperature of the aggregate shall be not more than 163°C. Open graded asphalt concrete shall be spread at a temperature of not less than 135°C measured in the hopper in the asphalt paver.
E. The compaction operation shall be such that the maximum distance between the asphalt paver and the initial breakdown rolling shall be no greater than 15 m.
F. During the placement of open graded asphalt concrete, the speed of the asphalt paver shall not exceed 10 m per minute.
G. The Contractor shall cover loads of open graded asphalt concrete with tarpaulins. The tarpaulins shall completely cover exposed open graded asphalt concrete in the hauling vehicle until the open graded asphalt concrete has been completely transferred into the asphalt paver hopper.

The grade of asphalt binder to be mixed with aggregate for Type Open Graded asphalt concrete shall be Grade PBA-6a conforming to the provisions in Section 92, "Asphalts," of the Standard Specifications.

The asphalt content of the asphalt mixture will be determined in conformance with the requirements in California Test 379, or in conformance with the requirements in California Test 382.

Paint binder (tack coat) shall be applied to existing surfaces to be surfaced and between layers of asphalt concrete, except when eliminated by the Engineer.

Paint binder (tack coat) shall be, at the option of the Contractor, rapid-setting asphaltic emulsion or paving asphalt. Rapid-setting asphaltic emulsion shall conform to the provisions in Section 39-4.02, "Prime Coat and Paint Binder (Tack Coat)," and the provisions in Section 94, "Asphaltic Emulsions," of the Standard Specifications. When paving asphalt is used for paint binder, the grade will be determined by the Engineer. Paving asphalt shall conform to the provisions in Section 39-4.02, "Prime Coat and Paint Binder (Tack Coat)," and the provisions in Section 92, "Asphalts," of the Standard Specifications.

Paint binder (tack coat) shall be applied in the liter per square meter range limits specified for the surfaces to receive asphalt concrete in the tables below. The exact application rate within the range will be determined by the Engineer.

Application Rates for Asphaltic Emulsion Paint Binder (Tack Coat) on Open Graded Asphalt Concrete		
Type of surface to receive paint binder (tack coat)		Rapid-setting Asphaltic Emulsion L/m^2(Note A)
Dense, compact surfaces and between layers, on PCC		0.10 – 0.25
Open textured, or dry, aged surfaces		0.45 – 0.55

Note A: Undiluted rapid-setting asphaltic emulsion.

Application Rates for Paint Binder (Tack Coat) on Open Graded Asphalt Concrete	
Type of surface to receive paint binder (tack coat)	Paving Asphalt L/m^2
Dense, compact surfaces and between layers	0.05 – 0.15
Open textured, or dry, aged surfaces	0.28 – 0.41

When asphaltic emulsion is used as paint binder (tack coat), asphalt concrete shall not be placed until the applied asphaltic emulsion has completely changed color from brown to black

DIST	COUNTY	ROUTE	KILOMETER POST TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	SF	80	12.6/13.2		

Caltrans Metric

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER — No. — Exp. — STATE OF CALIFORNIA

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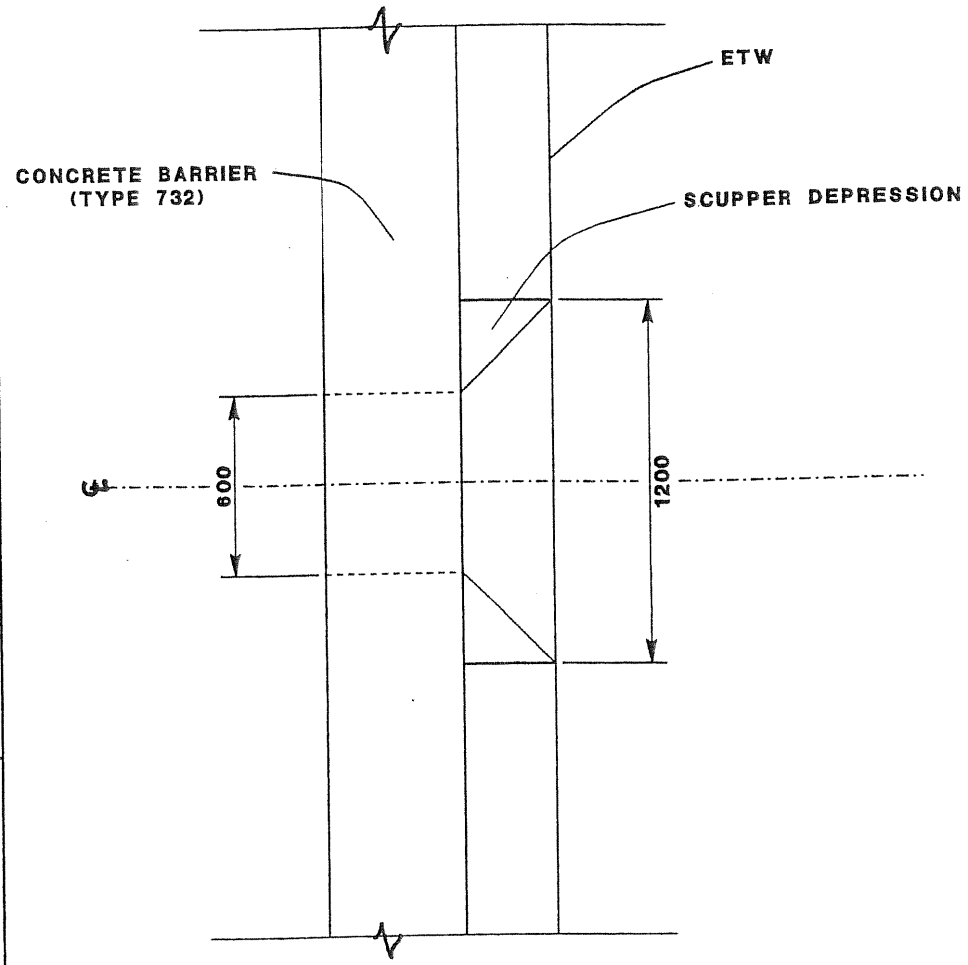
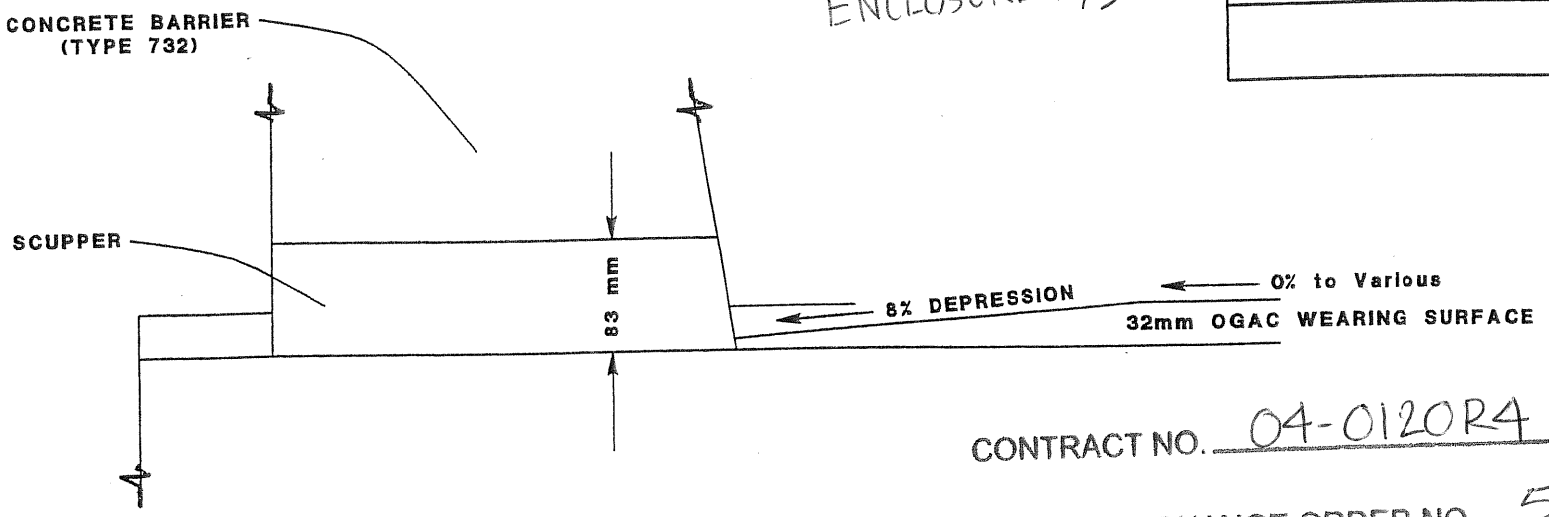
Caltrans now has a web site! To get to the web site, go to: http://www.dot.ca.gov

ENCLOSURE 2/3

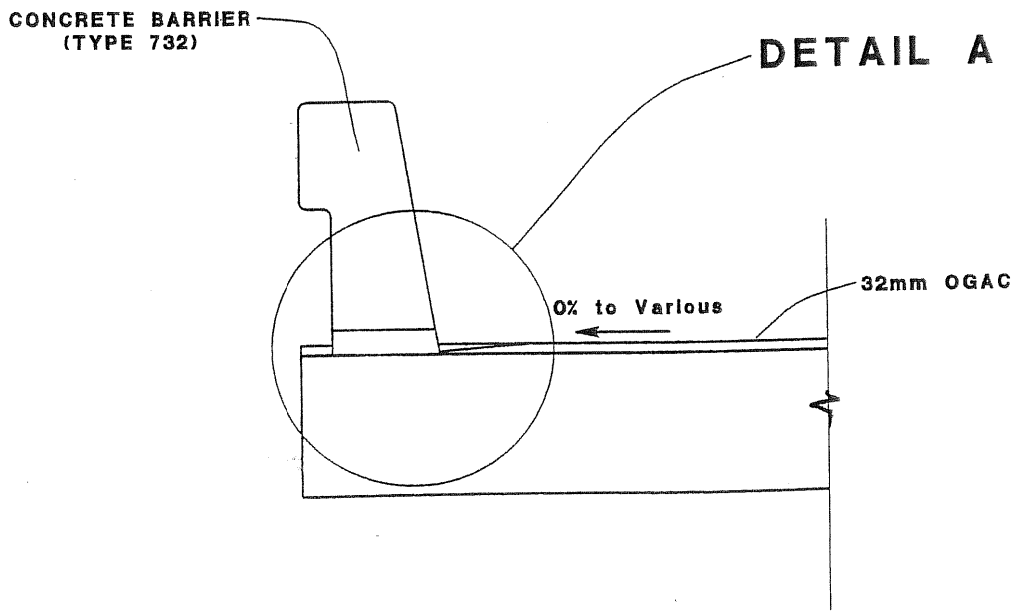


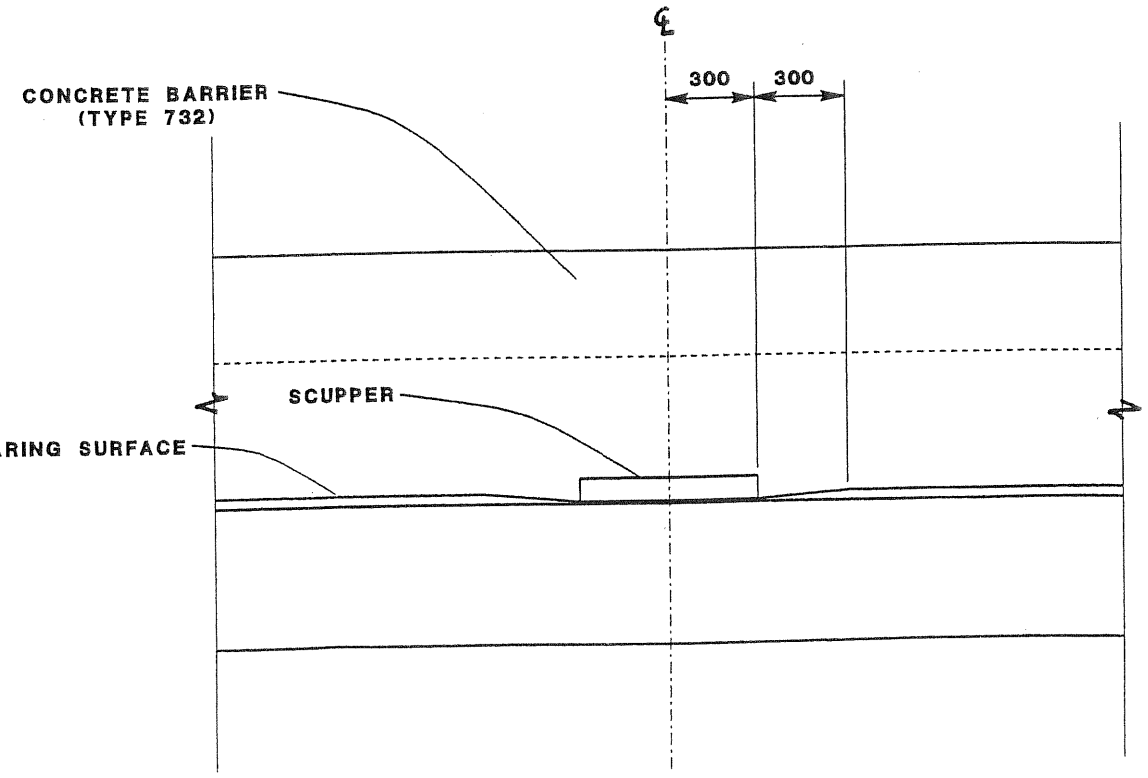


DETAIL A

CONTRACT NO. 04-0120R4

CONTRACT CHANGE ORDER NO. 54





REGISTERED PROFESSIONAL ENGINEER — TRINH T. LAI — C 63630 — EXP 9/30/06 — CIVIL — STATE OF CALIFORNIA

CONSTRUCTION DETAILS
RETAINING WALL SCUPPERS

NO SCALE

ALL DIMENSIONS ARE IN
MILLIMETERS UNLESS OTHERWISE SHOWN

DATE	REVISED BY	DATE REVISED

CALCULATED/DESIGNED BY

CHECKED BY

DESIGN OVERSIGHT

T. T. LAI

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

Caltrans

04	SF	80	12.6/13.2		

Metric

ROY A. IMBSEN
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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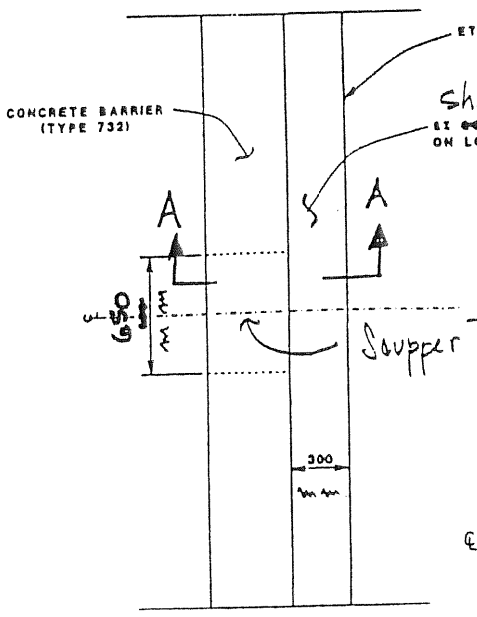
REGISTERED PROFESSIONAL ENGINEER
ROY A. IMBSEN
No. No. 16133
Exp. 06-30-07
CIVIL
STATE OF CALIFORNIA

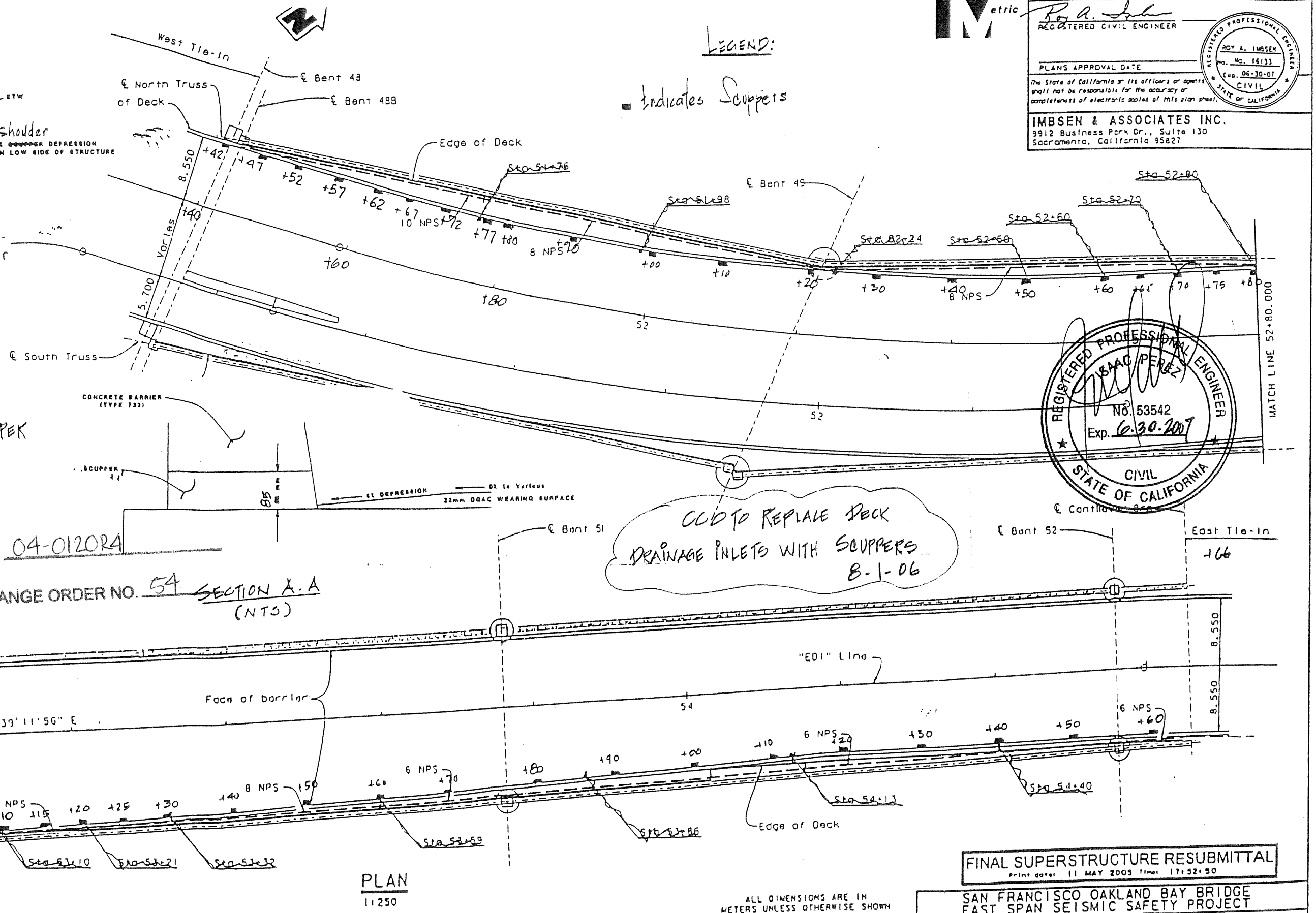
IMBSEN & ASSOCIATES INC.
9912 Business Park Dr., Suite 130
Sacramento, California 95827

LEGEND:

■ Indicates Scuppers



CONCRETE BARRIER SCUPPER PLAN (NTS)



CONTRACT NO. 04-0120R4

CONTRACT CHANGE ORDER NO. 54

SECTION A-A (NTS)

PLAN
1:250

CCO TO REPLACE DECK DRAINAGE INLETS WITH SCUPPERS 8-1-06

REGISTERED PROFESSIONAL ENGINEER
ISAAC PEREZ
No. 53542
Exp. 6.30.2007
CIVIL
STATE OF CALIFORNIA

FINAL SUPERSTRUCTURE RESUBMITTAL
Print date: 11 MAY 2005 time: 17:52:50

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

SAN FRANCISCO OAKLAND BAY BRIDGE
EAST SPAN SEISMIC SAFETY PROJECT

VIADUCT

DECK DRAINAGE LAYOUT - EASTBOUND

DESIGN	J. GOMEZ	CHECKED	J. HOLMAN
DETAILS	J. VALENTINE	CHECKED	L. SCHMIT
QUANTITIES	C.C. MYERS	CHECKED	C.C. MYERS

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

ROY A. IMBSEN
PROJECT MANAGER

CU
EA 0120R4

BRIDGE NO.	34-0006 (TEMP)
POST MILE	12.6

SHEET 102 OF 108

04	SF	80	12.6/13.2		

Caltrans Metric

ROY A. IMBSEN
REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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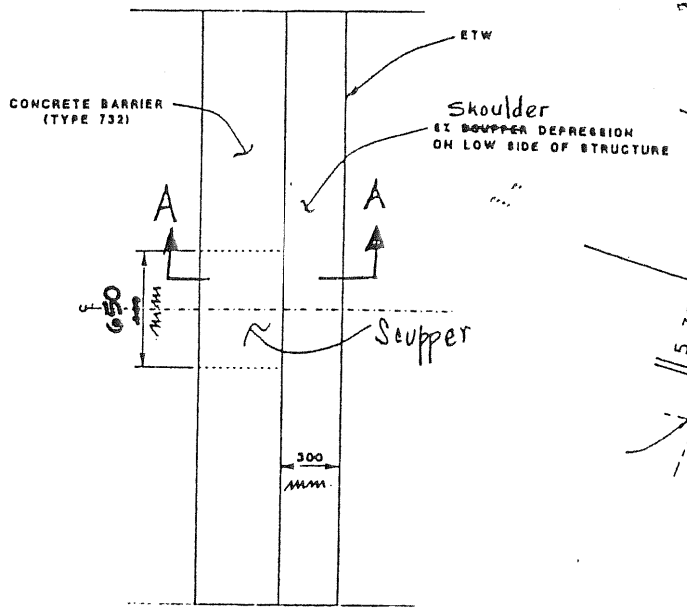
REGISTERED PROFESSIONAL ENGINEERS — ROY A. IMBSEN — No. No. 16133 — Exp. 06-30-07 — CIVIL — STATE OF CALIFORNIA

IMBSEN & ASSOCIATES INC.
9912 Business Park Dr., Suite 130
Sacramento, California 95827

LEGEND:

■ INDICATES SCUPPERS



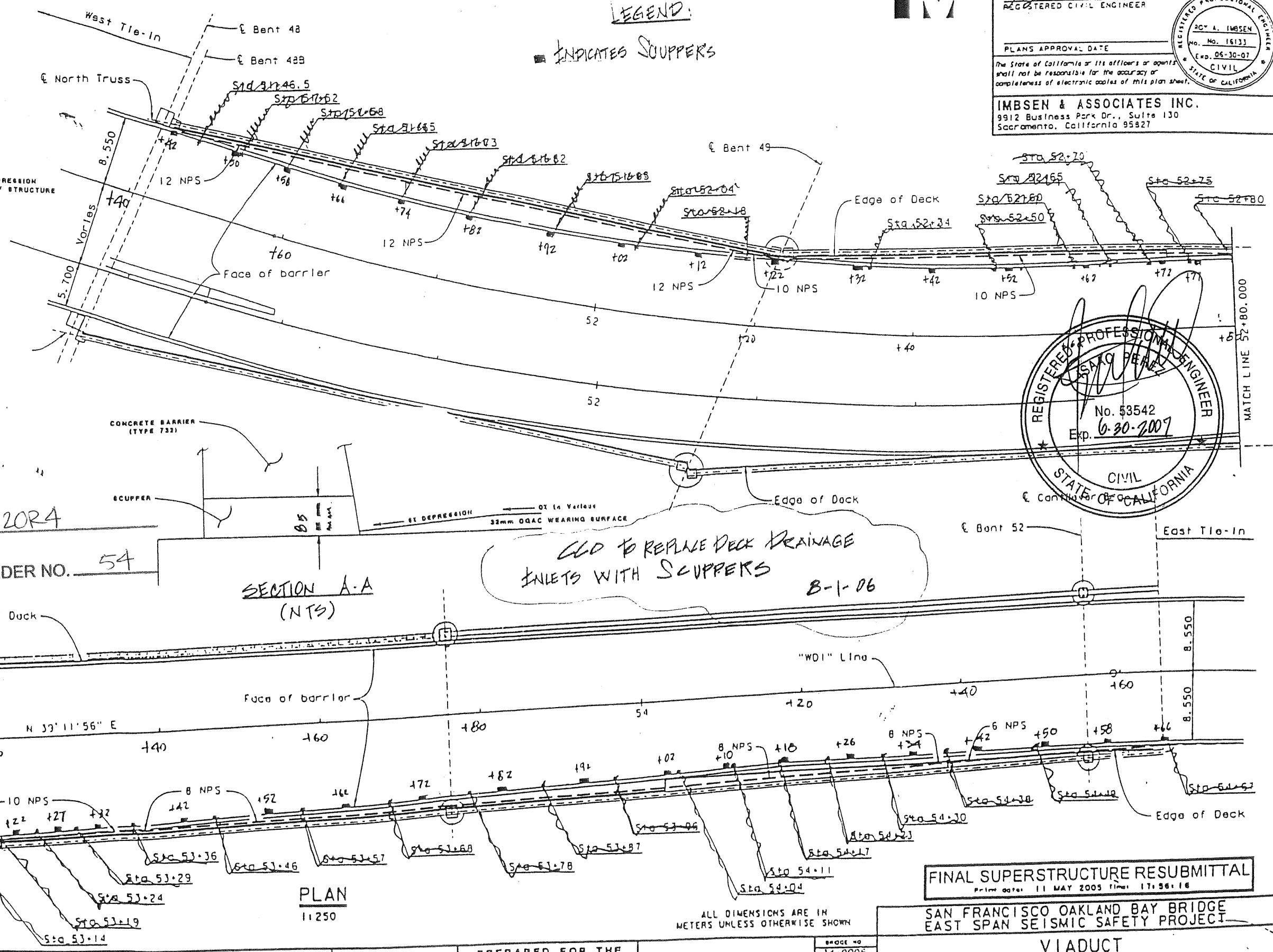
CONCRETE BARRIER SCUPPER.
PLAN
(NTS)

CONTRACT NO. 04-0120R4

CONTRACT CHANGE ORDER NO. 54

SECTION A-A
(NTS)

CCO TO REPLACE DECK DRAINAGE INLETS WITH SCUPPERS 8-1-06



PLAN
1:250

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

REGISTERED PROFESSIONAL ENGINEER — ROY A. IMBSEN — No. 53542 — Exp. 6-30-2007 — CIVIL — STATE OF CALIFORNIA

FINAL SUPERSTRUCTURE RESUBMITTAL
Print date: 11 MAY 2006 time: 17:56:16

SAN FRANCISCO OAKLAND BAY BRIDGE
EAST SPAN SEISMIC SAFETY PROJECT

VIADUCT

DECK DRAINAGE LAYOUT - WESTBOUND

DESIGN	J. GOMEZ	CHECKED	J. HOLMAN
DETAILED	R. CARTER	CHECKED	L. SCHMIDT
QUANTITIES	C.C. MYERS	CHECKED	C.C. MYERS

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

ROY A. IMBSEN
PROJECT MANAGER

CU
EA 0120R4

BRIDGE NO. 34-0006 (TEMP)
ALIGNMENT POST 12.6

SHEET 107 OF 108

DESIGN EXCEPTION

SIGN OFF DATE

PLOT DATE: 1 MAY 2006 17:56:16 — M:\Projects\Structures\Viaduct\Deck Drainage\D0107.dgn

ENCLOSURE 3/3

Temporary Bypass Structure – Deck Drainage Design

The Construction and Project Development Offices requested the Hydraulics Branch to provide the Deck Drainage design for the Temporary Bypass Structure (TBS). It was agreed that the TBS drainage should be designed utilizing the most hydraulically efficient and less complex system. Non-standard geometrics, one-foot shoulders, 10.5 feet lane widths, were some of the constraints encountered in designing a drainage system taking into account hydraulics capacity, traffic safety, structural integrity and maintenance. All these factors were evaluated and it was concluded that the design should only consider Scuppers. Scuppers are openings in the concrete barrier through which water can flow from the bridge deck.

Design criteria

- Storm Design Frequency and Design Spread. - Considering that this is a temporary structure that will be utilized for approximately five years, it was determined that a 10-year design frequency should be appropriate. The spread of water should be kept within the proposed one-foot shoulder; thus, proper scupper spacing should be determined to prevent risks associated with water in traffic lanes. However, in certain segments of the structure where the cross slope approaches to zero (superelevation reversals), the spread of water will infringe into the traffic lanes. At these locations the depth of water on the roadway can be considered insignificant; nevertheless a traffic management measure should be ready for implementation in the event that the spread of water on the roadway becomes unsafe to motorists.
- Speed of traffic. - Traffic speed was a concern presented to the Traffic Branch, and they agreed that a mandatory traffic speed of 45 MPH would be posted at the approach of the TBS. Hydroplaning is a function of speeds greater than 45 MPH, water depth and condition of the pavement surface.
- Pavement Surface. - The Hydraulics Branch also requested that the Materials Branch should be contacted to recommend a pavement surface that would reduce the hydroplaning potential on the TBS. The use of open graded AC has been shown to greatly reduce the hydroplaning potential of the roadway surface; this reduction is due to the ability of the water to be forced through the pavement under the tire.
- Use of Scuppers. - When scuppers are used to release water into the air, care must be taken that no erosion or damage occurs underneath. Water should never be discharged onto an embankment surface that lacks erosion protection. In locations where the free fall exceeds about 25 feet, the natural air movement will disperse the water enough not to erode the ground surface.

The attached memo shows the proposed deck drainage design for the TBS. This design was based on the above-mentioned **"Design Criteria",** and was presented to the Project Development and Construction Offices.