STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
OFFICE ENGINEER, MS 43
1727 30TH STREET
SACRAMENTO, CA 95816
P.O. BOX 168041
SACRAMENTO, CA 95816-8041
PHONE (916) 227-6300
FAX (916) 227-6151
TTY (916) 227-8454

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DEC 3 1 2003
CC MYERS, INC.
JOB 215 TEMP BYPASS STRUCTURE
IC-0011
215-103

cc: CCM

Flex your power!
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FACSIMILE (916) 635-9370

December 31, 2003

Mr. C.C. Myers
C.C. Myers, Inc.
P.O. Box 2948
Rancho Cordova, CA 95741

04-0120R4
04-SF-80-12.3/13.2
B.O. 12/02/03

Dear Mr. Myers,

On December 22, 2003, the Department's Pre-Award Qualifications Review Committee met with your company and your subcontractors to review your responses to the Pre-Award Information/Questionnaire submitted with your bid for this project.

Based on your responses to the questions posed at the meeting, your previous written responses to the Pre-Award Information/Questionnaire, and your additional responses dated December 17, 2003, the Department's Committee made a recommendation that C.C. Myers, Inc., be found to be qualified to perform the work on this project. The Chief Engineer adopted this finding on December 30, 2003.

The Department will proceed to award this project to C.C. Myers, Inc., when all applicable requirements have been met.

If you have any questions, please call Don Scheel at (916) 227-6221.

Sincerely,

Donald R. Scheel
for JOHN C. McMILLAN
Deputy Division Chief
Office Engineer

DIVISION OF OFFICE ENGINEER
ENGINEERING SERVICE CENTER
1727 30TH STREET -- MS 43
SACRAMENTO CA 95816

Caltrans

DATE 12-31-03

FAX NUMBER (916) 227-6151 ••••• CALNET 8 498-6151

FACSIMILE TRANSMITTAL FORM

DISTRICT OR HEADQUARTERS

DISTRICT: ______

FROM: Geneva Levin

OFFICE: ______

OFFICE: Office Engineer

ATTENTION: ______

PHONE: 916-227-6226

FAX NUMBER: ______

NO. OF PAGES (WITH COVER) 2

COMPANY: C. C. Myers, Inc.

ATTENTION: George Delano

OFFICE: ______

FAX NUMBER: 916-635-~~[illegible]~~ 8961

NO. OF PAGES (WITH COVER) 2

NOTES:

B. Cooper

CC MYERS INC.

FAX TRANSMISSION COVER SHEET

Date: December 31, 2003

To: Roy Imbsen

Company: Imbsen and Associates

Fax: 916-366-1501

Sender: George Delano

Re: TBS award

YOU SHOULD RECEIVE _2_ PAGE(S), INCLUDING THIS COVER SHEET. IF YOU DO NOT RECEIVE ALL THE PAGE(S), PLEASE CALL (916) 635-9370.

Pre-award info has been accepted. Award should proceed after good faith effort paperwork is reviewed by the feds, per Office Engineer.

• 3286 Fitzgerald Road • Rancho Cordova, Ca 95742 • 916-635-9370 • Fax 916-635-8961

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company
9912 Business Park Drive, Suite 130
Sacramento, CA 95827
(916) 366-0632 FAX (916) 366-1501

LETTER OF TRANSMITTAL

(2)

TO: C.C.Myers, Inc.
P.O. Box 2948
3286 Fitzgerald Road
Rancho Cordova, CA 95742

DATE: January 16, 2004	**IMBSEN JOB NO.:** 1295
ATTENTION: Mr. George Delano, P.E.	
RE: East Tie-in Preliminary Design Submittal	

WE ARE SENDING YOU ☒ **Attached** ☐ **Under separate cover via _____ the following items:**

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of Letter ☐ Change order ☐

COPIES	DATE	NO.	DESCRIPTION
6	1/16/2004		Design Information Package
20	1/16/2004		11x17 Plans
2	1/16/2004		CD-ROM with Electronic Plan Files
20	1/16/2004		Draft Supplemental Technical Special Provisions
2	1/16/2004		CD-ROM with Draft Supplemental Technical Special Provisions

THESE ITEMS ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐
☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS:

We are providing the Preliminary Design Submittal for the East Tie-in. One copy of the design information package, 10 sets of plans and 10 sets of specifications are for your use. The rest of the items should be submitted to Caltrans in accordance with Design Submittal Process in Section 5-1.14 of the Contract Specifications.

cc: File 1295.520.01

SIGNED ______________________

Dr. Roy Imbsen
Project Manager

TransmitEastTieinPrelimDesSubmittaltoCCM011604.doc *If enclosures are not as noted, kindly notify us at once.*

③

SOUTH/SOUTH DETOUR PROJECT 1293

DESIGN MEETING MINUTES

Location:	Caltrans 1801 30th Street Sacramento, CA 95816	Date: Time:	March 01, 2004 2:00 PM 3:30 PM

Minutes Prepared By: Roy A. Imbsen, Imbsen & Associates, Inc.

Attendees List: Peter Siegenthaler, Thomas Ostrom, Amer Bata, Dan Himick, Bob Coupe and Roy Imbsen

Purpose:

Explore the possibility of beginning the communications with Caltrans prior to award and to discuss issues not clearly covered in the TBS Notice to Contractors.

In an effort to expedite the above-mentioned project following the Contract award, a meeting was arranged to plan post award work arrangements so the Project could get off to a running start. Following the introductions and description of individual project responsibilities it was generally agreed that this would be a fast track project which would require effective communications. Additionally, it was recognized that the design would be the primary activity at the beginning of the project which would be best be carried out here in Sacramento. The Project Manager, Peter Siegenthaler, the Area Construction Manager, Amer Beta and the Resident Engineer Ken Loncharich are all located at Pier 7 in Oakland. Structure Representative, John Walter is at the Beale Street office in San Francisco. Occasionally, meetings would be held in the Bay Area, particularly for issues dealing with the site or with construction.

Tom Ostrom will be responsible for the Design Submittal Review. Tom explained that his review would focus on complying with the Site Specific Design Criteria for the TBS and ensuring public safety. He also added that if there were concerns, their review would be more in depth. He will be assisted by the Caltrans staff as needed. Lead Engineers will be assigned to each of the three sections. Dan Adams is one of the three Lead Engineers. We attempted to ask Tom some specific questions regarding the project, which he deferred until the award. He did however agree to entertain questions, which were more global, dealing with more general topics. Roy asked about the request of SGT to substitute the Chinese welding steel for the ASTM material A709M GR345. Tom agreed to look into the matter and advise us accordingly. A copy of SGT's suggested changes was given to Tom.

We also attempted to get some questions answered on the specifics for which were deferred until after the award date. Amer advised us that the Quality Control Plan did not have a schedule as required in the notice of contractors.

(Note: Subsequent review of the Bid Submittal indicates that both a Q/C Review Schedule, Attachment 1 and a Submittal Schedule, Attachment 3 were included with the Quality Control Plan.)

Tom Ostrom also advised us that Caltrans had started a review of our design and have formulated some questions on the East Tie-In. He expressed their concern on the use of the existing structure and the care required to jack and shift loads from the existing bridge to the new structure. He redirected that this would require careful planning and monitoring.

Following a explanation of delays on the current Bay Bridge project by Peter it was decided that a direct communication path between Caltrans structures and Imbsen with other indicated parties being advised through meeting agendas and notes would be the most desirable and expedite for this project. Assuming an award date of March 12, 2004 it was tentatively planned to meet on Tuesday, March 16, 2004 at Imbsen at 10:00 AM. Meetings will be held regularly at 10:00 AM on Tuesdays and Fridays at Imbsen. The schedule and meeting place will be adjusted on an as-need basis.

The agenda for the first meeting will a presentation of the Design Criteria by Caltrans followed by a question and answer session. Following this, CCM/IAI will brief Caltrans on the proposed design changes to the design requirements as presented in the Notice to Contractors. Caltrans will advise on their acceptance of our proposed changes.

Respectfully Submitted,

Roy A. Imbsen

OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
333 BURMA ROAD
OAKLAND, CA 94607-1015
IONE (510) 622-5660
AX (510) 286-0550

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MAR 1 1 2004

CC MYERS, INC.
JOB 215 TEMP BYPASS STRUCTURE
IC-#00118
215-IC3
IMBSEN

March 11, 2004
Contract No. 04-0120R4
04-SF-80-12.6/13.2
SL# 3

Mr. Robert W. Coupe
C. C. MYERS, INC.
3286 Fitzgerald Road
Rancho Cordova, CA 95742

RE: 215-SUB.00003-0
Subject: Preliminary Design Submittal for East Tie-In

Dear Mr. Coupe:

The Department has determined the above referenced project's Preliminary Design Submittal for the East Tie-In plan is incomplete, and is therefore not accepted. See the attached checklist for details pertaining to the completeness of the submittal.

Section 5-1.14 "Contractor Design" of the Special Provisions requires the Preliminary Design Submittals to be submitted after the apprvoal of the QC/QA plan. This section also requires the Preliminary Design submittal be submitted by complete element of each segment of the Temporary Bypass Structure (TBS). Your submital combines preliminary designs for the substructure, superstructure and foundation, which is considered three submittals.

Please address the comments contained in this letter and re-submit the submittals in conformance of Section 5-1.14 of the Special Provisions after approval of the QC/QA plan. If you have any questions, please contact me at (510) 622-5660.

Sincerely,

Kenneth Loncharich
Resident Engineer

Attachments

cc: File 5.03, 58.03

CHECKLIST FOR ACCEPTANCE OF THE PRELIMINARY DESIGN SUBMITTAL FOR THE EAST TIE-IN

NOTE: This checklist is intended to verify the minimum contents as required in Section 5-1.14 of the Special Provisions. Additional information may be required as determined by the Engineer to properly evaluate the submittal.

Comments: The submittal is incomplete and cannot be accepted for review.

PRELIMINARY DESIGN INFORMATION PACKAGE		
Item	Accept?	Comments
1. Describe any modifications to or deviations from the information submitted with the proposal drawing submittal.	YES	
2. Expected expansion joint movements.	YES	
3. Preliminary loading and linear elastic response spectra force and displacement results (i.e. axial, moment, shear) on all primary components due to design loads conforming to the design criteria shown on the plans.	NO	See Comments
4. Preliminary Inelastic static pushover results showing deformation capacity of all ductile primary members at the displacement limit state (DLS) displacements.	YES	
5. Preliminary Foundation Report	~~YES~~ NO	See Comments

DRAFT SUPPLEMENTAL TECHNICAL SPECIAL PROVISIONS		
Item	Foundation	Comments
6. Non-standard supplemental technical special provisions, and the engineering basis supporting the need for and content of each non-standard supplemental technical special provisions	NO	See Comments
7. Use and edit the most current versions of the Department's Standard Special Provisions and Bridge Reference Specifications. Provide engineering basis supporting the omission of relevant specifications.	NO	See Comments

CHECKLIST FOR ACCEPTANCE OF THE PRELIMINARY DESIGN SUBMITTAL

Segment: East Tie-in **Element:** All

Detailed Preliminary Design Drawings		
Item	Accept?	Comments
8. General Plans	YES	
9. Structure Plans	YES	
10. Abutment cross-sections	N/A	
11. Foundation Plans	YES	
12. Pier (i.e. tower/bent/column) cross-sections	YES	
13. Foundation Detail Plans	YES	
14. Typical Sections	YES	
15. Girder layouts or framing plans	YES	
16. Expansion joint details	NO	
17. Bearing details	NO	
18. Structural joint and connection details	YES	
19. Contain a drawing index with drawing numbers and drawing titles.	YES	
20. Be in metric units	YES	
21. Comply with the following manuals of the Department: Plan Preparation Manual, BDA, BDD, MTD, and Information and Procedures Guide of the Office if Special Funded Projects.	YES	
22. Be clearly marked "NOT FOR CONSTRUCTION"	YES	
23. Show the arrangement and material type and size of each structural member to demonstrate load paths from the superstructure to the ground through the substructure and foundation	NO	See Comments
24. Be of sufficient detail to (a) define the TBS elements in plan and elevation, including deck drainage and overhead and bridge mounted signs, (b) define the mounting details for electrical and mechanical systems (c) demonstrate conformance to the requirements of the contract documents.	NO	See Comments
25. Contain preliminary utility relocation plans identifying relocation of impacted utilities within boundary of the construction based on new potholing performed by the Contractor. Contractor may require additional potholing to verify impacted utilities as approved by the Engineer.	NO	Missing information related to utility relocation

Comments:

Item #3
Clarify "What is the controlling Load Group" for each component and " What are the "P, M, and V" that were used to size and detail the components.

Item #5
The only support locations are Bent 53L (Spread Footing W/ Tie Down Anchors) and Bent 53R (Pile Cap W/ 600 mm CIDH Concrete Piles). The "modifications to proposal drawings", foundation report, and the plan sheets give conflicting information for the Spread Footing Data Table and the Pile Data Table.

Items #6 and #7
The technical specifications shall be compiled in accordance with the P, S, and E guide. All modifications to the package (additions, omissions, and revisions) are considered non-standard supplemental technical special provisions. The engineering basis supporting the need for each non-standard supplemental technical special is required to be submitted for review.

Item #23
Explain in detail the load path from the existing truss into the new box beams and into Pier E1.

Item #24b
Missing mounting details for electrical and mechanical systems.

Item #24c
The contract envisioned a "move out – move in" at the East Tie-In, and the design criteria Items #9 "Temporary Stabilization of Spans YB4 & YB3", #10 "Move out Span YB4 Operation", and # 11 "Move in East Tie-In Operations" present a criteria for stabilizing and monitoring the existing structure. If the contractor proposes to modify the exist truss instead of the envisioned "Move out – Move in", he needs to submit his criteria for stabilizing and monitoring the existing truss.

333 Burma Road
Oakland, CA 94607

Caltrans

Fax

To:	Bob Coupe	**From:**	Kenneth Loncharich
Fax:	(916) 635-8961	**Pages:**	5
Phone:	(916) 635-9370	**Date:**	03/11/04
Re:	SL#3, 215-SUB.00003-0	**CC:**	

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☒ **Please Reply** ☐ **Please Recycle**

• **Comments:**

C

C.C. MYERS, INC.

P.O. Box 2948
Rancho Cordova, CA 95741

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FAX (916) 635-1527

LETTER OF TRANSMITTAL

Document No.: 215-TRN.00013	
Date: 03/12/2004	**Job No.:** 215
Attention: Dr. Roy Imbsen	
RE: 04-0120R4	
San Francisco Oakland Bay Bridge	
Temporary Bypass Structure	

To: **Imbsen & Associates, Inc.**
9912 Business Park Drive, Suite 130
Sacramento CA 95827

We are sending you: [X] Attached [ ] Under Separate Cover Via ____ The Followings Items;

[ ] Shop Drawings [ ] Change Order [ ] Specifications
[X] Copy of Letter [ ] Plans [ ] Other
[ ] Prints [ ] Samples

Copies	Item	Date	Description
1	1	3/12/2004	State Letter #3: Preliminary Design Submittal for East Tie-In

These Are Transmitted As Checked Below:

[ ] For Approval [ ] Approved as submitted [ ] Resubmit ___ Copies for approval
[X] For Your Use [ ] Approved as Noted [ ] Submit ___ Copies for distribution
[ ] As Requested [ ] Returned for Corrections [ ] Return ___ Corrected prints
[ ] For Review & Comment [ ] Other

Remarks:

Signed: RWC
Robert W. Coupe
Project Manager

y To: MO

File: 215-201

FILE COPY

5

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc. 9912 Business Park Drive Suite 130 Sacramento, CA 95827	Date: Time:	March 16, 2004 10:00 a.m.- 3:30 p.m.

Minutes Prepared By: Lance A. Schrey, Imbsen & Associates, Inc.

Attendees List: See Attachment 1

Purpose

The purpose was to have all parties working on the project to meet and set up a system to communicate with each other.

It is not the intent of these meeting minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees
Attachment 2 – Agenda

Distribution List

Dan Adams Caltrans (to distribute to Caltrans)
J. Ronning DCCI (to distribute to DCCI)
IAI Attendees
IAI File 1295.310.01

Meeting Notes

The following is a summary of pertinent issues, that were addressed at the meeting:

- Tom said that Caltrans has 3 teams set up to review the three different segments of the project. He said Dan would manage the QA team.

- Dan went over what he felt were the important parts of the criteria in Sections 1-4:

  - Section 1: He discussed important and ordinary structures.
  - Section 2: The loading criteria placed on the plans was used, since the falsework loading was deemed not adequate.
  - Section 3: He said due to the temporary nature of the structure the need for epoxy coated reinforcement was removed and the amount of cycles used for fatigue was reduced.
  - Section 4:
    - 4.1: Elastic response for the DEE event, remain stable under DLS.
    - 4.3: Capacity protected elements and P-Delta effect.
    - 4.4: No time history required
    - 4.7: Fuses to be in the bearings or the plastic hinges
    - 4.8: Expected properties
    - 4.9: Deformation from SDC
    - 4.10: High strength bolts
    - 4.11: Seismic detailing
    - 4.12: Design seismic loading

- Tom said a peer review team was set up for all of the Bay Bridge structures and they felt it was important to take into account vertical acceleration and for the floor beams to remain elastic. He said that to develop an ARS curve a return period of 92 years (appropriate for a five year life) was used (he said this was similar to the functional level earthquake for the other of the Bay Bridge projects). Therefore the DEE for the TBS would be similar to the FEE of the permanent structure.

- Tom discussed Design Criteria No. 6 sheet: He said Note 1, 50 mm cut of the existing columns, was removed because it was felt that it was not needed to capacity protect the existing floor beams.

- Tom discussed Design Criteria No. 7 sheet:

    - He said that 3 frames for the West Tie-In need to be looked at.
    - He said that when the existing structure from Bent 48 to the east is removed, the remaining structure will rely on Support Structures “A”, ”C” and “D” for support.
    - He said that the existing substructure is expected to fail in the seismic event and the SSL’s are to act as a “catcher” system.
    - 4.2 (g):
        - He feels IAI’s scheme will have problems meeting this section of the criteria.
        - Caltrans has concerns that the existing prestressing in the transverse beams may only be partially bonded.
        - The allowance for vertical support for Structure Support Location “D” was removed in Addendum # 5.
        - Caltrans envisions moving Westbound traffic back first, followed 6-9 months later by the Eastbound traffic, then remove the TBS.

- Tom discussed Design Criteria No. 8 sheet: He said that a great deal of geotechnical information has been provided and Caltrans would have to see if more information would be required.

- Tom discussed Design Criteria No. 9:

    - Caltrans feels the floor beam connection is the weak link.
        - Caltrans doesn’t want other forces attracted to the floor beams.
        - Concern with the columns peeling apart.
    - 8.2.1: Dead load table stiffness of new supports only and all mass to arrive at fundamental period.
    - 8.2.2: Caltrans wants the timber blocking so the structure does not see a jolt
    - 8.6.3: Monitoring - Caltrans has concerns that the ducts are not fully grouted, which could cause problems when the south girder is peeled apart. They want to verify the status of the bonding of the existing prestresssing steel. Deflection control system important at South Edge Girder.
    - 8.7.2: Caltrans wants to see more detail on the jacking system @ SSL “A”, “B” and “C”.
    - 8.9: Concern for deflection control.

- Tom discussed the south edge girder: The intent was to get one girder to work for the bypass and the final condition. Caltrans could not get one girder to work for both conditions.

- Tom said they are treating the Viaduct like a new bridge since it does not touch the existing structure.

- Tom discussed the East Tie-In:

    - He said modifying the existing structure puts the State more at risk then the roll-in/roll-out would.
    - He said a lot of criteria was developed for the West Tie-In, but not for the East Tie-In since they were anticipating a roll-in/roll-out scheme. He felt Caltrans would need to work with the Contractor to come up with a performance based criteria for the proposed East Tie-In Segment.
    - He said from their review to date, Caltrans has concerns that there may be a lack of redundancy
    - Since the Contractor wants to use the existing structure, Caltrans wants the contractor to verify the soundness of the existing rivets and any section loss due to rust of the existing members.

- Roy brought up concerns with the wind loading controlling the bearing design at Bent 48. Tom said they would look into it.

- Bob asked about an RFI process to answer questions. Nothing was decided.

- Caltrans has electronic files (DGN) of the contract plans. Ken will get these and forward to Bob.

- Caltrans will get back to the Contractor on how to incorporate Design Plans with Contract Plans.

- It was determined to have meetings at Imbsen's office Tuesday and Friday mornings at 9:00 am. Dan volunteered to come up with an agenda for the meetings.

- For Friday's meeting Caltrans will provide a list of where the design deviates from the Design Criteria.

- Caltrans review comments for the QA/QC Plan Submittal were reviewed and the following revisions will be made:
    - The identification for the submittals will be the date.
    - The schedule will be included in the QA/QC plan.
    - A copy of the stamps which are being placed on the plans will be added to the QA/QC plan.

- Reference to the State as the client or co-client will be removed.
- It will be noted that CC Myers will provide the quantities.

- Caltrans review comments for the West Tie-In Segment were reviewed and the following revisions will be made:
  - Caltrans would like special provisions associated with all of the items of work to be pulled and then noted why they are not being used. Ed said he would place the date in the footer of all pages.
  - Caltrans would like free body diagrams for the primary components for the controlling load cases to see the load path.
  - Todd will check into the plans not matching the Preliminary Foundation Report pertaining to tie-downs at some of the bents.
  - IAI will add detail for joint seal at the top of the beam.
  - More detail needs to be provided for the bearings. Todd said he is planning on using neoprene strip at the abutment.
  - Todd will look into a break in the South Edge Girder between Bent 43B and Bent 44.
  - Tom said the period called out in the Contract Plans refers to a cracked model.
  - IAI needs to provide utility information.

- Caltrans review comments for the Structure Support Locations were reviewed and the following revisions will be made:
  - Caltrans would like free body diagrams for the primary components for the controlling load cases to see the load path.
  - Push over analysis will be provided.
  - Caltrans would like special provisions associated with all of the items of work to be pulled and then noted why they are not being used.
  - How to adjust the structure using jacking will be shown.
  - All of the items for #23 and #24 will be addressed.

- Caltrans review comments for the East Tie-In Segment were reviewed and the following revisions will be made:
  - Caltrans would like free body diagrams for the primary components for the controlling load cases to see the load path.
  - Caltrans would like special provisions associated with all of the items of work to be pulled and then noted why they are not being used.
  - More detail will be provided for the bearings and the joint seals.
  - Caltrans wants to work with the contractor to come up with a criteria for the East Tie-In.

ATTACHMENT 1
Temporary Bypass Structure
Meeting with
CALTRANS AND C.C. MYER'S TEAM

Name	Organization	E-mail	Phone No.
1. KEN LONCHARICH	CALTRANS	KLONCHAR@DOT.CA.GOV	(510)622-5660
2. BOB COUPE	C.C. MYERS INC	BCOUPE@CCMYERS.COM	916-635-9370
3. Lance Schrey	IAI	schrey@imbsen.com	366-0632
4. ED "JACK" GREEBER	DCCI	EDGJACKZ@VERIZON	5036387052
5. Jim Ronning	DCCI	jimronning@msn.com	952 4706399
6. Ghassan Dini	IAI	gdini@imbsen.com	366-0632
7. RON PAZ	DCCI	rpaz@DAWINS CONSTRUCTION.COM	415-561-3321
8. DAN ADAMS	CALTRANS	dan_t_adams@dot.ca.gov	(916) 227-8358
9. [illegible]	CALTRANS	TOM_[illegible]	(916) 227-41[illegible]
10. PETER SIEGENTHALER	CALTRANS	peter_siegenthaler@dot.ca.gov	(510) 622-5112
11. Amer Bata	"	amer_bata@dot.ca.gov	(510) 622-5110
12. Roy A. Imbsen	IAI	raimbsen@imbsen.com	(916)366-0632
13. MAJID SARRAF	IAI	msarraf@imbsen.com	(916)360-0632 #52
14. TODD LAMBERT	IAI	tlambert@imbsen.com	916-366-0632
15. JOHN F. WALTERS	CALTRANS OSC	john_f_walters@dot.ca.gov	(415) 356-6634
16.			
17.			
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19.			
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ATTACHMENT 2

BAY BRIDGE TEMPORARY BYPASS

SOUTH SOUTH DETOUR
PROJECT KICKOFF MEETING AGENDA
Tuesday March 16, 2004

10:00 a.m.	Meeting Begin

Location:

Imbsen & Assoc. Inc.
9912 Business Park Drive Suite 130
Sacramento CA 95827

Agenda:

- Introductions
- Proposed meeting schedule
- Conformed set of Plans and Special Provisions
  - Electronic set of plans
  - How we are going to incorporate contract plans with new plans
- Establish procedures for asking Technical Questions
- QC/QA Plan Submittal
  - Submittal Tracking
  - Remove reference to Caltrans as the client or co-client
- Deviations from Caltrans Criteria
- Preliminary Design Submittal for the East Tie-In
  - Preliminary submittal: By segment vs. by element
  - Technical Specifications
  - Design Drawing Comments
- Preliminary Design Submittal for the West Tie-In
  - Preliminary submittal: By segment vs. by element
  - Technical Specifications
  - Design Drawing Comments
  - Structure Support Location A, C and D

Temporary Bypass Structure
Meeting with
CALTRANS AND C.C. MYER'S TEAM

Name	Organization	E-mail	Phone No.
1. KEN LONCHARICH	CALTRANS	KLONCHAR@DOT.CA.GOV	(510)622-5660
2. BOB COUPE	CC MYERS INC	BCOUPE@CCMYERS.com	916-635-9370
3. Lance Schrey	IAI	schreye@imbsen.com	366-0632
4. ED "JACK" GIEZER	DCCI	EDGJACKZ@VERIZON	503 638 7052
5. Jim Ronning	DCCI	jimronning@msn.com	952 470 6399
6. Ghassan Dini	IAI	gdini@imbsen.com	366-0632
7. RON PAZ	DCCI	rpaz@DANNYSCONSTRUCTION.COM	415-561-332
8. DAN ADAMS	CALTRANS	dan_l_adams@dot.ca.gov	(916) 227-8358
9. Tom Ostrom	CALTRANS	Tom_Ostrom	(916) 227-4119
10. PETER SIEGENTHALER	CALTRANS	Peter_Siegenthaler @dot.ca.gov	(510) 622-5112
11. Amer Bata	"	amer_bata@dot.ca.gov	(510) 622-5110
12. Roy A. Imbsen	IAI	raimbsen@imbsen.com	(916)366-0632
13. MAJID SARRAF	IAI	msarraf@imbsen.com	(916)366-0632 x52
14. TODD LAMBERT	IAI	tlambert@imbsen.com	916-366-0632
15. JOHN F. WALTERS	CALTRANS OSC	john_f_walters@dot.ca.gov	(916) 356-6634
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Comments by Dan Adams
3-25-04

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc. 9912 Business Park Drive Suite 130 Sacramento, CA 95827	Date: Time:	March 16, 2004 10:00 a.m.- 3:30 p.m.

DRAFT

Minutes Prepared By: Lance A. Schrey, Imbsen & Associates, Inc.

Attendees List: See Attachment 1

Purpose

The purpose was to have all parties working on the project to meet and set up a system to communicate with each other.

Attachments

Attachment 1 – Attendees
Attachment 2 – Agenda

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
IAI Attendees	
IAI File 1295.310.01	

DISCLAIMER

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

- Tom said that Caltrans has 3 teams set up to review the three different segments of the project. He said Dan would manage the QA team.

- Dan went over what he felt were the important parts of the criteria in Sections 1-4:

    - Section 1: He discussed important and ordinary structures.
    - Section 2: The loading criteria placed on the plans was used, since the falsework loading was deemed not adequate.
    - Section 3: He said due to the temporary nature of the structure the need for epoxy coated reinforcement was removed and the amount of cycles used for fatigue was reduced.
    - Section 4:
        - 4.1: Elastic response for the DEE event, remain stable under DLS.
        - 4.3: Capacity protected elements and P-Delta effect.
        - 4.4: No time history required
        - 4.7: Fuses to be in the bearings or the plastic hinges
        - 4.8: Expected properties
        - 4.9: Deformation from SDC
        - 4.10: High strength bolts
        - 4.11: Seismic detailing
        - 4.12: Design seismic loading

- Tom said a ~~pier~~ peer review team was set up for all of the Bay Bridge structures and they felt it was important to take into account vertical acceleration and for the floor beams to remain elastic. He said that to develop an ARS curve a return period of 5 years was used (he said this was the functional level for the other of the Bay Bridge projects). ∴ the DEE = FEE

  Appropriate for A L 5 yr.

  Similar to ... SR

  DETOUR PERM.

- Tom discussed Design Criteria No. 6 sheet: He said Note 1, 50 mm cut of the existing columns, was removed because it was felt that it was not needed to capacity protect the existing floor beams.

- Tom discussed Design Criteria No. 7 sheet:

    - He said that 3 frames for the West Tie-In need to be looked at.

- He said that when the existing structure from Bent 48 to the east is removed, the remaining structure will rely on Support Structures "A", "C" and "D" for support.
- He said that the existing substructure is expected to fail in the seismic event. [illegible] "Catcher" system
- 4.2 (g):
  - He feels IAI's scheme will have problems meeting this section of the criteria.
  - Caltrans has concerns that the existing prestressing in the transverse beams ~~is no longer or~~ only partially bonded.
  - [illegible] ~~He said originally~~ Structure Support Location "D" was for ~~vertical loads and lateral loads and that IAI's design still shows it this way.~~ [illegible]
  - Caltrans envisions moving Westbound traffic back first, followed 6-9 months later by the Eastbound traffic, then remove the TBS.

- Tom discussed Design Criteria No. 8 sheet: He said that a great deal of geotechnical information has been provided and Caltrans would have to see if more information would be required.

- Tom discussed Design Criteria No. 9:

REPLACE "They" w/ CALTRANS

- They feel the floor beam connection is the weak link.
  - They don't want other forces attracted to the floor beams.
  - Concern with the columns pealing apart.
- 8.2.1: Dead load table stiffness of new supports only and all mass to arrive at fundamental period. [illegible] criteria
- 8.2.2: They want timber blocking so the structure does not see a jolt
- 8.6.3: Monitoring - They have concern that the ducts are not fully grouted, which could cause problems when the south girder is pealed apart. They want to verify the status of the bonding of the existing prestresssing steel. Deflection control system important at South Edge Girder.
- 8.7.2: They want to see more detail on the jacking system @ SSL "A", "B" and "C".
- 8.9: Concern for deflection control.

- Tom discussed the south edge girder: The intent was to get one girder to work for the bypass and the final condition. Caltrans could not get one girder to work for both conditions.

- Tom said they are treating the Viaduct like a new bridge since it does not touch the existing structure.

- Tom discussed the East Tie-In:
  - He said modifying the existing structure puts the state more at risk then the roll-in/roll-out would.
  - He said a lot of criteria was developed for the West Tie-In, but not for the East Tie-In since they were anticipating a roll-in/roll-out scheme. He felt Caltrans would need to work with the Contractor to come up with a performance based criteria for the proposed East Tie-In Segment.
  - He said from their review to date, Caltrans has concerns that there may be a lack of redundancy
  - the Contractor
  - Since the Contractor wants to use the existing structure Caltrans wants to verify the soundness of the existing rivets and any section loss due to rust of the existing members.

- Roy brought up concerns with the wind loading controlling the bearing design at Bent 48. Tom said they would look into it.

- Bob asked about an RFI process to answer questions. Nothing was decided.

- Caltrans has electronic files (DGN) of the contract plans. Ken will get these and forward to Bob.

- Caltrans will get back to the Contractor on how to incorporate Design Plans with Contract Plans.

- It was determined to have meetings at Imbsen's office Tuesday and Friday mornings at 9:00 am. Dan volunteered to come up with an agenda for the meetings.

- For Fridays meeting Caltrans will provide a list of where the design deviates from the Design Criteria.

- Caltrans review comments for the QA/QC Plan Submittal were reviewed and the following revisions will be made:
  - The identification for the submittals will be the date.
  - The schedule will be included in the QA/QC plan.
  - A copy of the stamps which are being placed on the plans will be added to the QA/QC plan.
  - Reference to the State as the client or co-client will be removed.
  - It will be noted that CC Myers will provide the quantities.

- Caltrans review comments for the West Tie-In Segment were reviewed and the following revisions will be made:
  - Caltrans would like special provisions associated with all of the items of work to be pulled and then noted why they are not being used. Ed said he would place the date in the footer of all pages.
  - Caltrans would like free body diagrams for the primary components for the controlling load cases to see the load path.
  - Todd will check into the plans not matching the Preliminary Foundation Report pertaining to tie-downs at some of the bents.
  - IAI will add detail for joint seal at the top of the beam.
  - More detail needs to be provided for the bearings. Todd said he is planning on using neoprene strip at the abutment.
  - Todd will look into a break in the South Edge Girder between Bent 43B and Bent 44.
  - Tom said the period called out in the Contract Plans refers to a cracked model.
  - IAI needs to provide utility information.

- Caltrans review comments for the Structure Support Locations were reviewed and the following revisions will be made:
  - Caltrans would like free body diagrams for the primary components for the controlling load cases to see the load path.
  - Push over analysis will be provided.
  - Caltrans would like special provisions associated with all of the items of work to be pulled and then noted why they are not being used.
  - How to adjust the structure using jacking will be shown.
  - All of the items for #23 and #24 will be addressed.

- Caltrans review comments for the East Tie-In Segment were reviewed and the following revisions will be made:
  - Caltrans would like free body diagrams for the primary components for the controlling load cases to see the load path.
  - Caltrans would like special provisions associated with all of the items of work to be pulled and then noted why they are not being used.
  - More detail will be provided for the bearings and the joint seals.
  - Caltrans wants to work with the contractor to come up with a criteria for the East Tie-In.

ATTACHMENT 1
Temporary Bypass Structure
Meeting with
CALTRANS AND C.C. MYER'S TEAM

Name	Organization	E-mail	Phone No.
1. KEN LONCHARICH	CALTRANS	KLONCHAR@DOT.CA.GOV	(510)622-5660
2. BOB COUPE	C.C. MYERS INC	BCOUPE@CCMYERS.com	916-635-9370
3. Lance Schrey	IAI	schreye imbsen.com	366-0632
4. E.D. "JACK" GREER	DCCI	EDGJACKZ@VERIZON	5036387052
5. Jim Ronning	DCCI	jimronning@msn.com	952 4706399
6. Ghassam Dini	IAI	gdini@Imbsen.com	366-0632
7. RON PAZ	DCCI	rpaz@DANNYS CONSTRUCTION.COM	415-561-3321
8. DAN ADAMS	CALTRANS	dan_t_adams@dot.ca.gov	(916) 227-8358
9. Tom Osman	CALTRANS	TOM_OSMAN	(916) 227-4119
10. PETER SIEGENTHALER	CALTRANS	Peter_Siegenthaler@dot.ca.gov	(510) 622-5112
11. Amer Bata	"	amer_bata@dot.ca.gov	(510) 622-5110
12. Roy A. Imbsen	IAI	raimbsen@imbsen.com	(916)366-0632
13. MAJID SARRAF	IAI	msarraf@imbsen.com	(916)360-0632 x52
14. TODD LAMBERT	IAI	tlambert@imbsen.com	916-366-0632
15. JOHN F. WALTERS	CALTRANS OSC	john_f_walters@dot.ca.gov	(415) 356-6634
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ATTACHMENT 2

BAY BRIDGE TEMPORARY BYPASS

SOUTH SOUTH DETOUR
PROJECT KICKOFF MEETING AGENDA
Tuesday March 16, 2004

10:00 a.m.	Meeting Begin

Location:

Imbsen & Assoc. Inc.
9912 Business Park Drive Suite 130
Sacramento CA 95827

Agenda:

- Introductions
- Proposed meeting schedule
- Conformed set of Plans and Special Provisions
    - Electronic set of plans
    - How we are going to incorporate contract plans with new plans
- Establish procedures for asking Technical Questions
- QC/QA Plan Submittal
    - Submittal Tracking
    - Remove reference to Caltrans as the client or co-client
- Deviations from Caltrans Criteria
- Preliminary Design Submittal for the East Tie-In
    - Preliminary submittal: By segment vs. by element
    - Technical Specifications
    - Design Drawing Comments
- Preliminary Design Submittal for the West Tie-In
    - Preliminary submittal: By segment vs. by element
    - Technical Specifications
    - Design Drawing Comments
    - Structure Support Location A, C and D

DRAFT

6

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc.	Date:	March 26, 2004
	9912 Business Park Drive Suite 130 Sacramento, CA 95827	Time:	9:00 a.m.- 12:00 p.m.

Minutes Prepared By: Lance A. Schrey and Majid Sarraf of Imbsen & Associates, Inc. (IAI)

Attendees List: See Attachment 1

Purpose

The purpose was to begin technical discussions.

It is not the intent of these minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees
Attachment 2 – Agenda (prepared by IAI)

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
B. Coupe	CC Myers
IAI Attendees	
IAI File 1295.310.01	

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

1. Past meeting minutes from meeting on 3-16-2004 were discussed. Caltrans wanted several changes and a disclaimer added that the intent of the minutes are not to change the contract.

2. IAI to receive comments from Caltrans on meeting minutes from meeting on 3-19-2004 by the end of the day.

3. Request for Information (RFI) memo's were handed out (#1-#5 with #2 being void):

    a. RFI #4: IAI can go look at all submitted proposals (Kris Kuhl 227-6280), but Ken was going to look into getting IAI a copy of the proposals.
    b. RFI #1: Caltrans will look into this.
    c. RFI#5: Dan said the intent of the Criteria was to make sure the new design delivers less force than the existing to Bent E1.
        i. Tom read criteria 5.2.
        ii. Roy said under the current criteria that they would impact.
        iii. Caltrans to look into this issue.
    d. RFI#3: Roy said that IAI tried to comply with criteria.
        i. Tom brought up criteria, which states no deck joints in the Viaduct.
        ii. Caltrans to look into this issue.

4. Trinh brought up locations of potential conflict with the future ramp foundations. Caltrans to look into foundations at Bent 48.

5. To get electronic plans IAI needs to sign Confidentiality Agreement. Roy and Bob expressed concern with numbers 6,7 and 8 in the agreement. Tom said that this was the standard form. Lance said the form was for people to get As-built for various reasons and it should not apply to CC Myers or IAI since they are working on a contract for the state. Tom said the he and Ken would discuss and get back to us.

6. CC Myers should receive the comments on the Viaduct by next Tuesday at the latest.
    a. Dan said the comments were similar to those made for the other segments and that they would like to see Structure Plans.

7. East Tie-In technical discussion:
    a. Randy asked about the jacks taking lateral loads and how he would like to see details for the final configuration. Majid pointed out the details on the plans where small wide flange beam will be placed next to the jacks. This will be placed after jacking to provide for permanent longitudinal and

transverse shear transfer after the truss members are removed. Majid said every floor beam will have a wide flange beam.

b. Tom would like to see the time frame when the jacking will take place. He would also like to start developing the criteria. Majid said this process was intended be completed in a month to allow sufficient time for gradual removal and careful monitoring. Bob added that his schedule allows for a shorter time frame (4-7 days).
c. Caltrans would like to see the redistribution of forces in other members when each member is cut. Majid said no significant redistribution is expected as the loads removed correspond to the dead loads, and the additional live load imposed is expected to be carried by the jacks once they are locked off.
d. Randy asked if the jacks were to remain in place. Majid said the jacks will remain in place during the demolition process and the placing of the new deck to allow for possible adjustment of the deck elevations.
e. Tom asked how workers were to gain access for jacking on the lower south chords. Majid said a platform can be attached to the soffit of the lower box girder.
f. Tom expressed concern for fatigue. Majid said that the existing truss floor beam connections were not designed as moment connections. The load path for the new connection to the verticals will be maintained as a flexible connection.
g. Ali expressed concern with the stability of the C-bent. He said if Caltrans was designing this it would be fixed, while IAI's proposed design is acting like a prop. Majid explained that the new system is a moment resisting frame in the plane of the C-Bent. The moment resisting frame in the longitudinal direction has moment connections to the column at pier E1, and moment connections at the Hinge. The option of providing fixity to Bent #53 was explored in the past, but it did not appear to provide much improvement in behavior, while complicating the construction significantly by embedding the steel into the concrete section.
h. Randy said that they were not sure the existing deck is acting compositely. Majid said that the existing joists will not be removed, and through new stringers in the upper roadway the diaphragm action of the deck will be maintained.
i. Ali asked about the redundancy of the support wall. Majid said that the detail shown in the plans is in error that the connection should not be eccentric, and the detail will be corrected.
j. Caltrans commented that there is no detail for the northern most longitudinal beam. Majid showed in the details that the existing wind bracing would remain in place and be connected to the top of the North box beam.

FILE COPY ⑦

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc.	Date:	April 2, 2004
	9912 Business Park Drive Suite 130 Sacramento, CA 95827	Time:	2:00 p.m.- 4:00 p.m.

Minutes Prepared By: Lance A. Schrey of Imbsen & Associates, Inc.

Attendees List: See Attachment 1

Purpose

The purpose was to have all parties working on the project to meet, continue to set up a system to communicate with each other and begin asking technical questions.

It is not the intent of these meeting minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees
Attachment 2 – Agenda (prepared by IAI)
Attachment 3 – Pier E1 calculations (file copy only)

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
B. Coupe	CC Myers
IAI Attendees	
IAI File 1295.310.01	

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

1. Ken has As-builts for profile of 150 mm forced sewer main. Lance asked what clearance would be required to the pipe.

2. The drilling for the new borings (except for the boring on the slope) has been reschedule for the week of the 19th. The boring on the slope is still schedule for the week of the 12th.

3. RFI #4: To get a copy of all the proposal submittals IAI needs to make a written request. IAI can call Kris Kuhl to go and make copies.

4. RFI #3 (regarding the articulation at Bent 48B):

    a. Caltrans thinks 5% is low for friction.
    b. Tom said you need to look at the bearing and column stiffness combined. He was thinking that a load limiting devise would be utilized.
    c. Caltrans is asking for a bearing to respond elastically for loading Combination Groups I through VII (DEE), in addition the bearings shall be evaluated for stability with the displacements associated with Loading Combination Group VII (DLS). Roy does not agree with Tom's interpretation of the Design Criteria for load limiting devices.
    d. Tom wants a structure, which will deform uniformly, without being fixed at the abutment. Roy said this would require an elastic bearing. Roy said he would provide displacements.
    e. Dan said he would like to see a comparison of stiffness with respect to Bent 49.

5. RFI #5: Dan said the retrofit had to stop at some location. It was decided to stop it at Pier E1.

6. RFI #7 (regarding the capacity of existing Pier E1):

    a. Caltrans has no plans to retrofit Pier E1.
    b. Roy said the cantilever truss to the East of Pier E1 is causing the problem.
    c. Tom sees it as two separate issues. The first is the effect on the joint and the second is the stability of Pier E1.
    d. Majid presented results for Pier E1 (handouts attached).

e. Dan said it is important that Pier E1 does not receive any more loads than it sees in the existing condition.
f. Tom understands that the support bars of the bearing will hit the structural member.
g. Tom suggests looking at 4.3.6 of the Design Criteria.

Attachment 2

MEETING ATTENDANCE SHEET

San Francisco – Oakland Bay Bridge
Temporary Bypass Structure

IAI Job # 1295 Contract # 04-0120R4

Date: 4-02-2004

Caltrans:

☐	Pete Siegenthaller	☒	Tom Ostrom	☐	Manode Kodsuntie
☐	Amer Bata	☒	Dan Adams	☐	Trinh Lia
☐	Ken Loncharich	☐	Ali Asnaashari	☐	Nizar Melehani
☐	John Walters	☐	Randy Bains	☒	Eric Watson

CC Myers:

- ☒ Bob Coupe
- ☐ Bill Kidwell

DCCI:

- ☐ Jim Ronning
- ☐ Jack Geer
- ☐ Ron Paz

Imbsen & Associates:

☒	Roy Imbsen	☐	Jonathan Reina
☒	Lance Schrey	☐	Ghassam Dini
☐	Dick LeBeau	☐	Sasan Soltani
☐	Ed Tyk	☒	Majid Saraf
☐	Todd Lambert	☐	

Others:

☐	☐

Note: The boxes checked above designate attendance at the meeting.

Attachment 2

BAY BRIDGE TEMPORARY BYPASS

SOUTH SOUTH DETOUR
PROJECT MEETING AGENDA
Friday April 2, 2004

2:00 p.m. Meeting Begin

Location:

Imbsen & Assoc. Inc.
9912 Business Park Drive Suite 130
Sacramento CA 95827

Agenda:

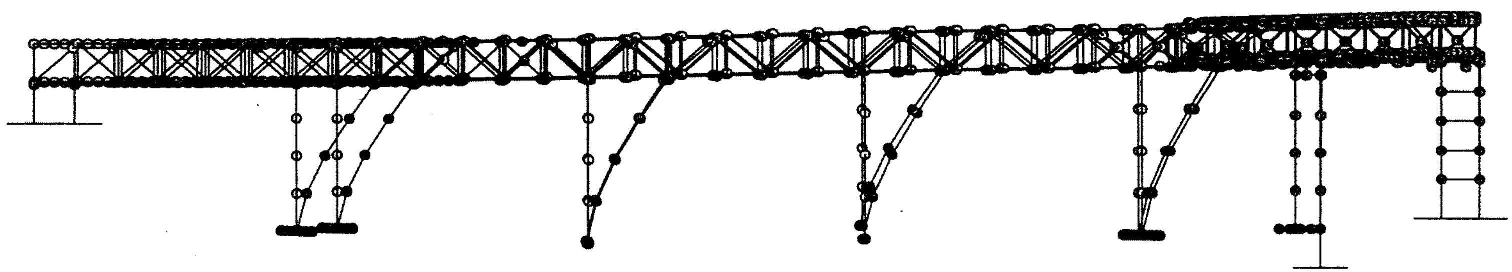
- Past meeting minutes
  - Meeting 3/23/04
- Conformed set of Plans and Special Provisions
  - Electronic set of plans
  - Confidentiality Agreement
- Request for Information Log
  - RFI # 1
  - RFI # 3
  - RFI # 4
  - RFI # 5
  - RFI # 6

East Tie-In/Viaduct Longitudinal Joint Displacement

		Modal Amplitude				
Mode #	Modal Force	U1	U2	U3	Modal Contribution	Disp.(in)
1	-1.444	15.923	-2.088	-0.010	72.7%	5.16
2	-0.066	1.443	11.904	-0.001	0.0%	0.00
3	1.456	-1.249	2.635	-0.026	1.1%	0.07
4	1.210	10.714	-5.911	0.001	25.1%	1.78
5	-1.042	-1.418	-2.444	0.024	0.6%	0.04
6	-0.177	-0.005	0.480	-0.033	0.0%	0.00
7	-0.930	0.599	1.158	-0.131	0.1%	0.01
8	0.292	-0.162	-0.119	0.087	0.0%	0.00
9	-0.245	-0.043	0.270	0.062	0.0%	0.00
10	0.459	-0.046	-0.168	0.251	0.0%	0.00
......	......	......	......	......	......	......
191	-0.221	0.001	-0.008	-0.002	0.0%	0.00
192	-0.583	0.067	-0.035	-0.002	0.0%	0.00
193	0.224	0.040	-0.021	-0.002	0.0%	0.00
194	-0.168	-0.032	0.047	-0.001	0.0%	0.00
195	0.028	0.011	-0.018	-0.003	0.0%	0.00
196	-0.247	-0.080	0.041	0.008	0.0%	0.00
197	0.023	0.001	-0.001	0.000	0.0%	0.00
198	-0.792	0.017	-0.012	-0.008	0.0%	0.00
199	0.135	0.002	0.003	0.001	0.0%	0.00
200	-0.087	-0.034	0.000	-0.004	0.0%	0.00
Sum	-7.043	23.629	4.861		100.0%	7.1

SAP2000

4/1/04 14:51:04



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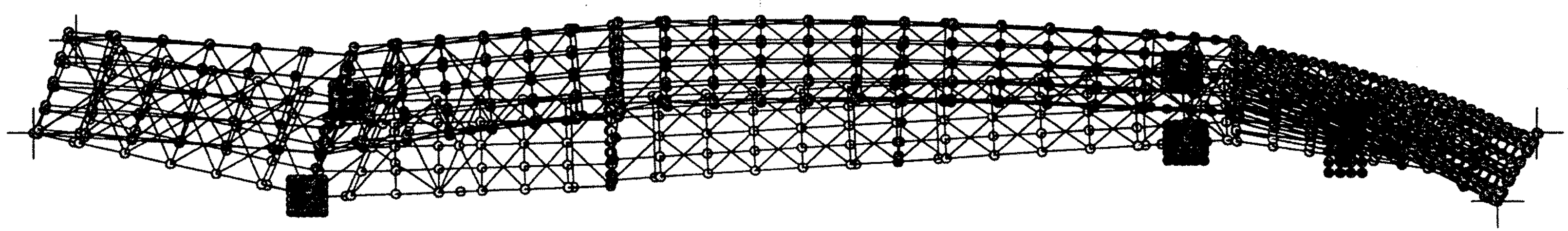

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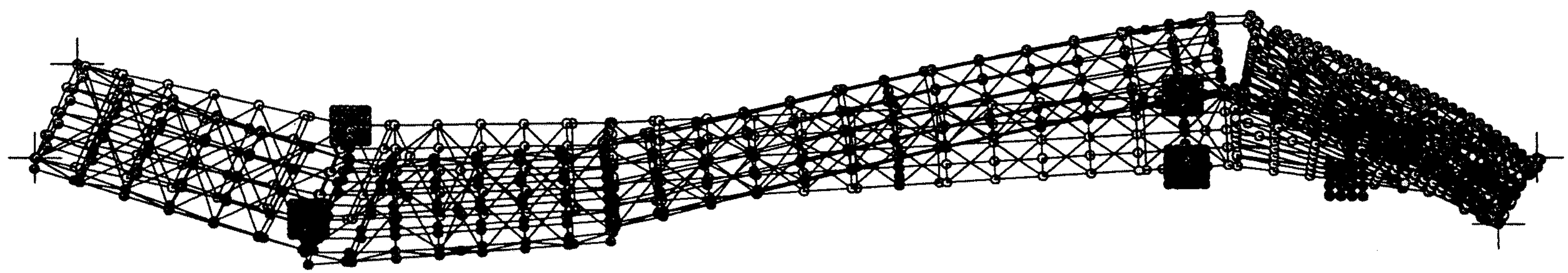

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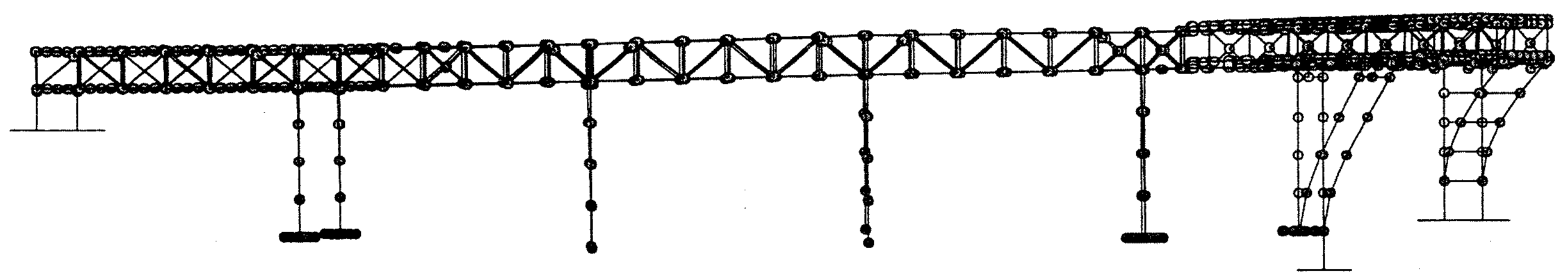

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Modal Mass Participation Ratios

MODE	PERIOD	INDIVID	UAL MODE (	PERCENT)	CUMULATI	VE SUM	(PERCENT)
		UX	UY	UZ	UX	UY	UZ
1	4.747698	29.0875	0.6345	0	29.0875	0.6345	0
2	4.160447	0.4053	34.9589	0	29.4928	35.5934	0
3	2.672246	0.4005	2.2612	0.0006	29.8933	37.8547	0.0007
4	1.822888	47.2823	18.2507	0	77.1756	56.1054	0.0007
5	1.683408	0.9062	3.4132	0.0009	78.0818	59.5185	0.0016
6	1.232719	0	0.1987	0.0026	78.0818	59.7172	0.0042
7	1.056046	0.3207	1.5171	0.0543	78.4025	61.2343	0.0585
8	0.875097	0.0319	0.0218	0.0325	78.4345	61.2561	0.0911
9	0.835298	0.0024	0.124	0.0184	78.4369	61.3801	0.1095
10	0.817705	0.0029	0.0499	0.3134	78.4398	61.43	0.4229
11	0.791219	0	0	0.0297	78.4399	61.43	0.4526
12	0.746329	0.0091	0.2563	0.0758	78.4489	61.6863	0.5284
13	0.692993	0.0041	0.02	7.5622	78.453	61.7064	8.0906
14	0.666046	0.0097	0.003	4.5771	78.4627	61.7093	12.6677
15	0.65922	0.0523	0.7022	0.0337	78.515	62.4115	12.7015
16	0.652641	0.0144	0.1677	0.5251	78.5295	62.5792	13.2265
17	0.644307	0.1406	0.171	0.1767	78.6701	62.7503	13.4032
18	0.634973	0.0607	0.5711	0.0299	78.7308	63.3214	13.4331
19	0.589063	0	0.0568	0.0016	78.7308	63.3782	13.4347
20	0.570241	0.0405	0.0121	0.7364	78.7713	63.3903	14.1711
21	0.546471	0.0044	0.0086	0.0141	78.7757	63.3989	14.1853
22	0.513624	0.3911	0.0011	5.3474	79.1668	63.4	19.5327
23	0.510614	0.0291	0.0001	1.3553	79.1959	63.4001	20.8879
24	0.499561	0	0.0005	0.0001	79.1959	63.4006	20.888
25	0.490777	0.0097	0.0658	3.5581	79.2056	63.4665	24.4461
26	0.482169	0.2728	0.0587	2.7039	79.4785	63.5251	27.15
27	0.468664	0.8193	0.1461	0.0007	80.2978	63.6712	27.1507
28	0.463502	0.0361	0.2255	0.266	80.3338	63.8967	27.4167
29	0.451725	0.2202	0.0023	0.1228	80.5541	63.899	27.5395
30	0.446042	0.0517	0.0743	0.0907	80.6057	63.9733	27.6303
31	0.443283	0.047	0.2078	0.0071	80.6527	64.1812	27.6373
32	0.442666	0.2735	0.066	0.0088	80.9261	64.2472	27.6461
33	0.434517	0.0238	0.5562	0.0862	80.9499	64.8034	27.7323
34	0.433728	0.0149	0.5923	0.0041	80.9648	65.3957	27.7364
35	0.43146	0.4314	0.0179	0.1569	81.3962	65.4136	27.8933
36	0.428153	0.0735	0.0001	0.4923	81.4697	65.4137	28.3857
37	0.411897	0.0021	0.6382	0.9395	81.4718	66.0519	29.3252
38	0.410135	0.1649	0.0504	1.2886	81.6367	66.1023	30.6138
39	0.408253	0.0006	0.2894	0.4157	81.6373	66.3917	31.0295
40	0.405467	0.1522	0.0484	0.0064	81.7895	66.4401	31.0359
41	0.403686	0.0356	0.5932	0.3904	81.8251	67.0333	31.4263
42	0.399052	0.0451	0.094	0.5439	81.8701	67.1273	31.9702
43	0.39847	0.0223	0.0423	0.2425	81.8925	67.1696	32.2127
44	0.394143	0.0005	0.1168	0.3285	81.8929	67.2864	32.5412
45	0.392319	0.0043	0.0002	0.0024	81.8972	67.2866	32.5436
46	0.388456	0.1579	0.0347	0.0714	82.0552	67.3213	32.615
47	0.387551	0.3011	0.0084	0.0396	82.3563	67.3297	32.6545
48	0.385084	0.2329	0.0032	0	82.5892	67.3329	32.6545
49	0.377507	0.1753	0.0007	0.3359	82.7645	67.3336	32.9904

50	0.374985	0.0029	0.0821	0.067	82.7673	67.4158	33.0574
51	0.372775	0	0.0063	0.0247	82.7673	67.4221	33.0821
52	0.371626	0.0034	0.0029	0.0025	82.7707	67.425	33.0846
53	0.369593	0.0079	0.0047	0.0131	82.7785	67.4297	33.0976
54	0.366532	0.0055	0.0109	0.0001	82.784	67.4407	33.0978
55	0.362356	0.0104	0.0076	0.0566	82.7944	67.4482	33.1544
56	0.361909	0.0029	0.0052	0.0058	82.7973	67.4535	33.1602
57	0.359492	0.0019	0.0004	0.1645	82.7993	67.4538	33.3246
58	0.358917	0.0031	0.0018	0.0043	82.8023	67.4556	33.329
59	0.357893	0.007	0.0002	0.0293	82.8093	67.4559	33.3582
60	0.355962	0.0067	0.0006	0.006	82.816	67.4565	33.3643
61	0.354345	0.0138	0.0088	0.0582	82.8298	67.4653	33.4225
62	0.352195	0	0.0003	0.0013	82.8298	67.4655	33.4238
63	0.348988	0.0007	0.0022	0.8676	82.8305	67.4677	34.2914
64	0.34284	0.0016	0.0352	0.0057	82.8321	67.5029	34.2971
65	0.342703	0.0073	0.2613	0.0678	82.8394	67.7642	34.3649
66	0.341978	0.0398	0.498	0.035	82.8792	68.2622	34.4
67	0.341754	0.001	0.0057	0.0031	82.8803	68.2679	34.403
68	0.339005	0.0093	0.376	0.0112	82.8896	68.6439	34.4143
69	0.337506	0	0.0005	0.0001	82.8896	68.6444	34.4143
70	0.335149	0.0001	0.0047	0.167	82.8897	68.6492	34.5813
71	0.333012	0.0033	0	0.019	82.893	68.6492	34.6002
72	0.331257	0	0.0001	0.3432	82.893	68.6493	34.9435
73	0.327878	0.0154	0.0001	0.0548	82.9084	68.6494	34.9983
74	0.326232	0.0003	0.0001	0.5102	82.9086	68.6495	35.5085
75	0.325319	0.0051	0.0001	1.5711	82.9138	68.6496	37.0797
76	0.322429	0.005	0.0007	0.0687	82.9188	68.6503	37.1483
77	0.320794	0.0063	0	0	82.9251	68.6503	37.1483
78	0.322121	0	0	0.0004	82.9251	68.6503	37.1487
79	0.315548	0.1036	0.001	0.0282	83.0288	68.6513	37.1769
80	0.311748	0.0004	0.0005	0.1421	83.0291	68.6518	37.3191
81	0.310086	0.0052	0.0007	0.0835	83.0343	68.6526	37.4026
82	0.309434	0	0.0023	0.1767	83.0344	68.6549	37.5793
83	0.308243	0	0.1447	0.0437	83.0344	68.7996	37.623
84	0.293524	0.0009	0.0001	0.0339	83.0353	68.7996	37.6569
85	0.293215	0.0012	0	0.0023	83.0365	68.7997	37.6592
86	0.28953	0.0612	0.0122	0	83.0977	68.8118	37.6593
87	0.28651	0.0077	0.0014	0.349	83.1054	68.8132	38.0083
88	0.286228	0.0003	0	0.0056	83.1057	68.8132	38.0138
89	0.2855	0.0001	0.0004	0.0842	83.1058	68.8137	38.0981
90	0.285155	0.0167	0.0075	0.7597	83.1224	68.8212	38.8577
91	0.28284	0.0488	0.0125	0.2023	83.1712	68.8337	39.06
92	0.281291	0.0211	0.0063	0.1086	83.1923	68.84	39.1686
93	0.279855	0.0023	0.0108	0.7825	83.1947	68.8508	39.9511
94	0.278727	0	0	0.0023	83.1947	68.8508	39.9534
95	0.276807	0	0.003	0.0005	83.1947	68.8538	39.9539
96	0.272996	0.0033	0.0767	0.2339	83.1979	68.9305	40.1879
97	0.272707	0.0006	0.0007	0.1992	83.1985	68.9311	40.3871
98	0.271091	0.022	0.0487	0.0661	83.2205	68.9798	40.4532
99	0.269875	0.0043	0.0174	0.3052	83.2248	68.9972	40.7584
100	0.267498	0.0046	0.0552	0.4425	83.2293	69.0524	41.2009
101	0.265514	0.0017	0.0118	0.2703	83.2311	69.0642	41.4712

102	0.261301	0.026	0.4645	0.0819	83.2571	69.5287	41.5531
103	0.259603	0.0084	0.2695	0.0302	83.2655	69.7982	41.5833
104	0.254676	0.0146	0.1659	0.007	83.28	69.964	41.5903
105	0.254049	0.016	0.1133	0.3161	83.296	70.0774	41.9064
106	0.250116	0.0001	0.0004	0.4561	83.2961	70.0778	42.3625
107	0.246065	0.0011	0.0001	0.0146	83.2972	70.0779	42.3771
108	0.245764	0.0002	0.0014	0.0402	83.2975	70.0793	42.4174
109	0.243282	0.3551	0.0572	0.1437	83.6526	70.1365	42.5611
110	0.242374	0.033	0.0008	0.2963	83.6856	70.1373	42.8574
111	0.238659	0.0905	0.0755	0.072	83.7761	70.2128	42.9293
112	0.238025	0.0221	0.0081	0.0628	83.7981	70.2209	42.9921
113	0.235354	0.0022	0.0029	0	83.8004	70.2238	42.9921
114	0.234107	0.0291	0.0177	0.143	83.8294	70.2415	43.1351
115	0.233798	0.0316	0.0969	0.0803	83.861	70.3384	43.2154
116	0.233432	0.0118	0.008	0.0011	83.8729	70.3465	43.2165
117	0.232111	0	0.0007	0.0128	83.8729	70.3472	43.2293
118	0.228358	0.2478	0.3435	0.0838	84.1207	70.6906	43.3131
119	0.226749	0.0458	0.0335	0.0465	84.1665	70.7241	43.3596
120	0.221288	0.0086	0.0034	0.0087	84.1752	70.7275	43.3683
121	0.218971	2.4505	10.9212	0.0485	86.6257	81.6487	43.4168
122	0.217562	0.0013	0.0015	0.0105	86.627	81.6502	43.4273
123	0.217184	0.35	2.1363	0.262	86.977	83.7865	43.6892
124	0.21491	0.0491	0.2973	0.0023	87.0261	84.0838	43.6915
125	0.214314	0.0007	0.0283	0.1563	87.0268	84.1122	43.8478
126	0.211498	0.2323	2.2739	0.0254	87.2591	86.3861	43.8732
127	0.208865	0.573	1.2032	0.0003	87.832	87.5893	43.8734
128	0.208418	0.0299	0.3297	0.0637	87.8619	87.919	43.9371
129	0.206245	0.0008	0.0002	0.0696	87.8628	87.9192	44.0067
130	0.206002	0.0683	0.0874	0.0301	87.9311	88.0067	44.0368
131	0.204698	0.2564	0	0.1146	88.1875	88.0067	44.1515
132	0.20286	0	0.1873	0.0027	88.1875	88.194	44.1542
133	0.198209	0.0055	0.0013	0.0109	88.193	88.1952	44.1651
134	0.197729	0.08	0.0016	0.1194	88.2729	88.1969	44.2845
135	0.197466	0.0024	0.0002	0.107	88.2753	88.1971	44.3915
136	0.197027	0.0363	0.0496	0.0173	88.3116	88.2467	44.4087
137	0.195086	0.3479	0.0046	0.0151	88.6595	88.2513	44.4238
138	0.194232	0.0273	0.0016	0.1141	88.6868	88.2529	44.5379
139	0.193268	0	0.0003	0.0094	88.6869	88.2532	44.5473
140	0.192034	0.0003	0.023	0.1518	88.6872	88.2763	44.699
141	0.191649	0.0008	0.0002	0.0374	88.688	88.2765	44.7364
142	0.190043	0.1386	0.0013	0.0009	88.8266	88.2778	44.7373
143	0.189759	0.0001	0.0132	0.0024	88.8267	88.291	44.7397
144	0.189689	0.1201	0.4249	0.0001	88.9469	88.716	44.7399
145	0.187208	0.4088	0.4339	0.0239	89.3557	89.1498	44.7638
146	0.184566	0.3111	0.3698	0.0047	89.6668	89.5196	44.7685
147	0.183585	0.0054	0	0.0114	89.6721	89.5197	44.7799
148	0.182729	0.0036	0	0.0064	89.6757	89.5197	44.7864
149	0.179964	0.0001	0.0012	0.0001	89.6757	89.5209	44.7865
150	0.177886	0.0103	0.0121	0.1123	89.6861	89.533	44.8988
151	0.177282	0	0	0	89.6861	89.533	44.8988
152	0.176713	0.0017	0.0025	0.0537	89.6878	89.5355	44.9525
153	0.175944	0.0144	0.0003	0	89.7022	89.5358	44.9525

154	0.17582	0.0509	0.004	0.0067	89.7531	89.5398	44.9591
155	0.173536	0.0026	0.0128	0.07	89.7557	89.5526	45.0292
156	0.172484	0.0027	0.0297	0.1879	89.7584	89.5823	45.2171
157	0.172097	0.0185	0.0013	0.0535	89.777	89.5836	45.2706
158	0.171222	0.0014	0.1052	0.0189	89.7783	89.6888	45.2894
159	0.169625	0.3086	0.097	0.0675	90.0869	89.7857	45.3569
160	0.168312	0.1623	0.2005	0.0735	90.2492	89.9862	45.4304
161	0.167874	0.2338	0.0173	0.1134	90.483	90.0035	45.5438
162	0.166422	0.239	0.0693	0.0134	90.722	90.0728	45.5573
163	0.164801	0.1731	0.0043	0.001	90.8951	90.0771	45.5583
164	0.164385	0.0245	0.0179	0.0646	90.9196	90.0951	45.6228
165	0.163131	0.0002	0.0089	0.0712	90.9198	90.104	45.694
166	0.162787	0.0132	0.0053	0.0141	90.933	90.1093	45.7081
167	0.161957	0.0061	0.0726	0.0329	90.9391	90.1818	45.741
168	0.161699	0.0015	0.0002	0.0198	90.9406	90.1821	45.7608
169	0.160883	0.0076	0.3688	0.0401	90.9481	90.5509	45.8009
170	0.160662	0.0272	0.1803	0.0364	90.9753	90.7312	45.8373
171	0.160192	0.4023	0.0101	0.0335	91.3776	90.7413	45.8708
172	0.158498	0.1046	0.0016	0.2721	91.4821	90.7429	46.143
173	0.156299	0.003	0.0007	0.1047	91.4851	90.7436	46.2477
174	0.155069	0.0073	0.0003	0.2244	91.4925	90.7439	46.472
175	0.15411	0.0058	0.0014	0.1351	91.4983	90.7453	46.6072
176	0.154039	0.0354	0.0567	0.0022	91.5337	90.8021	46.6093
177	0.153414	0.0126	0.0316	0.0062	91.5463	90.8337	46.6156
178	0.152972	0.0854	0.0802	0.0001	91.6316	90.9138	46.6156
179	0.150574	0.1389	0.0075	0.0035	91.7705	90.9214	46.6191
180	0.149715	0.0007	0.0051	0.0244	91.7711	90.9265	46.6435
181	0.149185	0.002	0.0122	0.0078	91.7732	90.9387	46.6513
182	0.14752	0.0088	0.0196	0.0087	91.782	90.9583	46.66
183	0.146745	0.0135	0.0016	1.2128	91.7954	90.9599	47.8728
184	0.14644	0.0116	0.0204	0.0142	91.807	90.9803	47.887
185	0.145377	0.0019	0.0826	0.0002	91.8089	91.0629	47.8872
186	0.143953	0.0062	0.0952	0.1104	91.8151	91.1581	47.9975
187	0.142878	0.2988	0.0636	0	92.1139	91.2218	47.9976
188	0.142215	0.0082	0.2536	0.0022	92.1221	91.4754	47.9997
189	0.141674	0.0049	0.0541	0.0052	92.127	91.5295	48.0049
190	0.140516	0.1709	0.0686	0.3139	92.298	91.5981	48.3188
191	0.139428	0.0003	0.0213	0.0044	92.2983	91.6194	48.3231
192	0.138914	1.0941	0.3759	0.0032	93.3924	91.9953	48.3264
193	0.13838	0.3988	0.1318	0.0039	93.7912	92.1271	48.3302
194	0.13804	0.248	0.6994	0.0007	94.0392	92.8265	48.331
195	0.137639	0.0306	0.099	0.0061	94.0698	92.9255	48.3371
196	0.137568	1.611	0.5475	0.0576	95.6808	93.473	48.3947
197	0.137154	0.0006	0.0001	0.0001	95.6814	93.4731	48.3948
198	0.136321	0.075	0.0451	0.0616	95.7563	93.5181	48.4564
199	0.135318	0.0009	0.0024	0.0009	95.7572	93.5206	48.4573
200	0.134365	0.3232	0	0.014	96.0804	93.5206	48.4713

Capacity check of Pier E1

1. Demand forces and bending moment at bottom of Pier E1

Table 1: Forces and bending moments at bottom of Pier E1 (either south or north side)

	DL	EQ1 = L+0.3(T+V)	EQ2 = T+0.3(L+V)	EQ3 = V+0.3(L+T)	DL+EQ1	DL+EQ2	DL+EQ3
P (kips)	-12300	10100	13900	5800	-2200	1600	-6500
QL (kips)	0	4500	3170	1800	4500	3170	1800
QT (kips)	0	2100	2830	1200	2100	2830	1200
ML (kip-ft)	0	424000	300000	172000	424000	300000	172000
MT (kip-ft)	0	60000	77200	33000	60000	77200	33000

In table 1, P is the axial force, minus means in compression and plus means in tension. The values under the load cases EQ1, EQ2 and EQ3 could be in tension and compression. QL and QT are the shear forces in longitudinal and transverse directions, respectively. ML and MT are the bending moments in longitudinal and transverse directions, respectively. The critical load case is DL+EQ1 shown in table 1, which has 2000 kips tension forces and has the largest bending moment (424,000 kip-ft) in longitudinal directions at the bottom of Pier E1.

2. Bending moment capacity at bottom of pier E1 based on section analysis

Section analysis was carried out using the program XTRACT. The material properties used in the section analysis are:

Yield stress of rebar: 36ksi
Failure strain of rebar: 9%
Concrete 28-day compression strength: 4ksi (unconfined concrete)
Tension strength of concrete: 0.4ksi
Failure strain of concrete: 0.5%

Because there is no sufficient transverse reinforcement, no confined concrete was considered in the section analysis.

Based on the forces and bending moment shown in table 1, the net axial force associated with the maximum bending moment in the load case of DL+EQ1 is 2000 kips compression. The section and moment curvature obtained from the XTRACT program output are shown in Figure 1 and 2. There are 336 longitudinal reinforcement bars with 1.25 X 1.25 inches square section. The total concrete section area is 924 square feet. The total reinforcement area is 3.642 square feet. Then the reinforcement ratio is only 0.39%.

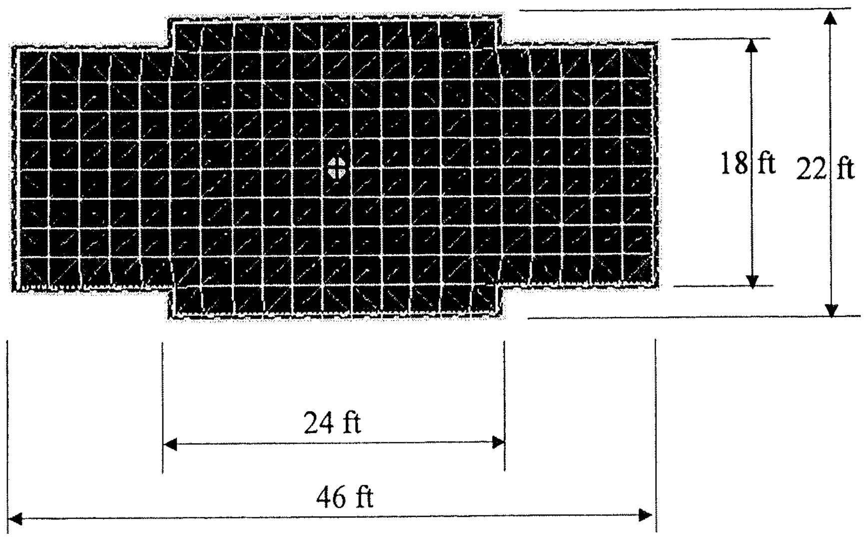

Figure 1: Section shape at bottom of Pier E1 (either south or north side)

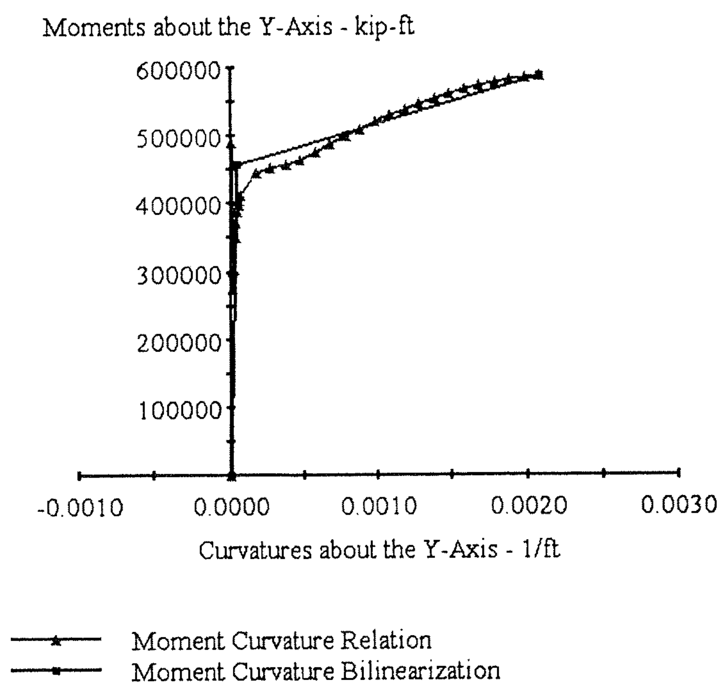

Figure 2: Bending moment vs. curvature at axial force 2000 kips

The bending moment capacity when the rebar begins to yield is 350,000 kip-ft. The nominal bending moment when maximum stress at extreme concrete fiber reaches rupture stress 475psi is 455,000 kip-ft.

XTRACT Analysis Report

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3/30/2004
Bay Bridge Baypass Structure
Pier E1
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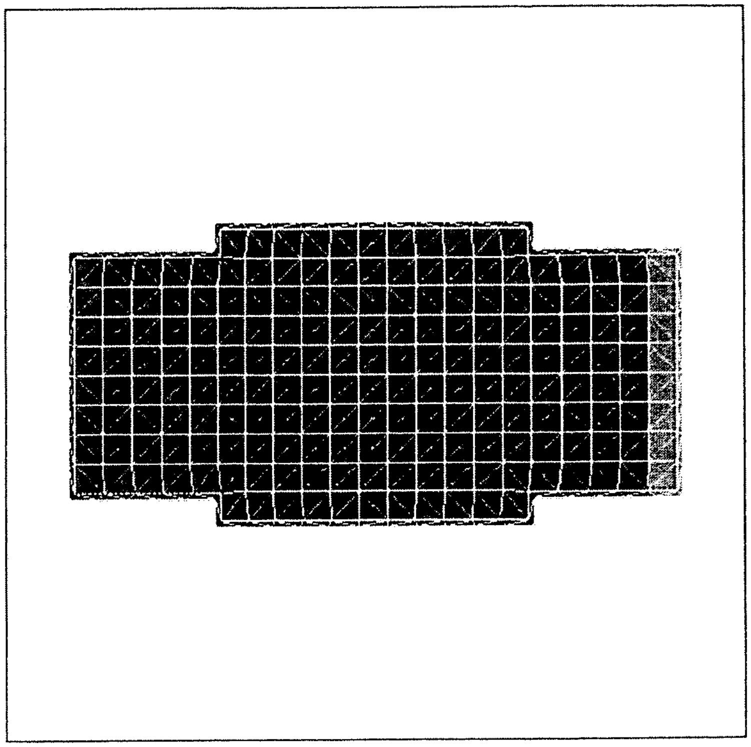
Section Name: SecBT
Loading Name: MCY2000
Analysis Type: Moment Curvature

Section Details:

X Centroid:	23.00 ft
Y Centroid:	11.00 ft
Section Area:	924.0 ft^2

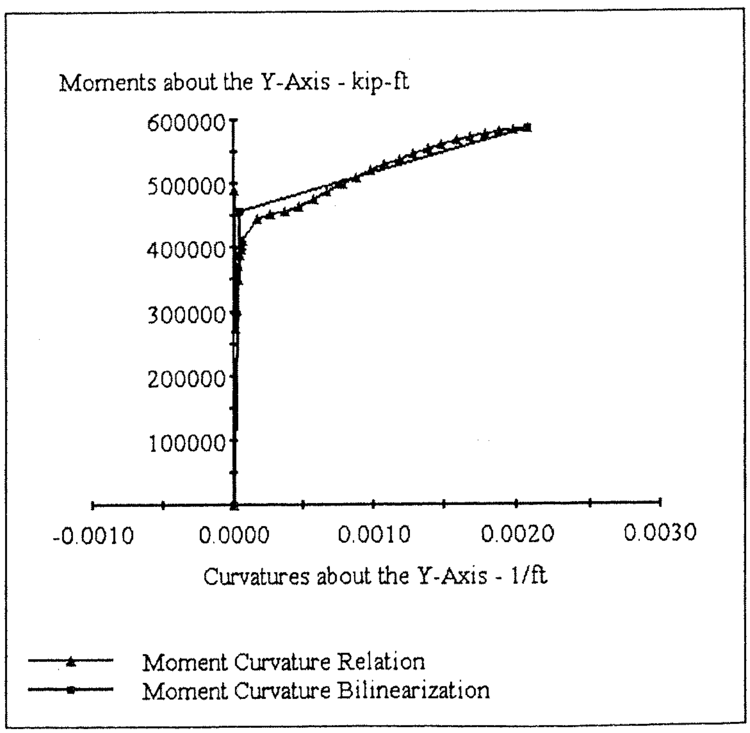


Loading Details:

Constant Load - P:	2000 kips
Incrementing Loads:	Myy Only
Number of Points:	30
Analysis Strategy:	Displacement Control

Analysis Results:

Failing Material:	Steel1
Failure Strain:	90.00E-3 Tension
Curvature at Initial Load:	-.1142E-19 1/ft
Curvature at First Yield:	34.33E-6 1/ft
Ultimate Curvature:	2.084E-3 1/ft
Moment at First Yield:	350.6E+3 kip-ft
Ultimate Moment:	588.6E+3 kip-ft
Centroid Strain at Yield:	.4747E-3 Ten
Centroid Strain at Ultimate:	43.46E-3 Ten
N.A. at First Yield:	13.83 ft
N.A. at Ultimate:	20.86 ft
Energy per Length:	1076 kips
Effective Yield Curvature:	44.75E-6 1/ft
Effective Yield Moment:	457.1E+3 kip-ft
Over Strength Factor:	1.288
EI Effective:	1.02E+10 kip-ft^2
Yield EI Effective:	6.45E+7 kip-ft^2
Bilinear Harding Slope:	.6317 %
Curvature Ductility:	46.56



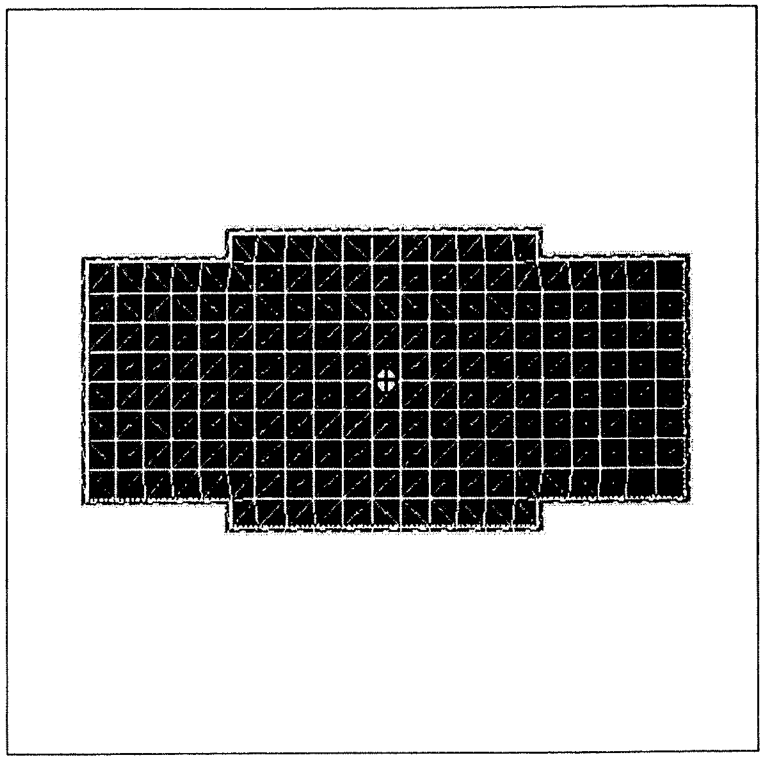
XTRACT Section Report

Section Name: SecBT

Imbsen & Associates, Inc. (in-house ı
Imbsen & Associates, Inc. (in-house ı
3/30/2004
Bay Bridge Baypass Structure
Pier E1
Page __ of __

Section Details:

X Centroid:	23.00 ft
Y Centroid:	11.00 ft
Section Area:	924.0 ft^2
I gross about X:	32.48E+3 ft^4
I gross about Y:	153.2E+3 ft^4
Reinforcing Bar Area:	3.642 ft^2
Percent Longitudinal Steel:	.3942 %
Overall Width:	46.00 ft
Overall Height:	22.00 ft
Number of Fibers:	504
Number of Bars:	336
Number of Materials:	2



Material Types and Names:

Unconfined Concrete:	■ Unconfined1
Strain Hardening Steel:	■ Steel1

Comments:

User Comments

FILE COPY ⑧

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc.	Date:	April 9, 2004
	9912 Business Park Drive Suite 130 Sacramento, CA 95827	Time:	10:00 a.m.- 12:00 p.m.

Minutes Prepared By: Lance A. Schrey of Imbsen & Associates, Inc.

Attendees List: See Attachment 1

Purpose

The purpose was to have all parties working on the project to meet, continue to set up a system to communicate with each other and begin asking technical questions.

It is not the intent of these meeting minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees
Attachment 2 – Agenda (prepared by IAI)
Attachment 3 – Viaduct Stiffness Comparison (file copy only)
Attachment 4 – Viaduct Displacement and Force information (file copy only)

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
B. Coupe	CC Myers
IAI Attendees	
IAI File 1295.310.01	

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

1. No response for RFI # 1 yet.

2. Tom is working on RFI # 8.

3. Next Tuesday's meeting will begin at 9:00 a.m. with a geotech discussion at 10:00 a.m..

4. RFI #7 (regarding the capacity of existing Pier E1):

   a. Tom said Caltrans has no plans to retrofit Pier E1.
   b. Roy said the numbers show Pier E1 is not good for DEE or DLS. Roy asked about an extra contract to analyze Pier E1. Tom does not want to get into an analysis of Pier E1.
   c. Dan said to use the cracked section for the seismic calculations, to assume E-1 is elastic and to use the corresponding displacement to obtain the gap.

5. Randy would like to see supporting calculations where the masses are placed.

6. Tom asked how the uplift numbers were derived. Roy said they are on the As-builts.

7. Tom said the structure performance is more important than the joint performance.

8. Roy described the transverse performance with help from the items listed below:
   a. Roy handed out a spread sheet, which showed the stiffness comparison for the Viaduct (attached).
   b. Roy handed out tables and graphs showing displacements and forces due to wind load for the Viaduct (attached).
   c. Tom said he has site specific wind information, which he will get to IAI.
   d. Tom would like to see the results if the friction at Bent 48B was increased. Roy said the residual displacement would not come out for several days.

9. Jim inquired if Caltrans wanted future access to be able to inspect the new East Tie-In. Tom said he would look into this issue.

10. IAI gave signed Confidentiality Agreement with cover letter to Amer.

11. Dan said all connections to existing members would need to be bolted.

Attachment 2

MEETING ATTENDANCE SHEET

San Francisco – Oakland Bay Bridge
Temporary Bypass Structure

IAI Job # 1295   Contract # 04-0120R4

Date: 4-09-2004

Caltrans:

☐ Pete Siegenthaller	☒ Tom Ostrom	☐ Manode Kodsuntie
☒ Amer Bata	☒ Dan Adams	☐ Trinh Lia
☐ Ken Loncharich	☐ Ali Asnaashari	☐ Nizar Melehani
☐ John Walters	☒ Randy Bains	☒ Eric Watson

CC Myers:

- ☐ Bob Coupe
- ☒ Bill Kidwell

DCCI:

- ☒ Jim Ronning
- ☐ Jack Geer
- ☐ Ron Paz

Imbsen & Associates:

☒ Roy Imbsen	☐ Jonathan Reina
☒ Lance Schrey	☐ Ghassam Dini
☐ Dick LeBeau	☐ Sasan Soltani
☐ Ed Tyk	☐ Majid Saraf
☐ Todd Lambert	☐

Others:

☐	☐

Note: The boxes checked above designate attendance at the meeting.

Attachment 2

BAY BRIDGE TEMPORARY BYPASS

SOUTH SOUTH DETOUR
PROJECT MEETING AGENDA
Friday April 9, 2004

10:00 a.m.	Meeting Begin

Location:

Imbsen & Assoc. Inc.
9912 Business Park Drive Suite 130
Sacramento CA 95827

Agenda:

- Past meeting minutes
  - Meeting 3/26/04
  - Meeting 3/30/04
  - Meeting 4/6/04

- Conformed set of Plans and Special Provisions
  - Electronic set of plans
  - Confidentiality Agreement

- Request for Information Log
  - RFI # 1
  - RFI # 3
  - RFI # 5
  - RFI # 7
  - RFI # 8

VIADUCT STIFFNESS COMPARISON

								COLUMN STIFFNESS				
		MASS	LENGTH		TOTAL	E	I	K	K/M	Rel. Col.	Bent	Rel. Bent
	BENT #	Top of Col.	Br. Pl.-OG	Eqiv. Len.	LENGTH	(ksf)	(ft^4)	(3EI/L^3)	(k/ft)/k	Stiffness	Stiffness	Stiffness
48	48L	1892						104	0.055	1.00	0.110	
	48R	1890						104	0.055			0.70
49	49L	3965	135	0	135	519000	491	311	0.078	0.99	0.158	
	49R	3915	135	0	135	519000	491	311	0.079			0.58
50	50L	2994	153	33	186	519000	491	144	0.048	0.89	0.091	
	50R	3229	153	33	186	519000	491	138	0.043			0.92
51	51L	3618	145	38	183	519000	491	175	0.048	0.73	0.084	
	51R	3663	157	38	195	519000	491	129	0.035			0.48
52	52L	2492	159	0	159	519000	491	190	0.076	0.78	0.174	
	52R	1990	158	0	158	519000	491	194	0.097			

Displacement (mm) under wind load (Design)

	Fixed in T	Free in T	5% Fric. In T	5% Fric. In Both
Bent 48	2	1034	277	270
Bent 49	264	572	354	333
Bent 50	463	363	442	433
Bent 51	319	271	310	305
Bent 52	124	120	123	123

Shear Force at Column Top under wind load (kN) (Design)

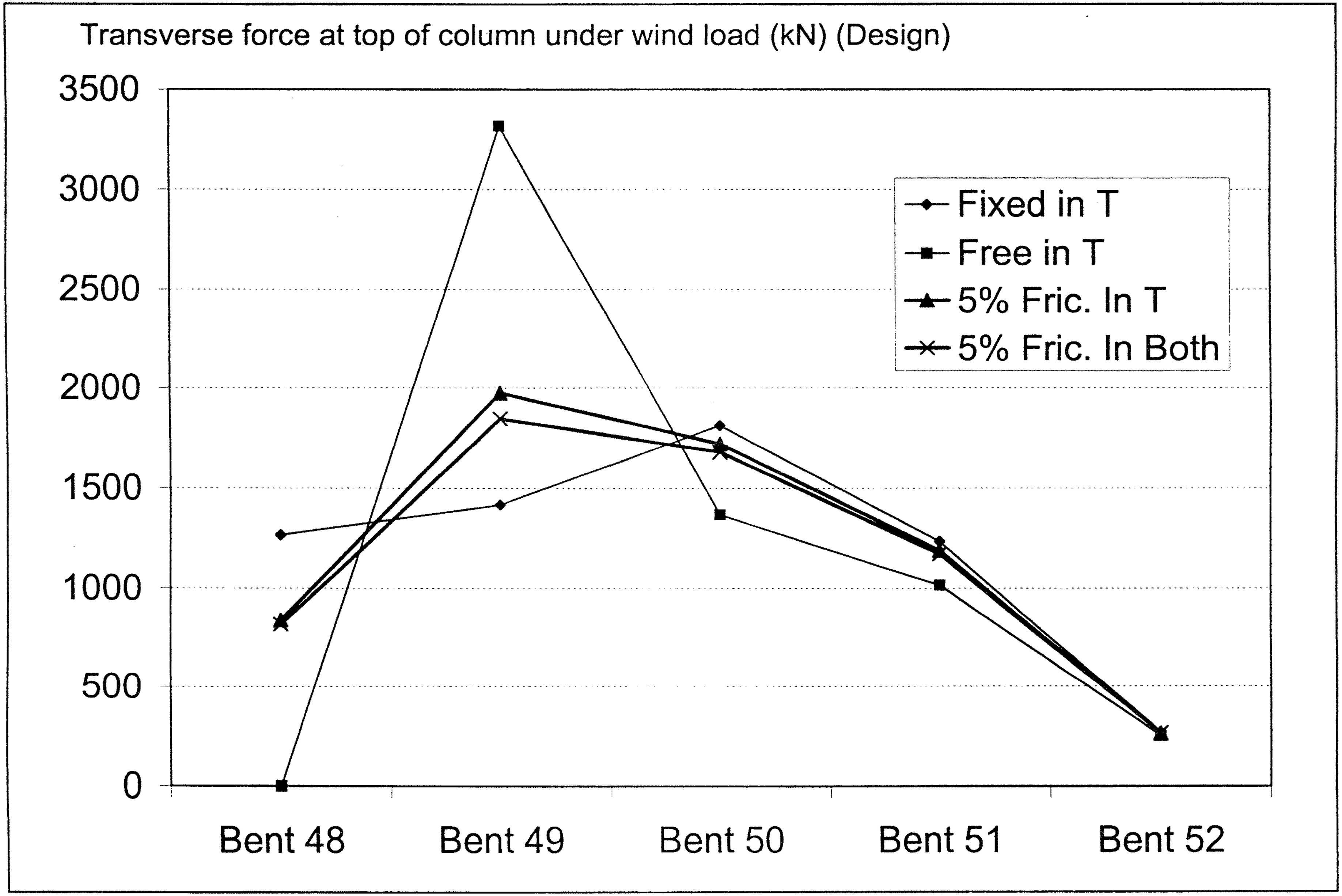
	Fixed in T	Free in T	5% Fric. In T	5% Fric. In Both
Bent 48	1268	0	840	819
Bent 49	1419	3314	1975	1846
Bent 50	1812	1369	1722	1681
Bent 51	1237	1015	1191	1173
Bent 52	268	250	263	264

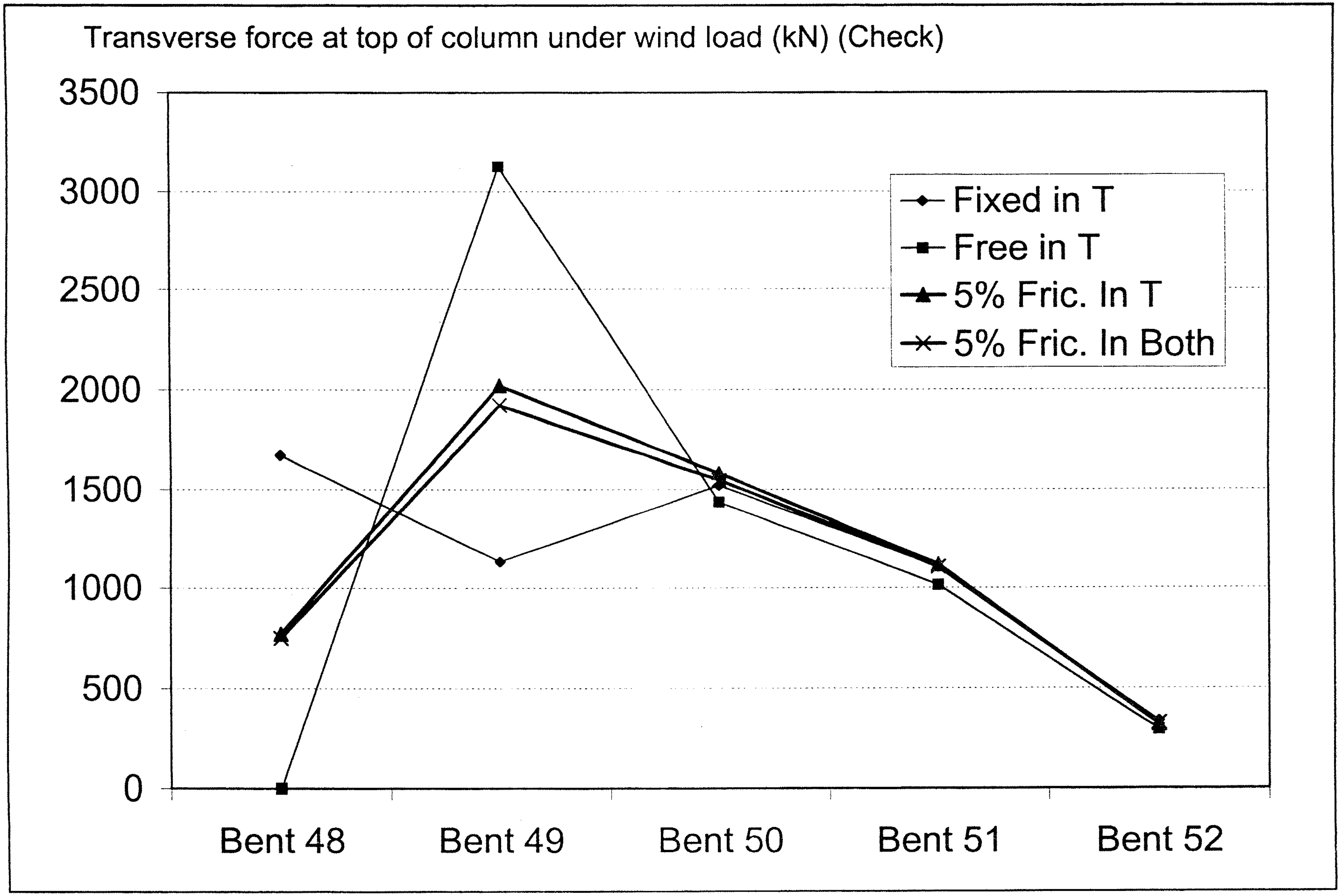
Displacement (mm) under wind load (Check)

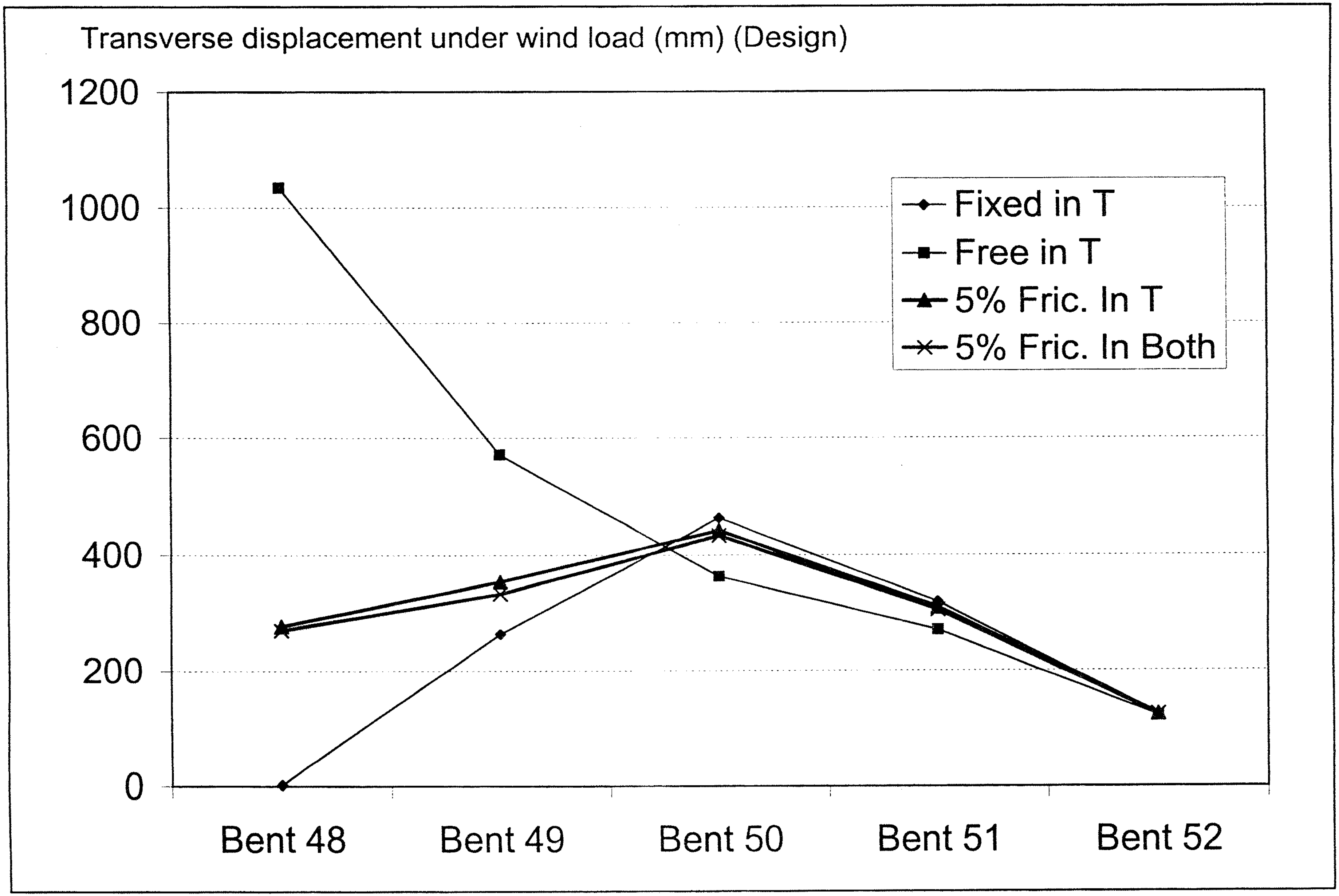
	Fixed in T	Free in T	5% Fric. In T	5% Fric. In Both
Bent 48	0	850	328	320
Bent 49	231	584	388	371
Bent 50	400	377	414	405
Bent 51	300	278	302	300
Bent 52	141	130	136	138

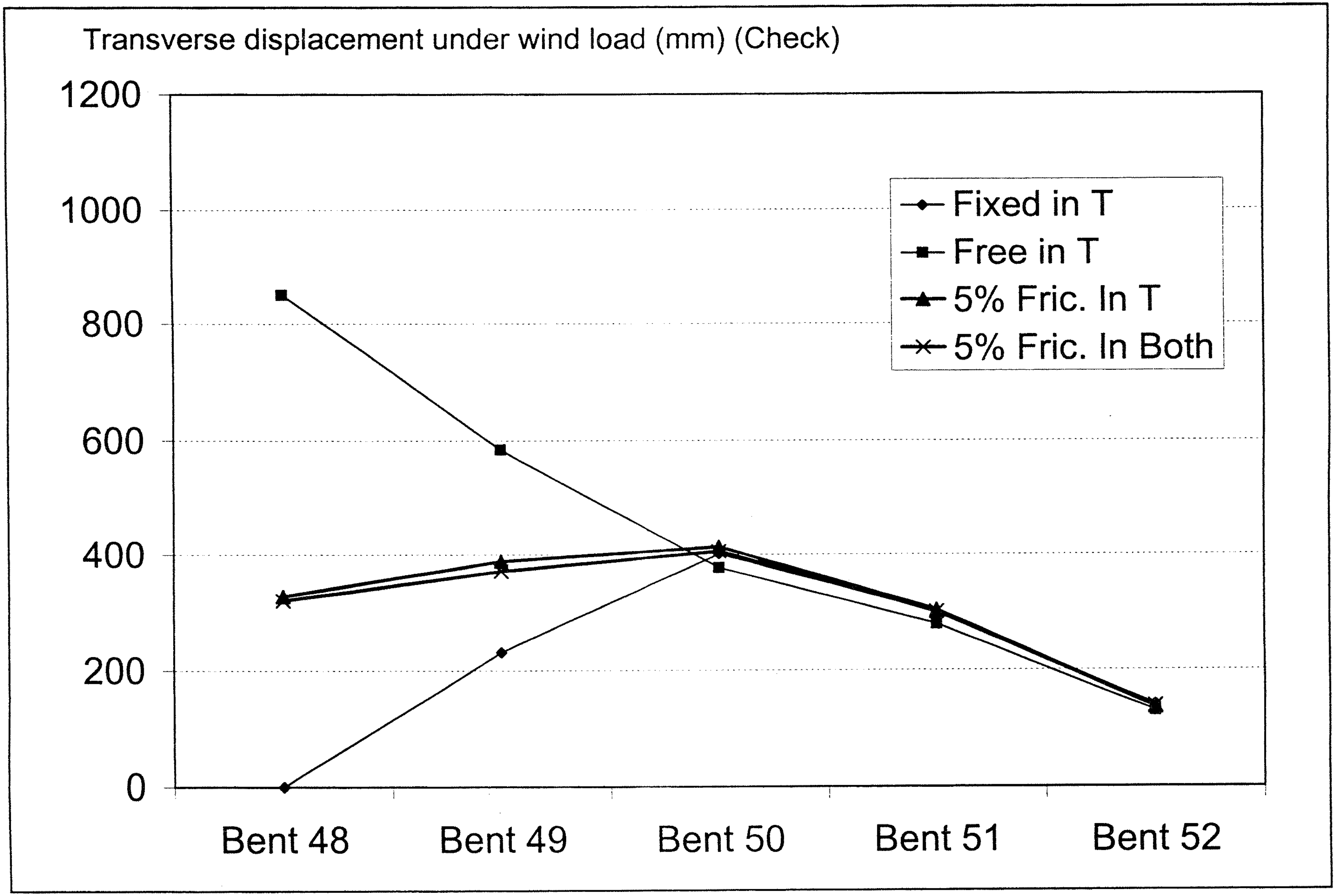
Shear Force at Column Top under wind load (kN) (Check)

	Fixed in T	Free in T	5% Fric. In T	5% Fric. In Both
Bent 48	1674	0	771	751
Bent 49	1131	3124	2020	1923
Bent 50	1521	1436	1584	1549
Bent 51	1104	1013	1116	1104
Bent 52	336	293	320	327


Transverse force at top of column under wind load (kN) (Design)
3500
3000
2500
2000
1500
1000
500
0
Bent 48
Bent 49
Bent 50
Bent 51
Bent 52
Fixed in T
Free in T
5% Fric. In T
5% Fric. In Both


Transverse force at top of column under wind load (kN) (Check)
3500
3000
2500
2000
1500
1000
500
0
Fixed in T
Free in T
5% Fric. In T
5% Fric. In Both
Bent 48
Bent 49
Bent 50
Bent 51
Bent 52


Transverse displacement under wind load (mm) (Design)
1200
1000
800
600
400
200
0
Bent 48
Bent 49
Bent 50
Bent 51
Bent 52
Fixed in T
Free in T
5% Fric. In T
5% Fric. In Both


Transverse displacement under wind load (mm) (Check)
1200
1000
800
600
400
200
0
Bent 48
Bent 49
Bent 50
Bent 51
Bent 52
Fixed in T
Free in T
5% Fric. In T
5% Fric. In Both

(9)

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc.	Date:	April 16, 2004
	9912 Business Park Drive Suite 130 Sacramento, CA 95827	Time:	9:00 a.m.- 11:30 p.m.

Minutes Prepared By: Lance A. Schrey of Imbsen & Associates, Inc.

Attendees List: See Attachment 1

Purpose

The purpose was to have all parties working on the project to meet, continue to set up a system to communicate with each other and begin asking technical questions.

It is not the intent of these meeting minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees
Attachment 2 – Agenda (prepared by IAI)
Attachment 3 – Viaduct Stiffness Comparison package (file copy only)
Attachment 4 – Viaduct Displacement and Forces due to Wind for 4% & 5% friction (file copy only)
Attachment 5 – Caltrans Comments on the Preliminary Foundation Reports for the West Tie-In and the East Tie-In (file copy only)
Attachment 6 – Viaduct Displacement and Forces due to Wind for 7% friction (file copy only)
Attachment 7 – Rocking Analysis and Pier Pushover Displacements (file copy only)

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
B. Coupe	CC Myers
IAI Attendees	
IAI File 1295.310.01	

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

1. Roy handed out Viaduct Stiffness Comparison package (attached).

2. Roy handed out Viaduct Force and Displacement package for 4% friction and 5% friction (attached) at Bent 48B. To approximate the frictional force a spring is used. This requires a trial and error procedure to be utilized.

3. Dan said we now meet the criteria for balanced stiffness between supports (i.e., Equation 4.3), but have too much displacement at Bent 48B under a service condition (wind loading).

4. Dan suggested looking into stiffening up the structure by using elastomeric bearing pads, which have a coefficient of friction of about 30%.

5. Tom asked Roy what displacement at Bent 48 he was comfortable with. Roy said 3"-4". Tom said that was the same amount he was comfortable with. Dan suggested revising the friction to get 3"-4" of displacement (while not being concerned about the stiffness variance between Bent 48 and Bent 49).

6. There was no word from Caltrans on Confidentiality Agreement.

7. Geotechnical Discussion:
   a. Bob Price is the Contract Manager for Caltrans, Saba Mohan is the lead worker.
   b. Saba handed out comments to date for the Preliminary Foundation Reports for the West Tie-In and the East Tie-In (attached).
   c. Dan asked if it was planned to drill a boring at each foundation location. He said that since the new support locations are now known it might be beneficial to make a boring at each location. IAI said there is a lot of existing boring information that the new borings are only to augment the existing information.
   d. Chris said that Geomatrix was planning to be on site during a lot of the geotechnical work to verify conditions.
   e. Lance said that it was anticipated that Caltrans would perform the typical amount of inspection on this contract. Caltrans concurred.

f. Saba said Caltrans has soil samples, which Geomatrix can come look at. They are located at the Caltrans Lab on Folsom Boulevard in Sacramento.

8. There was no answer from Caltrans yet on RFI #1.

9. Tom is working on RFI #8 to get IAI the requested information.

10. Roy handed out package "Rocking Analysis and Pier Pushover Displacements" (attached):
    a. Majid presented package.
    b. Tom and Dan were comfortable with the reported 1.75" reported yield displacement.
    c. Tom doesn't feel comfortable applying force/deformation equations, which were derived for small columns, on such a large pier that was constructed using seismic details from the 1930's.
    d. Tom said they would look at the information handed out and get back to IAI. He said we could continue with the design using 2" for the SEE movement of Pier E1 and 5" for the Viaduct.

11. During the meeting Roy had an engineer rerun analysis to obtain about 3" displacement (see items #2 and #5 above). The corresponding friction is 7% (handout attached). IAI will provide updated stiffness analysis for the 7% friction.

12. Tom said he is working on getting us the results of a wind study.

13. Caltrans Structures Maintenance is interested in getting access to the future structure for maintenance purposes. Dan will work with them to find out their needs.

14. John had an engineer perform a Constructability Review. He has several comments , which John will get to Dan.

15. Tom would like IAI to submit a RFI regarding the use of A490 bolts.

Attachment 2

MEETING ATTENDANCE SHEET

San Francisco – Oakland Bay Bridge
Temporary Bypass Structure

IAI Job # 1295 Contract # 04-0120R4

Date: 4-16-2004

Caltrans:

☐	Pete Siegenthaller	☒	Tom Ostrom	☐	Manode Kodsuntie
☐	Amer Bata	☒	Dan Adams	☐	Trinh Lia
☐	Ken Loncharich	☐	Ali Asnaashari	☐	Nizar Melehani
☒	John Walters	☐	Randy Bains	☐	Eric Watson

CC Myers:

☒ Bob Coupe

☒ Bill Kidwell

DCCI:

☐ Jim Ronning

☐ Jack Geer

☐ Ron Paz

Imbsen & Associates:

☒	Roy Imbsen	☐	Jonathan Reina
☒	Lance Schrey	☐	Ghassam Dini
☐	Dick LeBeau	☐	Sasan Soltani
☐	Ed Tyk	☒	Majid Saraf
☐	Todd Lambert	☐	

Others:

☒ Saba Mohan - Caltrans ☒ Chris Cutu - Geomatrix

Note: The boxes checked above designate attendance at the meeting.

Attachment 2

BAY BRIDGE TEMPORARY BYPASS

SOUTH SOUTH DETOUR
PROJECT MEETING AGENDA
Friday April 16, 2004

9:00 a.m.	Meeting Begin

Location:

Imbsen & Assoc. Inc.
9912 Business Park Drive Suite 130
Sacramento CA 95827

Agenda:

- Past meeting minutes
    - Meeting 4/02/04
    - Meeting 4/09/04

- Conformed set of Plans and Special Provisions
    - Electronic set of plans
    - Confidentiality Agreement

- Geotechnical Discussion
    - Caltrans comments on Preliminary Foundation Reports
    - Geomatrix questions of Caltrans

- Request for Information Log
    - RFI # 1 rev 1
    - RFI # 8
    - RFI # 9
    - RFI # 10
    - RFI # 11

VIADUCT STIFFNESS COMPARISON

		MASS	LENGTH		TOTAL	E	I	COLUMN STIFFNESS K	K/M	Rel. Col.	Bent	Rel. Bent
	BENT #	Top of Col.	Br. Pl.-OG	Eqiv. Len.	LENGTH	(ksf)	(ft^4)	(3EI/L^3)	(k/ft)/k	Stiffness	Stiffness	Stiffness
48	48L	1892						75	0.040	1.00	0.079	
	48R	1890						75	0.040			
49	49L	3965	135	0	135	519000	491	212	0.053	0.95	0.104	0.76
	49R	3915	135	0	135	519000	491	198	0.051			
50	50L	2994	153	33	186	519000	491	173	0.058	0.89	0.109	0.95
	50R	3229	153	33	186	519000	491	166	0.051			
51	51L	3618	145	38	183	519000	491	211	0.058	0.77	0.103	0.95
	51R	3663	157	38	195	519000	491	165	0.045			
52	52L	2492	159	0	159	519000	491	139	0.056	0.79	0.126	0.82
	52R	1990	158	0	158	519000	491	140	0.070			

Includes if-statements for (k/M)i / (k/M)j

Updated: 04.15.2004 (HS)

VIADUCT STIFFNESS COMPARISON

		MASS	LENGTH		TOTAL	E	I	COLUMN STIFFNESS K	COLUMN STIFFNESS K/M	Rel. Col.	Bent	Rel. Bent
	BENT #	Top of Col.	Br. Pl.-OG	Eqiv. Len.	LENGTH	(ksf)	(ft^4)	(3EI/L^3)	(k/ft)/k	Stiffness	Stiffness	Stiffness
48	48L	1892						140	0.074	1.00	0.148	
	48R	1890						140	0.074			
49	49L	3965	135	0	135	519000	491	212	0.053	0.95	0.104	0.70
	49R	3915	135	0	135	519000	491	198	0.051			
50	50L	2994	153	33	186	519000	491	173	0.058	0.89	0.109	0.95
	50R	3229	153	33	186	519000	491	166	0.051			
51	51L	3618	145	38	183	519000	491	211	0.058	0.77	0.103	0.95
	51R	3663	157	38	195	519000	491	165	0.045			
52	52L	2492	159	0	159	519000	491	139	0.056	0.79	0.126	0.82
	52R	1990	158	0	158	519000	491	140	0.070			

Includes if-statements for (k/M)i / (k/M)j

Updated: 4/15/04 HS

added soil/structure @ Bents 49 & 52

VIADUCT STIFFNESS COMPARISON

		MASS	LENGTH		TOTAL	E	I	COLUMN STIFFNESS K	COLUMN STIFFNESS K/M			
	BENT #	Top of Col.	Br. Pl.-OG	Eqiv. Len.	LENGTH	(ksf)	(ft^4)	(3EI/L^3)	(k/ft)/k	Rel. Col. Stiffness	Bent Stiffness	Rel. Bent Stiffness
48	48L	1892						140 ~~104~~	0.055	1.00	0.110	
	48R	1890						140 ~~104~~	0.055			0.70
49	49L	3965	135	0	135	519000	491	~~311~~ 212	0.078	0.99	0.158	
	49R	3915	135	0	135	519000	491	~~311~~ 198	0.079			0.58
50	50L	2994	153	33	186	519000	491	~~144~~ 173	0.048	0.89	0.091	
	50R	3229	153	33	186	519000	491	~~138~~ 166	0.043			0.92
51	51L	3618	145	38	183	519000	491	175	0.048	0.73	0.084	
	51R	3663	157	38	195	519000	491	129	0.035			0.48
52	52L	2492	159	0	159	519000	491	190	0.076	0.78	0.174	
	52R	1990	158	0	158	519000	491	194	0.097			

49L $\Delta = 4.722'$ $P = 1000$ kips $K = 212$ kip/ft
49R $\Delta = 5.057'$ $P = 1000$ kips $K = 198$ kip/ft

50L: $\Delta = 5.791'$ $P = 1000$ kips $K = 173$
50R: $\Delta = 6.007'$ $P = 1000$ kips $K = 166$

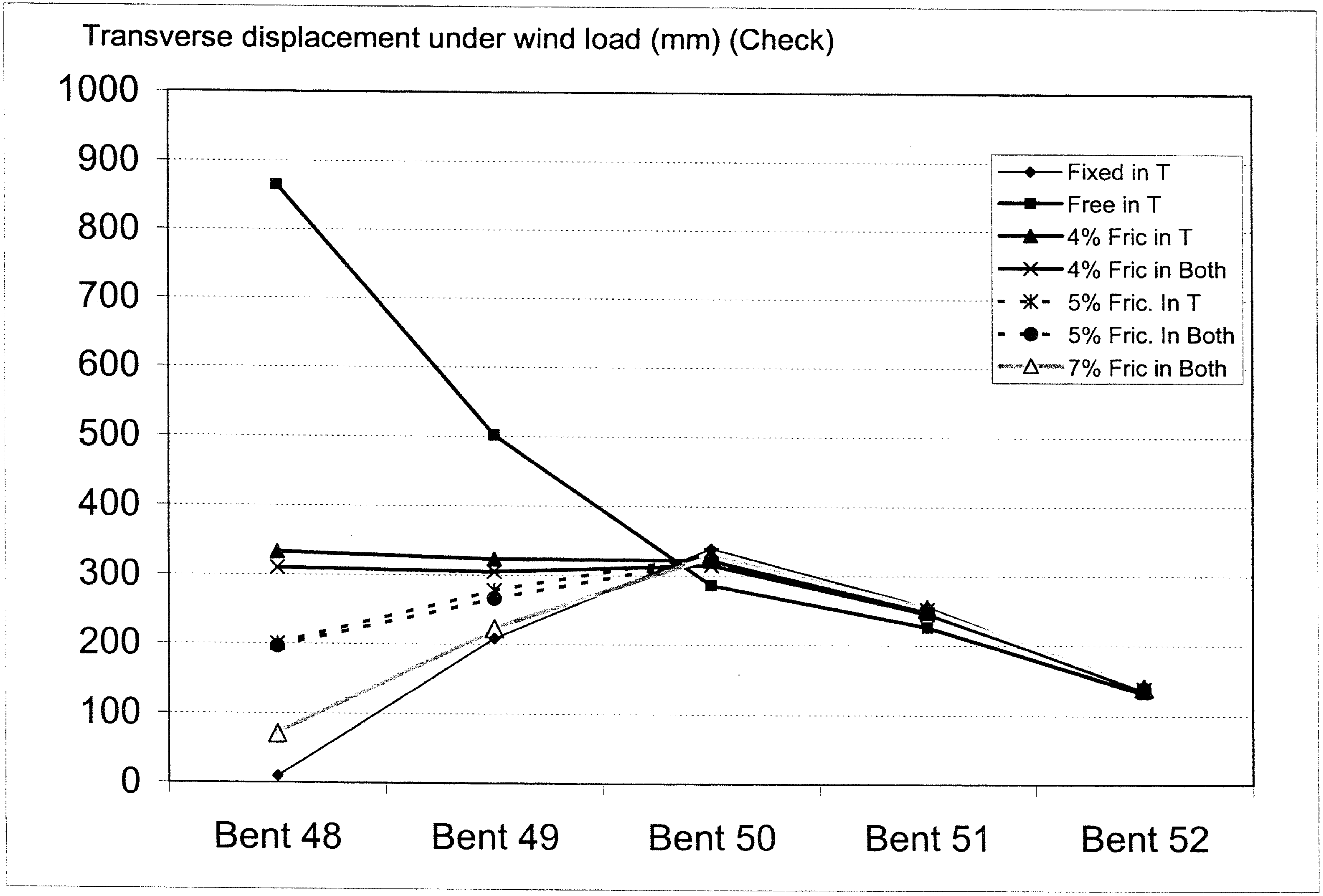
51L: $\Delta = 4.749'$ $P = 1000$ $k = 211$
51R: $\Delta = 6.069'$ $P = 1000$ $k = 165$

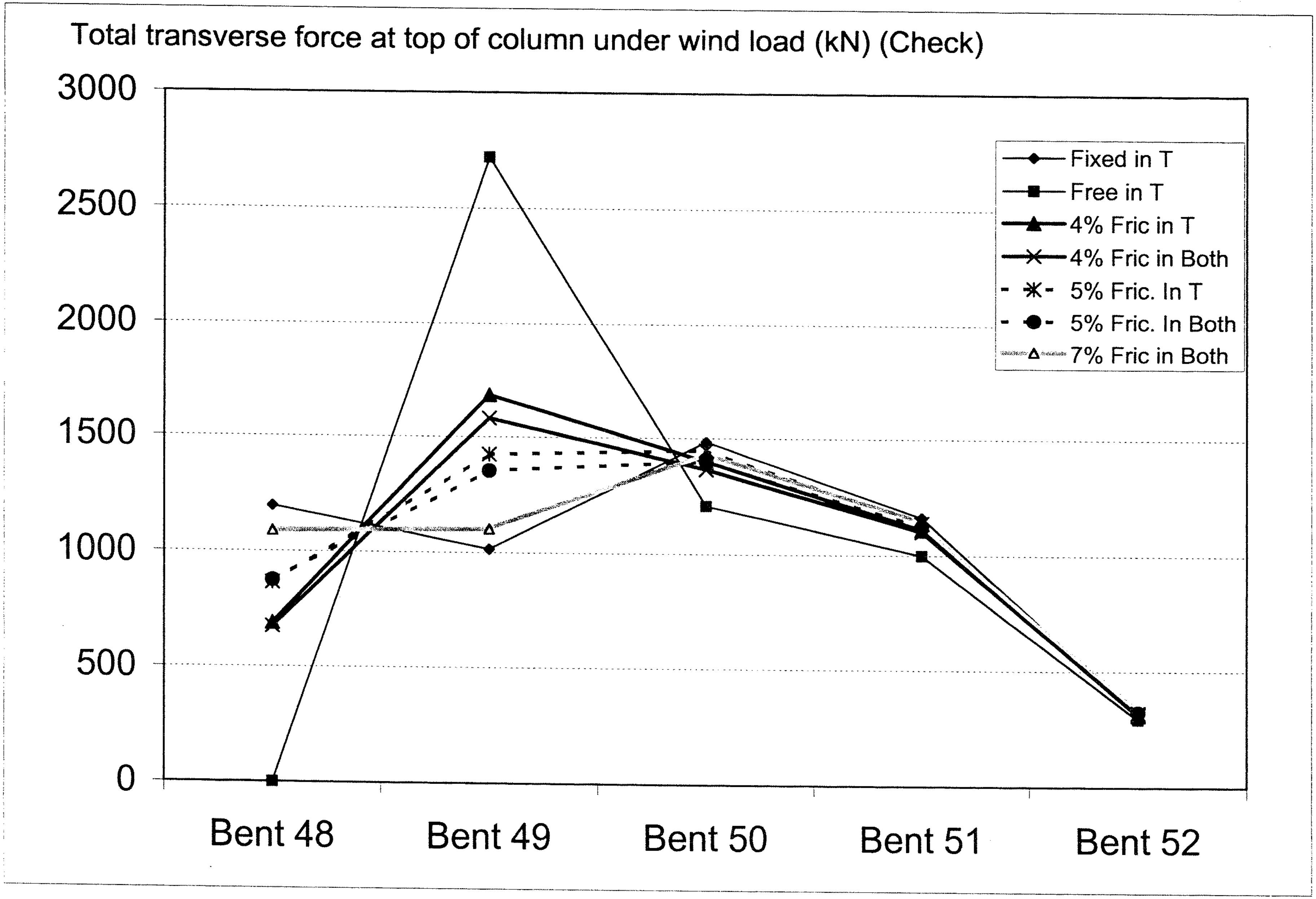
52L: $\Delta = 7.171'$ $P = 1000$ $k = 139$
52R: $\Delta = 7.164'$ $P = 1000$ $k = 140$

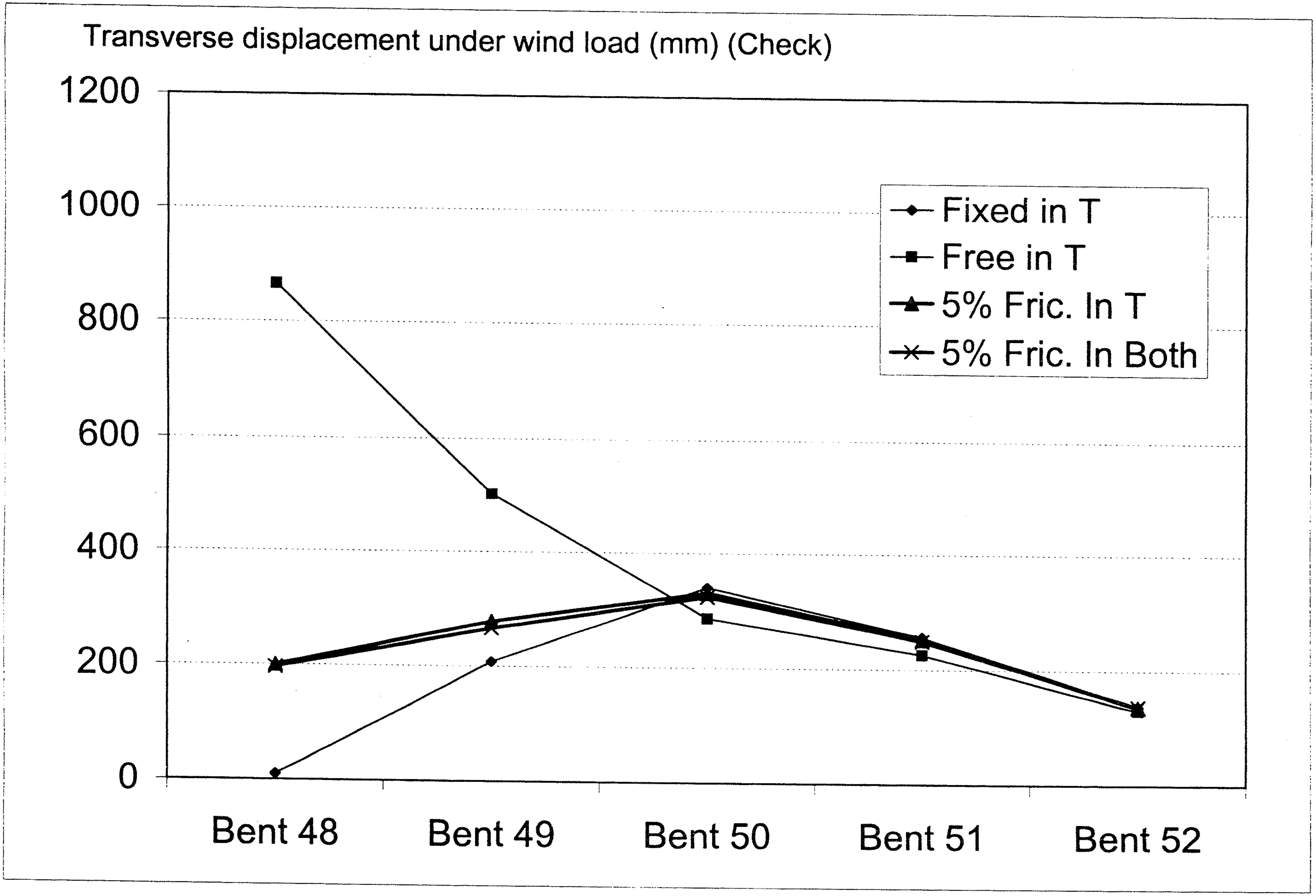
VIADUCT STIFFNESS COMPARISON

								COLUMN STIFFNESS				
		MASS	LENGTH		TOTAL	E	I	K	K/M	Rel. Col.	Bent	Rel. Bent
	BENT #	Top of Col.	Br. Pl.-OG	Eqiv. Len.	LENGTH	(ksf)	(ft^4)	(3EI/L^3)	(k/ft)/k	Stiffness	Stiffness	Stiffness
48	48L	1892						140	0.074	1.00	0.148	
	48R	1890						140	0.074			
49	49L	3965	135	0	135	519000	491	311	0.078	0.99	0.158	0.94
	49R	3915	135	0	135	519000	491	311	0.079			
50	50L	2994	153	33	186	519000	491	144	0.048	0.89	0.091	0.58
	50R	3229	153	33	186	519000	491	138	0.043			
51	51L	3618	145	38	183	519000	491	175	0.048	0.73	0.084	0.92
	51R	3663	157	38	195	519000	491	129	0.035			
52	52L	2492	159	0	159	519000	491	190	0.076	0.78	0.174	0.48
	52R	1990	158	0	158	519000	491	194	0.097			

No soil/structure interaction @ Bent @ 49 & 52


Transverse displacement under wind load (mm) (Check)
1000
900
800
700
600
500
400
300
200
100
0
Bent 48
Bent 49
Bent 50
Bent 51
Bent 52
Fixed in T
Free in T
4% Fric in T
4% Fric in Both
5% Fric. In T
5% Fric. In Both
7% Fric in Both


Total transverse force at top of column under wind load (kN) (Check)
3000
2500
2000
1500
1000
500
0
Bent 48
Bent 49
Bent 50
Bent 51
Bent 52
Fixed in T
Free in T
4% Fric in T
4% Fric in Both
5% Fric. In T
5% Fric. In Both
7% Fric in Both


Transverse displacement under wind load (mm) (Check)
1200
1000
800
600
400
200
0
Fixed in T
Free in T
5% Fric. In T
5% Fric. In Both
Bent 48
Bent 49
Bent 50
Bent 51
Bent 52

Displacements
in GLOBAL coordinate system

Bay Bridge Temporary Bypass Structures - IAI Project 1295
Truss Viaduct

Displacements under Wind Load

Case 1:
Bearings at Bent 48
transversely pinned & longitudinally free

Bent No.		Node Location	Node id	N-S Wind Longi.(X) mm	N-S Wind Trans.(Z) mm	S-N Wind Longi.(X) mm	S-N Wind Trans.(Z) mm	Check Longi.(X) mm	Check Trans.(Z) mm
48	North	Upper Deck	NU11	52	45	-80	-53	-64	48
		Lower Deck	NL11	65	25	-84	-30	-69	24
		Column Top	B48NP1	-1	5	1	-5	0	0
		Column Base	B48NP2	-1	3	1	-3	0	0
	South	Upper Deck	SU11	-15	12	-14	-21	0	20
		Lower Deck	SL11	-8	-6	-14	1	0	-4
		Column Top	B48SP1	1	-3	-1	3	0	0
		Column Base	B48SP2	1	-2	0	2	0	0
49	North	NW Upper Deck	NU17	3	247	-25	-248	-20	237
		NE Upper Deck	NU21	-6	244	-22	-248	-13	242
		NW Lower Deck	NL17	0	230	-30	-233	-23	226
		NE Lower Deck	NL21	-1	229	-21	-233	-13	226
		Column Top	B49NP1	-1	230	-30	-233	-22	220
		Column Base	B49NP9	0	6	-1	-6	0	1
	South	SW Upper Deck	SU17	-68	212	44	-214	47	208
		SE Upper Deck	SU20	-60	218	29	-223	31	223
		SW Lower Deck	SL17	-66	199	33	-203	40	200
		SE Lower Deck	SL20	-60	200	37	-204	41	200
		Column Top	B49SP1	-66	199	33	-203	39	195
		Column Base	B49SP9	-2	5	1	-5	0	1
50	North	NW Upper Deck	NU27	-8	392	-16	-392	-13	364
		NE Upper Deck	NU31	-48	409	18	-409	19	370
		NW Lower Deck	NL27	-12	380	-17	-378	-14	348
		NE Lower Deck	NL31	-42	380	19	-378	20	343
		Column Top	B50NP1	-13	380	-17	**-377**	-14	340
		Column Base	B50NP9	0	7	0	-7	0	1
	South	SW Upper Deck	SU27	-60	392	36	-392	31	365
		SE Upper Deck	SU31	-10	410	-20	-409	-8	369
		SW Lower Deck	SL27	-62	380	29	-378	23	345
		SE Lower Deck	SL31	-11	381	-12	-378	-1	346
		Column Top	B50SP1	-61	380	28	**-378**	23	[illegible]
		Column Base	B50SP9	-1	7	1	-7	-1	1
51	North	Upper Deck	NU41	-47	283	20	-282	26	278
		Lower Deck	NL41	-47	271	20	-270	27	263
		Column Top	B51NP1	-47	271	20	-269	26	257
		Column Base	B51NP9	-1	6	0	-6	-1	-3
	South	Upper Deck	SU41	-10	283	-17	-282	-2	277
		Lower Deck	SL41	-11	271	-16	-270	-2	262
		Column Top	B51SP1	-11	270	-16	-271	-2	256
		Column Base	B51SP9	0	5	0	-5	0	-2
52	North	Upper Deck	NU47	-47	130	23	-130	35	156
		Lower Deck	NL47	-52	123	22	-123	36	143
		Column Top	B52NP1	0	123	0	-123	0	140
		Column Base	B52NP9	0	2	0	-2	0	1
	South	Upper Deck	SU47	-10	130	-14	-130	4	154
		Lower Deck	SL47	-12	123	-19	-123	2	142
		Column Top	B52SP1	0	123	0	-124	0	139
		Column Base	B52SP9	0	2	0	-2	0	1

Displacements
in GLOBAL coordinate system

Bay Bridge Temporary Bypass Structures - IAI Project 1295
Truss Viaduct

Displacements under Wind Load

Case 2:
Bearings at Bent 48
transversely & longitudinally both free

Bent No.		Node Location	Node id	N-S Wind Longi.(X) mm	N-S Wind Trans.(Z) mm	S-N Wind Longi.(X) mm	S-N Wind Trans.(Z) mm	Check Longi.(X) mm	Check Trans.(Z) mm
48	North	Upper Deck	NU11	-215	812	189	-823	157	845
		Lower Deck	NL11	-209	811	192	-820	158	840
		Column Top	B48NP1	0	0	0	0	0	0
		Column Base	B48NP2	0	0	0	0	0	0
	South	Upper Deck	SU11	-93	872	64	-884	41	896
		Lower Deck	SL11	-89	870	68	-880	44	890
		Column Top	B48SP1	0	0	0	0	0	0
		Column Base	B48SP2	0	0	0	0	0	0
49	North	NW Upper Deck	NU17	-113	458	91	-458	82	511
		NE Upper Deck	NU21	-89	480	61	-484	59	517
		NW Lower Deck	NL17	-113	441	83	-445	75	493
		NE Lower Deck	NL21	-85	450	63	-454	63	493
		Column Top	B49NP1	-114	445	83	-448	73	480
		Column Base	B49NP9	-3	11	2	-11	0	2
	South	SW Upper Deck	SU17	6	516	-31	-518	-31	561
		SE Upper Deck	SU20	-22	513	-10	-518	-27	554
		SW Lower Deck	SL17	8	495	-41	-499	-39	536
		SE Lower Deck	SL20	-18	489	-5	-494	-21	536
		Column Top	B49SP1	8	491	-42	-496	-38	523
		Column Base	B49SP9	0	12	-1	-12	0	2
50	North	NW Upper Deck	NU27	-79	312	56	-311	63	304
		NE Upper Deck	NU31	-63	320	33	-318	34	321
		NW Lower Deck	NL27	-83	299	54	-296	61	294
		NE Lower Deck	NL31	-57	299	33	-296	36	290
		Column Top	B50NP1	-83	299	53	-295	59	[illegible]
		Column Base	B50NP9	-2	6	1	-6	-1	1
	South	SW Upper Deck	SU27	-20	312	-5	-311	-10	302
		SE Upper Deck	SU31	-37	320	7	-318	10	321
		SW Lower Deck	SL27	-22	299	-11	-295	-17	291
		SE Lower Deck	SL31	-38	299	15	-296	17	[illegible]
		Column Top	B50SP1	-22	298	-12	-295	-16	[illegible]
		Column Base	B50SP9	0	6	0	-6	0	1
51	North	Upper Deck	NU41	-62	241	35	-240	39	246
		Lower Deck	NL41	-62	231	35	-230	40	232
		Column Top	B51NP1	-62	232	35	-229	39	227
		Column Base	B51NP9	-1	5	1	-5	-1	-2
	South	Upper Deck	SU41	-36	241	9	-240	16	245
		Lower Deck	SL41	-37	231	9	-230	17	231
		Column Top	B51SP1	-37	231	9	-231	16	226
		Column Base	B51SP9	-1	4	0	-4	-1	-2
52	North	Upper Deck	NU47	-63	126	39	-126	47	147
		Lower Deck	NL47	-68	119	37	-120	47	135
		Column Top	B52NP1	0	120	0	-119	0	133
		Column Base	B52NP9	0	2	0	-2	0	1
	South	Upper Deck	SU47	-35	126	10	-126	22	146
		Lower Deck	SL47	-36	119	6	-119	20	134
		Column Top	B52SP1	0	119	0	-120	0	131
		Column Base	B52SP9	0	2	0	-2	0	1

Displacements
in GLOBAL coordinate system

Bay Bridge Temporary Bypass Structures - IAI Project 1295
Truss Viaduct

Displacements under Wind Load

Case 3:
Bearings at Bent 48
transversely 5%DL friction & longitudinally free

Bent No.		Node Location	Node id	N-S Wind Longi.(X) mm	N-S Wind Trans.(Z) mm	S-N Wind Longi.(X) mm	S-N Wind Trans.(Z) mm	Check Longi.(X) mm	Check Trans.(Z) mm
48	North	Upper Deck	NU11	25	132	-52	-140	-17	226
		Lower Deck	NL11	37	116	-56	-122	-20	207
		Column Top	B48NP1	0	1	0	-1	0	0
		Column Base	B48NP2	0	0	0	0	0	0
	South	Upper Deck	SU11	-25	107	-4	-117	10	214
		Lower Deck	SL11	-19	89	-2	-96	11	194
		Column Top	B48SP1	0	1	0	-1	0	0
		Column Base	B48SP2	0	0	0	0	0	0
49	North	NW Upper Deck	NU17	-11	283	-12	-282	2	305
		NE Upper Deck	NU21	-17	279	-11	-282	3	308
		NW Lower Deck	NL17	-13	263	-17	-266	-1	291
		NE Lower Deck	NL21	-11	263	-11	-266	5	291
		Column Top	B49NP1	-14	263	-18	-265	-1	283
		Column Base	B49NP9	0	6	0	-6	0	1
	South	SW Upper Deck	SU17	-65	256	40	-257	32	292
		SE Upper Deck	SU20	-57	259	26	-264	19	301
		SW Lower Deck	SL17	-61	240	28	-243	24	280
		SE Lower Deck	SL20	-57	241	34	-244	28	280
		Column Top	B49SP1	-61	240	28	-244	23	273
		Column Base	B49SP9	-1	6	1	-6	0	1
50	North	NW Upper Deck	NU27	-17	390	-6	-389	4	356
		NE Upper Deck	NU31	-52	406	22	-405	23	364
		NW Lower Deck	NL27	-22	378	-8	-375	3	341
		NE Lower Deck	NL31	-46	378	22	-375	25	336
		Column Top	B50NP1	-22	378	-8	-374	3	[illegible]
		Column Base	B50NP9	0	7	0	-7	0	1
	South	SW Upper Deck	SU27	-56	390	32	-389	23	357
		SE Upper Deck	SU31	-14	407	-16	-405	-3	363
		SW Lower Deck	SL27	-58	378	25	-375	15	338
		SE Lower Deck	SL31	-15	378	-8	-375	3	338
		Column Top	B50SP1	-58	377	24	-375	15	[illegible]
		Column Base	B50SP9	-1	7	0	-7	0	1
51	North	Upper Deck	NU41	-51	281	23	-281	30	274
		Lower Deck	NL41	-51	270	24	-269	31	259
		Column Top	B51NP1	-51	270	24	-268	30	253
		Column Base	B51NP9	-1	6	0	-6	-1	-3
	South	Upper Deck	SU41	-14	281	-13	-280	3	272
		Lower Deck	SL41	-15	270	-12	-269	3	258
		Column Top	B51SP1	-15	269	-12	-269	3	252
		Column Base	B51SP9	0	5	0	-5	0	-2
52	North	Upper Deck	NU47	-51	130	27	-130	39	154
		Lower Deck	NL47	-56	123	25	-123	40	142
		Column Top	B52NP1	0	123	0	-122	0	139
		Column Base	B52NP9	0	2	0	-2	0	1
	South	Upper Deck	SU47	-14	130	-10	-130	9	152
		Lower Deck	SL47	-15	123	-15	-123	7	140
		Column Top	B52SP1	0	122	0	-123	0	137
		Column Base	B52SP9	0	2	0	-2	0	1

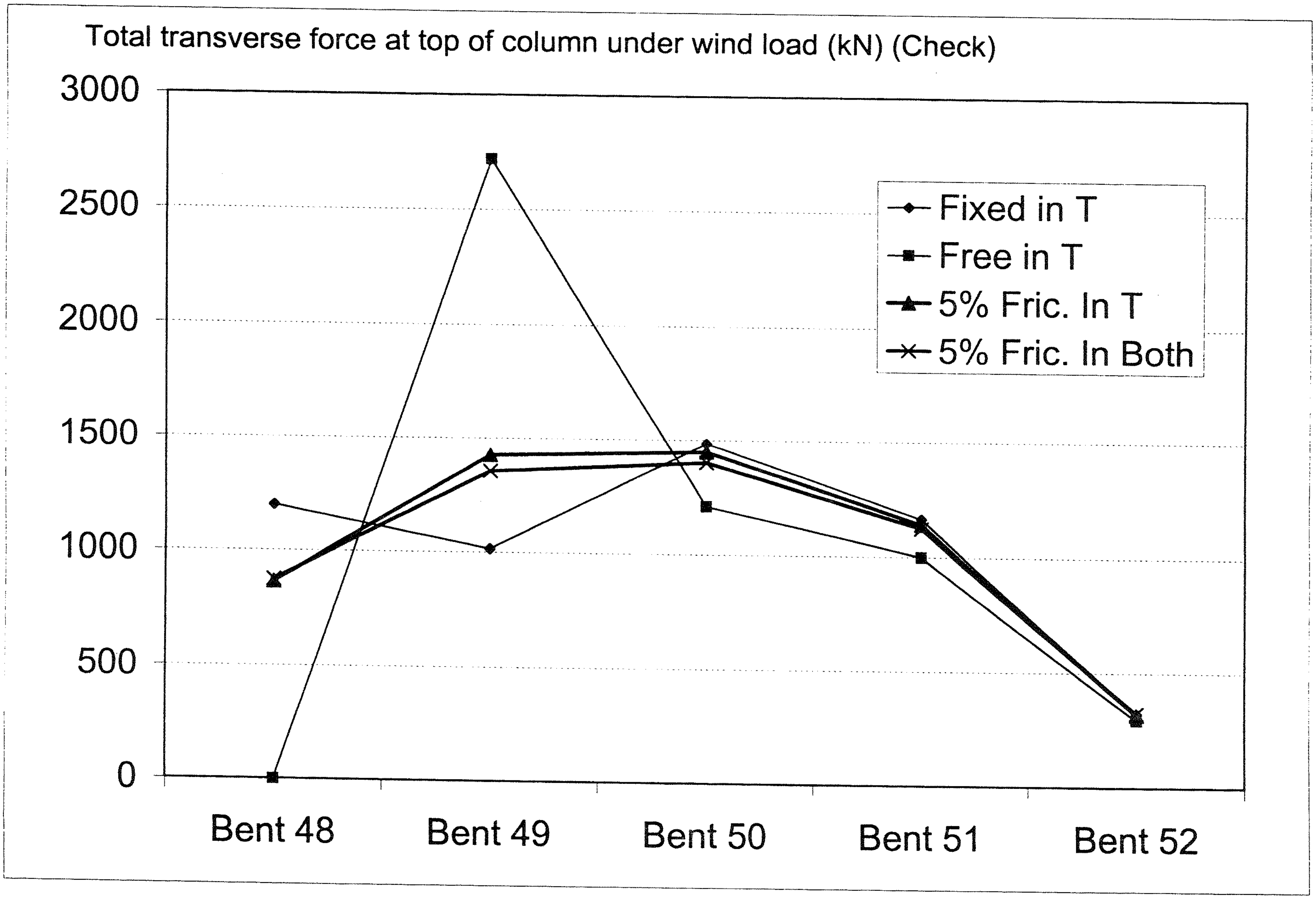
Displacements
in GLOBAL coordinate system

Bay Bridge Temporary Bypass Structures - IAI Project 1295
Truss Viaduct

Displacements under Wind Load

Case 4:
Bearings at Bent 48
transversely & longitudinally both 5%DL friction

Bent No.		Node Location	Node id	N-S Wind Longi.(X) mm	N-S Wind Trans.(Z) mm	S-N Wind Longi.(X) mm	S-N Wind Trans.(Z) mm	Check(1) Longi.(X) mm	Check(1) Trans.(Z) mm	Che[…] Longi.(X) mm
48	North	Upper Deck	NU11	-2	157	-10	-155	16	220	0
		Lower Deck	NL11	9	141	-13	-137	13	202	-2
		Column Top	B48NP1	1	1	-1	-1	0	0	0
		Column Base	B48NP2	0	1	0	-1	0	0	0
	South	Upper Deck	SU11	-40	138	29	-136	40	210	15
		Lower Deck	SL11	-34	121	31	-116	41	190	16
		Column Top	B48SP1	-1	1	0	-1	0	0	0
		Column Base	B48SP2	0	0	0	0	0	0	0
49	North	NW Upper Deck	NU17	-28	275	23	-271	33	290	11
		NE Upper Deck	NU21	-31	276	19	-273	30	296	10
		NW Lower Deck	NL17	-31	258	17	-256	29	278	7
		NE Lower Deck	NL21	-26	259	20	-258	32	278	11
		Column Top	B49NP1	-31	259	17	-256	28	271	7
		Column Base	B49NP9	-1	6	0	-6	0	1	0
	South	SW Upper Deck	SU17	-71	255	66	-250	59	279	28
		SE Upper Deck	SU20	-68	258	54	-256	46	289	18
		SW Lower Deck	SL17	-68	240	55	-237	52	268	20
		SE Lower Deck	SL20	-67	240	62	-238	55	268	27
		Column Top	B49SP1	-68	239	54	-237	50	261	20
		Column Base	B49SP9	-2	6	1	-6	0	1	0
50	North	NW Upper Deck	NU27	-31	378	24	-376	31	346	11
		NE Upper Deck	NU31	-62	395	49	-394	48	355	12
		NW Lower Deck	NL27	-36	366	22	-363	30	331	10
		NE Lower Deck	NL31	-57	366	49	**-363**	50	**326**	14
		Column Top	B50NP1	-36	366	22	**-362**	29	**324**	9
		Column Base	B50NP9	-1	7	0	-7	-1	1	0
	South	SW Upper Deck	SU27	-66	378	60	-376	50	347	23
		SE Upper Deck	SU31	-26	395	13	-394	24	354	13
		SW Lower Deck	SL27	-69	366	53	-363	42	329	16
		SE Lower Deck	SL31	-28	367	21	**-363**	30	**329**	20
		Column Top	B50SP1	-68	366	53	**-363**	41	**321**	15
		Column Base	B50SP9	-1	7	1	-7	-1	1	0
51	North	Upper Deck	NU41	-61	276	51	-275	55	270	15
		Lower Deck	NL41	-62	264	51	-263	55	255	15
		Column Top	B51NP1	-62	264	51	-262	54	249	15
		Column Base	B51NP9	-1	6	1	-6	-2	-3	-1
	South	Upper Deck	SU41	-27	276	16	-275	29	269	12
		Lower Deck	SL41	-27	264	16	-263	29	255	12
		Column Top	B51SP1	-27	264	16	-264	29	249	12
		Column Base	B51SP9	0	5	0	-5	-1	-2	0
52	North	Upper Deck	NU47	-62	130	54	-130	63	156	20
		Lower Deck	NL47	-67	122	53	-123	64	143	21
		Column Top	B52NP1	0	123	0	-122	0	140	0
		Column Base	B52NP9	0	2	0	-2	0	1	0
	South	Upper Deck	SU47	-26	130	18	-130	35	155	12
		Lower Deck	SL47	-28	123	14	-123	33	142	10
		Column Top	B52SP1	0	122	0	-123	0	139	0
		Column Base	B52SP9	0	2	0	-2	0	1	0



Total transverse force at top of column under wind load (kN) (Check)
3000
2500
2000
1500
1000
500
0
Bent 48
Bent 49
Bent 50
Bent 51
Bent 52
Fixed in T
Free in T
5% Fric. In T
5% Fric. In Both

Imbse.. Associates, Inc.
Bay Bridge Temporary Bypass Structures - IAI Project 1295
Truss Viaduct

Unfactored Axial Forces and Shears at Top of Columns under Wind Load

Case 1:

Bearings at Bent 48 - transversely pinned & longitudinally free

(Design)

Bent No.	Column Lcation	Member id	Dead Load Verti. Fx kN	Wind on Structure N-S Verti. Fx kN	N-S Longi. Fy kN	N-S Trans. Fz kN	S-N Verti. Fx kN	S-N Longi. Fy kN	S-N Trans. Fz kN
48	North	B48NP1	-8419	1824	0	2777	303	0	-2580
	South	B48SP1	-8405	322	0	-1724	1760	0	1532
49	North	B49NP1	-16933	3205	7	604	874	92	-613
	South	B49SP1	-16709	663	204	507	3308	-98	-525
50	North	B50NP1	-12619	2649	34	727	444	42	-722
	South	B50SP1	-13664	536	141	733	2839	-53	-713
51	North	B51NP1	-15265	3363	120	576	638	-51	-572
	South	B51SP1	-15464	696	23	441	3322	33	-442
52	North	B52NP1	-10694	1480	0	132	241	0	-131
	South	B52SP1	-8954	190	0	131	1553	0	-133
							15282	-34	-4898

(Check)

Bent No.	Column Lcation	Member id	Dead Load Verti. Fx kN	Wind on Structure N-S Verti. Fx kN	N-S Longi. Fy kN	N-S Trans. Fz kN	S-N Verti. Fx kN	S-N Longi. Fy kN	S-N Trans. Fz kN			
48	North	B48NP1	-9022				210	0	2496	1.44	#DIV/0!	-1.03
	South	B48SP1	-8688				1384	0	-1300	1.27	#DIV/0!	-1.18
49	North	B49NP1	-18429				903	67	565	0.97	1.38	-1.09
	South	B49SP1	-17842				3211	-109	449	1.03	0.90	-1.17
50	North	B50NP1	-13469				528	31	790	0.84	1.37	-0.91
	South	B50SP1	-14723				3174	-49	694	0.89	1.08	-1.03
51	North	B51NP1	-15628				516	-68	670	1.24	0.75	-0.85
	South	B51SP1	-15586				3272	4	492	1.02	9.23	-0.90
52	North	B52NP1	-11041				504	0	162	0.48	#DIV/0!	-0.81
	South	B52SP1	-8862				2065	0	159	0.75	#DIV/0!	-0.83
							15767	-124	5177			

Imbse… Associates, Inc.
Bay Bridge Temporary Bypass Structures - IAI Project 1295
Truss Viaduct

Unfactored Axial Forces and Shears at Top of Columns under Wind Load

Case 2:

Bearings at Bent 48 - transversely & longitudinally both free

(Design)

Bent No.	Column Lcation	Member id	Dead Load Verti. Fx kN	Wind on Structure N-S Verti. Fx kN	N-S Longi. Fy kN	N-S Trans. Fz kN	S-N Verti. Fx kN	S-N Longi. Fy kN	S-N Trans. Fz kN
48	North	B48NP1	-8419	1615	0	0	511	0	0
	South	B48SP1	-8405	552	0	0	1532	0	0
49	North	B49NP1	-16933	3539	351	1268	539	-253	-1278
	South	B49SP1	-16709	344	-22	1407	3628	130	-1427
50	North	B50NP1	-12619	2568	191	547	525	-115	-539
	South	B50SP1	-13664	571	53	551	2804	37	-529
51	North	B51NP1	-15265	3306	158	476	696	-89	-471
	South	B51SP1	-15464	747	75	359	3271	-19	-359
52	North	B52NP1	-10694	1473	0	124	248	0	-123
	South	B52SP1	-8954	214	0	123	1529	0	-125
							15282	-310	-4851

(Check)

Bent No.	Column Lcation	Member id	Dead Load Verti. Fx kN	Wind on Structure N-S Verti. Fx kN	N-S Longi. Fy kN	N-S Trans. Fz kN	S-N Verti. Fx kN	S-N Longi. Fy kN	S-N Trans. Fz kN			
48	North	B48NP1	-9022				338	0	0	1.51	#DIV/0!	#DIV/0!
	South	B48SP1	-8688				1229	0	0	1.25	#DIV/0!	#DIV/0!
49	North	B49NP1	-18429				661	-220	1349	0.82	1.15	-0.95
	South	B49SP1	-17842				3472	107	1372	1.04	1.21	-1.04
50	North	B50NP1	-13469				643	-133	639	0.82	0.87	-0.84
	South	B50SP1	-14723				3065	35	568	0.91	1.05	-0.93
51	North	B51NP1	-15628				525	-102	579	1.32	0.87	-0.81
	South	B51SP1	-15586				3270	-34	420	1.00	0.58	-0.85
52	North	B52NP1	-11041				518	0	147	0.48	#DIV/0!	-0.84
	South	B52SP1	-8862				2047	0	144	0.75	#DIV/0!	-0.86
							15768	-345	5218			

Imbsen & Associates, Inc.
Bay Bridge Temporary Bypass Structures - IAI Project 1295
Truss Viaduct

Unfactored Axial Forces and Shears at Top of Columns under Wind Load

Case 3:

Bearings at Bent 48 - transversely (5%DL=420kN) friction & longitudinally free

(Design)

Bent No.	Column Lcation	Member id	Dead Load Verti. Fx kN	Wind on Structure N-S Verti. Fx kN	N-S Longi. Fy kN	N-S Trans. Fz kN	S-N Verti. Fx kN	S-N Longi. Fy kN	S-N Trans. Fz kN
48	North	B48NP1	-8419	1780	0	417	345	0	-416
	South	B48SP1	-8405	370	0	420	1715	0	-425
49	North	B49NP1	-16933	3251	47	707	829	52	-714
	South	B49SP1	-16709	617	189	634	3353	-82	-650
50	North	B50NP1	-12619	2645	55	722	448	21	-715
	South	B50SP1	-13664	535	134	728	2840	-45	-706
51	North	B51NP1	-15265	3359	129	573	642	-60	-568
	South	B51SP1	-15464	700	30	438	3317	26	-438
52	North	B52NP1	-10694	1480	0	131	241	0	-130
	South	B52SP1	-8954	192	0	130	1551	0	-132
							15282	-88	-4895

(Check)

Bent No.	Column Lcation	Member id	Dead Load Verti. Fx kN	Wind on Structure N-S Verti. Fx kN	N-S Longi. Fy kN	N-S Trans. Fz kN	S-N Verti. Fx kN	S-N Longi. Fy kN	S-N Trans. Fz kN			
48	North	B48NP1	-9022				251	0	440	1.37	#DIV/0!	-0.95
	South	B48SP1	-8688				1335	0	426	1.28	#DIV/0!	-1.00
49	North	B49NP1	-18429				847	4	756	0.98	12.68	-0.95
	South	B49SP1	-17842				3275	-66	668	1.02	1.26	-0.97
50	North	B50NP1	-13469				547	-7	769	0.82	-3.14	-0.93
	South	B50SP1	-14723				3154	-32	678	0.90	1.43	-1.04
51	North	B51NP1	-15628				518	-78	657	1.24	0.76	-0.86
	South	B51SP1	-15586				3272	-6	481	1.01	-4.50	-0.91
52	North	B52NP1	-11041				506	0	159	0.48	#DIV/0!	-0.82
	South	B52SP1	-8862				2062	0	156	0.75	#DIV/0!	-0.84
							15767	-184	5188			

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Truss Viaduct

Unfactored Axial Forces and Shears at Top of Columns under Wind Load

Case 4:

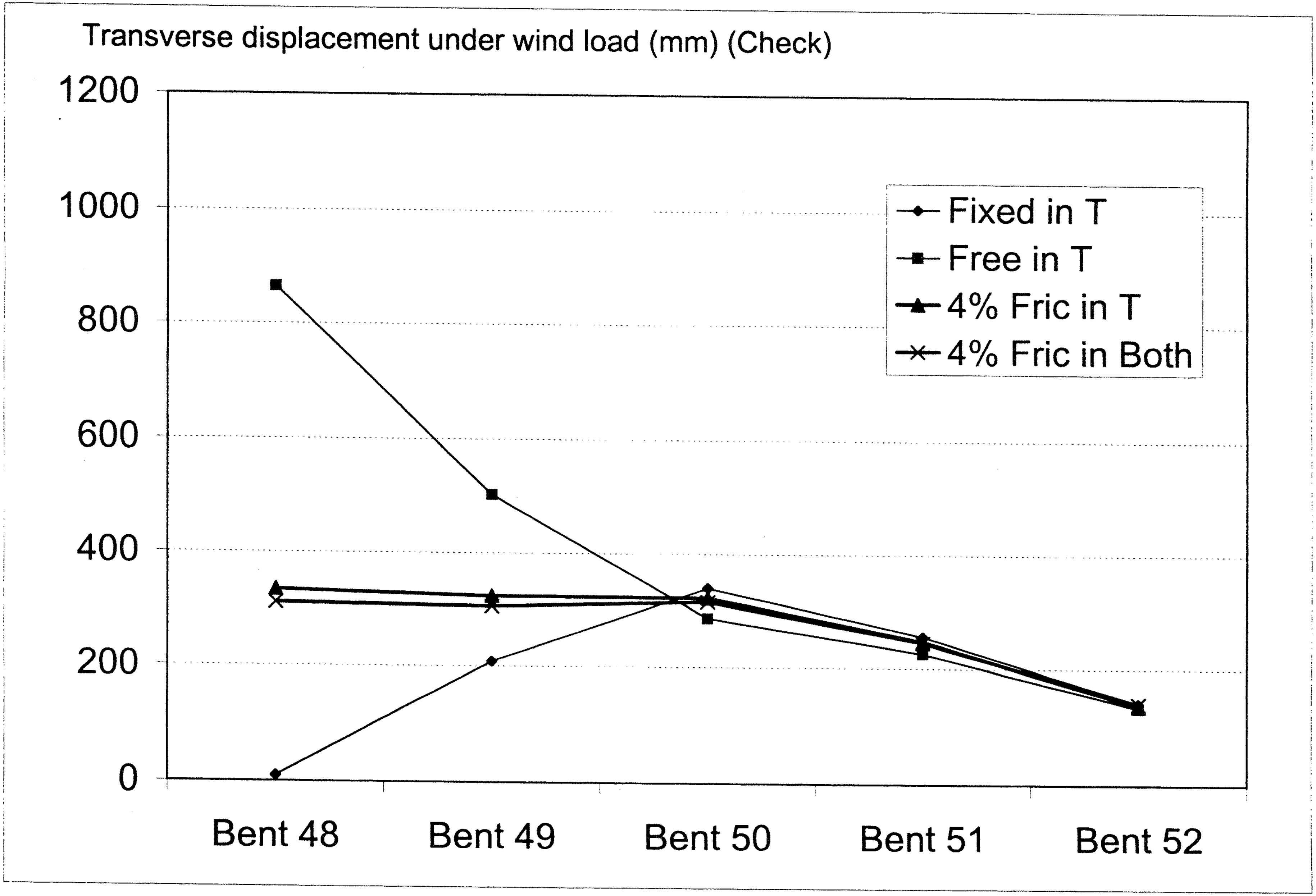
Bearings at Bent 48 - transversely & longitudinally both (5%DL) friction

(Design)

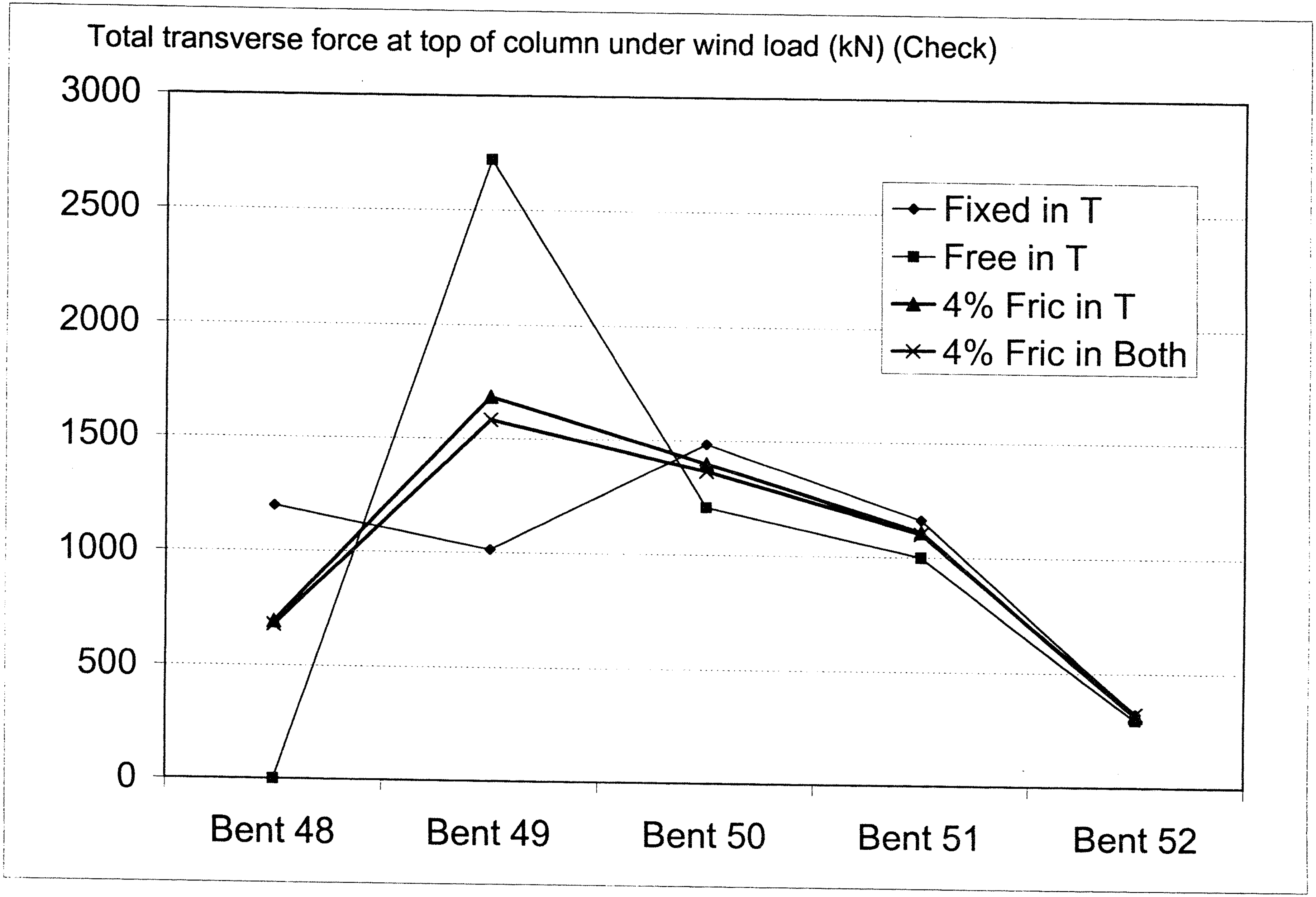
Bent No.	Column Lcation	Member id	Dead Load Verti. Fx kN	Wind on Structure N-S Verti. Fx kN	N-S Longi. Fy kN	N-S Trans. Fz kN	S-N Verti. Fx kN	S-N Longi. Fy kN	S-N Trans. Fz kN
48	North	B48NP1	-8419	1794	-418	437	333	429	-418
	South	B48SP1	-8405	366	221	435	1704	30	-418
49	North	B49NP1	-16933	3247	100	693	841	-54	-686
	South	B49SP1	-16709	609	211	632	3369	-163	-631
50	North	B50NP1	-12619	2634	85	697	461	-45	-688
	South	B50SP1	-13664	546	157	702	2824	-108	-680
51	North	B51NP1	-15265	3357	156	559	640	-129	-554
	South	B51SP1	-15464	703	56	427	3317	-34	-427
52	North	B52NP1	-10694	1479	0	131	242	0	-130
	South	B52SP1	-8954	194	0	130	1550	0	-132
							15282	-73	-4765

(Check)

Bent No.	Column Lcation	Member id	Dead Load Verti. Fx kN	Wind on Structure N-S Verti. Fx kN	N-S Longi. Fy kN	N-S Trans. Fz kN	S-N Verti. Fx kN	S-N Longi. Fy kN	S-N Trans. Fz kN			
48	North	B48NP1	-9022				240	446	444	1.38	0.96	-0.94
	South	B48SP1	-8688				1323	38	432	1.29	0.78	-0.97
49	North	B49NP1	-18429				860	-85	718	0.98	0.63	-0.96
	South	B49SP1	-17842				3285	-142	635	1.03	1.15	-0.99
50	North	B50NP1	-13469				557	-65	744	0.83	0.69	-0.92
	South	B50SP1	-14723				3143	-89	656	0.90	1.21	-1.04
51	North	B51NP1	-15628				522	-142	647	1.23	0.91	-0.86
	South	B51SP1	-15586				3273	-59	474	1.01	0.58	-0.90
52	North	B52NP1	-11041				507	0	162	0.48	#DIV/0!	-0.80
	South	B52SP1	-8862				2062	0	160	0.75	#DIV/0!	-0.82
							15771	-97	5072			



Transverse displacement under wind load (mm) (Check)
1200
1000
800
600
400
200
0
Bent 48
Bent 49
Bent 50
Bent 51
Bent 52
Fixed in T
Free in T
4% Fric in T
4% Fric in Both


Total transverse force at top of column under wind load (kN) (Check)
3000
2500
2000
1500
1000
500
0
Fixed in T
Free in T
4% Fric in T
4% Fric in Both
Bent 48
Bent 49
Bent 50
Bent 51
Bent 52

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Truss Viaduct

Unfactored Axial Forces and Shears at Top of Columns under Wind Load

Case 4_4%:

Bearings at Bent 48 - transversely & longitudinally both (4%DL) friction

(Design)

Bent No.	Column Lcation	Member id	Dead Load Verti. Fx kN	Wind on Structure N-S Verti. Fx kN	N-S Longi. Fy kN	N-S Trans. Fz kN	S-N Verti. Fx kN	S-N Longi. Fy kN	S-N Trans. Fz kN
48	North	B48NP1	-8419						
	South	B48SP1	-8405						
49	North	B49NP1	-16933						
	South	B49SP1	-16709						
50	North	B50NP1	-12619						
	South	B50SP1	-13664						
51	North	B51NP1	-15265						
	South	B51SP1	-15464						
52	North	B52NP1	-10694						
	South	B52SP1	-8954						
							0	0	0

(Check)

Bent No.	Column Lcation	Member id	Dead Load Verti. Fx kN	Wind on Structure N-S Verti. Fx kN	N-S Longi. Fy kN	N-S Trans. Fz kN	S-N Verti. Fx kN	S-N Longi. Fy kN	S-N Trans. Fz kN
48	North	B48NP1	-9022				263	354	339
	South	B48SP1	-8688				1288	274	338
49	North	B49NP1	-18429				829	-149	823
	South	B49SP1	-17842				3327	-138	758
50	North	B50NP1	-13469				572	-106	725
	South	B50SP1	-14723				3128	-96	640
51	North	B51NP1	-15628				524	-167	636
	South	B51SP1	-15586				3273	-80	465
52	North	B52NP1	-11041				508	0	162
	South	B52SP1	-8862				2059	0	159
							15772	-109	5045

Unfactored Axial Forces and Shears at Top of Columns under Wind Load

Case 3_4%:

Bearings at Bent 48 - transversely (4%DL=340kN) friction & longitudinally free

(Design)

Bent No.	Column Lcation	Member id	Dead Load Verti. Fx kN	Wind on Structure N-S Verti. Fx kN	N-S Longi. Fy kN	N-S Trans. Fz kN	S-N Verti. Fx kN	S-N Longi. Fy kN	S-N Trans. Fz kN
48	North	B48NP1	-8419						
	South	B48SP1	-8405						
49	North	B49NP1	-16933						
	South	B49SP1	-16709						
50	North	B50NP1	-12619						
	South	B50SP1	-13664						
51	North	B51NP1	-15265						
	South	B51SP1	-15464						
52	North	B52NP1	-10694						
	South	B52SP1	-8954						
							0	0	0

(Check)

Bent No.	Column Lcation	Member id	Dead Load Verti. Fx kN	Wind on Structure N-S Verti. Fx kN	N-S Longi. Fy kN	N-S Trans. Fz kN	S-N Verti. Fx kN	S-N Longi. Fy kN	S-N Trans. Fz kN
48	North	B48NP1	-9022				269	0	346
	South	B48SP1	-8688				1314	0	346
49	North	B49NP1	-18429				810	-41	874
	South	B49SP1	-17842				3315	-31	809
50	North	B50NP1	-13469				566	-32	743
	South	B50SP1	-14723				3136	-18	656
51	North	B51NP1	-15628				519	-83	641
	South	B51SP1	-15586				3271	-11	469
52	North	B52NP1	-11041				509	0	156
	South	B52SP1	-8862				2059	0	154
							15767	-216	5194

Displacements
in GLOBAL coordinate system

Bay Bridge Temporary Bypass Structures - IAI Project 1295
Truss Viaduct

Displacements under Wind Load

Case 3_4%:
Bearings at Bent 48
transversely 4%DL friction & longitudinally free

Bent No.		Node Location	Node id	N-S Wind Longi.(X) mm	N-S Wind Trans.(Z) mm	S-N Wind Longi.(X) mm	S-N Wind Trans.(Z) mm	Check Longi.(X) mm	Check Trans.(Z) mm
48	North	Upper Deck	NU11	25	132	-52	-140	18	350
		Lower Deck	NL11	37	116	-56	-122	16	334
		Column Top	B48NP1	0	1	0	-1	0	0
		Column Base	B48NP2	0	0	0	0	0	0
	South	Upper Deck	SU11	-25	107	-4	-117	16	351
		Lower Deck	SL11	-19	89	-2	-96	18	333
		Column Top	B48SP1	0	1	0	-1	0	0
		Column Base	B48SP2	0	0	0	0	0	0
49	North	NW Upper Deck	NU17	-11	283	-12	-282	18	346
		NE Upper Deck	NU21	-17	279	-11	-282	15	350
		NW Lower Deck	NL17	-13	263	-17	-266	14	331
		NE Lower Deck	NL21	-11	263	-11	-266	16	331
		Column Top	B49NP1	-14	263	-18	-265	13	323
		Column Base	B49NP9	0	6	0	-6	0	2
	South	SW Upper Deck	SU17	-65	256	40	-257	19	346
		SE Upper Deck	SU20	-57	259	26	-264	9	352
		SW Lower Deck	SL17	-61	240	28	-243	11	331
		SE Lower Deck	SL20	-57	241	34	-244	18	331
		Column Top	B49SP1	-61	240	28	-244	11	323
		Column Base	B49SP9	-1	6	1	-6	0	2
50	North	NW Upper Deck	NU27	-17	390	-6	-389	16	346
		NE Upper Deck	NU31	-52	406	22	-405	25	356
		NW Lower Deck	NL27	-22	378	-8	-375	15	332
		NE Lower Deck	NL31	-46	378	22	-375	27	327
		Column Top	B50NP1	-22	378	-8	-374	14	324
		Column Base	B50NP9	0	7	0	-7	0	1
	South	SW Upper Deck	SU27	-56	390	32	-389	16	346
		SE Upper Deck	SU31	-14	407	-16	-405	-1	355
		SW Lower Deck	SL27	-58	378	25	-375	9	329
		SE Lower Deck	SL31	-15	378	-8	-375	6	329
		Column Top	B50SP1	-58	377	24	-375	9	321
		Column Base	B50SP9	-1	7	0	-7	0	1
51	North	Upper Deck	NU41	-51	281	23	-281	32	268
		Lower Deck	NL41	-51	270	24	-269	32	253
		Column Top	B51NP1	-51	270	24	-268	32	247
		Column Base	B51NP9	-1	6	0	-6	-1	-2
	South	Upper Deck	SU41	-14	281	-13	-280	5	267
		Lower Deck	SL41	-15	270	-12	-269	6	252
		Column Top	B51SP1	-15	269	-12	-269	5	247
		Column Base	B51SP9	0	5	0	-5	0	-2
52	North	Upper Deck	NU47	-51	130	27	-130	40	153
		Lower Deck	NL47	-56	123	25	-123	41	140
		Column Top	B52NP1	0	123	0	-122	0	137
		Column Base	B52NP9	0	2	0	-2	0	1
	South	Upper Deck	SU47	-14	130	-10	-130	11	151
		Lower Deck	SL47	-15	123	-15	-123	9	139
		Column Top	B52SP1	0	122	0	-123	0	136
		Column Base	B52SP9	0	2	0	-2	0	1

Displacements
in GLOBAL coordinate system

Bay Bridge Temporary Bypass Structures - IAI Project 1295
Truss Viaduct

Displacements under Wind Load

Case 4_4%:
Bearings at Bent 48
transversely & longitudinally both 4%DL friction

Bent No.		Node Location	Node id	N-S Wind Longi.(X) mm	N-S Wind Trans.(Z) mm	S-N Wind Longi.(X) mm	S-N Wind Trans.(Z) mm	Check(1) Longi. mm	Check(1) Trans. mm
48	North	Upper Deck	NU11	-2	157	-10	-155	54	326
		Lower Deck	NL11	9	141	-13	-137	52	311
		Column Top	B48NP1	1	1	-1	-1	0	0
		Column Base	B48NP2	0	1	0	-1	0	0
	South	Upper Deck	SU11	-40	138	29	-136	54	326
		Lower Deck	SL11	-34	121	31	-116	56	309
		Column Top	B48SP1	-1	1	0	-1	0	0
		Column Base	B48SP2	0	0	0	0	0	0
49	North	NW Upper Deck	NU17	-28	275	23	-271	55	327
		NE Upper Deck	NU21	-31	276	19	-273	49	333
		NW Lower Deck	NL17	-31	258	17	-256	51	314
		NE Lower Deck	NL21	-26	259	20	-258	50	314
		Column Top	B49NP1	-31	259	17	-256	50	306
		Column Base	B49NP9	-1	6	0	-6	0	1
	South	SW Upper Deck	SU17	-71	255	66	-250	58	326
		SE Upper Deck	SU20	-68	258	54	-256	47	333
		SW Lower Deck	SL17	-68	240	55	-237	50	313
		SE Lower Deck	SL20	-67	240	62	-238	56	313
		Column Top	B49SP1	-68	239	54	-237	49	305
		Column Base	B49SP9	-2	6	1	-6	0	1
50	North	NW Upper Deck	NU27	-31	378	24	-376	50	338
		NE Upper Deck	NU31	-62	395	49	-394	59	348
		NW Lower Deck	NL27	-36	366	22	-363	48	325
		NE Lower Deck	NL31	-57	366	49	-363	60	320
		Column Top	B50NP1	-36	366	22	-362	47	317
		Column Base	B50NP9	-1	7	0	-7	-1	1
	South	SW Upper Deck	SU27	-66	378	60	-376	53	339
		SE Upper Deck	SU31	-26	395	13	-394	34	348
		SW Lower Deck	SL27	-69	366	53	-363	46	322
		SE Lower Deck	SL31	-28	367	21	-363	41	322
		Column Top	B50SP1	-68	366	53	-363	45	314
		Column Base	B50SP9	-1	7	1	-7	-1	1
51	North	Upper Deck	NU41	-61	276	51	-275	65	266
		Lower Deck	NL41	-62	264	51	-263	65	252
		Column Top	B51NP1	-62	264	51	-262	64	246
		Column Base	B51NP9	-1	6	1	-6	-2	-2
	South	Upper Deck	SU41	-27	276	16	-275	40	265
		Lower Deck	SL41	-27	264	16	-263	40	251
		Column Top	B51SP1	-27	264	16	-264	39	245
		Column Base	B51SP9	0	5	0	-5	-1	-2
52	North	Upper Deck	NU47	-62	130	54	-130	73	156
		Lower Deck	NL47	-67	122	53	-123	74	143
		Column Top	B52NP1	0	123	0	-122	0	140
		Column Base	B52NP9	0	2	0	-2	0	1
	South	Upper Deck	SU47	-26	130	18	-130	45	154
		Lower Deck	SL47	-28	123	14	-123	43	142
		Column Top	B52SP1	0	122	0	-123	0	139
		Column Base	B52SP9	0	2	0	-2	0	1

EA

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No.	Comment Date	sheet number	detail, view or elev	DESIGN COMMENT	Response Date	Status	to Reviewer's comment, if required.	Verify
Foundation Report by Geomatrix Cons., Project No. 9198.000 dated 1/22/04								
1	3/9/2004	3	3.1	Add Fugro-EMI ground motion rpt to end of bullet list				
2	3/10/2004	4	4.1.1	Should also be exploration at the actual support locations to define actual bedrock elevations and foundation				
3	3/9/2004	5	5.2, 2nd para	Seismicity is in ground motion rpt				
4	3/3/2004	5	5.3	Geomatix shows subsurface cross sections developed by Fugro-EMI. Need to make a statement whether they concur with the interpretation. If not, what additional investigation do they plan to do?				
5	3/9/2004	10	7.1.2 last sent.	est. top of rock el. Are per Fugro-EMI contours, which are approx. based on scarse data and judgement, actual el.				
6	3/9/2004	12	Table 7.1.2	Add "Approx." to "Top of rock" label				
7	3/9,10/2004	12	Table 7.1.2	(a) Bent 48 Ext. is at crest of steep slope. Pile are driven to tip above rock. New borings should help define actual rock depth. Was extending piles to rock considered? (b) Lateral stability is a concern, need to check. Check road plans for transition structures for road grade, it was to be lowered significantly in this area for RW construction etc				
8	3/9/2004	12	Table 7.1.2	For Bent 47B, rock el shown as 26.8 m but Section 7.1.2 said 21 to 27 m.				
9	3/9/2004	12	Table 7.1.2	For Bent 48 Ext and Int., rock el. shown as 21.5 m but Section 7.1.2 said 19 to 23 m.				
10	3/9/2004	18	Table 7.1.3	Add "Approx." to "Top of rock" label. Some piles listed with tip in rock such as Bent 43BL, but Sect. 7.1.3.1a says "Bent 47AR is the only CIDH pile ...in ...rock"?				
11	3/9/2004	18	Table 7.1.3	Bent 45R tip is @ rock, but 7.1.3.3c says 45R tips in sand?				
12	3/9/2004	20	7.1.3.3a, last sent.	How to compact inside a belled drill hole? How to check "density similar to ...adjacent soil", who should approve?				
13	3/9/2004	20	7.1.3.3d	Quantify "some minimum depth" for tremie conc head!				
14	3/9,10/2004	21	Sect. 7.1.3.4, 7.1.3.1a, 7.1.3.3c; Table 7.1.4	There are inconsistencies: 7.1.3.4 says CIDH tip in rock and settlement is 1/2". Sect. 7.1.3.1a says "Bent 47AR is the only CIDH pile ...in ...rock". Sect. 7.1.3.3c says 5 bents tip in sand "0-11m above rock". Table 7.1.4 shows some piles in soil, some in rock. Back in 7.1.3.4, is expected settlement of those piles tipping in soil also 13 mm?				
15	3/9/2004	24	Table 7.1.4b	Missing column headers to identify what is dimension or				

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No.	Comment Date	sheet number	detail, view or elev	DESIGN COMMENT	Response Date	Status	to Reviewer's comment, if required.	Verify
16	3/9/2004	24	Table 7.1.4b	State size of micropile for 1,335 kN capacity. Add "Approx." to "Top of rock" label				
17	3/9/2004	27	7.1.5.4	Does tiedown lock-off load not affect (reduce) the available geotechn. capacity of ftg given in prior tables?				
18	3/3/2004	26	7.1.5.2	No mention on centralizer, bearing plate, plastic sheathing, grouting procedure				
19	3/9/2004		7.1.5.4	Does lock-off affect available geotechn. capacity of ftg?				

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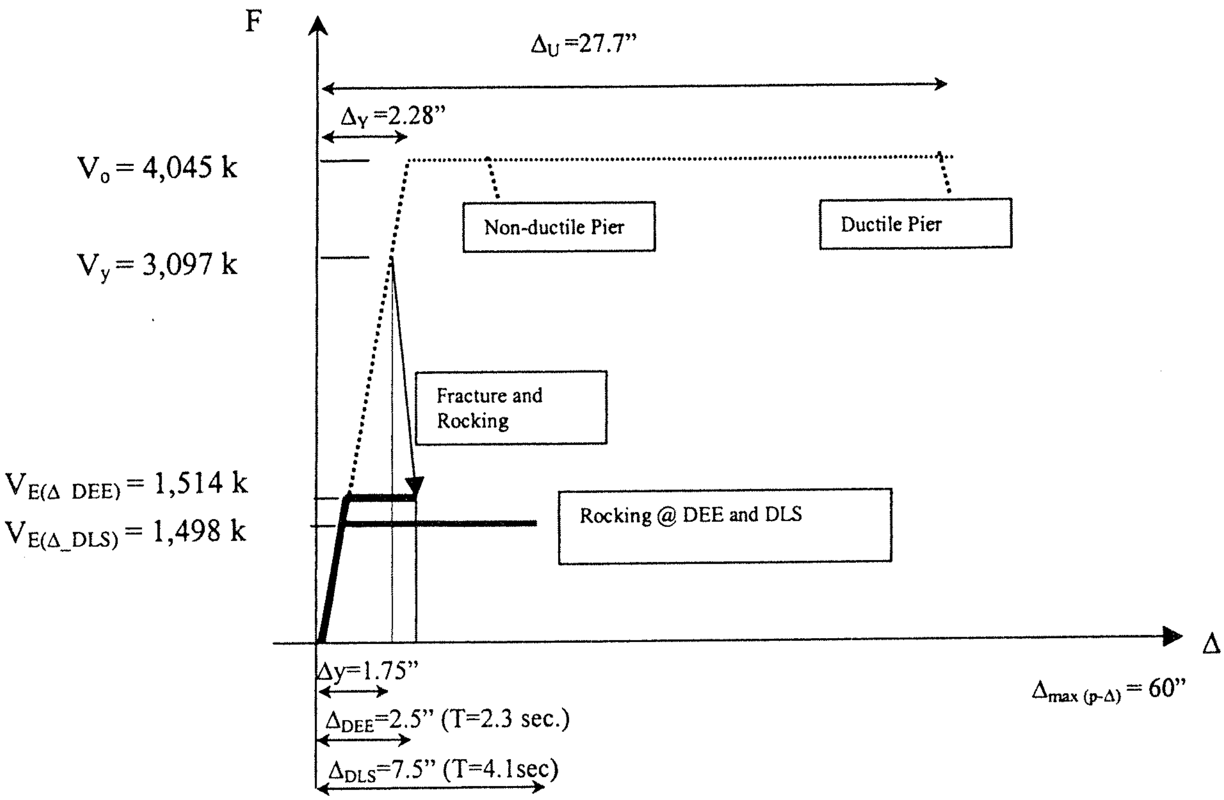
No.	Comment Date	sheet number	detail, view or elev	DESIGN COMMENT	Response Date	Status	to Reviewer's comment, if required.	Verify
Foundation Report for TBS East Tie-In by Geomatrix Cons., Project No. 9198.001 dated 1/15/04								
1	3/17/2004	3	3.1	Add Fugro-EMI ground motion rpt to end of bullet list				
2	3/17/2004	5	4.3, para 2	Refer to Fig 2 showing boreholes. 99C-137 missing in Fig 2				
3	3/17/2004	5	4.3, para 3	Should clarify that rock contours in EMI rpt are approximate, developed from scarse data and judgment. Local rock depth at ftgs should be probed, particularly at 53R				
4	3/17/2004	7	6.1	Imbsen plan sheet 16 of 51 dated Jan 2004 says 64 mm dia. (not 200 mm) tiedown				
5	3/17/2004	7	Table 6.1.1, Sect 6.1.1.1	Should probe depth to competent rock at actual ftg locations. Rock may be lower (+2.0m?) than bottom of ftg				
6	3/17/2004	7	6.1.1.1 para 1	What is contingency during construction if COMPETENT rock is below ftg bottom? Moffatt Nichols' EB Detour design has many ftgs in East Tie on foundation concrete below concrete spread ftg, benched into competent rock.				
7	3/17/2004	8	6.1.1.1 para 3, 6.1.2 para	State that GW is based on scarse data, fluctuates with tides, season, surface run-off				
8	3/18/2004	9	6.1.2 para 1, 7.0	Recommend soil exploration at support 53R to determine design parameters and construction considereations.				
9	3/18/2004	10	Table 6.1.2	Add "Approx." to GSE & "Top of rock" labels.				
10	3/18/2004	11	6.1.2.3a,b	Recommend soil exploration at all support locations to determine constructability of foundation type.				
11	3/18/2004	12	7.1.3.3d	Quantify "some minimum depth" for tremie conc head spec.				
12	3/18/2004	12	6.1.2.4	What does "somewhat incompressible nature of rock" mean? Pressuremeter tests on adjacent borings per Fugro-EMI Site Char. Rpt quantify rock compressibilty. How was CIDH pile settlement determined?				
13	3/9/2004	15	6.1.3.4	"lock-off will be spec. on plans" - Does tiedown lock-off not reduce available geotechn. Ftg capacity in table 6.1.1?				
14	3/18/2004	15	6.1.3.4	Geotech should provide locked-off load of the tie-down anchor. This will affect deflection of the foundation.				
15	3/18/2004	16	6.3.2	"stability of excavations...cannot be predicted" these are existing soils. A simple manual or backhoe field trench would answer this. Fugro-EMI Found. Rpt Sect. 5.2.3.3 reported soil caving in geoprobings at nearby W4R ftg.				

EA

YBI, TBS, East Segment, SFOBB East Span Seismic Safety Project

No.	Comment Date	sheet number	detail, view or elev	DESIGN COMMENT	Response Date	Status	to Reviewer's comment, if required.	Verify
16	3/18/2004	17	7.0	RE "assumption that subsurface conditons do not deviate appreciably from...exploratory borings and CPT" and "some funding is recommended ... add'l exploration": Additional borings may be required to back up the assumptions.				
17	3/18/2004	19	8.0	Add Fugro-EMI ground motion rpt. Geomatrix refer to old Imbsen plans Dec 2003, we looked at Jan 2004, has significant differences				
18	3/18/2004	-	Fig. 2	CPT 99C-137 not shown next to 99-305. Caltrans' 94-5 & 95-2 can be shown also. "Transverse" mispelled				

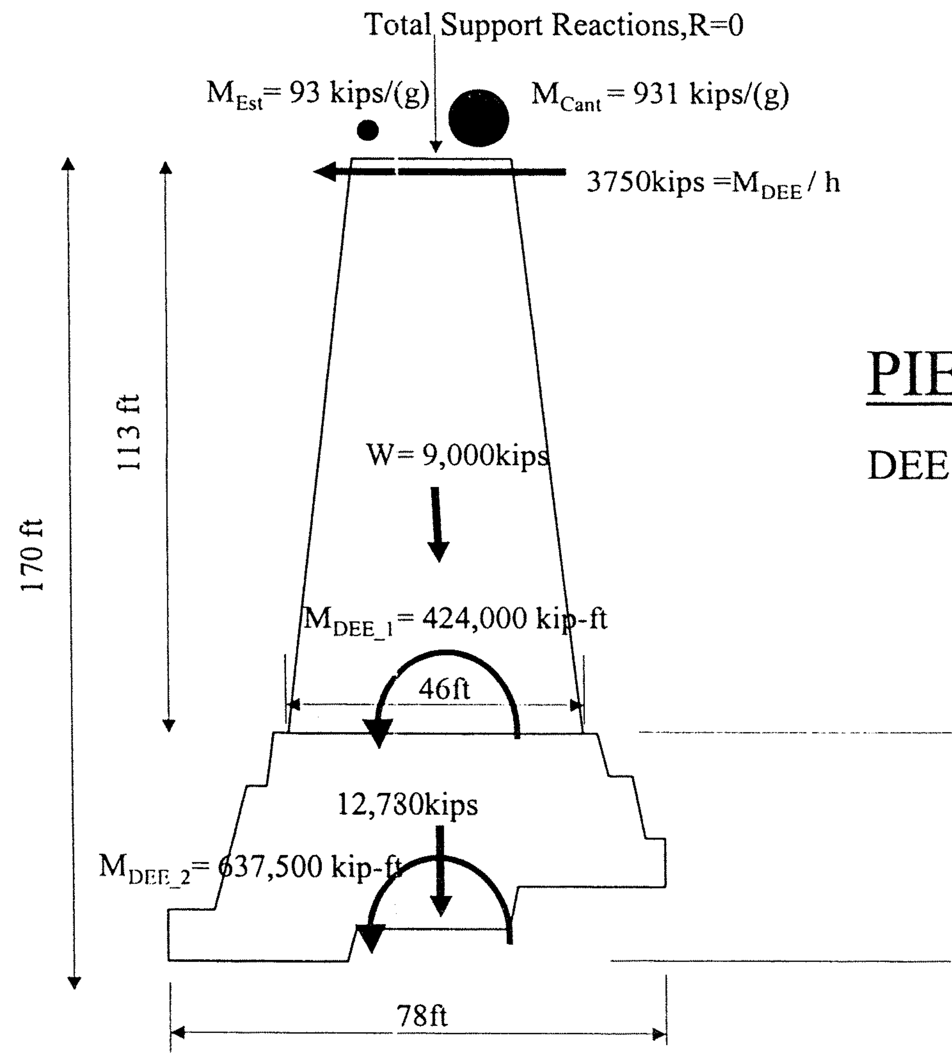
Rocking analysis and pier pushover displacements



Δ_U = Displacement Capacity of Pier E1, assuming full ductility
Δ_Y = Idealized yield displacement of Pier E1
Δy = yield displacement at initiation of steel bar yielding
Δ_{DEE} = Rocking displacement response at DEE
Δ_{DLS} = Rocking displacement response at DLS (3 x DEE)
V_o = Overstrength Shear Capacity of Pier E1
V_o = Shear Capacity corresponding to initial Yielding of Pier E1
$V_{E(\Delta\_DEE)}$ = Overturning Rocking Force at DEE Displacement
$V_{E(\Delta\_DLS)}$ = Overturning Rocking Force at DLS Displacement

PIER E1

DEE forces and overturning moments



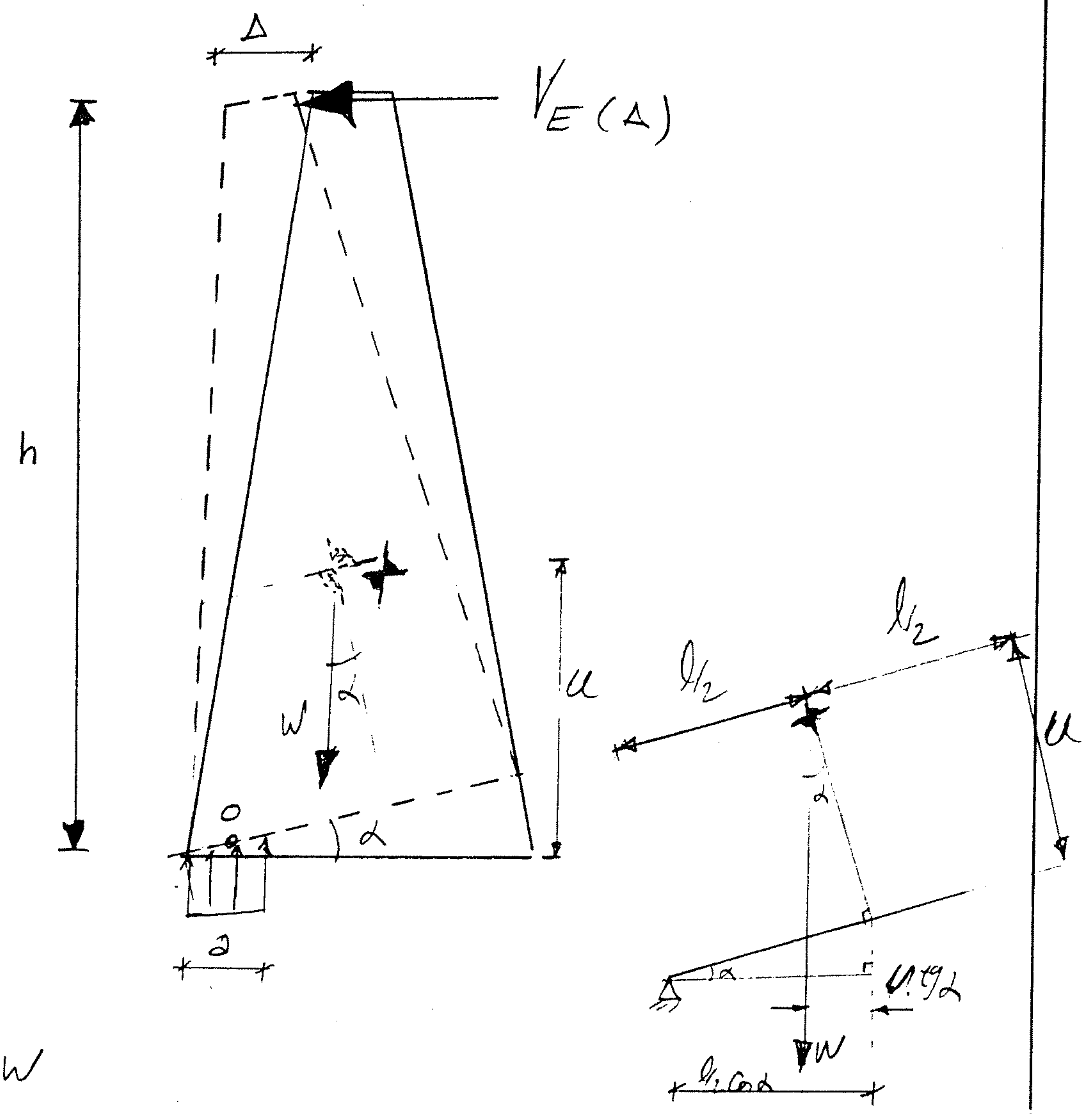
Ductility evaluation using pushover analysis

1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
P(kips)	Rebar	L(ft)	d (in)	Lp(ft)	ϕ_y	ϕ_u	Mp(kip-ft)	$(EI)_{eff}$	K_{eff}	Vp(kips)	Δy(ft)	θp	Δp(in)	Δu(in)	DEE(in)	3*DEE(in)
2000	0.39%	113	1.27	9.61	4.48E-05	0.00208	457100	1.021E+10	21238	4045	2.28	0.0196	25.4	27	3.27	9.82

Note that:

1) P is axial load acting at either top or base of the column under DL+EQ
2) D is the diameter of the column
3) Rebar means the longitudinal rebar ratio
4) L is the column length between column top and top face of footing
5) d is the diameter of the longitudinal rebar
6) Lp is the plastic hinge length that calculated from $Lp=0.08L+0.15f_yd$
7) ϕ_y is the effective yield curvature from section analysis
8) ϕ_u is the ultimate curvature obtained from section anlaysis
9) M_p is effective plastic moment
10) $(EI)_{eff}$ is effective bending stiffness of the column = M_p / ϕ_y
11) K_{eff} is effective shear stiffness of the column = $3(EI)_{eff} / L^3$
12) V_p is shear force based on the effective plastive moment divided by column length = M_p/L
13) Δ_y is the elastic deformation capacity = V_p / K_{eff}
14) θ_p is rotation angle of the plastic hinge = $L_p(\phi_u - \phi_y)$
15) Δ_p is the plastic deformation capacity due to the rotation of plastic hinge = $\theta_p(L-L_p/2)$
16) Δ_u is the total deformation capacity of the column = $\Delta_y + \Delta_p$
17) 3*Spect is 3 times of the deformation demand under project spectrum
18) 0.10g is the deformation demand under 0.1g static force
19) Wind is the deformation demand under wind load
20) D/C is the maximum defomation demand (here is under 0.1g) divided by deformation capacity Δ_u

ROCKING ANALYSIS - PIER E1

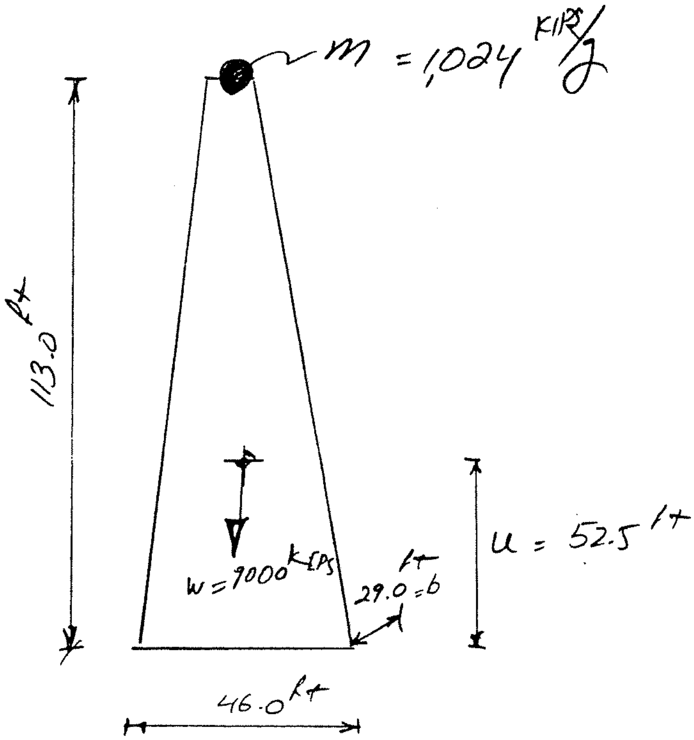


$K_s \cdot a \cdot b = W$

$$V_E(\Delta) = \frac{W}{h}\left(\frac{l}{2}\cos\alpha - u \cdot tg\alpha - \frac{a}{2} \right)$$

$$tg\alpha = \frac{\Delta}{h} \quad , \quad \cos\alpha = \frac{1}{\sqrt{1+\left(\frac{\Delta}{h}\right)^2}}$$

Job Title EAST TIE-IN		Job No. 1295	Sheet 1
Subject PIER E1.	Designed By M. SARRAF	Date 4/15/04	of
ROCKING ANALYSIS	Checked By	Date	Total Sheet
			of



$$u = \frac{113.0'}{3.0}\left(\frac{2\times 30^{ft} + 46.0^{ft}}{30.0 + 46.0}\right) = 52.5^{ft}$$

$$a = \frac{W}{K_s \cdot b} = \frac{9000}{40^{KSF} \cdot 29} = 7.75^{ft}$$

ASSUME $\Delta_{DEE} = 10.0''$

$$tg\,\alpha = \frac{\Delta}{h} = \frac{10''}{12 \times 113} = 7.37 \times 10^{-3}$$

$$\cos\alpha = 0.99 \approx 1.0$$

Job Title		Job No.	Sheet 2
Subject	Designed By	Date	of
	Checked By	Date	Total Sheet
			of

$$V_E(\Delta) = \frac{9000^{k}}{113^{ft}}\left(1.0 \times \frac{46.0}{2} - 52.5 \times \frac{\Delta^{(ft)}}{113} - \frac{7.75}{2}\right)$$

$$V_E(\Delta) = 79.64\,(19.12 - 0.0387\,\Delta'')$$

$$\boxed{V_E(\Delta) = 1522.7 - 3.08\,\Delta^{(in)}}$$

$$M_R = V_E(\Delta)\cdot h$$

ASSUME: $\Delta = 10'' \longrightarrow V_E(\Delta) = 1{,}491$, $M_R = V_E \cdot h = 168{,}580^{k'}$

$$K = \frac{V_E(\Delta)}{\Delta} = \frac{1{,}491^{k}}{\left(\frac{10''}{12}\right)'} = 1{,}789\ {}^{k/ft}$$

$$T = 2\pi\sqrt{\frac{M}{K}} = 2\pi\sqrt{\frac{1{,}024}{1{,}789}} = 4.75^{\ SEC.}$$

$S_a = 0.0131^{(g)}$, $D = \frac{1.5}{40 \cdot 0.15 + 1.0} + 0.5 =$

DAMPED RESPONSE

$= 0.714$

$$S_a' = 0.0131^{(g)} \times 0.714 = 0.00937^{(g)}$$

Job Title		Job No.	Sheet 3
Subject	Designed By	Date	of
	Checked By	Date	Total Sheet
			of

$$\Delta = S_D = \frac{S_a'}{\omega^2} = \frac{S_a'}{\left(\frac{2\pi}{T}\right)^2} = \frac{0.00937 \times 32.2^{ft/sec}}{\left(\frac{2\pi}{4.75}\right)^2}$$

$$\Delta = 2.06^{(in)}, \quad F = m \cdot S_a' = 1{,}024 \times 32.2 \times 0.00937$$
$$= 308.9 \text{ KIPS} < V_{E(\Delta)}$$

USE $\Delta = 2.06''$

$$V_{E(\Delta)} = 1522.7 - 3.08 \times 2.06 = 1515.6^{k}$$

$$K = \frac{V_{E(\Delta)}}{\Delta} = \frac{1515.6}{\left(\frac{2.06}{12}\right)} = 8{,}287^{k/ft}$$

$$T = 2\pi\sqrt{\frac{M}{K}} = 2\pi\sqrt{\frac{1{,}024}{8{,}287}} = 2.2^{SEC.}$$

$$S_a = 0.0708^{(g)}$$

$$S_a' = 0.714 \times 0.0708 = 0.0505^{(g)}$$

$$\Delta = S_D = \frac{S_a'}{\omega^2} = \frac{S_a'}{\left(\frac{2\pi}{T}\right)^2} = \frac{0.0505 \times 32.2}{\left(\frac{2\pi}{2.2}\right)^2}$$

$$\Delta = 0.199^{ft} = 2.4^{(in)}, \quad F = 1{,}665 > V_{E(\Delta)}$$

Job Title	Job No.	Sheet 4
Subject	Designed By	Date	of
	Checked By	Date	Total Sheet
			of

$\Delta = 2.4^{in}$

$V_{E(\Delta)} = 1522.7 - 3.08 \times 2.2 = 1514.6^{\text{KIPS}}$

$K = \dfrac{V_{E(\Delta)}}{\Delta} = \dfrac{1514.6}{\left(\dfrac{2.4^{in}}{12}\right)} = 7{,}573 \ ^{K/ft}$

$T = 2\pi\sqrt{\dfrac{M}{K}} = 2\pi\sqrt{\dfrac{1024}{7{,}573}} = 2.3^{\text{SEC.}}$

$S_a = 0.0672^{(g)}$

$S_a' = 0.714 \times 0.0672 = 0.0479^{(g)}$

$\Delta = S_D = \dfrac{S_a'}{W^2} = \dfrac{S_a'}{\left(\dfrac{2\pi}{T}\right)^2} = \dfrac{0.0479 \times 32.2}{\left(\dfrac{2\pi}{2.3}\right)^2}$

$= 0.207^{ft} = 2.48^{in}$

$\therefore \boxed{\Delta_{DEE} = 2.5^{in}}$

Job Title		Job No.	Sheet 5
Subject	Designed By	Date	of
	Checked By	Date	Total Sheet
			of

$\Delta_{DLS} = ?$

ASSUME $\Delta_{DLS} = 3\Delta_{DEE} = 3 \times 2.5'' = 7.5''$

$V_{E(\Delta)} = 1522.7 - 3.08 \times 7.5 = 1498.9^{k}$

$k = \dfrac{V_{E(\Delta)}}{\Delta} = \dfrac{1{,}498.9^{k}}{\left(\frac{7.5}{12}\right)} = 2{,}398$

$T = 2\pi\sqrt{\dfrac{M}{K}} = 2\pi\sqrt{\dfrac{1{,}024}{2{,}398}} = 4.1$ SEC.

Job Title		Job No.	Sheet 6
Subject	Designed By	Date	of
	Checked By	Date	Total Sheet
			of

$$\Delta_{DLS} = 3\,\Delta_{DEE} = 7.5^{in}$$

$$M_R = V_{E(D)} \cdot h$$

$$V_{E(D)} = 1522.7 - 3.08 \times 7.5 = 1{,}499.6^{k}$$

$$M_R = 1{,}499.6 \times 113^{ft} = 169{,}458^{k'}$$

MAXIMUM DISPLACEMENT

$$\Delta_{max} = ?$$

$$V_{E(D)} = 0$$

$$\frac{w}{h}\left(\frac{l}{2}\cos\alpha - u \cdot \tan\alpha - \frac{t}{2}\right) = 0$$

$$\frac{46}{2} \cdot \cos\alpha - 52.5 \times \frac{\Delta}{113} - \frac{7.75}{2} = 0$$

$$23 \cdot \frac{1}{\sqrt{1 + \frac{\Delta}{113}}} - 52.5 \cdot \frac{\Delta}{113} - \frac{7.75}{2} = 0$$

Job Title		Job No.	Sheet
Subject	Designed By	Date	of
	Checked By	Date	Total Sheet
			of

$$\frac{23}{\sqrt{1+\frac{\Delta}{113}}} = 3.875 + 0.464\,\Delta$$

$$\Delta = \left(\frac{23}{\sqrt{1+\frac{\Delta}{113}}} - 3.875\right)\frac{1}{0.464}$$

$$\Delta_{max} = 35.0 \text{ ft}$$

P-Δ LIMIT.

$$\frac{P.\Delta}{M_R} \leqslant 0.3$$

$$M_R = 169{,}458^{\,k\text{-}ft} = V_E \cdot h \quad , \quad P = 9000^{\,k}$$

$$\Delta \leqslant \frac{0.3 \times M_R}{P} = \frac{0.3 \times 169{,}458}{9000} = 5.64 \text{ ft}$$

$$V_E(\Delta) = 1522.7 - 3.08 \times 12 \times 5.64 = 1313^{\,k}$$

$$M_R = 1313 \times 113' = 148{,}369^{\,k'} \longrightarrow \Delta_{max} = 4.94 \text{ ft} \approx 5.0 \text{ ft}$$

Job Title		Job No.	Sheet
Subject	Designed By	Date	of
	Checked By	Date	Total Sheet
			of

Capacity check of Pier E1

1. Demand forces and bending moment at bottom of Pier E1

Table 1: Forces and bending moments at bottom of Pier E1 (either south or north side)

	DL	EQ1 = L+0.3(T+V)	EQ2 = T+0.3(L+V)	EQ3 = V+0.3(L+T)	DL+EQ1	DL+EQ2	DL+EQ3
P (kips)	-12300	10100	13900	5800	-2200	1600	-6500
QL (kips)	0	4500	3170	1800	4500	3170	1800
QT (kips)	0	2100	2830	1200	2100	2830	1200
ML (kip-ft)	0	424000	300000	172000	424000	300000	172000
MT (kip-ft)	0	60000	77200	33000	60000	77200	33000

In table 1, P is the axial force, minus means in compression and plus means in tension. The values under the load cases EQ1, EQ2 and EQ3 could be in tension and compression. QL and QT are the shear forces in longitudinal and transverse directions, respectively. ML and MT are the bending moments in longitudinal and transverse directions, respectively. The critical load case is DL+EQ1 shown in table 1, which has 2000 kips tension forces and has the largest bending moment (424,000 kip-ft) in longitudinal directions at the bottom of Pier E1.

2. Bending moment capacity at bottom of pier E1 based on section analysis

Section analysis was carried out using the program XTRACT. The material properties used in the section analysis are:

Yield stress of rebar: 36ksi
Failure strain of rebar: 9%
Concrete 28-day compression strength: 4ksi (unconfined concrete)
Tension strength of concrete: 0.4ksi
Failure strain of concrete: 0.5%

Because there is no sufficient transverse reinforcement, no confined concrete was considered in the section analysis.

Based on the forces and bending moment shown in table 1, the net axial force associated with the maximum bending moment in the load case of DL+EQ1 is 2000 kips compression. The section and moment curvature obtained from the XTRACT program output are shown in Figure 1 and 2. There are 336 longitudinal reinforcement bars with 1.25 X 1.25 inches square section. The total concrete section area is 924 square feet. The total reinforcement area is 3.642 square feet. Then the reinforcement ratio is only 0.39%.

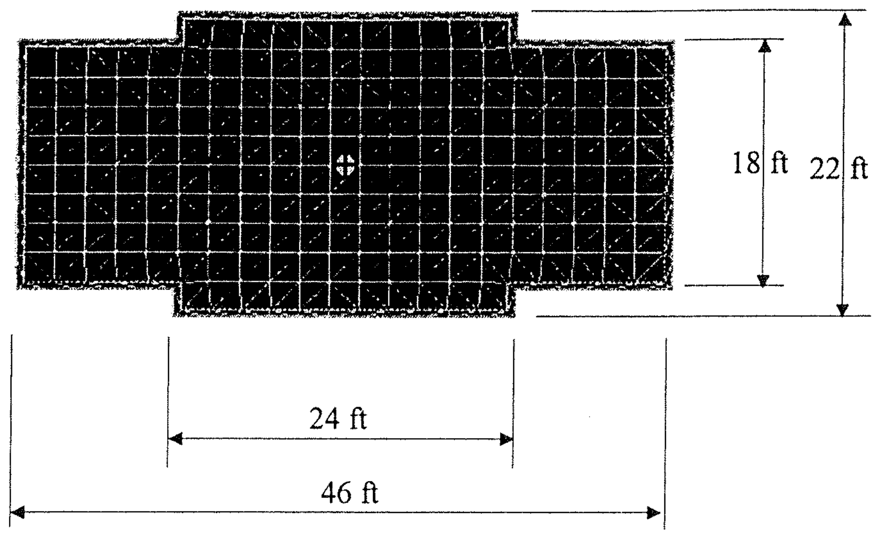


Figure 1: Section shape at bottom of Pier E1 (either south or north side)

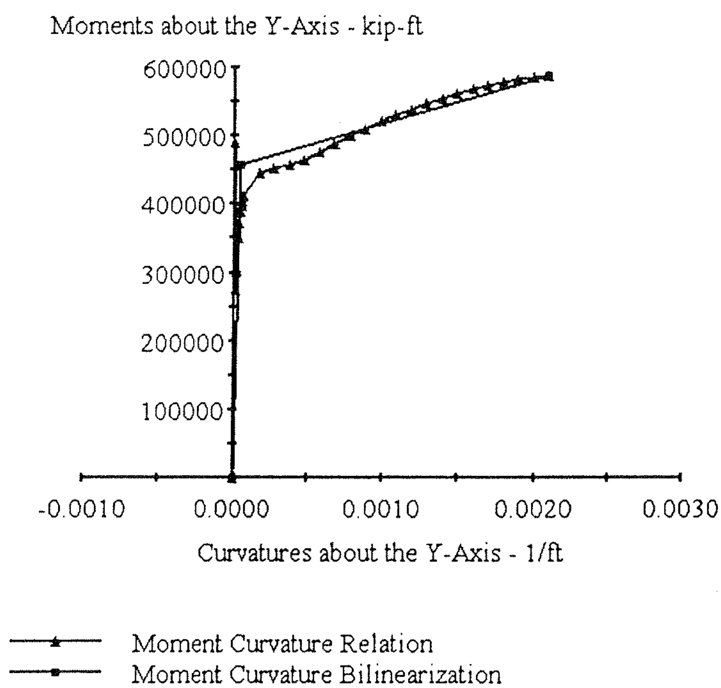


Figure 2: Bending moment vs. curvature at axial force 2000 kips

The bending moment capacity when the rebar begins to yield is 350,000 kip-ft. The nominal bending **moment when** maximum stress at extreme concrete fiber reaches rupture stress 475psi is 455,000 kip-ft.

Ductility evaluation using pushover analysis

1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
P(kips)	Rebar	L(ft)	d (in)	Lp(ft)	ϕ_y	ϕ_u	Mp(kip-ft)	$(EI)_{eff}$	K_{eff}	Vp(kips)	Δy(ft)	θp	Δp(in)	Δu(in)	DEE(in)	3*DEE(in)
2000	0.39%	113	1.27	9.61	4.48E-05	0.00208	457100	1.021E+10	21238	4045	2.28	0.0196	25.4	27	3.27	9.82

Note that:

1) P is axial load acting at either top or base of the column under DL+EQ
2) D is the diameter of the column
3) Rebar means the longitudinal rebar ratio
4) L is the column length between column top and top face of footing
5) d is the diameter of the longitudinal rebar
6) Lp is the plastic hinge length that calculated from $Lp=0.08L+0.15f_yd$
7) ϕ_y is the effective yield curvature from section analysis
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9) M_p is effective plastic moment
10) $(EI)_{eff}$ is effective bending stiffness of the column = M_p / ϕ_y
11) K_{eff} is effective shear stiffness of the column = $3(EI)_{eff} / L^3$
12) V_p is shear force based on the effective plastive moment divided by column length = M_p/L
13) Δ_y is the elastic deformation capacity = V_p / K_{eff}
14) θ_p is rotation angle of the plastic hinge = $L_p(\phi_u - \phi_y)$
15) Δ_p is the plastic deformation capacity due to the rotation of plastic hinge = $\theta_p(L-L_p/2)$
16) Δ_u is the total deformation capacity of the column = $\Delta_y + \Delta_p$
17) 3*Spect is 3 times of the deformation demand under project spectrum
18) 0.10g is the deformation demand under 0.1g static force
19) Wind is the deformation demand under wind load
20) D/C is the maximum deformation demand (here is under 0.1g) divided by deformation capacity Δ_u

(10)

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Caltrans 111 Grand Ave Room 12-820 Oakland, CA	Date: Time:	April 23, 2004 10:00 a.m.- 12:00 p.m.

Minutes Prepared By: Bill Kidwell, Majid Sarraf and Roy Imbsen.

Attendees List: See Attachment 1

Purpose

The purpose was to have all parties working on the project to meet, continue to set up a system to communicate with each other and begin asking technical questions.

It is not the intent of these meeting minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees
Attachment 2 – Agenda (prepared by IAI)
Attachment 3 – RFI List
Attachment 4 – Viaduct Stiffness Comparison 4/15/04 run date with 4/22/04 run date
Attachment 5 – Abutment 48 Force vs. Displacement chart
Attachment 6 – East Tie-in Load path diagrams and Pier E1 Capacity in Transverse directions

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
B. Coupe	CC Myers
IAI Attendees	
IAI File 1295.310.01	

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

1. Roy handed out Viaduct Stiffness Comparison sheet between 4/15/04 run date and 4/22/04 run date (attached).

2. Roy handed out Abutment 48 Force vs displacement chart. Tom is not satisfied the structure will behave as shown in the diagram.

3. Dan requested Imbsen to submit an RFI requesting acceptance of a lower value for the relative stiffness between bents 48 and 49.

4. Ken will email Roy the pertinent information to include in the confidentiality agreement to permit issuance of the as-built plans. Ken will provide Tom and Roy with disks containing the as-built plans.

5. Tom wants transverse displacement of the structure to be consistent with other structures. Tom cannot find any guidelines addressing this issue. Because of the flexible design, Tom would like to see further evaluation of the structure at lower wind speed and what affect this may have on the traveling public.

6. Tom requested evaluation of the structure beyond DLS to determine if there will be any detrimental affects to the structure if an event greater than DLS occurs. Will the structure sustain major damage after DLS?

7. Ken said it could take up to a month to get surveys to provide information requested by Imbsen.

8. Tom is still working on getting the wind speed information.

9. Roy proposed that a lateral load analysis for a unit load can be performed to demonstrate the continuity of the superstructure and to ensure that the stiffness of bents are reasonably proportioned.

10. Majid explained the seismic design load path in the East Tie-In, and pointed out the possibility of rocking in the transverse direction. Majid emphasized the major influence that various assumptions on the boundary conditions can have on seismic forces applied to the superstructure as well as to the anchorage at Pier E1. He also noted the fact that the criteria did not spell out the condition of Pier E1 as either duc-

tile substructure or as seismically isolated component to limit the loads transferred to the superstructure. Dan and Tom pointed out that the superstructure is intended to remain essentially elastic. Dan stated that Pier E1 should be assumed as elastic substructure and is expected to be capable of resisting seismic forces transferred from East Tie-In. Dan emphasized the importance of having a safety factor of 3 against seismic forces resisted by the anchorages to Pier E1.

11. Roy suggested that another option for the seismic design strategy would be to install a load limiting device between Pier E1 and the East Tie-In. This was discussed conceptually with a sketch drawn by Majid to illustrate the principals involved.

Attachment 1

MEETING ATTENDANCE SHEET

San Francisco – Oakland Bay Bridge
Temporary Bypass Structure

IAl Job # 1295   Contract # 04-0120R4

Date: 4-23-2004

Caltrans:

☐ Pete Siegenthaller	☒ Tom Ostrom	☐ Manode Kodsuntie
☐ Amer Bata	☒ Dan Adams	☐ Trinh Lia
☒ Ken Loncharich	☒ Ali Asnaashari	☐ Nizar Melehani
☒ John Walters	☒ Randy Bains	☐ Eric Watson

CC Myers:

☐ Bob Coupe

☒ Bill Kidwell

DCCI:

☐ Jim Ronning
☐ Jack Geer
☐ Ron Paz

Imbsen & Associates:

☒ Roy Imbsen	☐ Jonathan Reina
☐ Lance Schrey	☐ Ghassam Dini
☐ Dick LeBeau	☐ Sasan Soltani
☐ Ed Tyk	☒ Majid Sarraf
☐ Todd Lambert	☐

Others:

☐   ☐

Note: The boxes checked above designate attendance at the meeting.

Attachment 2

BAY BRIDGE TEMPORARY BYPASS

SOUTH SOUTH DETOUR
PROJECT MEETING AGENDA
Friday April 23, 2004

10:00 a.m.	Meeting Begin

Location:

Caltrans
111 Grand Avenue Room 12-820
Oakland CA

Agenda:

- Past meeting minutes
  - Meeting 4/02/04
  - Meeting 4/09/04
  - Meeting 4/16/04
- Conformed set of Plans and Special Provisions
  - Electronic set of plans
  - Confidentiality Agreement
- Request for Information Log
  - Outstanding RFI's
- Force vs. Load Displacement of frictional resistance mechanism (as requested by Tom Ostrom)
- Longitudinal and transverse seismic load paths in superstructure
- Longitudinal response of Pier E1 and seismic design forces in superstructure (Elastic vs. ductile design)
- Transverse response of Pier E1 and seismic design forces in superstructure (Elastic vs. ductile design)

San Francisco Oakland Bay Bridge
Temporary Bypass Structure
RFI ITEM LIST
IAI Project # 1295 Contract # 04-0120R4

RFI No.	INFORMATION REQUIRED	DATE ASKED	DATE REQ.	DATE DONE	COMMENTS
00001	Can "Contractors Engineer" be split into several individuals?	3-25-04 4/02/04	ASAP	3/30/04 4/19/04	Request was denied. Revision to RFI was submitted.
00002	VOID	3-25-04			
00003	Should the articulation at Bent 48B be unrestrained in the Transverse direction with the wind loading being the governing load condition?	3-25-04	ASAP	4/19/04	
00004	We would like to get a copy of the Proposal Submittals from all of the other contractors for this contract?	3-25-04	4/09/04	4/02/04	Make a written request to Caltrans [illegible]
00005	Should the modular joints be designed to accommodate the DEE or the DLS opening?	3/26/04	ASAP		
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
00007	Does the pier E1 have the capacity to resist the effect of a DEE earthquake and deform to a DLS earthquake as specified in the design criteria?	4/2/04	4/09/04		
00008	Please provide the structure calculations for the South Edge Girder Support shown on the Contract Plans?	4/6/04	4/09/04		
00009	Should the connection of the East Tie-In to Pier E1 have a safety factor of three for the DLS case?	4/16/04	ASAP		
00010	Should the lateral bracing system for the East Tie-In be designed for the over strength capacity of the Pier E1?	4/16/04	ASAP		
00011	Should the East Tie-In be assumed to be ductile?	4/16/04	ASAP		
00012	We intend to use A490 bolts on this contract, is that acceptable?	4/22/04	ASAP		
00013					
00014					
00015					
00016					
00017					
00018					

VIADUCT STIFFNESS COMPARISON

	BENT #	MASS Top of Col.	LENGTH Br. Pl.-OG	TOTAL LENGTH	E (ksf)	I (ft^4)	COLUMN STIFFNESS K (3EI/L^3)	COLUMN STIFFNESS K/M (k/ft)/k	Rel. Col. Stiffness	Bent Stiffness	Rel. Bent Stiffness
48	48L	1892					75	0.040	1.00	0.079	
	48R	1890					75	0.040			
49	49L	3965	135	135	519000	491	212	0.053	0.95	0.104	0.76
	49R	3915	135	135	519000	491	198	0.051			
50	50L	2994	153	186	519000	491	173	0.058	0.89	0.109	0.95
	50R	3229	153	186	519000	491	166	0.051			
51	51L	3618	145	183	519000	491	211	0.058	0.77	0.103	0.95
	51R	3663	157	195	519000	491	165	0.045			
52	52L	2492	159	159	519000	491	139	0.056	0.79	0.126	0.82
	52R	1990	158	158	519000	491	140	0.070			

Includes if-statements for (k/M)i / (k/M)j

Updated: 04.15.2004 (HS

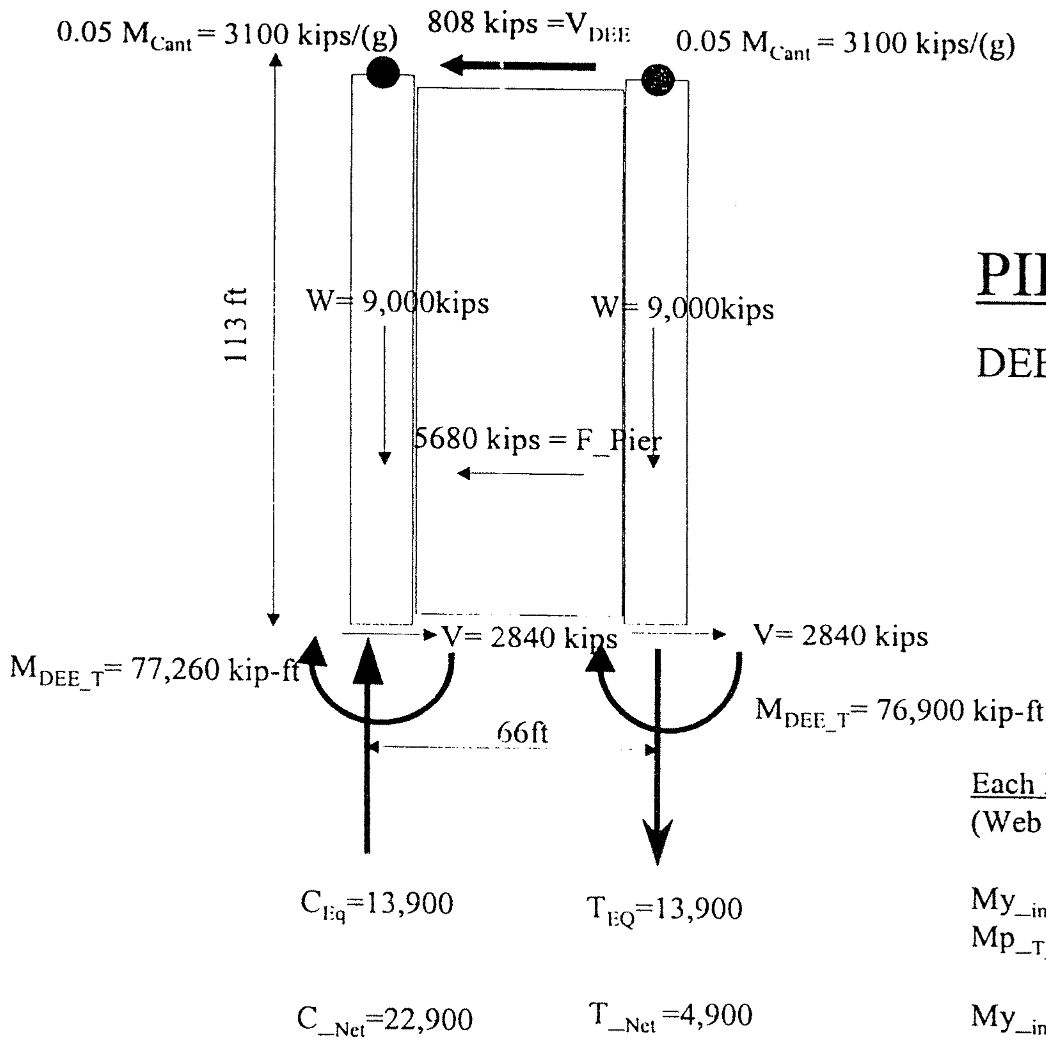
VIADUCT STIFFNESS COMPARISON

	BENT #	MASS Top of Col.	LENGTH Br. Pl.-OG	TOTAL LENGTH	E (ksf)	I (ft^4)	COLUMN STIFFNESS K (3EI/L^3)	COLUMN STIFFNESS K/M (k/ft)/k	Rel. Col. Stiffness	Bent Stiffness	Rel. Bent Stiffness
48	48L	1892					575	0.304	1.00	0.608	
	48R	1890					575	0.304			
49	49L	3965	135	135	519000	491	212	0.053	0.95	0.104	0.17
	49R	3915	135	135	519000	491	198	0.051			
50	50L	2994	153	186	519000	491	173	0.058	0.89	0.109	0.95
	50R	3229	153	186	519000	491	166	0.051			
51	51L	3618	145	183	519000	491	211	0.058	0.77	0.103	0.95
	51R	3663	157	195	519000	491	165	0.045			
52	52L	2492	159	159	519000	491	139	0.056	0.79	0.126	0.82
	52R	1990	158	158	519000	491	140	0.070			

Includes if-statements for (k/M)i / (k/M)j

Updated: 04.22.2004 (HS

Total Support Reactions,R=0



PIER E1- Transverse

DEE forces and Capacities

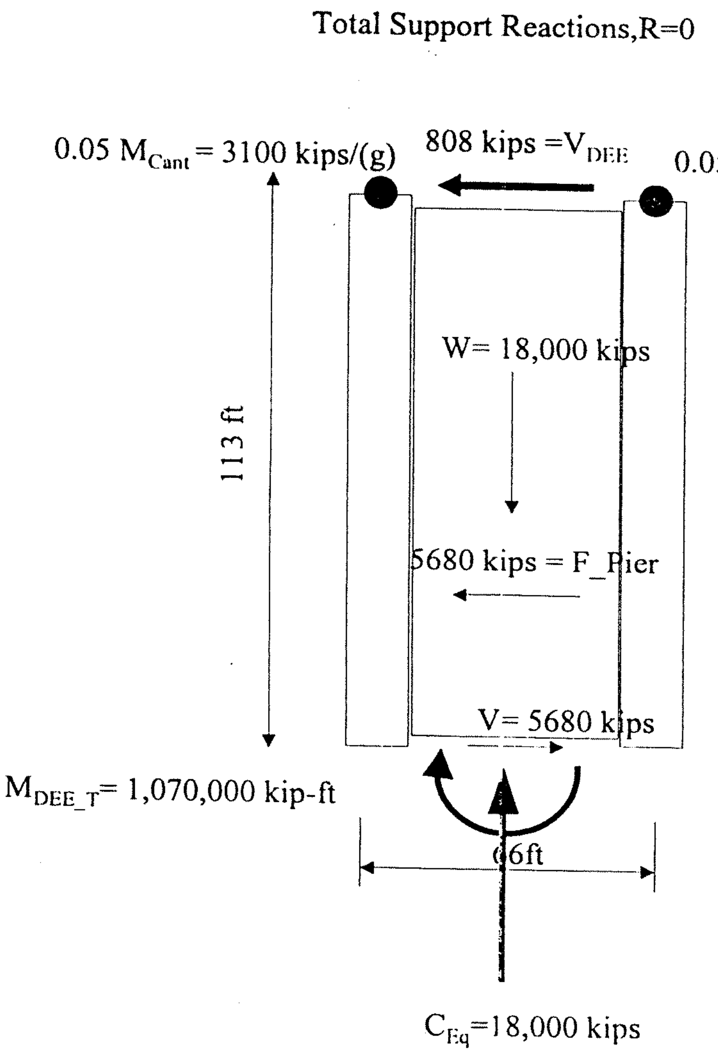
Overturning Moment, Mo_1 =1,070,000 k-ft

Restoring Moment, M_{R1} =594,000 k-ft

Each Piers Section Capacity
(Web wall capacity excluded)

$My_{\_init}$ = 122,600 kip-ft (Due to Combined T)
$Mp_{\_T\_}$ = 177,000 kip-ft (Due to Combined T)

$My_{\_init}$ = 349,200 kip-ft (Due to Combined C)
$Mp_{\_C\_}$ = 400,000 kip-ft (Due to Combined C)



PIER E1- Transverse

DEE forces and Capacities

Overturning Moment, Mo_1 =1,070,000 k-ft

Restoring Moment, M_{R1} =594,000 k-ft

Each Piers Section Capacity
(Web wall included)

$My_{\_init}$ = 1,995,000 kip-ft
$Mp_{\_T\_}$ = 2,400,000 kip-ft

XTRACT Analysis Report

Section Name:	Combined-2
Loading Name:	18000KIP
Analysis Type:	Moment Curvature

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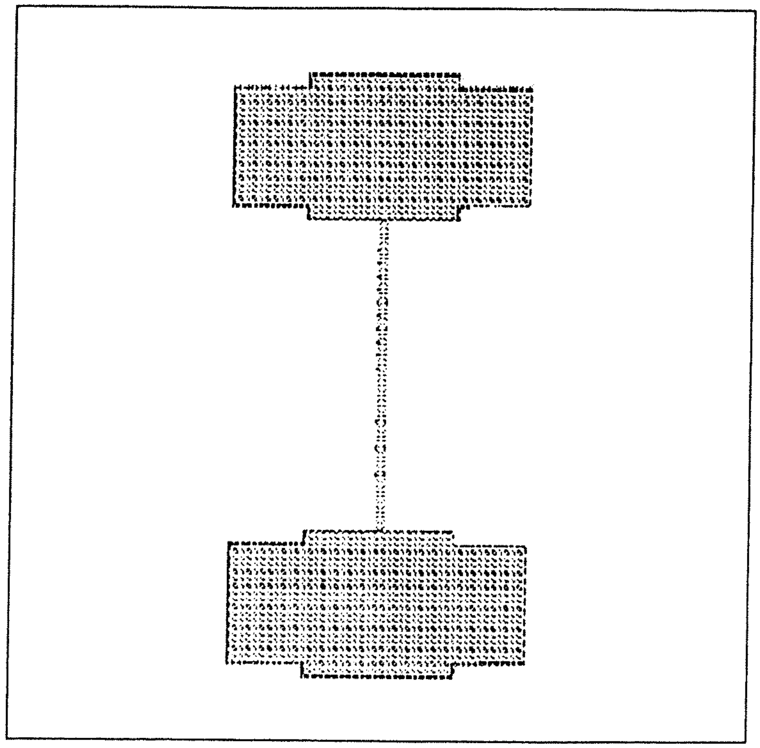
4/23/2004
Bay Bridge Baypass Structure
Pier E1
Page __ of __

Section Details:

X Centroid:	23.00 ft
Y Centroid:	-22.00 ft
Section Area:	1958 ft^2

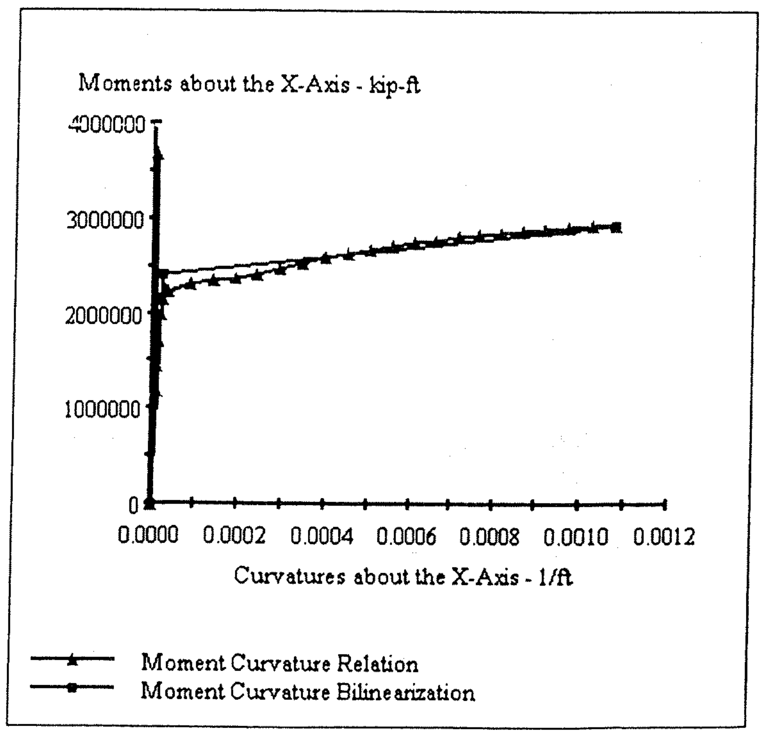


Loading Details:

Constant Load - P:	18.00E+3 kips
Constant Load - Mxx:	-1.000 kip-ft
Incrementing Loads:	Mxx Only
Number of Points:	30
Analysis Strategy:	Displacement Control

Analysis Results:

Failing Material:	Steel1
Failure Strain:	90.00E-3 Tension
Curvature at Initial Load:	.8949E-12 1/ft
Curvature at First Yield:	17.16E-6 1/ft
Ultimate Curvature:	1.073E-3 1/ft
Moment at First Yield:	1.995E+6 kip-ft
Ultimate Moment:	2.939E+6 kip-ft
Centroid Strain at Yield:	.4951E-3 Ten
Centroid Strain at Ultimate:	43.33E-3 Ten
N.A. at First Yield:	28.86 ft
N.A. at Ultimate:	40.39 ft
Energy per Length:	2839 kips
Effective Yield Curvature:	20.72E-6 1/ft
Effective Yield Moment:	2.409E+6 kip-ft
Over Strength Factor:	1.220
EI Effective:	1.16E+11 kip-ft^2
Yield EI Effective:	5.04E+8 kip-ft^2
Bilinear Harding Slope:	.4332 %
Curvature Ductility:	51.79



XTRACT Analysis Report

Imbsen & Associates, Inc. (in-house us
Imbsen & Associates, Inc. (in-house us
4/22/2004
Bay Bridge Baypass Structure
Pier E1
Page __ of __

Section Name:	SecBT
Loading Name:	Trans_max
Analysis Type:	Moment Curvature

Section Details:

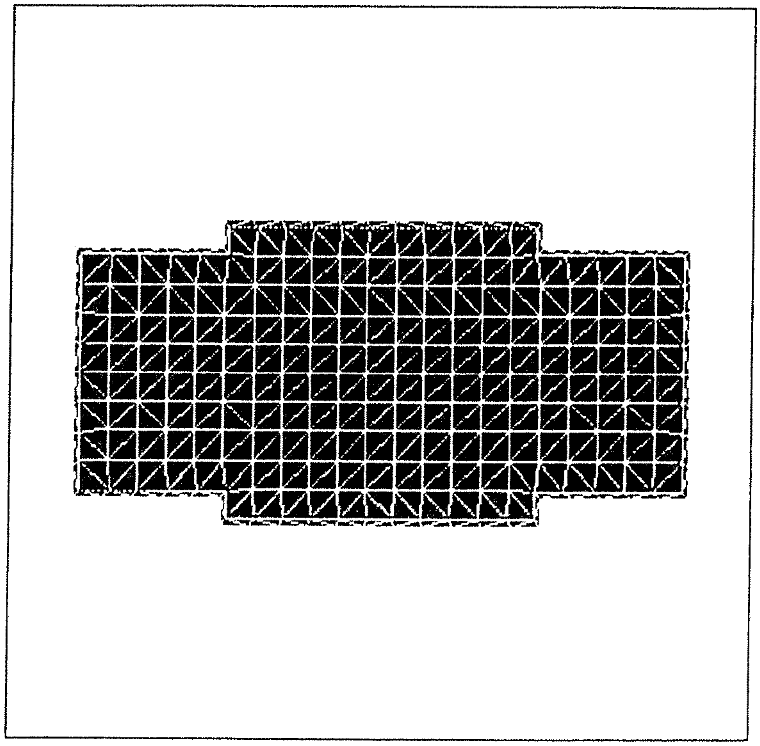
X Centroid:	23.00 ft
Y Centroid:	11.00 ft
Section Area:	924.0 ft^2

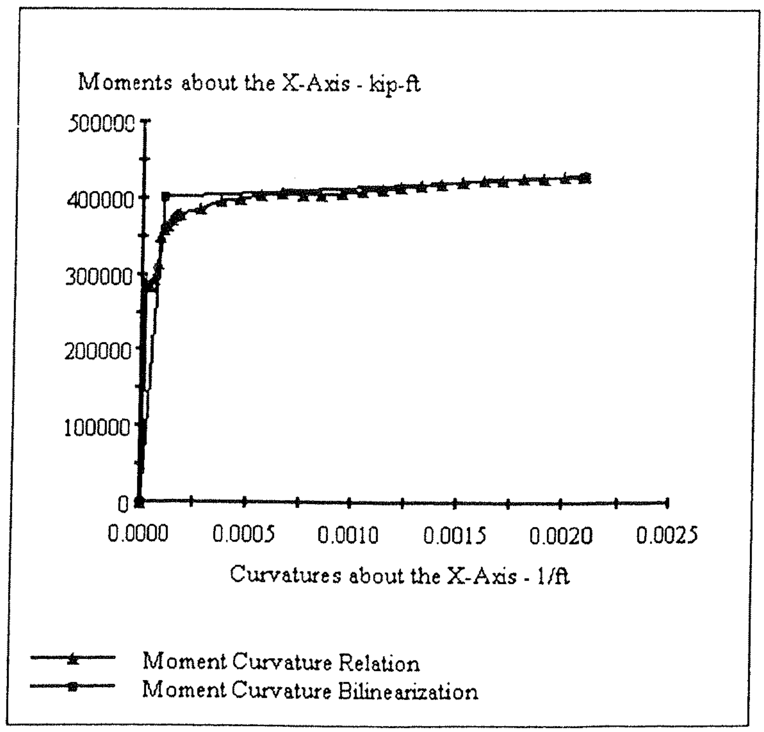
Loading Details:

Constant Load - P:	22.90E+3 kips
Constant Load - Mxx:	-1.000 kip-ft
Incrementing Loads:	Mxx Only
Number of Points:	30
Analysis Strategy:	Displacement Control

Analysis Results:

Failing Material:	Unconfined1
Failure Strain:	5.000E-3 Compression
Curvature at Initial Load:	.5722E-10 1/ft
Curvature at First Yield:	84.40E-6 1/ft
Ultimate Curvature:	2.085E-3 1/ft
Moment at First Yield:	349.2E+3 kip-ft
Ultimate Moment:	428.7E+3 kip-ft
Centroid Strain at Yield:	.3686E-3 Ten
Centroid Strain at Ultimate:	17.59E-3 Ten
N.A. at First Yield:	4.368 ft
N.A. at Ultimate:	8.435 ft
Energy per Length:	844.2 kips
Effective Yield Curvature:	96.88E-6 1/ft
Effective Yield Moment:	400.9E+3 kip-ft
Over Strength Factor:	1.069
EI Effective:	4.14E+9 kip-ft^2
Yield EI Effective:	1.40E+7 kip-ft^2
Bilinear Harding Slope:	.3384 %
Curvature Ductility:	21.53





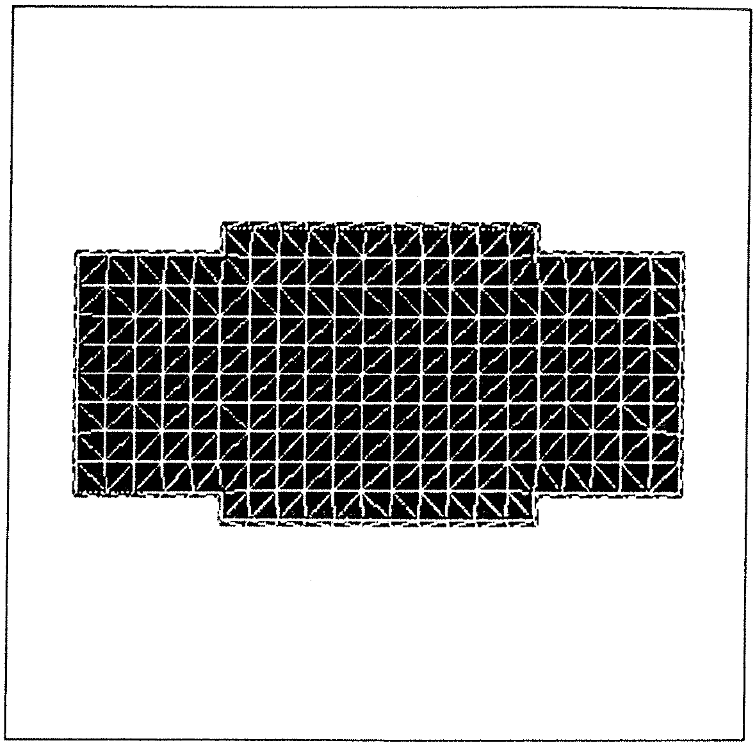
XTRACT Analysis Report

Imbsen & Associates, Inc. (in-ho
Imbsen & Associates, Inc. (in-ho
4/22/2004
Bay Bridge Baypass Structure
Pier E1

Section Name: SecBT
Loading Name: Trans_min
Analysis Type: Moment Curvature

Section Details:

X Centroid:	23.00 ft
Y Centroid:	11.00 ft
Section Area:	924.0 ft^2

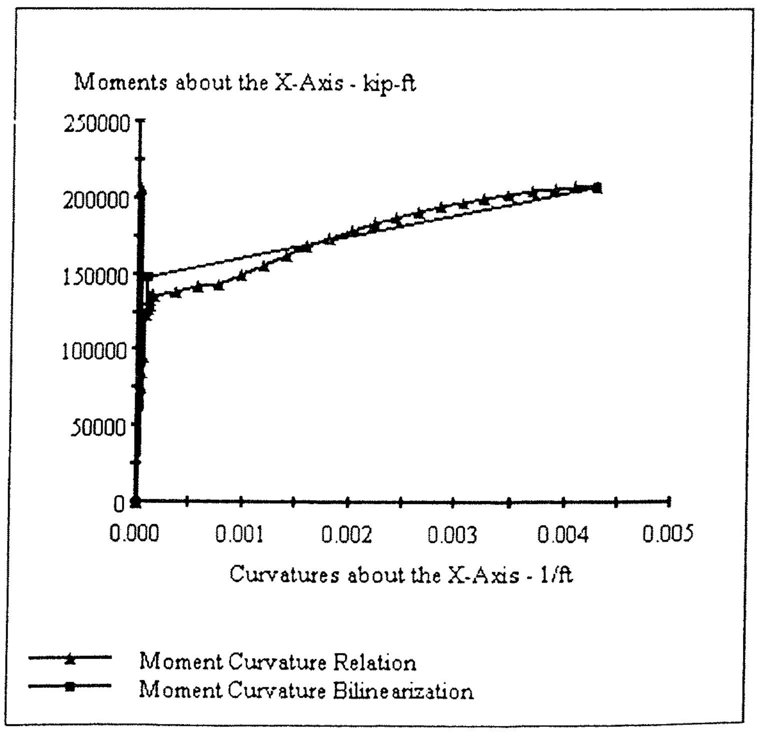


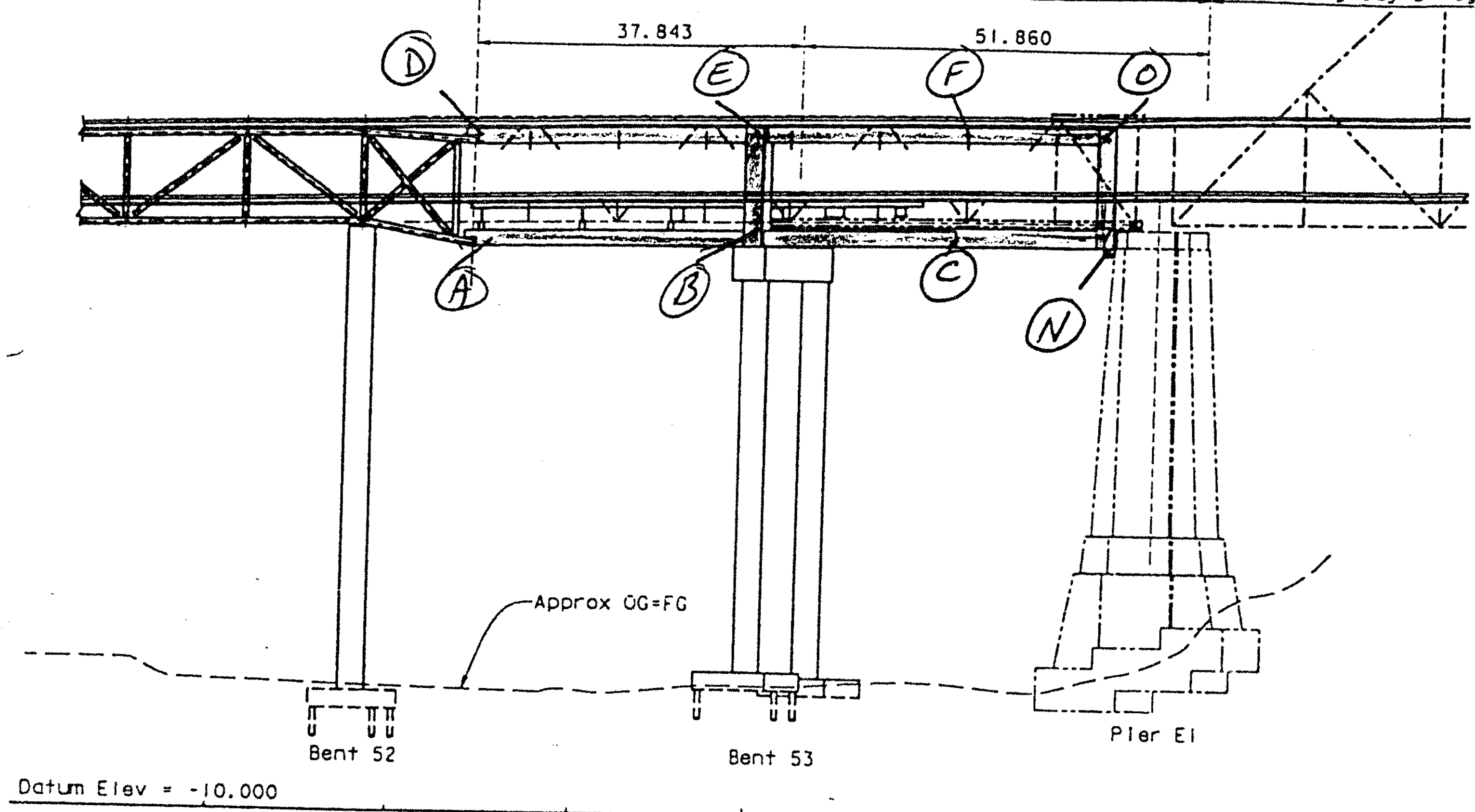
Loading Details:

Constant Load - P:	-4900 kips
Constant Load - Mxx:	-1.000 kip-ft
Incrementing Loads:	Mxx Only
Number of Points:	30
Analysis Strategy:	Displacement Control

Analysis Results:

Failing Material:	Unconfined1
Failure Strain:	5.000E-3 Compression
Curvature at Initial Load:	.5729E-10 1/ft
Curvature at First Yield:	70.93E-6 1/ft
Ultimate Curvature:	4.280E-3 1/ft
Moment at First Yield:	122.6E+3 kip-ft
Ultimate Moment:	207.7E+3 kip-ft
Centroid Strain at Yield:	.5079E-3 Ten
Centroid Strain at Ultimate:	41.37E-3 Ten
N.A. at First Yield:	7.161 ft
N.A. at Ultimate:	9.665 ft
Energy per Length:	752.7 kips
Effective Yield Curvature:	85.70E-6 1/ft
Effective Yield Moment:	148.1E+3 kip-ft
Over Strength Factor:	1.402
EI Effective:	1.73E+9 kip-ft^2
Yield EI Effective:	1.42E+7 kip-ft^2
Bilinear Harding Slope:	.8214 %
Curvature Ductility:	49.95





ELEVATION
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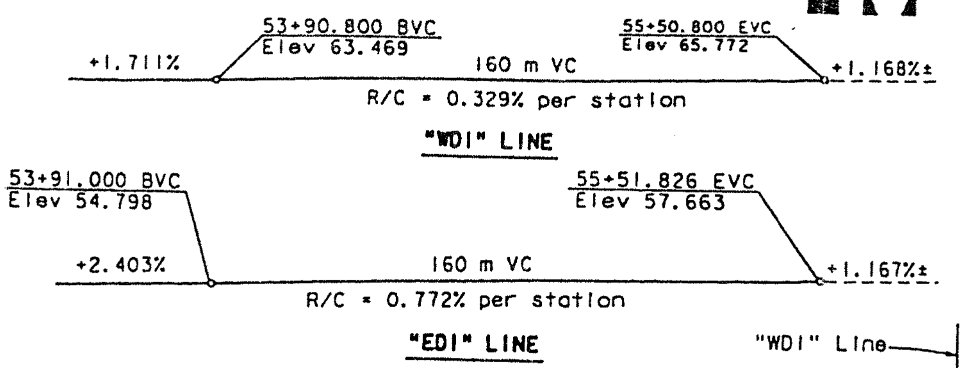
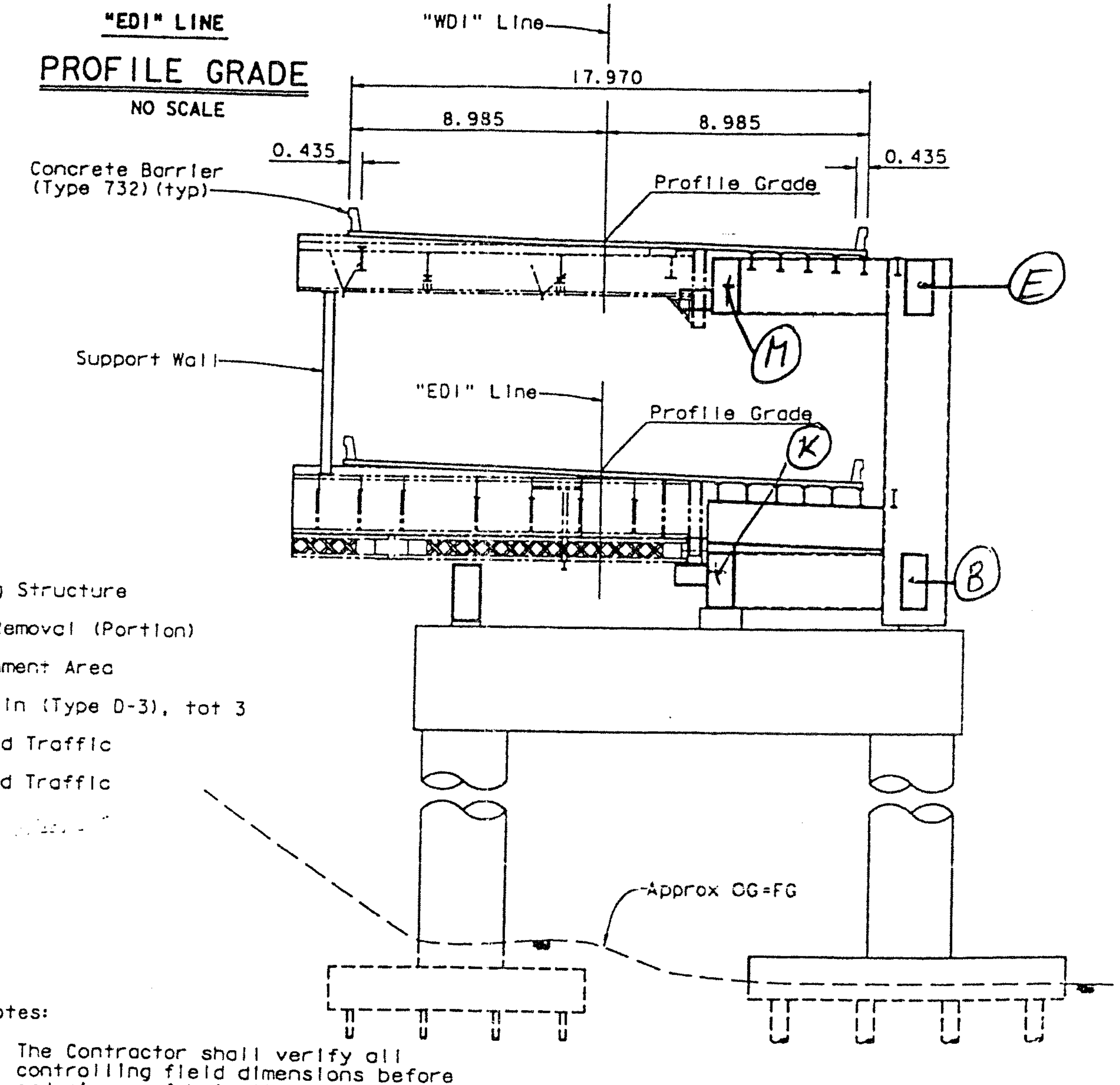
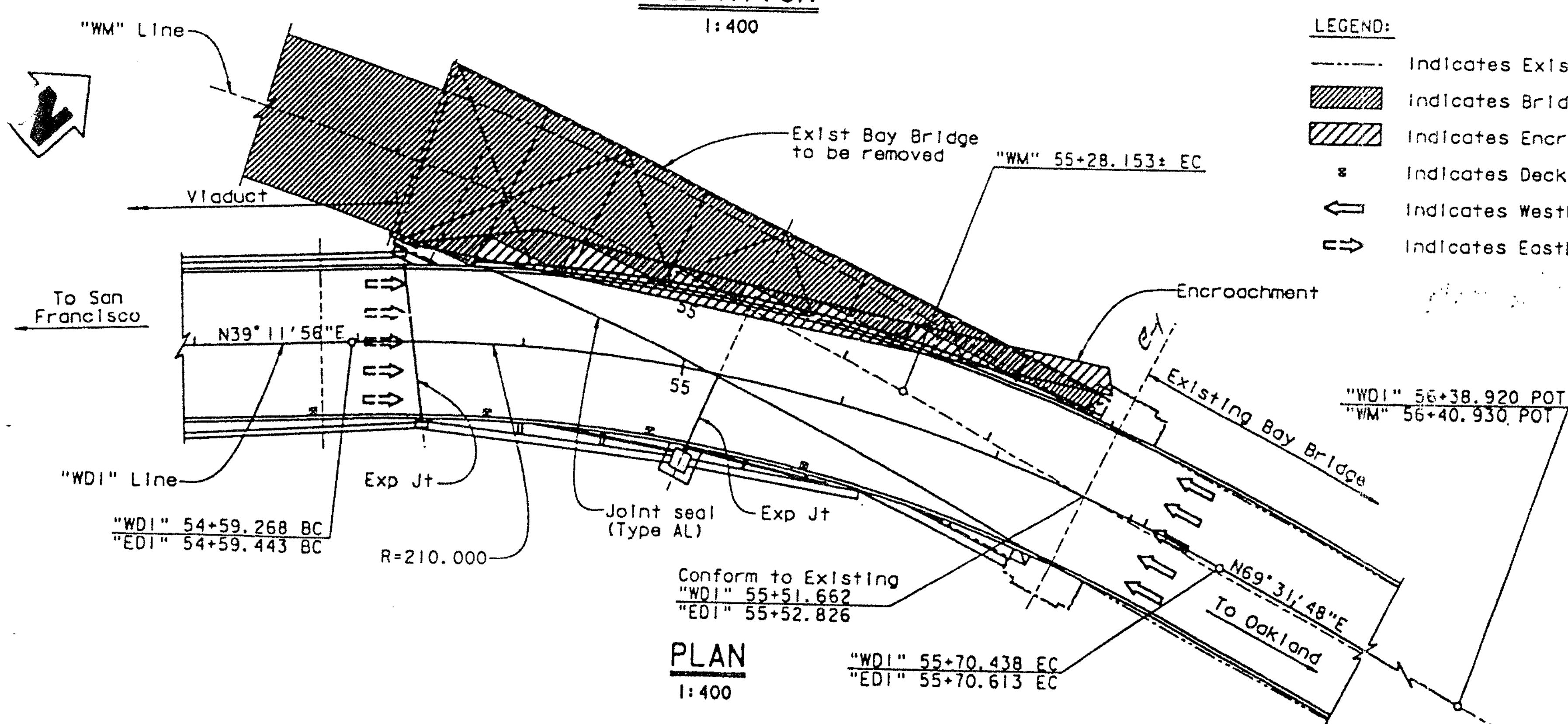


PROFILE GRADE
NO SCALE



SECTION AT BENT 53
1:125



PLAN
1:400

LEGEND:

- Indicates Existing Structure
- Indicates Bridge Removal (Portion)
- Indicates Encroachment Area
- Indicates Deck Drain (Type D-3), tot 3
- Indicates Westbound Traffic
- Indicates Eastbound Traffic

Notes:

1. The Contractor shall verify all controlling field dimensions before ordering or fabricating any material.
2. All components are capacity protected except for the columns, which are designed for ductile behavior.
3. For General Notes, Pile Data Table & Spread Footing Table, see "Index to Plans" sheet.

ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE SHOWN

PRELIMINARY SUBMITTAL
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Print date: 16 JAN 2004 Time: 14:57:48

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER
No.
Exp.
CIVIL
STATE OF CALIFORNIA

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

DESIGN	BY M. SARRAF	CHECKED	LOAD FACTOR DESIGN	LIVE LOADING: HS20-44 AND ALTERNATIVE AND PERMIT DESIGN LOAD	
DETAILS	BY E. HARRIS	CHECKED	LAYOUT	BY E. HARRIS	CHECKED
QUANTITIES	BY	CHECKED	SPECIFICATIONS	BY	PLANS AND SPECS COMPARED

DESIGN OVERSIGHT
SIG. DATE
DESIGN GENERAL PLAN SHEET (METRIC) (REV. 3/1/99)
16 JAN 2004 14:57:48 n:\bay bridge\east tie-in\sgeneralplan.dgn

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ROY A. IMBSEN
PROJECT MANAGER

CU
EA 0120R4

BRIDGE NO. 34-0006 (TEMP)
KP (PM) 12.6

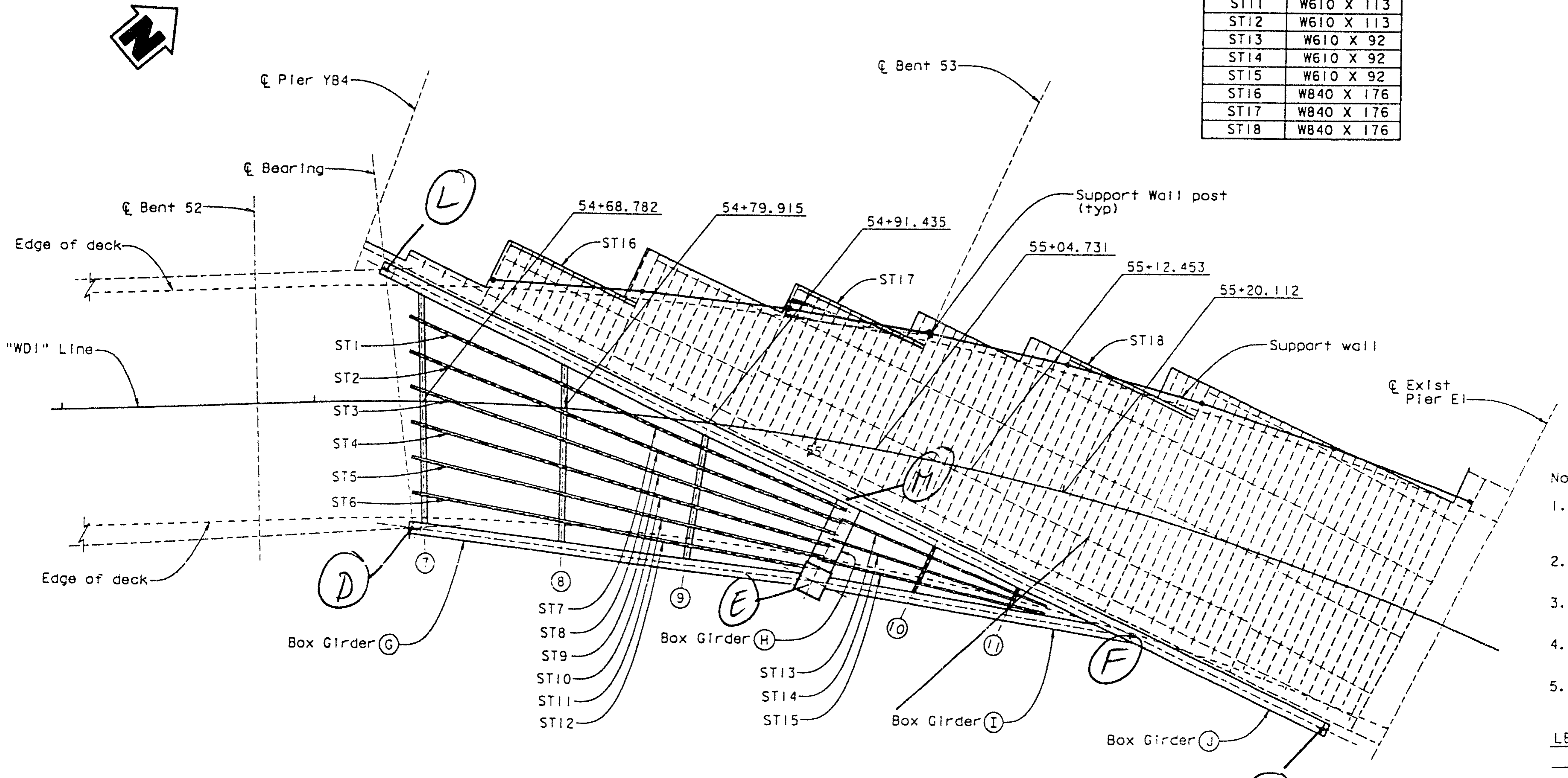
SAN FRANCISCO OAKLAND BAY BRIDGE
EAST SPAN SEISMIC SAFETY PROJECT

EAST TIE-IN

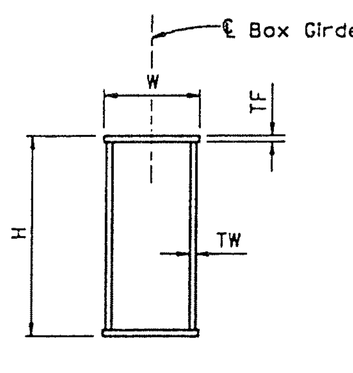
GENERAL PLAN

DISREGARD PRINTS BEARING EARLIER REVISION DATES
REVISION DATES (PRELIMINARY STAGE ONLY)
SHEET 1 OF 5

Stringer	Size
ST1	W610 X 153
ST2	W610 X 153
ST3	W610 X 153
ST4	W610 X 153
ST5	W610 X 153
ST6	W610 X 153
ST7	W610 X 113
ST8	W610 X 113
ST9	W610 X 113
ST10	W610 X 113
ST11	W610 X 113
ST12	W610 X 113
ST13	W610 X 92
ST14	W610 X 92
ST15	W610 X 92
ST16	W840 X 176
ST17	W840 X 176
ST18	W840 X 176



PLAN
1:200



BOX GIRDER DETAIL
NO SCALE

Box Girder	H	W	TF	TW
G	1981	762	44.4	22.2
H	1981	1524	50.8	38.1
I	1981	762	54.0	22.2
J	1981	1067	44.6	25.4

Notes:

1. The Contractor shall verify all controlling field dimensions before ordering or fabricating any material.
2. For Support Wall, see "Support Wall Layout" sheet.
3. For Floor Beam details, see "Floor Beam Details No. 1 & 2" sheets.
4. For Stringer details, see "Stringer Details" sheet.
5. For Box Girder details, see "Box Girder Details" sheets.

LEGEND:

- ——-—- Indicates Existing Structure
- (1) Indicates Floor Beam Number
- (A) Indicates Box Girder Designation

PRELIMINARY SUBMITTAL
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Print date: 05 MAR 2004 Time: 10:09:04

04	SF	80	12.6/13.2		

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Caltrans Metric

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

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

DESIGN	BY M. SARRAF	CHECKED
DETAILS	BY E. HARRIS	CHECKED
QUANTITIES	BY	CHECKED

PREPARED FOR THE
STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

ROY A. IMBSEN
PROJECT MANAGER

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

CU
EA 0120R4

SAN FRANCISCO OAKLAND BAY BRIDGE
EAST SPAN SEISMIC SAFETY PROJECT

EAST TIE-IN

FRAMING PLAN - UPPER DECK

SHEET 20

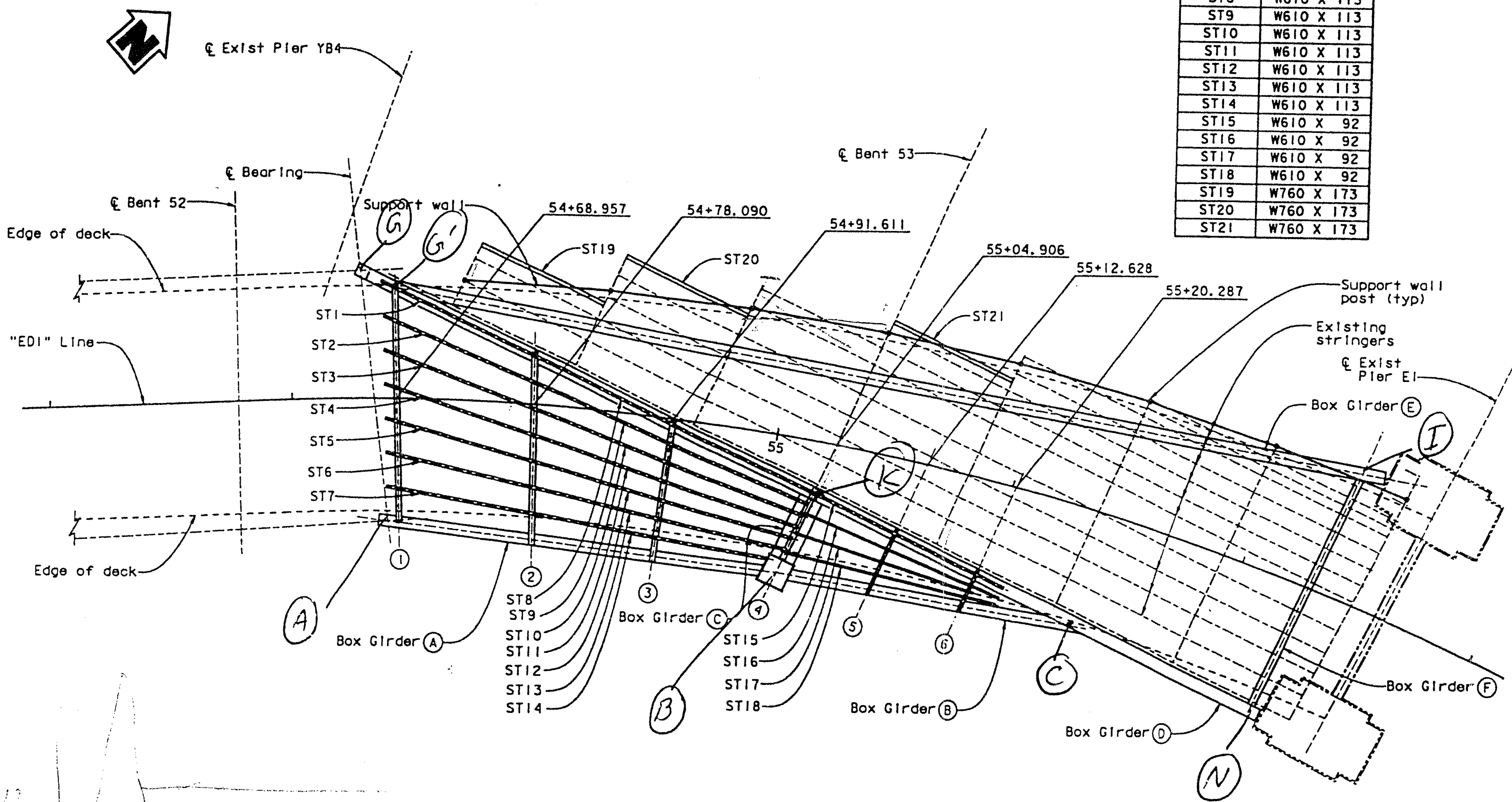
ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

DISREGARD PRINTS BEARING EARLIER REVISION DATES

DESIGN OVERSIGHT

OFF DATE

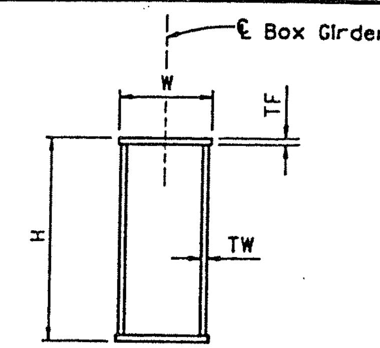
DETAIL SHEET (METRIC) (REV. 3/1/98)
MAR 2004 10:09:04 h:\bay bridge\east tie-in\sfrmain - ud.dgn



PLAN LOWER DECK

1:200

Stringer	Size
ST1	W610 X 153
ST2	W610 X 153
ST3	W610 X 153
ST4	W610 X 153
ST5	W610 X 153
ST6	W610 X 153
ST7	W610 X 153
ST8	W610 X 113
ST9	W610 X 113
ST10	W610 X 113
ST11	W610 X 113
ST12	W610 X 113
ST13	W610 X 113
ST14	W610 X 113
ST15	W610 X 92
ST16	W610 X 92
ST17	W610 X 92
ST18	W610 X 92
ST19	W760 X 173
ST20	W760 X 173
ST21	W760 X 173



BOX GIRDER DETAIL

NO SCALE

Box Girder	H	W	TF	TW
A	1981	762	44.4	22.2
B	1981	762	57.1	22.2
C	1081	1067	50.8	38.1
D	1981	1067	44.6	25.4
E	1981	1067	44.4	25.4
F	1270	914	44.4	25.4

Notes:

1. The Contractor shall verify all controlling field dimensions before ordering or fabricating any material.
2. For Support Wall, see "Support Wall Layout" sheet.
3. For Floor Beam details, see "Floor Beam Details No. 1 & 2" sheets.
4. For Stringer details, see "Stringer Details" sheet.
5. For Box Girder details, see "Box Girder Details" sheets.

LEGEND:

------ Indicates Existing Structure

(1) Indicates Floor Beam Number

(A) Indicates Box Girder Designation

PRELIMINARY SUBMITTAL NOT FOR CONSTRUCTION
Print date: 16 JAN 2004 Time: 15:27:08

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

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

REGISTERED CIVIL ENGINEER

PLANS APPROVAL DATE

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REGISTERED PROFESSIONAL ENGINEER No. Exp. CIVIL STATE OF CALIFORNIA

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

Caltrans Metric

DESIGN OVERSIGHT

SIGN OFF DATE

DESIGN DETAIL SHEET (METRIC) (REV. 3/1/98)
16 JAN 2004 15:27:08 fn\bay bridge\east tie-in\sfrmpln - ld.dgn

DESIGN	BY M. SARRAF	CHECKED	
DETAILS	BY E. HARRIS	CHECKED	
QUANTITIES	BY	CHECKED	

PREPARED FOR THE STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

ROY A. IMBSEN
PROJECT MANAGER

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

SAN FRANCISCO OAKLAND BAY BRIDGE
EAST SPAN SEISMIC SAFETY PROJECT

EAST TIE-IN

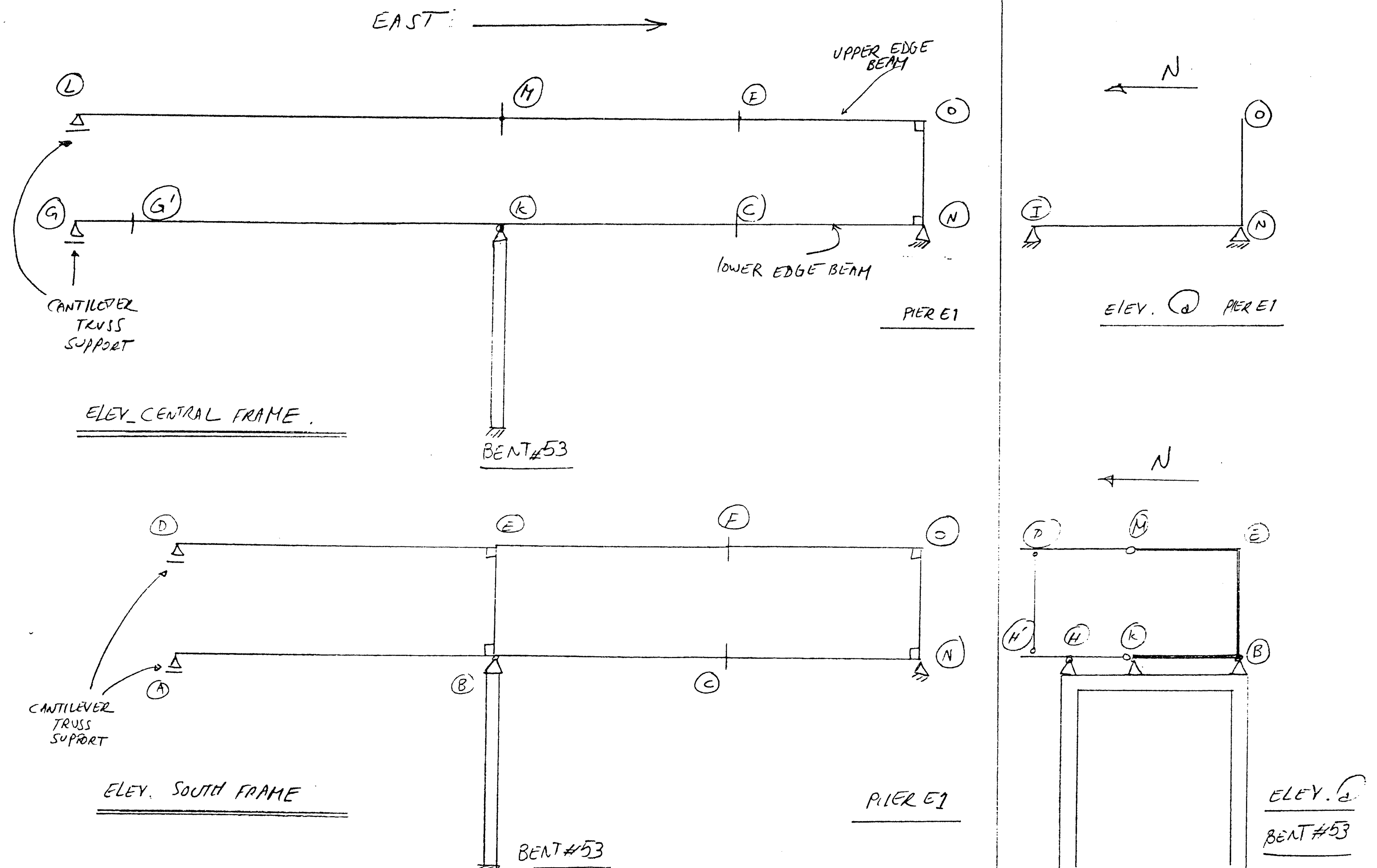
FRAMING PLAN - LOWER DECK

ORIGINAL SCALE IN MILLIMETERS FOR REDUCED PLANS 0 10 20 30 40 50 60 70 80 90 100

CU
EA 0120R4

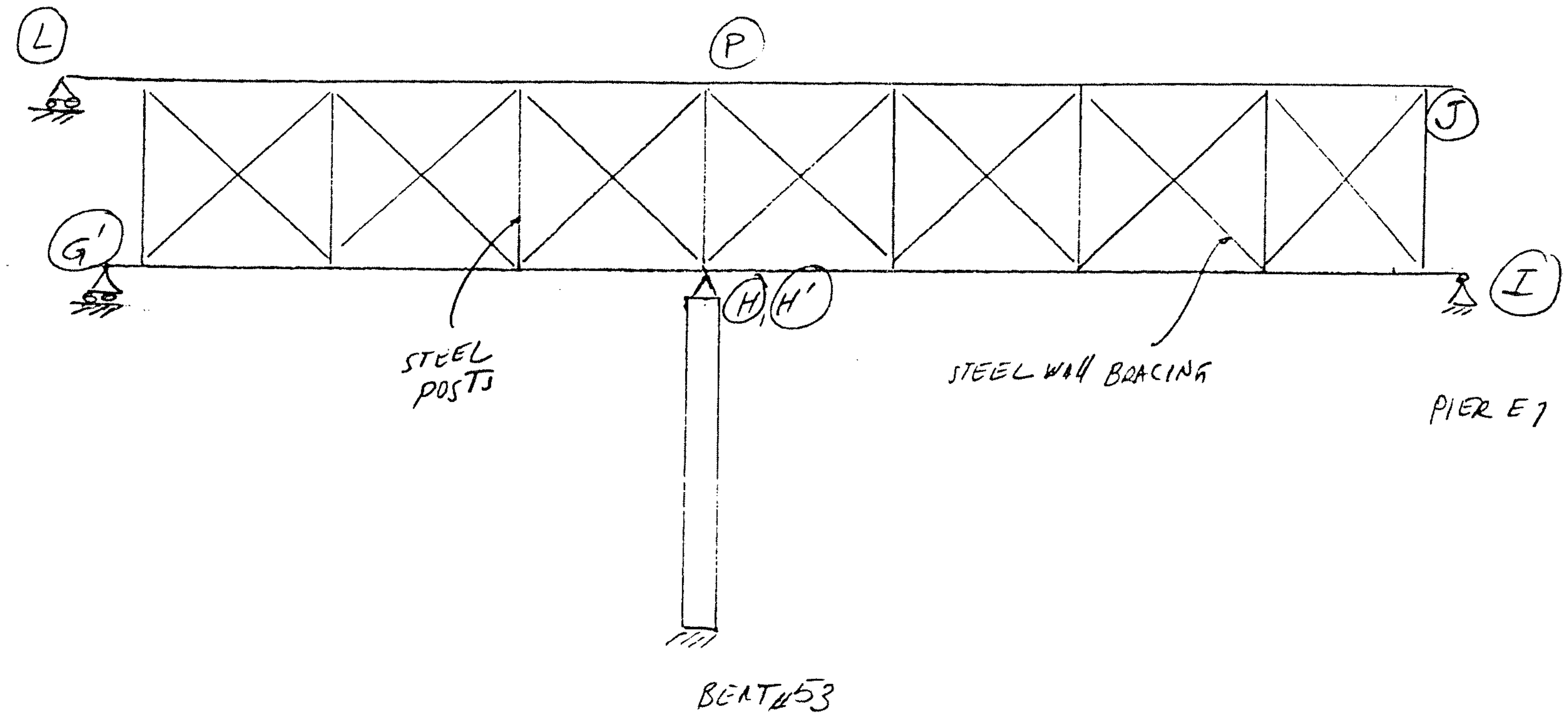
DISREGARD PRINTS BEARING EARLIER REVISION DATES

REVISION DATES (PRELIMINARY STAGE ONLY) SHEET OF



IMBSEN & ASSOCIATES, INC.
Bridge Engineering Consultants
9912 Business Park Drive, Suite 130
Sacramento, CA 95827
Phone: (916) 366-0632
FAX: (916) 366-1501

Job Title TBP. EAST - TIE IN		Job No. 1295	Sheet 1
Subject FRAMES S AND C	Designed By M. SARRAF	Date	of
	Checked By	Date	Total Sheet
			of



ELEV. NORTH FRAME

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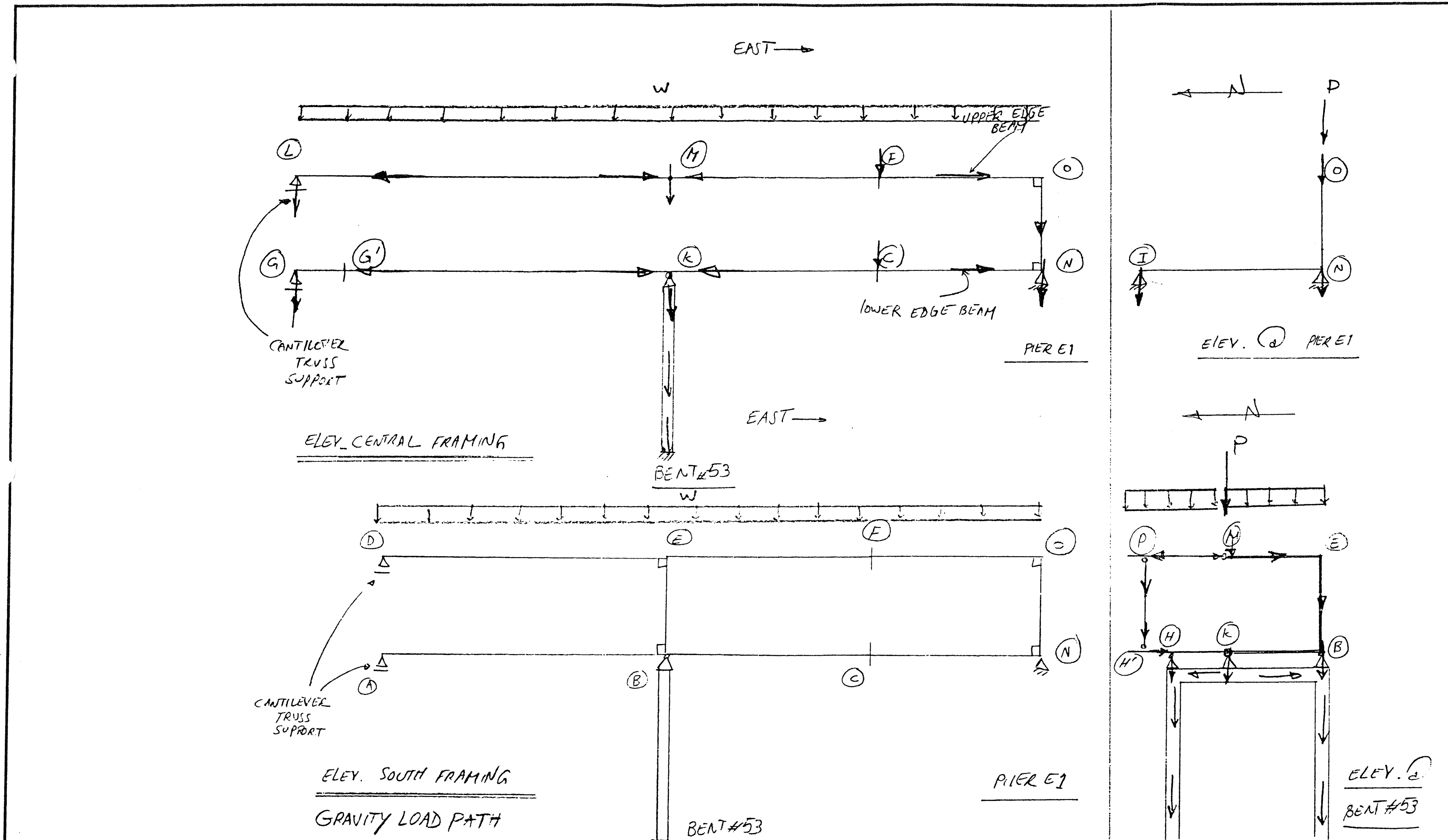
Sacramento, CA 95827
Phone: (916) 366-0632
FAX: (916) 366-1501

Job Title TBS EAST TIE IN		Job No. 1295	Sheet 2
Subject	Designed By M. SARRAF	Date	of
NORTH FRAME	Checked By	Date	Total Sheet
			of



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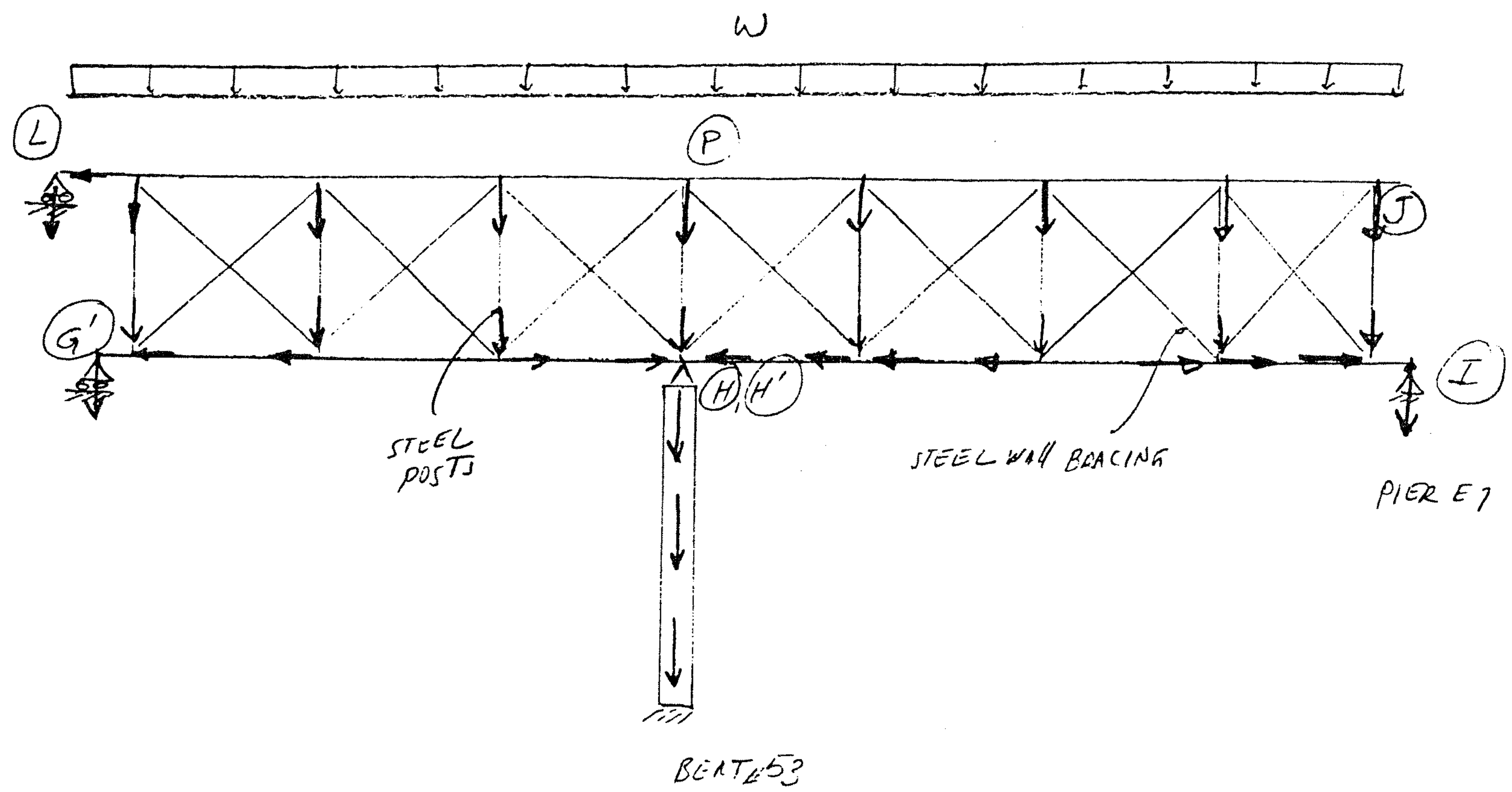
Sacramento, CA 95827

Phone: (916) 366-0632
FAX: (916) 366-1501

Job Title: T.B.S EAST TIE-IN		Job No. 1295	Sheet 3
Subject: SOUTH & CENTRE FRAME	Designed By: M. SARRAF	Date	of
GRAVITY LOAD PATHS	Checked By	Date	Total Sheet
			of



ELEV. NORTH FRAMING

GRAVITY LOAD PATH

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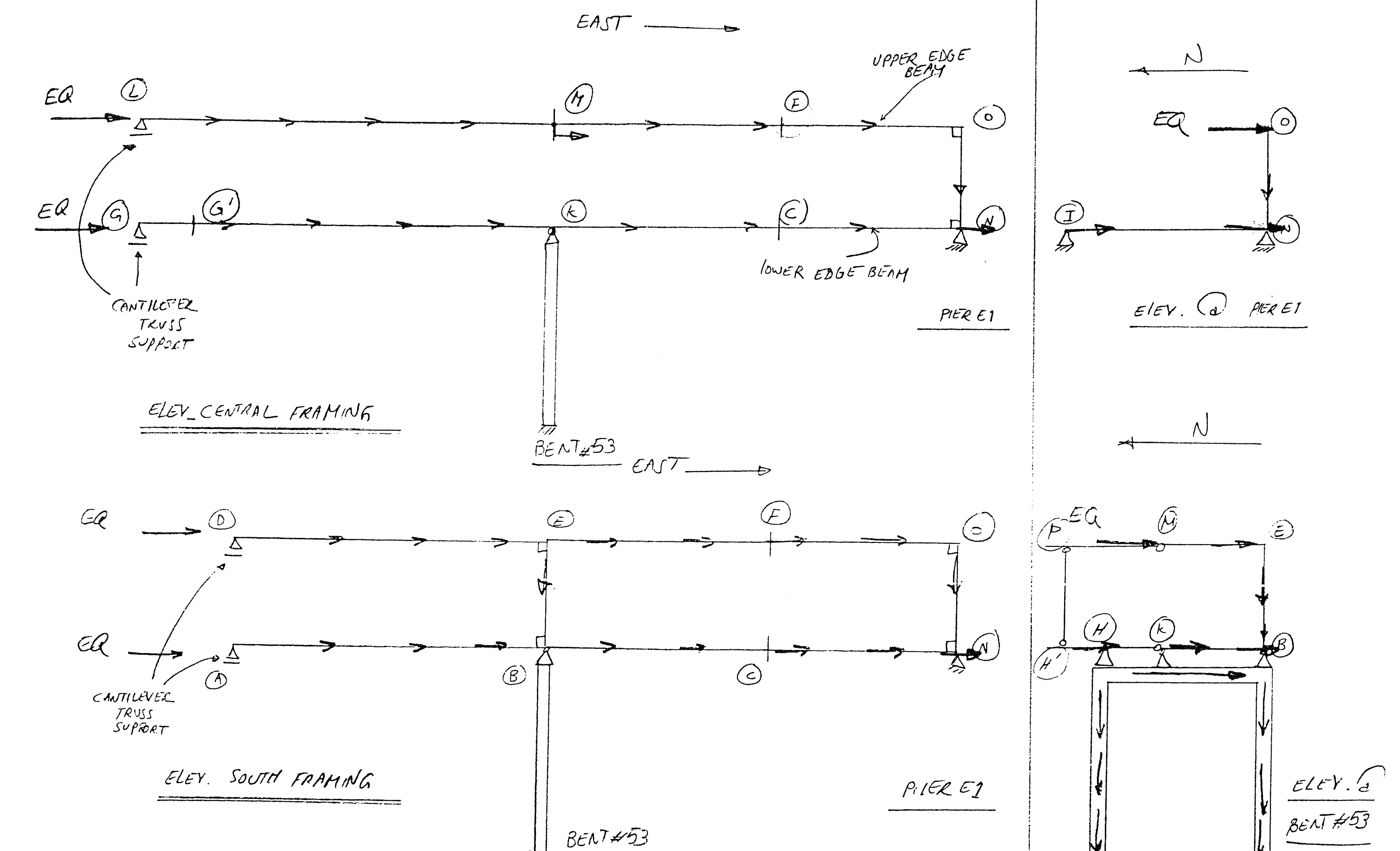
Bridge Engineering Consultants
9912 Business Park Drive, Suite 130
Sacramento, CA 95827

Phone: (916) 366-0632
FAX: (916) 366-1501

Job Title T.B.P. EAST TIE-IN		Job No. 1295	Sheet 4
Subject NORTH FRAME	Designed By M. SARRAF	Date	of
GRAVITY LOAD PATH	Checked By	Date	Total Sheet
			of



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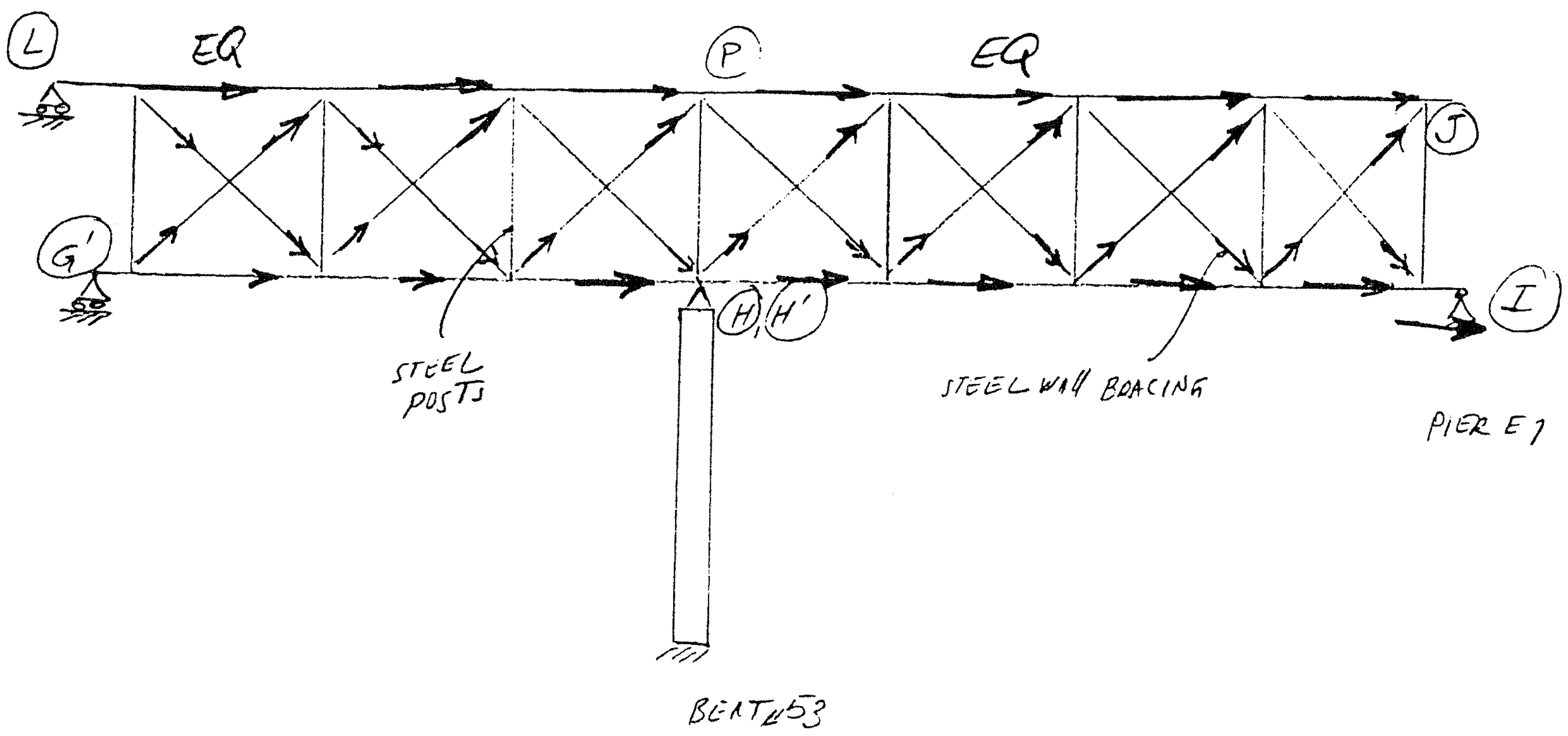
Bridge Engineering Consultants
9912 Business Park Drive, Suite 130
Sacramento, CA 95827

Phone: (916) 366-0632
FAX: (916) 366-1501

Job Title	T. B. P.			Job No. #1295	Sheet 5
Subject	SOUTH. & CENTR. FRAMES.	Designed By	M. SARRAF	Date	of
	SEISMIC PATH	Checked By		Date	Total Sheet
					of



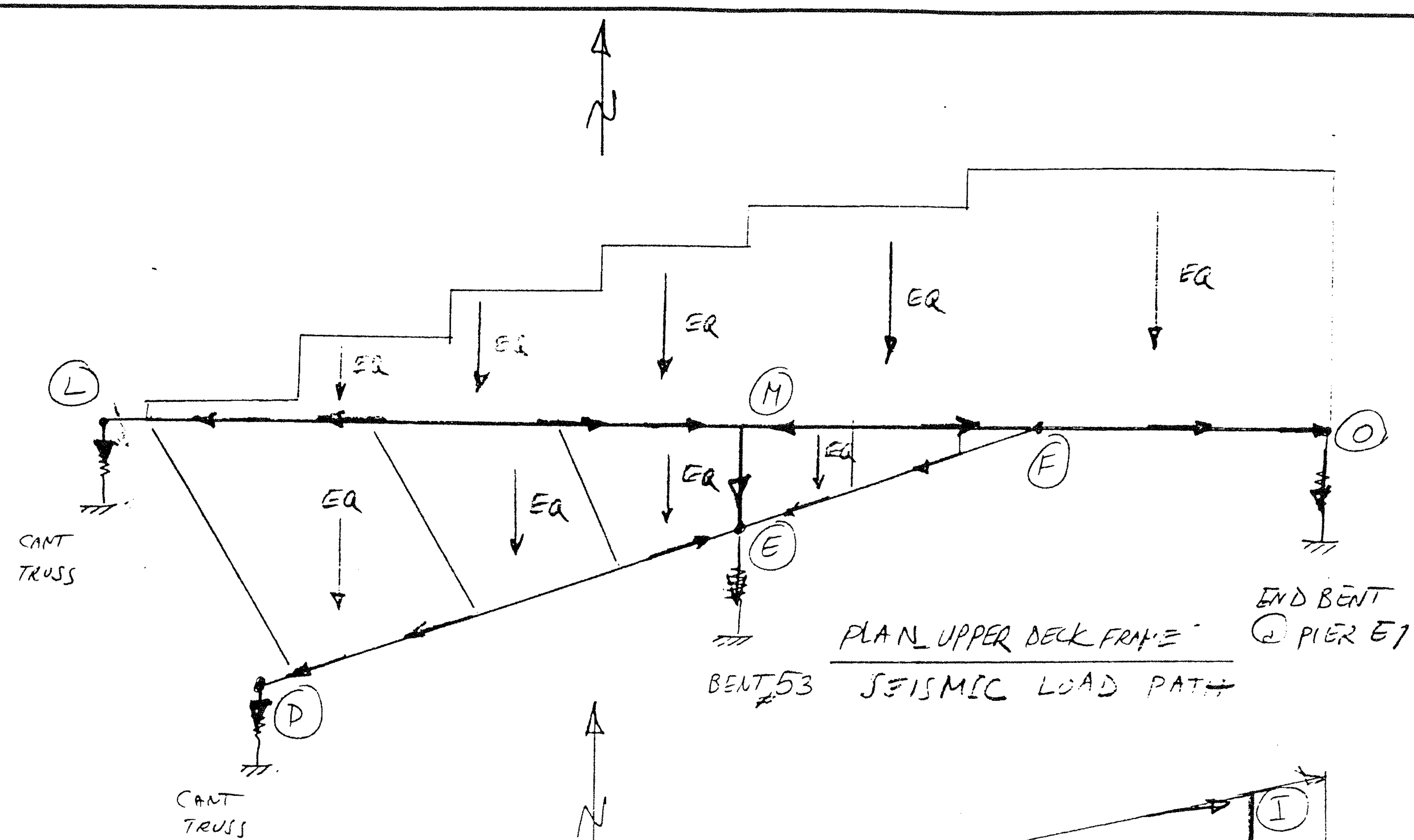
ELEV. NORTH FRAMING

SEISMIC LOAD PATH

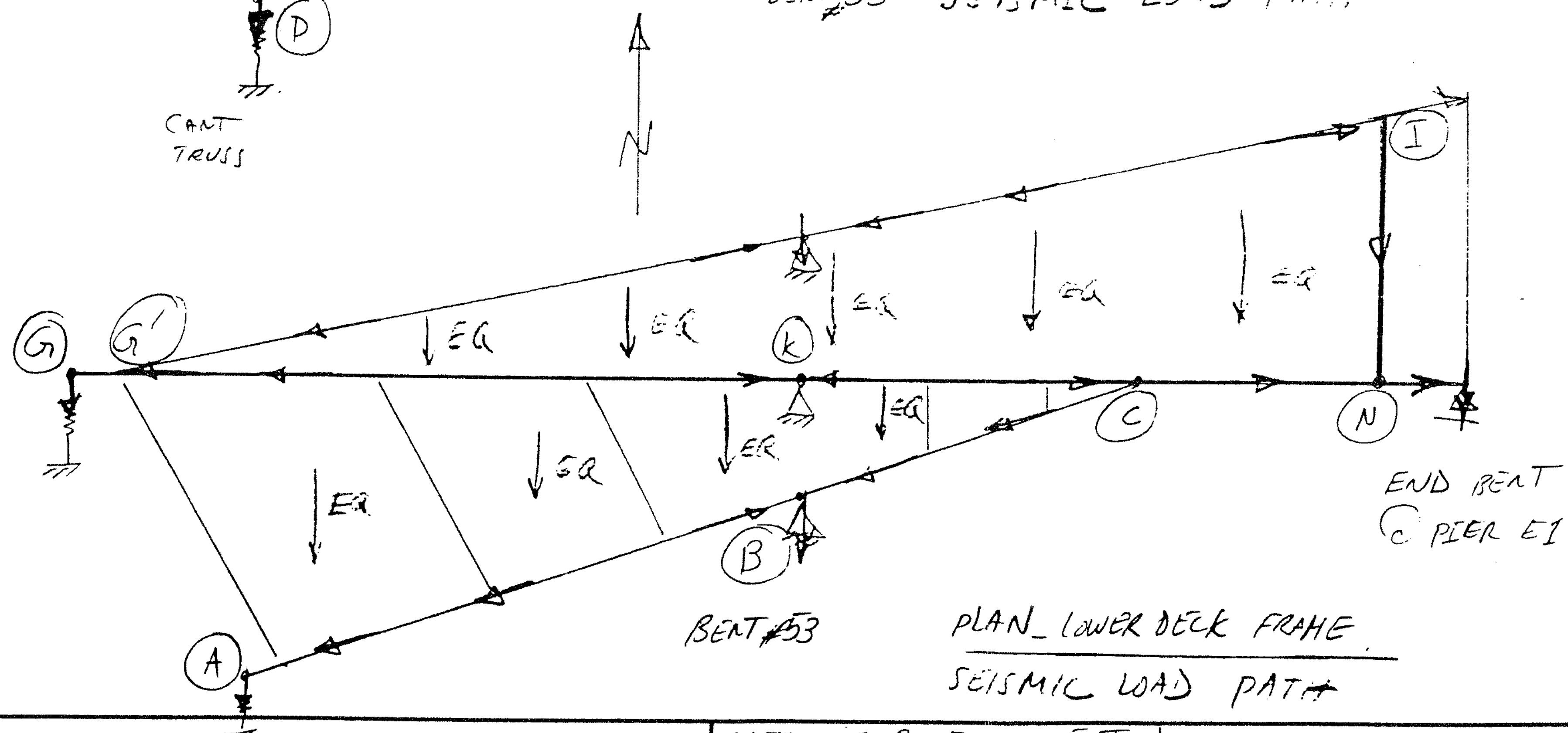
IMBSEN & ASSOCIATES, INC.
Bridge Engineering Consultants
9912 Business Park Drive, Suite 130
Sacramento, CA 95827

Phone: (916) 366-0632
FAX: (916) 366-1501

Job Title T. B. P., ETN		Job No. 1295	Sheet 6
Subject NORTH FRAME	Designed By M SARRAF	Date	of
SEISMIC PATHS.	Checked By	Date	Total Sheet
			of



PLAN_UPPER DECK FRAME
SEISMIC LOAD PATH



PLAN_LOWER DECK FRAME
SEISMIC LOAD PATH

IMBSEN & ASSOCIATES, INC.
Bridge Engineering Consultants
9912 Business Park Drive, Suite 130
Sacramento, CA 95827

Phone: (916) 366-0632
FAX: (916) 366-1501

Job Title T.B.P E.T.N.				Job No 1295	Sheet 7
Subject PIANS, UP & LOW		Designed By M. SARRAF		Date	of
SEISMIC PATH		Checked By		Date	Total Sheet
					of

(11)

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc.	Date:	April 27, 2004
	9912 Business Park Drive Suite 130 Sacramento, CA 95827	Time:	9:00 a.m.- 12:00 p.m.

Minutes Prepared By: Lance A. Schrey of Imbsen & Associates, Inc.

Attendees List: See Attachment 1

Purpose

The purpose was to have all parties working on the project to meet, continue to set up a system to communicate with each other and begin asking technical questions.

It is not the intent of these meeting minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees
Attachment 2 – Agenda (prepared by IAI)
Attachment 3 – Viaduct Stiffness Comparison (file copy only)

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
B. Coupe	CC Myers
IAI Attendees	
IAI File 1295.310.01	

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

1. Ken had not looked at John's E-mail regarding Confidentiality Agreement. He said he would look at and E-mail during our meeting.

2. Lance asked about comments from Caltrans regarding draft meeting minutes for 4/2/2004, 4/9/2004 and 4/16/2004. Dan said the only comment they had was item #16 from the minutes of 4/16/2004. Bill said CC Myers was concerned that RFI's #5 and #7 keep being discussed with no resolution. Lance said IAI has not received response to these RFI's. Tom said it would be easier if they had a submittal. Tom also said he would like to see a criteria for the East Tie-In.

3. It was agreed to have a joint at E-1 to handle 2" of displacement.

4. Roy handed out Viaduct Stiffness Comparison (attached).

5. Tom is concerned with the flexibility of the structure.

6. Caltrans will want to see displacement results for load groups 1-7.

7. Roy said he is looking at DIS bearing with lead core.

8. Tom said he received results from the wind study, which he is looking at and will get back to IAI on it.

9. Lance asked about a site specific rainfall intensity. He asked about the deck drainage criteria since the shoulders are very small. Dan said he would look into this issue.

10. Regarding RFI #8, Tom said he is putting together a package, which he hopes to get to IAI on Friday the 30th.

11. Roy and Tom are in general agreement that E-1 will not come down in a DLS event due to a combination of energy dissipation resulting from splice failure and rocking.

12. Discussion regarding RFI #9 (connection of East Tie-In to Pier E-1):

    a. Roy proposed a smaller safety factor.

b. Randy said that the force that Pier E-1 sees should be minimized.
c. Ali would like the bracket connecting to Pier E-1 to be able to handle the forces associated with 3 x DEE for the connection of the bracket or bolster.
d. Ali asked if Bent 53 could handle all of the mass of span 53. Majid said he was not comfortable with that idea.

13. Regarding RFI #10: Caltrans would like the superstructure of the East Tie-In to remain elastic at DLS.

14. Regarding RFI #11: Caltrans said the C-Bent should be considered part of the superstructure. Caltrans said they envisioned the roll in/roll out to be elastic.

15. Lance asked for maintenance reports regarding the existing structure in span YB-4.

16. Lance inquired whether Caltrans Structures Maintenance would want inspection walkways. Caltrans will look into this issue.

17. John asked for the power-point presentation, which IAI had previously completed, to give to his scheduler.

18. Regarding RFI #12: Dan said he talked with Lian Duan and A490 bolts are OK. Lian cautioned that in accordance with BDS 10.24.1.1, A490 bolts can not be galvanized.

19. By the end of the meeting Ken had forwarded Johns E-mail. It was decided that IAI would fill out a new Confidentiality Agreement adding verbiage from the E-mail and exchange it for As-builts on 4/28/2004.

Attachment 1

MEETING ATTENDANCE SHEET

San Francisco – Oakland Bay Bridge
Temporary Bypass Structure

IAI Job # 1295 Contract # 04-0120R4

Date: 4-27-2004

Caltrans:

☐	Pete Siegenthaller	☒	Tom Ostrom	☐	Manode Kodsuntie
☐	Amer Bata	☒	Dan Adams	☐	Trinh Lia
☐	Ken Loncharich	☒	Ali Asnaashari	☐	Nizar Melehani
☒	John Walters	☒	Randy Bains	☐	Eric Watson

CC Myers:

- ☐ Bob Coupe
- ☒ Bill Kidwell

DCCI:

- ☐ Jim Ronning
- ☐ Jack Geer
- ☐ Ron Paz

Imbsen & Associates:

☒	Roy Imbsen	☐	Jonathan Reina
☒	Lance Schrey	☐	Ghassam Dini
☐	Dick LeBeau	☐	Sasan Soltani
☐	Ed Tyk	☒	Majid Saraf
☐	Todd Lambert	☐	

Others:

☐	☐

Note: The boxes checked above designate attendance at the meeting.

Attachment 1

BAY BRIDGE TEMPORARY BYPASS

SOUTH SOUTH DETOUR
PROJECT MEETING AGENDA
Tuesday April 27, 2004

9:00 a.m.	Meeting Begin

Location:

Imbsen & Assoc. Inc.
9912 Business Park Drive Suite 130
Sacramento CA 95827

Agenda:

- Past meeting minutes
  - Meeting 4/02/04
  - Meeting 4/09/04
  - Meeting 4/16/04

- As-built plans
  - List of files on CD
  - Confidentiality Agreement

- Request for Information Log
  - RFI # 5, 7, 8, 9, 10, 11, & 12

- Viaduct
  - Superstructure participation in stiffness calculations for each bent

- East Tie-In

VIADUCT STIFFNESS COMPARISON

	BENT #	MASS Top of Col.	LENGTH Br. Pl.-OG	TOTAL LENGTH	E (ksf)	I (ft^4)	COLUMN STIFFNESS K (3EI/L^3)	K/M (k/ft)/k	Rel. Col. Stiffness	Bent Stiffness	Rel. Bent Stiffness
48	48L	1892					75	0.040	1.00	0.079	
	48R	1890					75	0.040			0.76
49	49L	3965	135	135	519000	491	212	0.053	0.95	0.104	
	49R	3915	135	135	519000	491	198	0.051			0.95
50	50L	2994	153	186	519000	491	173	0.058	0.89	0.109	
	50R	3229	153	186	519000	491	166	0.051			0.95
51	51L	3618	145	183	519000	491	211	0.058	0.77	0.103	
	51R	3663	157	195	519000	491	165	0.045			0.82
52	52L	2492	159	159	519000	491	139	0.056	0.79	0.126	
	52R	1990	158	158	519000	491	140	0.070			

Includes if-statements for (k/M)i / (k/M)j

Updated: 04.15.2004 (HS

VIADUCT STIFFNESS COMPARISON

	BENT #	MASS Top of Col.	LENGTH Br. Pl.-OG	TOTAL LENGTH	E (ksf)	I (ft^4)	COLUMN STIFFNESS K (3EI/L^3)	K/M (k/ft)/k	Rel. Col. Stiffness	Bent Stiffness	Rel. Bent Stiffness
48	48L	1892					575	0.304	1.00	0.608	
	48R	1890					575	0.304			0.17
49	49L	3965	135	135	519000	491	212	0.053	0.95	0.104	
	49R	3915	135	135	519000	491	198	0.051			0.95
50	50L	2994	153	186	519000	491	173	0.058	0.89	0.109	
	50R	3229	153	186	519000	491	166	0.051			0.95
51	51L	3618	145	183	519000	491	211	0.058	0.77	0.103	
	51R	3663	157	195	519000	491	165	0.045			0.82
52	52L	2492	159	159	519000	491	139	0.056	0.79	0.126	
	52R	1990	158	158	519000	491	140	0.070			

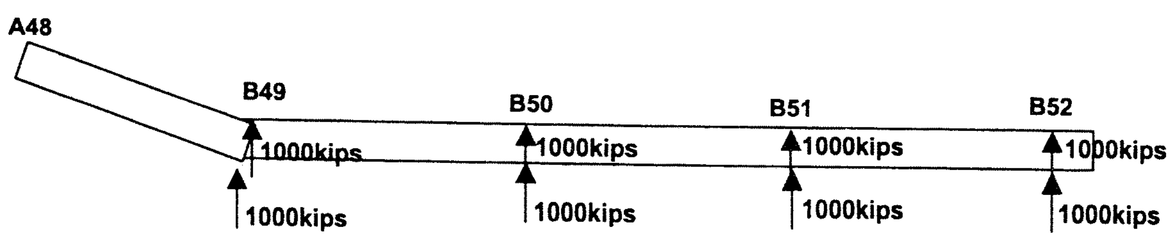
Includes if-statements for (k/M)i / (k/M)j

Updated: 04.22.2004 (HS

Column stiffness for different friction resistance at abutment 48 cosidered the effect of supperstructure

		4%		5%		7%		9%		12%		Fixed	
		Force(kips) Disp(ft)	Stiffness (kip/ft)	Force(kips) Disp(ft)	Stiffness (kip/ft)	Force(kips Disp(ft)	Stiffness (kip/ft)	Force(kips Disp(ft)	Stiffness (kip/ft)	Force(kips Disp(ft)	Stiffness (kip/ft)	Force(kips Disp(ft)	Stiffness (kip/ft)
A48	North	158 2.234	71	204 1.478	138	290 0.722	402	745 0.417	1787	948 0.363	2612	1418 0.111	12775
	South	149 1.945	77	178 1.107	161	182 0.28	650	-160 -0.027	5926	-271 -0.045	6022	3 0.031	97
B49	North	893 4.201	213	850 3.995	213	800 3.754	213	1095 5.929	185	742 3.47	214	536 2.475	217
	South	783 3.929	199	730 3.657	200	672 3.354	200	981 5.884	167	616 3.064	201	443 2.169	204
B50	North	1074 5.827	184	1090 5.908	184	1099 5.955	185	907 4.295	211	1072 5.803	185	911 4.903	186
	South	964 5.78	167	977 5.861	167	985 5.909	167	712 4.278	166	960 5.759	167	815 4.868	167
B51	North	896 4.244	211	904 4.284	211	910 4.31	211	907 4.295	211	896 4.241	211	813 3.841	212
	South	704 4.228	167	710 4.267	166	714 4.293	166	712 4.278	166	703 4.225	166	640 3.829	167
B52	North	320 2.181	147	320 2.182	147	320 2.186	146	319 2.176	147	319 2.179	146	319 2.174	147
	South	316 2.153	147	316 2.153	147	317 2.157	147	315 2.147	147	316 2.151	147	316 2.152	147

Load condition



12

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc. 9912 Business Park Drive Suite 130 Sacramento, CA 95827	Date: Time:	April 30, 2004 9:00 a.m.- 12:00 p.m.

Minutes Prepared By: Lance A. Schrey of Imbsen & Associates, Inc.

Attendees List: See Attachment 1

Purpose

The purpose was to have all parties working on the project to meet, continue to set up a system to communicate with each other and begin asking technical questions.

It is not the intent of these meeting minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees
Attachment 2 – Agenda (prepared by IAI)
Attachment 3 – Preliminary Draft Criteria for the East Tie-In (file copy only)

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
B. Coupe	CC Myers
IAI Attendees	
IAI File 1295.310.01	

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

1. Tom provided Wind Study Report, dated January 2002.

2. Ken (by phone) said he would be able to send out electronic version of the contract Special Provisions.

3. RFI #8: Tom still working on it.

4. RFI #12: Ken said the contract calls for A325 Bolts. He would like to see a change request from CC Myers. Caltrans said A490 Bolts can not be hot dipped galvanized.

5. IAI asked Caltrans what they were looking for in the way of a load path diagram for the preliminary submittal.
   a. Caltrans would like to see truck location transversely.
   b. For the preliminary submittal only controlling load case is needed.
   c. Roy presented truss diagram with loads shown. This was acceptable to Caltrans. It was agreed the information for the laterals, chords and the columns.
   d. For the East Tie-In it was agreed to the requested information for the box beams, Bent 53 and for the connections to the Viaduct and Pier E-1.

6. Tom did not have a problem with what is shown on the Viaduct for deck drainage.

7. Bill asked if he could use Engineering Basis as a reason to use A490 Bolts? Tom said that is a contractual issue to be discussed with Ken.

8. Todd came in and discussed the West Tie-In:
   a. Todd asked where the timber blocking goes. Tom was not clear if the timber blocking goes in both directions. Tom said he would investigate and to make it an agenda item for Tuesdays meeting.
   b. Todd inquired about the existing post-tensioning.
      i. Roy said he talked with Dave Swanson, who worked on the existing. He said they did have problems grouting and suggested detensioning to see if the strands were bonded.

    ii. Tom stated that if the SEG is built as per the Contract Plans that Caltrans is comfortable with the existing post-tensioning. It is important that the anchorages are not damaged during concrete removal of the SEG.

  c. Todd inquired about the criteria for Pier Walls.
    i. Todd said he can not meet the SDC criteria for Pier Walls for a portion of Support Structure Location "A".
    ii. Tom said that the West Tie-In was definitely a widening not new construction and was not sure the SDC should control. He felt IAI should look more at the capacity verses the demand. Tom wanted this issue placed on the Agenda for Tuesdays meeting.

9. **Roy handed** out a preliminary draft criteria for the East Tie-IN (at**tached**). Caltrans will review and discuss at the next meeting.

Attachment 1

MEETING ATTENDANCE SHEET

San Francisco – Oakland Bay Bridge
Temporary Bypass Structure

IAI Job # 1295 Contract # 04-0120R4

Date: 4-30-2004

Caltrans:

☐	Pete Siegenthaller	☒	Tom Ostrom	☐	Manode Kodsuntie
☐	Amer Bata	☒	Dan Adams	☐	Trinh Lia
☐	Ken Loncharich	☐	Ali Asnaashari	☐	Nizar Melehani
☐	John Walters	☐	Randy Bains	☐	Eric Watson

CC Myers:

☐ Bob Coupe

☒ Bill Kidwell

DCCI:

☐ Jim Ronning
☐ Jack Geer
☐ Ron Paz

Imbsen & Associates:

☒	Roy Imbsen	☐	Jonathan Reina
☒	Lance Schrey	☐	Ghassam Dini
☐	Dick LeBeau	☐	Sasan Soltani
☐	Ed Tyk	☐	Majid Saraf
☒	Todd Lambert	☐	

Others:

☐ ☐

Note: The boxes checked above designate attendance at the meeting.

Attachment 2

BAY BRIDGE TEMPORARY BYPASS

SOUTH SOUTH DETOUR
PROJECT MEETING AGENDA
Friday April 30, 2004

9:00 a.m.	Meeting Begin

Location:

Imbsen & Assoc. Inc.
9912 Business Park Drive Suite 130
Sacramento CA 95827

Agenda:

- Past meeting minutes
- Electronic Version of Standard Specifications
- Request for Information Log
  - Outstanding RFI's
- Free Body Diagrams for Preliminary Submittals
- East Tie-In Criteria
- Miscellaneous Questions

East Tie-In Seismic Design Criteria

- Pier E1
  Assume, as per discussions with Caltrans, the Pier is capable of resisting 3 D_{EE} or D_{LS} earthquake with corresponding displacement capacity of 2" for D_{EE} and 6" for D_{LS}.

- The connection of a bolster or bracket to Pier E1 supporting the bridge, the vertical dead load shall be designed for 3 D_{EE} in all three directions.

- A load limiting device attached to Pier E1 shall have as a minimum elastic capacity of D_{EE} with a deformation capacity of D_{LS}.

- Connections of the load limiting device to Pier E1 and the East Tie-In shall have a capacity of 1.25 D_{EE}.

- The load limiting device shall be designed to have an elongation and a shortening capacity not more than six inches (i.e., D_{LS}).

- The superstructure box girders A thru J shall be designed to resist elasticity 3 D_{EE}.

- The support wall on the north side of the East Tie-In shall be designed to resist elastically 3 D_{EE}.

- The floor beams and secondary members shall be designed to resist D_{EE} with the deformation capacity of D_{LS}.

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SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc.	Date:	May 4, 2004
	9912 Business Park Drive Suite 130 Sacramento, CA 95827	Time:	10:00 a.m.- 12:00 p.m.

Minutes Prepared By: Lance A. Schrey of Imbsen & Associates, Inc.

Attendees List: See Attachment 1

Purpose

The purpose was to have all parties working on the project to meet, continue to set up a system to communicate with each other and begin asking technical questions.

It is not the intent of these meeting minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees
Attachment 2 – Agenda (prepared by IAI)
Attachment 3 – Preliminary Ductility results – West Tie-In
Attachment 4 – Preliminary Draft Criteria for the East Tie-In (file copy only)

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
B. Coupe	CC Myers
IAI Attendees	
IAI File 1295.310.01	

d. Item #5: Dan asked what would happen when the displacement was greater than 6".
e. Item #6: Randy doesn't want the floor beams to be damaged. Roy said he doesn't want to design the existing to 3 x DEE elastically. Dan asked what IAI would do if the existing floor beams could not take the loads from DEE. Roy said they would have to be retrofitted.
f. Item #8: Caltrans would like connections to be added. Ali said that this did not comply with the criteria. Roy said the idea is to fuse and that it is OK for the final condition. Ali is concerned with the existing floor beams being designed to DEE while the new is designed to DLS. Roy will have Majid look at 3 x DEE and DLS for the floor beams. Randy would like to see wind displacements at the joints for the East Tie-In.

6. Todd and Jonathan came in and discussed the West Tie-In:
   a. Timber Blocking:
      i. Manode said the Timber Blocking is between the floor beams and the shear keys and no elastomeric pads in the longitudinal direction. Caltrans wants to see blocking between all floor beams along SSL "A" & SSL "D". A discussion ensued regarding Contract Sheet 118 and how the CC Myers team interpreted the access restrictions near the existing columns were to be left clear for future construction. Therefore blocking within those floor beams was not included in the proposal submittal. By doing this IAI pointed out that Design Criteria 8.4 has already been satisfied.
      ii. Todd will look into blocking at SSL "A" & "D".
      iii. Manode said there is to be a minimum of a 2" gap at the bottom of the center girder and the top of SSL "D".
      iv. This same 2" vertical gap at SSL "A" is to be filled with elastomeric pads.
      v. Roy asked about getting calculations from Caltrans for the blocking.
   b. Pier Walls at SSL "A": Jonathan showed sheet with preliminary ductility results (attached). Todd asked about providing reinforcing ties to provide ductility. Roy suggested looking at pier wall testing. Dan would like to take back ductility results to review. Todd said he would clean it up and E-mail it to Dan.

Attachment 1

MEETING ATTENDANCE SHEET

San Francisco – Oakland Bay Bridge
Temporary Bypass Structure

IAI Job # 1295   Contract # 04-0120R4

Date: 5-04-2004

Caltrans:

☐	Pete Siegenthaller	☐	Tom Ostrom	☒	Manode Kodsuntie
☐	Amer Bata	☒	Dan Adams	☐	Trinh Lia
☐	Ken Loncharich	☒	Ali Asnaashari	☐	Nizar Melehani
☒	John Walters	☒	Randy Bains	☐	Eric Watson

CC Myers:

☐	Bob Coupe
☒	Bill Kidwell

DCCI:

☐	Jim Ronning
☐	Jack Geer
☐	Ron Paz

Imbsen & Associates:

☒	Roy Imbsen	☒	Jonathan Reina
☒	Lance Schrey	☐	Ghassam Dini
☐	Dick LeBeau	☐	Sasan Soltani
☐	Ed Tyk	☐	Majid Saraf
☒	Todd Lambert	☐	

Others:

☐		☐	

Note: The boxes checked above designate attendance at the meeting.

Attachment 2

BAY BRIDGE TEMPORARY BYPASS

SOUTH SOUTH DETOUR
PROJECT MEETING AGENDA
Tuesday May 4, 2004

10:00 a.m.	Meeting Begin

Location:

Imbsen & Assoc. Inc.
9912 Business Park Drive Suite 130
Sacramento CA 95827

Agenda:

- Past meeting minutes
- Request for Information Log
    - Outstanding RFI's
- West Tie-In questions
    - Timber blocking
    - Post Tension in existing
    - Pier Walls – SSL-A
- East Tie-In Draft Criteria

Attachment 3

PRELIMINARY

Bay Bridge West Tie In

SSL A Design

SSL A

ID	SSLA1	SSLA2	SSLA3	SSLA4	SSLA5	SSLA6	SSLA7	SSLA8	
No of FB	1	1	1	3	3	3	3	3	
V	565	546	589	885	688	709	499	659	
dFTG	7.56	7.56	7.56	6.56	6.56	6.56	6.56	6.56	
w	11.2	11.2	11.2	27	27	27	27	27	
Kftg	307.8982	307.8982	307.8982	644.0727	644.0727	644.0727	644.0727	644.0727	
Pftg	582	582	582	1056	1056	1056	1056	1056	
d/c	0.97	0.94	1.01	0.84	0.65	0.67	0.47	0.62	<1
Trans	1.84	1.77	1.91	1.37	1.07	1.10	0.77	1.02	
L	22	22	22	22	22	22	22	22	
φy	4.92E-04	4.92E-04	4.92E-04	4.78E-04	4.78E-04	4.78E-04	4.78E-04	4.78E-04	
φu	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02	1.43E-02	
db	1.41	1.41	1.41	2	2	2	2	2	
Lp	35.50	35.50	35.50	41.52	41.52	41.52	41.52	41.52	>28.8, 40.8
Δy	0.95	0.95	0.95	0.93	0.93	0.93	0.93	0.93	
φp	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	
θp	0.041	0.041	0.041	0.048	0.048	0.048	0.048	0.048	
Δp	10.06	10.06	10.06	11.59	11.59	11.59	11.59	11.59	
Δc	11.01	11.01	11.01	12.52	12.52	12.52	12.52	12.52	
μc	11.6	11.6	11.6	13.5	13.5	13.5	13.5	13.5	>3
μd	1.93	1.86	2.01	1.48	1.15	1.19	0.84	1.11	<5
DLS	0.50	0.48	0.52	0.33	0.26	0.26	0.19	0.25	<1

ID	SSLA1	SSLA2	SSLA3	SSLA4	SSLA5	SSLA6	SSLA7	SSLA8	
No of FB	1	1	1	3	3	3	3	3	
V	319	246	265	111	97	78	84	75	
dFTG	7.56	7.56	7.56	3.28	3.28	3.28	3.28	3.28	
w	16	16	16	16	16	16	16	16	
Kftg	439.8545	439.8545	439.8545	190.8364	190.8364	190.8364	190.8364	190.8364	
Pftg	831	831	831	156	156	156	156	156	
d/c	0.38	0.30	0.32	0.71	0.62	0.50	0.54	0.48	
Long	0.73	0.56	0.60	0.58	0.51	0.41	0.44	0.39	
L	22	22	22	22	22	22	22	22	
φy	1.82E-04	1.82E-04	1.82E-04	4.79E-04	4.79E-04	4.79E-04	4.79E-04	4.79E-04	
φu	3.39E-03	3.39E-03	3.39E-03	1.03E-02	1.03E-02	1.03E-02	1.03E-02	1.03E-02	
db	1.41	1.41	1.41	2	2	2	2	2	
Lp	35.50	35.50	35.50	41.52	41.52	41.52	41.52	41.52	
Δy	0.35	0.35	0.35	0.93	0.93	0.93	0.93	0.93	
φp	0.003	0.003	0.003	0.010	0.010	0.010	0.010	0.010	
θp	0.009	0.009	0.009	0.034	0.034	0.034	0.034	0.034	
Δp	2.33	2.33	2.33	8.23	8.23	8.23	8.23	8.23	
Δc	2.69	2.69	2.69	9.16	9.16	9.16	9.16	9.16	
μc	7.6	7.6	7.6	9.9	9.9	9.9	9.9	9.9	>3
μd	2.06	1.59	1.71	0.63	0.55	0.44	0.47	0.42	<1
DLS	0.81	0.62	0.67	0.19	0.17	0.13	0.14	0.13	<1

East Tie-In Seismic Design Criteria

- Pier E1
  Assume, as per discussions with Caltrans, the Pier is capable of resisting 3 D_{EE} or D_{LS} earthquake with corresponding displacement capacity of 2" for D_{EE} and 6" for D_{LS}.

- The connection of a bolster or bracket to Pier E1 supporting the bridge, the vertical dead load shall be designed for 3 D_{EE} in all three directions.

- A load limiting device attached to Pier E1 shall have as a minimum elastic capacity of D_{EE} with a deformation capacity of D_{LS}.

- Connections of the load limiting device to Pier E1 and the East Tie-In shall have a capacity of 1.25 D_{EE}.

- The load limiting device shall be designed to have an elongation and a shortening capacity not more than six inches (i.e., D_{LS}).

- The superstructure box girders A thru J shall be designed to resist elasticity 3 D_{EE}.

- The support wall on the north side of the East Tie-In shall be designed to resist elastically 3 D_{EE}.

- The floor beams and secondary members shall be designed to resist D_{EE} with the deformation capacity of D_{LS}.

FILE COPY (14)

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc.	Date:	May 7, 2004
	9912 Business Park Drive Suite 130 Sacramento, CA 95827	Time:	10:00 a.m.- 12:00 p.m.

Minutes Prepared By: Lance A. Schrey of Imbsen & Associates, Inc.

Attendees List: See Attachment 1

Purpose

The purpose was to have all parties working on the project to meet, continue to set up a system to communicate with each other and begin asking technical questions.

It is not the intent of these meeting minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees
Attachment 2 – Agenda (prepared by IAI)
Attachment 3 – Handout for Viaduct Displacements due to Wind and DEE

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
B. Coupe	CC Myers
IAI Attendees	
IAI File 1295.310.01	

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

1. IAI handed out RFI #13 w/ handouts. Trinh said he would review and get back to IAI as soon as he could.

2. IAI requested electronic version of the Road Plans. Trihn did not think it would be a problem to get them.

3. There is a meeting in Oakland at 10:00 a.m. on May 11th to discuss the scheduled deck survey of the existing deck on the 15th and 16th.

4. There is no word yet on if Caltrans Structures Maintenance would like inspection platforms for the East Tie-In.

5. Lance asked about the use of scuppers and having the deck drainage extend into the traveled way due to the small shoulders. Trinh said that scuppers would not be allowed and he would look into allowing some of the drainage extend into the traveled way.

6. Roy handed out a graph of the transverse displacements for each bent for the Viaduct and East Tie-In for both the wind and DEE load cases.
   a. Randy is concerned that the existing Floor Beams will see loads higher than DEE.
   b. Tom quoted 4.3.5 of the Design Criteria.
   c. Majid asked what Caltrans envisioned with the Roll-Out/Roll-In. Tom said no fusing was envisioned. Tom also said they wanted it to remain elastic for DEE and stable for DLS.

7. RFI #11: Majid raised questions on the interpretation of the criteria and its applicability to Pier E1 in the ETI, since the entire TBS is required to have either a well-defined ductile substructure or a load limiting device. Majid felt that there is not any capacity protection if the superstructure, E1 substructure, and anchorage to E1, are expected to remain essentially elastic and there is no fusing. He said the assumption of the above components remaining essentially elastic is in contradiction of the criteria itself. Majid questioned the RFI response, which was not reflecting the acceptance of using ductile or load limiting, devices as was discussed in previous meetings. Tom responded that the responses where outdated and the concept of fusing or using load limiting devices at Pier E1 was already accepted by Caltrans. Dan said Caltrans never wanted to perform an analysis of Pier E-1. Tom said he wants to see a new submittal of the East Tie-In before considering modifications to the criteria.

8. Roy said IAI is looking at the bearings and continuing with the criteria for the East Tie-In.

9. Trinh commented that several of the foundations are outside the limits shown on the plans.
   a. Caltrans said Bent 52 Left extends to far north. Dan said it is 260 mm, Trinh said about 90 mm. Tom said that the new structure foundation (for the final structure) is in the same location and may require modification on IAI's part. Dan said IAI's footing also conflicts with the existing footing of Bent YB-4. IAI said they would investigate.
   b. Trinh said Bent 49 Right extends past the limits shown on the plans. Lance commented that limit line was not called out on the plans so it could be layed out and that several inquiry's were made, but no answers were given. Tom said they were not sure the reason for the limit in that location that there did not seem to be a conflict with anything and they would look into it.
   c. Trinh said it appeared that the right columns of Bent 50 and 51 were also in conflict. IAI will investigate.
   d. Trinh also commented that it appeared that Torpedo Factory Road was being infringed upon. Lance said he believed that the specifications say that there only needs to be access.

10. Randy and Ali inquired about the fuse and how to make sure the fuse is activated at the desired load.

11. It was decided not to have a meeting next Tuesday.

Attachment 3

MEETING ATTENDANCE SHEET

San Francisco – Oakland Bay Bridge
Temporary Bypass Structure

IAI Job # 1295 Contract # 04-0120R4

Date: 5-07-2004

Caltrans:

- [ ] Pete Siegenthaller
- [ ] Amer Bata
- [ ] Ken Loncharich
- [ ] John Walters
- [x] Tom Ostrom
- [x] Dan Adams
- [x] Ali Asnaashari
- [x] Randy Bains
- [x] Manode Kodsuntie
- [x] Trinh La
- [ ] Nizar Melehani
- [ ] Eric Watson

CC Myers:

- [ ] Bob Coupe
- [x] Bill Kidwell

DCCI:

- [ ] Jim Ronning
- [ ] Jack Geer
- [ ] Ron Paz

Imbsen & Associates:

- [x] Roy Imbsen
- [x] Lance Schrey
- [ ] Dick LeBeau
- [ ] Ed Tyk
- [ ] Todd Lambert
- [ ] Jonathan Reina
- [ ] Ghassam Dini
- [ ] Sasan Soltani
- [ ] Majid Saraf
- [ ]

Others:

- [ ]
- [ ]

Note: The boxes checked above designate attendance at the meeting.

Attachment 3

BAY BRIDGE TEMPORARY BYPASS

SOUTH SOUTH DETOUR
PROJECT MEETING AGENDA
Friday May 7, 2004

10:00 a.m.	Meeting Begin

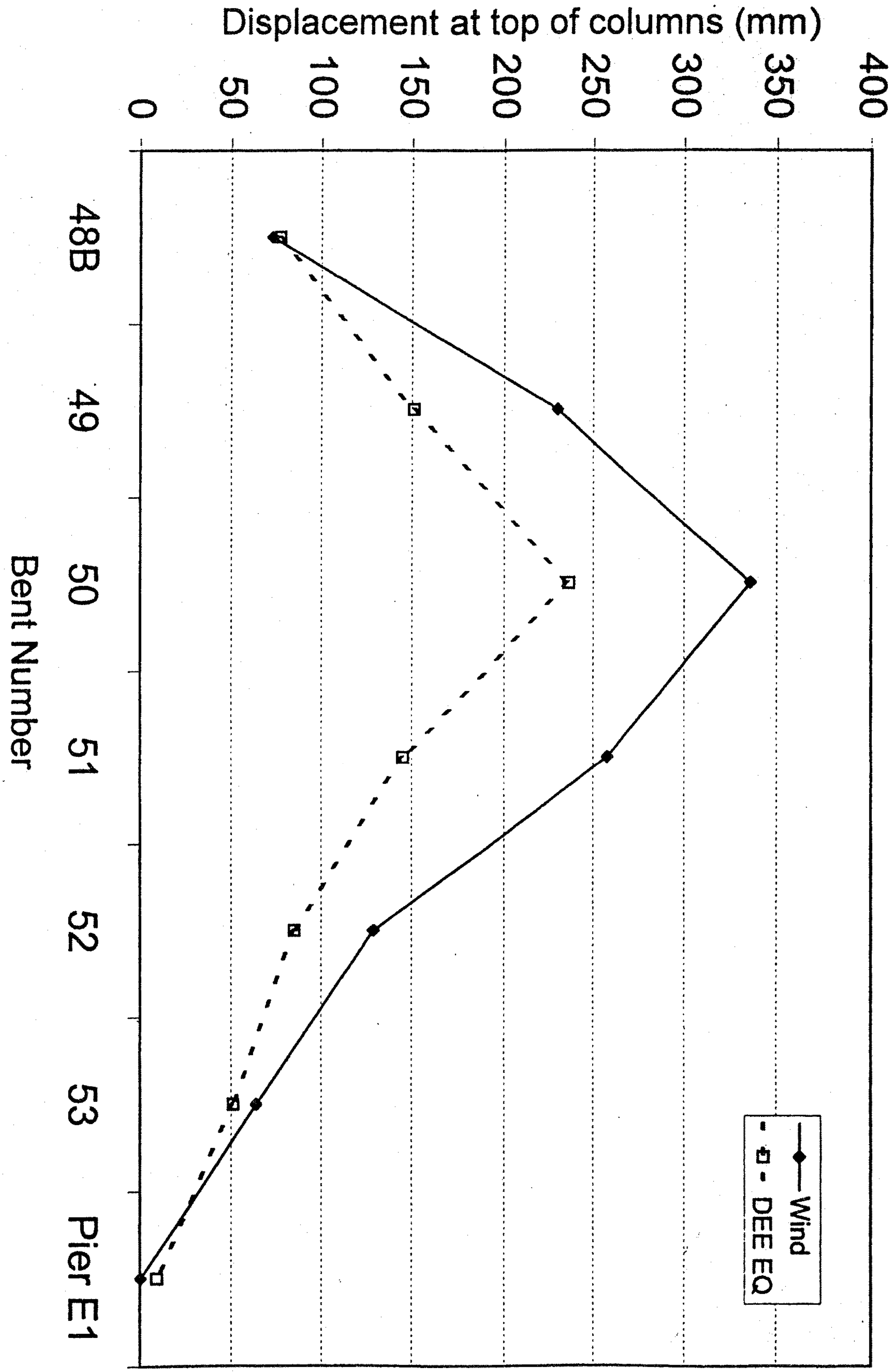
Location:

Imbsen & Assoc. Inc.
9912 Business Park Drive Suite 130
Sacramento CA 95827

Agenda:

- Past meeting minutes
- Request for Information Log
  - Outstanding RFI's
  - New RFI's
- West Tie-In
  - SSL "A" Ductility Requirements
- East Tie-In Draft Criteria
  - Displacement Handout

Attachment 3



IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company
9912 Business Park Drive, Suite 130
Sacramento, CA 95827
(916) 366-0632 FAX (916) 366-1501

LETTER OF TRANSMITTAL

(15)

TO: C.C.Myers, Inc.
P.O. Box 2948
3286 Fitzgerald Road
Rancho Cordova, CA 95742

DATE: May 27, 2004	**IMBSEN JOB NO.:** 1295
ATTENTION: Mr. Bill Kidwell	
RE: East Tie-In Preliminary Design Submittal	

WE ARE SENDING YOU ☒ **Attached** ☐ **Under separate cover via** _____ **the following items:**

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of Letter ☐ Change order ☐

COPIES	DATE	NO.	DESCRIPTION
11	5/27/2004		Design Information Package
22	5/27/2004		11x17 Plans
5	5/27/2004		CD-ROM with Electronic Plan Files
2	5/27/2004		CD-ROM with Preliminary Foundation Report Text for the Viaduct and the East Tie-In

THESE ITEMS ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐
☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS:

We are providing the Preliminary Design Resubmittal for the East Tie-In. One copy of the Design information package and 5 sets of plans are for your use. The rest of the items should be submitted to Caltrans in accordance with Design Submittal Process in Section 5-1.14 of the Contract Specs.

cc: File 1295.520.01

SIGNED Roy A. Imbsen
Dr. Roy Imbsen
Project Manager

 If enclosures are not as noted, kindly notify us at once.

(16)

DEPARTMENT OF TRANSPORTATION
333 BURMA ROAD
OAKLAND, CA 94607-1015
PHONE (510) 622-5660
FAX (510) 286-0550

Flex your power!
Be energy efficient!

June 4, 2004
Contract No.04-0120R4
04-SF-80-12.6/13.2
Temporary Bypass Structure
SL# 00023

Mr. Robert W. Coupe
C. C. MYERS, INC.
3286 Fitzgerald Road
Rancho Cordova, CA 95742

Subject: Preliminary Design Submittal: East Tie-In
Reference: CCM Doc. No.: 215-SUB.0003-1

Dear Mr. Coupe:

The East Tie-In Preliminary Design submittals are incomplete and require additional information prior to being accepted. The following information is needed to facilitate the review:

- As commented on the previous Preliminary Design Submittal, dated January 16, 2004, the contract envisioned a "move out – move in" operation at the East Tie-In. Clearly, the design criteria has not been developed for the proposed modification of the existing truss. If the contractor opts to modify the existing truss, then a new East Tie-In specific criteria needs to be submitted together with the preliminary design package. At a minimum, the new criteria shall address the following:

    - Sequence of operations
    - Jacking operations
    - Method for controlling and monitoring deflections
    - Stabilization of structure during construction
    - Monitoring of all critical members
    - Contingency plans for any unanticipated events during operations, such as a jack failing, etc.
    - Evaluation of all existing members and connections that will be incorporated into the TBS.

- Preliminary inelastic static pushover results and capacities for ductile elements are not shown. The designer should show that the inelastic behavior of Bent 53 would not induce any additional loads into the superstructure.

cc: File 5.03, 26.08

Additionally, we would like you to submit the following information, *if available*, in order to help facilitate and expedite our review:

- Supplement the preliminary loading provided in the submittal. Provide the results from all loading combinations in Groups I-VII regardless of whether they are controlling or not. The controlling load group then needs to be identified for each member. Please provide the SAP report for member forces in addition to the graphical results.

- Loads provided are only for the final configuration. Since the bridge is to be constructed in stages, preliminary loads are required for the entire sequence from start to finish.

- Provide fatigue stress ranges for all fatigue sensitive members verses allowable stress ranges per code.

If you have any comments or questions, please contact me at (510) 622-5660.

Sincerely,

Kenneth Loncharich
Resident Engineer

DEPARTMENT OF TRANSPORTATION
333 BURMA ROAD
OAKLAND, CA 94607-1015
PHONE (510) 622-5660
FAX (510) 286-0550

Flex your power!
Be energy efficient!

TO: Mr. Robert W. Coupe
C. C. MYERS, INC.
3286 Fitzgerald Road
Rancho Cordova, CA 95742

Date: June 04, 2004

RECEIVED
JUN - 8 2004
CC MYERS, INC.
JOB 215 TEMP BYPASS STRUCTURE
IC - 00221
215-123
FAXED COPY SENT TO IMBSEN

RE: Contract No. 04-0120R4
04-SF-80-12.6/13.2
Temporary Bypass Structure

2004 JUN -8 P 3:09
REC'D C C MYERS INC

Dear Mr. Coupe:

Enclosed for your review/signature/records is the following:

_____1. Weekly Statement of Working Days, Report No. __________.

_____2. Progress Payment Voucher No. __________.

_____3. Approved Contract Change Order No. __________.

_____4. Proposed Contract Change Order No. ____________ for your review and signature. Please sign and return.

__X__5. __SL # 00023 : Preliminary Design Submittals: East-Tie-In

Sincerely,

(for)
Kenneth Loncharich
Resident Engineer

cc: File

5

FILE COPY
JUN 07 2004
Project # 1295 Lance

C.C. MYERS, INC.

3286 Fitzgerald Road
Rancho Cordova, CA 95742

cc: Roy
Majid

CCM Job # 215: Temporary Bypass Structure
San Francisco Oakland Bay Bridge

FAX

Date: 07-Jun-2004

Document #: 215-FAX.00015

To: Dr. Roy Imbsen
Imbsen & Associates, Inc.

Fax#: 916-366-1501

From: Robert Coupe

Fax#: 916-635-8961
Phone#: 916-635-9370

Subject: East Tie-In Preliminary Design Submittal

Message:

Here is a copy of State letter 23 with which they respond to your East Tie-In Preliminary Design Submittal.

cc: MO

file:215-201

Total pages sent including this one: 3

Original to follow: no

FILE COPY (17)

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc.	Date:	June 9, 2004
	9912 Business Park Drive Suite 130 Sacramento, CA 95827	Time:	10:00 a.m.- 12:15 p.m.

Minutes Prepared By: Todd Lambert of Imbsen & Associates, Inc.

Attendees List: See Attachment 1

Purpose

The purpose was to have all parties working on the project to meet to answer technical questions associated with the design.

It is not the intent of these meeting minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees
Attachment 2 – Agenda (prepared by IAI)

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
B. Coupe	CC Myers
IAI Attendees	
IAI File 1295.310.01	

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

1. IAI received minor comments from Dan today on all three meeting minutes.

2. Dan sent response to RFI #00014 that there about eight binders of calculations available for our review and to copy if needed. John Mook, contract manager for PBQ&D, has these binders and we should schedule our visit through Dan.

3. RFI #00015 rev 1 is in the hands of District 4 to provide response.

4. Support Structure Location C – Todd discussed two possible options for the design of the temporary portion of this support location. One, that CC Myers is investigating, would be a modular frame capable of transmitting the longitudinal force imposed by the DEE to the foundation. The other option would be to resist all of the longitudinal force in the concrete walls placed beyond Bent 45. However, the shear demand would be 280 kip at each floor beam. Capacity of the floor beams needs to be checked to resist this load. Tom said that the PBQ&D design used concentrically braced frames with bars for bracing along the length of the support, but in the end found it not feasible.

5. Support Structure Location D – Todd explained the background to RFI #00016 and that the longitudinal force was based on the DEE and the question is how to place a structural system including a foundation in the short period the bridge is closed to traffic. Tom said the criteria isn't clear on what longitudinal load is to be applied for this temporary condition. He said their response to this RFI would be for us to look to calculate the longitudinal braking force and compare it to a reduced seismic force where a lower percent of the static force would be applied.

6. Majid came into the meeting to discuss the East Tie-In:
   a. Tom said they are satisfied with the amount of data with tabulation of load results given to them on Monday afternoon, but would like to know the controlling load case for each stage. Tom also asked that the submittal include information about how sensitive the design is to the variable live load and how does the cutting of the members affect the load distribution.
   b. Majid said that the jacking would be performed simultaneously at each panel point to support the predetermined dead load re-

action. At which time the strain gages would be zeroed out to then measure the effects of any live load.

c. Ali asked if the jacking operation is based on measuring displacement or force. Majid said it would be based on predetermined static reactions at each panel point.

d. It was decided to go through the staging operation based on the handout given to Caltrans on Monday afternoon.

7. Stage 1 – Shows the existing condition with all loads tabulated, but does not include seismic loads.

8. Stage 2 – Shows simultaneous jacking at all panel points to unload the south truss due to dead load. Displacement transducers are placed at every jacking point. Tom suggested measuring the grades from a fixed point like Pier E1. Ali said they want to see the sensitivity to the amount of live load. Majid said that the live load induced forces will be measured through strain gage readings and the jacking loads applied will include 50% ± of the maximum readings. In addition, the operation will be performed during very low traffic volumes and include closure of the lane nearest the jacking points.

9. Stage 3 – The south truss has now been removed, but the north truss is still in place.

   a. Ali questioned why this stage doesn't include some seismic loading, as it will be in place for some period of time. Based on a reduced probability, some demand below DEE could be used. This would be compared to full wind load to see which controlled.
   b. Majid said that a significantly reduced seismic hazard could be applied through construction. Furthermore, the South ETI structure does provide significant lateral resistance to the DLS earthquake and it will be in place before the South truss members are removed. Thus, seismic loading during these temporary stages should not control the design.
   c. Tom said section 2.6.1 and 2.6.2 of the criteria refers to Caltrans BDS and an ASCE document for loading on temporary structures.
   d. Tom said they would like to see preliminary design criteria as a road map to how the east tie-in is designed and constructed.
   e. Roy said they are updating the animation file (PowerPoint) to match the latest staging submittal.
   f. Because of time limitations, it was decided this discussion should continue at the next meeting.

10. Bent 53 Pushover Analysis – Majid said there are fixed bearings at the top of the columns. Ali questioned how the superstructure could be capacity protected when the column analysis shows it to remain elasti-

cally for both the DEE and DLS and beyond the DLS. Tom read section 4.3.4 of the criteria regarding ductile structures. Numerous discussions took place regarding weakening the columns and using load limiting bearings to limit the force the superstructure would see. Roy said it sounds like Caltrans is asking the design to include the possibility of a higher level earthquake then the DLS. Majid said this capacity protected requirement is not being met now at Pier E1 where the criteria calls for the anchorage to E1 and E1 is assumed to be a non-ductile element. Majid questioned the inconsistency in seismic design assumptions as it relates to different parts of the ETI superstructure. It was decided that this too would be continued to the next meeting.

11. Regarding the submittal review priority, it was said that a separate discussion had been held between Ken and Bob.

12. Ali said they also had concern with Stage 9 and to discuss it at the next meeting.

13. Roy said that they now have the loads tabulated for all the stages. At the meeting on Monday, Roy gave out hard copies of the tabulated loads for only Stage 1 and the last stage. Caltrans asked that we email the electronic file of all the tabulated loads (for all stages) to Dan for their review.

Attachment 1

MEETING ATTENDANCE SHEET

San Francisco – Oakland Bay Bridge
Temporary Bypass Structure

IAI Job # 1295 Contract # 04-0120R4

Date: 5-21-2004

Caltrans:

☐	Pete Siegenthaller	☒	Tom Ostrom	☒	Manode Kodsuntie
☐	Amer Bata	☒	Dan Adams	☐	Trinh Lia
☐	Ken Loncharich	☒	Ali Asnaashari	☐	Nizar Melehani
☒	John Walters	☒	Randy Bains	☐	Eric Watson

CC Myers:

☒ Bob Coupe

☒ Bill Kidwell

DCCI:

☐ Jim Ronning

☐ Jack Geer

☐ Ron Paz

Imbsen & Associates:

☒	Roy Imbsen	☐	Jonathan Reina
☐	Lance Schrey	☐	Ghassam Dini
☐	Dick LeBeau	☐	Sasan Soltani
☐	Ed Tyk	☒	Majid Saraf
☒	Todd Lambert	☐	George Imbsen

Others:

☐ ☐

Note: The boxes checked above designate attendance at the meeting.

Attachment 2

BAY BRIDGE TEMPORARY BYPASS

SOUTH SOUTH DETOUR
PROJECT MEETING AGENDA
Wednesday June 9, 2004

10:00 a.m.	Meeting Begin	end meeting 11:45am

Location:

Imbsen & Assoc. Inc.
9912 Business Park Drive Suite 130
Sacramento CA 95827

Agenda:

- Past meeting minutes
  - 5/7/04
  - 5/18/04
  - 5/21/04
- Request for Information Log
  - RFI #00014 – calculations for ETI roll-out/roll-in
  - RFI #00015 – deck drainage
- West Tie-In
  - Support Structure Location C – longitudinal load support system
  - Support Structure Location D – RFI #00016 – structure type to transmit force into ground
- Submittal review priority
- Recap East Tie-In preliminary submittal

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company

June 21, 2004 #1295-

Mr. Bob Coupe
C.C. Myers, Inc.
3286 Fitzgerald Road
Rancho Cordova, CA 95742

Subject: TBS - Response to Correspondence of June 11, 2004

Dear Mr. Coupe:

We are in receipt of three items of correspondence dated June 11, 2004. Responses to each follow:

RFI #215-rfi-0001.00014-0 Availability of East Tie-in Roll-out Roll-in Design Criteria Calculations at Caltrans.
We attended two meetings with Caltrans last week to present our recommended design criteria. We have reached conceptual agreement with Caltrans on this criteria. As a result of our efforts, we are able to reduce the loads for which we must design. We are modifying the design at this time for these reduced loads. Roy discussed the basics of our approach with Mr. Myers at your office last Friday. Attachment A contains a brief summary of the results of our meetings with Caltrans.

State Letter SL#24: Viaduct Preliminary Design Acceptance
We have received their acceptance of our 5/20/04 submittal, and thus expect comments to be provided in 3 weeks plus 5 days from our submittal, which was June 15, 2004. Have you received their comment letter yet? When we receive the comments we will make the necessary changes and submit the Viaduct Final Foundation Design Submittal. As a reminder, for that submittal, we need the following information from C.C. Myers:

1. Final Quantity Calculations, per page 89 of the contract specs (we assume for pile-related items only).
2. Engineering basis for certain "non-standard" supplemental technical special provisions requested by C.C. Myers and its subcontractors. Refer to Viaduct Preliminary Design Submittal comment numbers 6 and 7 for a description of Caltrans requirements in this regard (we again assume for piling-related work items only).
3. Structure construction sequencing plan.
4. Special falsework or shoring concept plans for the R.E. Pending File.

Sacramento Office
9912 Business Park Drive
Suite 130
Sacramento, CA 95827
(916) 366-0632 Phone
(916) 366-1501 Fax

San Diego Office
9471 Ridgehaven Court
Suite E
San Diego, CA 92123
(858) 277-4180 Phone
(858) 505-9515 Fax

Irvine Office
21 Technology Drive
Irvine, CA 92618
(949) 727-9336 Phone
(949) 727-7391 Fax

Fresno Office
7395 N. Palm Bluffs Ave.
Suite 104
Fresno, CA 93711
(559) 449-6190 Phone
(559) 449-4591 Fax

Oakland Office
167 Filbert Street
Oakland, CA 94607
(510) 267-1835 Phone

CCM Doc. No. 215-LET.00016 Construction Engineer

We do not have a problem with CCM reassignment of a Construction Engineer. We understand from your letter than no additional time will be spent by Imbsen in the field, other than that originally budgeted in our agreement. If you believe that Caltrans will not require written verification that the structure is constructed according to approved plans and specs except for at the conclusion of the job, then that is your position. We are fine with that as long as Caltrans is fine with that. Please reply if we have misinterpreted the intent of this letter.

Additionally we have one other item to discuss:

West Tie-in SSL C and D

Please provide the necessary information regarding the design of West Tie-in SSL C & D so we can complete our West Tie-in Preliminary Design Submittal. We understand you are meeting at our office on Monday June 21 to discuss this matter.

Summary

1. Please forward the State Letter regarding Viaduct Preliminary Design comments that was according to our records due on June 15.
2. Please provide information listed for the upcoming Viaduct Final Foundation Design submittal.
3. Please provide SSL C & D component information.

We look forward to a successful completion of this project. Please contact us if you need clarification or wish to discuss any of these or other project issues.

Sincerely,

Mark A. Imbsen for

Roy A. Imbsen, P.E., D.Engr.
Project Manager

MAI/tm/jlh

Attach.

cc: IAI File
1295.320
Schrey, Lance
Imbriani, Mark

Attachment A

We have met with Caltrans on several occasions this week to discuss the East Tie-In. The primary topic has been the decreased force levels that are induced into the superstructure at the upper and lower deck levels due to elastic response of the sub-structure to the 3 D_{EE} (D_{LS}) level. They have agreed to permit the use of a lower level in the longitudinal direction to account for the rocking of Pier E-1. They have expressed some concern about the uncertainty of this damage and rocking of the pier and requested that we provide an additional backup yielding mechanism in the longitudinal direction to ensure the reduced seismic force. We have resolved that issue with them by allowing a plastic hinge to form in the transverse beam at the pin connection as illustrated in a figure given to C.C. Myers Friday, June 18. We are currently designing that beam and plastic hinging mechanism. Additionally, we have devised a concept to release the transverse force at the Pier to lower the shear force transmitted to the substructures.

Lance 16
cc: Roy
Majid

19

JAMES M. RONNING, P.E.
6640 GALPIN BOULEVARD
EXCELSIOR, MN 55331
PHONE: 952 470 6399
FAX: 952 470 6659
jimronning@msn.com

FILE COPY
JUN 2 1 2004
Project #________

FACSIMILE COVER SHEET

DATE: 21 JUN 04

COMPANY / LOCATION: C.C. MYERS
ATTENTION: BOB COUPE
FAX NUMBER: 916 635 8961

CC: IMBSEN & ASSOC., ROY IMBSEN, 916 366 1501
DCCI – SHAKOPEE, WILLIE MIZELL, 952 445 4337
DCCI – GOLDEN GATE, RON PAZ, 415 561 3305

NUMBER OF PAGES: 1 (INCLUDING THIS COVER SHEET)

URGENT MESSAGE

Subject: East Tie-In Design Criteria

Gentlemen:

Last week I was informed by Roy Imbsen that IAI was drafting a new design criteria for the east tie-in structure. On Friday, June 18, I received a copy of the draft via email from IAI.

The draft document contains certain language that is more restrictive and burdensome to DCCI's construction activities than was, could have or should have been anticipated at bid time. Since we have not had sufficient time to review the draft, the full extent of the consequences to DCCI's construction operations is unknown at this time.

I understand that the draft was to have been submitted to Caltrans today. I recommend postponing the submittal to Caltrans until a thorough in-house review by all affected parties is complete and comments considered and incorporated into the draft.

Regards,

James M. Ronning

20

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company

June 21, 2004 #1295

Mr. Bob Coupe
C.C. Myers, Inc.
3286 Fitzgerald Road
Rancho Cordova, CA 95742

Subject: Supplemental Submittal for the East Tie-In

Dear Mr. Coupe:

As requested by Caltrans we are submitting to you more information for the East Tie-In segment. These items should be added to the Design Information Package and are as follows:

1. Section 3B (Revised): Preliminary Loading Force Displacement Results on Primary Components (electronic version only)
2. Section 4A (Revised): Pushover Analysis
3. Section 6A: Design Criteria (to be submitted 6/23/2004)
4. Section 7 (New Section): Rocking Analysis of Pier E1
5. Section 8 (New Section): Substructure Force/Displacements

We have also included a new plan set (11" x 17" hard copy and electronic version), since there have been several changes. Please let me know if you have any questions,

Sincerely,

FOR Roy A. Imbsen, P.E., D. Engr.
Project Manager

RAI/tm/jlh

Sacramento Office
9912 Business Park Drive
Suite 130
Sacramento, CA 95827
(916) 366-0632 Phone
(916) 366-1501 Fax

San Diego Office
9471 Ridgehaven Court
Suite E
San Diego, CA 92123
(858) 277-4180 Phone
(858) 505-9515 Fax

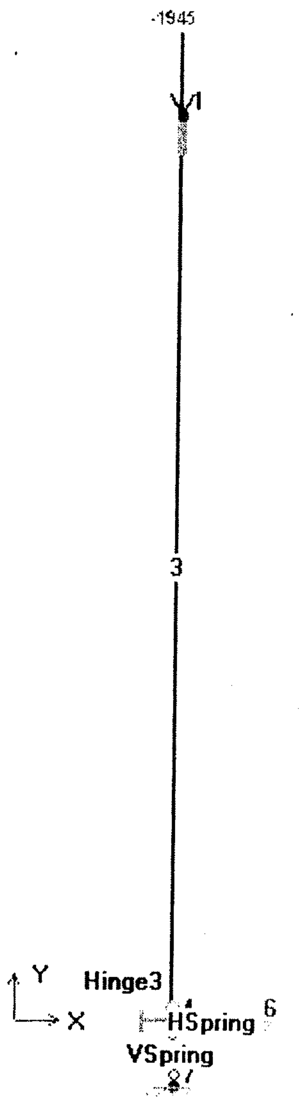
Irvine Office
21 Technology Drive
Irvine, CA 92618
(949) 727-9336 Phone
(949) 727-7391 Fax

Fresno Office
7395 N. Palm Bluffs Ave
Suite 104
Fresno, CA 93711
(559) 449-6190 Phone
(559) 449-4591 Fax

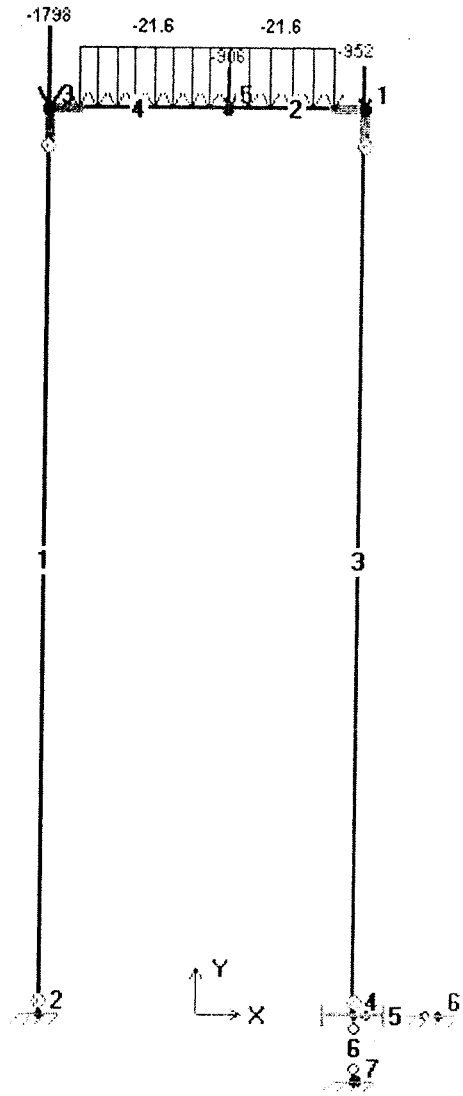
Oakland Office
167 Filbert Street
Oakland, CA 94607
(510) 267-1835 Phone

SECTION 4-A

PRELIMINARY INELASTIC PUSHOVER RESULTS



BENT # 53 SOUTH COL., LONG



BENT #53. TRANS.

CAPP Analysis Report

Loading Name: Combo1

6/21/2004

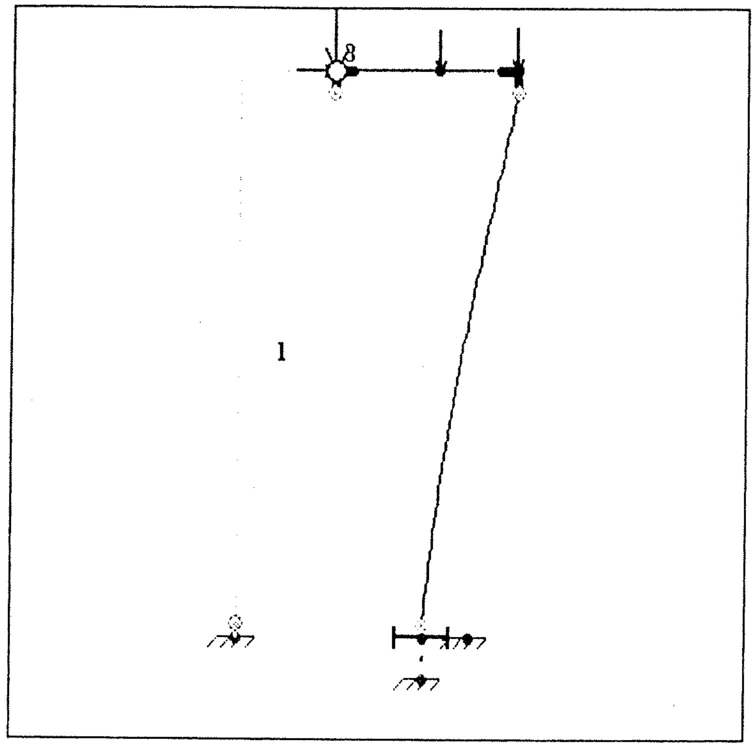
Report Type: Push Over Analysis Summary

Comments: BENT #53, TRANSVERSE

Page __ of __

Model Details:

Nmber of Members/Nodes:	6 Members, 7 Nodes
Overall Width:	796.8 in
Overall Height:	1912 in



Loading Details:

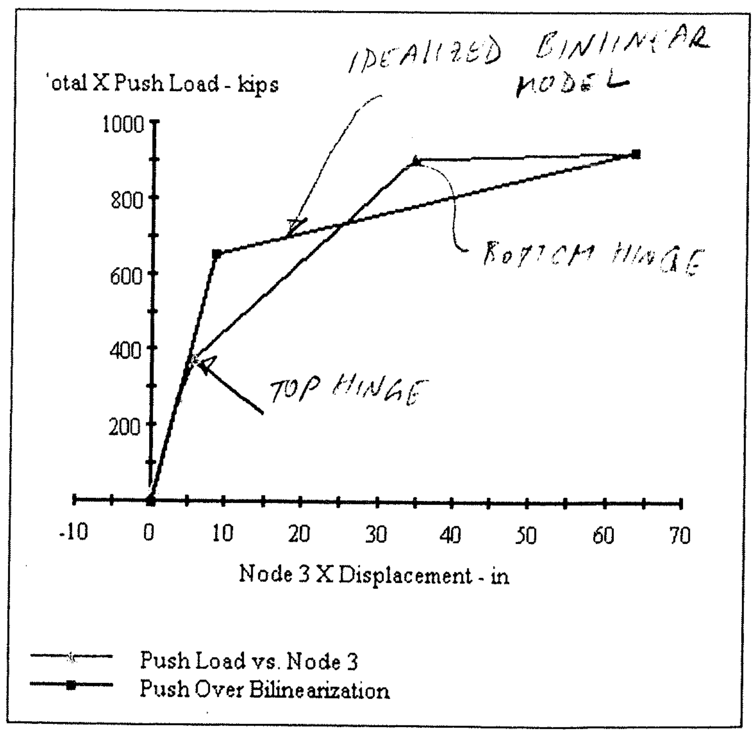
Non-Push Load Combo:	1(Load1)
Push Load Case:	Load2
Num. Loads in Push Case:	1 in X Dir., 0 in Y Dir.
P-Delta Effects Included:	Yes

Termination Details:

Analysis Termination:	Cap. Reached in Mem. 1
Member Element Type:	Element3 - Beam Column
Termination Cause:	Mom. Rot. Hinge - Hinge1
Hinge1 :	-0.0142 rad
Last Hinge Moment:	-786.E+3 kips-in
Mem. Drift at Termination:	3.548%

Analysis Results:

Critical Node (Node Shown):	3
Number of Events:	6
First X Yield Push Load:	36.79 kips
Max X Push Load:	926. kips
X First Yield Displacement:	0.4537 in
X Ultimate Displacement:	63.32 in
Area Under Push-Disp Curve:	46.E+3 kips-in
Effective Yield Disp:	8.518 in
Effective Yield Push Load:	651.2 kips
Eff System Ductility:	7.434
Eff Elastic Stiffness:	76.19 kips/in
Eff Plastic Stiffness:	5.014 kips/in
Bilinear Harding Slope:	6.581 %
Over Strength Factor:	1.422



CAPP Analysis Report

Loading Name: Combo1 6/21/2004

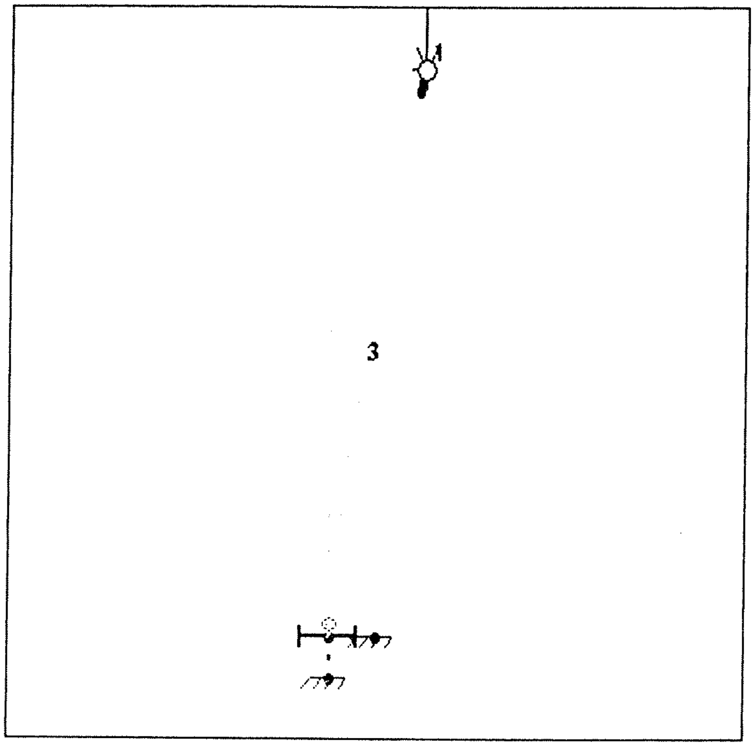
Report Type: Push Over Analysis Summary

Comments: – BENT #53 – SINGIE COLUMN – LONG.

Page __ of __

Model Details:

Nmber of Members/Nodes:	3 Members, 4 Nodes
Overall Width:	163.2 in
Overall Height:	1912 in



Loading Details:

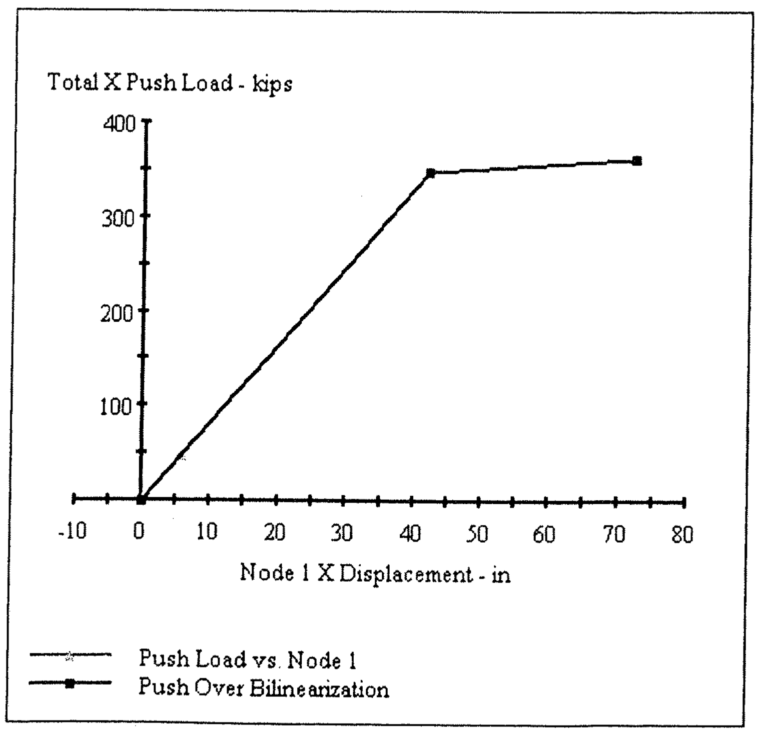
Non-Push Load Combo:	1(Load1)
Push Load Case:	Load2
Num. Loads in Push Case:	1 in X Dir., 0 in Y Dir.
P-Delta Effects Included:	Yes

Termination Details:

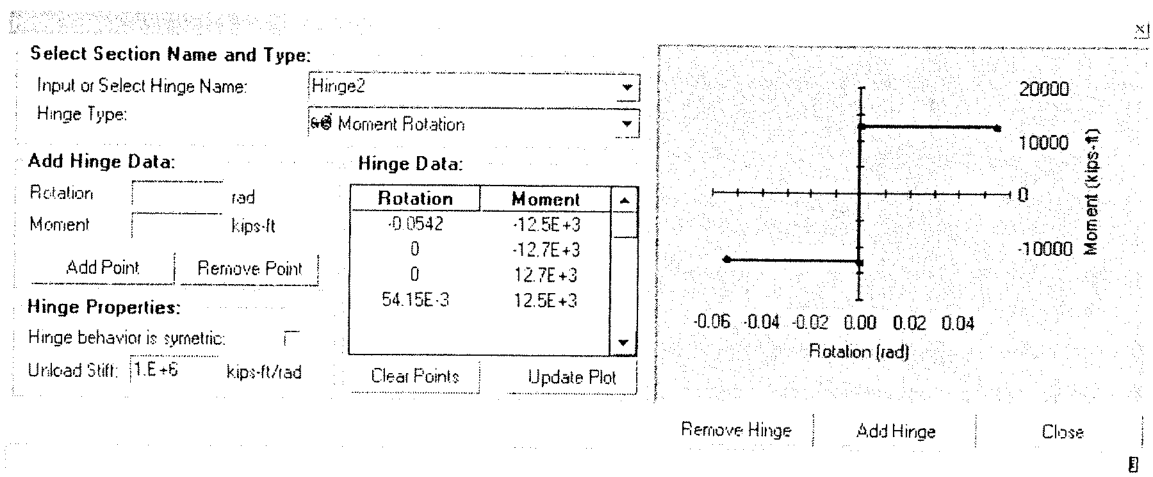
Analysis Termination:	Cap. Reached in Mem. 3
Member Element Type:	Element1 - Beam Column
Termination Cause:	Mom. Rot. Hinge - Hinge3
Hinge3 Plastic Rot:	14.15E-3 rad
Last Hinge Moment:	786.E+3 kips-in
Mem. Drift at Termination:	3.826%

Analysis Results:

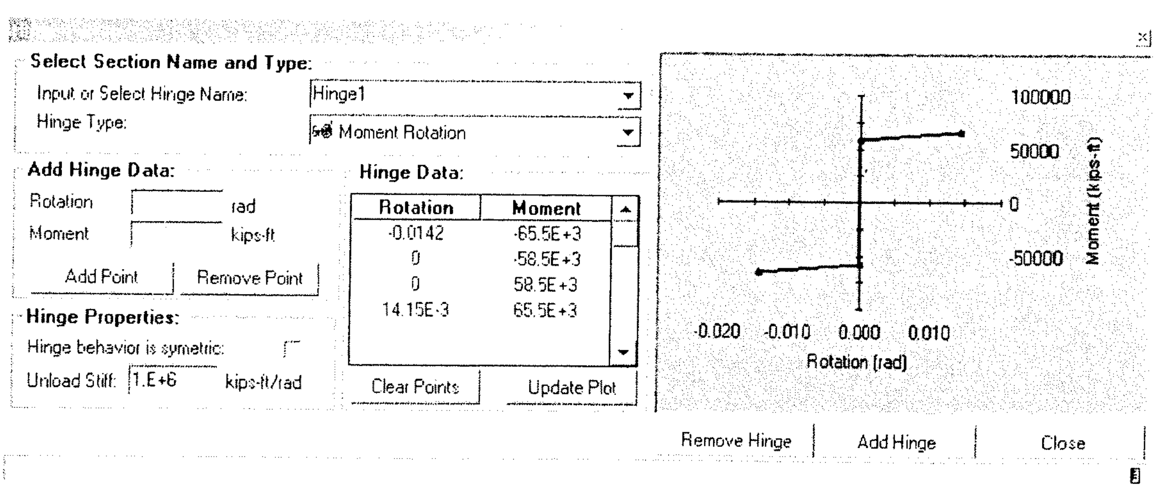
Critical Node (Node Shown):	1
Number of Events:	3
First X Yield Push Load:	48.49 kips
Max X Push Load:	362.5 kips
X First Yield Displacement:	5.822 in
X Ultimate Displacement:	72.23 in
Area Under Push-Disp Curve:	18.06E+3 kips-in
Effective Yield Disp:	42. in
Effective Yield Push Load:	348.3 kips
Eff System Ductility:	1.72
Eff Elastic Stiffness:	8.286 kips/in
Eff Plastic Stiffness:	0.4683 kips/in
Bilinear Harding Slope:	5.651 %
Over Strength Factor:	1.041



Bent 53
Column Plastic Hinge



Bent #53 ,Column Plastic Hinge Model @ Top



Bent #53 ,Column Plastic Hinge Model @ Bottom

Long. Pushover of Bent #53. Single Column

```
# CAPP Generated Input file
# Created = 6/21/2004

UNITS
   FORCE=Kips
   LENGTH=Feet

JOINT
   NUM=1  X=26.4  Y=148.5
   NUM=4  X=26.4  Y=0
   NUM=6  X=40  Y=0
   NUM=7  X=26.67  Y=-10.83

RESTRAINT
   NUM=4 DOF=R1
   NUM=6 DOF=U1,U2,R1
   NUM=7 DOF=U1,U2,R1

MATERIAL
   NAME=Mat1  TYPE=Concrete  E=519.1E+3  W=0.15

SECTION
   NAME=Col1  TYPE=User_Defined  MAT=Mat1  I=238  A=78.47
   NAME=cap1  TYPE=User_Defined  MAT=Mat1  I=498.2  A=144

ELEMENT
   NAME=Element1  TYPE=Elastic_Beam_Column  SEC=Col1
   NAME=Element2  TYPE=Elastic_Beam_Column  SEC=cap1
   NAME=Element3  TYPE=Elastic_Beam_Column  SEC=Col1
   NAME=Element4  TYPE=Elastic_Beam_Column  SEC=cap1
   NAME=HSpring4  TYPE=Axial_Spring  HINGE=HSpring  PDELTA=0
   NAME=VSpring4  TYPE=Axial_Spring  HINGE=VSpring  PDELTA=0

HINGE
   NAME=Hinge1  TYPE=Moment_Rotation  ISSYM=0  UNLOAD=1.E+6
      DATA  M=-65.5E+3  R=-0.0142
      DATA  M=-58.5E+3  R=0
      DATA  M=58.5E+3  R=0
      DATA  M=65.5E+3  R=14.15E-3
   NAME=Hinge2  TYPE=Moment_Rotation  ISSYM=0  UNLOAD=1.E+6
      DATA  M=-12.5E+3  R=-0.0542
      DATA  M=-12.7E+3  R=0
      DATA  M=12.7E+3  R=0
```

```
    DATA  M=12.5E+3  R=54.15E-3
  NAME=Hinge3  TYPE=Moment_Rotation  ISSYM=0  UNLOAD=1.E+6
    DATA  M=-65.5E+3  R=-0.0142
    DATA  M=-58.5E+3  R=0
    DATA  M=58.5E+3  R=0
    DATA  M=65.5E+3  R=14.15E-3
  NAME=HSpring  TYPE=Force_Displacement  ISSYM=0  UNLOAD=1.E+6
    DATA  F=-38.39E+3  D=-2
    DATA  F=-19.19E+3  D=-1
    DATA  F=0  D=0
    DATA  F=19.19E+3  D=1
    DATA  F=38.39E+3  D=2
  NAME=VSpring  TYPE=Force_Displacement  ISSYM=0  UNLOAD=1.E+6
    DATA  F=-1.549E+6  D=-2
    DATA  F=-774.6E+3  D=-1
    DATA  F=0  D=0
    DATA  F=774.6E+3  D=1
    DATA  F=1.549E+6  D=2

MEMBER
  NUM=3  ELEM=Element1  INODE=1  JNODE=4  IOFF=6  JHINGE=Hinge3
  NUM=5  ELEM=HSpring4  INODE=4  JNODE=6  IREL=-1  JREL=-1
  NUM=6  ELEM=VSpring4  INODE=4  JNODE=7

LOAD
  NAME=Load1  TYPE=Dead_Load
    NODEDATA  NUM=1  Y=-1945
  NAME=Load2  TYPE=Push_Load
    NODEDATA  NUM=1  X=1

COMBO
  NAME=Combo1
    LOAD=Load1  SF=1
    LOAD=Load2  SF=1

GRIDLINES

PROJECT_PROPERTIES

END
```

Transverse Pushover of Bent #53, Single Column

```
# CAPP Generated Input file
# Created = 6/21/2004


UNITS
  FORCE=Kips
  LENGTH=Feet

JOINT
  NUM=1  X=26.4  Y=148.5
  NUM=2  X=-26.4  Y=0
  NUM=3  X=-26.4  Y=148.5
  NUM=4  X=26.4  Y=0
  NUM=5  X=3.7  Y=148.5
  NUM=6  X=40  Y=0
  NUM=7  X=26.67  Y=-10.83

RESTRAINT
  NUM=2 DOF=U1,U2,R1
  NUM=4 DOF=R1
  NUM=6 DOF=U1,U2,R1
  NUM=7 DOF=U1,U2,R1

MATERIAL
  NAME=Mat1  TYPE=Concrete  E=519.1E+3  W=0.15

SECTION
  NAME=Col1  TYPE=User_Defined  MAT=Mat1  I=238  A=78.47
  NAME=cap1  TYPE=User_Defined  MAT=Mat1  I=498.2  A=144

ELEMENT
  NAME=Element1  TYPE=Elastic_Beam_Column  SEC=Col1
  NAME=Element2  TYPE=Elastic_Beam_Column  SEC=cap1
  NAME=Element3  TYPE=Elastic_Beam_Column  SEC=Col1
  NAME=Element4  TYPE=Elastic_Beam_Column  SEC=cap1
  NAME=HSpring4  TYPE=Axial_Spring  HINGE=HSpring  PDELTA=0
  NAME=VSpring4  TYPE=Axial_Spring  HINGE=VSpring  PDELTA=0

HINGE
  NAME=Hinge1  TYPE=Moment_Rotation  ISSYM=0  UNLOAD=1.E+6
    DATA  M=-65.5E+3  R=-0.0142
    DATA  M=-58.5E+3  R=0
    DATA  M=58.5E+3  R=0
    DATA  M=65.5E+3  R=14.15E-3
```

```
  NAME=Hinge2 TYPE=Moment_Rotation ISSYM=0 UNLOAD=1.E+6
    DATA M=-12.5E+3 R=-0.0542
    DATA M=-12.7E+3 R=0
    DATA M=12.7E+3 R=0
    DATA M=12.5E+3 R=54.15E-3
  NAME=Hinge3 TYPE=Moment_Rotation ISSYM=0 UNLOAD=1.E+6
    DATA M=-65.5E+3 R=-0.0142
    DATA M=-58.5E+3 R=0
    DATA M=58.5E+3 R=0
    DATA M=65.5E+3 R=14.15E-3
  NAME=HSpring TYPE=Force_Displacement ISSYM=0 UNLOAD=1.E+6
    DATA F=-38.39E+3 D=-2
    DATA F=-19.19E+3 D=-1
    DATA F=0 D=0
    DATA F=19.19E+3 D=1
    DATA F=38.39E+3 D=2
  NAME=VSpring TYPE=Force_Displacement ISSYM=0 UNLOAD=1.E+6
    DATA F=-1.549E+6 D=-2
    DATA F=-774.6E+3 D=-1
    DATA F=0 D=0
    DATA F=774.6E+3 D=1
    DATA F=1.549E+6 D=2

MEMBER
  NUM=1 ELEM=Element3 INODE=2 JNODE=3 JOFF=6 IHINGE=Hinge1
JHINGE=Hinge2
  NUM=2 ELEM=Element2 INODE=5 JNODE=1 JOFF=5
  NUM=3 ELEM=Element1 INODE=1 JNODE=4 IOFF=6 IHINGE=Hinge2
JHINGE=Hinge3
  NUM=4 ELEM=Element2 INODE=3 JNODE=5 IOFF=5
  NUM=5 ELEM=HSpring4 INODE=4 JNODE=6 IREL=-1 JREL=-1
  NUM=6 ELEM=VSpring4 INODE=4 JNODE=7

LOAD
  NAME=Load1 TYPE=Dead_Load
    NODEDATA NUM=1 Y=-952
    NODEDATA NUM=3 Y=-1798
    NODEDATA NUM=5 Y=-906
    MEMDATA NUM=2 IY=-21.6 JY=-21.6
    MEMDATA NUM=4 IY=-21.6 JY=-21.6
  NAME=Load2 TYPE=Push_Load
    NODEDATA NUM=3 X=1

COMBO
  NAME=Combo1
    LOAD=Load1 SF=1
```

```
    LOAD=Load2  SF=1
GRIDLINES
PROJECT_PROPERTIES
END
```

XTRACT Section Report

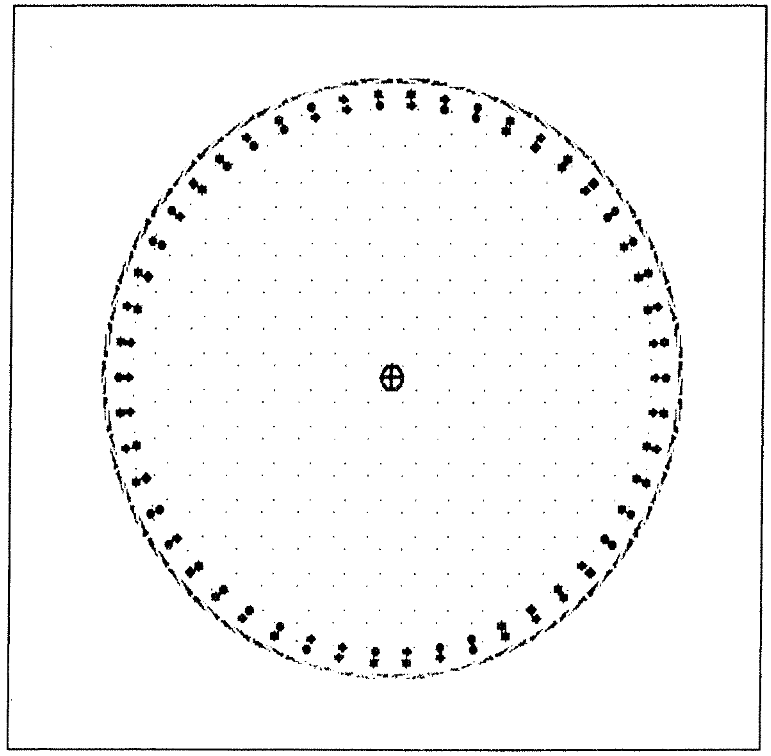
Section Name: 10_ft_conf

BENT #53 , Col. , BOTTOM SECTION

Majid Sarraf
Imbsen & Associates
6/21/2004
Bay Bridge Project
Temporary Viaduct

Section Details:

X Centroid:	.6585E-3 ft
Y Centroid:	.1422E-16 ft
Section Area:	78.34 ft^2
I gross about X:	503.4 ft^4
I gross about Y:	503.2 ft^4
Reinforcing Bar Area:	1.563 ft^2
Percent Longitudinal Steel:	1.995 %
Overall Width:	9.980 ft
Overall Height:	10.000 ft
Number of Fibers:	518
Number of Bars:	100
Number of Materials:	4



Material Types and Names:

Unconfined Concrete:	Unconfined1
Confined Concrete:	Confined1
Strain Hardening Steel:	Steel1
Strain Hardening Steel:	Steel1_nom

Comments:

Section Type: Circular Column
Type of Reinforcing: Hoop Reinforcing
Transverse Reinforcing Bar Size: #8
Spacing of Transverse Steel: .5 ft
Outside Diameter: 10 ft
Cover Thickness: .1666 ft
Number of Longitudinal Bars: 100
Longitudinal Bar Size: #14
Cover Concrete: Unconfined1
Column Core Concrete: Confined1
Longitudinal Steel: Steel1

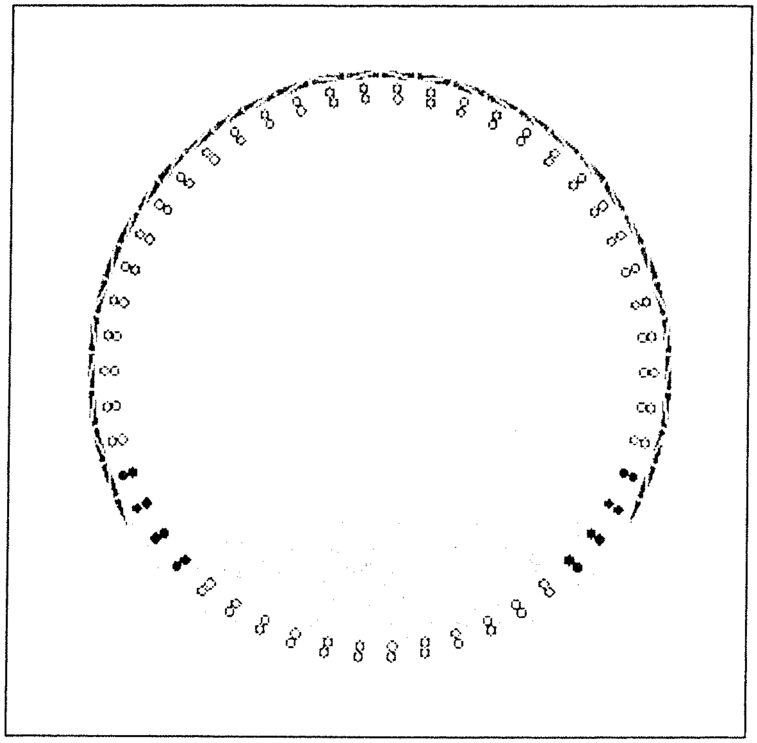
XTRACT Analysis Report

Majid Sarraf
Imbsen & Associates
6/21/2004
Bay Bridge Project
Temporary Viaduct

Section Name:	10_ft_conf
Loading Name:	10_ft_Conf
Analysis Type:	Moment Curvature

Section Details:

X Centroid:	.6585E-3 ft
Y Centroid:	.1422E-16 ft
Section Area:	78.34 ft^2

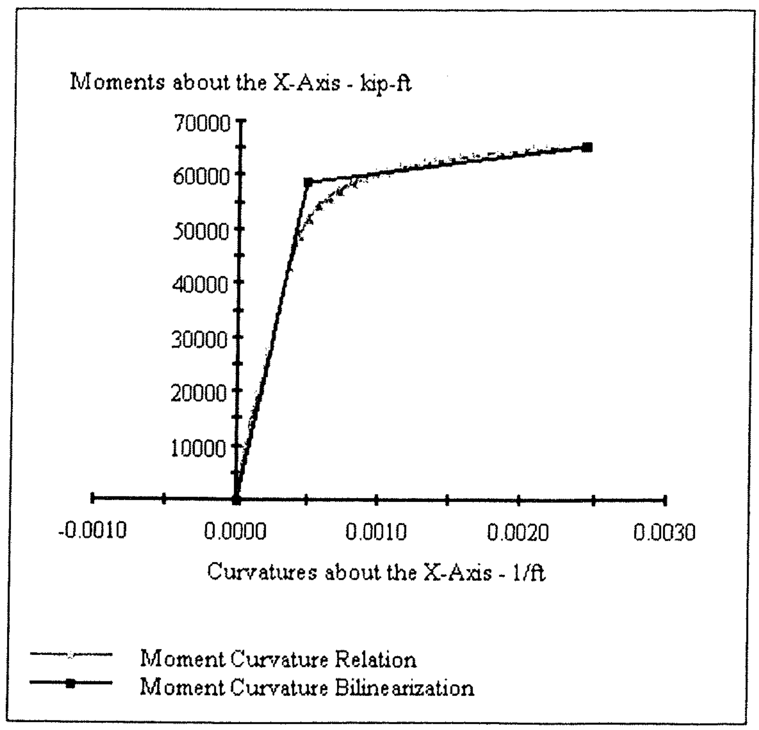


Loading Details:

Constant Load - P:	2360 kips
Incrementing Loads:	Mxx Only
Number of Points:	30
Analysis Strategy:	Displacement Control

Analysis Results:

Failing Material:	Unconfined1
Failure Strain:	6.000E-3 Compression
Curvature at Initial Load:	-.1052E-13 1/ft
Curvature at First Yield:	.3488E-3 1/ft
Ultimate Curvature:	2.415E-3 1/ft
Moment at First Yield:	43.33E+3 kip-ft
Ultimate Moment:	65.52E+3 kip-ft
Centroid Strain at Yield:	.4992E-3 Ten
Centroid Strain at Ultimate:	5.880E-3 Ten
N.A. at First Yield:	1.431 ft
N.A. at Ultimate:	2.434 ft
Energy per Length:	134.4 kips
Effective Yield Curvature:	.4717E-3 1/ft
Effective Yield Moment:	58.60E+3 kip-ft
Over Strength Factor:	1.118
EI Effective:	1.24E+8 kip-ft^2
Yield EI Effective:	3.564E+6 kip-ft^2
Bilinear Harding Slope:	2.870 %
Curvature Ductility:	5.120



Comments:

User Comments

XTRACT Analysis Report

Majid Sarraf
Imbsen & Associates
6/21/2004
Bay Bridge Project
Temporary Viaduct

Section Name:	10FT_Rd1 , BENT #53 , Col. TOP, SECTION
Loading Name:	MC_2770
Analysis Type:	Moment Curvature

Section Details:

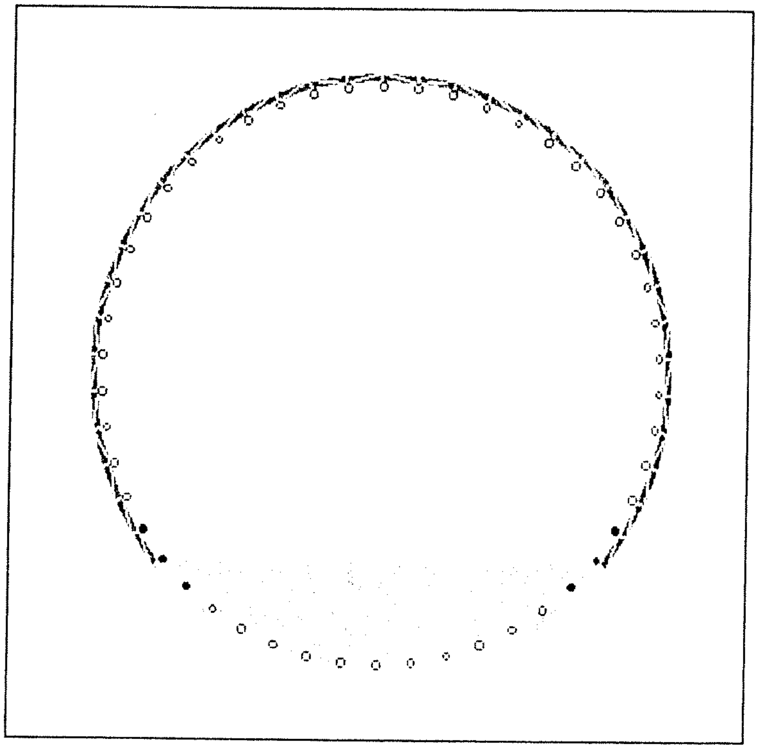
X Centroid:	.3688E-3 ft
Y Centroid:	.1454E-3 ft
Section Area:	78.34 ft^2

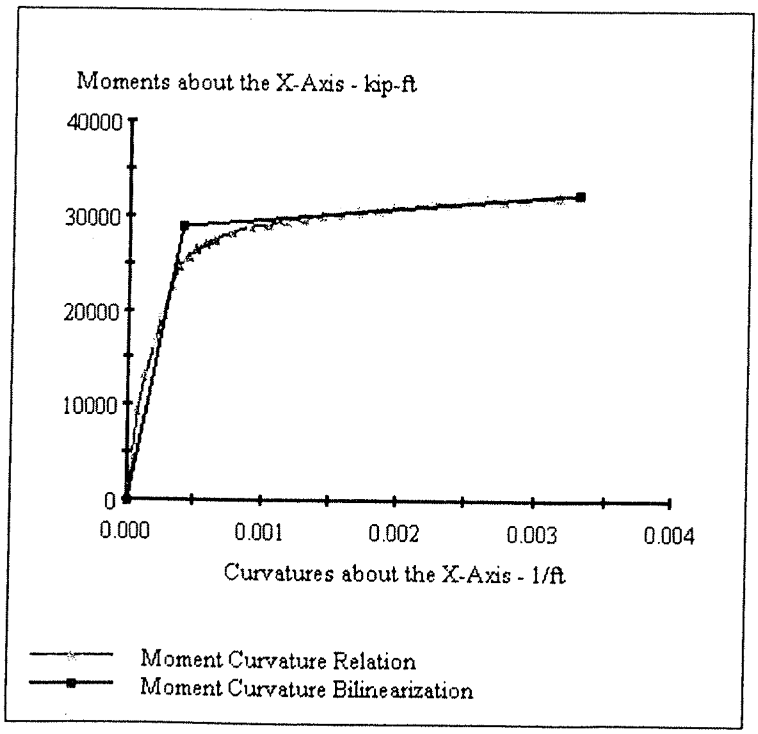
Loading Details:

Constant Load - P:	2770 kips
Incrementing Loads:	Mxx Only
Number of Points:	30
Analysis Strategy:	Displacement Control

Analysis Results:

Failing Material:	Unconfined1
Failure Strain:	6.000E-3 Compression
Curvature at Initial Load:	.7350E-11 1/ft
Curvature at First Yield:	.3142E-3 1/ft
Ultimate Curvature:	3.298E-3 1/ft
Moment at First Yield:	22.77E+3 kip-ft
Ultimate Moment:	32.29E+3 kip-ft
Centroid Strain at Yield:	.5733E-3 Ten
Centroid Strain at Ultimate:	10.22E-3 Ten
N.A. at First Yield:	1.824 ft
N.A. at Ultimate:	3.100 ft
Energy per Length:	94.47 kips
Effective Yield Curvature:	.3988E-3 1/ft
Effective Yield Moment:	28.89E+3 kip-ft
Over Strength Factor:	1.117
EI Effective:	7.25E+7 kip-ft^2
Yield EI Effective:	1.170E+6 kip-ft^2
Bilinear Harding Slope:	1.615 %
Curvature Ductility:	8.272





Comments:

User Comments

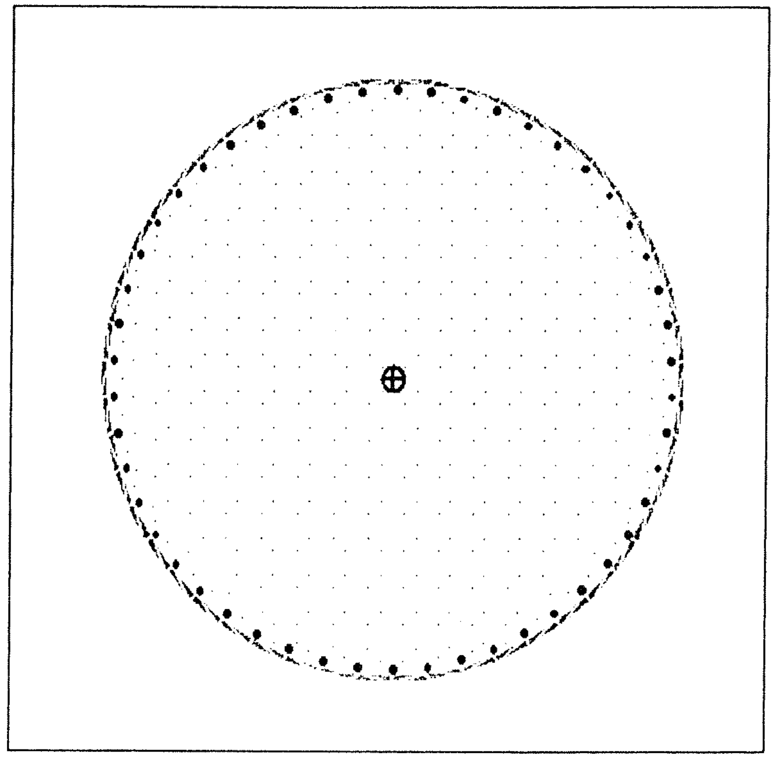
XTRACT Section Report

Section Name: 10FT_Rd1

Majid Sarraf
Imbsen & Associates
6/21/2004
Bay Bridge Project
Temporary Viaduct

Section Details:

X Centroid:	.3688E-3 ft
Y Centroid:	.1454E-3 ft
Section Area:	78.34 ft^2
I gross about X:	493.0 ft^4
I gross about Y:	492.9 ft^4
Reinforcing Bar Area:	.5420 ft^2
Percent Longitudinal Steel:	.6919 %
Overall Width:	9.980 ft
Overall Height:	10.000 ft
Number of Fibers:	518
Number of Bars:	50
Number of Materials:	3



Material Types and Names:

Unconfined Concrete:	Unconfined1
Confined Concrete:	Confined1
Strain Hardening Steel:	Steel1_nom

Comments:

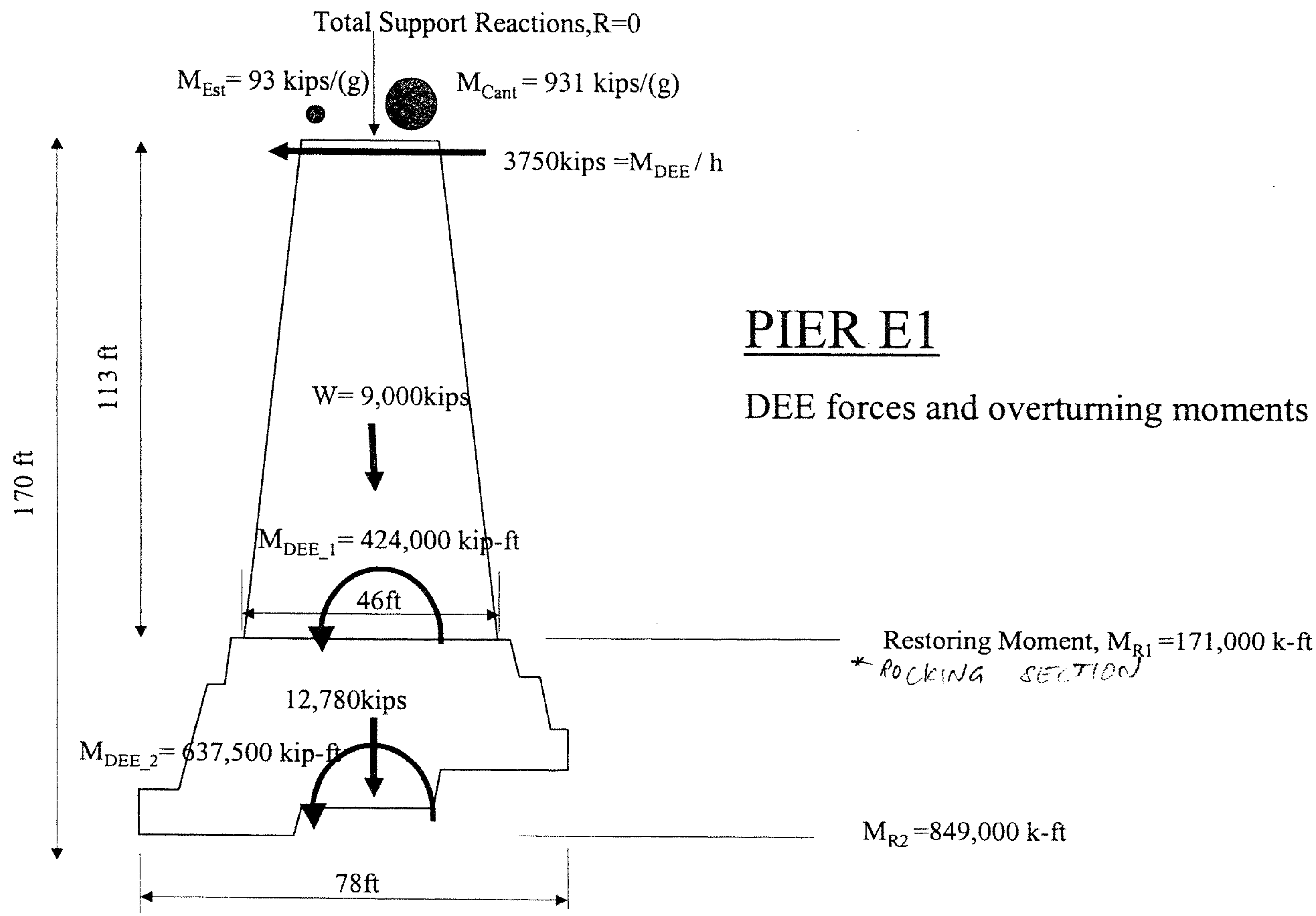
Section Type: Circular Column
Type of Reinforcing: Hoop Reinforcing
Transverse Reinforcing Bar Size: #8
Spacing of Transverse Steel: .5 ft
Outside Diameter: 10 ft
Cover Thickness: .1666 ft
Number of Longitudinal Bars: 50
Longitudinal Bar Size: #11
Cover Concrete: Unconfined1
Column Core Concrete: Confined1
Longitudinal Steel: Steel1

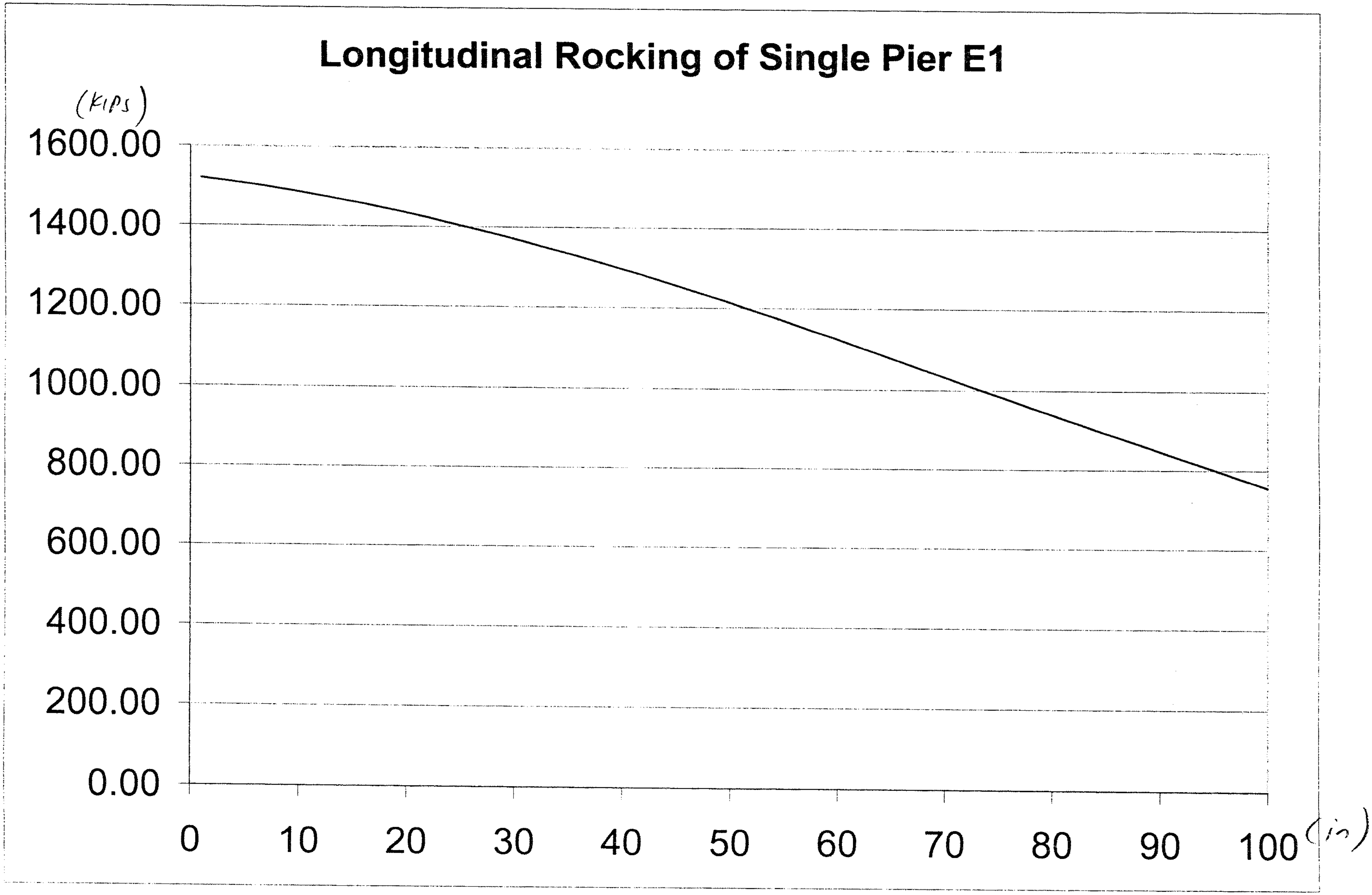
SECTION 7

ROCKING ANALYSIS OF PIER E1

PIER E1

DEE forces and overturning moments





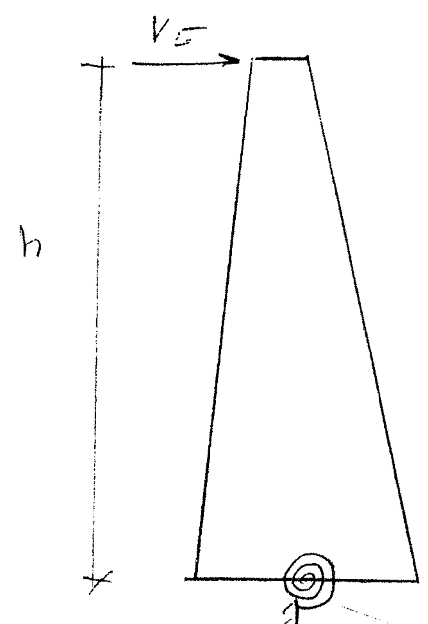
Longitudinal Rocking of Single Pier E1
(kips)
1600.00
1400.00
1200.00
1000.00
800.00
600.00
400.00
200.00
0.00
0
10
20
30
40
50
60
70
80
90
100
(in)

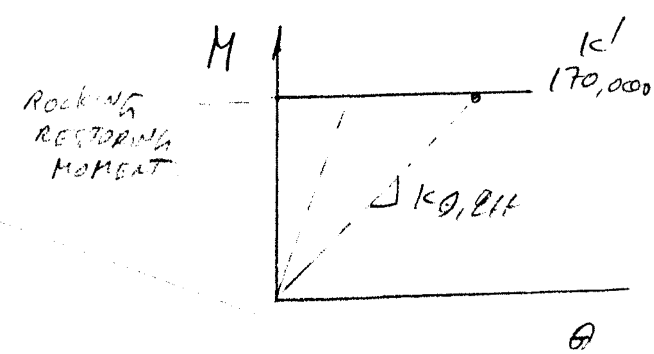
2

Pier E1

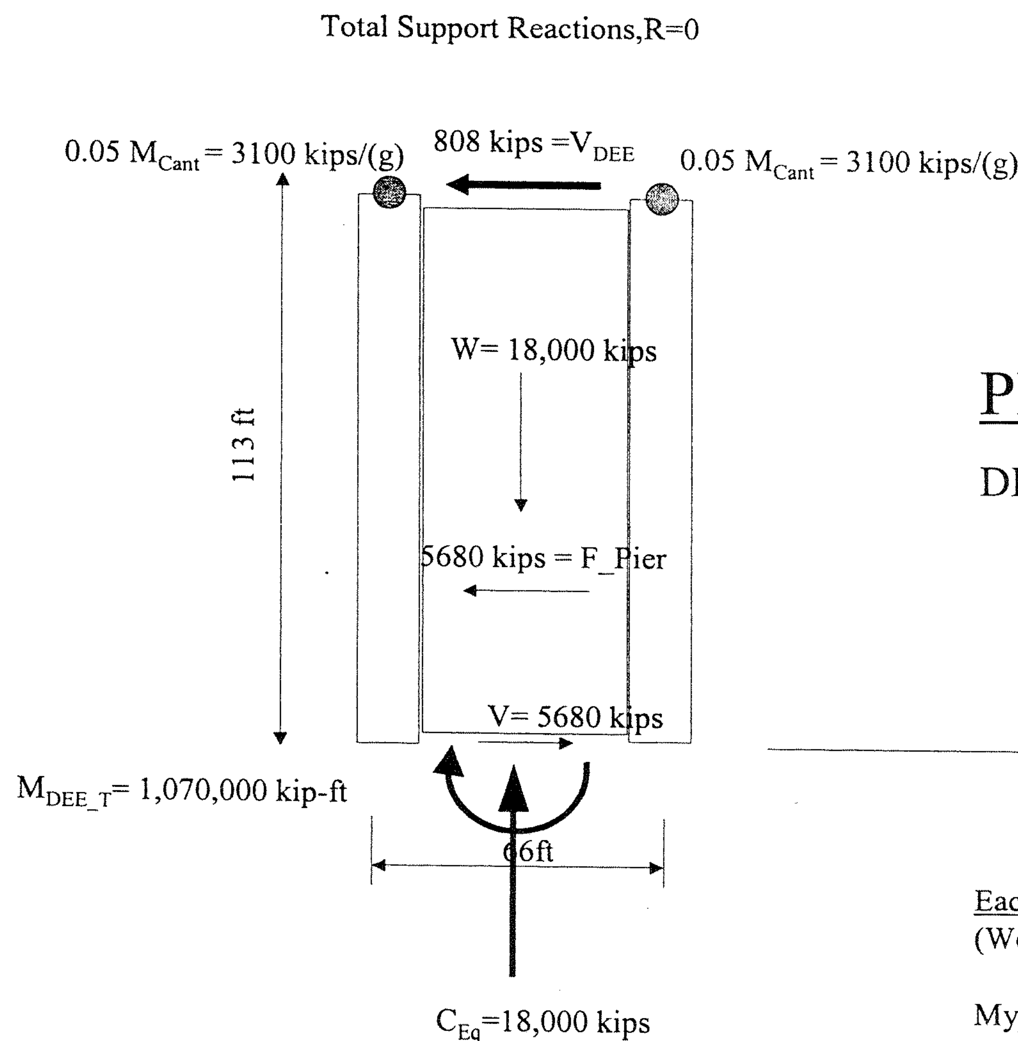
Rotational Long. Rocking Stiffness

Δ	h	$a = W/(Ks \times b)$	$\tan(\alpha) = \frac{\Delta}{h}$	$\cos(\alpha) = \frac{1}{\sqrt{1+(\Delta/h)^2}}$	$V_E = \frac{W}{h}(l/2 \times \cos(\alpha) - u \times \tan(\alpha) - a/2)$	$K_\theta = \frac{V_E \times h^2}{\Delta}$
(in)	(ft)	(ft)			(kips)	Kips/rad
1	113	7.75	0.0007	0.999960845	1520.07	232,918,009
2	113	7.75	0.0015	0.999843407	1516.78	116,206,273
3	113	7.75	0.0022	0.99964777	1513.33	77,295,044
4	113	7.75	0.0029	0.999374071	1509.75	57,833,952
5	113	7.75	0.0037	0.999022502	1506.02	46,152,925
6	113	7.75	0.0044	0.99859331	1502.15	38,361,942
7	113	7.75	0.0052	0.998086795	1498.14	32,793,854
8	113	7.75	0.0059	0.997503312	1493.99	28,615,087
9	113	7.75	0.0066	0.996843267	1489.69	25,362,548
10	113	7.75	0.0074	0.996107117	1485.26	22,758,380
11	113	7.75	0.0081	0.995295372	1480.69	20,625,768
12	113	7.75	0.0088	0.994408592	1475.98	18,846,836
13	113	7.75	0.0096	0.993447383	1471.14	17,339,979
14	113	7.75	0.0103	0.992412402	1466.16	16,046,909
15	113	7.75	0.0111	0.991304351	1461.05	14,924,880
16	113	7.75	0.0118	0.990123977	1455.80	13,941,836
17	113	7.75	0.0125	0.988872071	1450.42	13,073,263
18	113	7.75	0.0133	0.987549468	1444.92	12,300,096
19	113	7.75	0.0140	0.986157042	1439.28	11,607,284
20	113	7.75	0.0147	0.984695707	1433.52	10,982,785
21	113	7.75	0.0155	0.983166415	1427.64	10,416,855
22	113	7.75	0.0162	0.981570154	1421.63	9,901,518
23	113	7.75	0.0170	0.979907946	1415.50	9,430,188
24	113	7.75	0.0177	0.978180846	1409.25	8,997,377
25	113	7.75	0.0184	0.97638994	1402.89	8,598,474
26	113	7.75	0.0192	0.974536344	1396.41	8,229,579
27	113	7.75	0.0199	0.9726212	1389.82	7,887,370
28	113	7.75	0.0206	0.970645676	1383.12	7,568,999
29	113	7.75	0.0214	0.968610965	1376.30	7,272,012
30	113	7.75	0.0221	0.966518279	1369.39	6,994,282





IDEALIZED ROCKING ROTATIONAL SPRING USED IN SAP 2000 MODEL.



PIER E1- Transverse

DEE forces and Capacities

Overturning Moment, Mo_1 =1,070,000 k-ft

Restoring Moment, M_{R1} =594,000 k-ft

<u>Each Piers Section Capacity</u>
(Web wall included)

$My_{\_init}$ = 1,995,000 kip-ft
$Mp_{\_T\_}$ = 2,400,000 kip-ft

NOTE : NO ROCKING IN TRANS. CONSIDERED

XTRACT Analysis Report

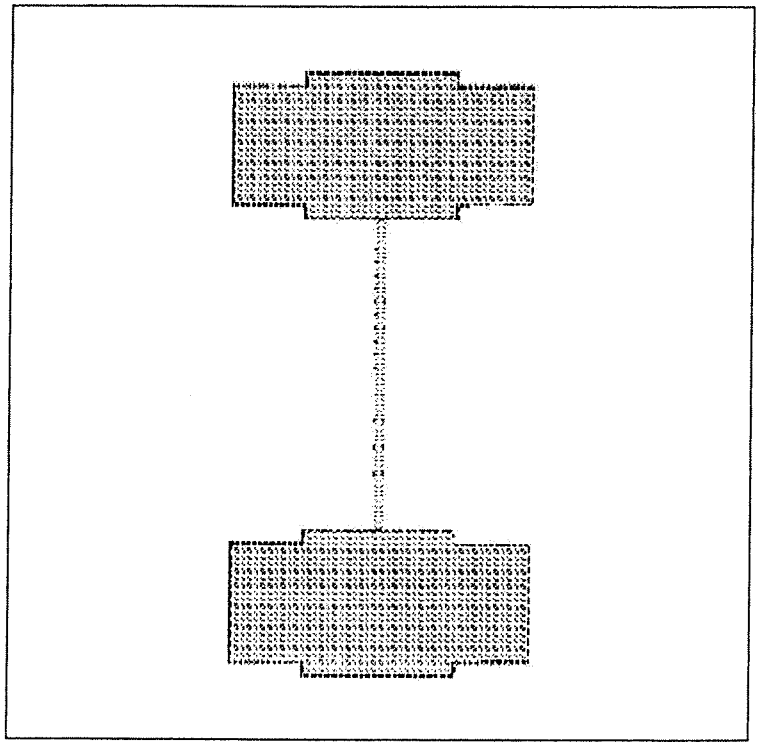
Imbsen & Associates, Inc. (in-house us
Imbsen & Associates, Inc. (in-house us
4/23/2004
Bay Bridge Baypass Structure
Pier E1
Page __ of __

Section Name: Combined-2
Loading Name: 18000KIP
Analysis Type: Moment Curvature

PIER E1 - TRANS. BENDING

Section Details:

X Centroid:	23.00 ft
Y Centroid:	-22.00 ft
Section Area:	1958 ft^2

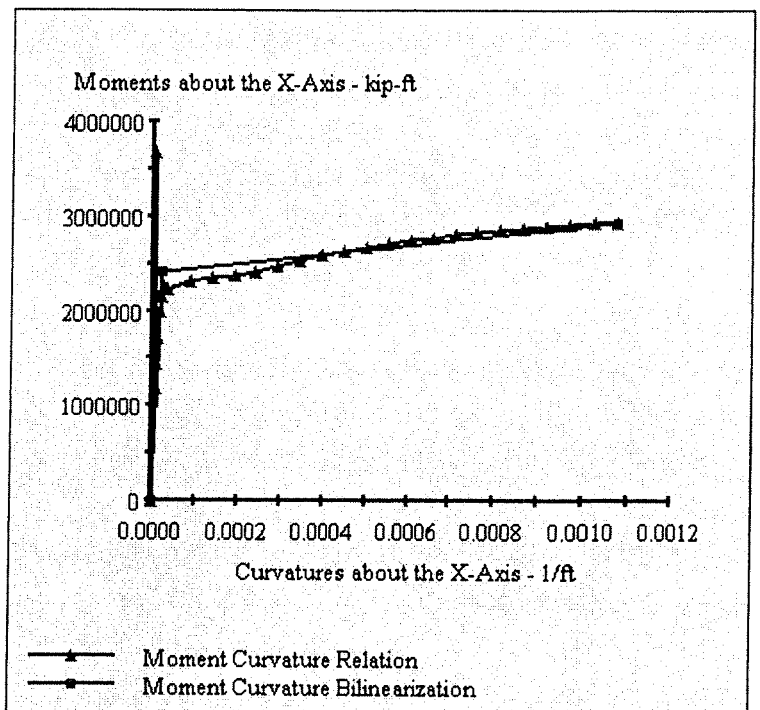


Loading Details:

Constant Load - P:	18.00E+3 kips
Constant Load - Mxx:	-1.000 kip-ft
Incrementing Loads:	Mxx Only
Number of Points:	30
Analysis Strategy:	Displacement Control

Analysis Results:

Failing Material:	Steel1
Failure Strain:	90.00E-3 Tension
Curvature at Initial Load:	.8949E-12 1/ft
Curvature at First Yield:	17.16E-6 1/ft
Ultimate Curvature:	1.073E-3 1/ft
Moment at First Yield:	1.995E+6 kip-ft
Ultimate Moment:	2.939E+6 kip-ft
Centroid Strain at Yield:	.4951E-3 Ten
Centroid Strain at Ultimate:	43.33E-3 Ten
N.A. at First Yield:	28.86 ft
N.A. at Ultimate:	40.39 ft
Energy per Length:	2839 kips
Effective Yield Curvature:	20.72E-6 1/ft
Effective Yield Moment:	2.409E+6 kip-ft
Over Strength Factor:	1.220
EI Effective:	1.16E+11 kip-ft^2
Yield EI Effective:	5.04E+8 kip-ft^2
Bilinear Harding Slope:	.4332 %
Curvature Ductility:	51.79



XTRACT Analysis Report

Section Name: SecBT

Loading Name: Trans_min

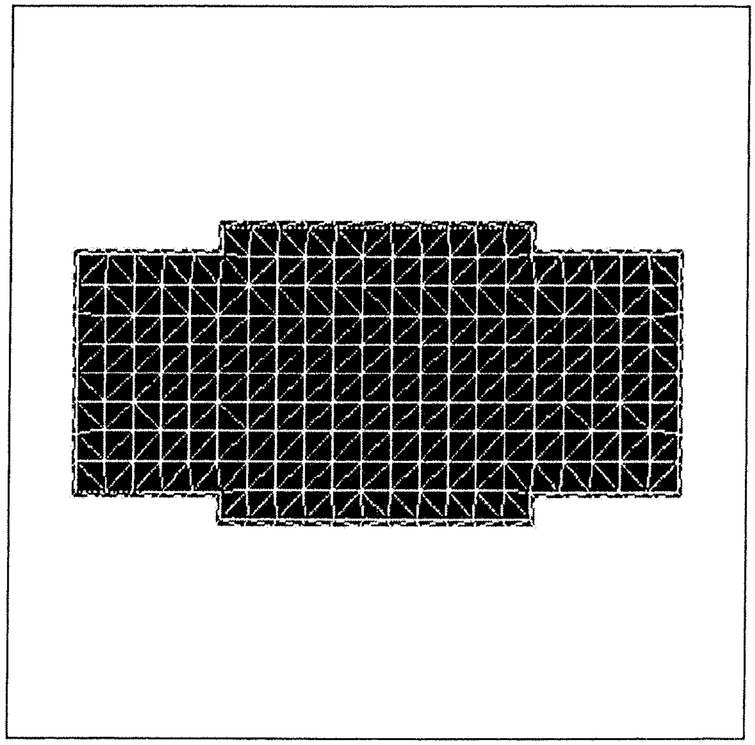
Analysis Type: Moment Curvature

SINGLE PIER E1, LONG. BENDING

LOW AXIAL LOAD

Section Details:

X Centroid:	23.00 ft
Y Centroid:	11.00 ft
Section Area:	924.0 ft^2

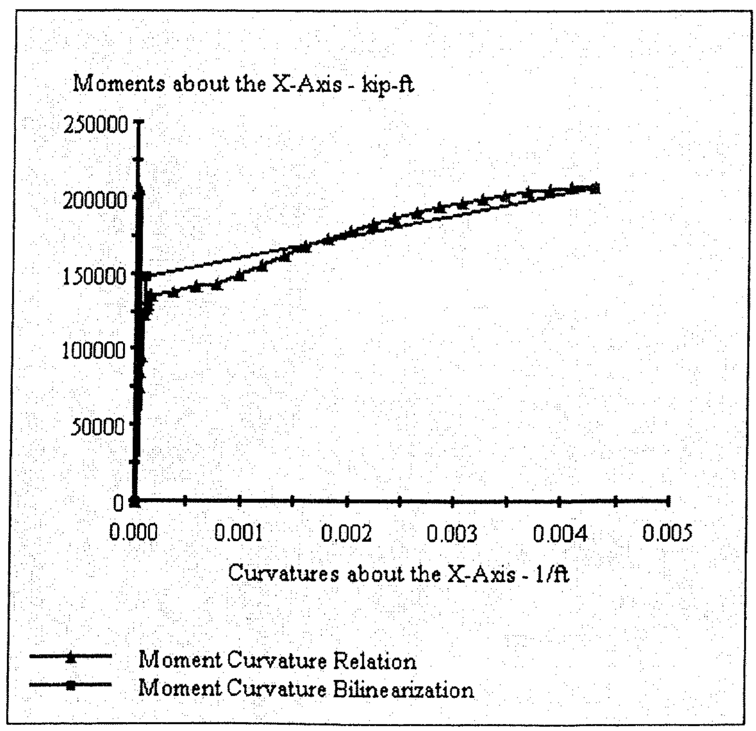


Loading Details:

Constant Load - P:	-4900 kips
Constant Load - Mxx:	-1.000 kip-ft
Incrementing Loads:	Mxx Only
Number of Points:	30
Analysis Strategy:	Displacement Control

Analysis Results:

Failing Material:	Unconfined1
Failure Strain:	5.000E-3 Compression
Curvature at Initial Load:	.5729E-10 1/ft
Curvature at First Yield:	70.93E-6 1/ft
Ultimate Curvature:	4.280E-3 1/ft
Moment at First Yield:	122.6E+3 kip-ft
Ultimate Moment:	207.7E+3 kip-ft
Centroid Strain at Yield:	.5079E-3 Ten
Centroid Strain at Ultimate:	41.37E-3 Ten
N.A. at First Yield:	7.161 ft
N.A. at Ultimate:	9.665 ft
Energy per Length:	752.7 kips
Effective Yield Curvature:	85.70E-6 1/ft
Effective Yield Moment:	148.1E+3 kip-ft
Over Strength Factor:	1.402
EI Effective:	1.73E+9 kip-ft^2
Yield EI Effective:	1.42E+7 kip-ft^2
Bilinear Harding Slope:	.8214 %
Curvature Ductility:	49.95



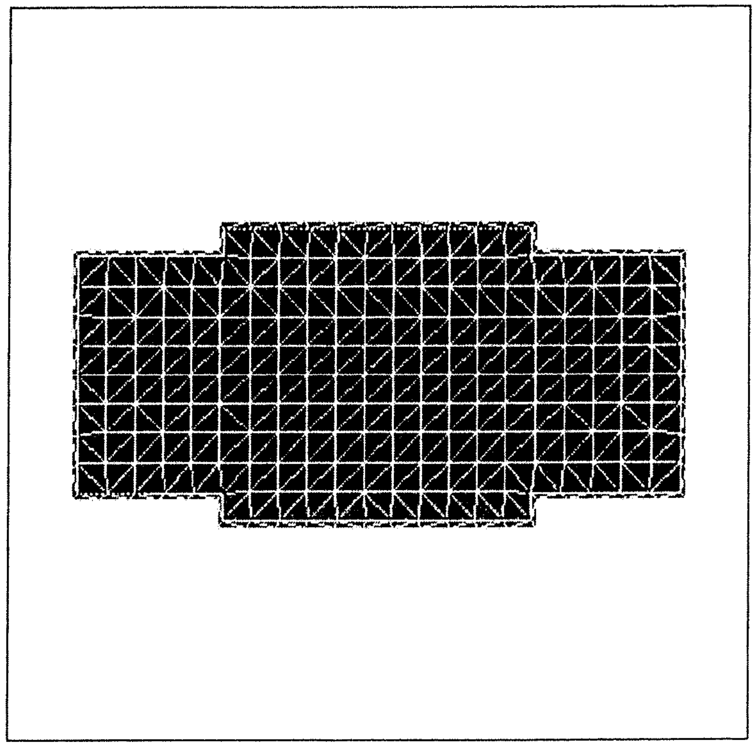
XTRACT Analysis Report

Imbsen & Associates, Inc. (in-house us
Imbsen & Associates, Inc. (in-house us
4/22/2004
Bay Bridge Baypass Structure
Pier E1
Page __ of __

Section Name:	SecBT
Loading Name:	Trans_max SINGLE PIER E1, LONG. BENDING HIGH AXIAL LOAD
Analysis Type:	Moment Curvature

Section Details:

X Centroid:	23.00 ft
Y Centroid:	11.00 ft
Section Area:	924.0 ft^2

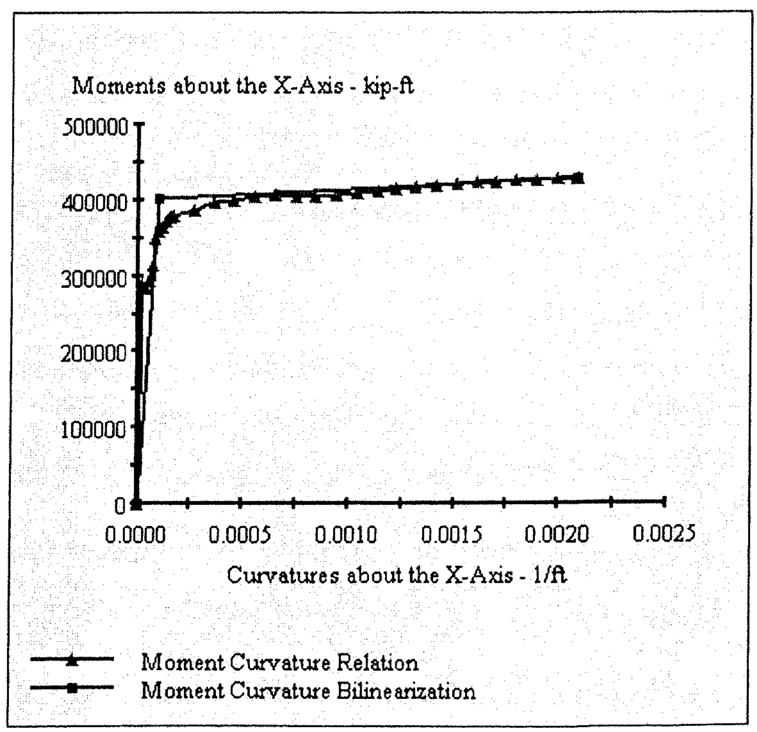


Loading Details:

Constant Load - P:	22.90E+3 kips
Constant Load - Mxx:	-1.000 kip-ft
Incrementing Loads:	Mxx Only
Number of Points:	30
Analysis Strategy:	Displacement Control

Analysis Results:

Failing Material:	Unconfined1
Failure Strain:	5.000E-3 Compression
Curvature at Initial Load:	.5722E-10 1/ft
Curvature at First Yield:	84.40E-6 1/ft
Ultimate Curvature:	2.085E-3 1/ft
Moment at First Yield:	349.2E+3 kip-ft
Ultimate Moment:	428.7E+3 kip-ft
Centroid Strain at Yield:	.3686E-3 Ten
Centroid Strain at Ultimate:	17.59E-3 Ten
N.A. at First Yield:	4.368 ft
N.A. at Ultimate:	8.435 ft
Energy per Length:	844.2 kips
Effective Yield Curvature:	96.88E-6 1/ft
Effective Yield Moment:	400.9E+3 kip-ft
Over Strength Factor:	1.069
EI Effective:	4.14E+9 kip-ft^2
Yield EI Effective:	1.40E+7 kip-ft^2
Bilinear Harding Slope:	.3384 %
Curvature Ductility:	21.53

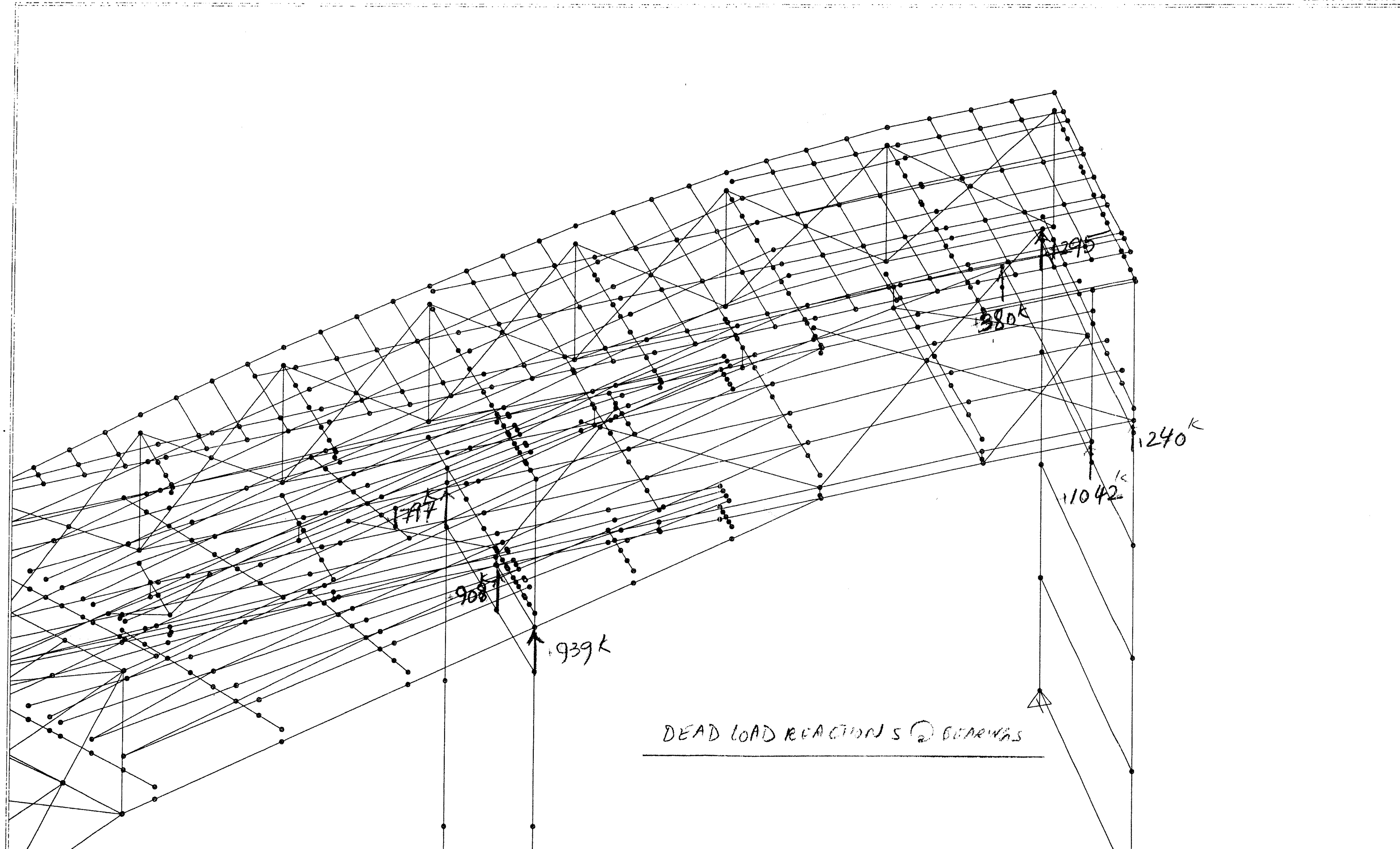


SECTION 8

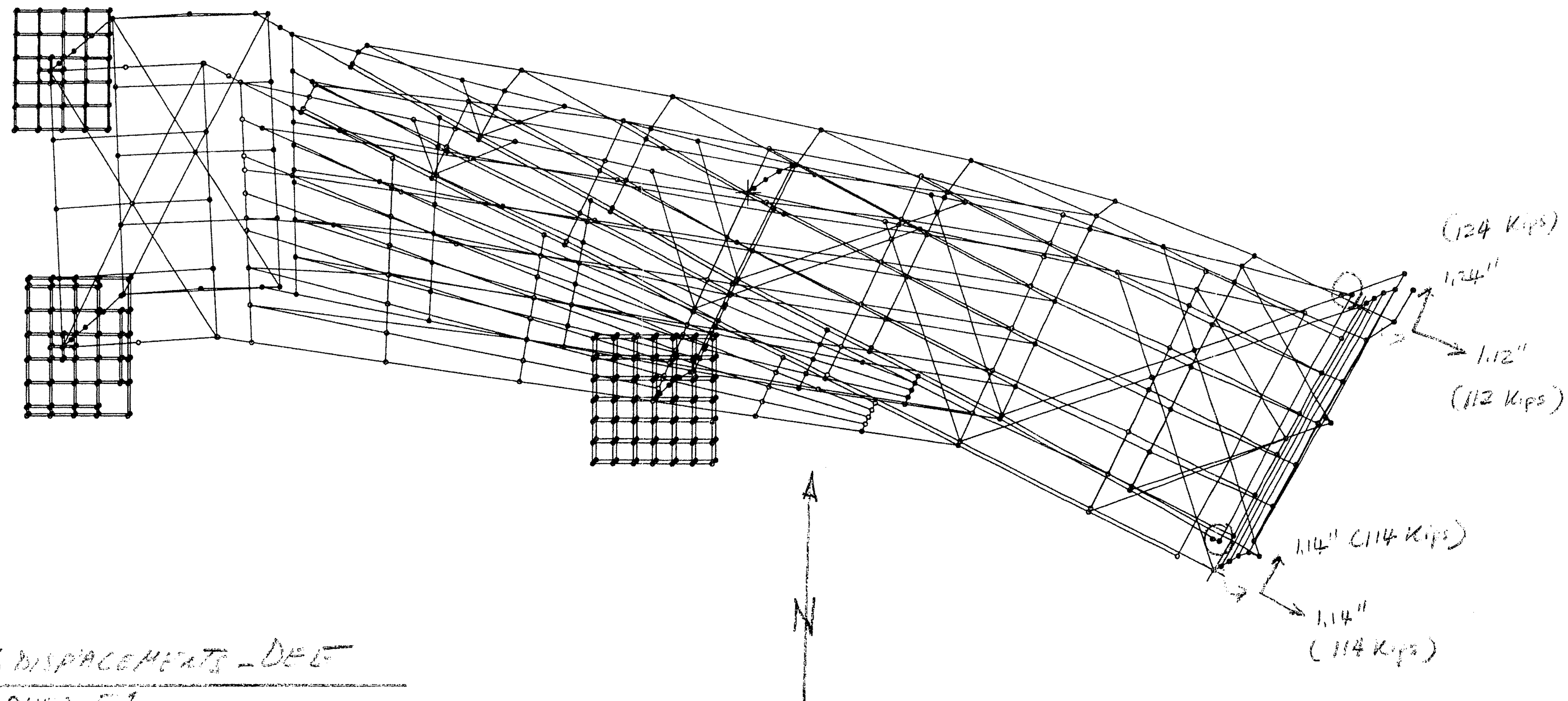
SUBSTRUCTURE FORCES/DISPLACEMENTS

SAP2000

6/21/04 14:38:33

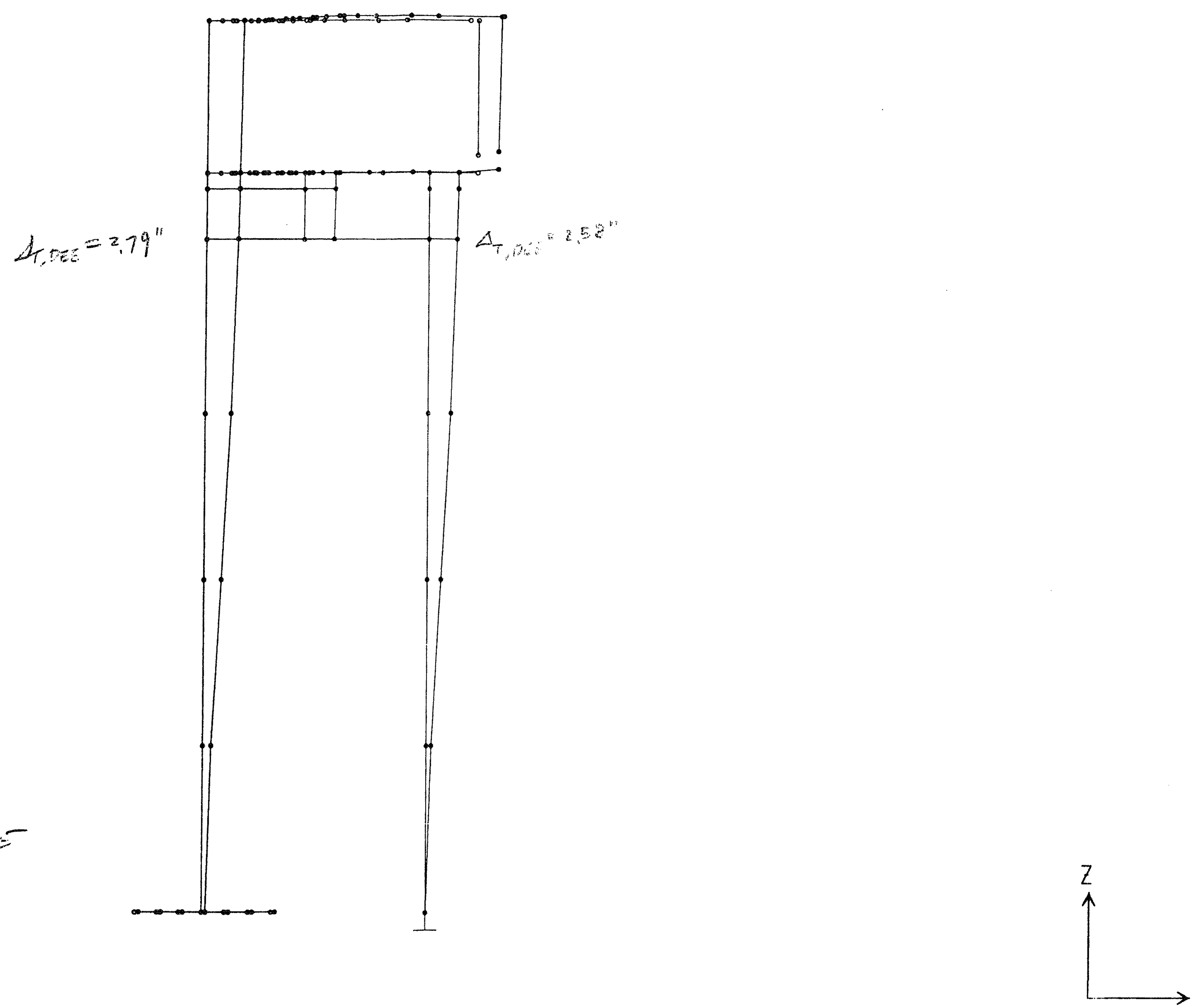


SAP2000 v7.40 - File:VDEastSpect - 3-D View - Kip-in Units

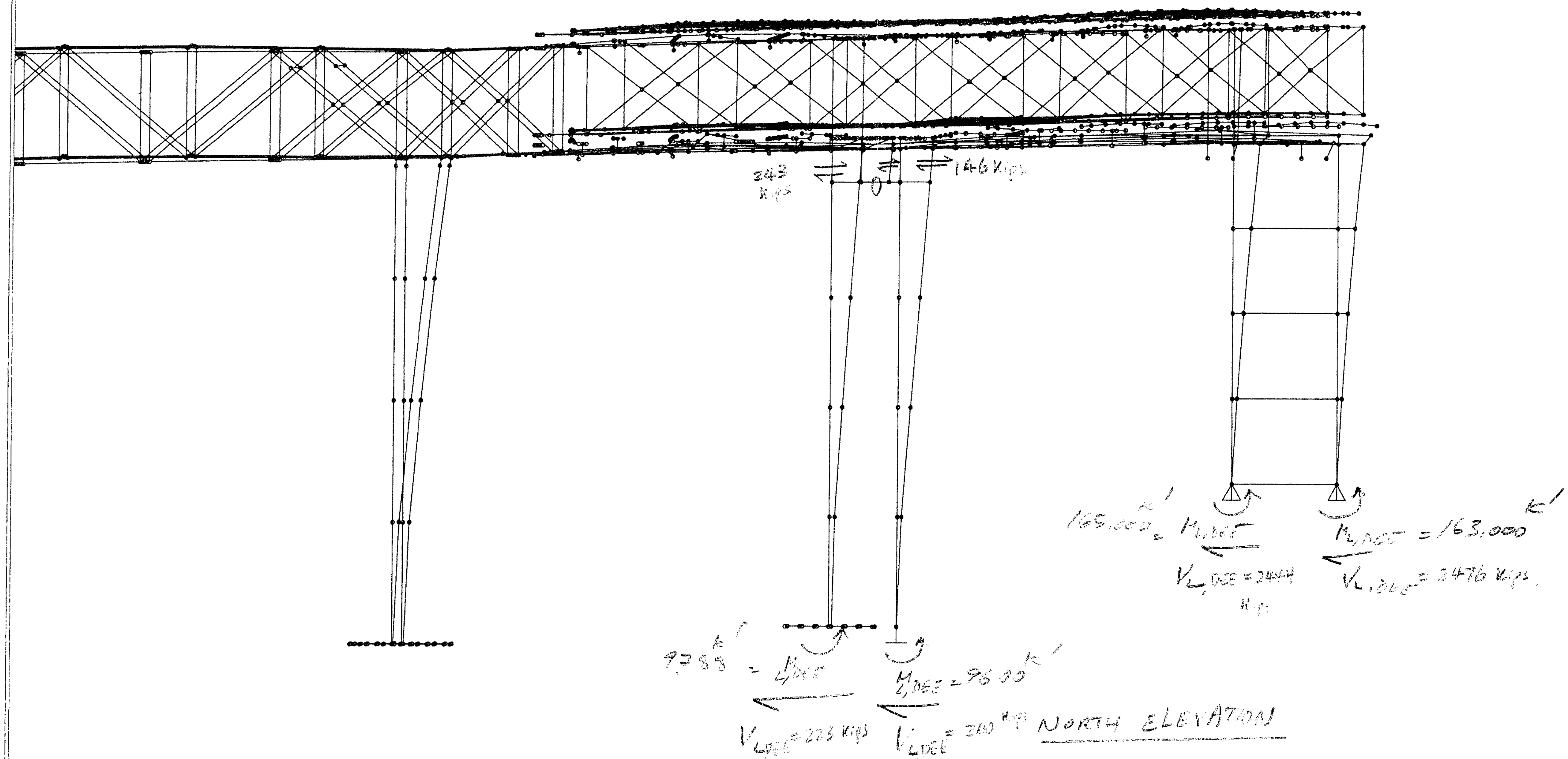


ISOLATION BEARING DISPLACEMENTS - DEF
AT PIER E1

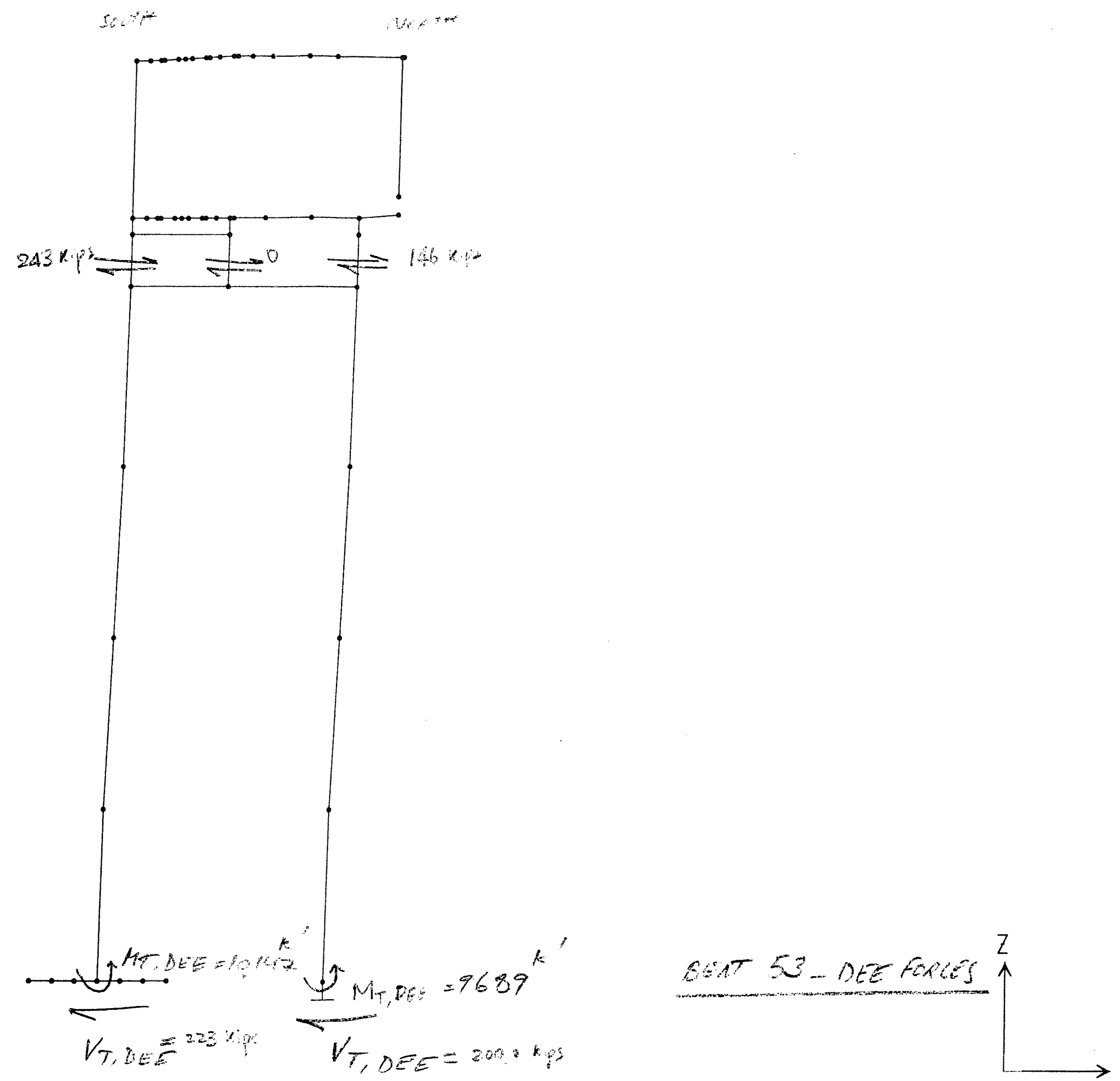
SAP2000 v7.40 - File:VDEastSpect - Deformed Shape (ENVP) - Kip-ft Units

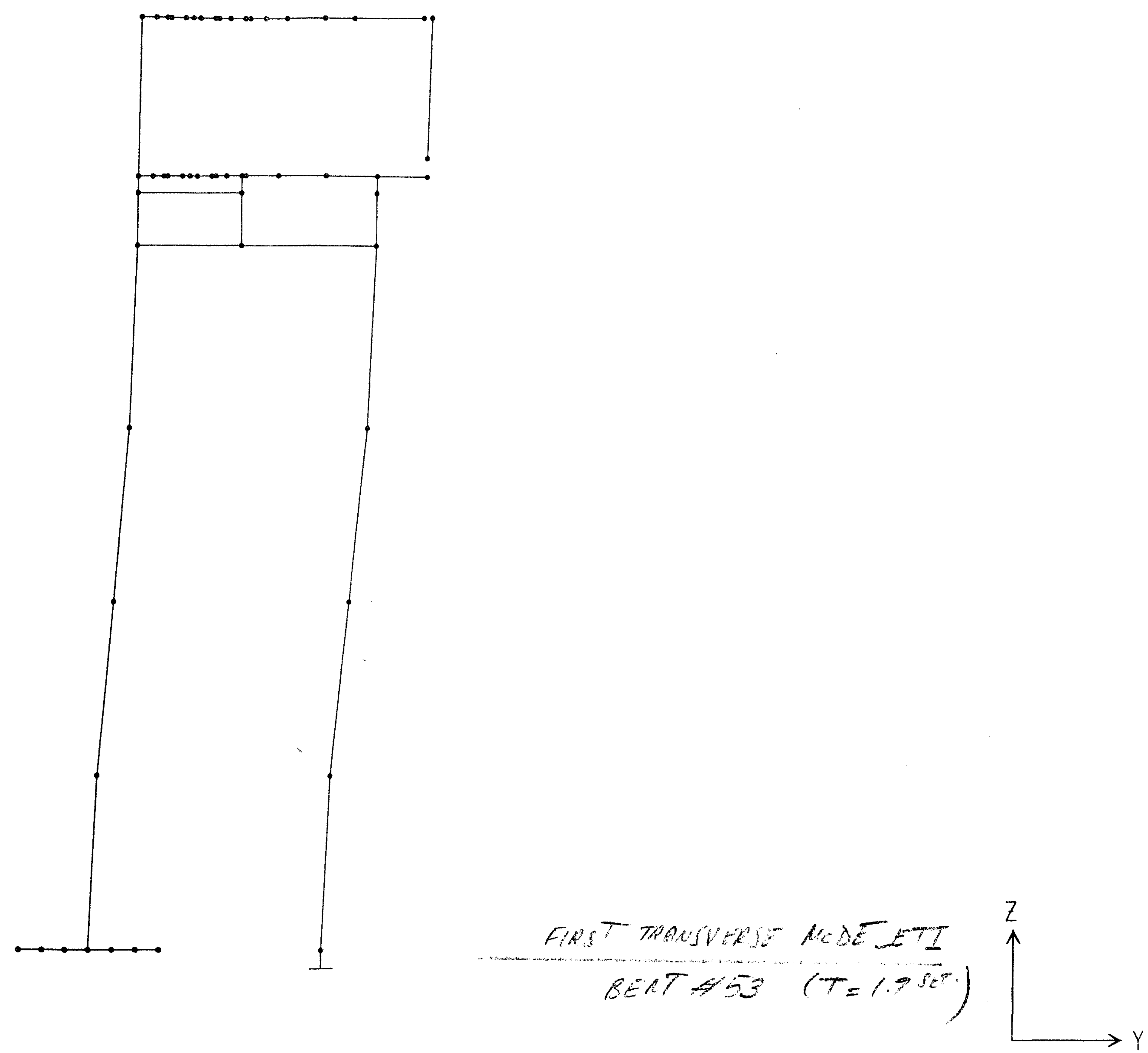


BENT #8 DISPLACEMENTS - DEE



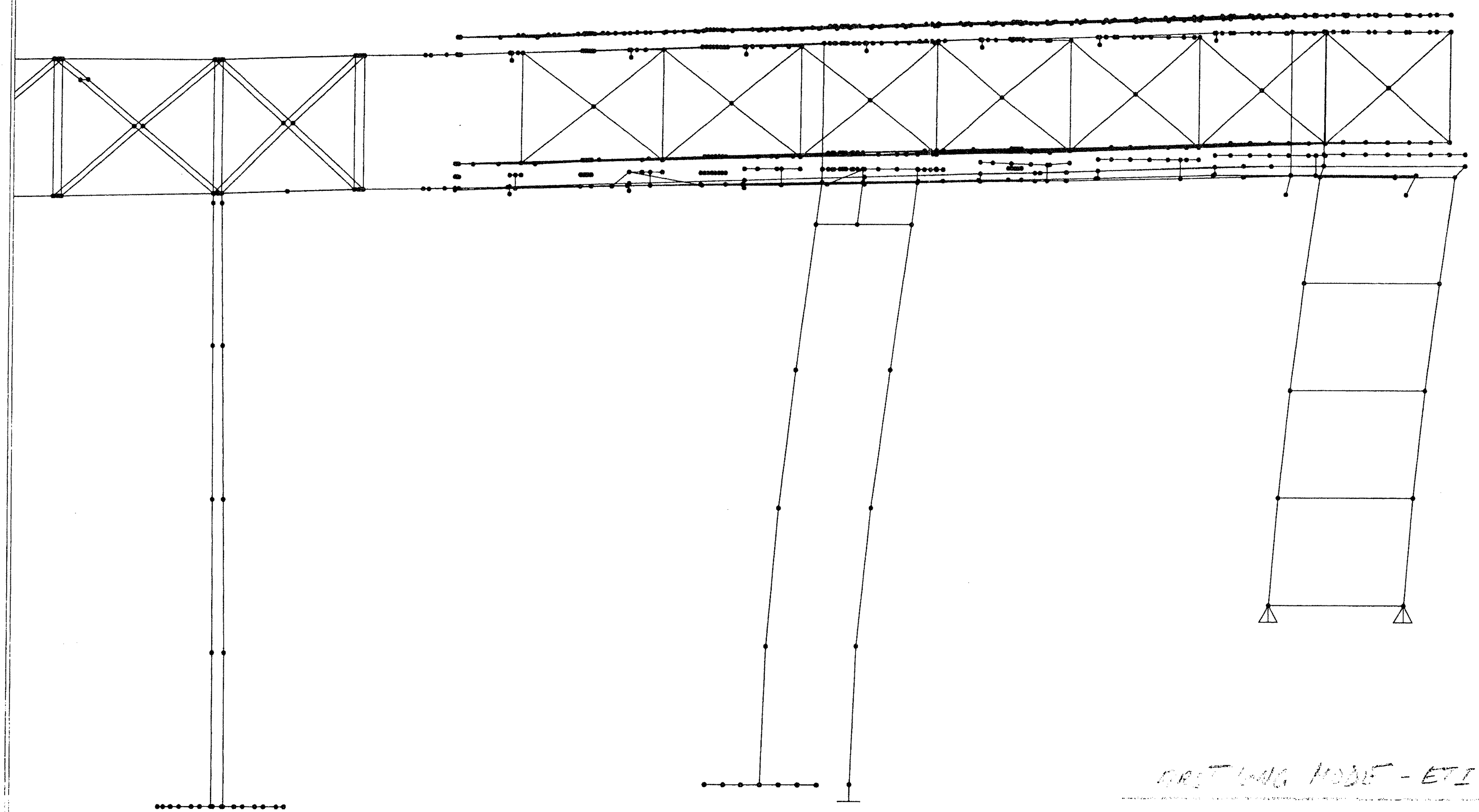
SAP2000 v7.40 - File:VDEastSpect - Deformed Shape (ENVP) - Kip-ft Units


South
243 kips
0
146 kips
M_T,DEE = 9689 k'
V_T,DEE = 223 kips
V_T,DEE = 200 kips
BEAT 53 – DEE FORCES
Z
Y


FIRST TRANSVERSE MODE ETI
BENT #53 (T=1.9 SEC.)
Z
Y

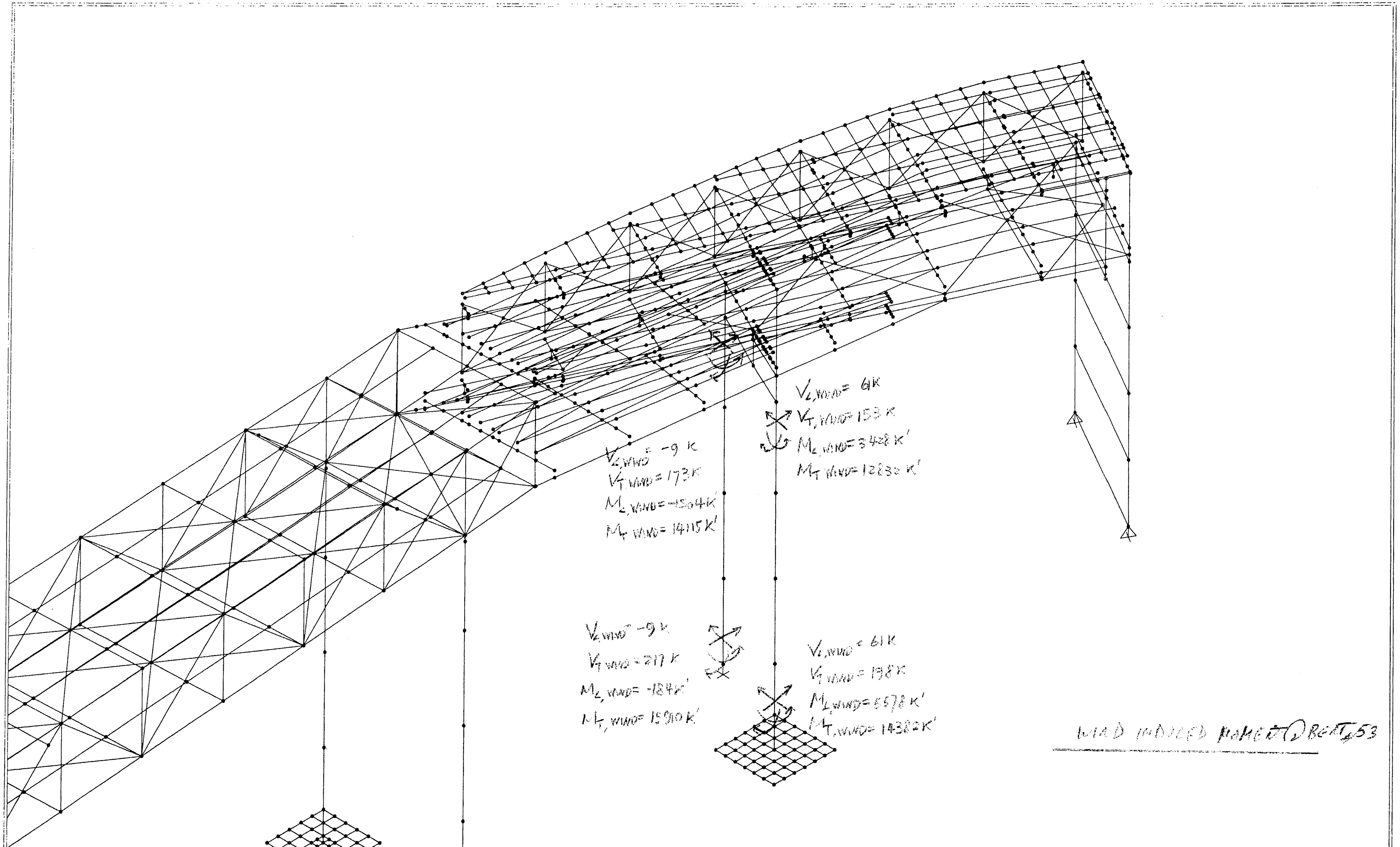
SAP2000

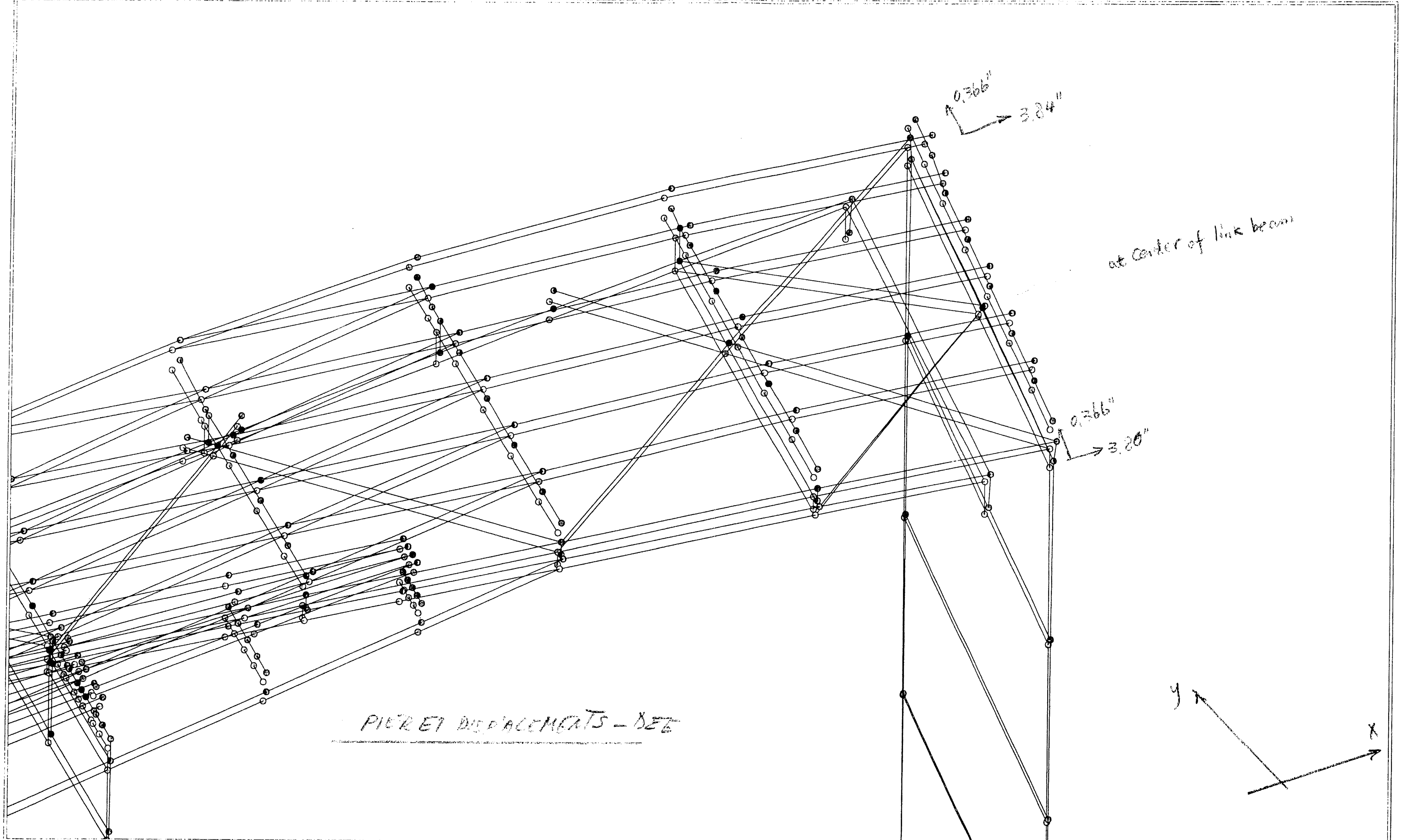
6/21/04 12:24:10



FIRST LONG MODE - ETI ($T = 3.15^{SEC.}$)

SAP2000 v7.40 - File:VDEastSpect - Mode 4 Period 3.1500 seconds - Kip-f t Units


V_L,WIND = 61K
V_T,WIND = 153 K
M_L,WIND = 3428 K'
M_T,WIND = 12832 K'
V_L,WIND = -9 K
V_T,WIND = 173K
M_L,WIND = -1504K'
M_T,WIND = 14115 K'
V_L,WIND = -9 K
V_T,WIND = 217 K
M_L,WIND = -184K'
M_T,WIND = 15910 K'
V_L,WIND = 61K
V_T,WIND = 198K
M_L,WIND = 5578 K'
M_T,WIND = 14382 K'
WIND INDUCED MOMENT @ BENT #53



SAP2000 v7.40 - File:VDEastSpect - Deformed Shape (ENVP) - Kip-ft Units

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company
9912 Business Park Drive, Suite 130
Sacramento, CA 95827
(916) 366-0632 FAX (916) 366-1501

LETTER OF TRANSMITTAL

TO: C.C.Myers, Inc.
P.O. Box 2948
3286 Fitzgerald Road
Rancho Cordova, CA 95742

DATE: June 21, 2004
IMBSEN JOB NO.: 1295
ATTENTION: Mr. Bob Coupe
RE: East Tie-In Supplemental Preliminary Design Submittal

WE ARE SENDING YOU ☒ **Attached** ☐ **Under separate cover via** _____ **the following items:**

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of Letter ☐ Change order ☐

COPIES	DATE	NO.	DESCRIPTION
6	6/21/2004		Revisions to Design Information Package
22	6/21/2004		11x17 Plans
5	6/21/2004		CD-ROM with Electronic Plan Files
2	6/21/2004		CD-ROM of Section 3B of Design Information Package (Structural Member Forces)

THESE ITEMS ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐
☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS:
As requested by Caltrans we are providing this Supplemental Preliminary Design Submittal for the East Tie-In.

cc: File 1295.520.01

SIGNED Jomu A. Sch[illegible] FOR Dr. Roy Imbsen
Project Manager

Transmit ETI Supl Prelim Des Sub to CCM 062104.doc *If enclosures are not as noted, kindly notify us at once.*

21

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company

June 23, 2004 #1295

Mr. Bob Coupe
C.C. Myers, Inc.
3286 Fitzgerald Road
Rancho Cordova, CA 95742

Subject: Draft Design Criteria, East Tie-In Bypass Structure

Dear Mr. Coupe:

As requested by Caltrans we are submitting to you a Draft Design Criteria for East Tie-In segment.

Please note that in this draft the comments from Danny's Construction Co. regarding the operations for various stages of constructions are incorporated as per your e-mail of June 22, 2004. Please let me know if you have any questions.

Sincerely,

Roy A. Imbsen, P.E., D. Engr.
Project Manager

RAI/jlh

cc: IAI File

DRAFT DESIGN CRITERIA

FOR THE TEMPORARY EAST TIE-IN BYPASS STRUCTURE (ETI)

PREPARED FOR:

PREPARED BY

IMBSEN & ASSOCIATES, INC.
9912 BUSINESS PARK DRIVE, SUITE 130
SACRAMENTO, CALIFORNIA 95827

JUNE 23, 2004

1. GENERAL

The Temporary East Tie-In Bypass Structure (ETI) shall be designed in accordance with
"Bridge Design Specifications" (BDS), LFD Version, April 2000, California Department of Transportation, (1996 AASHTO with interims, and revisions by Caltrans), modified or augmented as detailed in this design criteria document. Addenda through 13 have been incorporated into this design criteria.

DL	DEAD LOAD
SDL	SUPERIMPOSED DEAD LOAD
LL	LIVE LOAD
EQ	EARTHQUAKE
I	IMPACT
HSS	HOLLOW STRUCTURAL SECTIONS
TBS	TEMPORARY BYPASS STRUCTURE
DEE	DESIGN EVALUATION EARTHQUAKE
DLS	DISPLACEMENT LIMIT STATE
YBI	YERBA BUENA ISLAND
kL/r	SLENDERNESS RATIO
N	NORTH
S	SOUTH
SSI	SOIL STRUCTURE INTERACTION
e	DISPLACEMENT DUE TO EARTHQUAKE
RDWY	ROADWAY
PT	POST-TENSIONING
USCG	US COAST GUARD
AASHTO	American Association of State Highway Officials
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
AWS	American Welding Society
SEI	Structural Engineering Institute
ANSI/ASCE 7-95	Minimum Design Loads for Buildings and Other Structures
SEI/ASCE 37-02	American Society of Civil Engineers Design loads on Structures During Construction
ANSI/AASHTO/AWS/ D1.1	American Welding Society - Structural Welding
ANSI/AASHTO/AWS/ D1.5	
ANSI/AASHTO/AWS/ D1.4	

	Code - D1.1 American Welding Society - Bridge Welding Code - D1.5 American Welding Society - Structural Welding Code Reinforcement Steel - D1.4

1.1 Definition of Terms:

Temporary Bypass Structure (TBS)
The Temporary Bypass Structure (TBS) is the West Tie-In, Viaduct and East Tie-In segments

The East Tie-In as envisioned by Caltrans was a Roll-Out/Roll-In Structure. An innovative scheme of cutting through the South Truss of existing Span YB4 was presented by CC Myers to provide a staged construction with less uncertaintly than the Roll-Out Roll In operations. The overall objective being to avoid the high level of risk of completing the replacement within a twenty four period.

Temporary Structures
Temporary Structures are those used to build the TBS, or remove portions of existing bridge structure to facilitate TBS construction. Temporary Structures are classified as Ordinary and Important.

Ordinary Construction
Falsework
Shoring
Bridge Removal Location A – Falsework and Bracing

Important Construction (for operations of High Consequence)

~~Temporary Supports for the Move-In Operation (Includes Skidway and Lifting Structures, etc.)~~

Load Transfer to the new structural steel frame and Removal of the South Truss of The ETI.
Placement of the North Support System and Removal of the North Truss and portions of Existing Floor Beams.

~~Temporary Supports for the Move-Out Operation (Includes Skidway and Lifting Structures, etc.)~~

Temporary Shaoring – Excavation bracing adjacent to the foundations for the Existing YBI Viaduct~~, West Tie-In Support Structure Locations A-D, Viaduct~~

and East Tie-In. Shoring shall be either Braced or Restrained with Tie-Back's.

~~Support Structure Locations A, B, C and D for the Existing YBI Viaduct Bridge Removal Location B – Falsework and Bracing.~~

2. DESIGN LOADS

This section covers all design loads except for seismic demands discussed in Section 4.

2.1 Structural Dead Loads – DL

Unless specified herein or in BDS, all dead loads shall be as specified in the Specifications cited in Article 1, General.

2.1.1 Concrete

The in-service air dry unit mass of normal weight concrete, including reinforcement shall be 24.3 kN/m^3 (155 lb/ft^3). The in-service air dry unit mass of sand lightweight concrete including reinforcement shall be 18.8 kN/m^3 (120 lb/ft^3).

2.1.2 Steel

The unit mass of structural steel, including fabricated plate steel, rolled shapes, and wire, shall be 76.9 kN/m^3 (490 lb/ft^3).

2.2 Other Permanent Loads – SDL

2.2.1 Vehicular Barriers

Temporary Railings Type "K" = 5.7 kN/m (390 lb/ft)
Type 732 = 8.5 kN/m (585 lb/ft)

2.2.2 Wearing Surface

Wearing surface on the Viaduct and the
~~West Tie-In on Support Structure Location B has no additional wearing surface.~~
East Tie-In shall not exceed 23.5 kN/m^3 (150 pcf)
Unit weight AC (asphalt concrete) (Type A) = 23.5 kN/m^3 (150 pcf) for existing YBI Viaduct.

2.2.3 Provision for Utilities

7.2 kN/m (500 lb/ft)

This value includes allowance for miscellaneous metal, drainage, lighting system, utilities, utility supports, service platform utilities, and service platform support.

2.2.4 Stay-in-Place Formwork

When stay-in-place forms are used in construction, the design shall consider the increased deck dead load and the superimposed dead load of the stay-in-place form.

2.3 Live Loads – LL+~~I~~I
See Caltrans BDS

2.3.1 Standard Truck Alternate Military Vehicle and Lane Loads
See Caltrans BDS

2.3.2 Load Reduction Factors for Multiple Lane Loading
See Caltrans BDS

2.3.3 Permit Vehicle Loads
See Caltrans BDS

2.3.4 Maintenance Vehicle
Not Applicable

2.3.5 ~~2.3.5~~ Live Load Contribution Under Seismic Conditions
See Caltrans BD

2.3.6 Live Load- East Tie-In
Live loads shall be applied to each stage carrying traffic. The loading shall be applied to each structural configuration with each member designed to resist the applied loads for the duration of each stage.
~~See Caltrans BDS~~

2.4 Thermal Effects – T

2.4.1 Uniform Temperature – Tc and Ts
Design Temperature range shall correspond to BDS requirements for coastal areas:

Mean Temperature	27°C (81°F)
Rise or Fall:	
Concrete	17°C (30°F)
Steel	22°C (40°F)

2.4.2 Coefficient of Thermal Expansion

Normal weight Concrete:	10.8×10^{-6}/°C (6.0×10^{-6}/°F)
Sand light-weight Concrete:	9.0x10 /°C (5.0x10 /°F)
Steel:	11.7x10 /°C (6.5x10 /°F)

2.5 Wind – W
On Finished TBS: in accordance with Caltrans BDS
On Structures during construction: in accordance with SEI/ASCE 37-02 with companion ANSI/ASCE 7-95.

2.6 Combination of Loads

2.6.1 Temporary Bypass Structure & Temporary Supports carrying traffic
See Caltrans BDS.

2.6.2 Temporary Structures
For Load Factor Design: See SEI / ASCE 37-02 Sections 2.1 and 2.2.
For Allowable Stress Design: See SEI / ASCE 37-02 Sections 2.1 and 2.3.

3. MATERIALS

3.1 Concrete for Temporary Bypass Structures

3.1.1 Concrete – Cast In Place Superstructure & Substructure
Reinforced Concrete

f'_c min. = See Caltrans BDS.

fy = 420 MPa (reinforcement)

3.1.2 Prestressed Concrete

3.1.2.1 Prestressing Steel

Concrete: f'_c min. = See Caltrans BDS.
Strand: 1860 Mpa Low Relaxation
Bar: ASTM A722

3.1.3 Prestresses Losses
For conventional CIP Concrete on Falsework:
Standard galvanized steel ducts:
Wabble coefficient: k=0.0007(/m) (0.0002/ft)
Friction coefficient u=0.20(/rad)

3.1.4 Reinforcement Protection
No epoxy-coated reinforcement shall be used for the Temporary Bypass Structure.

3.2 Timber
Timber design shall comply with AASHTO (1996).

3.3 Structural Steel for Temporary Bypass Structures

3.3.1 General Materials
Unless modified herein, or specified in the BDS, structural steel shall comply with the AASHTO Materials Specifications and ASTM.

3.3.1.1 Structural Steel

Plates:	See Caltrans BDS
Rolled Shapes:	See Caltrans BDS
HSS:	ASTM A500
Structural Pipe:	ASTM A106 Grade C (Fy=275 MPa)
	API 5L Grade B – X52 (Fy=240-360 MPa)

3.3.1.2 Existing YB4 Truss

See Section 10.

3.3.2 Fasteners

ASTM ~~A325~~A490, high strength bolts unless noted otherwise.

3.3.3 Anchor Bolts

ASTM 354 Grade BD

3.3.4 Welding

Welding of superstructure (Non-tubular) members shall comply with ANSI/AASHTO/AWS D1.5. Welding of substructure members (Tubular and Non-Tubular) shall comply with ANSI/AWS D1.1. Reinforcement with ANSI/AWS D1.4.

3.3.5 Fatigue

Components shall be checked per BDS to withstand fatigue induced by 500,000 cycles of loading.

Existing members which are to be incorporated into the TBS shall be designed to withstand the fatigue resistance of 2,000,000 cycles of loading so as to reflect the history of these members.

3.3.6 Cleaning and Painting

Exposed new metal surfaces and areas of connections to existing steel shall be dry blast cleaned and dry spot blast cleaned, respectively, in conformance with the requirements in Surface Preparation Specification No. 10, "Near White Blast Cleaning,' of the "SSPC: The Society for Protective Coatings." Blast cleaned surfaces shall receive a single undercoat, which shall consist of a waterborne inorganic zinc coating conforming to the requirements in AASHTO Designation M 300, Type I or Type II except that:

1) The first 3 sentences of Section 5.6, "Primer Field Performance Requirements", shall not apply for Type II coatings and the entire Section 5.6.1 shall not apply for either type of inorganic zinc coating.

3.4 Allowable Materials for the Temporary Bypass Structures

~~Figures 3.4.1 & 3.4.2 illustrate a~~Allowable materials for the ~~Bypass~~East Tie-In Structures~~.~~ ~~Materials designations from figures~~ are listed below~~in Table 3.4~~.

East Tie-In

A – Superstructure Girder or Truss = Steel, Concrete
B – Substructure = Steel, Concrete, (for bearings see 4.7.1)
C – Foundation
D - Footing = Concrete,
E - Piles = Steel, Tie down anchors

3.5 Acoustic Damping of Stay-In-Place Formwork

Exposed metal deck used for the upper deck of the viaduct segment shall have a noise-reducing coating as designated in the special provisions.

~~Table 3.4: Allowable Materials for Temporary Bypass Structures~~

~~West Tie-In~~

~~A – Superstructure = Steel, Concrete, Prestress steel hardware~~
~~B – Substructure = Steel, Concrete, Tie-down cables~~
~~C – Foundation Footing = Concrete, Piles = Steel or concrete, Tie-down anchors~~
~~D – Bracing and Cradle Support = Steel, Concrete~~
~~E1 – Temporary Center Girder Vertical Support = Timber, Steel~~
~~E2 – Center Girder Lateral Support = Steel, Concrete~~
~~F – South Edge Vertical and Lateral Support = Steel, Concrete~~
~~G1 – Temporary Support Footings (for E1 supports) = Timber, Concrete~~
~~G2 – Support Footings = Concrete~~

~~Note: Timber is allowed for blocking and wedging where required, (i.e., between floor beams.)~~

~~Viaduct~~

~~A – Superstructure Girder or Truss = Steel, Concrete,~~
~~B – Substructure = Steel, Concrete, (for bearings see 4.7.1)~~
~~C – Foundation Footing = Concrete, Piles = Steel, Tie down anchors~~

East Tie-In

A – Superstructure Girder or Truss = Steel, Concrete
B – Substructure = Steel, Concrete, (for bearings see 4.7.1)
C – Foundation
D - Footing = Concrete,
E - Piles = Steel, Tie down anchors

~~Notes:~~
~~1.For West Tie-In allowable materials, see Figure 3.4.2.~~
~~2.Two towers shown for Viaduct Substructure (illustrative purpose only)~~
~~3.E1/E2 and G1/G2 are installed in stages. See "Design Criteria No. 7" sheet~~

4. SEISMIC DESIGN

Seismic design shall be performed in accordance with BDS, modified by or augmented with provisions of Caltrans Seismic Design Criteria Version 1.2 (SDC) December 2001, the Caltrans Guide Specifications for Seismic Design of Steel Bridges (GSSDSB) December 2001, the AASHTO Guide Specification for Seismic Isolation Design, 2000, and project specific criteria as detailed in this document.

The structures shall be designed for the DEE and shall be evaluated for DLS.

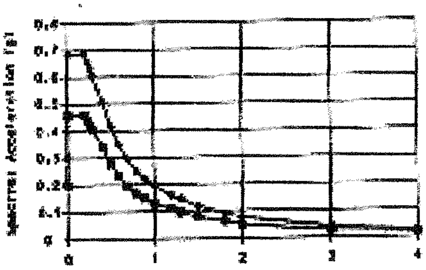
4.1 Seismic Demand for Temporary Bypass Structures

4.1.1 Design Seismic Loading

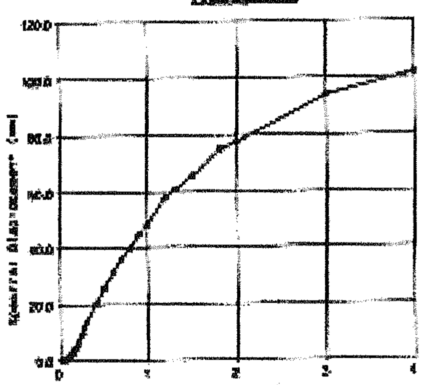
Note: Live load shall not be considered with seismic load (Use DL + SDL)

4.1.2 Design Evaluation Earthquake

The design member forces and displacements (elastic response) shall be based on the results of a linear response spectrum analysis for the 3-dimensional Design Evaluation Earthquake (DEE) acceleration response spectra (5% damped) for horizontal and vertical loading shown in Fig. 4.1.2A. The vertical acceleration spectral amplitudes are 2/3 the horizontal values. The spectral accelerations are tabulated in Table 4.1.2A. Spectral displacements are shown in Figure 4.1.2B & tabulated in Table 4.1.2B.



DEE Response Spectrum
Figure 4.1.2A



DEE Spectral Displacement
Figure 4.1.2B

TABLE 4.1.2A
Design Evaluation Event (DEE)

Period (sec)	Horizontal Acceleration (g)	Vertical Acceleration (g)
0.00	0.[illegible]	0.200
0.01	0.686	0.457
0.1	0.686	0.457
0.2	0.686	0.457
0.24	0.654	0.436
0.27	0.631	0.421
0.3	0.606	0.404
0.4	0.509	0.338
0.5	0.416	0.277
0.6	0.349	0.233
0.7	0.285	0.197
0.8	0.226	0.157
0.9	0.213	0.148
1	0.184	0.128
1.2	0.161	0.107
1.3	0.144	0.096
1.5	0.117	0.078
1.8	0.093	0.062
2	0.071	0.048
3	0.042	0.028
4	0.0255	0.017

TABLE 4.1.2B
Design [illegible] Event (DEE)

Period (sec)	[illegible] Horizontal Displacement (mm)
0.01	0
0.1	1
0.2	7
0.24	9
0.27	11
0.3	14
0.4	20
0.5	26
0.6	31
0.7	36
0.8	41
0.9	47
1	54
1.2	60
1.3	60
1.5	65
1.8	75
2	77
3	94
4	100

4.1.3 Minimum Lateral Strength

Each column or pier shall have a minimum lateral flexural capacity (based on expected material properties) to resist a lateral force of 0.1 Pdl. Where Pdl is the tributary dead load applied at the center of gravity of the superstructure and substructure elements.

4.1.4 Displacement Capacity for Displacement Limit State

In addition to member force design, structures shall be designed to respond in a stable manner (no reduction in strength capacity) under total global system displacement demands corresponding to three (3) times the elastic displacements. This is referred to as Displacement Limit State (DLS).

4.1.5 Modification of the 5% Damped Design Spectra for Approved Load-Limiting Devices

If design is based on a system with effective damping that is demonstrably different, the 5% damped response spectra may be modified for the different effective damping by factoring the spectral amplitudes as indicated below.

Effective Damping (% critical)	5	10	20
Modification Factor	1.0	0.83	0.67

The assumed damping shall be no greater than 20%. Analysis procedures shall be in accordance with the AASHTO Guide Specification for Seismic Isolation Design.

4.2 Segments and Articulation

The Temporary Bypass Structure shall consist of three distinct structures ~~types~~:

i) The West Tie-In
ii) The Viaduct
iii) The East Tie-In

The distinct structures shall be separated by expansion joints located at the beginning of Viaduct (Sta. 51+23 top deck, Sta. 51+33 bottom deck) and at the common Viaduct/East Tie In support (Sta. 54+61). ~~The specified overall articulation is illustrated in Figure 4.2.~~

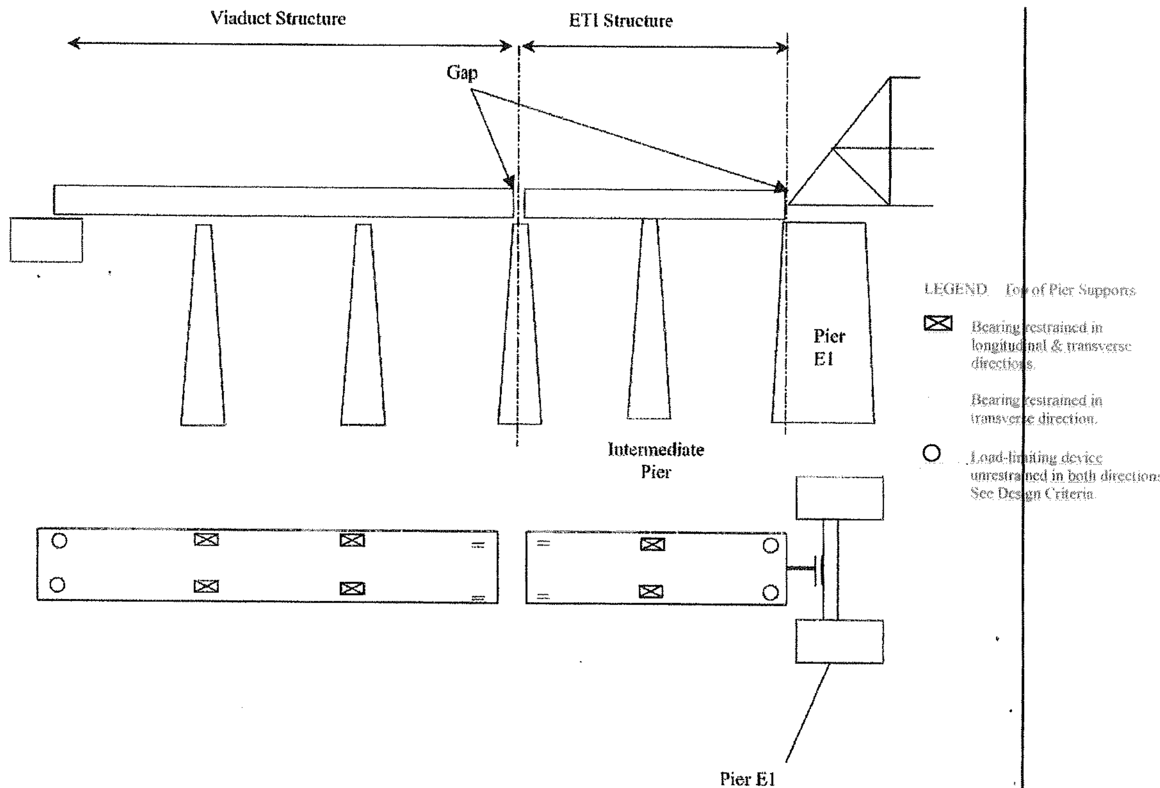


Figure 4.2: Schematics Elevation and plan-Articulation of Temporary Bypass Structure

East Tie-In

The East Tie-In shall be a two-span continuous double-deck structure anchored to Pier E-1. The anchorage shall be designed to resist forces resulted from overstrength of a ductile fusing mechanism, or rocking of the Pier E-1. The anchorage shall be designed to resist the total design seismic force of the East Tie-In span only.

~~**West Tie-In**~~

~~Vertical and lateral articulation of the West Tie-In construction and support of the Existing YBI Viaduct shall be considered at all stages of construction of the West Tie-In as shown in plan in Figures 4.2 (a) through (h), and in section in Figures 4.2 (i) and (j).~~

~~The West Tie-In contains 3 distinct frames with 3 distinct structural systems. Frame 1 is defined between existing Bents 39 and 42; Frame 2 is defined approximately between existing Bents 43 and 46; Frame 3 is defined between existing Bents 46 and 48.~~

~~Frame 1 of the West Tie-In structure is a series of short cantilevered frames. The cantilevers support the existing edge girder. Lateral restraint for the existing YBI Frame 1 of the West Tie-In.~~

~~Frame 2 of the West Tie-In structure is a grillage supported on 3 sides with its free edge supporting the existing edge girder. The cantilever spans from the support to the free edge and provides support in line with the existing floor beams. The "simple" span is supported on Frame 1 to Frame 3 of the West Tie-In.~~

~~Frame 3 of the West Tie-In structure is a series of portal frames and is physically disconnected from the existing YBI Viaduct Structure.~~

~~Viaduct Structure:~~

~~The bypass viaduct structure shall consist of a continuous (i.e., no intermediate expansion joints) double-deck superstructure supported on substructure consisting of towers or piers and the abutment (at West Tie-In). The supporting substructure, if a flexible structure (fundamental period of system with tributary mass is 0.7 seconds or more), shall be designed as a "ductile" system wherein reserve capacity is demonstrated, so that the DLS criteria is satisfied. If the substructure is designed to provide a stiff structural system (fundamental period of system with tributary mass is less than 0.7 seconds), load-limiting devices (bearings) positioned at top of the substructure (under superstructure) may be designed to accommodate the DLS criteria and thus protect the substructure from unacceptable damage.~~

~~Irregularities in geometry, mass distribution and structural stiffness shall be avoided wherever possible. Balanced stiffness and mass distribution shall be a design objective.~~

~~East Tie-In~~

~~The East Tie-In shall be a simply-supported double deck span and shall be anchored to Pier E-1. The anchorage shall be designed with a safety factor not less than 3. The anchorage shall be designed to resist the total design seismic force of the East Tie-In span only.~~

~~4.2.1 Balanced Stiffness~~

~~For the Viaduct Structure, the ratio of effective stiffness between any two bents within a frame (including abutment/bearing) or between any two columns within a bent shall satisfy equation 4.1, and the ratio of effective stiffness between adjacent bents within a frame or between adjacent columns within a bent shall satisfy equation 4.2.~~

~~An increase in superstructure mass along the length of the frame shall be accompanied by a reasonable increase in column stiffness. For variable width frames the tributary mass supported by each bent, pier or column shall be included in the stiffness comparisons as specified by equation 4.1(b) and 4.2(c).~~

~~Constant Width Frames~~ ~~Frames~~	~~Variable Width~~
$\cancel{K^{e_i} / K^{e_j} \geq 0.5}$ ~~(4.1a)~~	$\cancel{\dfrac{K^{e_j}/Mi}{K^{e_j}/Mj} \geq 0.5}$ ~~(4.1b)~~
$\cancel{K^{e_i} / K^{e_j} \geq 0.75}$ ~~(4.2a)~~	$\cancel{\dfrac{K^{e_j}/Mi}{K^{e_i}/Mj} \geq 0.75}$ ~~(4.2b)~~
K^{e_i} = ~~The smaller effective bent or column stiffness~~	Mi = ~~Tributary mass of column or bent i~~
K^{e_j} = ~~The larger effective bent or column stiffness~~	Mj = ~~Tributary mass of column or bent j~~

~~The following considerations shall be taken into account when calculating effective stiffness: framing effects, end conditions, column height, percentage of longitudinal and transverse column steel, column diameter, and foundation flexibility.~~

~~4.2.2 Balanced Geometry – Viaduct Segment~~

~~The ratio of fundamental periods of vibration for the tower, bents and piers adjacent to the viaduct, in the longitudinal and transverse direction shall satisfy equation 4.3.~~

$$\cancel{Ti / Tj > 0.7} \qquad \text{(4.3)}$$

~~Ti = Natural period of the less flexible frame~~
~~Tj = Natural period of the more flexible frame~~

~~4.2.3 Adjusting Dynamic Characteristics – West Tie-In~~

~~Evaluation of the local ductility demands and capacities is required if project constraints make it impractical to satisfy the stiffness and structure period requirements in equations 4.1, 4.2, and 4.3.~~

4.2.4 Dynamic Characteristics - East Tie-In

The articulation of the East Tie-In is defined in ~~Fig.~~Section **4.2.** (To be discussed with Caltrans)

The ETI structure shall be tied to Pier E1 and be allowed to move along with Pier E1 in the longitudinal direction. The superstructure and anchorage shall be design capacity protected against longitudinal rocking force associated with Pier E1.

In addition to rocking mechanism of Pier E1, a secondary load-limiting device in anchorage to Pier E1 shall be designed to protect the superstructure in case the rocking of Pier E1 does not occur as anticipated.

Superstructure shall be free to move in the transverse direction in relation to Pier E1. Load limiting devices in transverse direction shall be designed and provided at all connections to Pier E1 to protect superstructure against maximum anticipated seismic forces developed at Displacement Limit State (DLS), as per section 4.3.3.

At intermediate support to ETI structure, the superstructure shall have capacity protection against the maximum anticipated forces (longitudinal and transverse) anticipated to develop in the substructure at the Displacement Limit State (DLS), as per section 4.3.3.

4.3 Performance Criteria

4.3.1 Bypass Structures
The required performance is defined as "essentially" elastic response of structure components under the Design Evaluation Earthquake. In addition, the minimum specified "ductility" capacity for the DLS shall be provided.

4.3.2 Design Evaluation Earthquake (DEE)
After the design evaluation earthquake the bridge shall suffer "no loss of operation". The bridge shall remain essentially elastic.

4.3.3 Displacement Limit State (DLS)
The Structure shall maintain stability and vertical load-carrying capacity at the deformations associated with the DLS.

4.3.4 Ductile Structures or Structures with Protective Systems
The stability of the structure shall be demonstrated by means of pushover analysis. The structures shall have a clearly defined inelastic mechanism for response to lateral loads. The inelastic response shall be restricted to substructure components (elements of columns, piers, or towers) or connections at top of substructures to superstructure (e.g. load limiting bearings), or the substrcutured to foundation.

4.3.5 Double-Deck Superstructure
Under both the DEE and the DLS, inter-deck lateral strength, stiffness and displacement shall be controlled so that transverse inter-deck response is elastic. The maximum drift ratio shall be 0.65%.

4.3.6 Foundation Components

The lateral, vertical and rotational capacity of the foundations shall exceed the respective demands. The size and number of foundation components and their layout shall be designed to resist the following demands:

The service level moments, shears and axial demands imparted by the substructure (i.e., column, tower, pier) component(s) considering the nominal material properties and strength reduction factors in BDS and design load (service) geotechnical capacities.

The overstrength moment capacity and associated shear, in combination with axial demand, of the adjoining substructure (i.e., column, tower leg, pier) component(s). The demands shall be associated with the Displacement Limit State (DLS) and shall be based on the substructure components' expected nominal material properties (as defined in section 4.8). The resistance shall rely on nominal material properties and geotechnical resistance (ultimate) of the foundation components.

For a capacity-protected substructure, (e.g., as illustrated in Figure 4.7.1 (~~b~~a) the foundation shall be designed for the load-limiting overstrength capacity where the overstrength factor is per the manufacturer's specification, with a minimum of 1.2.

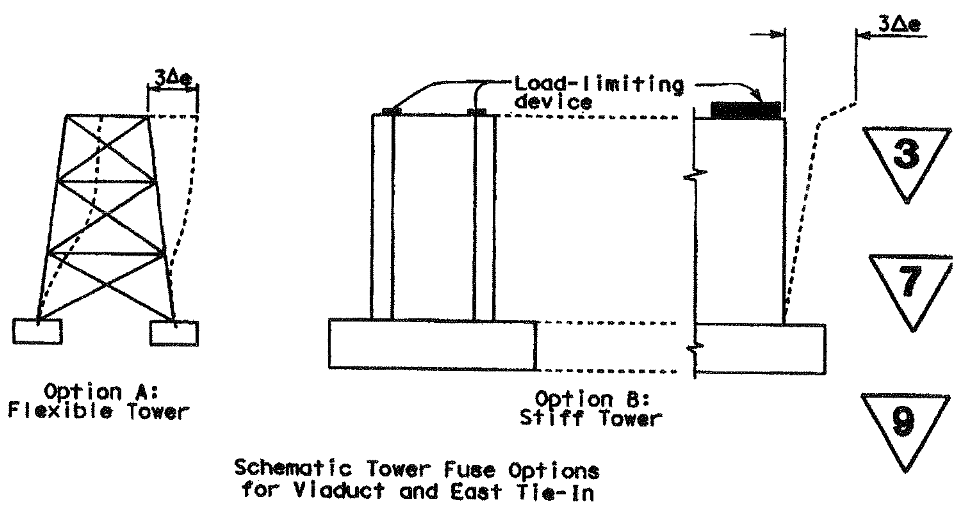


Figure 4.7.1(a)

4.3.7 Collapse Avoidance

For seismic loading during construction, the performance objective shall be to avoid collapse. See Sections 4.12 and sections 8,9,10 & 11 for performance objectives involved with High Consequence Operations (e.g. Lifting, Skidding)

4.4 Seismic Analysis

4.4.1 General

The design of the Bypass structures shall be performed using 3D linear elastic response spectrum analysis. Response spectrum analysis shall be used to establish target displacements for non-linear static (i.e. pushover) analysis.

At a minimum, the analysis techniques implemented should be appropriate and boundary condition assumptions, mass distribution, and member representation shall be clearly documented.

4.4.2 Displacement Capacity Evaluation

Lateral displacement capacity of structures shall be evaluated using non-linear static (i.e., pushover) analysis. All displacement capacity evaluations shall use models that reflect the "best estimate" of the likely structure and foundation condition at the time of the design evaluation earthquake.

When pushover analysis is used to calculate the deformation capacity of the structures, the deformation capacity, corresponding to the limiting strains in material shall exceed the calculated deformation demand. Pushover analysis shall be conducted along at least two principal axes.

The deformation and/or displacement capacity of structures shall be evaluated using the limiting material strains and conditions contained in Section 4.10.

For structures with protective systems, the contractor shall demonstrate the devices providing the protection can perform their function up to the required displacement (DLS).

4.4.3 Soil-Structure Interaction Effects

Soil-structure interaction effects shall be incorporated into the design analyses of the bridge system. Foundation dynamic characteristics shall be incorporated into the analysis with discrete elements representing piles and footings with appropriate representation of the effects of soil structure interaction (SSI), or simplified equivalent group dynamic characteristics including stiffness, mass and damping.

4.4.4 Combination of Effects

For response spectrum analysis, seismic effects from excitation of three orthogonal directions shall be combined by the 30% rule, where the forces resulting from excitation in one direction are combined with 30% of the forces resulting from excitation in the orthogonal directions.

4.5 P - Δ Effects

P - Δ Effects in supports, piers and towers shall be considered.

4.6 Capacity Design

Structural elements, other than members constituting the "ductile" horizontal load resisting part of the structure, or load-limiting devices, shall be designed to resist the over-strength capacity of the "ductile" elements.

4.7.1 Structural Fuses

Approved Load-Limiting devices are elastomeric bearings, lead-rubber bearings and PTFE bearings.

~~a) West Tie-In~~
~~Structural fuses or devices may be employed to achieve the specified "ductile" displacement response. Schematic sections (shown in Figure 4.7.1 (a) of the West Tie-In, show potential fuses that are acceptable.~~
~~These include:~~
~~-Plastic hinges at the bases of concrete piers or bents via ductile seismic detailing~~
~~-Steel frames configured and proportioned for ductility~~
~~-Load-limiting devices between piers (towers) and the superstructure.~~

b) Viaduct and East Tie-In

Viaduct and East Tie-In structural fuses are shown in Fig. 4.7.1 (~~b~~a).
These include:

i) Plastic hinges at the bases of concrete piers or bents via ductile seismic detailing
ii) Steel frames and members configured and proportioned for inelastic response.
iii) Load-limiting devices when very stiff piers are used.
iv) Rocking of Pier E-1 in the longitudinal direction.

In all cases with the use of fuses, capacity design (with over-strength) shall be employed so that the fuse is mobilized prior to failure modes (brittle) that have not been provided for; i.e., in order to prevent inelastic response of capacity – protected structural components.

4.7.2 Design of Devices

Seismic isolation devices shall be designed according to the AASHTO "Guide Specification for Seismic Isolation Design", 2000.

4.8 Material Properties for Ductile Elements

4.8.1 Design Flexural Strength-Reinforced Concrete Sections

The design flexural strength of plastic hinges for normal weight concrete shall be based on expected material strengths:

$f'_{ce} = 1.3 f'_c$ or 34.5 MPa (5000 psi), whichever is greater

$f_{ye} = 1.1 f_y$

Maximum concrete strains at the design flexural strength shall not exceed 0.005. If moment curvature analysis is used to determine the design flexural strength, the steel strains shall be limited to values given in SDC.

4.8.2 Maximum Plastic Moment (Overstrength) – Reinforced Concrete Sections
The maximum plastic (or overstrength) moment shall be determined using moment-curvature analysis as per SDC.

4.8.3 Design Flexural Strength-Structural Steel Sections
Expected yield strength Fye of steel is defined as:

$$F_{ye} = R_y F_y$$

where

F_{ye} = expected yield strength of steel (MPa)

R_y = overstrength factor for steel

F_y = specified minimum yield strength of steel (MPa)

Table 4.8.3

Application	R_y
Plate and all other products	1.1
Hot-rolled structural shapes and bars	
ASTM A36	1.5
A572 Grade 42	1.3
All other grades	1.1
Hollow Structural Section	
ASTM A500, A501, A618 and A84	1.3
Steel Pipe – ASTM A53	1.4

4.8.4 Maximum Plastic Moment (Overstrength) – Structural Steel Sections
The maximum plastic (or overstrength) moment shall be determined using moment-curvature analysis as per Caltrans GSSDSB Sect. 3.1.2 and Sect. 5.1.1.

4.9 Deformation Capacity

4.9.1 Deformation Capacity-Reinforced Concrete Members
When demonstrating ductility capability, the deformation capacity of concrete structures shall be calculated using plastic hinge lengths calculated according to SDC Sect 7.6 and rotational capacities corresponding to the allowable material strains from Section 4.10.

4.9.2 Deformation Capacity-Structural Steel Members
When demonstrating ductility capability, the deformation capacity of steel structures shall be calculated using plastic hinge lengths, Lp corresponding to the allowable material strains from Section 4.10.

$$L_p = \text{maximum of } \begin{cases} \dfrac{L}{8} & \text{for ductile steel components} \\ 450\,\text{mm} \end{cases}$$

4.10 Allowable Material Strains

4.10.1 Normal Weight Concrete

Allowable strains in normal weight concrete shall be:

Piers (Average extreme fiber strains in plastic hing):

Design Evaluation Earthquake $\varepsilon_c DEE = 0.005$

Beyond DEE (DLS), ε_{cu} is in accordance with SDC.

4.10.2 Reinforcing Steel

Allowable strains in reinforcing steel shall be:

Piers (Average extreme fiber strains in plastic hinge):

Design Evaluation Earthquake $\varepsilon_s DEE$ per SDC

Beyond DEE (DLS) ε_s per SDC

Where ε_{su} is the steel strain at ultimate stress.

For Grade 60 (A706) reinforcement ε_{su} may be taken as:

Confinement bars No. 10-32 (No. 3-10) $\varepsilon_{su} = 0.12$

Main bars No. 29-57 (No. 9-18) $\varepsilon_{su} = 0.09$

4.10.3 Structural Steel

Table 4.10.3 Limiting Values for Steel Stress-Strain Curves

f_y (MPa) (ksi)	f_u (MPa) (ksi)	ε_y	ε_{sh}
345 (50)	460 (67)	0.0016	0.02
830 (120)	1040 (150)	0.005	0.01
-	1110 (160)	0.0053	0.01

4.11 Seismic Detailing

4.11.1 Concrete

Ductile detailing is required for all ductile components. The detailing and proportioning requirements relating to splices and confinement in plastic hinge zones shall be in accordance with SDC Chapter 8. The detailing and proportioning of concrete joints to address joint shear shall be in accordance with SDC Chapter 7.

4.11.2 Steel

For ductile substructures, compact sections shall be provided in all connections and where inelastic behavior is expected under the Beyond DEE-Basis criteria (DLS). The slenderness ratio (kl/r) of primary diagonal bracing in vertical frames shall not exceed 80 and the sections shall be compact.

For ~~Move-Out of Span~~ YB4 ~~and Move-In of East Tie-In (whether by rolling, skidding, lifting, or other operations),~~ all steel work ~~(support structure and ancillary equipment)~~ shall comply with requirements for compact sections (maximum slenderness ratios corresponding to plastic limit store per AISC-LRFD).

4.12 Design Seismic Loading-Temporary Construction

Temporary Construction that is attached (coupled) to the TBS shall be considered to be the TBS and shall be designed for the DEE and DLS.

Temporary Construction that is NOT attached (de-coupled) to the TBS shall be designed for the following Horizontal and Vertical Loading.

Horizontal

Ordinary - No Seismic Loading Criteria; lateral loads shall be derived as indicated in the Standard Specifications and this Design Criteria.

Important - Seismic Loads that are the greater of the response spectrum specified under Section 4.1.2 Design Evaluation Earthquake (DEE), or 0.2g equivalent static inertial loads.

Vertical

Ordinary - No seismic loading

Important - Equivalent Static Vertical Load shall be 2/3 of the horizontal seismic load.

Seismic Lateral Earth Pressure

Ordinary - None

Important - as defined by the Geotechnical Engineer of Record.

5. EXPANSION JOINTS AND SEAT WIDTHS

5.1 Expansion Joints

Bridge expansion joints are located as shown in Figure 5.1 to establish TBS segment limits for bidding purposes only. Joints may be modular (excluding metal to metal contact). They shall be designed to span the gap between segments and for movement demands from temperature rise and fall, creep and shrinkage, and the design evaluation earthquake (DEE) and DLS displacements. Temperature movements need not be combined with seismic movements.

Modular expansion joints shall be sized to be functional (water seals may be damaged) throughout the range of movement (translations & rotation) associated with the DEE. During the opening cycle of the DLS, the joint shall be designed to carry live loads, and the length of the support bars shall be sized such that separation beams and bearing bars will not become unseated.

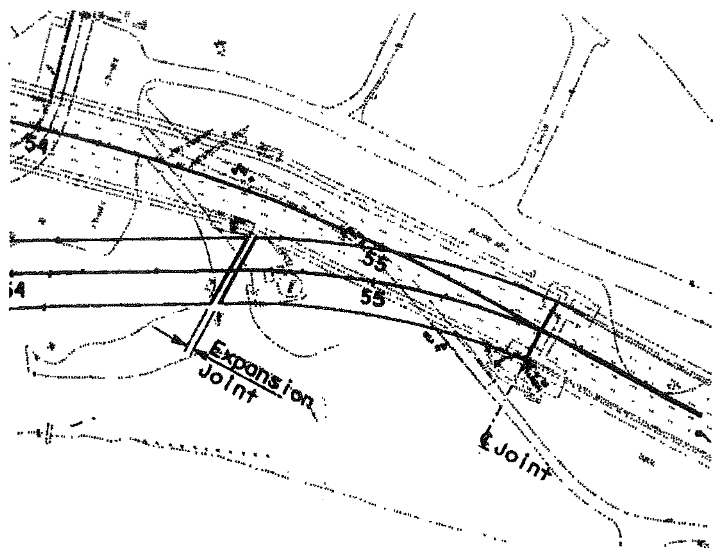


Figure 5.1

5.2 Seat Widths

Seat widths shall be sized such that joints can open fully under three times the DEE elastic response without losing seat on the bearings. Minimum gap lengths shall be the sum of magnitudes of relative longitudinal displacement responses (three times the elastic spectral displacements) for abutting structures. Minimum seat widths shall be in accordance with SDC.

6. BRIDGE DRAINAGE

Drainage for the Temporary Bypass Structure shall be designed in accordance with procedures and details outlined in Caltrans Memo to Designers 18-1 (June 1989) and Bridge Design Aids 17-1 (October 1989).

Drainage for the Temporary Bypass Structure is Class I. Drains shall not be within the lanes.

The transverse drainage of the roadway shall be provided by a suitable crown in the roadway surface and longitudinal drainage by camber or gradient. Water flowing downgrade in a gutter section shall be intercepted and not permitted to run onto the bridge. Longitudinal drainage on long bridges shall be provided and collected at inlets, which shall be of sufficient size and number to drain the gutters adequately. Downspouts, where required, shall be made of rigid corrosion-resistant material not less than 100mm in least dimension and shall be provided with cleanouts. The details of deck drains shall be such as to prevent the discharge of drainage water against erosion at the outlet of the downspout. Deck drains may be connected to conduits leading to storm water outfalls at ground level. Overhanging portions of concrete decks shall be provided with a drop bead or notch. The outlet of deck runoff shall be located at concrete lined v-ditches as shown on the contract plans.

7. GEOTECHNICAL AND FOUNDATION DESIGN

The design of the foundations will be based on the Eastbound Detour sections of "Geotechnical Foundation Report for Yerba Buena Island Approach and Self-Anchored Suspension Bridge" (100% Submittal), Fugro – Earth Mechanics JV, June 2002.

7.1 Earth Retaining Structures

Permanent and temporary ER structures will be based on the Eastbound Detour sections of "Geotechnical Foundation Report for Yerba Buena Island Approach and Self-Anchored Suspension Bridge" (100% Submittal), Fugro – Earth Mechanics JV, June 2002.

8. WEST TIE-IN OPERATIONS

(Section 8 Deleted)

9. ~~TEMPORARY STABLIZATION FOR SPANS YB4 & YB3~~

~~9.1 General~~

~~Existing YB1 Span YB3 (Pier YB3 – Pier YB4) and Span YB4 (Pier YB4 – Pier E1) shall be stabilized prior to release of any existing anchorage of Span YB4 (at Piers E1 and YB4).~~

~~All connections to existing steel truss members shall be bolted. For connection design to existing truss, use allowable tensile stress of 140 MPa (20 ksi).~~

9.2 Anchorage of Span YB4 at Pier E1

Minimum temporary anchorage for span yB4 at Pier E1 prior to releasing existing anchorage (cut through shoe) and until transfer of span to skid beam or support for move-out, shall be:

i) 2400 kN at each bottom chord of N. & S. truss in the transverse direction
ii) 2400 kN in each bottom chord of N. & S. truss in the longitudinal direction.

9.3 Anchorage of Span YB4 at Pier YB4

Minimum temporary anchorage for span YB4 at Pier YB4 prior to releasing existing anchorage (cut through shoe) and until transfer of span to skid beam or support for move-out, shall be:

i) 2400 kN at each bottom chord of N. & S. truss in the transverse direction

ii) 2400 kN in each bottom chord of N. & S. truss in the longitudinal direction.

9.4 Restraint of Span YB3 at Piers YB3 & YB4
Minimum temporary restraint for span YB3, prior to releasing existing anchorage of Span YB4 and until complete removal of the span, shall be:

i). at Pier YB4, 2400 kN at each bottom chord of N. & S. truss in the transverse direction
ii) at Pier YB3, 2400 kN tie across each bottom chord of N. & S. truss between Spans YB2 and YB3, in the longitudinal direcstion.

10. EAST TIE-IN DESIGN

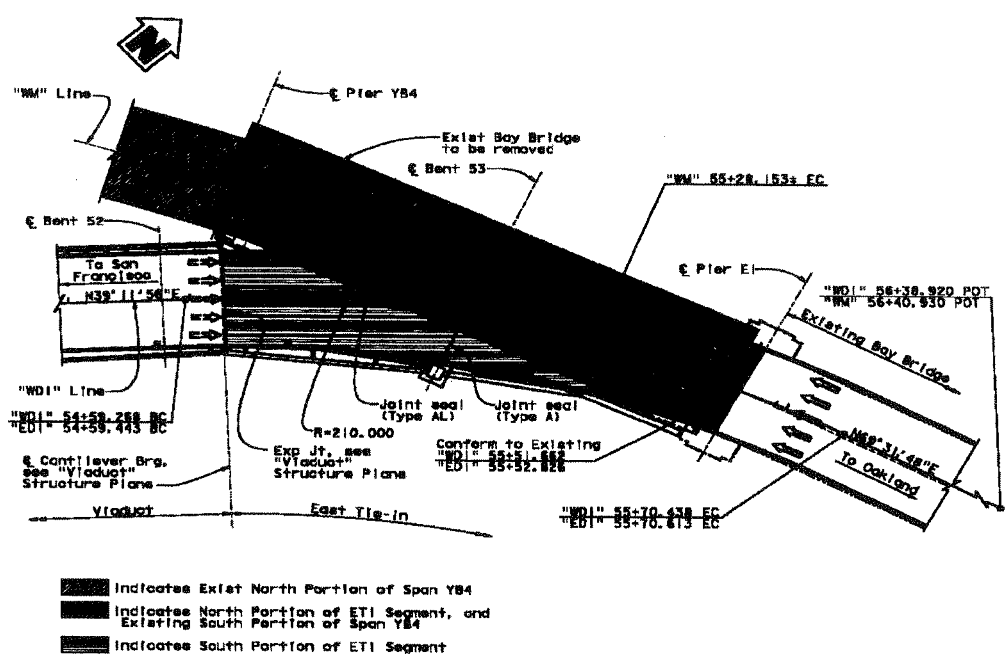


Figure 10.1: Plan View of the East Tie-In

The East Tie-In structure as shown in Figure 10.1 includes:
a) South Portions of East Tie-In
b) North Portions of East Tie-In (South Portion of existing South YB4 to remain)
North Portions of Existing YB4 to be removed

The East Tie-In consists of a new section, which is joined to the east end of the Viaduct and is connected to the south side of Span YB4 as shown in Figure 10.1. The truss opening is sufficient to maintain the horizontal alignment and to provide for five (5) lanes of traffic. Prior to the shifting of traffic and removal of the effected truss members the entire load of the South Truss will be transferred to the new structure as described in more detail for Stages 1 thru 5.

Shifting of traffic as called for in Stage 6 will be completed within the 24 hour allotted closure period. Having shifted traffic onto the new TBS the north side support of the East Tie-In will be constructed and portions of the north side of Span YB4 will be removed along with the north truss as shown in Stages 1 thru 9.

The East Tie-In is supported at its West End by a cantilever section extending beyond Bent 52, a new bent designated Bent 53 and existing Pier E-1. A modular expansion joint shall be at its West End placed to provide for both thermal and seismic longitudinal movements. The East Tie-In is tied both longitudinally and transversely to Bent E1.

The East Tie-In is composed of a structural steel frame supported by cantilevered arms of the steel viaduct, concrete Bent 53 and the existing E-1. The structural steel frame is composed of massive steel box girder sections, which provide support for both the upper and lower decks. The superstructure is continuous from the cantilever end to Pier E1. The anchorage at Pier E1 shall be designed for D_{LS} providing a safety factor of 3 for the D_{LS} design earthquake of the East Tie-In. It is assumed that Pier E1 will resist the imposed seismic forces of the East Tie-In and the cantilever truss to the east of Pier E1 for DLS design earthquake. The longitudinal design displacement of Pier E1 for this event will be 50mm for DEE and 150 mm for DLS. The transverse design displacement is assumed to be zero.

A load limiting device as shown in Figure 4.7.1b is placed at the connection between Pier E1 and the East Tie-In. The load limiting device is unidirectional and will limit the loads imposed on the East Tie-In in the transverse direction.

10.1 Existing YBI Viaduct

10.1.1 Reinforced Concrete Original 1934

Concrete: $f'_c = 3000psi,\ f_c = 1200psi,\ n = 10$

Reinforcement: $f_y = 33ksi$

Unit weight (reinforced) = 150 pcf

Steel: $f_y = 36,000\ psi, fu = 55,000\ psi$

10.1.2 Structural Steel Original 1934:

$f_y = 37,000psi,\ f'_u = 62,000psi$ (carbon steel)

$f_y = 45,000psi,\ f'_u = 80,000psi$ (silicon steel)

10.1.3 Lightweight Concrete 1964 Modifications:

$f'_c = 4500psi,\ f_c = 1800psi,\ n = 15$

Reinforcement – Intermediate Grads:

$f_y = 40ksi$ per CRSI

10.1.4 Structural Steel 1964 Modifications:

A440: $f_y = 45{,}000\ psi, fu = 55{,}000\ psi$

T1: $f_y = 100{,}000\ psi, fu = 115{,}000\ psi$

The connections to existing YB4 includes:

Upper Deck Jacking Brackets and Pedestals
Lower Deck Jacking Brackets and Pedestals
Steel Posts and Bracket connections to Existing Floor Beams
Steel Pedestals Supporting Lower Deck Floor Beams

11. EAST TIE-IN CONSTRUCTION STAGING AND OPERATIONS

The East Tie-In shall be constructed in stages as described herein. Each stage shall be designed to resist the imposed service loads and seismic loads. A typical section of the roadway at Bent 53 is shown in Figures 11.1 thru 11.9 to demonstrate the various stages. A typical section of the existing roadways supported by the YB4 Span Truss is shown in Figure 11.0. There are five (5) lanes of traffic in each direction, the upper deck carrying west bound traffic and the lower deck carrying east bound traffic.

11.1 Construction Staging

This section describes the construction staging that shall be used for the East Tie-In structure.

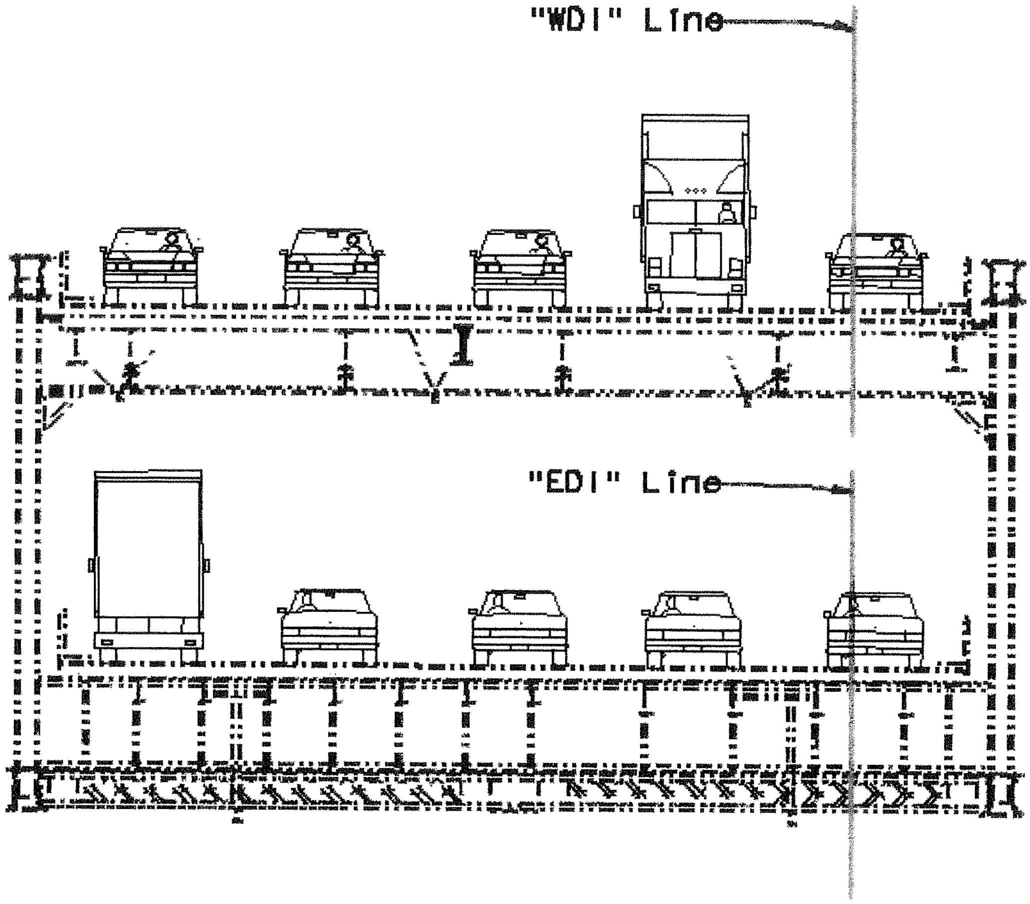


Figure 11.0: Typical Section-Existing YB4 Truss Span

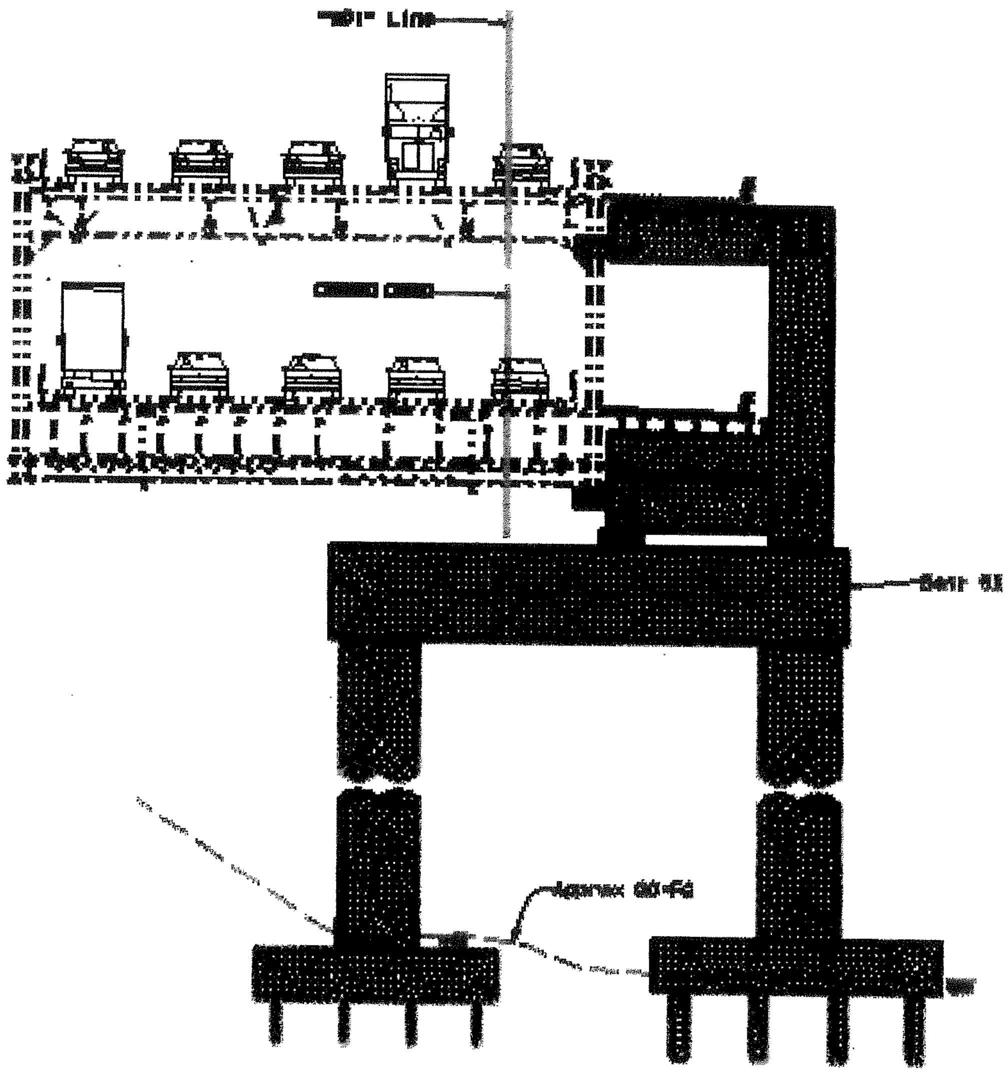
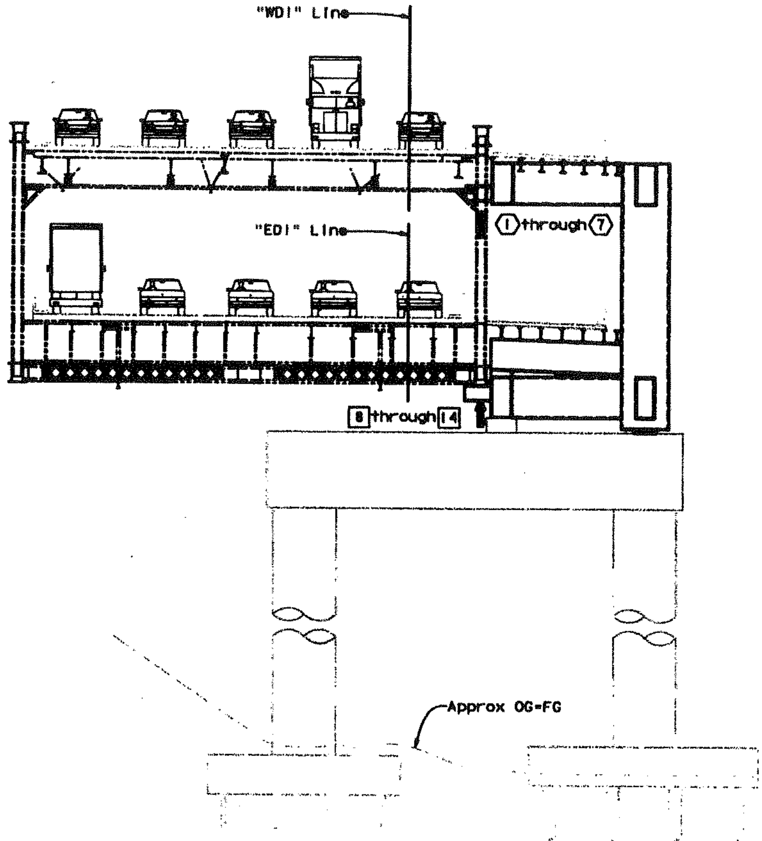


Figure 11.1: Stage 1 – Construction of South Segment Prior to Connection

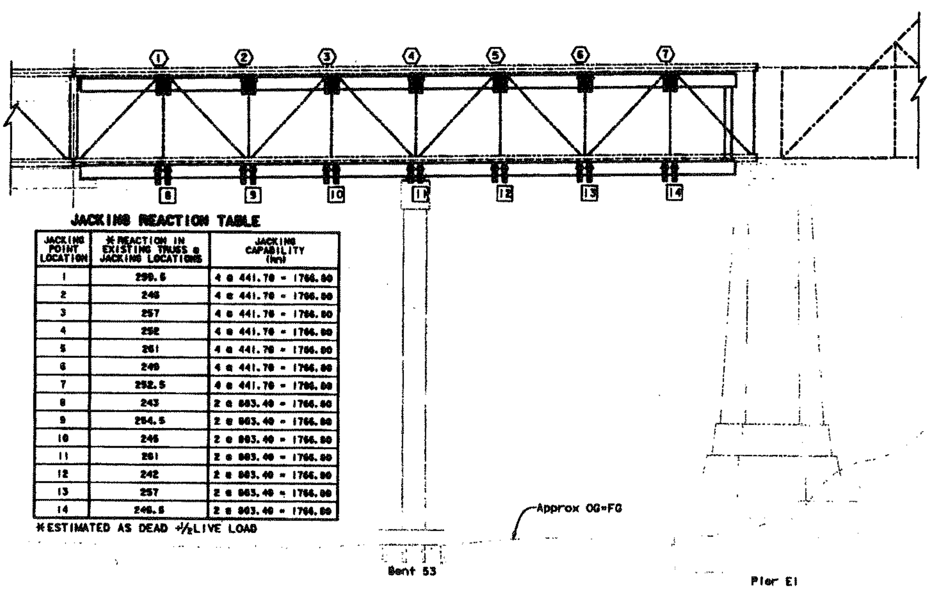
Stage 1 as shown in Figure 11.1 basically includes the construction of the new South Segment prior to the connection to the existing Span YB4. At this stage the existing span is in its as-built condition. The South Segment is complete with decking to the closure pour. The construction of the concrete Bent 53 is complete and supporting the steel box sections are in place. The barriers along the south edge of the roadway are also in place. The connections to existing YB4 includes:

Upper Deck Jacking Brackets and Pedestals
Lower Deck Jacking Brackets and Pedestals
Steel Posts and Bracket connections to Existing Floor Beams
Steel Pedestals Supporting Lower Deck Floor Beams

At this stage there is no connection between the new and the existing structures.



a) Typical Section View



JACKING REACTION TABLE

JACKING POINT LOCATION	*REACTION IN EXISTING TRUSS @ JACKING LOCATIONS	JACKING CAPABILITY (kN)
1	299.5	4 @ 441.70 = 1766.80
2	248	4 @ 441.70 = 1766.80
3	257	4 @ 441.70 = 1766.80
4	252	4 @ 441.70 = 1766.80
5	261	4 @ 441.70 = 1766.80
6	249	4 @ 441.70 = 1766.80
7	252.5	4 @ 441.70 = 1766.80
8	243	2 @ 883.40 = 1766.80
9	254.5	2 @ 883.40 = 1766.80
10	246	2 @ 883.40 = 1766.80
11	261	2 @ 883.40 = 1766.80
12	242	2 @ 883.40 = 1766.80
13	257	2 @ 883.40 = 1766.80
14	246.5	2 @ 883.40 = 1766.80

*ESTIMATED AS DEAD +½LIVE LOAD

b) Elevation View

Figure 11.2: Load Transfer of South Segment
Stage 2

Stage 2, as shown in Figure 11.2, involves the load transfer of the South Truss from the YB4 span to the new South Segment. This stage begins with the installation of the jacking system and the geometry monitoring system. The jacking system consists of lock nut hydraulic cylinders (jacks), calibrated pressure gauges, a hydraulic pressure source (pump) and the jacking control system (distribution manifold(s) and valves). The geometry monitoring system shall consist of strategically placed control point targets and optical surveying instruments with distance measuring capabilities (total station). The jacking and geometry monitoring systems shall be such that the jacking pressures and the structure geometry can be measured at any time during the load transfer.

Calibrated pressure gauges for each jacking location will be used to monitor the total jacking load applied. The total jacking load applied at a jacking point will be determined as the product of the effective cylinder area(s) and the calibrated pressure. Each pressure gauge will be calibrated and certified at the manufacturer's facility and the corresponding documents submitted for field use. The effective cylinder areas will be certified by the jack manufacturer. The jacking control system shall be capable of isolating any and all jacking locations for individual adjustment of the applied jacking load. A schematic drawing shall be provided showing all components of the jacking system and the hydraulic circuits.

Absolute structure displacements shall be kept within ±150mm of the current roadway position and the induced roadway superelevation must be maintained to within ±0.5 percent. During the jacking operation the hydraulic jack pistons cannot be extended more than 10mm above the hydraulic cylinder without a redundant support system. The redundant support system may be either a stack of steel plates or shims or a threaded locking device to support a threaded hydraulic jack system.

DL: +Existing YB4 Truss
+Entire Existing Deck
-Jacking Dead Loads, Existing
LL: -Reduced Lanes of Traffic
(Maximum 5)

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Jacking Dead Loads, New
LL: +Tributary Live Load
Transfer due to Jacking, (Maximum ½ of full 5 lanes of traffic)

Description:

- Existing truss in its as-built condition still in service
- Jacking system installed includes jacking brackets

-Jacking is performed simultaneously at all jacking points to raise the south truss and reduce the predicted pre-existing dead load induced and anticipated live load induced member forces to nearly zero. This zero member-force condition exists when the south truss is raised to the fabricated no-load camber as determined from archive design and shop drawings. Once this condition is achieved, the lock nuts on the jacks are seated. Any additional live load will be carried by the mechanically locked jacks. –

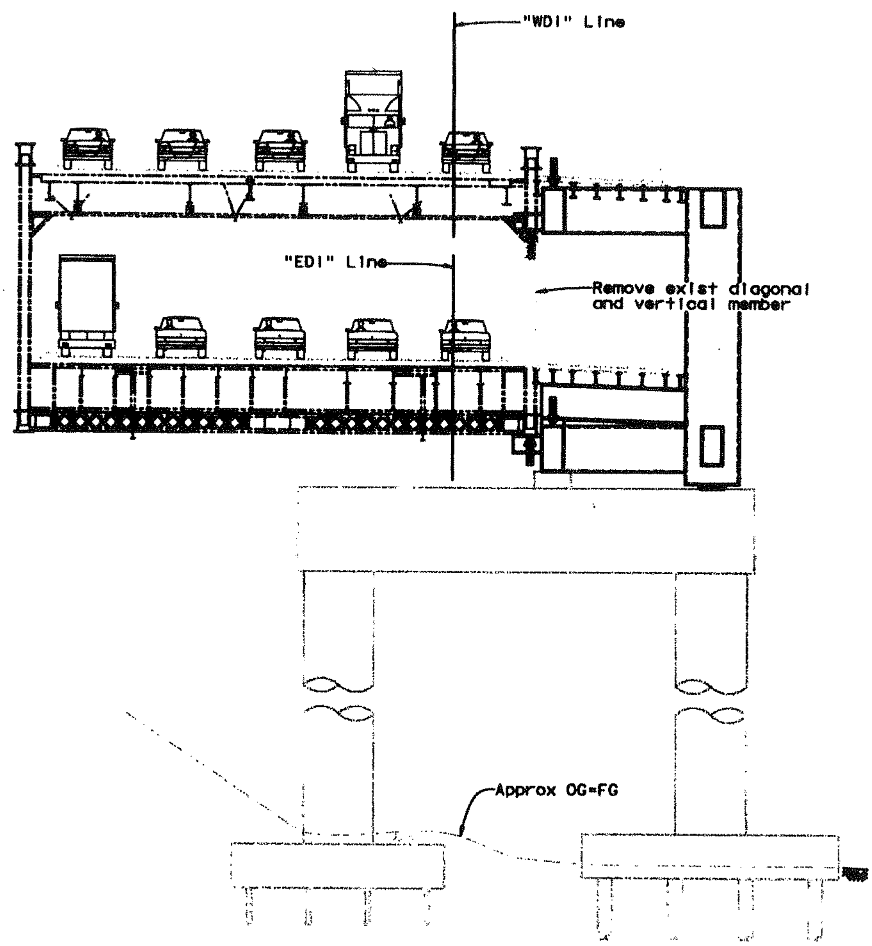


Figure 11.3: Stage 3 – Removal of Portions of South Truss

Description:

-Diagonal, vertical and top chord members of the south truss will be deactivated (cut) in a predetermined sequence while each jacking point is supported by the mechanically locked jacks. At any time during the deactivating process the applied jacking load at any

point can be determined by performing a hydraulic lift-off of the locking nut(s). Load and geometry adjustments can be performed at any time during the deactivation process.
-Upon removal of a truss member, the hydraulic Jacks in the locked condition will carry any new live loads and any dead loads (in addition to those estimated) of the south truss, however the north truss will still be carrying its share of the loads.
After cutting, comparison of the actual jacking with the analytical results will be made and necessary adjustment will be made for subsequent cutting.

DL: +Existing YB4 Truss
+Entire Existing Deck
- Jacking Dead Loads, Existing
LL: - Reduced Lanes of Traffic (Maximum 5)

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Jacking Dead Loads, New
LL: +Tributary Live Load Transfer due to Jacking, (Maximum 1/2 of full 5 lane of traffic)

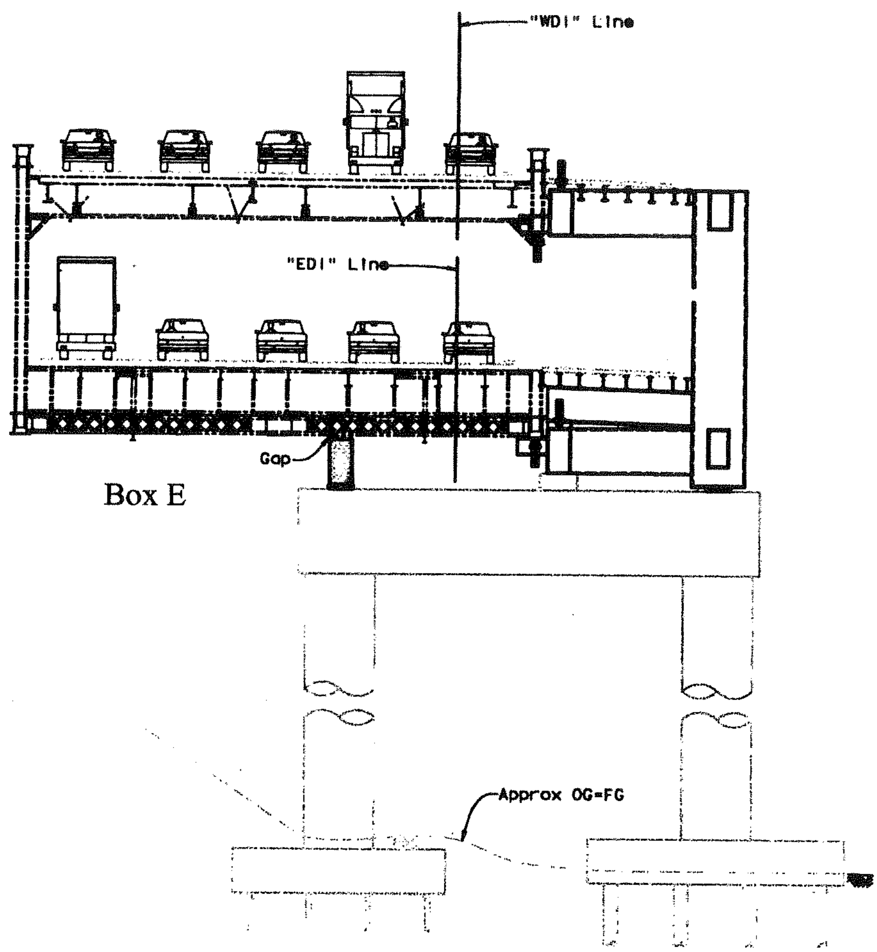


Figure 11.4: Stage 4 – Construction of North Segment Support System

Stage 4 will include the placement of the North Box Girder E as shown in Figure 11.4. The existing North Truss will remain in service. No load transfer to girder "E" will occur in this stage. The pedestals will be placed, but not yet bolted to the floor beams.

- <u>Description:</u>

-Existing north truss in its as-built condition still in service
-The north box girder 'E' is erected.
-Pedestals are erected but not bolted to floor beams.
- During this stage, no load transfers from lower deck to box 'E' is assumed.

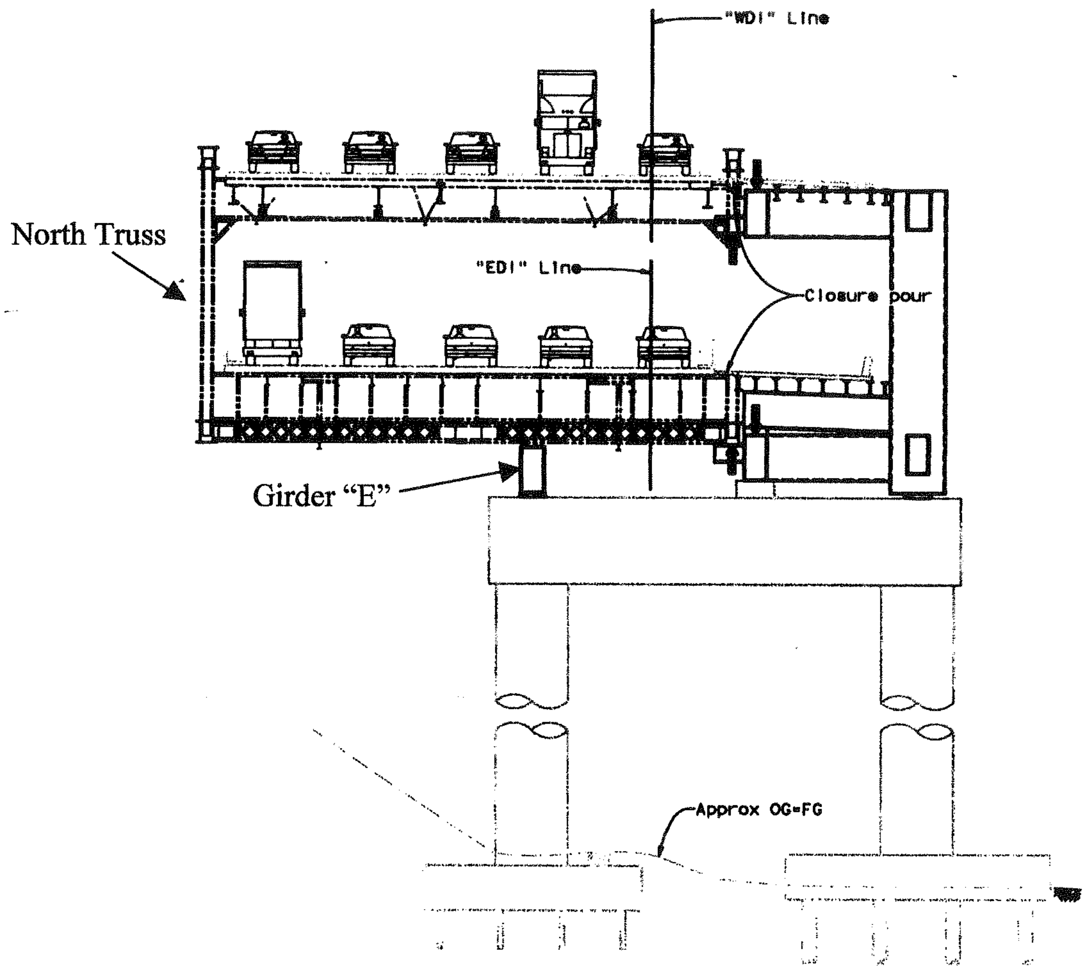


Figure 11.5: Stage 5 – Closure Pour for South Segment

As shown in Figure 11.5 this stage includes the closure pour between the South Segment and the south edge of the existing Span YB4. Note that the existing North Truss is still in position in the as-built condition. There is no load transfer to Box E during this stage.

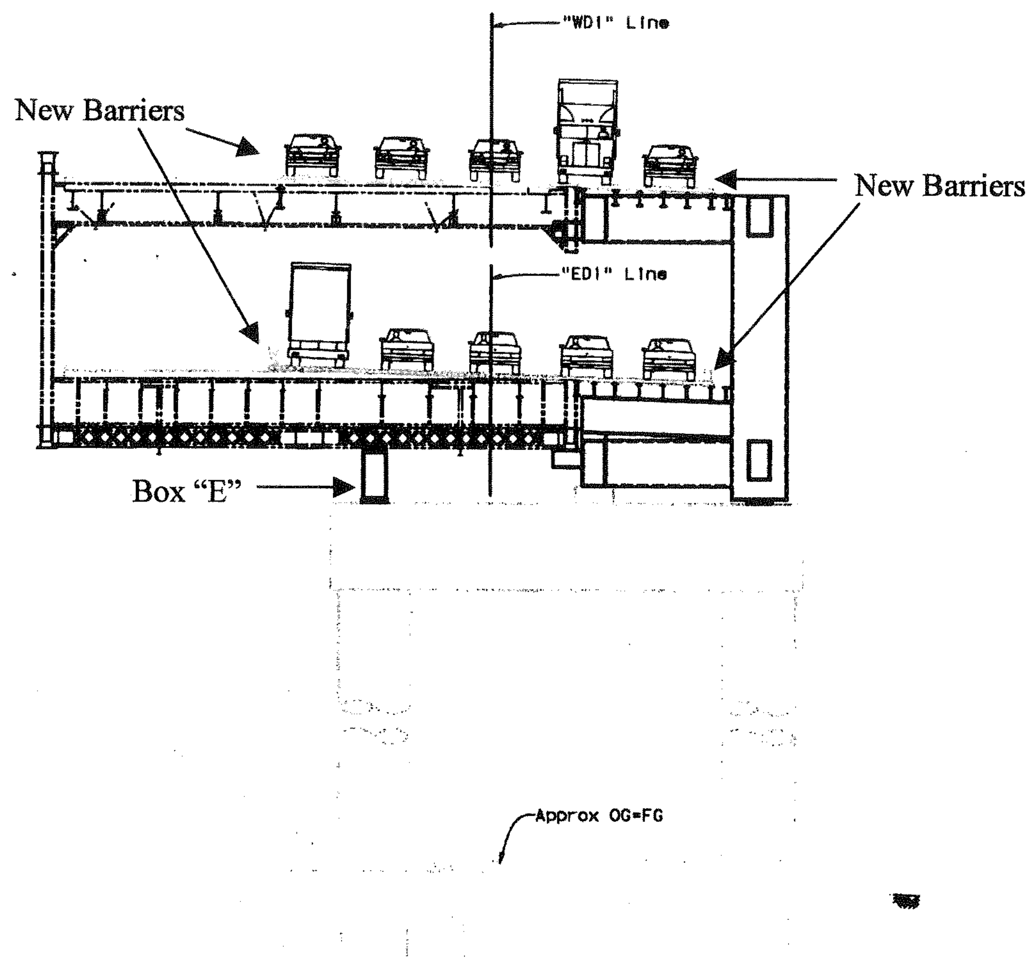


Figure 6: Stage 6 – Traffic Shift

Stage 6 is the barrier change on the north side and the traffic change onto the new South Segment. The existing North Truss in the existing condition is still in service. The pedestals are shimmed to snuggly fit against the floor beams for fastening. A small portion of the live loading will be transferred to Box E at this stage.

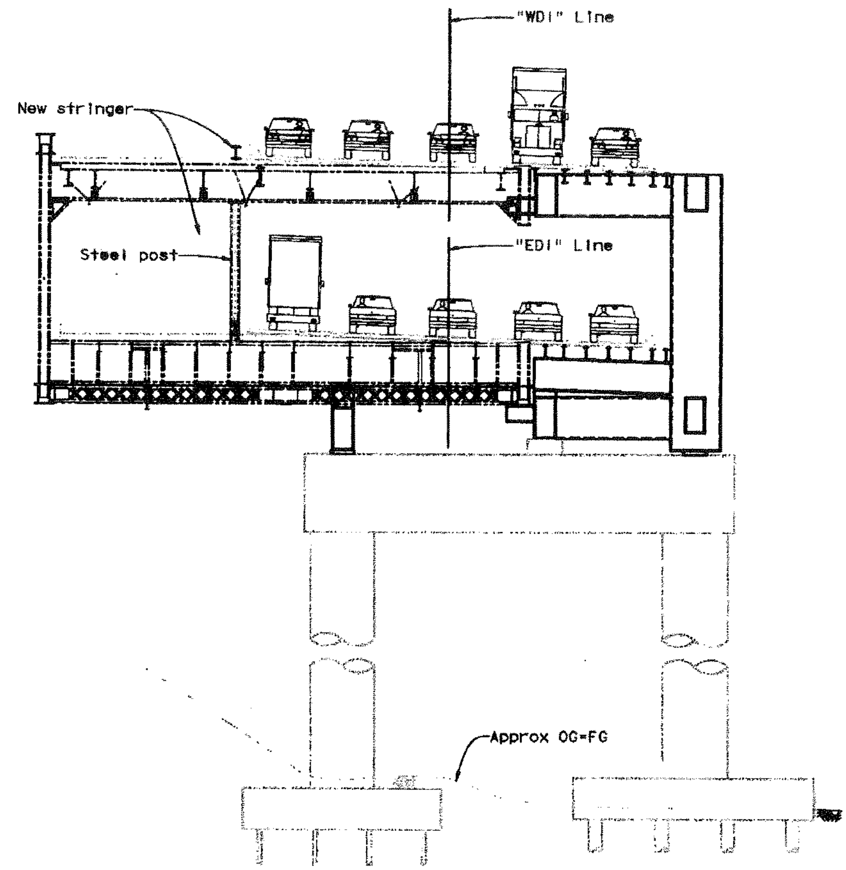


Figure 11.7: Stage 7 – Placement of Upper Deck Support

Stage 7 as shown in Figure 11.7 includes the placement of the stringers on the upper and lower decks, which are tied to the concrete deck. The steel posts are erected to fit snuggly between the upper and lower floor beams. Following the placement of the vertical posts the steel cross bracing and brackets shall be installed to provide stability to the post both in plane and out of plane of the braced frame system. The load transfer from the upper deck to the lower deck and ultimately to the Box E is limited at this stage with the North Truss still a major part of the total load resisting mechanism.

DL:	+Existing YB4 Truss	
	+Entire Existing Deck	
	- Jacking Dead Loads,	Existing
LL:	+ X Lanes of Traffic	
DL	+New Steel Frame	
	+New Concrete Deck	
	+New Barriers	
	+Jacking Dead Loads,	New
	+ Full Weight Deck Closure,	

LL: +Tributary Live Load, Transfer due to Jacking,
+4 Lanes of Traffic

Description:

- Existing north truss in as-built condition still in service.
-The steel posts are erected by lightly jacking to fit between the floor beams above and below.
- The steel cross-bracings and brackets are installed to provide stability of post in both in-plane and out of plane of the braced frame system.
- Erect new stringer and anchor to deck to support north portions of the deck prior to demolition.
-Load transfer from upper and lower deck to box 'E' is assumed limited, considering that the north truss is still in service and mainly carrying the loads.

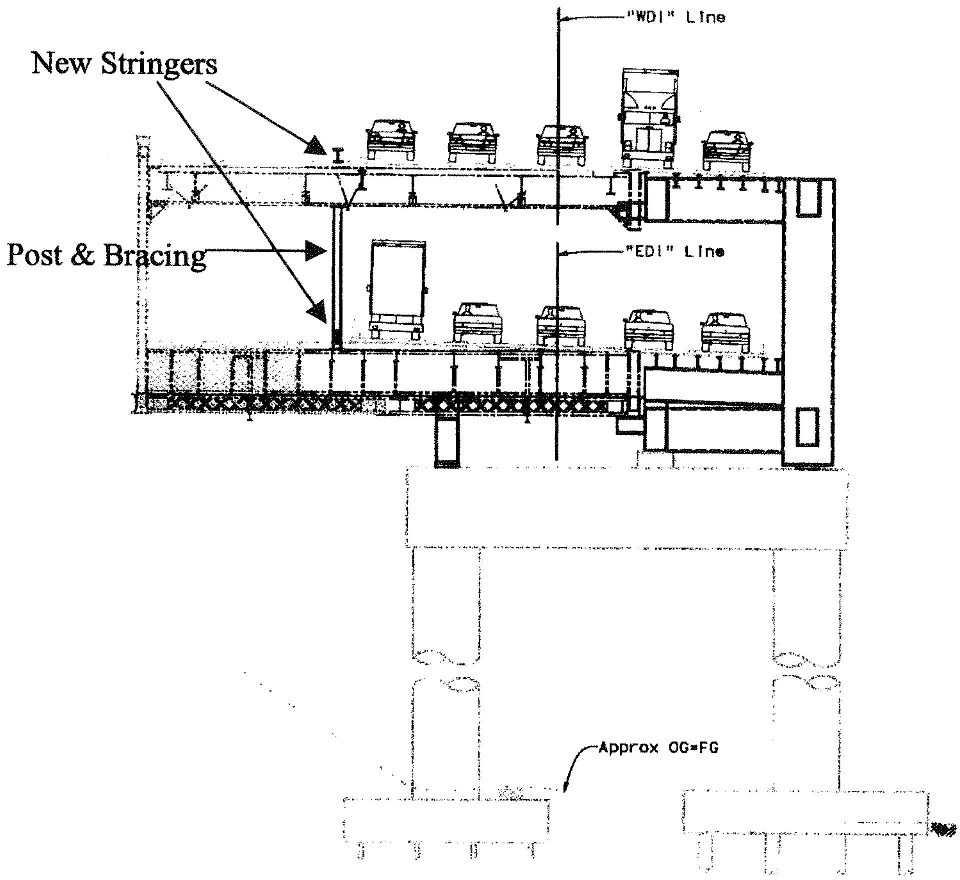


Figure 11.8: Stage 8 – Load Transfer and Demolition of the North Portion of the Span

This stage includes the load transfer from the existing North Truss to Box Girder E and removal of the north portions of the upper and lower decks and the North Truss.

DL: +Remaining South Portions of Existing Deck

- Reduced Jacking Dead Loads, Existing
LL: + X Lanes of Traffic

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Reduced Jacking Dead Loads, New
+ Full Weight Deck Closure,
LL: +Tributary Live Load, Transfer due to Jacking,
+ Y Lanes of Traffic

<u>Description:</u>

- Demolish north portions of the upper and lower decks.
- Flame cut north portions of upper and lower deck floorbeams while adequately bracing the north truss.
- Upon cutting of the floor beams and removal of the north truss, all dead and live loads of the remaining portions of the existing truss will be carried by box E.

Box "E"

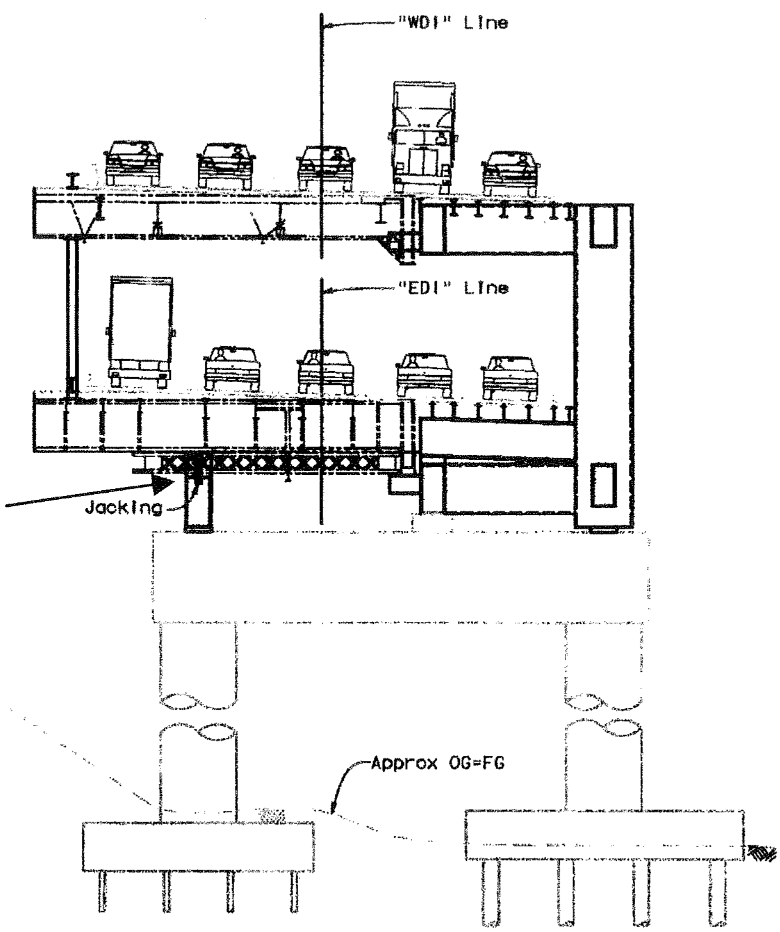


Figure 11.9: Stage 9 –
Adjust Profile and Superelevation

DL: +Remaining South Portions of Existing Deck
- Reduced Jacking Dead Loads, Existing
LL: + X Lanes of Traffic

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Reduced Jacking Dead Loads, New
+ Full Weight Deck Closure,
LL: +Tributary Live Load, Transfer due to Jacking,
+ Y Lanes of Traffic

Description:

-Adjusting the elevation of the lower and upper deck floor beams by simultaneously jacking at all floor beam pedestals supported on Box E.
-Placing shim plates and permanently bolting of pedestals to Box E.

25

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION
BURMA ROAD
LAND, CA 94607-1015
ONE (510) 622-5660
FAX (510) 286-0550

CC: Majid
Dick L.

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JUN 28 2004

CC MYERS, INC.
JOB 215 TEMP BYPASS STRUCTURE
IC-00310
215-103
1MB5EN

June 28, 2004
Contract No. 04-0120R4
04-SF-80-12.6/13.2
Temporary Bypass Structure
SL# 37

Mr. Robert W. Coupe
C. C. MYERS, INC.
3286 Fitzgerald Road
Rancho Cordova, CA 95742

RE: 215-SUB.00003-2
Subject: Preliminary Design Submittal for East Tie-In

Dear Mr. Coupe:

The Department has accepted the above referenced submittal. However, the Final Design Submittal for the East Tie-In will not be accepted until the design criteria is mutually agreed upon.

If you have any questions, please contact me at (510) 622-5660.

Sincerely,

Kenneth Loncharich
Resident Engineer

cc: File 5.03, 58.03

333 Burma Road
Oakland, CA 94607

Caltrans

Fax

To:	Bob Coupe	**From:**	Kenneth Loncharich
Fax:	(916) 635-8961	**Pages:**	9
Phone:	(916) 635-9370	**Date:**	6/28/2004
Re:	SL#36 & SL#37	**CC:**	

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

● **Comments:**

26

CC MYERS INC.

12-Aug-2004

Document No.:215-LET.00026

Imbsen & Associates, Inc.
9912 Business Park Drive, Suite 130
Sacramento, CA 95827

Temporary Bypass Structure
Contract No. 04-0120R4
CCM Job # 215

Attn: Dr.Roy Imbsen
President

Re: East Tie-in Misc. Materials

Dear Dr.Roy Imbsen,

C.C. Myers, Inc, is in receipt of Imbsen and Associates August 12, 2004 (attached) email indicating Imbsen and Associates need for "Caltrans final approval of the superstructure prior to finalizing our design and detailing connections". This prevents ordering this material. Imbsen and Associates is already behind in their deliverables and holding off ordering material for the East Tie-in will further delay Imbsen and Associates delivery dates set forth in your subcontract. Please be advised any and all costs associated with this delay will be withheld from your account.

Very Truly Yours,
C. C. MYERS, INC.

Bill Kidwell
Project Engineer

cc: MO,BK,BC

File:

Bill Kidwell

rom: Majid Sarraf [msarraf@Imbsen.com]
ent: Thursday, August 12, 2004 2:11 PM
To: 'bkidwell@ccmyers.com'
Cc: Roy Imbsen
Subject: FCM, East Tie-In.

CC MYERS
AUG 12 2004

JC-00484
215-201
MO
BF
BC

Bill,

These are the Fracture Critical components of the main steel members in the East Tie-In.

1- Bottom flange and web plates of all floor beams
2- Web and flange plates of all boxes beams, except box F
3- All plates of columns K and L

As shown on the spreadsheet, our estimates only include the main components listed (does not include small components such as structural shapes or plates for connections, and brackets). We need Caltrans final approval of the superstructure prior to finalizing our design and detailing connections.

Thanks,

Majid

Dr. Majid Sarraf, P.E., P.Eng.
Project Engineer / Senior Seismic Specialist
Imbsen and Associates Inc.
9912 Business Park Drive, Suite 130
Sacramento, CA 95827
Tel: (916) 366-0632
Fax: (916) 366-1501

CCMYERS 9166359370 08/12 '04 14:55 NO.151 01/02

42

Roy

FILE COPY
AUG 12 2004
Project #

C.C. MYERS, INC.

3286 Fitzgerald Road
Rancho Cordova, CA 95742

CCM Job # 215: Temporary Bypass Structure
San Francisco Oakland Bay Bridge

cc: Roy
Mark
Lance
File

FAX

Date: 12-Aug-2004

Document #: 215-FAX.00047

To: Dr. Roy Imbsen
Imbsen & Associates, Inc.

cc: Dr. Roy

Fax#: 916-366-1501

From: Bill Kidwell

Fax#: 916-635-8961
Phone#: 916-635-9370

Subject: **East Tie-in Misc. Materials Ordering**

Message:

cc: MO,BK,BC
file:215-201

Total pages sent including this one: 2

Original to follow: yes

27

DEPARTMENT OF TRANSPORTATION
333 BURMA ROAD
OAKLAND, CA 94607-1015
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((510) 286-0550

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August 12, 2004
Contract No. 04-0120R4
04-SF-80-12.6/13.2
Temporary Bypass Structure
SL# 70

RECEIVED
AUG 16 2004
CC MYERS, INC.
JOB 215 TEMP BYPASS STRUCTURE
IC- 490
215-103

Mr. Robert W. Coupe
C. C. MYERS, INC.
51 Macalla Road
San Francisco, CA 94130

RE: 215-SUB.00003-2
Subject: Preliminary Design Submittal for East Tie-In Substructure

Dear Mr. Coupe:

The Department has reviewed the above referenced project's Preliminary Design Submittal for the foundation for the East Tie-In. The enclosed attachments outline the comments required to be incorporated into the final design submittal.

If you have any questions, please contact me at (510) 622-5660.

Sincerely,

Kenneth Loncharich
Resident Engineer

cc: File 5.03, 58.03

Review Comments on East Tie-In Draft Supplemental Technical Special Provisions dated May 20, 2004

Comment No.	Comment By	Page No.	STSP Paragraph	SPECIFICATION COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
1A	SD	Various		Specifications that require submittal to the "Engineer" or the "Engineer" is to approve various items of work, the contractor should obtain the "Contractor Engineer" approval and buy off before the State "Engineer" can provide the required approval.			
2A	SD	Various		Specifications that required testing of material, the contractor needs to provide, the engineer for approval, information on the testing facilities and type of tests. The contractor's engineer, engineer of record, should have the opportunity to review and approve the tested material prior to submitting to the engineer for approval. In addition, the contractor should obtain the final approval from the engineer on all tests and materials as provided in the special provisions.			
3A	SD	62		This SSP should be included in the STSP. The proposed concrete bent cap and columns used to support the super structure exceed the least dimension requirements of 2 m as provided in the instructions for using this SSP. If the Contractor's Engineer elected not to use this SSP, then he needs to provide measures to cope with generation of heat from hydration of the cement and attendant volume change to minimize cracking, i.e. the engineering basis for not using it.			
4A	SD	93		Paragraph 10 of "52-1.08B(2) Butt Welded Splice: The new edited text should read as follows: "Contractor's Engineer and the Engineer." The (State) Engineer will still have to provide QC to various items of work as provided in the Standard Specifications and the Special Provisions.			
5A	SD	94		Paragraph 1 of "52-1.08C Service Splice and Ultimate Butt Splice Testing Requirements": The new edited text should read as follows: "Contractor's Engineer and the Engineer." The (State) Engineer will still have to provide QC to various items of work as provided in the Standard Specifications and the Special Provisions.			
6A	SD	95	1	STSP shall not alter the number of days allocated for the Engineer to review any submittal as provided in the special provisions. Please reedit.			

Review Comments on East Tie-In Draft Supplemental Technical Special Provisions dated May 20, 2004

Comment No.	Comment By	Page No.	STSP Paragraph	SPECIFICATION COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, If required.	Verify
7A	SD	95	5	STSP shall not alter the number of days allocated for the Engineer to review any submittal as provided in the special provisions. Please reedit.			
8A	SD	97	3	Should "Contractor's Engineer." be included in this paragraph?			
9A	SD	97		General comment: in Section 52 "Reinforcement", Provision where the Engineer is required to perform a certain task the Contractor Engineer should be included in those provisions. The Contractor's Engineer is the "Engineer of Record" for the design of the SSD and should provide the buy off before the Engineer gives the final OK.			
10A	SD	99	last	STSP shall not alter the number of days allocated for the Engineer to review any submittal as provided in the special provisions. Please reedit.			
11A	SD	100	2	STSP shall not alter the number of days allocated for the Engineer to review any submittal as provided in the special provisions. Please reedit.			
12A	METS	55		Refering to the "Structural Bolting Handbook" as providing the justification for modifying the bolting tables from the Standard Specifications and the Standard Special Provisions is not the correct reference per the Standard Specifications. The Standard Specifications, Section 55-3.14 "Bolted Connections," require that "Bolted connections using fastener assemblies shall conform to the requirements in "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" (RCSC Specification) approved by the Research Council on Structural Connections of the Engineering Foundation, and these specifications. The "Structural Bolting Handbook" is a summary of the requirements found in the RSCS specification however, the Contractor should be required to comply with the RCSC specification per the Standard Specifications.			

04-0120R4 Tempo ..ry Bypass Structure
Review Comments on East Tie-In Information Package dated June 21, 2004

Comment No.	Comment By	Sheet No.	Sections	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
1B	SD			Since the structure is quiet flexible, will the riders experience any discomfort due to the lateral movement?			
2B	SD	1-3	Section 7	Rocking analysis needs to provide additional information. Provide statement stating all assumptions and conclusions made for rocking analysis. Provide procedure and reference materials used for rocking analysis. What are the consequences of rocking not occurring?			
3B	SD	1	Section 7	Total support reaction at Pier E1 is stated as being zero. Provide additional information to verify.			
4B	SD	2	Section 4A	Pushover analysis does not seem to incorporate soil/structure interaction. If the analysis does include foundations stiffness, provide force deflection curves for both the spread footing and pile system.			
5B	SD		Section 4A	Pushover analysis for Bent 53 shows that the superstructure is not capacity protected since the columns hinge at a higher force. This is in conflict with note 2 on sheet 1 of 59			
6B	SD	6,7	Section 8	Sap model does not appear to have soil/structure interaction. What are boundary conditions used within the model. Provide electronic copies of all SAP models used for analysis. Indicate what are the differences between models and why additional models were generated.			
7B	SD		Section 8	Provide modal mass participation ratios. Does the mass participation ratios indicate that the structure is well behaved?			
8B	SD		Section 8	Can an irregular, unsymmetrical structure with changes in mass and stiffness be accurately captured within the SAP model?			
9B	SD		Section 4A	How was the superstructure capacity determining in the transverse and longitudinal direction?			
10B	SD		Section 4A	On the Pushover Curve - Pier E1 Transverse, what does the 0.12W force level indicate?			
11B	SD		Section 4A	The pushover curve @ pier E1 in the transverse direction, is this the response of the pier or the isolation bearings?			

Review Comments on East Tie-In Preliminary Design Plans dated June 21, 2004

Comment No.	Comment By	Plan Sheet No.	Detail, View or elev	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
1C	SD	2	Elevation	Spread footing should be shown lower than pile cap.			
2C	SD	11	Elevation	#25 Hoop spacing is not clearly indicated. Why is the spacing of the #25 hoops larger at top than the mid section? What is the reference line shown? Is the 20m no splice zone from top of footing? No splice zone should be shown at both the top & bottom of column Redraw elevation to clarify.			
3C	SD	11	Elevation	Longi. bar cut-off for columns is not shown. Are all splices within the column ultimate splices?			
4C	SD	11	Elevation	Does the left column have a section C-C?			
5C	SD	11	Section A-A	Bottom reinf. bars are drawn asymmetrical about C/L of bent?			
6C	SD	11	Bent Cap	Section A-A does not indicate bar size of the side bars			
7C	SD	11	Bent Cap	Rebar spacing seems tight. See preferred spacing per BDD pg 13-20			
8C	SD	12	Bent Cap	Bent cap / column joint shall be designed to ensure proper performance of knee-joint opening and closing. Provide joint shear calculations.(Column / Footing joint also)			
9C	SD	12	Bent Cap	Bent Cap reinforcement looks light. Reinforcement should be arranged to ensure that plastic hinging occurs within the column only.(i.e. designed for column overstrength moment)			
10C	SD	12	Plan - Bot. Reinf.	The bars going through the right column state "#43 bars, tot. 10" but 14 bars are drawn? How long are these bars? Are the bars going through the left column the same as the right column?			
11C	SD	12	Bent Cap	Bottom Reinforcement for bent cap seems insufficient and improperly arranged. Number of bars is inconsistent with section A-A. Note 5 on sheet 11 states that there is no splices allowed in main cap reinforcement, yet the bottom reiforcement plan shows all lap splices with no continuous bars. Indicate on plans location of "No splice Zone"			
12C	SD	12	Bent Cap	Bundled bars not shown or utilized			
13C	SD	14,15	Elevation	Dimension top and bottom mat rebar within footing			

Temporary Bypass Structure

Review Comments on East Tie-In Preliminary Design Plans dated June 21, 2004

Comment No.	Comment By	Plan Sheet No.	Detail, View or elev	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
14C	SD	11	Elevation	What is the elevation at the top of the Bent cap			
15C	SD	14,15	Elevation	The footing stirrups should have 180 degree hook at top not 135 degree.			
16C	SD	40	Section A-A	Has the anchorage @ Pier E1 been designed for 3 X DEE force ?			
17C	METS	Various		All weld sizes should be specified			

44

FILE COPY
AUG 2 3 2004
Project #_______

C.C. MYERS, INC.

3286 Fitzgerald Road
Rancho Cordova, CA 95742

CC: DR. ROY
LANCE

CCM Job # 215: Temporary Bypass Structure
San Francisco Oakland Bay Bridge

FAX

Date: 13-Aug-2004

Document #: 215-FAX.00048

To: Dr. Roy Imbsen
Imbsen & Associates, Inc.
9912 Business Park Dr. #130
Sacramento CA 95827

Fax#: 916-366-1501

From: Robert Coupe

Fax#: 916-635-8961
Phone#: 916-635-9370

Subject: East Tie-In Substructure Review Comments

Message:

Here is a copy of State Letter #70 regarding the above noted subject.

cc: MO, BK

file:215-201

Total pages sent including this one: 7

Original to follow: yes

DEPARTMENT OF TRANSPORTATION
333 BURMA ROAD
OAKLAND, CA 94607-1015
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August 18, 2004
Contract No. 04-0120R4
04-SF-80-12.6/13.2
Temporary Bypass Structure
SL# 80

RECEIVED
AUG 18 2004
CC MYERS, INC.
JOB 215 TEMP BYPASS STRUCTURE
IC-511
215-103
IMBSEN
BC

Mr. Robert W. Coupe
C. C. MYERS, INC.
51 Macalla Road
San Francisco, CA 94130

RE: 215-SUB.00003-2, 215-SUB.0003-03
Subject: Preliminary Design Submittal for East Tie-In Superstructure

Dear Mr. Coupe:

The Department has reviewed the above referenced project's Preliminary Design Submittal for the superstructure of the East Tie-In. The enclosed attachments outline the comments required to be incorporated into the final design submittal.

If you have any questions, please contact me at (510) 622-5660.

Sincerely,

Kenneth Loncharich
Resident Engineer

Attachments

cc: File 5.03, 58.03

Review Comments on East Tie-In Draft Supplemental Technical Special Provisions dated May 20, 2004

Comment No.	Comment By	Page No.	STSP Paragraph	SPECIFICATION COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
1A	METS	55		Refering to the "Structural Bolting Handbook" as providing the justification for modifying the bolting tables from the Standard Specifications and the Standard Special Provisions is not the correct reference per the Standard Specifications. The Standard Specifications, Section 55-3.14 "Bolted Connections," require that "Bolted connections using fastener assemblies shall conform to the requirements in "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" (RCSC Specification) approved by the Research Council on Structural Connections of the Engineering Foundation, and these specifications. The "Structural Bolting Handbook" is a summary of the requirements found in the RSCS specification however, the Contractor should be required to comply with the RCSC specification per the Standard Specifications.			
2A	SD	Various		No specifications were provided for the following items of work as shown or described on the plans 1- Overhead sign structure 2- Utilities carried by the structure 3- Permanent CORRUGATED steel deck forms 4- Class B coating to be used at contact surfaces at bolted connections. 5- Jacking operation			
3A	SD	58	13	please complete once the needed information become available.			
4A	SD	68		Is this SSP for the "Permanent CORRUGATED steel deck forms"? If so, please correct accordingly.			
5A	SD	68	3	Please provide the "Engineering basis" for changing coating designation of G 165 to G 90. (G165 provide 1.65 oz/ft2 while G90 provide 0.9 oz/ft2 of coating cover)			
6A	SD	68	4	The new edited text should read as follows: "Contractor's Engineer." In addition, detailed working drawing for the forms shall be submitted to the Engineer for approval. Please reedit.			
7A	SD	68	6	It looks like conflicting information are introduced by editing this paragraph. Please clarify.			
8A	SD	69	12	Since the 25-mm in the minimum clearance to bar reinforcing then the plans should adhere to the specs requirements and no editing will be required. Specs supercede the plans.			

Review Comments on East Tie-In Draft Supplemental Technical Special Provisions dated May 20, 2004

Comment No.	Comment By	Page No.	STSP Paragraph	SPECIFICATION COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
9A	SD	69	14	remove the added text "welds," contractor to verify with the engineer if welding is an approved method for securely fastened to the form to their supports. In addition, this is in conflict with paragraph 10 where welding to the flange is not allowed.			
10A	SD	70-74		SSP "51METH", please provide the engineering basis for not using this SSP.			
11A	SD	93	10	52-1.08B(2) Butt Welded Splice: The new edited text should read as follows: "Contractor's Engineer and the Engineer." The (State) Engineer will still have to provide QC to various items of work as provided in the Standard Specifications and the Special Provisions.			
12A	SD	94	1	52-1.08C Service Splice and Ultimate Butt Splice Testing Requirements: The new edited text should read as follows: "Contractor's Engineer and the Engineer." The (State) Engineer will still have to provide QC to various items of work as provided in the Standard Specifications and the Special Provisions.			
13A	SD	95	1	STSP shall not alter the number of days allocated for the Engineer to review any submittal as provided in the special provisions. Please reedit.			
14A	SD	95	5	STSP shall not alter the number of days allocated for the Engineer to review any submittal as provided in the special provisions. Please reedit.			
15A	SD	97	3	Should "Contractor's Engineer" be included in this paragraph?			
16A	SD	97		General comment; in Section 52 "Reinforcement", Provision where the Engineer is required to perform a certain task the Contractor Engineer should be included in those provisions. The Contractor's Engineer is the "Engineer of Record" for the design of the SSD and should provide the buy off before the Engineer gives the final OK.			
17A	SD	99	last	STSP shall not alter the number of days allocated for the Engineer to review any submittal as provided in the special provisions. Please reedit.			
18A	SD	100	2	STSP shall not alter the number of days allocated for the Engineer to review any submittal as provided in the special provisions. Please reedit.			

Review Comments on East Tie-In Draft Supplemental Technical Special Provisions dated May 20, 2004

Comment No.	Comment By	Page No.	STSP Paragraph	SPECIFICATION COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
19A	SD	103-116		SSP 55-500 "STEEL STRUCTURE" have a very large amount of alternation from its original form. Please provide copies of the different references as indicated in various paragraphs. Engineering basis is required to justify such editing.			
20A	SD	117		SSP 59-500 "CLEAN AND PAINT STRUCTURAL STEEL" should be added and edited accordingly as provided by the design criteria shown on the contract plans. Also to address the instruction requirements provided in specifications for the joint seal assemblies.			
21A	SD	117		SSP 75-500 "MISCELLANEOUS METAL (BRIDGE): Paragraph 1: should not be edited as submitted. No engineering basis were provided to justify such editing.			
22A	SD	118	4, 9	Please follow the editing Instructions.			
23A	SD	119	14	Please follow the editing instructions.			
24A	SD	120	7	Please delete since paragraphs 5-8 are deleted. See instructions at paragraph 5.			

04-0120R4

Temporary Byp[illegible]s Structure
Review Comments on East Tie-In Information Package dated June 21, 2004

Comment No.	Comment By	Sections	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, If required.	Verify
1B	SD	General comments	A detailed description of the structural performance of the East Tie-in past DEE, DLS up to failure needs to be provided. The description shall include the nature of which members or connections are likely to fail at forces beyond DLS. Entire superstructure shall perform elastically up to DLS.			
2B	SD	4-A	In "Pushover curve- Bent #53 Transverse " What does superstructure capacity 0.12W=700 kip means. How was this force was calculated. What would happen if the lateral load exceed 700 Kip.			
3B	SD	4-A	The proposed structure at it's final condition is a double deck structure. The pushover analysis was performed based on a single degree of freedom of structure. This structure has two degrees of freedom and the pushover analysis should reflect that.			
4B	SD	4-A	There are two pushover analysis summary curve for bent 53 in transverse direction. Which one is correct?			
5B	SD	7	What is the rocking analysis of the pier 1 for? What does it mean and how is this beening utilized.			
6B	SD	6, Stage 7	How much is the " lightly jacking" load between the floor beams. The jacking load should be shown in the contract plans.			

04-0120R4 **Tempora⸱⸱ Bypass Structure**

Review Comments on East Tie-In Preliminary Design Plans dated June 21, 2004

Comment No.	Comment By	Plan Sheet No.	Detail, View or elev	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
1C	DD	General	Plan	Deck drainage and drainage piping are not shown.			
2C	DD	1, 11	Elevation	The 300 NPS Water and 100 NPS Water locations are not consistent with the Viaduct Plans submitted Aug. 10.			
3C	DD	1	Elevation	The WD1 profile shows two reverse 60 m vertical curve. This does not meet the Exception to Advisory Design Standards for this project.			
4C	DD	1	Elevation	Profile is missing minimum vertical clearance between upper deck and lower deck. Show station and minimum vertical clearance at which minimum vertical clearance occurs.			
5C	METS	Various		All weld sizes should be specified			
6C	SD		General comments	Provide completed connection details along with calculations. Provide details and calculations of all existing connections that are to be reutilized in the East Tie-in.			
7C	SD		General comments	Bent 53 bearing detail is not correctly shown on all the section views. Update all sheets			
8C	SD		General comments	The structure is designed unsymmetrically. Global stability needs to be carefully studied with considerations of actual connection details.			
9C	SD		General comments	Will the superstructure perform elastically up to the DLS level?			
10C	SD		General comments	Identify which members new or existing will be designated as Fracture Critical members.			
11C	SD		General comments	The longitudinal stiffness of the upper deck consists of a flexible support wall with cross bracing and a rigid truss frame of Box girder G, I and J. How can you quantify their longitudinal stiffness behavior under seismic, temperature, and wind load.			
12C	SD		General comments	The support wall is not a redundant system. Need to show what will happen to the bridge if one or two of this vertical element were damaged by an errant vechicle and could not carry the imposed			
13C	SD		General comments	The existing concrete decks is not composite with the floor beams and stringers. How can you rely on the concrete deck to transmit the lateral loads to the bent 53.			
14C	SD		General comments	What will be the condition of the existing deck surface once the jacking operation has been performed? Will the deck lift off the stringers during jacking?			

Review Comments on East Tie-In Preliminary Design Plans dated June 21, 2004

Comment No.	Comment By	Plan Sheet No.	Detail, View or elev	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
15C	SD		General comments	The existing structure has been modified in such way that the analysis from the global model become questionable. How can we verify the global computer model of the East Tie-in structure, at it's final configuration, represent the structural behavior under service and seismic load.			
16C	SD		General comments	Supplement Technical provisions. Provide specifications for the jacking operation, deflection control monitoring, demolition process, evaluation for use of existing members and tolerances for fitting of new members.			
17C	SD		General comments	Can the jacking operation be safely done while there is traffic on the bridge? What precautions are to be taken to ensure public safety?			
18C	SD		General comments	If the superstructure is not capacity protected against lateral force resulting from the column plastic hinges, then show what is the failure mechanism of the superstructure structural components at lateral force equivalent to plastic shear of columns.			
19C	SD	1	Section	What is vertical clearance at the protruding post of the south truss? Post is venerable to damage even if clearance is meet.			
20C	SD	1	Section	Why was the "WD1" profile changed from the contract plans?			
21C	SD	2	General Notes	Sheet 2 of 59 refers the Design Criteria 1 to 10 as part of the general notes. These design guidelines are for a move in and move out design and do not apply. The note should be revised to reflect the contractor proposed structure design guidelines. The new design guideline has not yet been approved by Caltrans			
22C	SD	2	General Notes	List HSS Grade under structural steel			
23C	SD	3	Plan	It appears that there is a grade break @ the "WM" line on the upper deck? Provide deck cross sections @ 5m increments along "WD1" line to indicate uniform cross slope.			
24C	SD	3	Plan	Is the existing deck surface going to be the final deck surface? Is an overlay required over the existing deck portion? Correct all section views if no overlay is proposed.			
25C	SD	6	Elevation	During the jacking operation what are the consequences to the existing truss members, if the jacking load exceed the value shown on the plans. When Jacking loads are being applied at the location shown on the plans, the existing truss is still supported/connected to the Pier E1 and YB4 tower, what will happen to these connections and supports.			

Review Comments on East Tie-In Preliminary Design Plans dated June 21, 2004

Comment No.	Comment By	Plan Sheet No.	Detail, View or elev	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
26C	SD	6,10	Table	Jacking Reaction Table does not show units for reactions. Reactions appear to be in kip, but need to be in kN.			
27C	SD	6,10	Table	Jacking Reaction Table. Provide separate columns for DL only and 1/2 LL. Provide note stating that reactions will be re-determined in field to accurately reflect actual conditions at time of jacking and that the members shall only cut once a zero stress state has been achieved.			
28C	SD	6	Elevation	Cantilevered span of viaduct is shown differently than on GP			
29C	SD	6	Legend	Cutting sequence has not been shown. Show proposed cutting sequence.			
30C	SD	7	Elevation	Stage 4. How are lateral forces going to be resisted once the posts and diagonals are removed? How is the load transferred through the jacks?			
31C	SD	7	Elevation	Specify gap dimension above box girder.			
32C	SD	8	Elevation	Stage 6. The construction of this stage coincide with shifting the traffic. You are allowed one 24 hour of the closure of the bridge. Can these activities be accomplished in one day.			
33C	SD	9	Elevation	How are the forces in the north truss relieved? (stage 7) Just by placing the support wall and shifting traffic does not relieve all of the forces within members. Provide calculations to show that truss members would not be under any significant stress prior to demolition.			
34C	SD	9	Elevation	Show sequence of demolition of north truss and decks. Provide calculations to ensure that members are not overstressed during the demolition process.			
35C	SD	10	Elevation	What is the purpose of jacking locations 15 through 21? Are they just the locations from where the deck can be adjusted or are they intended to lift the truss and relieve forces? It does not seem possible that forces can be relieved by jacking from Box Girder E (long distance from girder to north truss).			
36C	SD	10	Table	What does the reactions in the table represent? Is the deck dead load included or not?			
37C	SD	5-->10	Stages	The construction staging that was provided in the "Draft Design Criteria" should be incorporated in to these sheets and should be taken out of the criteria. There is an inconsistency between the plans and "Draft Criteria" as to how the forces within the truss members are relieved.			

Review Comments on East Tie-In Preliminary Design Plans dated June 21, 2004

Comment No.	Comment By	Plan Sheet No.	Detail, View or elev	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, If required.	Verify
38C	SD	11	Elevation	The existing floor beam for the lower deck will experience a different loading condition than was anticipated in the original design. The lower deck floor beams will now be supported by box girder E and box girder D. The wall support which rest on this floor beam produce a cantilever moment at face of the box girder E and produce a beam deflection in upward direction of the floor beam. Can the floor beams, in their current conditions, handle the new imposed cantilever moment? Will the upward deflection of the floor beam cause a delamination of the concrete deck from the existing stringers? The effect of this revised loading of the floor beam should be investigated. Also, an investigation into rather the composite action of the reinforced concrete deck with the existing stringers is capable of transmitting the lateral forces to bent 53 should be conducted.			
39C	SD	11	Elevation	The elevation provided at bottom of floor beam indicates that the TBS will be lower than the minimum elevation as shown on sheet 23A of the contract plans. Verify that all component of superstructure are above the minimum.			
40C	SD	13	Detail 1	How was the bearings at bent 53 modeled within SAP? Are the bearing supposed to prevent movement in all directions but allow rotation? It appears there may be significant moment transfer due to the 38mm dia. Anchor Bolts.			
41C	SD	13	Detail 1	Dimension anchor bolt layout.			
42C	SD	17	Plan	Provide connection details of how existing wind bracing is going to be connected to box girders			
43C	SD	17	Plan	Box Girder F seems to conflict with anchorage and wind bracing.			
44C	SD	18	Plan	Is there adequate space on the jacking support beam to provide for shimming.			
45C	SD	18	Elevation	How is access provided for bolting of the jacking support beams. Called out detail "Jacking Details No.3" is not consistent with the elevation. There is only one jack per support beam, while the detail shows two. Can the upper stiffener plate inside the box girder be welded on both sides?			
46C	SD	18	Plan	How are the lateral loads going to be transferred through the jack? Specify thickness of the plate placed underneath the jacking bracket.			

Review Comments on East Tie-In Preliminary Design Plans dated June 21, 2004

Comment No.	Comment By	Plan Sheet No.	Detail, View or elev	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
47C	SD	18	Section A-A	How are the jacking brackets going to be installed at locations where there are diagonals? It seems that the gusset plate for the diagonals may cause installation problems.			
48C	SD	18	Section B-B	Specify number and size of bolts required for jacking bracket			
49C	SD	18,21	Plan, Elevation	Show the final configuration of the connection once the jacks are removed.			
50C	SD	19	Side View	Bottom Chord Jacking bracket. Why is there a fillet weld pointing to the W-section? Show welds at bearing plate. Provide calculations for the design of jacking brackets.			
51C	SD	22	Section View	Steel pedestal on Box Girder E should reference detail.			
52C	SD	22	Section View	How are the concrete deck seismic forces transmitted to the lateral load resisting elements.			
53C	SD	22	Section View	Provide calculations to show that existing floor beams in their existing conditions are capable of sustaining the design loading.			
54C	SD	22	Section A-A	Provide calculations and/or design aids used for designing deck. Provide missing dimensions and label permanent deck form. How are deck forms going to be laid out ? (Perpendicular to what line). Are the forms spanning from one stringer to the next or are the forms spanning across all the stringers? If the forms span between stringers is there enough bearing area?			
55C	SD	22	Part Section	Why is the intermediate diaphragm only required on the lower deck? Show all diaphragms on the framing plans. Provide detail for connection of intermediate diaphragm.			
56C	SD	23	Section A-A	Specify interior plate size.			
57C	SD	23	Detail 1	Clarify what is meant to be "Weld Channel 50"?			
58C	SD	23	Elevation	Is there a cover plate at the top of the C-bent column? Provide details to ensure that buckling would not be a concern with the C-bent. What is the factor of safety for the C-bent?			
59C	SD	23	Detail	Bearing mounting detail. How is competent concrete assured for shear transfer?			
60C	SD	24,25	Plan	Station for floor beam #1 has not been provided or is mislabeled. Provide bearings for the floor beam layout.			
61C	SD	24,25	Box Section	Dimension the overhanging portion of the flange.			

Review Comments on East Tie-In Preliminary Design Plans dated June 21, 2004

Comment No.	Comment By	Plan Sheet No.	Detail, View or elev	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
62C	SD	27	Elevation	Specify connection for stiffener plate at section B-B. Provide design calcs to show adequacy of section A-A. Provide access holes for bolt installation.			
63C	SD	29	Plan	It appears that the scaling is off for both Box C and H. Check max bolt spacing per BDS 10.24.6			
64C	SD	30	Plan	How is the interior angle between Box D and E sealed? Provide details for connections of both the exterior and interior angle between Box D and E. Specify the size of the stiffener plates. Provide calculations for connection for eccentric loading.			
65C	SD	31	Section A-A	Check prying on gusset plate. Where are the bolts on the bottom and left side of section A-A shown?			
66C	SD	32	Section B-B	Specify welds for stiffener plates.			
67C	SD	34	Detail 1	Labeling for section A-A and B-B need to be switched.			
68C	SD	40,42	Plan	There is no space shown between the end of the box girder and the bracket. Show all the required clearances to ensure proper isolation. Show location of existing cantilever tie bars to ensure adequate clearance from drill and bond operation.			
69C	SD	40,42	Section A-A	Drill and bond note should reference #3 not #4.			
70C	SD	41,43	Elevation	Provide calculations for bracket design. Does the bracket have an adequate seat width as required by SDC and also to accommodate isolation. Specify the hole size for the plate resting on E1.			
71C	SD	41,43	Section A-A	Bracket has oversized holes. How is the shear going to be transferred?			
72C	SD	44	Elevation	Provide detail for beveled plate and pedestal. How is the beam rotation accommodated? Specify welds for stiffener plates.			
73C	SD	44	Section A-A	Specify welds for End Brace Stiffener Plate. Specify slope for bracing. Add plate between L's and conform bolt spacing to BDS 10.24.6.2			
74C	SD	44	Section B-B	Show detail for skewed location.			
75C	SD	44		Provide connection detail for floor beam 4 to column.			
76C	SD	44,45	Detail	Floor beam detail. Specify weld for built-up member.			
77C	SD	45	Section B-B	Provide table to indicate exactly which connection is to be used at the ends of the floor beams.			
78C	SD	46	Stringer Con.	How is the stringer rotation prevented at the supports?			
79C	SD	46	Section B-B	Is there a connection between the plate and the box beam?			

Review Comments on East Tie-In Preliminary Design Plans dated June 21, 2004

Comment No.	Comment By	Plan Sheet No.	Detail, View or elev	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, If required.	Verify
80C	SD	47	Elevation	There needs to be a more robust system for the connection of the existing cross beams. Proposed system will perform poorly during a seismic event. Existing members can not be welded onto. Details on this sheet are not very clear. Does this details provide support for the cantilever end of the existing stringer. What is the connection of the ST17 to ST24 to concrete deck. It seem the load is transfer to the existing concrete deck. Can this concrete be able to resist the additional load. How is this ST steel section is modeled in the global model.			
81C	SD	51	Elevation	Correct post connection to eliminate eccentricity.			
82C	SD	52	Detail1	The connection of cross frame post (W 360X101) is welded to the base plate, the cross frame (WT) is welded to the flanges of W310X97 and the flanges of the W310X97 is bolted to the web of the existing floor beam. This is very complex joint. How was it modeled in the global model. Was this joint molded as fix or pin.			
83C	SD	53	Detail 3	How much of the lower concrete deck is removed for placement of the new W 310X97. Are you going to leave a hole on the concrete deck and what is the protection for the rebar? Is the remaining part of the slab stable around the wall support?			

04-0120R4 Temporary Bypass

Review Comments on East Tie-In Draft Design Criteria dated June 23, 2004

Comment No.	Comment By	Section No.	Detail, View or elev	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
1D	SC	11.2	Stage 2 - Load Transfer of South Segment	Absolute structure displacement of 150mm (6") is too much. Do you mean 15mm?			
2D	SC	11.2	Stage 2 - Load Transfer of South Segment	Need details for redundant support system. Plates, Shims etc			
3D	SC	11.2	Stage 2 - Load Transfer of South Segment	Hoe is it verified that a zero force condition exists when the south truss is raised to the fabricated no-load camber?			
4D	SC	11.2	Stage 2 - Load Transfer of South Segment	During jacking operation, how would one measure and quantify that a zero force exists in a member? Is there a proposed method for monitoring stress/load in truss members?			
5D	SC	11.2	Stage 2 - Load Transfer of South Segment	Will jacking be applied simultaneously at points 1 thru 14?			
6D	SC	11.3	Stage 3 - Removal of Portions of South Truss	There's mention of a predetermined sequence for cutting members while being supported by mechanical jacks. Sequence to be determined by the Contractor's Engineer? Must be included as part of the plans. Is the upper chord or any potion of the upper chord to be removed?			
7D	SC	11.3	Stage 3 - Removal of Portions of South Truss	Will "lift-off" be performed at all locations after every cut? Who will determine what adjustments need to be made?			
8D	SC	11.3	Stage 3 - Removal of Portions of South Truss	What impacts to the North Truss load distribution are resultant from jacking at the South Truss?			
9D	SC	11.5	Stage 5 - Deck Closure Pour	It will be understood to match grade for closure pour. Should also mention that existing barrier is to be removed and that area ground or resurfaced?			

04-0120R4 Temporary Bypass

Review Comments on East Tie-In Draft Design Criteria dated June 23, 2004

Comment No.	Comment By	Section No.	Detail, View or elev	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
10D	SC	11.6	Stage 6 - Traffic Shift	Are there measures in place to place anchored Barrier Rail as opposed to temporary K-Rail?			
11D	SC	11.6	Stage 6 - Traffic Shift	In the traffic shift, how much load is to be transferred to support Girder E? Will there be some adjustments done (i.e. making connections from existing floor beam to Box 'E' to bent cap and such) to accomplish this? What portion of the live loading is expected to be transferred to Box E?			
12D	SC	11.7	Stage 7 - Placement of Upper Deck Support	There's mention of load transfer from upper deck to lower deck to Box E as being limited. Please quantify.			
13D	SC	11.7	Stage 7 - Placement of Upper Deck Support	Stating that steel posts will be installed by lightly jacking structure is inadequate. Please provide more details on jacking scheme.			
14D	SC	11.8	Stage 8 - Load Transfer at North Portion of Span and Demolition	More details required for North Truss and deck system removal.			

45

C.C. MYERS, INC.

FILE COPY
AUG 1 9 2004
Project #______

3286 Fitzgerald Road
Rancho Cordova, CA 95742

CCM Job # 215: Temporary Bypass Structure
San Francisco Oakland Bay Bridge

cc: DR ROY
LANCE

FAX

Date: 19-Aug-2004

Document #: 215-FAX.00050

To: Dr. Roy Imbsen
Imbsen & Associates, Inc.

Fax#: 916-366-1501

From: Robert Coupe

Fax#: 415-399-0587
Phone#: 415-399-0175

Subject: Preliminary Design Submittal for East Tie-In Superstructure

Message:

Here is a copy of State letter #80, with which they provide their comments on the East Tie-In Preliminary superstructure submittal.

cc: MO, BK
file: 215-201

Total pages sent including this one: 15

Original to follow: no

FILE COPY (29)

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc.	Date:	August 31, 2004
	9912 Business Park Drive Suite 130 Sacramento, CA 95827	Time:	10:00 a.m.- 12:30 p.m.

Minutes Prepared By: Lance A. Schrey of Imbsen & Associates, Inc.

Attendees List: See Attachment 1

Purpose

The purpose was to have all parties working on the project to meet to answer technical questions related to the East Tie-In Foundation.

It is not the intent of these meeting minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
B. Coupe	CC Myers
IAI Attendees	
IAI File 1295.310.01	

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

1. The first response (1D) from the Caltrans Review Comments for the East Tie-In criteria: "Absolute structure displacement of 150 mm (6") is too much. Do you mean 15 mm?" was discussed.
   a. Majid said that raising the structure 6" is required for load transfer.
   b. Majid suggested an alternative way of measuring live load induced forces in truss members by temporarily shutting down traffic for a few minutes to zero out strain gages and get their reading after letting traffic resume.
   c. Ali is concerned with tension members. He wants to know where the forces go when the members are cut. Majid said the new structure will be already in place to take any possible unbalanced force
   d. Ali would like upper and lower bound. 25% more and less force was suggested to perform a sensitivity study should some difference be experienced in the jacking operation from that predicted.
   e. Amer does not think Caltrans should tell IAI what needs to be done to verify member stresses. He feels it is IAI's responsibility.
   f. Randy would like displacements and forces at each node during the jacking.
   g. Majid suggested loosening the anchor bolts to allow very small lift off the south truss as a way of measuring whether the total jacking load has overcome the total dead load in the truss.
   h. Caltrans asked how long the load transfer would take place. Roy said Jim Ronning of DCCI would go over on Thursday.
   i. John did not understand the 6" as originally described in the criteria. He would like to know what happens to the North Truss when working on the South Truss. He said the cutting procedure would need to be spelled out.

2. Roy asked about small stoppages in traffic (e.g., 15 minutes) at times of low traffic. John said that this was not per the Special Provisions, but this could probably be done (with communication with the CHP).

3. Ali brought up the concern of overturning at Bent 53 and the need for anchor bolts.

4. Randy was concerned that there is nothing to restrain the lateral forces at the jacking locations during jacking. Majid said that nothing

is being done during jacking to cause lateral loads, as the truss is mainly a statically determinant system and during such operation will have somewhat of a rigid body rotation.

5. Dan is concerned about the YB3 span. He said it was originally being supported longitudinally by the E1 bent and with the partial removal of the YB4 bent this support would be lost. IAI will look into the demolition plans.

6. IAI again asked for maintenance reports.

7. In the criteria Randy does not like the definition of terms. He said Caltrans primary concern is public safety. IAI will modify this.

8. Ali suggested listing areas in BDS and SDC in which IAI is not planning on meeting the requirements.

9. Ali brought up 4.1.4 of the Criteria. Majid said this is exactly from the Criteria in the Contract Plans and our interpretation is that the structure does not collapse or have significant loss of capacity when subjected to 3xDEE displacements. It was suggested to investigate what PB's intention was for this criteria.

10. Randy wanted clarification on the rocking at Pier E-1. Majid said he was expecting cracking at the top of the footing, because that was the weakest point and the section was highly under-reinforced. Roy said that Dan and Tom previously agreed to IAI's approach of considering the rocking of the Pier E1 to have a more realistic representation of longitudinal seismic action of the structure.

11. Caltrans would like to know which members can not go past DLS. Majid said it was not within IAI's scope of work to demonstrate the behavior of the structure beyond DLS, while the structure is designed for maximum of either 0.12g or DLS displacements. He also felt providing such data would require a very difficult 3-dimensional pushover analysis.

Attachment 1

MEETING ATTENDANCE SHEET

San Francisco – Oakland Bay Bridge
Temporary Bypass Structure

IAI Job # 1295   Contract # 04-0120R4

Date: 8-31-2004

Caltrans:

- [ ] Pete Siegenthaller
- [x] Amer Bata
- [ ] Ken Loncharich
- [x] John Walters
- [ ] Tom Ostrom
- [x] Dan Adams
- [x] Ali Asnaashari
- [x] Randy Bains
- [ ] Manode Kodsuntie
- [ ] Saba Mohan
- [ ] Nizar Melehani
- [ ] Eric Watson

CC Myers:

- [ ] Bob Coupe
- [x] Bill Kidwell

DCCI:

- [ ] Jim Ronning
- [ ] Jack Geer
- [ ] Ron Paz

Imbsen & Associates:

- [x] Roy Imbsen
- [x] Lance Schrey
- [ ] Dick LeBeau
- [ ] Ed Tyk
- [ ] Todd Lambert
- [ ] Jonathan Reina
- [ ] Ghassam Dini
- [ ] Sasan Soltani
- [x] Majid Saraf
- [ ] George Imbsen

Others:

- [ ]
- [ ]

Note: The boxes checked above designate attendance at the meeting.

FILE COPY (30)

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location: Imbsen & Assoc. Inc. Date: September 1, 2004

9912 Business Park Drive
Suite 130
Sacramento, CA 95827 Time: 10:00 a.m.- 12:15 a.m.

Minutes Prepared By: Lance A. Schrey of Imbsen & Associates, Inc. (IAI)

Attendees List: See Attachment 1

Purpose

The purpose was to discuss the schedule and the shop plans for the East Tie-In.

Attachments

Attachment 1 – Attendees

Distribution List

IAI Attendees
Bob Coupe and Sam Hanna
Jim Ronning (to distribute to all DCCI attendees)
IAI File 1295.310.01

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

1. Bill K. suggested talking to Dan and Tom to find out if it is needed to design past DLS.

2. Bob said that developing new criteria for the East Tie-In was an extra. Dan suggested meeting with Caltrans to discuss this.

3. Bob wanted everybody to work together on the East Tie-In to finish the design, shop plans and procure the steel.

4. Roy said for the overall design, the East Tie-In design was 80% complete. Dan said if the criteria changes, it would have a dramatic effect on IAI's design.

5. Sam said it is difficult to tie to the existing. He needs information from IAI. He would like electronic files. George will put these on a disk.

6. Lance to set Sam up with FTP site.

7. Sam would like standards and sample drawings.

8. Bob said two fabricators would be involved with the East Tie-In. He said the rolled shapes and the High Strength steel would be fabricated in the United States and all of the other work will be done in China.

9. Jim said his role is to review drawings for constructibility. Bill R. is working for DCCI and his comments will be run through Jim prior to getting to Sam.

10. Bill R. feels an erection procedure should be the first order of work.

11. Sam asked about pad elevations for the Cantilever, Bent 53 and Pier E-1. Majid said IAI started with the deck elevations and worked down. George said he is waiting for final elevations.

12. Sam said the deck superelevation is not represented properly on the plans.

13. Sam asked about camber:

a. Majid said only cambering of stringers and floor beams is not sufficient to meet the deck profile supported on the main boxes (except E) and they need to be cambered to provide camber. Jim said IAI should camber members for dead load.
b. Bill R. said he has never seen a box this big cambered. Jack said he has.
c. Sam asked for splicing locations. Majid indicated location of section changes as minimum location for splicing points
d. Jim said the North Girder will be erected in one piece.
e. Majid asked CC Myers to provide information about maximum length and length of pieces that can be shipped and handled in the field prior to bolting to specifying splicing points and end connection details.

14. Sam said IAI should call out the welds, but not put the weld preparation on the plans.

15. Referring to sheet 27 of 59, Sam suggested going with bolted bent plates.

Attachment 1

MEETING ATTENDANCE SHEET

San Francisco – Oakland Bay Bridge
Temporary Bypass Structure

IAI Job # 1295 Contract # 04-0120R4

Date: 9-01-2004

Caltrans:

- ☐ Pete Siegenthaller
- ☐ Amer Bata
- ☐ Ken Loncharich
- ☐ John Walters
- ☐ Tom Ostrom
- ☐ Dan Adams
- ☐ Ali Asnaashari
- ☐ Randy Bains
- ☐ Manode Kodsuntie
- ☐ Trinh La
- ☐ Nizar Melehani
- ☐ Eric Watson

CC Myers:

- ☒ Bob Coupe
- ☒ Bill Kidwell
- ☒ Dan Himick

DCCI:

- ☒ Jim Ronning
- ☒ Jack Geer (joined late)
- ☒ Ron Paz
- ☒ Bill Ritchie

Imbsen & Associates:

- ☒ Roy Imbsen
- ☒ Lance Schrey
- ☐ Dick LeBeau
- ☐ Ed Tyk
- ☐ Todd Lambert
- ☒ George Imbsen
- ☐ Ghassam Dini
- ☐ Sasan Soltani
- ☒ Majid Saraf
- ☐ Ray Imbsen

Others:

- ☒ Sam Hanna
- ☒ Moto Baba

Note: The boxes checked above designate attendance at the meeting.

FILE COPY 31

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc.	Date:	September 2, 2004
	9912 Business Park Drive Suite 130 Sacramento, CA 95827	Time:	10:00 a.m.- 01:00 p.m.

Minutes Prepared By: Lance A. Schrey of Imbsen & Associates, Inc.

Attendees List: See Attachment 1

Purpose

The purpose was to have all parties working on the project to meet to answer technical questions related to the East Tie-In Superstructure.

It is not the intent of these meeting minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees
Attachment 2 – Hydraulic Scheme (File copy only)
Attachment 3 – Caltrans comments on the East Tie-In Draft Design Criteria (File copy only)

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
B. Coupe	CC Myers
IAI Attendees	
IAI File 1295.310.01	

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

1. Jim handed out Hydraulic Scheme (attached) and talked about the procedure.
    a. The truss will be jacked to the As-built camber, taken from the original plans.
    b. All jacks will have equal load, but more displacement in the center then at the ends (every jacking point has the same load).
    c. John asked if members will be deactivated in one lane closure. Jim said yes.
    d. Members will be deactivated at time of least traffic. The jack valve will be closed at the point where the member is to be deactivated. Vertical members will be deactivated first.

2. Randy asked if chords to be cut. Majid said only the top.

3. Ali concerned about lateral stability.
    a. John said lateral resistance will need to be provided other than friction. Jim thinks this will only affect the top deck.
    b. Jim said at the Golden Gate when jacking 10% friction was used.
    c. Dan said there was something in the criteria for temporary structure.
    d. Jim said it would be 4-6 weeks to get to the North Truss from the South Truss.

4. Ali asked about the loads shown on the plans and if they will be removed. Jim said yes.

5. Jim said surveying will be done during jacking.

6. Dan asked about the differential displacements at Bent 53. Maximum at the North side and zero at the south side. Majid doubts this is a problem due to the flexible connections, but he will investigate.

7. John would like contingencies in the plans.

8. Jim said strain gages do not really help since it is uncertain how much load is in the member initially.

9. It was agreed to put the stage construction (with written description) on the plans.

10. Jim said the maximum load on the hydraulic components is 10,000 psi. He said the hoses that they will be using have a bursting capacity of 30,000 psi. He said all of the jacks will be new for this job.

11. Caltrans would like more clarification on the North truss removal. Bill said this will be part of the removal plans. IAI will provide more information regarding the North Truss removal in the stage construction of the plans.

12. Caltrans comments on the East Tie-In Draft Design Criteria (attached) were discussed:
    a. Comments 1D through 6D: These were answered in Jim's presentation.
    b. Comment 7D: This will be shown in the jacking plan.
    c. Comment 8D: Majid will investigate.
    d. Comment 10D: John said a strong rail is needed. Bill said to plan on standard anchorage. Caltrans to look into criteria.
    e. Comments 10D through 14D: More needs to be shown on the plans. The demo plans should have quantified numbers.

13. John would like to see a CCO for not meeting the balanced stiffness criteria.

14. Dan pointed out that IAI is not meeting the criteria in the East Tie-In, since it is not simply supported as in the case of the roll-out/roll-in span.

Attachment 1

MEETING ATTENDANCE SHEET

San Francisco – Oakland Bay Bridge
Temporary Bypass Structure

IAI Job # 1295 Contract # 04-0120R4

Date: 9-02-2004

Caltrans:

☐	Pete Siegenthaller	☐	Tom Ostrom	☐	Manode Kodsuntie
☐	Amer Bata	☒	Dan Adams	☐	Saba Mohan
☐	Ken Loncharich	☒	Ali Asnaashari	☒	Gary Lai
☒	John Walters	☒	Randy Bains	☐	Eric Watson

CC Myers:

- ☐ Bob Coupe
- ☒ Bill Kidwell

DCCI:

- ☒ Jim Ronning
- ☒ Jack Geer
- ☐ Ron Paz

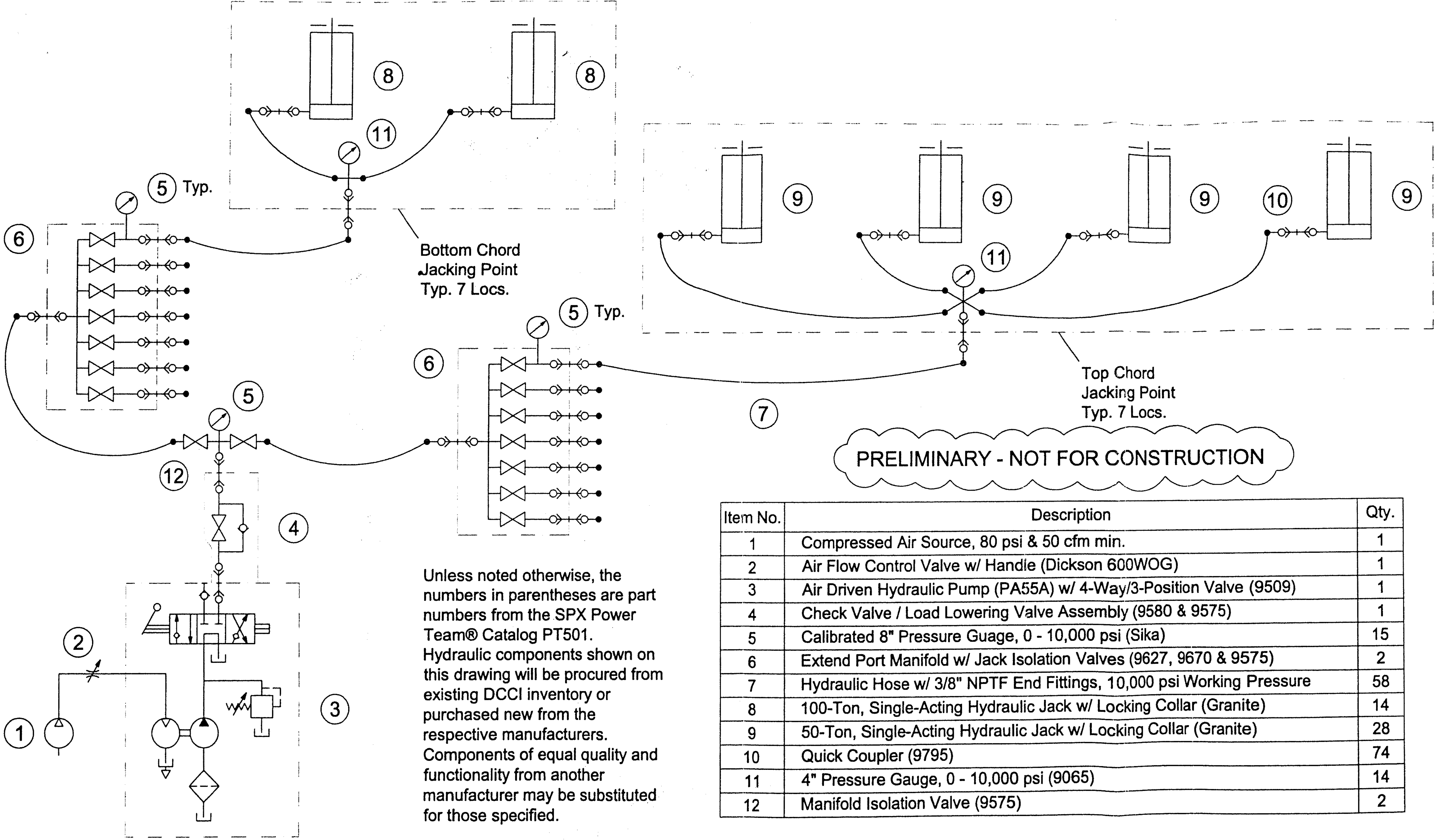
Imbsen & Associates:

☒	Roy Imbsen	☐	Jonathan Reina
☒	Lance Schrey	☐	Ghassam Dini
☐	Dick LeBeau	☐	Sasan Soltani
☐	Ed Tyk	☒	Majid Saraf
☐	Todd Lambert	☐	George Imbsen

Others:

☐ ☐

Note: The boxes checked above designate attendance at the meeting.



PRELIMINARY - NOT FOR CONSTRUCTION

Unless noted otherwise, the numbers in parentheses are part numbers from the SPX Power Team® Catalog PT501. Hydraulic components shown on this drawing will be procured from existing DCCI inventory or purchased new from the respective manufacturers. Components of equal quality and functionality from another manufacturer may be substituted for those specified.

Item No.	Description	Qty.
1	Compressed Air Source, 80 psi & 50 cfm min.	1
2	Air Flow Control Valve w/ Handle (Dickson 600WOG)	1
3	Air Driven Hydraulic Pump (PA55A) w/ 4-Way/3-Position Valve (9509)	1
4	Check Valve / Load Lowering Valve Assembly (9580 & 9575)	1
5	Calibrated 8" Pressure Guage, 0 - 10,000 psi (Sika)	15
6	Extend Port Manifold w/ Jack Isolation Valves (9627, 9670 & 9575)	2
7	Hydraulic Hose w/ 3/8" NPTF End Fittings, 10,000 psi Working Pressure	58
8	100-Ton, Single-Acting Hydraulic Jack w/ Locking Collar (Granite)	14
9	50-Ton, Single-Acting Hydraulic Jack w/ Locking Collar (Granite)	28
10	Quick Coupler (9795)	74
11	4" Pressure Gauge, 0 - 10,000 psi (9065)	14
12	Manifold Isolation Valve (9575)	2

ᵀ ιes M. Ronning, P.E.
6640 Galpin Boulevard
Excelsior, Minnesota 55331
Phone: 952 470 6399

Rev. 0: For Information 08/30/04

Danny's Construction Company, Inc.
1066 West Third Avenue
Shakopee, Minnesota 55379
Phone: 952 445 4143

SAN FRANCISCO OAKLAND BAY BRIDGE
EAST SPAN SEISMIC SAFETY PROJECT
CALTRANS BRIDGE NO. 34-0006 (TEMP)

EAST TIE-IN
SOUTH TRUSS
LOAD TRANSFER
HYDRAULIC SCHEMATIC

DRAWN JMR	CHECKED JMR
APPROVED JRC	DATE 08/30/04
DRAWING NO. 410.01 - HS - 1 REV. 0	

04-0120R4 Temporary Bypass

Review Comments on East Tie-In Draft Design Criteria dated June 23, 2004

Comment No.	Comment By	Section No.	Detail, View or elev	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
1D	SC	11.2	Stage 2 - Load Transfer of South Segment	Absolute structure displacement of 150mm (6") is too much. Do you mean 15mm?			
2D	SC	11.2	Stage 2 - Load Transfer of South Segment	Need details for redundant support system. Plates, Shims etc			
3D	SC	11.2	Stage 2 - Load Transfer of South Segment	Hoe is it verified that a zero force condition exists when the south truss is raised to the fabricated no-load camber?			
4D	SC	11.2	Stage 2 - Load Transfer of South Segment	During jacking operation, how would one measure and quantify that a zero force exists in a member? Is there a proposed method for monitoring stress/load in truss members?			
5D	SC	11.2	Stage 2 - Load Transfer of South Segment	Will jacking be applied simultaneously at points 1 thru 14?			
6D	SC	11.3	Stage 3 - Removal of Portions of South Truss	There's mention of a predetermined sequence for cutting members while being supported by mechanical jacks. Sequence to be determined by the Contractor's Engineer? Must be included as part of the plans. Is the upper chord or any potion of the upper chord to be removed?			
7D	SC	11.3	Stage 3 - Removal of Portions of South Truss	Will "lift-off" be performed at all locations after every cut? Who will determine what adjustments need to be made?			

04-0120R4 Temporary Bypass

Review Comments on East Tie-In Draft Design Criteria dated June 23, 2004

Comment No.	Comment By	Section No.	Detail, View or elev	COMMENT	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
8D	SC	11.3	Stage 3 - Removal of Portions of South Truss	What impacts to the North Truss load distribution are resultant from jacking at the South Truss?			
9D	SC	11.5	Stage 5 - Deck Closure Pour	It will be understood to match grade for closure pour. Should also mention that existing barrier is to be removed and that area ground or resurfaced?			
10D	SC	11.6	Stage 6 - Traffic Shift	Are there measures in place to place anchored Barrier Rail as opposed to temporary K-Rail?			
11D	SC	11.6	Stage 6 - Traffic Shift	In the traffic shift, how much load is to be transferred to support Girder E? Will there be some adjustments done (i.e. making connections from existing floor beam to Box 'E' to bent cap and such) to accomplish this? What portion of the live loading is expected to be transferred to Box E?			
12D	SC	11.7	Stage 7 - Placement of Upper Deck Support	There's mention of load transfer from upper deck to lower deck to Box E as being limited. Please quantify.			
13D	SC	11.7	Stage 7 - Placement of Upper Deck Support	Stating that steel posts will be installed by lightly jacking structure is inadequate. Please provide more details on jacking scheme.			
14D	SC	11.8	Stage 8 - Load Transfer at North Portion of Span and Demolition	More details required for North Truss and deck system removal.			

8/31/2004
SL #80 Attachment

BAY BRIDGE TEMPORARY BYPASS

SOUTH SOUTH DETOUR
PROJECT MEETING AGENDA
Thursday September 2, 2004

10:00 a.m.	Meeting Begin

Location:

Imbsen & Assoc. Inc.
9912 Business Park Drive Suite 130
Sacramento CA 95827

Agenda:

- Construction Staging/Jacking Operation – Jim Ronning
    - Displacements and Load Monitoring
    - Potential Lane Closure

- Criteria – General Discussion
    - Caltrans Review Comments

CCMYERS 9166359370 09/08 '04 14:45 NO.126 01/01

03 04 12:34p Caltrans 333 Burma Rd 1 510 286 0550 P.2

(32)

Attn: Leonard
949-753-5164

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

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

CC Myers
51 Macalla Road
San Francisco, CA 94130

Attn: Mr. Bob Coupe

September 03, 2004

Contract No. 04-0120R4
04-SF-80-12.6, 13.2
Temporary Bypass Structure

Letter No. 05.03.01-000106

Subject: Temporary Suspension of East & West Tie-In Construction

Dear Mr. Coupe,

In accordance with Section 8-1.05 "Temporary Suspension of Work" of the Standard Specifications, portions of the contract are temporarily suspended, effective September 2, 2004. All construction operations involving the East Tie-In, West Tie-In, and Bent 48, will be suspended until further notice. Additionally, k-rail placement, roadway restriping, and other traffic control operations scheduled for next week will also be suspended until further notice. However, clearing & grubbing and any utility relocation work may still proceed as planned.

During the temporary suspension, unaffected portions of work can still proceed in accordance with the contract plans and with the approval of the Engineer.

In accordance with Section 10-1.20 "Time Related Overhead," of the Special Provisions, the lump sum bid item for Time Related Overhead will be adjusted accordingly.

Compensation for delays resulting from this temporary suspension will be made in accordance with Section 8-1.09 Right of Way Delays of the Standard Specifications.

Determination of a commensurate time extension will be made in accordance with Section 8-1.07 Liquidated Damages of the Standard Specifications pending a time impact analysis.

Please provide a Schedule Revision (CPM) to show the effect of this change on the currently scheduled completion date.

Administrative procedures and open dialog will continue on the design process.

If you have any comments or questions, please contact me at (510) 622-5660 or Andrew Yan at (510) 286-0540.

Sincerely,

Resident Engineer
Ken Loncharich
cc: J.F. Walters,
A. Bata

"Caltrans improves mobility across California"

file:05.03.01

34

CC MYERS INC.

September 13, 2004

Document No.: 215-STL.00030

State of California
Department of Transportation
333 Burma Road
Oakland, CA 94607

Temporary Bypass Structure
Contract No. 04-0120R4
CCM Job # 215

Attn: Mr. Kenneth Loncharich
Resident Engineer

Re: East Tie-In Design Criteria

Dear Mr. Loncharich,

Our design subcontractor, Imbsen & Associates, Inc. and your design team have spent a considerable effort in developing a design criteria to be used for the East Tie-In. This has been a work in progress, and as of today, is still not complete. In doing this, Imbsen has had to redirect their resources from the design work to the development of this design criteria. As a result, costs have been incurred and valuable time spent working on the criteria, causing the design of the East Tie-In to be lagging.

Section 10-1.15 of the Special Provisions indicates that the contract plans contain criteria to enable the contractor to develop the design. This has proven to not be the case with the East Tie-In. As such, we request that you issue a Contract Change Order to compensate us for the costs and delays that have resulted from the development of the new East Tie-In design criteria.

Very Truly Yours,
C. C. MYERS, INC.

Robert W. Coupe
Project Manager

cc: MO
JG
DH

File: 215-101

P.O. Box 2948, Rancho Cordova, CA 95741 • 3286 Fitzgerald Rd., Rancho Cordova, CA 95742 • 916•635•9370 • Fax 916•635•1527

35

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

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

CC Myers
51 Macalla Road
San Francisco, CA 94130

Attn: Mr. Bob Coupe

RECEIVED

SEP 3 0 2004

CC MYERS, INC.
JOB 215 TEMP BYPASS STRUCTURE
IC-762
215-103
IMBSEM

September 30, 2004

Contract No. 04-0120R4
04-SF-80-12.6, 13.2
Temporary Bypass Structure

Letter No. 05.03.01-000137

Subject: East Tie-In Design Criteria

Dear Mr. Coupe,

This Office has received and reviewed your request for additional compensation for the development of design criteria for the East Tie-In design selected by your team. The Department has comments in regards to this request.

Section 10-1.15, Paragraph 3 "General" states that the TBS is shown schematically on the plans with the required design criteria to enable the Contractor to develop the design. There is sufficient information provided to complete a design at the East Tie-In following the requirements for a simply-supported double deck span. CC Myers/ IAI, however, has chosen to deviate from this specification to a more complex continuous span with an intermediate bent. In choosing this design, CCM/IAI has increased the overall complexity of the work, which now must be supplemented by additional design criteria not already included in the contract plans and specifications.

CC Myers/ IAI has chosen a design different from one that could be generated using the information provided by the Contract plans and specifications. As such, the additional costs for generating new design criteria shall be borne solely by CCMyers/IAI.

The State will only process a no cost change order, initiated by CCMyers, to allow for the deviation from the Contract Plan and Specification design criteria.

Sincerely,

Gary Lai
for

Resident Engineer
Lourdes David

cc: DAdams,ABata,ERufino
file: 05.03.01

FILE COPY (36)

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc.	Date:	October 5, 2004
	9912 Business Park Drive Suite 130 Sacramento, CA 95827	Time:	09:00 a.m.- 12:00 p.m.

Minutes Prepared By: Lance A. Schrey of Imbsen & Associates, Inc.

Attendees List: See Attachment 1

Purpose

The purpose was to discuss critical issues for the TBS project.

It is not the intent of these meeting minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees
Attachment 2 – SSD Criteria Issues Handout (file copy only)
Attachment 3 – Photo's of facilitator sketches

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
B. Coupe	CC Myers
IAI Attendees	
IAI File 1295.310.01	

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

1. Judith MacBrian (Caltrans) facilitated the meeting.

2. Dan H. would like to get all issues out on the table and get a time-frame on the design to get steel released for fabrication.

3. Judith asked for the key issues for the meeting:
   a. Roy said the Design Criteria for the East Tie-In and Capacity Protection at Bent 53.
   b. Pete said he wanted a seamless design between the segments.
   c. Dan A. said that the TBS – Viaduct design appears to be in accordance with the Criteria.
   d. Roy said wind loading at Bent 48B.
   e. Roy said the foundation redesign of Bent 52L. Dan H. requested that this issue is scratched, since it is already a Contract Change Order (CCO).
   f. Roy said design of SSL "A" of the West Tie-In and the response of Pier E-1.
   g. Tom said the Erection Plan for the West Tie-In and the East Tie-In.

4. The Design Criteria issue for the East Tie-In (ETI) was discussed.
   a. Roy presented a flow chart showing a section, which IAI is now in, with the ongoing Design Criteria Development that was not originally anticipated.
   b. Roy stated that the Seismic Design Criteria shown in the Contract Plans is not consistent with the contract to build the structure proposed by CC Myers and IAI.
   c. Roy explained that alternatives were encouraged, that multispans were allowed and that nowhere in the Contract Plans or Special Provisions did it require a separate criteria for the ETI.
   d. Tom stated the following locations where the design does not meet the ETI criteria.
      i. The connection to Pier E-1 with a safety factor of 3.0.
      ii. The period requirement between Bent 52 and Bent 53.
      iii. The articulation of the Viaduct and the ETI (section 4.2)
   e. Tom said it is common for a complicated structure for the criteria and the design to be completed at the same time.
   f. Pete said when the ETI Criteria is completed it would be a CCO.
   g. Tom said to get his concurrence the state would have to see the design plans, the calculations and the final criteria.

h. Ray pointed out that the development of the ETI Design Criteria had both cost and schedule implications as part of the CCO.
i. A discussion ensued regarding if the criteria was required by the contract.
j. Roy suggested a performance based criteria that met the seismic hazard could be very simple.
k. Tom handed out a list entitled "SSD Criteria Issues" (attached), which stated what they would like to see incorporated in the plans.
l. Roy presented the Bent stiffnesses and showed how they do meet the criteria.
m. Tom said the State wants to see the failure mechanism. Roy said that the criteria only says to go to DLS. Dan A. said they would waive the capacity protection requirement if the failure mechanisms were to be shown. Roy explained that this would be difficult and less reliable.

BREAK

5. Regarding the ETI Design Criteria, Dan H. asked Caltrans to define what they want and CC Myers will come up with the cost and if necessary go to the Dispute Review Board.

6. Dan A. stated the Caltrans would like to see Bent Caps for the Viaduct. Dan H. said if Caltrans pays for it that they can have Bent Caps for the Viaduct. It was then decided to explore the option of placing Bent Caps on the Viaduct Bents with Dan H. and Pete to work out the contractual issues for this at a later date.

7. It was also decided to explore the option of a balanced load path for the ETI.

8. Tom asked for results regarding the factor of safety of 3.0 at Pier E-1.

9. Pete said given the unresolved criteria issues, he did not think anything should be fabricated yet.

10. With the rejection of the Signature Span Bid, Caltrans called a meeting on October 1, 2004, to discuss how to proceed with the project. Six alternatives were discussed. Caltrans wanted costs and schedule impact information from CC Myers for each alternative to help with their decision. At this meeting it was reaffirmed that CC Myers is to get costs for the different alternatives to Caltrans by October 18, 2004.

11. Roy said he would get preliminary information for placing the Caps on the Viaduct Bents by Friday October 8th.

12. Tom said the biggest distress the existing structure would see is at load transfer. Dan H. said they would get the ETI Erection Plan to IAI by early next week.

13. Roy stated again that the Seismic Design Criteria shown in the Contract Plans is not consistent with the contract.

Attachment 1

MEETING ATTENDANCE SHEET

San Francisco – Oakland Bay Bridge
Temporary Bypass Structure

IAI Job # 1295   Contract # 04-0120R4

Date: 10-05-2004

Caltrans:

- ☒ Pete Siegenthaller
- ☒ Amer Bata
- ☐ Ken Loncharich
- ☐ John Walters
- ☐ John Uozumi
- ☒ Tom Ostrom
- ☒ Dan Adams
- ☐ Ali Asnaashari
- ☐ Randy Bains
- ☐ Chris Lee
- ☒ Judith MacBrian
- ☐ Saba Mohan
- ☒ Gary Lai
- ☒ Lourdes David
- ☐ Eric Watson

CC Myers:

- ☒ Bob Coupe
- ☒ Bill Kidwell
- ☒ Juan Gray
- ☒ Dan Himick

DCCI:

- ☐ Jim Ronning
- ☐ Jack Geer

Imbsen & Associates:

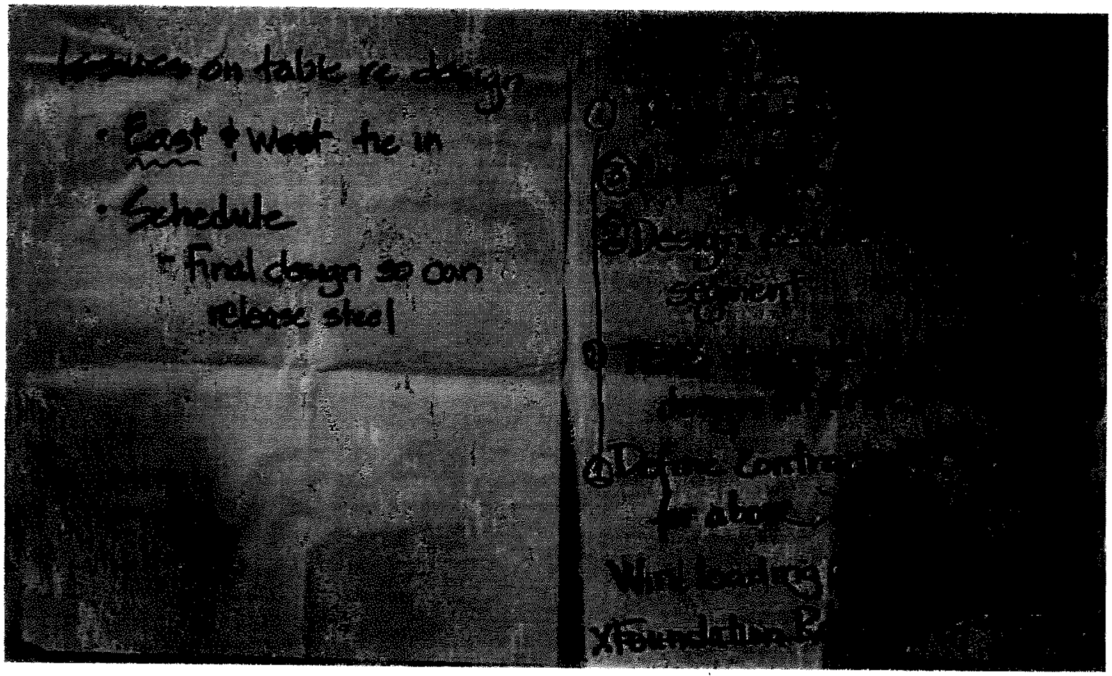
- ☒ Roy Imbsen
- ☒ Lance Schrey
- ☒ Mark Imbriani
- ☐ Ed Tyk
- ☒ Todd Lambert
- ☐ James Gomez
- ☐ Ghassam Dini
- ☐ Sasan Soltani
- ☒ Majid Saraf
- ☒ Ray Imbsen

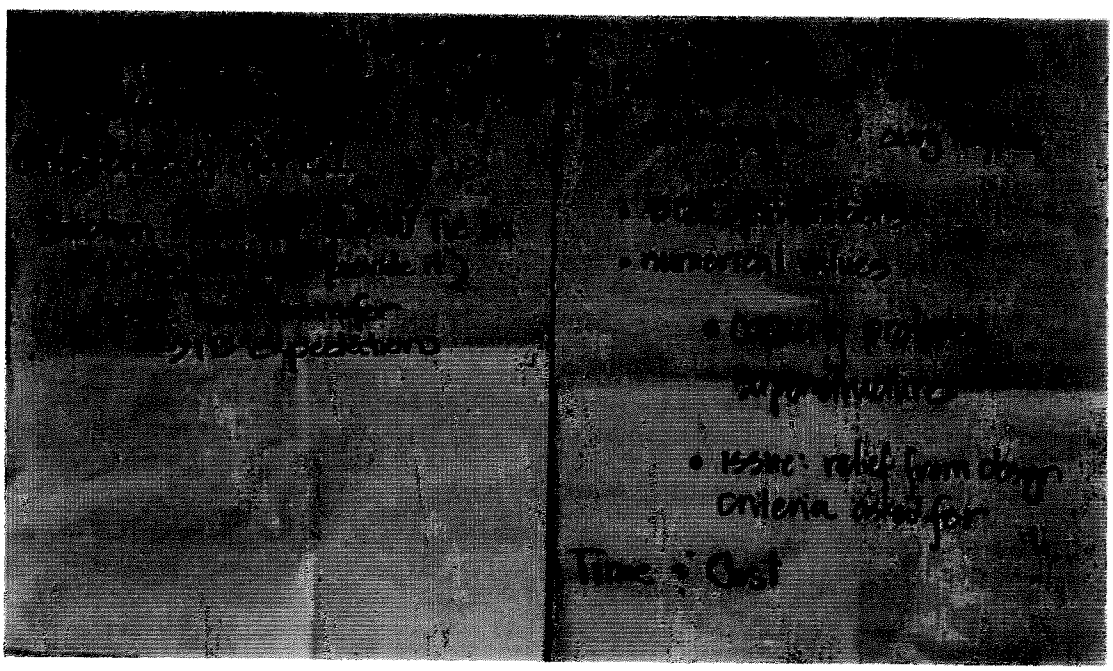
Others:

- ☐
- ☐

Note: The boxes checked above designate attendance at the meeting.

Attachment 3





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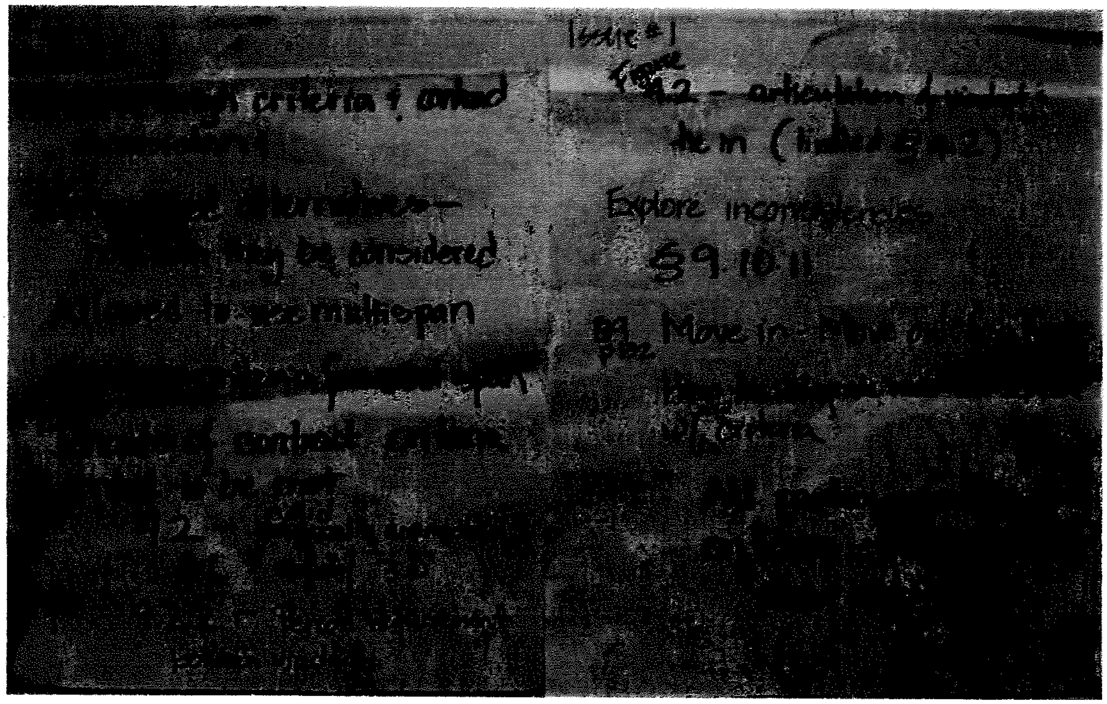

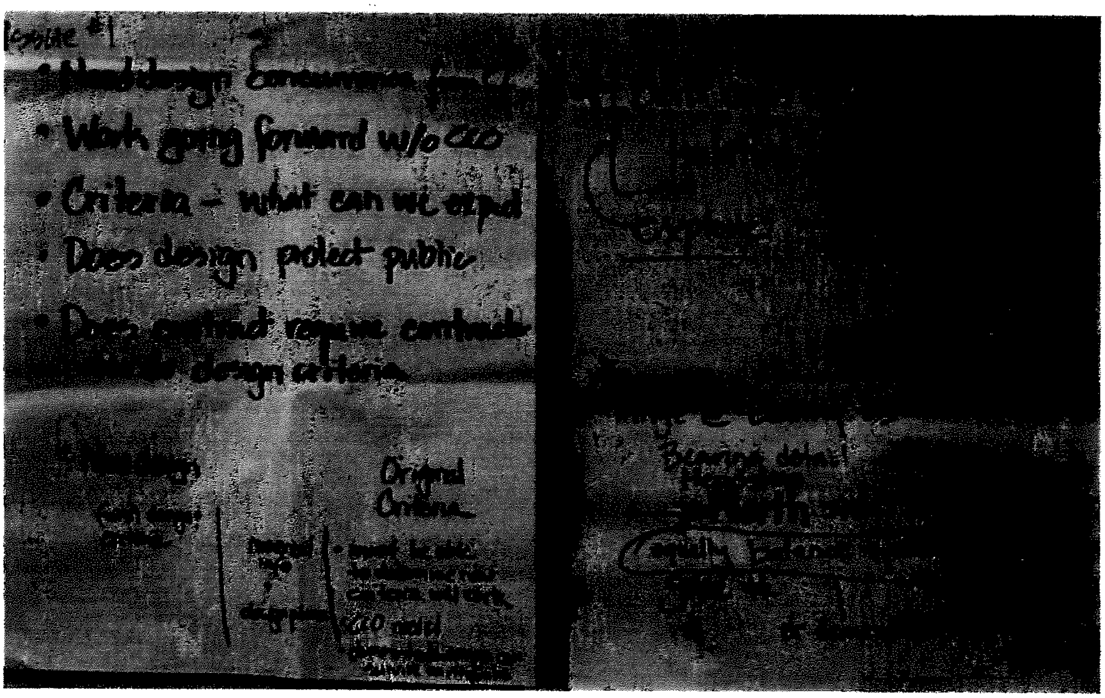

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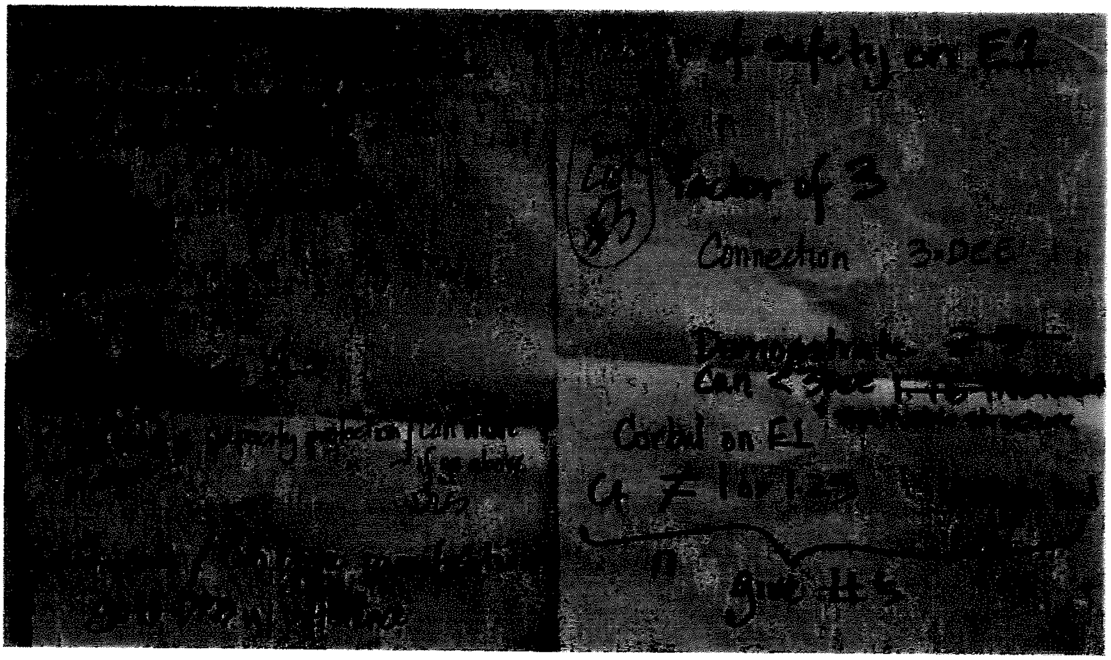
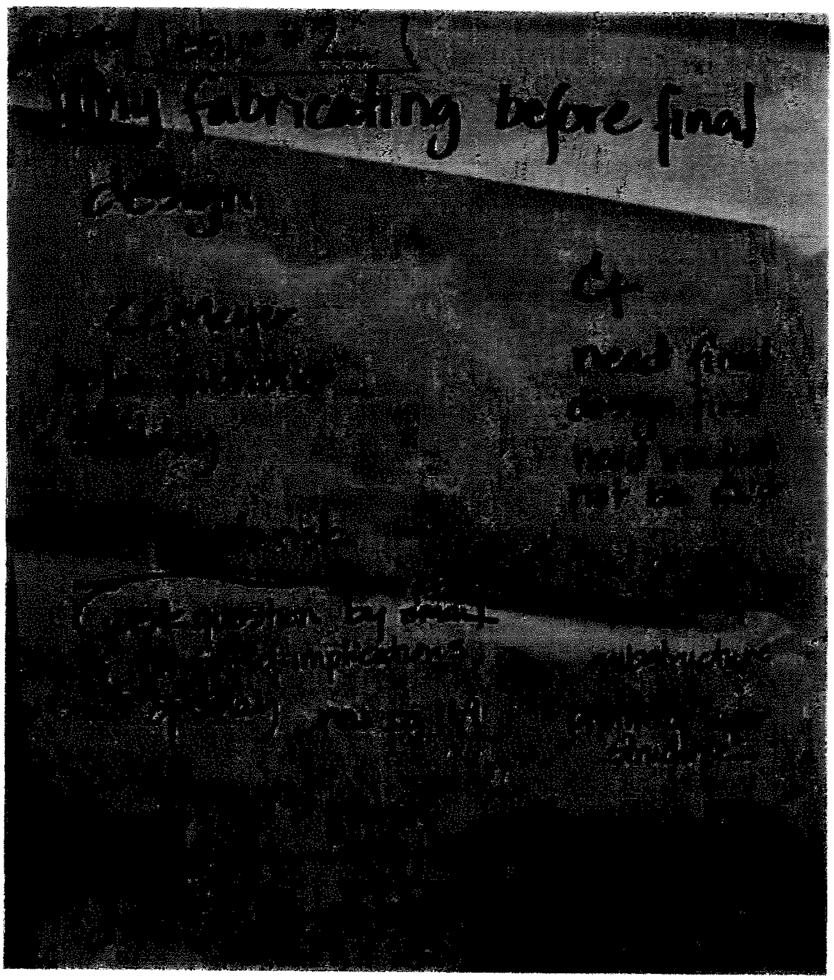
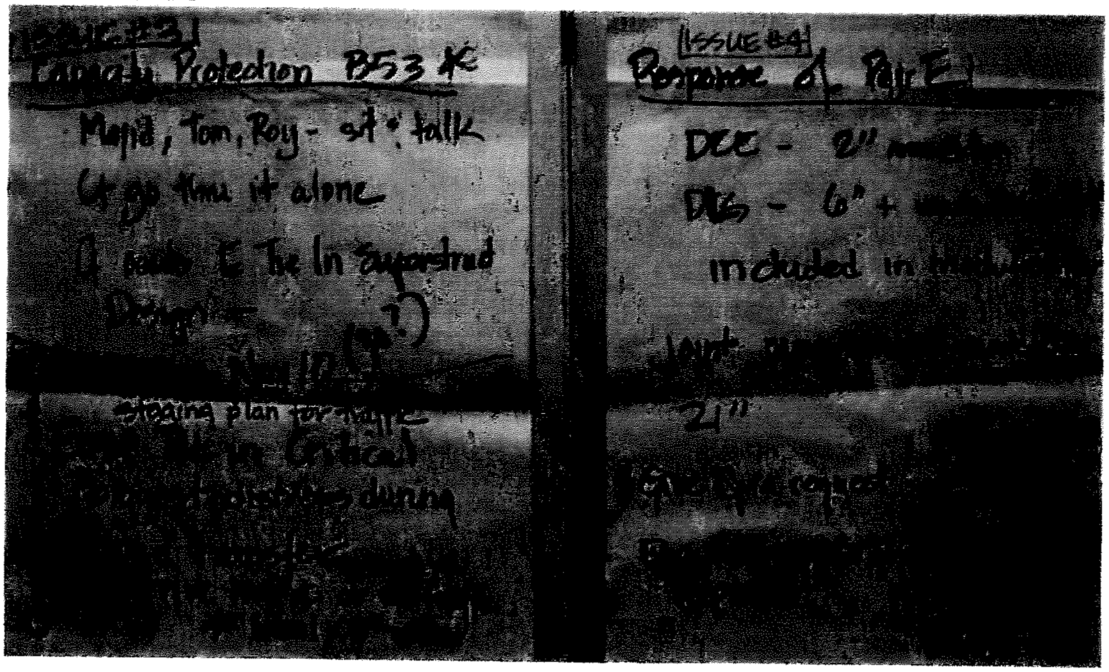




Attachment 3



SSD Criteria Issues
October 5th 2004
Tom Ostrom

ıst Tie In:

1. Traffic Barriers shall meet NCHRP Report 350 level 4 design/testing.

2. Akin to 4.2 "Segments and Articulation" for Viaduct. Irregularities in geometry, mass distribution and structural stiffness shall be avoided wherever possible. Balanced stiffness and mass distribution shall be the design objective. Provide:

    A longitudinal and transverse load path on the north side that does not require diaphragm action through the upper and lower decks to transfer lateral loads to the south side moment resisting frame.

    Balanced mass and stiffness between upper deck and lower deck longitudinal load paths and the bearings at E1, B53 & the viaduct hinge.

    Satisfy the last paragraph of 4.7.1 "Structural Fuses" by verifying that the structure remains capacity protected beyond the DLS or determine the failure mechanism for the entire structural system.

3. Satisfy 4.2 "Segments and Articulation" East Tie-In: The connection to E-1 shall be designed with a factor of Safety of not less than 3.

4. Satisfy 4.4.1 analysis techniques should be appropriate…

    Integrated design and erection scheme.

    Zero out the loads in the north truss prior to load transfer.

    Provide analysis verifying the load path for each stage of the load transfer including lateral and longitudinal response of the entire ETI frame considering YB4 & YB3 spans.

    Stay within the .65% maximum drift ratio specified in 4.3.5 during load transfer.

    Maximum vertical deflection of the box beams during load transfer not to exceed 10 mm akin to 11.2 " Roll/skid-in Transfer Beam Vertical Stiffness"

    The load transfer system shall have provisions for adjustment in the lateral and vertical directions.

    A written procedure for all mechanical and structural details, jacking control, manifold arrangements, calibrations procedures, fail-safe control system, proof testing, and rehearsal.

    Continuous automatic monitoring.

    Risk management plan identifying all major risks associated with the load transfer operation and a contingency plan to mitigate the risks.

Viaduct:

- Structural System

  Conform to Figure 4.2 Option A or Option B and 4.2 "Segments and Articulation" for the Viaduct
  Conform to 4.21 Balanced Stiffness
  Conform to 4.2.2 Balanced Geometry-Viaduct Segment

  Or

  Provide bent caps at Bents 49, 50, 51 and 52 and satisfy the last paragraph of 4.7.1 "Structural Fuses" by verifying that the structure remains capacity protected beyond the DLS or determine the failure mechanism for the entire structural system.

West Tie In:

1. 4.2.3 "Adjusting Dynamic Characteristics-West Tie-In" Local Ductility Demand/Capacity check of SSL A must be consistent with accepted industry practice regarding flexural and shear elements.

2. 8.6.3 Monitoring of existing Post Tensioning System.

3. Mutually agreed upon NDT of the existing YBI viaduct post tensioning rods.

   Robust SSL C design. Full fixity through all components.

5. 8.6.3 Mutually agreed upon NDT of the existing YBI viaduct post tensioning rods.

6. 8.7.2 Jacking Supports at SSL A, B, and C.

7. 8.8 Deflection Monitoring.

37

CC MYERS INC.

October 07, 2004

Document No.: 215-STL.00044

State of California
Department of Transportation
333 Burma Road
Oakland, CA 94607

Temporary Bypass Structure
Contract No. 04-0120R4
CCM Job # 215

Attn: Mr. Lourdes David
Resident Engineer

Re: East Tie-In Design Criteria

Dear Mr. David,

We are in receipt of your letter 137 regarding the above noted matter. In your letter, you state that you will be issuing a no cost change order to allow for the deviation of the contract to allow the implementation of our East Tie-In design concept. We do not believe that this is necessary. The reason for this is that the project specifications allow for the East Tie-In design to be something other than the roll out/roll in concept that was envisioned by the State in the contract. You also quote the portion of Section 10-1.15 of the Special Provisions that specifies that the design criteria shown on the plans is sufficient for the Contractor to develop the design. This clause contradicts the other portions of the specifications that allow us to use an alternate design. In essence, the contract allows for alternative design concepts, but the design criteria is only applicable to a simply supported double deck span.

Also in your letter, you indicate that our chosen design is more complex and must be supplemented with additional design criteria not already included in the contract plans and specifications. We acknowledge this and have spent a considerable effort to date in developing this additional criteria. Your statement that we have deviated from the specifications in producing a more complex design is not valid. The specifications do allow us to produce a more complex design. They do not, however, require that we develop and additional criteria from that shown in the plans to supplement it, as you suggest.

It is for the above discussed reasons that in our letter 215-STL.00030, we requested the issuance of a Contract Change Order to cover the cost of and time for the development of the design criteria to supplement the criteria shown in the plans. We again re-iterate that request. In the mean time however, based on the discussions and conclusions reached in our meeting with you on October 5, 2004, we are forwarding to you on behalf of our designer, Imbsen & Associates, Inc., a Notice of Potential Claim regarding this matter. Please find this notice attached.

As stated in the Notice of Potential Claim from Imbsen, all parties agree that the new East Tie-In design criteria will be an ongoing effort through completion of the final design. As such, we are not able to ascertain what impact this new criteria will have on the cost and time for construction. We

P.O. Box 2948, Rancho Cordova, CA 95741 • 3286 Fitzgerald Rd., Rancho Cordova, CA 95742 • 916•635•9370 • Fax 916•635•1527

therefore, intend to further evaluate the matter once the criteria is complete and we reserve our right to make an additional request for a Contract Change Order to cover the cost and time required for implementing those aspects of the new design criteria that deviate from the current contract requirements.

Very Truly Yours,
C. C. MYERS, INC.

Robert W. Coupe
Project Manager

cc: BK, MO, JG, DH

File: 215-101, 215-9903

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION

NOTICE OF POTENTIAL CLAIM

CEM-6201A (NEW 9/2002)

FOR STATE USE ONLY		
Received by:	(For Resident Engineer)	Date:

To	CONTRACT NUMBER	DATE	IDENTIFICATION NUMBER
Lourdes David (resident engineer)	04-0120R4	10/7/04	3

This is an Initial Notice of Potential Claim for additional compensation submitted as required under the provisions of Section 9-1.04 "Notice of Potential Claim" of the Standard Specifications. The act of the Engineer, or his/her failure to act, or the event, thing, occurrence, or other cause giving rise to the potential claim occurred on:

DATE: 10/5/04

The particular nature and circumstances of this potential claim are described as follows:

The Caltrans Design Criteria as included in the Contract Plans and Special Provisions is not in conformance with the Contract between Caltrans and C.C. Myers. Caltrans encouraged potential bidders to submit alternatives to the roll-out/roll-in that they envisioned. Caltrans did not contractually require C.C. Myers to provide for a new design criteria for the alternative prior to accepting or as a condition for accepting the bid. This is a change to the contract for both cost and schedule.

Caltrans and IAI agree that the new East Tie-In design criteria needs to be an ongoing effort through the completion of the final design. This added requirement by Caltrans has a significant impact on our design cost and schedule. The nature of the costs incurred includes design time and costs.

(attach additional sheets as needed)

The undersigned originator (Contractor or Subcontractor as appropriate) certifies that the above statements and attached documents are made in full cognizance of the California False Claims Act, Government Code Sections 12650-12655. The undersigned further understands and agrees that this potential claim to be further considered, unless resolved, must fully conform to the requirements in Section 9-1.04 of the Standard Specifications and must be restated as a claim in the Contractors written statement of claims in conformance with Section 9-1.07B of the Standard Specifications.

Imbsen & Associates, Inc.

SUBCONTRACTOR or CONTRACTOR

(Circle One)

(Authorized Representative)

For subcontractor notice of potential claim

This notice of potential claim in knowledged and forwarded by

CC MYERS INC

PRIME CONTRACTOR

(Authorized Representative)

ADA Notice — For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814

NOPC East Tie-in Criteria 10-06-04.doc

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
NOTICE OF POTENTIAL CLAIM
CEM-6201A (NEW 9/2002)

FOR STATE USE ONLY		
Received by:	(For Resident Engineer)	Date:

38

To	CONTRACT NUMBER	DATE	IDENTIFICATION NUMBER
Lourdes David (resident engineer)	**04-0120R4**	**10/7/04**	**3**

This is an Initial Notice of Potential Claim for additional compensation submitted as required under the provisions of Section 9-1.04 "Notice of Potential Claim" of the Standard Specifications. The act of the Engineer, or his/her failure to act, or the event, thing, occurrence, or other cause giving rise to the potential claim occurred on:

DATE: 10/5/04

The particular nature and circumstances of this potential claim are described as follows:

The Caltrans Design Criteria as included in the Contract Plans and Special Provisions is not in conformance with the Contract between Caltrans and C.C. Myers. Caltrans encouraged potential bidders to submit alternatives to the roll-out/roll-in that they envisioned. Caltrans did not contractually require C.C. Myers to provide for a new design criteria for the alternative prior to accepting or as a condition for accepting the bid. This is a change to the contract for both cost and schedule.

Caltrans and IAI agree that the new East Tie-In design criteria needs to be an ongoing effort through the completion of the final design. This added requirement by Caltrans has a significant impact on our design cost and schedule. The nature of the costs incurred includes design time and costs.

(attach additional sheets as needed)

The undersigned originator (Contractor or Subcontractor as appropriate) certifies that the above statements and attached documents are made in full cognizance of the California False Claims Act, Government Code Sections 12650-12655. The undersigned further understands and agrees that this potential claim to be further considered, unless resolved, must fully conform to the requirements in Section 9-1.04 of the Standard Specifications and must be restated as a claim in the Contractors written statement of claims in conformance with Section 9-1.07B of the Standard Specifications.

Imbsen & Associates, Inc.

SUBCONTRACTOR or CONTRACTOR

(Circle One)

(Authorized Representative)

For subcontractor notice of potential claim

This notice of potential claim in knowledged and forwarded by

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(Authorized Representative)

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(39)

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

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

RECEIVED
OCT 14 2004
CC MYERS, INC.
JOB 215 TEMP BYPASS STRUCTURE

October 13, 2004

CC Myers
51 Macalla Road
San Francisco, CA 94130

Attn: Mr. Bob Coupe

Contract No. 04-0120R4
04-SF-80-12.6, 13.2
Temporary Bypass Structure

Letter No. 05.03.01-000156
IC-818
215-103
215-990 3
IMBSEN - FAX

Subject: NOPC No. 3

Reference: 215-STL.00044

Dear Mr. Coupe,

The Department has received your Notice of Potential Claim No. 3 on October 8, 2004 regarding the East Tie-In Criteria. Additional information is needed prior to making a determination of merit.

You are reminded of Section 9-1.04, Notice of Potential Claim, of the Special Provisions that within 15 days of submitting the initial notice of potential claim, you are required to provide a signed supplemental notice of potential claim that provides, among others, the following information:

1) The estimated cost of the potential claim, including an itemized breakdown of individual costs and how the estimate was determined.
2) A time impact analysis of the project schedule.

If the estimated cost or the effect on the scheduled completion date changes after you have submitted your supplemental notice, you shall then update this information as soon as the change is recognized and submit it to the Engineer.

If you have any comments or questions, please contact me at (510) 622-5660.

Sincerely,

Lourdes David

Lourdes David
Resident Engineer

cc: G. Lai

file: 05.03.01

FILE COPY 40

SOUTH/SOUTH DETOUR PROJECT 1295

DESIGN MEETING MINUTES

Location:	Imbsen & Assoc. Inc.	Date:	October 15, 2004
	9912 Business Park Drive Suite 130 Sacramento, CA 95827	Time:	08:00 a.m.- 11:30 p.m.

Minutes Prepared By: Lance A. Schrey of Imbsen & Associates, Inc.

Attendees List: See Attachment 1

Purpose

The purpose was to have all parties working on the project to meet to answer technical questions related to the East Tie-In Superstructure erection.

It is not the intent of these meeting minutes to change the contract in any way.

Attachments

Attachment 1 – Attendees
Attachment 2 – Draft – South Truss Load Transfer & Deactivation Procedure (file copy only)
Attachment 3 – East Tie-In South Truss Load Transfer Hydraulic Schematic (file copy only)

Distribution List

Dan Adams	Caltrans (to distribute to Caltrans)
J. Ronning	DCCI (to distribute to DCCI)
B. Coupe	CC Myers
IAI Attendees	
IAI File 1295.310.01	

Meeting Notes

The following is a summary of pertinent issues, which were addressed at the meeting:

1. Jim handed out "Draft – South Truss Load Transfer & Deactivation Procedure" (attached) and "East Tie-In South Truss Load Transfer Hydraulic Schematic" (attached).

2. Jim said that due to the fact when jacking on the South Truss, some of the force goes to the North Truss, that the deactivation of the truss will become more of a force based operation instead of displacement base as previously assumed.

3. Majid said the connection of the Floor Beam to the Box Beam will not be loosened and retightened.

4. Tom asked about a contingency plan if the existing structure has bad rivets or excessive rust. Jim said that DCCI is experienced in retrofitting and if this occurred they would put together the required retrofit solution.

5. Jack asked about earlier retrofit that Caltrans had worked on (the contract was never advertised). Tom said he would try to get that for DCCI.

6. Jim went through handouts:

    a. He said one man per every two jacks.
    b. He said they would utilize locking collars allowing no more then ¼" to ½" gap.
    c. He said there was an error in the handout that # 9 on page 3 should be 50% not 100%.
    d. Tom suggested when deactivating that full closures are available and the operation might be more precise utilizing them (assuming the district approves of them).
    e. Jim and Majid feel they can predict forces more accurately than displacements.
    f. Juan said the Floor Beams will act as a brace for out of plane bending.
    g. Ali asked if the only time you can tell the load in a member is when it is cut. Jim concurred.
    h. Tom said he will want visual inspection before and after each load transfer operation. Tom suggested a photo survey.

i. Dan feels since CC Myers wants to utilize the existing truss, if there are anomalies with the existing structure then they should fix them.

7. Tom said they were originally looking at two years for the TBS and now they are looking at five years.

8. Tom thinks we need to know now how the existing structure behaves under Live Load so we can compare with how the new ETI reacts.

9. Tom has concerns if the existing deck is going to act composite. Majid presented new detail (recently discovered) w/ rebar welded to the top of the existing stringers, which would make it composite.

10. Tom said since CC Myers chose to use the existing structure they that they are responsible for the structural integrity of the structure.

11. Tom wants the structure to end up in the same position in space that it starts out in. They need to know the three-dimensional location of the North Truss so they can tell where it ends up in case of load redistribution to floor beams etc. Jim said that DCCI could come out the following night and get the structure back to its original position.

12. Jim said they are looking at doing all of the load transfer work while the roadway is open to traffic one lane in each direction.

13. Dan asked about jacking up both the North Truss and the South Truss at the same time. Jim said it was considered to be too expensive.

14. Jim said up until the time they start cutting a member they can get the truss back to its original position. Tom would like to see a contingency plan. Ali would like to see contingency plan for lateral movement. Jim will submit to Caltrans a flow chart with decision points.

15. Jim discussed the North Truss transfer:

    a. First the upper deck north of the cut line will be removed.
    b. Place the new braced wall.
    c. Remove the bottom deck outside the limit. Demolition contractor to cut along edge first then break.
    d. Remove the three most eastern floor beams.
    e. Put hinges in the remaining Floor Beams (upper and lower) from east to west by deactivating flanges.

16. Tom asked about lead based paint and the need to verify the restrictions.

17. Tom asked for schedule. Jim said it would be submitted with the final design.

18. Jim expressed his desire to not use pressure gage calibration. He would like to order calibrated gages with calibrated curves. He feels his stated load will be within 2%-3% of actual load. Tom suggested an RFI should be submitted to Caltrans.

Attachment 1

MEETING ATTENDANCE SHEET

San Francisco – Oakland Bay Bridge
Temporary Bypass Structure

IAI Job # 1295 Contract # 04-0120R4

Date: 10-15-2004

Caltrans:

☐	Pete Siegenthaller	☒	Tom Ostrom	☒	Erwin Rufino
☐	Amer Bata	☒	Dan Adams	☐	Saba Mohan
☐	Ken Loncharich	☒	Ali Asnaashari	☒	Gary Lai
☐	John Walters	☒	Randy Bains	☐	Lourdes David
☐	John Uozumi	☐	Chris Lee	☐	Eric Watson

CC Myers:

☐ Bob Coupe
☐ Bill Kidwell
☒ Juan Gray
☐ Dan Himick

DCCI:

☒ Jim Ronning
☒ Jack Geer

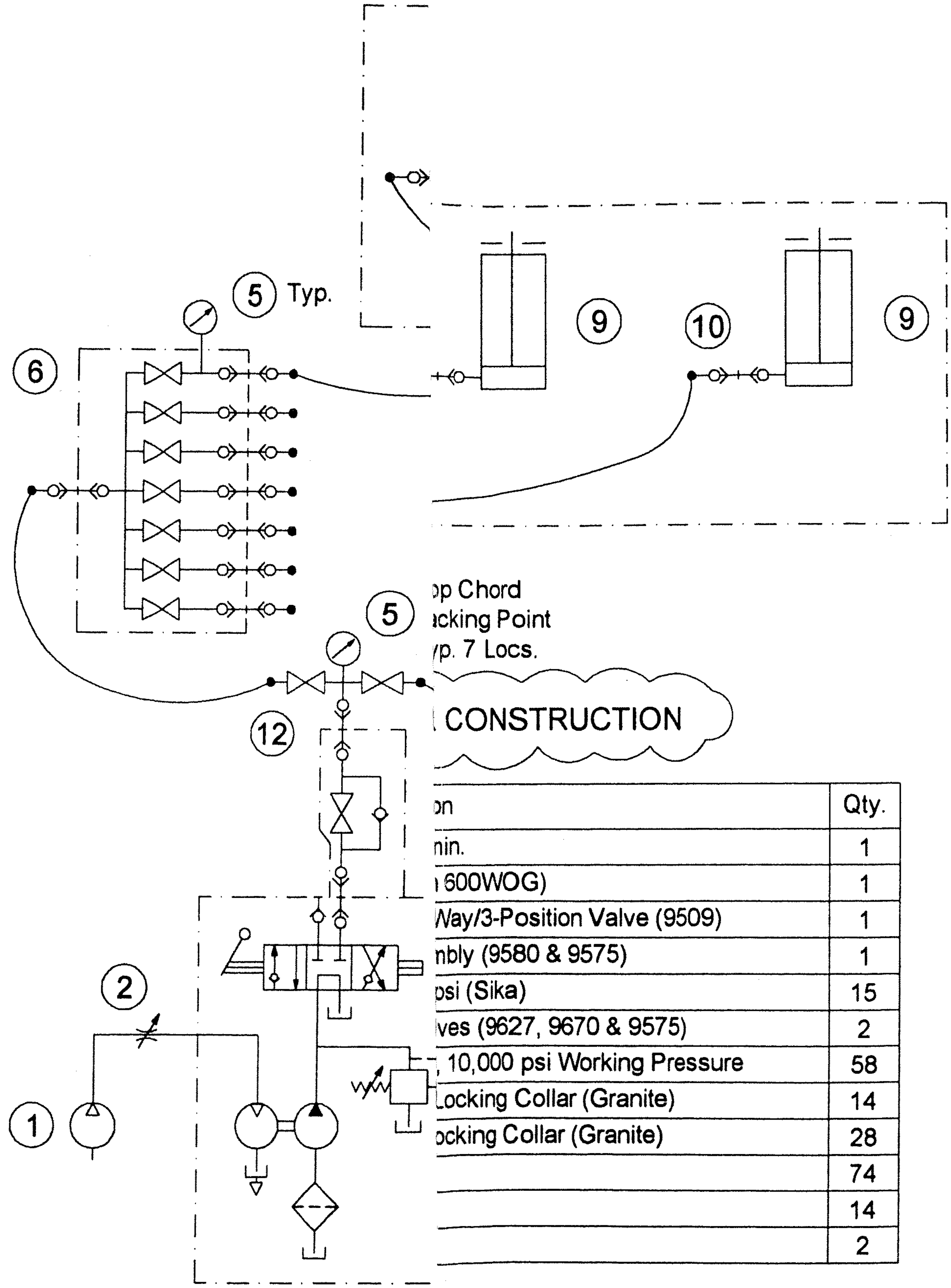
Imbsen & Associates:

☐	Roy Imbsen	☐	James Gomez
☒	Lance Schrey	☐	Ghassam Dini
☒	Mark Imbriani	☐	Sasan Soltani
☐	Ed Tyk	☒	Majid Saraf
☐	Todd Lambert	☐	Ray Imbsen

Others:

☐ ☐

Note: The boxes checked above designate attendance at the meeting.



on	Qty.
nin.	1
600WOG)	1
Way/3-Position Valve (9509)	1
nbly (9580 & 9575)	1
psi (Sika)	15
ves (9627, 9670 & 9575)	2
, 10,000 psi Working Pressure	58
Locking Collar (Granite)	14
ocking Collar (Granite)	28
	74
	14
	2

James M. Ronning, P.E.
6640 Galpin Boulevard
Excelsior, Minnesota 55331
Phone: 952 470 6399

Rev. 0: For Infor

EAST TIE-IN
SOUTH TRUSS
LOAD TRANSFER
HYDRAULIC SCHEMATIC

DRAWN	CHECKED
JMR	JMR
APPROVED	DATE
JRC	08/30/04

DRAWING NO.
410.01 - HS - 1
REV. 0

DRAFT

San Francisco Oakland Bay Bridge
East Span Seismic Safety Project
Caltrans Bridge No. 34-0006 (Temp)
East Tie-In (ETI)
South Truss Load Transfer & Deactivation Procedure
Danny's Construction Company, Inc. (DCCI)
James M. Ronning, P.E.
Rev. 2: October 14, 2004

Pertinent Plans & Specifications

General references to Imbsen & Associates (IAI) East Tie-In Plan Sheets 1 thru 59 of 59 (Plan Sheets) and IAI Design Criteria for the Temporary East Tie-In Bypass Structure (ETI) (The Criteria) are included as such in this procedure. Of particular relevance are the IAI Staging Plans (Sheets 5 thru 10 of 59), Jacking Location Plan (Sheet 17 of 59) and Jacking Details (Sheets 18 thru 21). Project specifications, especially those pertaining to the control and maintenance of traffic, shall apply at all times during the implementation of this procedure.

Objective

The objective of this procedure is to prescribe the activities required to (1) transfer the existing Span YB4 tributary loads at the south truss to hydraulic jacks at the support points of the new ETI structural system, (2) deactivate (cut) and remove the necessary members of the south truss, (3) adjust the elevations of the jacking points to attain the desired roadway profile, and (4) transfer the jacking loads to permanent bearings at the new support points. These activities are shown as Stages 2 & 3 of The Criteria.

The load transfer and demolition for the northerly part of Span YB4 are covered in a separate document titled, North Truss Load Transfer & Demolition Procedure.

Predecessor Activities

It is assumed that the Viaduct Spans 50, 51 and the Span 52 Cantilever are constructed and ready to receive the new ETI structural system. The new ETI structural system including concrete decks shall be constructed as much as possible while maintaining clearances to the existing Span YB4 for live load deflections (Ref:

Figure 11.1: "Stage 1 – Construction of South Segment Prior to Connection" of The Criteria) (Note: The Criteria shall be revised to include the construction of Box Girder E and the Anchorage Bracing (Ref: Plan Sheets 24 & 33 of 59)). Access walkways and platforms and fall projection systems shall be installed prior to the commencement of jacking operations. Survey monitoring equipment shall be placed according to the procedure, Geometry Monitoring during Load Transfer & Deactivation (to be developed). Hydraulic jacks are placed but not engaged.

Jacking System & Personnel

The jacking system is shown on DCCI Drawing Number 410.01-HS-1, East Tie-In South Truss Load Transfer Hydraulic Schematic. The hydraulic pump and manifolds will be placed on the new lower deck. Hoses will be run from the manifolds to the jacks. One person will be responsible for operating the pump and actuating the valves as required during jacking operations. Jacking loads at each jacking point will be the product of the effective cylinder areas of the jacks and the calibrated pressure.

In addition to the one pump operator mentioned above, there will be two people stationed at each upper chord jacking point and one person at each bottom chord jacking point to monitor jack movements, adjust locking collars and install permanent bearings and/or steel shims. A jacking supervisor working under the direction of the Contractor's engineer shall be responsible for implementing the jacking procedures herein prescribed.

Load Transfer & Deactivation Intent

The intent is to unload the existing south truss such that its member forces have been significantly reduced so they can be deactivated (cut) and removed without undesirable dynamic effects. The desirable condition of near-zero loads in the truss members exists when the truss is jacked up to its fabricated (cambered) geometry as determined from historical documents.

Load transfer & deactivation will be accomplished during nighttime hours with a maximum number of south lanes closed to minimize the effects of live load on the south truss. Following deactivation, the truss members may be removed after the completion of activities prescribed herein.

The anticipated jacking loads and the corresponding jack pressures to accomplish the load transfer are shown in the table, Jacking Point Loads & Jack Pressures. The jacking point numbers are shown on IAI Sheet 6 of 59. To simplify the jacking operation prior to deactivation of truss members, the average of the tabulated loads will be applied at each jacking point. The deviations of the average load from the anticipated jacking loads are tabulated and shown to be within acceptable limits.

As the south truss is raised relative to the north truss, the jacking points at the south truss will move transversely to the north. Also, as the south truss chords are unloaded, the upper and lower chords will expand and contract causing the jacking points to move longitudinally to the east or to the west. To accommodate these horizontal movements, each jack will bear on Stainless Steel/PTFE bearings. Most of the transverse movement will be recovered as the jacking points are lowered to their original elevations. Since the top chord of the truss will eventually be removed and the bottom chord remains unloaded, the longitudinal movements will remain.

The anticipated movements are shown in the table, Jacking Point Displacements. The intent is to detail the structural steel such that the Jacking Brackets and Support Beams are concentric in the final condition (Ref. Plan Sheets 18 & 19). Secondary effects such as cross frame stiffness and deck diaphragm action may reduce the anticipated movements of the truss. Hence, acceptable tolerances for the magnitude of displacements under the prescribed jacking loads are included in the table.

Transfer Load from Existing Truss to Hydraulic Jacks

To transfer load from the existing south truss to the hydraulic jacks, proceed as follows:

1. Stop traffic for 10 minutes and perform the baseline survey to establish the existing dead load geometry of Span YB4.
2. Shim all jacks tight. Note: There may be movement between the jacking brackets and jacking support beams due to live loads on the existing span.
3. Configure valves for extend as follows:
    a. 4-way valve at pump in extend position.
    b. Load lowering valve at extend port closed.
    c. Jack isolation valves at extend port manifolds open.
4. By actuating the airflow control valve, extend the jacks until they are seated firmly against the shims at the bottom of the jacking brackets. The pressure required should be negligible on the 10,000-psi gauges.
5. Inspect the jacking system for proper configuration.
6. By opening the airflow control valve, simultaneously extend all jacks to a pressure of 500 psi. As the jacks extend, adjust the locking collars such that they are 1/8" to 1/4" above the seated position. Close the airflow control valve.
7. Adjust the jack locking collars 1/4" above the seated position. (The locking collars must not be seated and loaded if jacking loads are to be measured by calibrated pressure.)
8. Visually inspect truss jacking brackets, jacking support beams, hydraulic jacking system and SS/PTFE bearings.
9. Repeat Steps 6 through 8 in increments of 500 psi until the pressure reaches 50% 100% of the average full-dead load pressure.
10. Survey the truss and compare the actual truss deflections with those predicted for the 50%-Load.
11. Repeat Steps 6 through 8 in increments of 500 psi until the pressure reaches 100% of the average full-dead load pressure.
12. Survey the truss and compare the actual truss deflections with those predicted for the 100%-Load.

13. Proceed to the following section titled, Deactivation of Truss Members.

Deactivation of Truss Members

1. Ensure that a 1/4" gap exists at the jack locking collars.
2. Configure valves for deactivation as follows:
   a. 4-way valve at pump in extend position.
   b. Load lowering valve at extend port closed.
   c. Jack isolation valves at extend port manifolds open.
3. Close the jack isolation valves at jacking points 2, 4, 6, 8, 10, 12 & 14.
4. Deactivate the truss verticals.
5. Monitor pressures as the truss members are deactivated. Pressure fluctuations during deactivation may indicate a miscalculation of the tributary dead loads at each jacking point. If the fluctuations are random and within 10 % of predicted values, no adjustment is necessary for the remaining jacking points. If fluctuations appear to be of the same direction and magnitude, an adjustment of the remaining jacking points may be necessary.
6. Close the jack isolation valve for jacking point 11.
7. Deactivate the diagonal members from jacking points 3 to 11 & 5 to 11.
8. See Step 5.
9. Close the jack isolation valves for jacking points 3 & 5.
10. Deactivate the diagonal members from jacking points 3 to 9 & 5 to 13.
11. See Step 5.
12. Close the jack isolation valves for jacking points 9 & 13.
13. Deactivate the diagonal members from jacking points 1 to 9 & 7 to 13.
14. See Step 5.
15. Close the jack isolation valves for jacking points 1 & 7.
16. Deactivate the diagonal members from jacking point 1 to the west truss bearing and from jacking point 7 to the east truss bearing.
17. Record pressures at all jacking points.
18. Proceed to the following section titled, Adjust Jacking Point Elevations.

Adjust Jacking Point Elevations

Incrementally lower the jacking points in 1/2" increments according to the following procedure until the desired elevations are reached:

1. Ensure that a 1/4" gap exists at the jack locking collars at all times during adjustment operations.
2. Open the jack isolation valve(s) for the jacking point(s) to be adjusted.
3. Carefully open load lowering valve to lower the jacking point(s) to the desired elevation. Close the jack isolation valves.
4. Repeat Steps 3 & 4 until all jacking points are at the desired elevation.
5. Record pressures at all jacking points.
6. Proceed to the following section titled, Activate Permanent Bearings.

Activate Permanent Bearings

To transfer loads from the jacks to the permanent bearings, proceed as follows:

1. Install permanent bearings at all jacking points.
2. Install shims between permanent bearings and jacking brackets.
3. Configure valves for lowering individual jacking points as follows:
    a. 4-way valve at pump in retract position.
    b. Load lowering valve at extend port closed.
    c. Jack isolation valves at extend port manifolds closed.
4. Open the jack isolation valve(s) for the jacking point(s) to be lowered onto permanent bearings.
5. Carefully open load lowering valve to lower the jacking point(s) onto the permanent bearings. Bleed off all pressure and close the jack isolation valves.
6. Repeat Steps 4 & 5 until all jacking points have been lowered onto permanent bearings.
7. Open all jack isolation valves and ensure that the pressure has been bled off of all jacks.
8. Tighten all bolts and/or perform all welds at the bearing connections to establish the required positive lateral support.

Unloading the Jacking System

If it becomes necessary during the load transfer to unload the hydraulic jacks and return the Span YB4 to its original self-supporting condition independent of the new structural support system proceed as follows:

1. Configure valves in preparation for lowering hydraulic jacks as follows:
    a. 4-way valve at pump in retract position.
    b. Load lowering valve at extend port closed
    c. Jack isolation valves at extend port manifold open.
2. Ensure that a gap of 1/4" to 1/2" at the jack locking collars exists at all times during the unloading operation.
3. Carefully open the load lowering valve to simultaneously lower all the jacking points. The pressure will gradually bleed down to zero and the jacks will disengage form the jacking brackets.
4. Ensure that sufficient separation exists between the existing Span YB4 and the new structural support system, including the hydraulic jacks, to allow for live load deflections without interference.

East Tie-In
South Truss Load Transfer & Deactivation Procedure
Jacking Point Displacements
Danny's Construction Company, Inc.
James M. Ronning, P.E.
Rev. 1: October 14, 2004

Jacking Point	Displacements at 50% Load, in			Displacements at 100% Load, in		
	Northing	Easting	Elevation	Northing	Easting	Elevation
1	0.75	0.11	1.13	1.50	0.22	2.25
2	1.32	0.16	2.18	2.64	0.31	4.36
3	1.56	0.30	2.65	3.12	0.60	5.29
4	1.80	0.44	3.11	3.60	0.88	6.21
5	1.57	0.61	2.62	3.13	1.21	5.23
6	1.33	0.77	2.12	2.66	1.53	4.24
7	0.78	0.87	1.06	1.56	1.74	2.12
8	0.12	0.93	1.11	0.24	1.85	2.22
9	0.28	0.81	2.16	0.56	1.61	4.31
10	0.35	0.62	2.62	0.70	1.23	5.23
11	0.42	0.43	3.08	0.84	0.85	6.15
12	0.36	0.27	2.63	0.71	0.53	5.26
13	0.29	0.11	2.18	0.57	0.21	4.36
14	0.15	0.06	1.09	0.30	0.11	2.18
	Tolerance at 50% Load $\pm(0.25 + \lvert 0.40 \times \text{Tabulated Value} \rvert)$			Tolerance at 100% Load $\pm(0.25 + \lvert 0.30 \times \text{Tabulated Value} \rvert)$		

Tabulated values are relative displacements between the Jacking Points and the south truss support at Pier E1. Positive displacements are northward, eastward and upward; negative displacements, though not included in this table, are southward, westward and downward.

East Tie-In
South Truss Load Transfer & Deactivation Procedure
Jacking Point Loads & Jack Pressures
Danny's Construction Company, Inc.
James M. Ronning, P.E.
Rev. 0: October 12, 2004

Jacking Point	Load, kips See Note 1	Jacks Per Point	Eff. Area Ea. Jack, sq in	Total Eff. Area, sq in	Pressure, psi 50% Load	Pressure, psi 100% Load	Error of Average, %
1	260	4	10.99	43.96	2,950	5,925	0
2	245	4	10.99	43.96	2,775	5,575	6
3	257	4	10.99	43.96	2,925	5,850	1
4	252	4	10.99	43.96	2,875	5,725	3
5	261	4	10.99	43.96	2,975	5,925	0
6	249	4	10.99	43.96	2,825	5,675	4
7	253	4	10.99	43.96	2,875	5,750	3
8	243	2	20.57	41.14	2,950	5,900	0
9	255	2	20.57	41.14	3,100	6,200	-4
10	245	2	20.57	41.14	2,975	5,950	0
11	261	2	20.57	41.14	3,175	6,350	-7
12	242	2	20.57	41.14	2,950	5,875	1
13	257	2	20.57	41.14	3,125	6,250	-5
14	246	2	20.57	41.14	3,000	5,975	-1
Average					2,975	5,925	

Note 1: Dead Load + 1/2 Live Load

CC MYERS INC.

41

October 22, 2004

Document No.: 215-STL.00048

State of California
Department of Transportation
333 Burma Road
Oakland, CA 94607

Temporary Bypass Structure
Contract No. 04-0120R4
CCM Job # 215

Attn: Mr. Lourdes David
Resident Engineer

Re: East Tie-In Design Criteria
Notice of Potential Claim No. 3

Dear Mr. David,

Attached please find Part B to our Notice of Potential Claim No. 3. We are forwarding this to you, on behalf of our designer, Imbsen & Associates, Inc., in accordance with Section 9-1.04 of the Standard Specifications, as amended by the Special Provisions.

As stated in the Notice of Potential Claim from Imbsen, and our previous correspondence regarding this matter, all parties agree that the new East Tie-In design criteria will be an ongoing effort through completion of the final design. As such, we are not able to ascertain what impact this new criteria will have on the cost and time for construction. We therefore, intend to further evaluate the matter once the criteria is complete and we reserve our right to make an additional request for a Contract Change Order to cover the cost and time required for implementing those aspects of the new design criteria that deviate from the current contract requirements.

Very Truly Yours,
C. C. MYERS, INC.

Robert W. Coupe
Project Manager

cc: MO, DH

File: 215-101, 215-9903

Faxing 3 pages to 510-286-0550 on October 22, 2004 at about 10 AM.

P.O. Box 2948, Rancho Cordova, CA 95741 • 3286 Fitzgerald Rd., Rancho Cordova, CA 95742 • 916•635•9370 • Fax 916•635•1527

STATE OF CALIFORNIA - DEPARTMENT OF TRANSPORTATION
SUPPLEMENTAL NOTICE OF POTENTIAL CLAIM
CEM-6201B (NEW 9/2002)

FOR STATE USE ONLY		
Received by:	(For Resident Engineer)	Date:

To	CONTRACT NUMBER	DATE	IDENTIFICATION NUMBER
Lourdes David (resident engineer)	04-0120R4	October 20, 2004	3

This is a Supplemental Notice of Potential Claim for additional compensation submitted as required under the provisions of Section 9-1.04 "Notice of Potential Claim" of the Standard Specifications. The act of the Engineer, or his/her failure to act, or the event, thing, occurrence, or other cause giving rise to the potential claim occurred on:

DATE: October 5, 2004

The particular nature and circumstances of this potential claim are described in detail as follows:

The CC Myers/IAI design for the East Tie-In (ETI) is different than that represented in the Caltrans Notice to Contractors and Special Provisions for Contract No 04-0120R4. Caltrans did not prohibit an alternative to the roll-out/roll-in, nor the use of a multi-span, in fact they asked for innovative ideas. The CC Myers/IAI design for the ETI includes a steel rigid frame, which is supported at mid-span (i.e. Bent 53) and utilizes a portion of the upper and lower deck of existing Span YB4.

The Design Criteria included in the Caltrans Contract Plans specifically addresses the anticipated roll-out/roll-in option envisioned by Caltrans. As the design progressed beyond the bid and the preliminary submittal stage, Mr. Tom Ostrom of Caltrans requested that a site-specific criteria for the ETI be developed and submitted with the final plans. It was recognized at that time that the development of the criteria would be an ongoing partnering effort as the design progressed with continuous development by IAI and intermittent submittals to Caltrans for review. The magnitude of the design criteria development and its impact on our design was discussed at a partnering meeting held on October 5, 2004. We were also advised at this meeting that additional compensation along with the appropriate extension to the contract time would not be forthcoming.

(attach additional sheets as needed)

The basis of this potential claim including all relevant contract provisions are listed as follows:

The basis for our claim is that the design effort has been affected by development of the "ETI Bridge Specific" criteria. C.C. Myers/IAI team is requesting that additional time and compensation be given since this has had a considerable impact on our progress to date.

At a pre-bid meeting in Oakland, Caltrans asked for innovative concepts. Question 232 of the Bidder Inquiry List asked if the span between Bents E1 and YB4 can be modified or retrofitted. Caltrans said this was acceptable as long as the Contractor met a number of criteria. Nowhere did it state a new criteria would be required. The Special Provisions state "The TBS is shown schematically on the plans with the required design criteria to enable the Contractor to develop the design and complete the construction." Nowhere did it state a new criteria would be required. Caltrans awarded the contract to CC Myers, thus accepting their alternative, which was represented with proposal drawings with the bid package.

(attach additional sheets as needed)

The estimated dollar cost of the potential claim including a description of how the estimate was derived and an itemized breakdown of the individual costs are attached hereto.

We are not able to come up with a total cost for this NOPC until the ETI Bridge Specific Design Criteria is complete and it's impacts can be fully ascertained.. We have come up with the following tasks for cost and time of the design aspect of this NOPC:

a. Conduct analysis for sensitivity studies,

b. Verification of potential seismic design strategies,

c. Compliance with Caltrans' new requirements,

d. Final seismic design verification,

e. Develop and coordinate the review by Caltrans through the partnering,

f. Complete

Cost estimates for the engineering and support staff will include the following classifications:

- Project Engineer
- Project Engineer

- Design Engineer
- CADD Operator

(attach additional sheets as needed)

A time impact analysis of the disputed disruption has been performed and is attached hereto. The affect on the scheduled project completion date is as follows:

Since the development of the design criteria is an ongoing effort, only an estimate of 5 months delay to date can be made at this time and complete verification of the impact through the project schedule is not possible at this time.

(attach additional sheets as needed)

The undersigned originator (Contractor or Subcontractor as appropriate) certifies that the above statements and attached documents are made in full cognizance of the California False Claims Act, Government Code Sections 12650-12655. The undersigned further understands and agrees that this potential claim to be further considered, unless resolved, must fully conform to the requirements in Section 9-1.04 of the Standard Specifications and must be restated as a claim in the Contractors written statement of claims in conformance with Section 9-1.07B of the Standard Specifications.

Imbsen & Associates, Inc.

SUBCONTRACTOR OR CONTRACTOR

(Circle one)

Roy A. Imbsen

(Authorized Representative)

For subcontractor notice of potential claim

This notice of potential claim in acknowledged, certified and forwarded by

CC MYERS INC

PRIME CONTRACTOR

Robert W G

(Authorized Representative)

ADA Notice For individuals with sensory disabilities, this document is available in alternate formats. For information call (916) 654-6410 or TDD (916) 654-3880 or write Records and Forms Management, 1120 N Street, MS-89, Sacramento, CA 95814

P. 01

TRANSACTION REPORT

OCT-22-2004 FRI 09:52 AM

FOR: A 916 853 2638

DATE	START	RECEIVER	TX TIME	PAGES	TYPE	NOTE	M#	DP
OCT-22	09:51 AM	15102860550	40"	3	SEND	OK	456	

TOTAL : 40S PAGES: 3

CC MYERS INC.

October 22, 2004

Document No.: 215-STL.00048

State of California
Department of Transportation
333 Burma Road
Oakland, CA 94607

Temporary Bypass Structure
Contract No. 04-0120R4
CCM Job # 215

Attn: Mr. Lourdes David
Resident Engineer

Re: East Tie-In Design Criteria
Notice of Potential Claim No. 3

Dear Mr. David,

Attached please find Part B to our Notice of Potential Claim No. 3. We are forwarding this to you, on behalf of our designer, Imbsen & Associates, Inc., in accordance with Section 9-1.04 of the Standard Specifications, as amended by the Special Provisions.

As stated in the Notice of Potential Claim from Imbsen, and our previous correspondence regarding this matter, all parties agree that the new East Tie-In design criteria will be an ongoing

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company
9912 Business Park Drive, Suite 130
Sacramento, CA 95827
(916) 366-0632 FAX (916) 366-1501

LETTER OF TRANSMITTAL

42

FILE COPY

TO: C.C.Myers, Inc.
P.O. Box 2948
3286 Fitzgerald Road
Rancho Cordova, CA 95742

DATE: October 29, 2004	**IMBSEN JOB NO.:** 1295
ATTENTION: Mr. Bob Coupe	
RE: East Tie-In Final Foundation Design Submittal	

WE ARE SENDING YOU ☒ **Attached** ☐ **Under separate cover via** _____ **the following items:**

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of Letter ☐ Change order ☐

COPIES	DATE	NO.	DESCRIPTION
3	10/29/2004		QC Checklist
22	10/29/2004		11x17 East Tie-In Foundation Design Plans
5	10/29/2004		CD-ROM with Electronic Plan Files
22	10/29/2004		Final Supplemental Technical Special Provisions – East Tie-In Foundation
5	10/29/2004		CD with Final Supplemental Technical Special Provisions – East Tie-In Foundation
5	10/29/2004		Binder of Foundation Design Calculations ETI
5	10/29/2004		Binder of Foundation Check Calculations ETI
6	10/29/2004		Final Design Information Package – East Tie-In
3	10/29/2004		Foundation Review Memo

THESE ITEMS ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit _____ copies for approval
☒ For your use ☐ Approved as noted ☐ Submit _____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return _____ corrected prints
☐ For review and comment ☐
☐ FOR BIDS DUE _____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS:

We are providing the resubmittal for the Final Foundation Submittal for the East Tie-in. One copy of the QC checklist, one copy of the Foundation Review Memo, one copy of the Design Information Package, 5 sets of plans, and 5 sets of specs are for your use. The rest of the items should be submitted to Caltrans in accordance with Design Submittal Process in Section 5-1.14 of the Contract Specs.

cc: File 1295.540.03

SIGNED Marlelij Jue
for Dr. Roy Imbsen
Project Manager

If enclosures are not as noted, kindly notify us at once.

43

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

November 03, 2004

CC Myers
51 Macalla Road
San Francisco, CA 94130

Contract No. 04-0120R4
04-SF-80-12.6, 13.2
Temporary Bypass Structure

Attn: Mr. Bob Coupe

Ref: 215-STL.00048

Letter No. 05.03.01-000190

Subject: NOPC # 3

Dear Mr. Coupe,

This Office acknowledges receipt of CC Myers's Notice of Potential Claim No. 3 Part B regarding the East Tie-In Design, dated October 22, 2004.

The current East Tie-In design by CC Myers and Imbsen and Associates Inc. (IAI) deviates from the requirements of the contract plans and Special Provisions. While alternate designs are allowed by contract, they must still adhere to the specified design criteria shown on the plans and Special Provisions. The design by IAI fails to meet these requirements. Rather than rejecting the design, the State has shown a willingness to work with IAI to modify the design criteria. The State has also requested that IAI assemble and furnish the modified design criteria that is being used for the East Tie-In design to help facilitate the State's review for the design submittals. This request is in accordance with Special Provisions Section 5-1.14 "Contractor Design" under subsection "Final Design Submittal", which states, "The Contractor shall also furnish additional information as requested by the Engineer to facilitate review of the final design information package". As CC Myers and IAI are presenting a design that does not follow the design criteria specified by the contract plans and Special Provisions, an additional criteria would had to have been developed, reviewed, and accepted in order for the design to be completed.

As stated in Special Provisions Section 10-1.15 "Temporary Bypass Structure", the contract plans contain sufficient design criteria for the Contractor to develop a TBS design. The envisioned roll-in roll-out concept is but one design that could have been generated using the criteria provided by the contract.

It is for these reasons that this Office finds no merit to this Notice of Potential Claim.

Please contact me at (510) 286-0511 for any additional questions.

Sincerely,

<<< **ORIGINAL SIGNED** >>>

Gary Lai
Structures Representative
for
Resident Engineer
Lourdes David

cc: D Adams, A Bata, E Rufino

file: 05.03.01, 62.03

44

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

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

RECEIVED

CC Myers, Inc.
51 Macalla Road
San Francisco, CA 94130

November 5, 2004

Contract No. 04-0120R4
04-SF-80-12.6, 13.2
Temporary Bypass Structure

CC MYERS, INC.
JOB 215 TEMP BYPASS STRUCTURE
IC-989
215-103
IMBSEN-FAX
JG

Attn: Mr. Bob Coupe

Ref: 215-SUB.00060-00

Letter No. 05.03.01-000195

Subject: East Tie-In Final Foundation Design Submittal

Dear Mr. Coupe:

The Department has determined that the above referenced submittal is incomplete and therefore is unable to accept the submittal. Please refer to the attached Checklist for Acceptance of the Final Design Submittal (4 pages) for more information.

Please feel free to contact me at (510) 286-5011 for any questions you may have.

Sincerely,

EBRufino

FOR Gary J. Lai
Structures Representative
for
Resident Engineer
Lourdes David

cc: D. Adams, D. Allred, E. Rufino
file: 05.03.01

CHECKLIST FOR ACCEPTANCE OF THE FINAL DESIGN SUBMITTAL

Segment: East Tie-In

File: 04-SF-80-12.6/13.2
04-0120R4
Temporary Bypass Structure
Doc.# 215-SUB.xxxxx

Element: Foundations

Date Received: November 2nd, 2004

Comments: Item #25(c) must be resolved prior to commencing the review process for the Final Design of the ETI Foundations.

Quality Control		
ITEM	Accept?	Comments?
1. Final marked-up documents and annotated checklists prepared by an individual who has reviewed the documents for conformance to the requirements of the contract documents.	Yes	See Comments
2. Each design drawing and supplemental technical special provision shall have a check print, representing the final content of the design drawing or supplemental technical special provision.	Yes	See Comments
3. As evidence of their review, the designer and independent checker shall sign and date the check print	Yes	See Comments

Final Design Information Package		
ITEM	Accept?	Comments?
4. Describe any modifications to or deviations from the information submitted with the preliminary design submittal, including a detailed description of resolution of reviewer comments.	Yes	See Comments
5. Any revised document that has changed since the preliminary design submittal.	Yes	
6. Structure construction sequencing plan	N/A	
7. Resident Engineer's (RE) Pending File contents as specified in the Information and Procedures Guide of the Office of Special Funded Projects of the Department	Yes	-
8. Final Foundation Report	Yes	

Final Detailed Construction Drawings		
ITEM	Accept?	Comments?
9. General Plans	Yes	
10. Structure Plans	N/A	
11. Abutment cross-sections	N/A	
12. Foundation Plans	Yes	
13. Pier (i.c. tower/bent/column) cross-sections	N/A	
14. Foundation Detail Plans	Yes	
15. Typical Sections	N/A	
16. Girder layouts or framing plans	N/A	
17. Expansion joint details	N/A	
18. Bearing details	N/A	
19. Structural joint and connection details	N/A	
20. Contain a drawing index with drawing numbers and drawing titles.	Yes	
21. Be in metric units	Yes	
22. Comply with the following manuals of the Department: Plan Preparation Manual, BDA, BDD, MTD, and Information and Procedures Guide of the OSF Projects.	Yes	
~~23. Be clearly marked "NOT FOR CONSTRUCTION"~~		
24. Show the arrangement and material type and size of each structural member to demonstrate load paths from the superstructure to the ground through the substructure and foundation	Yes	
25. Be of sufficient detail to (a) define the TBS elements in plan and elevation, including deck drainage and overhead and bridge mounted signs, (b) define the mounting details for electrical and mechanical systems (c) demonstrate conformance to the requirements of the contract documents.	No	Load path to the foundation is being transmitted through a superstructure element that is not in conformance with the design criteria shown on the plans.
26. Bear the stamp, signature, and license expiration date of the Contractor's Engineer or designee, who is responsible for developing the drawings.	Yes	
27. Contain final utility relocation plans identifying relocation of impacted utilities within boundary of the construction based on new potholing performed by the Contractor. Contractor may require additional potholing to verify impacted utilities as approved by the Engineer.		

Final TBS Design and Independent Check Calculations			
ITEM	Design	Check	Comments?
28. Bound separately for each segment	Yes	Yes	
29. Bear the stamp, signature, and license expiration date of the Contractor's Engineer or designee, who is responsible for developing the drawings.	Yes	Yes	
30. Be clearly labeled as design or check calculations, indicating the contract number and title, and description of the calculations	Yes	Yes	
31. Contain a table of contents with page numbers; all calculation pages shall be numbered.	Yes	Yes	
32. Be decipherable and organized so that the design logic can be easily followed.	Yes	Yes	
33. Contain documentation of assumptions, conclusions, references and design logic.	Yes	Yes	
34. Contain copies of design charts, with specific entries highlighted that were used in the design.	Yes	Yes	
35. Contain only final input and output of computer runs.	Yes	Yes	
36. Contain hand calculations, or computer-generated calculations	Yes	Yes	

Final Quantity Calculations			
ITEM	Design	Check	Comments?
37. Quantity calculations and quantity check calculations shall be prepared, compared and resolved, and submitted in accordance with the requirements of Chapter 11 of the BDA manual and the PS and E guide of the Department.	Yes	Yes	

Final Supplemental Technical Special Provisions		
ITEM	Accept?	Comments?
38. Non-standard supplemental technical special provisions, and the engineering basis supporting the need for and content of each non-standard supplemental technical special provisions	Yes	
39. Use and edit the most current versions of the Department's Standard Special Provisions and Bridge Reference Specifications. Provide engineering basis supporting the omission of relevant specifications.	Yes	

Comments:

Items #1 thru #3 – The Quality Control Plan Checklist indicates that the Designer and Checker have resolved and documented all design, details and layout differences.

Item #4 – Assume that Preliminary Design Drawing dated 1-27-04 is a typo and should read Preliminary Design Drawing dated 6-21-04

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FILE COPY
NOV 09 2004
Project #______

C.C. MYERS, INC.

51 MACALLA ROAD
SAN FRANCISCO, CA 94130

CCM Job # 215: Temporary Bypass Structure
San Francisco/Oakland Bay Bridge

DR. Roy
LANCE
MARK I.
ED TYK
RAY

FAX

Date: 09-Nov-2004

Document #: 215-FAX.00194

To: Dr. Roy Imbsen
Imbsen & Associates, Inc.

Fax#: 916-366-1501

From: Robert Coupe

Fax#: 415-399-0587
Phone#: 415-399-0175

Subject: **East Tie-In Final Foundation Design Submittal**

Message: Please see attached letter from Caltrans.

cc: Main Office, BC, JG

file:215-210

Total pages sent including this one: 6

Original to follow: NO

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company
9912 Business Park Drive, Suite 130
Sacramento, CA 95827
(916) 366-0632 FAX (916) 366-1501

LETTER OF TRANSMITTAL

FILE COPY 45

TO: C.C.Myers, Inc.
P.O. Box 2948
3286 Fitzgerald Road
Rancho Cordova, CA 95742

DATE: November 12, 2004

IMBSEN JOB NO.: 1295 -540.03

ATTENTION: Mr. Bob Coupe

RE: East Tie-In Final Substructure Design Submittal

WE ARE SENDING YOU ☒ **Attached** ☐ **Under separate cover via** _____ **the following items:**

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of Letter ☐ Change order ☐

COPIES	DATE	NO.	DESCRIPTION
3	11/12/2004		QC Checklist
22	11/12/2004		11x17 East Tie-In Substructure Design Plans
5	11/12/2004		CD-ROM with Electronic Plan Files
22	11/12/2004		Final Supplemental Technical Special Provisions – East Tie-In Substructure
5	11/12/2004		CD with Final Supplemental Technical Special Provisions – East Tie-In Substructure
5	11/12/2004		Binder of Substructure Design Calculations ETI
5	11/12/2004		Binder of Substructure Check Calculations ETI
6	11/12/2004		Final Design Information Package – East Tie-In

THESE ITEMS ARE TRANSMITTED as checked below:

☐ For approval
☒ For your use
☐ As requested
☐ For review and comment
☐ FOR BIDS DUE _____

☐ Approved as submitted
☐ Approved as noted
☐ Returned for corrections
☐
☐ PRINTS RETURNED AFTER LOAN TO US

☐ Resubmit _____ copies for approval
☐ Submit _____ copies for distribution
☐ Return _____ corrected prints

REMARKS:

We are providing the submittal for the Final Substrucure Submittal for the East Tie-in. One copy of the QC checklist, one copy of the Design Information Package, 5 sets of plans, and 5 sets of specs are for your use. The rest of the items should be submitted to Caltrans in accordance with Design Submittal Process in Section 5-1.14 of the Contract Specs.

cc: File 1295.540.03

SIGNED [signature]

Dr. Roy Imbsen
Project Manager

 If enclosures are not as noted, kindly notify us at once.

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CC MYERS INC.

November 22, 2004

Document No.: 215-LET.00081

Imbsen & Associates, Inc.
9912 Business Park Drive, Suite 130
Sacramento, CA 95827

Temporary Bypass Structure
Contract No. 04-0120R4
CCM Job # 215

Attn: Dr.Roy Imbsen
President

Re: TBS action items

Dear Dr. Imbsen,

In accordance to our previous meetings, we are sending you a summary of actions performed by CCM and our other subcontractors, in order to solve and clarify the various design issues. As of today, we believe the major outstanding erection issues for the East Tie-In have been answered, and we would like to have your comments, if any, on this matter.

Item No.	Action By	Action Item	Seg-ment	Assign Date	Date Due	Date Done	Notes
1	DCCI	9. Finalize Box E pedestal	ETI	8/24/04	11/15/04	11/15/04	
2	DCCI	12 Finalize Upper Brkt	ETI	8/24/04		11/08/04	
3	DCCI	11 Finalize Lower Brkt	ETI	8/24/04		11/08/04	
4	DCCI	15 Finalize hinge details	ETI	8/24/04			
5	DCCI	16 Box skew framing joint design	ETI	8/24/04		11/15/04	
6	DCCI	19 Box F-L framing connection	ETI	8/24/04		11/11/04	
7	DCCI	20 Seismic strut Box D-E Connection	ETI	8/24/04		11/08/04	
8	DCCI	21 Floor beam end connections	ETI	8/24/04		11/15/04	
9	DCCI	Erection plan	ETI	9/01/04		11/17/04 For North Truss	For 11/30 submittal to CT
10	CCM	Micropiles issues, CCM to inquire with CT	WTI	10/22/04			For 12/31/04 submittal
11	CCM	South edge girder constructability	WTI	10/22/04		11/05/04	For 12/31/04 submittal
12	AVAR	Prestress shop plans from AVAR	WTI	10/22/04			For 12/31/04 submittal

P.O. Box 2048, Rancho Cordova, CA 95741 • 3286 Fitzgerald Rd, Rancho Cordova, CA 95742 • 916•635•9370 • Fax 916•635•1527

C C MYERS INC.

13	CT	Deck drainage questions	WTI	10/22/04			For 12/31/04 submittal
14	CCM	Deflection control; NDT PT system	WTI	9/10/04			For 12/31/04 submittal
15	CCM	Blockings support	WTI	10/22/04			For 12/31/04 submittal
16	DCCI	10 Lateral connection to box E	ETI			11/15/04	

We are looking forward to your submittal of the East Tie-In Design Criteria, as requested to us by the State, as this document will be the yardstick for review of the East Tie-In Foundation, Substructure, and Superstructure submittals.

Very Truly Yours,
C. C. MYERS, INC.

Juan C. Gray

Juan Gray
Project Engineer

cc: DH
RW.C
JG

File: 215-201

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2 2004
Project #

C.C. MYERS, INC.

51 MACALLA ROAD
SAN FRANCISCO, CA 94130

cc: Roy
Lance

CCM Job # 215: Temporary Bypass Structure
San Francisco/Oakland Bay Bridge

FAX

Date: 22-Nov-2004

Document #: 215-FAX.00212

To: Dr. Roy Imbsen
Imbsen & Associates, Inc.

Fax#: 916-366-1501

From: Juan Gray

Fax#: 916-635-8961
Phone#: 916-635-9370

Subject: **TBS action items**

Message:

cc: RW.C
MO
JG

file:215-201

Total pages sent including this one: 3

Original to follow: yes

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company
9912 Business Park Drive, Suite 130
Sacramento, CA 95827
(916) 366-0632 FAX (916) 366-1501

LETTER OF TRANSMITTAL

Lance

47

TO: C.C.Myers, Inc.
P.O. Box 2948
3286 Fitzgerald Road
Rancho Cordova, CA 95742

DATE: November 29, 2004

IMBSEN JOB NO.: 1295

ATTENTION: Mr. Bob Coupe

RE: East Tie-In Informational Package Submittal

cc: Majid
File

WE ARE SENDING YOU ☒ **Attached** ☐ **Under separate cover via** _____ **the following items:**

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of Letter ☐ Change order ☐

COPIES	DATE	NO.	DESCRIPTION
~~X~~ 10	11/29/2004		East Tie-In Design Criteria
~~X~~ 3	11/29/2004	83	11x17 East Tie-In Design Plans
	11/29/2004	~~3~~	~~Binder of Design Calculations~~ ETI Superstructure
	11/29/2004	1	Binder ~~of~~ Check Calculations ETI Superstructure

THESE ITEMS ARE TRANSMITTED as checked below:

☐ For approval
☒ For your use
☐ As requested
☐ For review and comment
☐ FOR BIDS DUE _____

☐ Approved as submitted
☐ Approved as noted
☐ Returned for corrections
☐
☐ PRINTS RETURNED AFTER LOAN TO US

☐ Resubmit _____ copies for approval
☐ Submit _____ copies for distribution
☐ Return _____ corrected prints

REMARKS:

We are providing the submittal for the Informational Package Submittal for the East Tie-in. One set of plans and one copy of the East Tie-In Design Criteria is for your use, the rest of the items should be submitted to Caltrans.

cc: File 1295.540.03

SIGNED Roy A. Imbsen

Dr. Roy Imbsen
Project Manager

 If enclosures are not as noted, kindly notify us at once.

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company
9912 Business Park Drive, Suite 130
Sacramento, CA 95827
(916) 366-0632 FAX (916) 366-1501

LETTER OF TRANSMITTAL

Lance

TO: Caltrans

DATE: 11/29/04

IMBSEN JOB NO.: 1295

ATTENTION: Mr. Tom Ostrom

RE: East Tie In Information Package Submittal

cc: Majid
File

WE ARE SENDING YOU ☐ **Attached** ☐ **Under separate cover via** _____ **the following items:**

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of Letter ☐ Change order ☐

COPIES	DATE	NO.	DESCRIPTION
4			East Tie in Design Criteria
4			11x17 East Tie-In Design Plans
4			Binder of Design Calcs ETI Superstructure
4			Binder of Check Calcs ETI Superstructure

THESE ITEMS ARE TRANSMITTED as checked below:

☐ For approval
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REMARKS:

cc: File

SIGNED Roy A. Imbsen

Document1

If enclosures are not as noted, kindly notify us at once.

DRAFT DESIGN CRITERIA

FOR THE TEMPORARY EAST TIE-IN BYPASS STRUCTURE (ETI)

PREPARED FOR:

CALTRANS

PREPARED BY

IMBSEN & ASSOCIATES, INC.
9912 BUSINESS PARK DRIVE, SUITE 130
SACRAMENTO, CALIFORNIA 95827

NOVEMBER 22, 2004

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company

1. GENERAL

The Temporary East Tie-In Bypass Structure (ETI) shall be designed in accordance with:
"Bridge Design Specifications" (BDS), LFD Version, April 2000, California Department of Transportation, (1996 AASHTO with interims, and revisions by Caltrans), modified or augmented as detailed in this design criteria document. Addenda through 13 have been incorporated into this design criteria.

DL	DEAD LOAD
SDL	SUPERIMPOSED DEAD LOAD
LL	LIVE LOAD
EQ	EARTHQUAKE
I	IMPACT
HSS	HOLLOW STRUCTURAL SECTIONS
TBS	TEMPORARY BYPASS STRUCTURE
DEE	DESIGN EVALUATION EARTHQUAKE
DLS	DISPLACEMENT LIMIT STATE
YBI	YERBA BUENA ISLAND
kL/r	SLENDERNESS RATIO
N	NORTH
S	SOUTH
SSI	SOIL STRUCTURE INTERACTION
Δe	DISPLACEMENT DUE TO EARTHQUAKE
RDWY	ROADWAY
PT	POST-TENSIONING
USCG	US COAST GUARD
AASHTO	American Association of State Highway Officials
ANSI	American National Standards Institute
ASCE	American Society of Civil Engineers
AWS	American Welding Society
SEI	Structural Engineering Institute
ANSI/ASCE 7-95	Minimum Design Loads for Buildings and Other Structures
SEI/ASCE 37-02	American Society of Civil Engineers Design loads on Structures During Construction
ANSI/AASHTO/AWS/ D1.1	American Welding Society - Structural Welding Code - D1.1
ANSI/AASHTO/AWS/ D1.5	American Welding Society - Bridge Welding Code - D1.5
ANSI/AASHTO/AWS/ D1.4	

	American Welding Society - Structural Welding Code Reinforcement Steel - D1.4

1.1 Definition of Terms:

Temporary Bypass Structure (TBS)
The Temporary Bypass Structure (TBS) is the West Tie-In, Viaduct and East Tie-In segments

Temporary Structures
Temporary Structures are those used to build the TBS, or remove portions of existing bridge structure to facilitate TBS construction. Temporary Structures are classified as Ordinary or Important.

Ordinary Construction
- Falsework
- Shoring
- Bridge Removal Location A – Falsework and Bracing

Important Construction (for operations of High Consequence)

Load Transfer from the existing South Truss of Span YB4 to the new East Tie-In structural steel frame and removal of the South Truss of Span YB4. Placement of the North Support System and Removal of the North Truss and portions of Existing Floor Beams.

Temporary Shoring – Excavation bracing adjacent to the foundations for the Existing YBI Viaduct and East Tie-In. Shoring shall be either Braced or Restrained with Tie-Back's.

2. DESIGN LOADS
This section covers all design loads except for seismic demands discussed in Section 4.

2.1 Structural Dead Loads – DL
Unless specified herein or in BDS, all dead loads shall be as specified in the Specifications cited in Article 1, General.

2.1.1 Concrete
The in-service air dry unit mass of normal weight concrete, including reinforcement shall be 24.3 kN/m^3 (155 lb/ft^3). The in-service air dry unit mass of sand lightweight concrete including reinforcement shall be 18.8 kN/m^3 (120 lb/ft^3).

2.1.2 Steel

The unit mass of structural steel, including fabricated plate steel, rolled shapes, and wire, shall be 76.9 kN/m^3 (490 lb/ft^3).

2.2 Other Permanent Loads – SDL

2.2.1 Vehicular Barriers

Temporary Railings Type "K" = 5.7 kN/m (390 lb/ft)
Type 732 = 8.5 kN/m (585 lb/ft)

2.2.2 Wearing Surface

The wearing surface on the
East Tie-In shall not exceed 23.5 kN/m^3 (150 pcf)
Unit weight AC (asphalt concrete) (Type A) = 23.5 kN/m^3 (150 pcf) for existing YBI Viaduct.

2.2.3 Provision for Utilities

7.2 kN/m (500 lb/ft)

This value includes allowance for miscellaneous metal, drainage, lighting system, utilities, utility supports, service platform utilities, and service platform support.

2.2.4 Stay-in-Place Formwork

When stay-in-place forms are used in construction, the design shall consider the increased deck dead load and the superimposed dead load of the stay-in-place form.

2.3 Live Loads – LL+I

See Caltrans BDS

2.3.1 Standard Truck Alternate Military Vehicle and Lane Loads

See Caltrans BDS

2.3.2 Load Reduction Factors for Multiple Lane Loading

See Caltrans BDS

2.3.3 Permit Vehicle Loads

See Caltrans BDS

2.3.4 Maintenance Vehicle

Not Applicable

2.3.5 Live Load Contribution Under Seismic Conditions

See Section 4.1.1 and Caltrans BDS

2.3.6 Live Load- East Tie-In

Live loads shall be applied to each stage carrying traffic. The loading shall be applied to each structural configuration with each member designed to resist the applied loads for the duration of each stage. Time dependent effects should have appropriate time Factor of Safety.

2.4 Thermal Effects – T

2.4.1 Uniform Temperature – Tc and Ts

Design Temperature range shall correspond to BDS requirements for coastal areas:

Mean Temperature	27°C (81°F)
Rise or Fall:	
Concrete	17°C (30°F)
Steel	22°C (40°F)

2.4.2 Coefficient of Thermal Expansion

Normal weight Concrete:	$10.8\text{x}10^{-6}$/°C ($6.0\text{x}10^{-6}$/°F)
Sand light-weight Concrete:	9.0x10 /°C (5.0x10 /°F)
Steel:	11.7x10 /°C (6.5x10 /°F)

2.5 Wind – W

On Finished ETI: in accordance with Caltrans BDS

On Structures during construction: in accordance with SEI/ASCE 37-02 with companion ANSI/ASCE 7-95.

2.6 Combination of Loads

2.6.1 Temporary Bypass Structure & Temporary Supports carrying traffic

See Caltrans BDS.

2.6.2 Temporary Structures

For Load Factor Design: See SEI / ASCE 37-02 Sections 2.1 and 2.2.

For Allowable Stress Design: See SEI / ASCE 37-02 Sections 2.1 and 2.3.

3. MATERIALS

3.1 Concrete for Temporary Bypass Structures

3.1.1 Concrete – Cast In Place Superstructure Deck & Substructure

Reinforced Concrete

f_c' min. = See Caltrans BDS.

fy = 420 MPa (reinforcement)

3.1.2 Prestressed Concrete

3.1.2.1 Prestressing Steel

Concrete:	f'_c min. = See Caltrans BDS.	
Strand:	1860 Mpa	Low Relaxation
Bar:	ASTM A722	

3.1.3 Prestresses Losses

For conventional CIP Concrete on Falsework:

Standard galvanized steel ducts:

Wobble coefficient:	k=0.0007(/m) (0.0002/ft)
Friction coefficient	u=0.20(/rad)

3.1.4 Reinforcement Protection

No epoxy-coated reinforcement shall be used for the ETI.

3.2 Timber

Timber design shall comply with AASHTO (1996).

3.3 Structural Steel for ETI

3.3.1 General Materials

Unless modified herein, or specified in the BDS, structural steel shall comply with the AASHTO Materials Specifications and ASTM.

3.3.1.1 Structural Steel

Plates:	See Caltrans BDS
Rolled Shapes:	See Caltrans BDS
HSS:	ASTM A500
Structural Pipe:	ASTM A106 Grade C (Fy=275 MPa)
	API 5L Grade B – X52 (Fy=240-360 MPa)

3.3.1.2 Existing YB4 Truss

See Section 10.

3.3.2 Fasteners

ASTM A490, high strength bolts unless noted otherwise (pending CCO).

3.3.3 Anchor Bolts

ASTM 354 Grade BD

3.3.4 Welding

Welding of superstructure (Non-tubular) members shall comply with ANSI/AASHTO/AWS D1.5. Welding of substructure members (Tubular and Non-Tubular) shall comply with ANSI/AWS D1.1. Welding of Reinforcement shall comply with ANSI/AWS D1.4.

3.3.5 Fatigue

Components shall be checked per BDS to withstand fatigue induced by 500,000 cycles of loading.

All members which are to be incorporated into the ETI shall be evaluated for their fatigue resistance to 2,000,000 cycles of loading in their projected Lifetime taking into account their total history of loading.

3.3.6 Cleaning and Painting

Exposed new metal surfaces and areas of connections to existing steel shall be dry blast cleaned and dry spot blast cleaned, respectively, in conformance with the requirements in Surface Preparation Specification No. 10, "Near White Blast Cleaning,' of the "SSPC: The Society for Protective Coatings." Blast cleaned surfaces shall receive a single undercoat, which shall consist of a waterborne inorganic zinc coating conforming to the requirements in AASHTO Designation M 300, Type I or Type II except that:

1) The first 3 sentences of Section 5.6, "Primer Field Performance Requirements", shall not apply for Type II coatings and the entire Section 5.6.1 shall not apply for either type of inorganic zinc coating.

3.4 Allowable Materials for the Temporary Bypass Structures

Allowable materials for the East Tie-In Structures are listed below.

East Tie-In

A – Superstructure Girder or Truss = Steel, Concrete
B – Substructure = Steel, Concrete, (for bearings see 4.7.1)
C – Foundation
D - Footing = Concrete,
E - Piles = Steel, Tie down anchors

3.5 Acoustic Damping of Stay-In-Place Formwork

Exposed metal deck used for the upper deck shall have a noise-reducing coating as designated in the special provisions.

4. SEISMIC DESIGN

Seismic design shall be performed in accordance with BDS, modified by or augmented with provisions of Caltrans Seismic Design Criteria Version 1.2 (SDC) December 2001, the Caltrans Guide Specifications for Seismic Design of Steel Bridges (GSSDSB) December 2001, the AASHTO Guide Specification for Seismic Isolation Design, 2000, and project specific criteria as detailed in this document.

The structures shall be designed for the DEE and shall be evaluated for DLS.

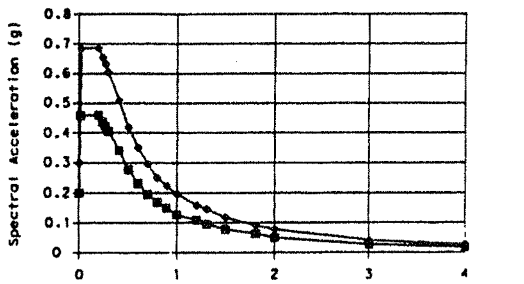
4.1 Seismic Demand for Temporary Bypass Structures

4.1.1 Design Seismic Loading

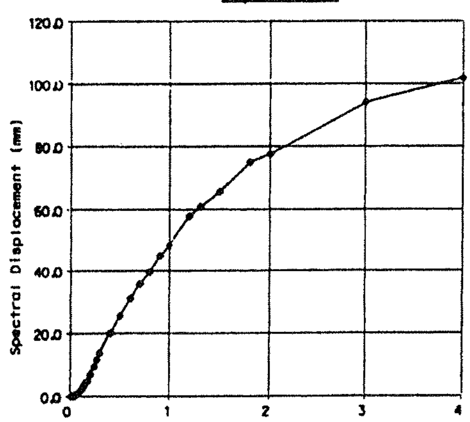
Note: Live load shall not be considered with seismic load (Use DL + SDL)

4.1.2 Design Evaluation Earthquake (DEE)

The design member forces and displacements (elastic response) shall be based on the results of a linear response spectrum analysis for the 3-dimensional Design Evaluation Earthquake (DEE) acceleration response spectra (5% damped) for horizontal and vertical loading shown in Fig. 4.1.2A. The vertical acceleration spectral amplitudes are 2/3 the horizontal values. The spectral accelerations are tabulated in Table 4.1.2A. Spectral displacements are shown in Figure 4.1.2B & tabulated in Table 4.1.2B.



Period (sec)
DEE Response Spectrum
Figure 4.1.2A



Period (sec)
DEE Spectral Displacement
Figure 4.1.2B

TABLE 4.1.2A
Design Evaluation Event (DEE)

Period (sec)	Horizontal Acceleration (g)	Vertical Acceleration (g)
0.00	0.300	0.200
0.01	0.686	0.457
0.1	0.686	0.457
0.2	0.686	0.457
0.24	0.654	0.436
0.27	0.631	0.421
0.3	0.606	0.404
0.4	0.509	0.339
0.5	0.416	0.277
0.6	0.349	0.233
0.7	0.295	0.197
0.8	0.251	0.167
0.9	0.223	0.149
1	0.194	0.129
1.2	0.161	0.107
1.3	0.144	0.096
1.5	0.117	0.078
1.8	0.093	0.062
2	0.078	0.052
3	0.042	0.028
4	0.0255	0.017

TABLE 4.1.2B
Design Evaluation Event (DEE)

Period (sec)	Elastic Horizontal Displacement (mm)
0.01	0
0.1	1
0.2	7
0.24	9
0.27	11
0.3	14
0.4	20
0.5	28
0.6	31
0.7	36
0.8	40
0.9	45
1	58
1.2	60
1.3	60
1.5	65
1.8	75
2	77
3	94
4	102

4.1.3 Minimum Lateral Strength

Each new column or pier shall have a minimum lateral flexural capacity (based on expected material properties) to resist a lateral force of 0.1 Pdl. Where Pdl is the tributary dead load applied at the center of gravity of the superstructure and substructure elements.

4.1.4 Displacement Capacity for Displacement Limit State

In addition to member force design, new structures shall be designed to respond in a stable manner (no reduction in strength capacity) under total global system displacement demands corresponding to three (3) times the elastic displacements. This is referred to as Displacement Limit State (DLS).

4.1.5 Modification of the 5% Damped Design Spectra for Approved Load-Limiting Devices

If design is based on a system with effective damping that is demonstrably different, the 5% damped response spectra may be modified for the different effective damping by factoring the spectral amplitudes as indicated below.

Effective Damping (% critical)	5	10	20
Modification Factor	1.0	0.83	0.67

The assumed damping shall be no greater than 20%. Analysis procedures shall be in accordance with the AASHTO Guide Specification for Seismic Isolation Design.

4.2 Segments and Articulation

The Temporary Bypass Structure shall consist of three distinct structures:

i) The West Tie-In
ii) The Viaduct
iii) The East Tie-In

The distinct structures shall be separated by expansion joints located at the beginning of Viaduct (Sta. 51+23 top deck, Sta. 51+33 bottom deck) and at the common Viaduct/East Tie In support (Sta. 54+61).

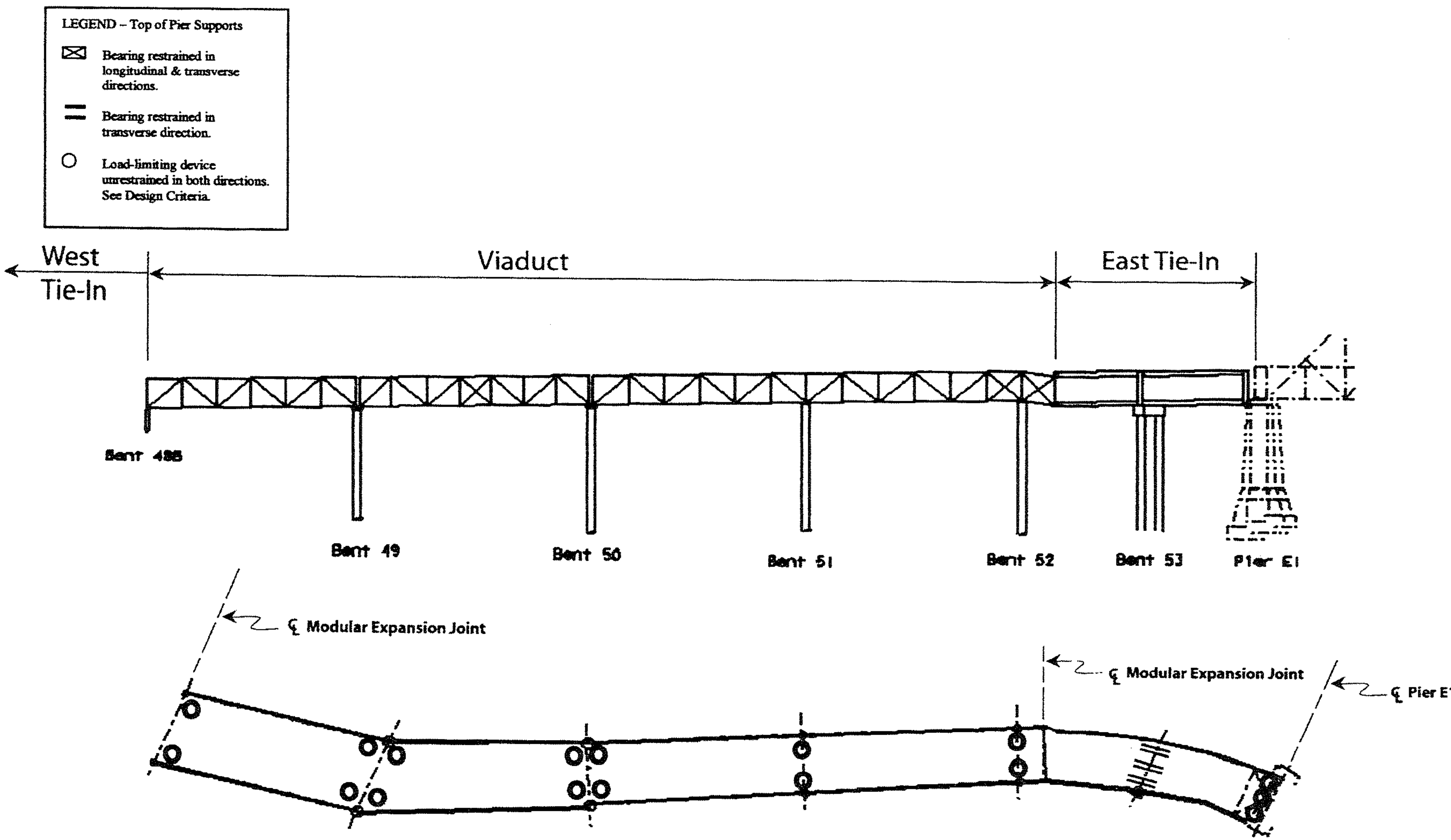


Figure 4.2: Schematics Elevation and plan-Articulation of Temporary Bypass Structure

East Tie-In

The East Tie-In shall be a two-span continuous double-deck structure anchored to Pier E-1. The anchorage shall be designed to resist forces resulted from overstrength of a ductile fusing mechanism, or rocking of the Pier E-1. The anchorage shall be designed to resist the total design seismic force of the East Tie-In span only.

4.2.1 Balanced Stiffness

The Viaduct and the East Tie-In are coupled together in the transverse direction. The two structures vibrate together transversely with Bent 48b and Pier E-1 acting as anchor points. The ratio of the stiffness between any two bents (excluding Bent 48b and Pier E-1) from Bent 49 to Bent 53 inclusive shall satisfy Equation 4.2. The ratio of the effective stiffness of any two columns within a bent shall satisfy Equation 4.1.

Constant Width Frames		Variable Width	
$K^{e_i}/K^{e_j} \geq 0.5$	(4.1a)	$\dfrac{K^{e_j}/Mi}{K^{e_i}/Mj} \geq 0.5$	(4.1b)
$K^{e_i}/K^{e_j} \geq 0.75$	(4.2a)	$\dfrac{K^{e_j}/Mi}{K^{e_i}/Mj} \geq 0.75$	(4.2b)
K^{e_i} = The smaller effective bent or column stiffness		Mi= Tributary mass of column or bent i	
K^{e_j} = The larger effective bent or column stiffness		Mj= Tributary mass of column or bent j	

4.2.2 Balanced Geometry – Viaduct Segment

The ratio of fundamental periods of vibration for Bent 53 of the East Tie-In and the Viaduct in the longitudinal and transverse direction shall satisfy equation 4.3.

$$Ti/Tj > 0.7 \qquad (4.3)$$

Ti = Natural period of the less flexible frame
Tj = Natural period of the more flexible farme

4.2.4 Dynamic Characteristics - East Tie-In

The articulation of the East Tie-In is defined in Section 4.2.

The ETI structure shall be tied to Pier E-1 and be allowed to move along with Pier E-1 in the longitudinal direction. The superstructure and anchorage shall be capacity-protected against longitudinal rocking force associated with Pier E-1.

The dynamic characteristics of Pier E-1 were determined by considering the inertia effects of the cantilever truss to the east of Pier E-1 and the inertia effects of the East Tie-In. Both rocking and ductility were considered in evaluating the capacity of the pier (see Appendix A for Pier E-1 evaluation). It was concluded that based on this evaluation Pier E-1 would rock yielding a displacement longitudinally for the D_{EE} event of 50mm and 150mm for the D_{LS} event.

In addition to rocking mechanism of Pier E-1 described above, a secondary load-limiting device at the anchorage to Pier E-1 shall be designed to protect the superstructure and the anchorage to Pier E-1 in case the rocking of Pier E-1 does not occur as anticipated.

The Superstructure shall be free to move in the transverse direction in relation to Pier E-1. Load limiting devices in transverse direction shall be designed and provided at all connections to Pier E-1 to protect superstructure against maximum anticipated seismic forces developed at Displacement Limit State (DLS), considering a factor of Safety of 1.25, as per Section 4.3.3.

At intermediate support to ETI structure, the superstructure shall have capacity protection against the maximum anticipated forces (longitudinal and transverse) anticipated to develop in the substructure at the Displacement Limit State (DLS), as per section 4.3.3.

4.3 Performance Criteria

4.3.1 Bypass Structures

The required performance is defined as "essentially" elastic response of structure components under the Design Evaluation Earthquake. In addition, the minimum specified "ductility" capacity for the DLS shall be provided.

4.3.2 Design Evaluation Earthquake (DEE)

After the design evaluation earthquake the bridge shall suffer "no loss of operation". The bridge shall remain essentially elastic.

4.3.3 Displacement Limit State (DLS)

The Structure shall maintain stability and vertical load-carrying capacity at the deformations associated with the DLS.

4.3.4 Ductile Structures or Structures with Protective Systems

The stability of the structure shall be demonstrated by means of pushover analysis. The structures shall have a clearly defined inelastic mechanism for response to lateral loads. The inelastic response shall be restricted to substructure components (elements of columns, piers, or towers) or connections at top of substructures to superstructure (e.g. load limiting bearings), or the substrcutured to foundation.

4.3.5 Double-Deck Superstructure
Under both the DEE and the DLS, inter-deck lateral strength, stiffness and displacement shall be controlled so that transverse inter-deck response is elastic. The maximum drift ratio shall be 0.65%.

4.3.6 Foundation Components
The lateral, vertical and rotational capacity of the foundations shall exceed the respective demands. The size and number of foundation components and their layout shall be designed to resist the following demands:

The service level moments, shears and axial demands imparted by the substructure (i.e., column, tower, pier) component(s) considering the nominal material properties and strength reduction factors in BDS and design load (service) geotechnical capacities.

The overstrength moment capacity and associated shear, in combination with axial demand, of the adjoining substructure (i.e., column, tower leg, pier) component(s). The demands shall be associated with the Displacement Limit State (DLS) and shall be based on the substructure components' expected nominal material properties (as defined in section 4.8). The resistance shall rely on nominal material properties and geotechnical resistance (ultimate) of the foundation components.

For a capacity-protected substructure, (e.g., as illustrated in Figure 4.7.1 (a) the foundation shall be designed for the load-limiting overstrength capacity where the overstrength factor is per the manufacturer's specification, with a minimum of 1.2.

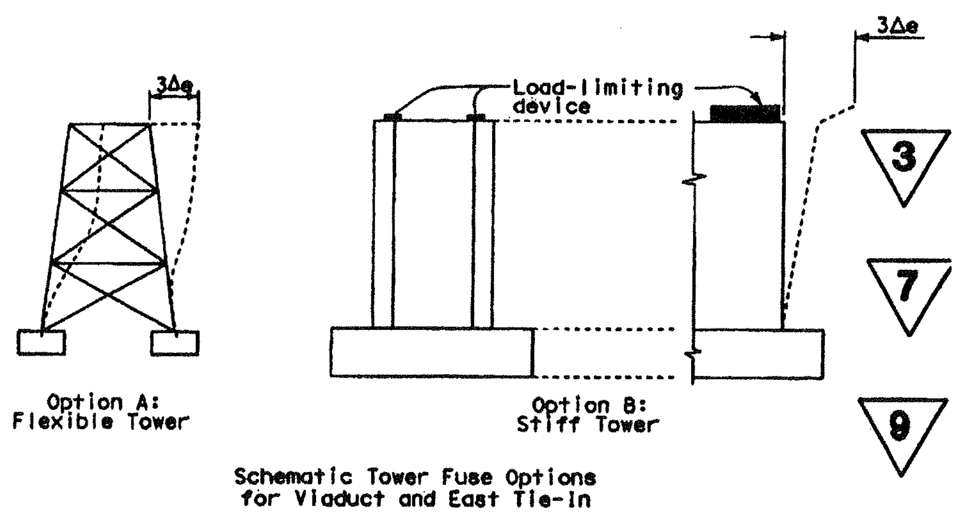


Figure 4.7.1(a)

4.3.7 Collapse Avoidance

For seismic loading during construction, the performance objective shall be to avoid collapse. See Sections 4.12 and sections 8,9,10 & 11 for performance objectives involved with High Consequence Operations.

4.4 Seismic Analysis

4.4.1 General

The design of the Bypass structures shall be performed using 3D linear elastic response spectrum analysis. Response spectrum analysis shall be used to establish target displacements for use in the non-linear static (i.e. pushover) analysis.

At a minimum, the analysis techniques implemented should be appropriate and boundary condition assumptions, mass distribution, and member representation shall be clearly documented.

4.4.2 Displacement Capacity Evaluation

Lateral displacement capacity of structures shall be evaluated using non-linear static (i.e., pushover) analysis. All displacement capacity evaluations shall use models that reflect the "best estimate" of the likely structure and foundation condition at the time of the design evaluation earthquake.

When pushover analysis is used to calculate the deformation capacity of the structures, the deformation capacity, corresponding to the limiting strains in material shall exceed the calculated deformation demand. Pushover analysis shall be conducted along at least two principal axes.

The deformation and/or displacement capacity of structures shall be evaluated using the limiting material strains and conditions contained in Section 4.10.

For structures with protective systems, the contractor shall demonstrate the devices providing the protection can perform their function up to the required displacement (DLS).

4.4.3 Soil-Structure Interaction Effects

Soil-structure interaction effects shall be incorporated into the design analyses of the bridge system. Foundation dynamic characteristics shall be incorporated into the analysis with discrete elements representing piles and footings with appropriate representation of the effects of soil structure interaction (SSI), or simplified equivalent group dynamic characteristics including stiffness, mass and damping.

4.4.4 Combination of Effects

For response spectrum analysis, seismic effects from excitation of three orthogonal directions shall be combined by the 30% rule, where the forces resulting from excitation in one direction are combined with 30% of the forces resulting from excitation in the orthogonal directions.

4.5 P - Δ Effects

P - Δ Effects in supports, piers and towers shall be considered.

4.6 Capacity Design

Structural elements, other than members constituting the "ductile" horizontal load resisting part of the structure, or load-limiting devices, shall be designed to resist the over-strength capacity of the "ductile" elements.

4.7.1 Structural Fuses

Approved Load-Limiting devices are elastomeric bearings, lead-rubber bearings and PTFE bearings.

b) Viaduct and East Tie-In
   Viaduct and East Tie-In structural fuses are shown in Fig. 4.7.1 (a).
   These include:
   i) Plastic hinges at the bases of concrete piers or bents via ductile seismic detailing
   ii) Steel frames and members configured and proportioned for inelastic response.
   iii) Load-limiting devices when very stiff piers are used.
   iv) Potential Rocking of Pier E-1 in the longitudinal direction.

In all cases with the use of fuses, capacity design (with over-strength) shall be employed so that the fuse is mobilized prior to failure modes (brittle) that have not been provided for; i.e., in order to prevent inelastic response of capacity – protected structural components.

4.7.2 Design of Devices

Seismic isolation devices shall be designed according to the AASHTO "Guide Specification for Seismic Isolation Design", 2000.

4.8 Material Properties for Ductile Elements

4.8.1 Design Flexural Strength-Reinforced Concrete Sections

The design flexural strength of plastic hinges for normal weight concrete shall be based on expected material strengths:

$f'_{ce} = 1.3 f'_c$ or 34.5 MPa (5000 psi), whichever is greater

$f_{ye} = 1.1 f_y$

Maximum concrete strains at the design flexural strength shall not exceed 0.005. If moment curvature analysis is used to determine the design flexural strength, the steel strains shall be limited to values given in SDC.

4.8.2 Maximum Plastic Moment (Overstrength) – Reinforced Concrete Sections
The maximum plastic (or overstrength) moment shall be determined using moment-curvature analysis as per SDC.

4.8.3 Design Flexural Strength-Structural Steel Sections
Expected yield strength Fye of steel is defined as:

$$F_{ye} = R_y F_y$$

where

F_{ye} = expected yield strength of steel (MPa)

R_y = overstrength factor for steel

F_y = specified minimum yield strength of steel (MPa)

Table 4.8.3

Application	R_y
Plate and all other products	1.1
Hot-rolled structural shapes and bars	
ASTM A36	1.5
A572 Grade 42	1.3
All other grades	1.1
Hollow Structural Section	
ASTM A500, A501, A618 and A84	1.3
Steel Pipe – ASTM A53	1.4

4.8.4 Maximum Plastic Moment (Overstrength) – Structural Steel Sections
The maximum plastic (or overstrength) moment shall be determined using moment-curvature analysis as per Caltrans GSSDSB Sect. 3.1.2 and Sect. 5.1.1.

4.9 Deformation Capacity

4.9.1 Deformation Capacity-Reinforced Concrete Members
When demonstrating ductility capability, the deformation capacity of concrete structures shall be calculated using plastic hinge lengths calculated according to SDC Sect 7.6 and rotational capacities corresponding to the allowable material strains from Section 4.10.

4.9.2 Deformation Capacity-Structural Steel Members
When demonstrating ductility capability, the deformation capacity of steel structures shall be calculated using plastic hinge lengths, Lp corresponding to the allowable material strains from Section 4.10.

$$L_p = \text{maximum of} \begin{cases} \dfrac{L}{8} & \text{for ductile steel components} \\ 450\text{ mm} & \end{cases}$$

4.10 Allowable Material Strains

4.10.1 Normal Weight Concrete

Allowable strains in normal weight concrete shall be:

Piers (Average extreme fiber strains in plastic hinge):

Design Evaluation Earthquake	$\varepsilon_c DEE = 0.005$
Beyond DEE (DLS),	ε_{cu} is in accordance with SDC.

4.10.2 Reinforcing Steel

Allowable strains in reinforcing steel shall be:

Piers (Average extreme fiber strains in plastic hinge):

Design Evaluation Earthquake	$\varepsilon_s DEE$ per SDC
Beyond DEE (DLS)	ε_s per SDC

Where ε_{su} is the steel strain at ultimate stress.

For Grade 60 (A706) reinforcement ε_{su} may be taken as:

Confinement bars No. 10-32 (No. 3-10)	$\varepsilon_{su} = 0.12$
Main bars No. 29-57 (No. 9-18)	$\varepsilon_{su} = 0.09$

4.10.3 Structural Steel

Table 4.10.3 Limiting Values for Steel Stress-Strain Curves

f_y (MPa) (ksi)	f_u (MPa) (ksi)	ε_y	ε_{sh}
345 (50)	460 (67)	0.0016	0.02
830 (120)	1040 (150)	0.005	0.01
-	1110 (160)	0.0053	0.01

4.11 Seismic Detailing

4.11.1 Concrete

Ductile detailing is required for all ductile components. The detailing and proportioning requirements relating to splices and confinement in plastic hinge zones shall be in accordance with SDC Chapter 8. The detailing and proportioning of concrete joints to address joint shear shall be in accordance with SDC Chapter 7.

4.11.2 Steel

For ductile substructures, compact sections shall be provided in all connections and where inelastic behavior is expected under the Beyond DEE-Basis criteria (DLS). The slenderness ratio (kl/r) of primary diagonal bracing in vertical frames shall not exceed 80 and the sections shall be compact.

For YB4 all steel work shall comply with requirements for compact sections (maximum slenderness ratios corresponding to plastic limit store per AISC-LRFD).

4.12 Design Seismic Loading-Temporary Construction

Temporary Construction that is attached (coupled) to the TBS shall be considered to be the TBS and shall be designed for the DEE and DLS.

Temporary Construction that is NOT attached (de-coupled) to the TBS shall be designed for the following Horizontal and Vertical Loading.

Horizontal

Ordinary - No Seismic Loading Criteria; lateral loads shall be derived as indicated in the Standard Specifications and this Design Criteria.

Important - Seismic Loads that are the greater of the response spectrum specified under Section 4.1.2 Design Evaluation Earthquake (DEE), or 0.2g equivalent static inertial loads.

Vertical

Ordinary - No seismic loading

Important - Equivalent Static Vertical Load shall be 2/3 of the horizontal seismic load.

Seismic Lateral Earth Pressure

Ordinary - None

Important - as defined by the Geotechnical Engineer of Record.

5. EXPANSION JOINTS AND SEAT WIDTHS

5.1 Expansion Joints

Bridge expansion joints are located as shown in Figure 5.1 to establish TBS segment limits. Joints may be modular (excluding metal to metal contact). They shall be designed to span the gap between segments and for movement demands from temperature rise and fall, creep and shrinkage, and the design evaluation earthquake (DEE) and DLS displacements. Temperature movements need not be combined with seismic movements.

Modular expansion joints shall be sized to be functional (water seals may be damaged) throughout the range of movement (translations & rotation) associated with the DEE. During the opening cycle of the DLS, the joint shall be designed to carry live loads, and the length of the support bars shall be sized such that separation beams and bearing bars will not become unseated.

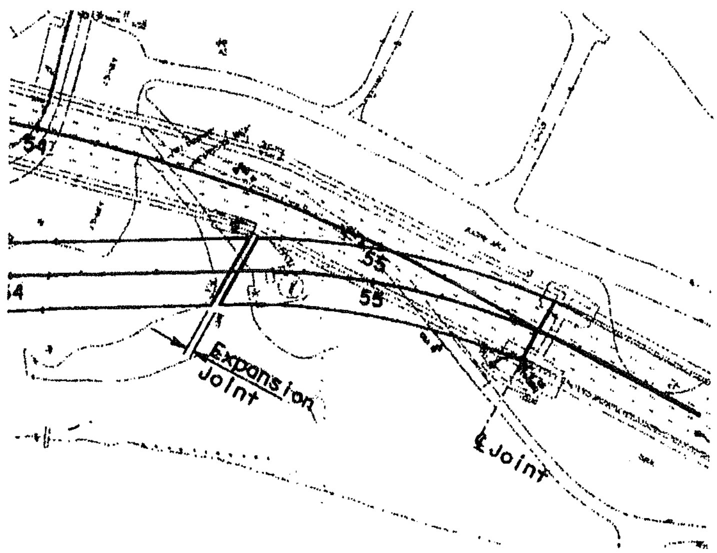


Figure 5.1

5.2 Seat Widths

Seat widths shall be sized such that joints can open fully under three times the DEE elastic response without losing seat on the bearings. Minimum gap lengths shall be the sum of magnitudes of relative longitudinal displacement responses (three times the elastic spectral displacements) for abutting structures. Minimum seat widths shall be in accordance with SDC.

6. BRIDGE DRAINAGE

Drainage for the Temporary Bypass Structure shall be designed in accordance with procedures and details outlined in Caltrans Memo to Designers 18-1 (June 1989) and Bridge Design Aids 17-1 (October 1989).

Drainage for the Temporary Bypass Structure is Class I. Drains shall not be within the lanes.

The transverse drainage of the roadway shall be provided by a suitable crown in the roadway surface and longitudinal drainage by camber or gradient. Water flowing downgrade in a gutter section shall be intercepted and not permitted to run onto the bridge. Longitudinal drainage on long bridges shall be provided and collected at inlets, which shall be of sufficient size and number to drain the gutters adequately. Downspouts, where required, shall be made of rigid corrosion-resistant material not less than 100mm in least dimension and shall be provided with cleanouts. The details of deck drains shall be such as to prevent the discharge of drainage water against erosion at the outlet of the downspout. Deck drains may be connected to conduits leading to storm water outfalls at ground level. Overhanging portions of concrete decks shall be provided with a drop bead or notch. The outlet of deck runoff shall be located at concrete lined v-ditches as shown on the contract plans.

7. GEOTECHNICAL AND FOUNDATION DESIGN

The design of the foundations will be based on the Eastbound Detour sections of "Geotechnical Foundation Report for Yerba Buena Island Approach and Self-Anchored Suspension Bridge" (100% Submittal), Fugro – Earth Mechanics JV, June 2002.

7.1 Earth Retaining Structures

Permanent and temporary ER structures will be based on the Eastbound Detour sections of "Geotechnical Foundation Report for Yerba Buena Island Approach and Self-Anchored Suspension Bridge" (100% Submittal), Fugro – Earth Mechanics JV, June 2002.

8. WEST TIE-IN OPERATIONS

(Section 8 Deleted)

9. TEMPORARY STABLIZATION FOR SPANS YB4 & YB3

9.1 General

Existing YB1 Span YB3 (Pier YB3 – Pier YB4) and Span YB4 (Pier YB4 – Pier E1) shall be stabilized prior to release of any existing anchorage of Span YB4 (at Piers E1 and YB4).

All connections to existing steel truss members shall be bolted. For connection design to existing truss, use allowable tensile stress of 140 MPa (20 ksi).

9.2 Anchorage of Span YB4 at Pier E1

Minimum temporary anchorage for span yB4 at Pier E1 prior to releasing existing anchorage (cut through shoe) and until transfer of span to skid beam or support for move-out, shall be:

i) 2400 kN at each bottom chord of N. & S. truss in the transverse direction

ii) 2400 kN in each bottom chord of N. & S. truss in the longitudinal direction.

9.3 Anchorage of Span YB4 at Pier YB4
Minimum temporary anchorage for span YB4 at Pier YB4 prior to releasing existing anchorage (cut through shoe) and until transfer of span to skid beam or support for move-out, shall be:

i) 2400 kN at each bottom chord of N. & S. truss in the transverse direction
ii) 2400 kN in each bottom chord of N. & S. truss in the longitudinal direction.

9.4 Restraint of Span YB3 at Piers YB3 & YB4
Minimum temporary restraint for span YB3, prior to releasing existing anchorage of Span YB4 and until complete removal of the span, shall be:

i) at Pier YB4, 2400 kN at each bottom chord of N. & S. truss in the transverse direction
ii) at Pier YB3, 2400 kN tie across each bottom chord of N. & S. truss between Spans YB2 and YB3, in the longitudinal direction.

10. EAST TIE-IN DESIGN

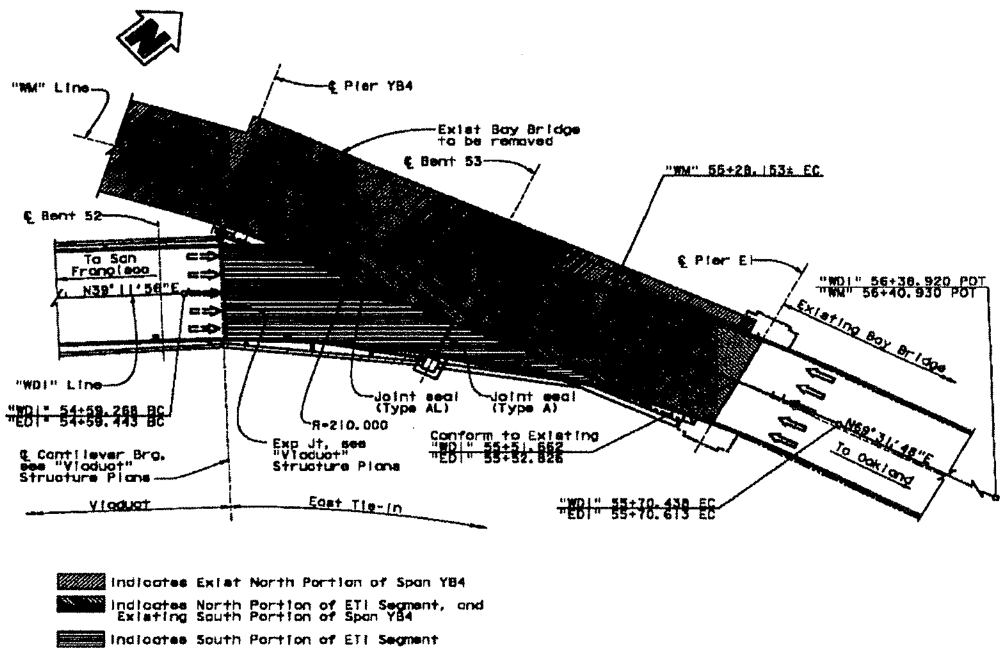


Figure 10.1: Plan View of the East Tie-In

The East Tie-In structure as shown in Figure 10.1 includes:

a) South Portions of East Tie-In
b) North Portions of East Tie-In (South Portion of existing South YB4 to remain)
c) North Portions of Existing YB4 to be removed

The East Tie-In consists of a new section, which is joined to the east end of the Viaduct and is connected to the south side of Span YB4 as shown in Figure 10.1. The truss opening is sufficient to maintain the horizontal alignment and to provide for five (5) lanes of traffic. Prior to the shifting of traffic and removal of the effected truss members the entire load of the South Truss will be transferred to the new structure as described in more detail for Stages 1 thru 5.

Shifting of traffic as called for in Stage 6 will be completed within the 24 hour allotted closure period. Having shifted traffic onto the new TBS the north side support of the East Tie-In will be constructed and portions of the north side of Span YB4 will be removed along with the north truss as shown in Stages 1 thru 9.

The East Tie-In is supported at its West End by a cantilever section extending beyond Bent 52, a new bent designated Bent 53 and existing Pier E-1. A modular expansion joint shall be at its West End placed to provide for both thermal and seismic longitudinal movements. The East Tie-In is tied both longitudinally and transversely to Bent E1.

The East Tie-In is composed of a structural steel frame supported by cantilevered arms of the steel viaduct, concrete Bent 53 and the existing E-1. The structural steel frame is composed of large steel box girder sections, which provide support for both the upper and lower decks. The superstructure is continuous from the cantilever end to Pier E1. The anchorage at Pier E1 shall be designed for D_{LS} providing a safety factor of 3 for the D_{LS} design earthquake of the East Tie-In. It is assumed that Pier E1 will resist the imposed seismic forces of the East Tie-In and the cantilever truss to the east of Pier E1 for DLS design earthquake. The longitudinal design displacement of Pier E1 for this event will be 50mm for DEE and 150 mm for DLS. The transverse design displacement is assumed to be zero.

A load limiting device as shown in Figure 4.7.1b is placed at the connection between Pier E1 and the East Tie-In. The load limiting device is unidirectional and will limit the loads imposed on the East Tie-In in the transverse direction.

10.1 Existing YBI Viaduct (Note that allowable strength limits are in accordance with Load Factor Design methods specified in BDS)

10.1.1 Reinforced Concrete Original 1934 (Assumed)

Concrete: $f'_c = 3000psi,\ f_c = 1200psi,\ n = 10$

Reinforcement: $f_y = 33ksi$

Unit weight (reinforced) = 150 pcf

Steel: $f_y = 36{,}000\ psi, fu = 55{,}000\ psi$

10.1.2 Structural Steel Original 1934: (Assumed)

$f_y = 37{,}000psi,\ f'_u = 62{,}000psi$ (carbon steel)

$f_y = 45{,}000psi,\ f'_u = 80{,}000psi$ (silicon steel)

10.1.3 Lightweight Concrete 1964 Modifications:

$f'_c = 4500psi,\ f_c = 1800psi,\ n = 15$

Reinforcement – Intermediate Grads:

$f_y = 40ksi$ per CRSI (As-Builts)

10.1.4 Structural Steel 1964 Modifications:

A440: $f_y = 45{,}000\ psi, fu = 55{,}000\ psi$

T1: $f_y = 100{,}000\ psi, fu = 115{,}000\ psi$

(Note test samples maybe taken for portions of YB4 Span to be removed)

11. EAST TIE-IN CONSTRUCTION STAGING AND OPERATIONS

The East Tie-In shall be constructed in stages as described herein. Each stage shall be designed to resist the imposed service loads and seismic loads. A typical section of the roadway at Bent 53 is shown in Figures 11.1 thru 11.9 to demonstrate the various stages. A typical section of the existing roadways supported by the YB4 Span Truss is shown in Figure 11.0. There are five (5) lanes of traffic in each direction, the upper deck carrying west bound traffic and the lower deck carrying east bound traffic.

Sensitivity Studies:

Sensitivity studies may be conducted prior to the load transfer to help ascertain if members or joints will be overstressed. If there are some anomalies that occur during jacking operations it has been proposed to do a sensitivity study using a variation of 25 percent of the predicted jacking values. Having conducted an analysis using the results of the sensitivity studies prior to the jacking operations, tolerances may be established to avoid overstressing.

Stress Consideration:

Throughout the jacking and demolition operations, stresses due to a combination of dead loads and jacking loads in the existing truss members and their end connections shall not exceed 90% of their strength limits (i.e., f_y for tension and f_{cr}, for compression members) to avoid any permanent deformations of components, which will remain in service as part of the completed ETI.

Stability Considerations:

Throughout the jacking and demolition operations, stability of existing truss verticals shall be ensured by providing temporary or permanent lateral supports or positive connections to other stable members where such need is substantiated through analysis.

Deactivations and Demolitions:

No truss members shall be deactivated when subjected to stresses anticipated in excess of 10% of its capacity.

11.1 Construction Staging

This section describes the construction staging that shall be used for the East Tie-In structure. A survey will be conducted, prior to construction, jointly by Caltrans and C.C. Myers qualified engineers to establish the existing condition of Span YB4. All components to be incorporated in the final bridge will be inspected to determine their condition for the design. Additionally, the survey will establish a base line from which to determine any damage that could result from the load transfer. It is currently anticipated that this survey will be done during a routine

Caltrans bi-annual maintenance inspection and the cost for equipment and access will be born by Caltrans.

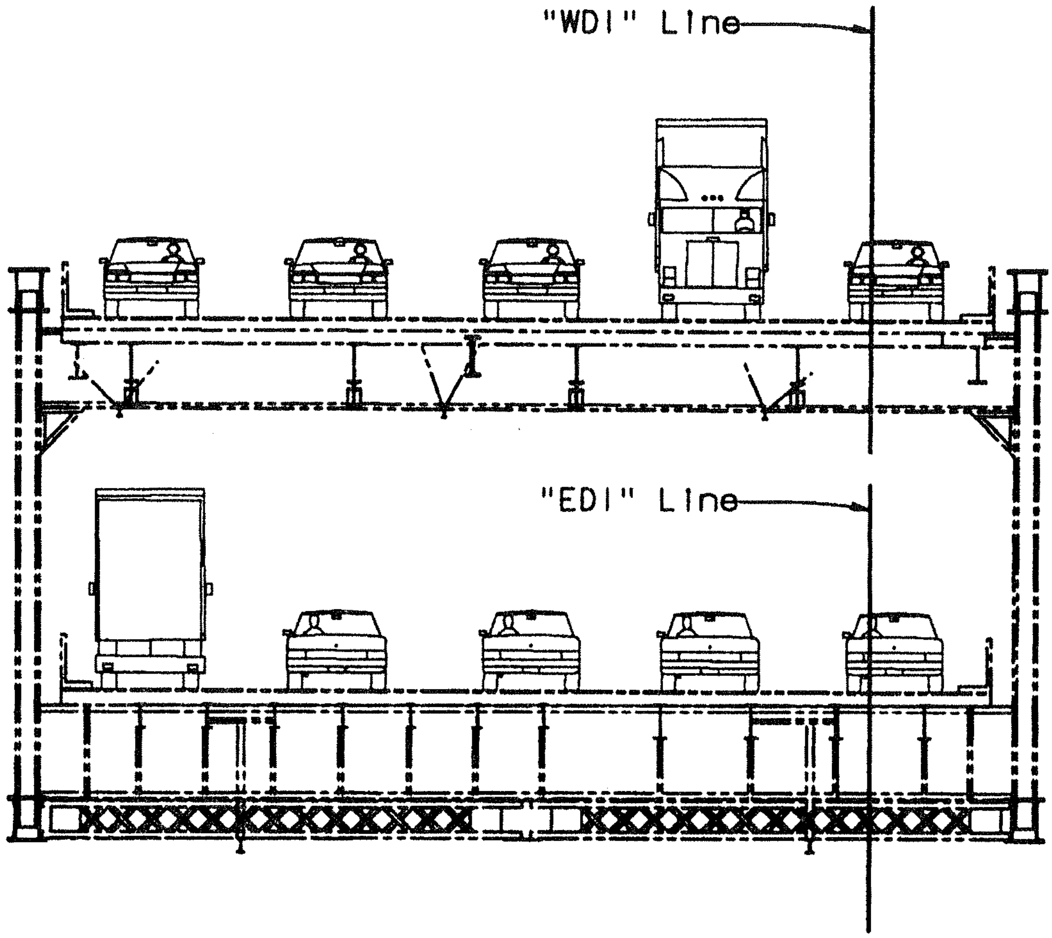


Figure 11.0: Typical Section-Existing YB4 Truss Span

STAGE 1

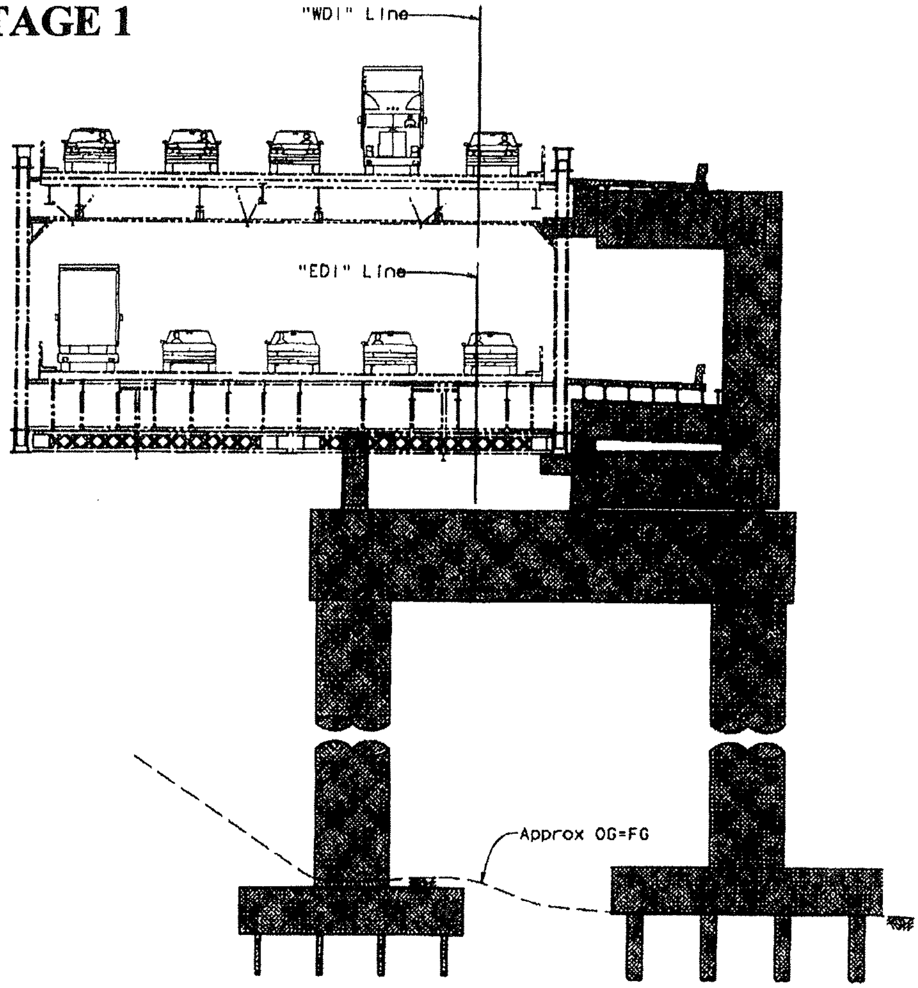


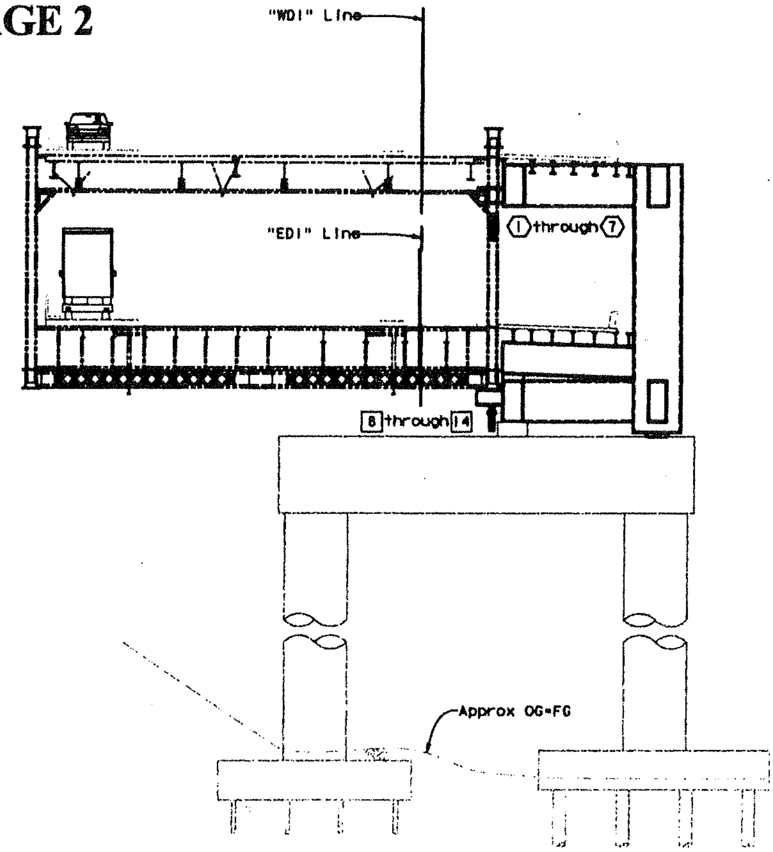
Figure 11.1: Stage 1 – Construction of South Segment Prior to Connection

Stage 1 as shown in Figure 11.1 basically includes the construction of the new South Segment prior to the connection to the existing Span YB4. At this stage the existing span is in its as-built condition. The South Segment is complete with decking to the closure pour. The construction of the concrete Bent 53 is complete and supporting the steel box sections are in place. The barriers along the south edge of the roadway are also in place. The connections to existing YB4 includes:

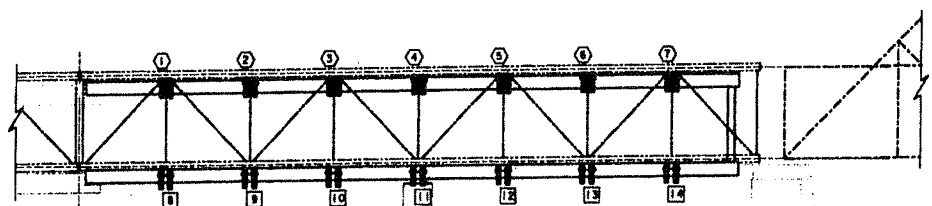
Upper Deck Jacking Brackets and Pedestals
Lower Deck Jacking Brackets and Pedestals
Steel Posts and Bracket connections to Existing Floor Beams
Steel Pedestals Supporting Lower Deck Floor Beams

At the completion of this stage there is no connection between the new and the existing structures.

STAGE 2



a) Typical Section View



JACKING REACTION TABLE

JACKING POINT LOCATION	* REACTION IN EXISTING TRUSS @ JACKING LOCATIONS	JACKING CAPABILITY (kN)
1	299.5	4 @ 441.70 = 1766.80
2	245	4 @ 441.70 = 1766.80
3	297	4 @ 441.70 = 1766.80
4	252	4 @ 441.70 = 1766.80
5	261	4 @ 441.70 = 1766.80
6	249	4 @ 441.70 = 1766.80
7	252.5	4 @ 441.70 = 1766.80
8	243	2 @ 883.40 = 1766.80
9	294.5	2 @ 883.40 = 1766.80
10	245	2 @ 883.40 = 1766.80
11	261	2 @ 883.40 = 1766.80
12	242	2 @ 883.40 = 1766.80
13	257	2 @ 883.40 = 1766.80
14	248.5	2 @ 883.40 = 1766.80

* ESTIMATED AS DEAD +½ LIVE LOAD

b) Elevation View

Figure 11.2: Load Transfer of South Segment
Stage 2

Stage 2, as shown in Figure 11.2, involves the load transfer of the South Truss from the YB4 span to the new South Segment. This stage begins with the installation of the jacking system and the geometry monitoring system. The jacking system consists of lock nut hydraulic cylinders (jacks), calibrated pressure gauges, a hydraulic pressure source (pump) and the jacking control system (distribution manifold(s) and valves). The geometry monitoring system shall consist of strategically placed control point targets and optical surveying instruments with distance measuring capabilities (total station). The jacking and geometry monitoring systems shall be such that the jacking pressures and the structure geometry can be measured at any time during the load transfer.

Calibrated pressure gauges for each jacking location will be used to monitor the total jacking load applied. The total jacking load applied at a jacking point will be determined as the product of the effective cylinder area(s) and the calibrated pressure. Each pressure gauge will be calibrated and certified at the manufacturer's facility and the corresponding documents submitted for field use. The effective cylinder areas will be certified by the jack manufacturer. The jacking control system shall be capable of isolating any and all jacking locations for individual adjustment of the applied jacking load. A schematic drawing shall be provided showing all components of the jacking system and the hydraulic circuits.

Absolute structure displacements shall be kept within ±150mm of the current roadway position and the induced roadway superelevation must be maintained to within ±0.5 percent. During the jacking operation the hydraulic jack pistons cannot be extended more than 10mm above the hydraulic cylinder without a redundant support system. When public traffic will be carried over the bridge during jacking operations, the Contractor's jacking method shall include provisions for blocking up the superstructure from the new beams or falsework such that there will be a gap of less than one inch between the falsework and the superstructure during all phases of the jacking operations.

The superstructure shall be jacked and adjusted to grade uniformly and in such a manner that a roadway satisfactory for the used of public traffic is provided in conformance with the provisions in Section 7-1.08, "Public Convenience," of the Standard Specifications.

Description:
- Existing truss in its as-built condition still in service
- Jacking system installed includes jacking brackets
-Jacking is performed simultaneously at all jacking points to raise the south truss and reduce the predicted pre-existing dead load and anticipated live load member forces to nearly zero. This zero member-force condition exists when the south truss is raised by applying prescribed jacking loads not to exceed the fabricated no-load camber as determined from the archives of design and shop drawings. Once this condition is achieved, the lock nuts on the jacks are seated. Any additional live load will be carried by the mechanically locked jacks. The jacking loads are established from the dead loads of existing YB4 (i.e., dead load shears of existing floor beams and tributary weight of truss members at every panel point plus to appropriate live load as described below.

-Pressure transducers for each jack will be used to monitor the total jacking load applied to be:

- Not more than the estimated dead load reactions if the bridge is temporarily closed to traffic
- Not more than the estimated dead load reactions plus 50% of the live load if the bridge is partially closed
- Less than or equal to the dead load reactions plus the full live load.

-Displacement transducers will be used to monitor and adjust elevations and relative displacements of the two structures at each jacking point.
-Traffic on the south side shall be significantly reduced (Through 3 or more lane closures, after midnight) for a few hours.

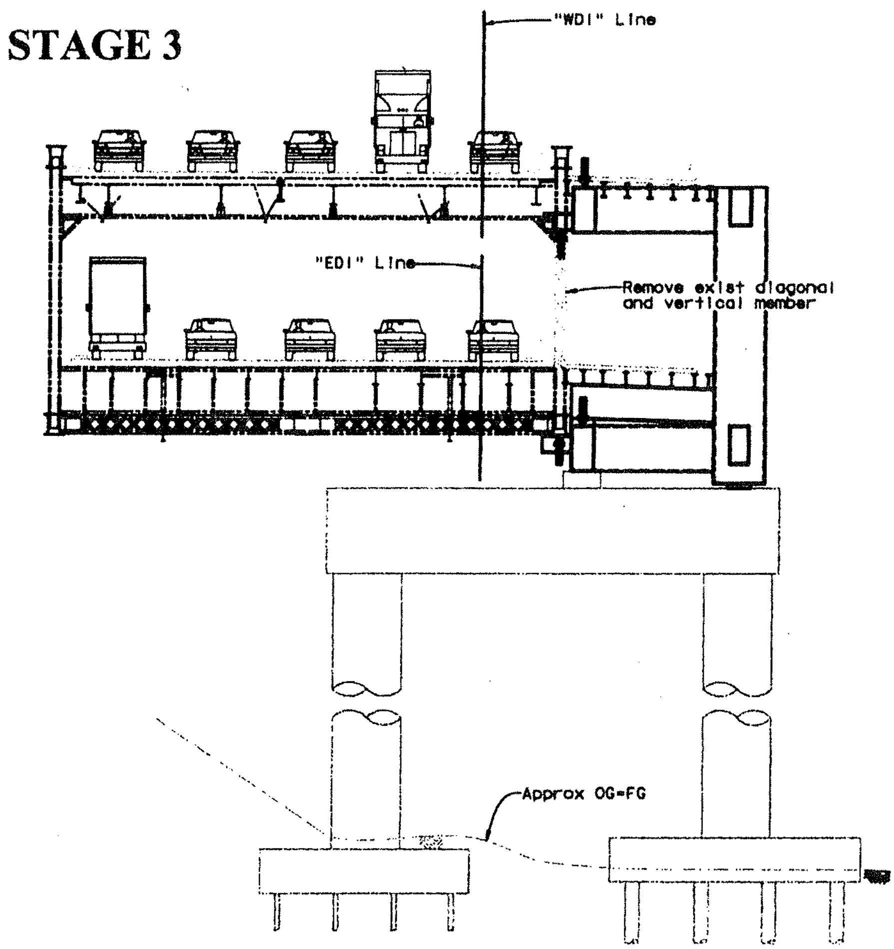


Figure 11.3: Stage 3 – Removal of Portions of South Truss

Description:

-Diagonal, vertical and top chord members of the south truss will be deactivated (cut) in a predetermined sequence while each jacking point is supported by the mechanically

locked jacks. At any time during the deactivating process the applied jacking load at any point can be determined by performing a hydraulic lift-off of the locking nut(s). Load and geometry adjustments can be performed at any time during the deactivation process.
-Upon removal of a truss member, the hydraulic Jacks in the locked condition will carry any new live loads and any dead loads (in addition to those estimated) of the south truss, however the north truss will still be carrying its share of the loads.
After cutting, comparison of the actual jacking with the analytical results will be made and necessary adjustment will be made for subsequent cutting.

DL: +Existing YB4 Truss
+Entire Existing Deck
- Jacking Dead Loads, Existing
LL: - Reduced Lanes of Traffic (Maximum 5)

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Jacking Dead Loads, New
LL: +Tributary Live Load Transfer due to Jacking, (Maximum 1/2 of full 5 lane of traffic)

STAGE 4

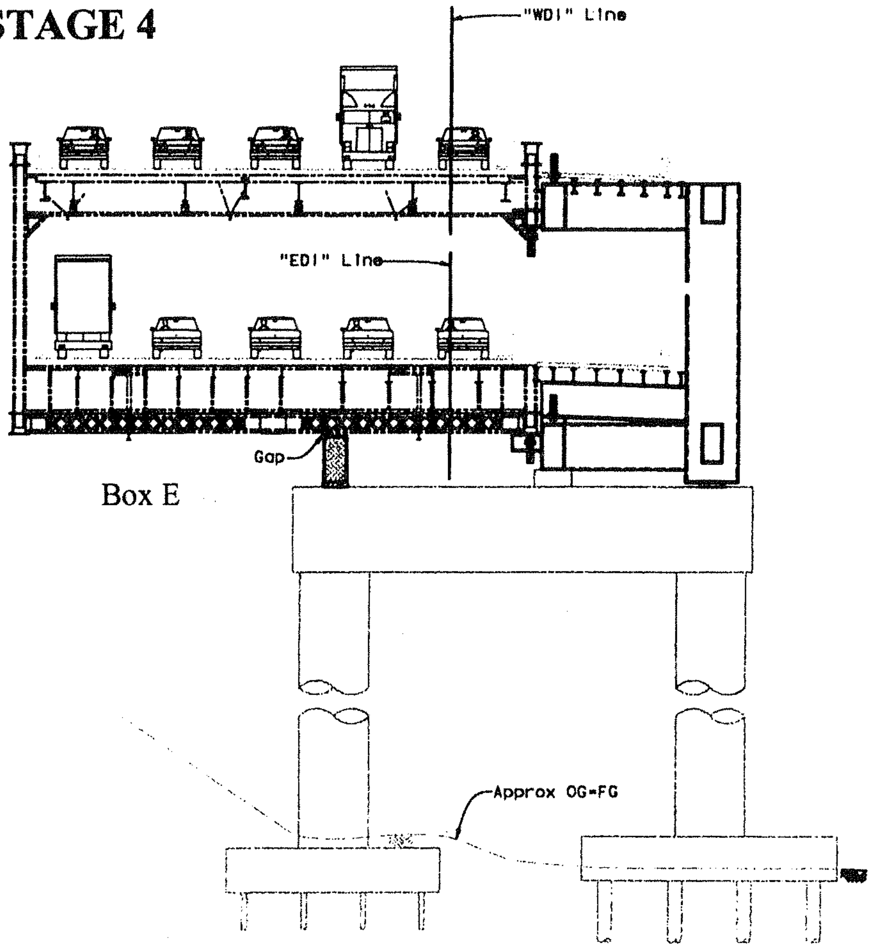


Figure 11.4: Stage 4 – Construction of North Segment Support System

Stage 4 will include the placement of the North Box Girder E as shown in Figure 11.4. The existing North Truss will remain in service. No load transfer to girder "E" will occur in this stage. The pedestals will be placed, but not yet bolted to the floor beams.

- Description:

-Existing north truss in its as-built condition still in service
-The north box girder 'E' is erected.
-Pedestals are erected but not bolted to floor beams.
- During this stage, no load transfers from lower deck to box 'E' is assumed.

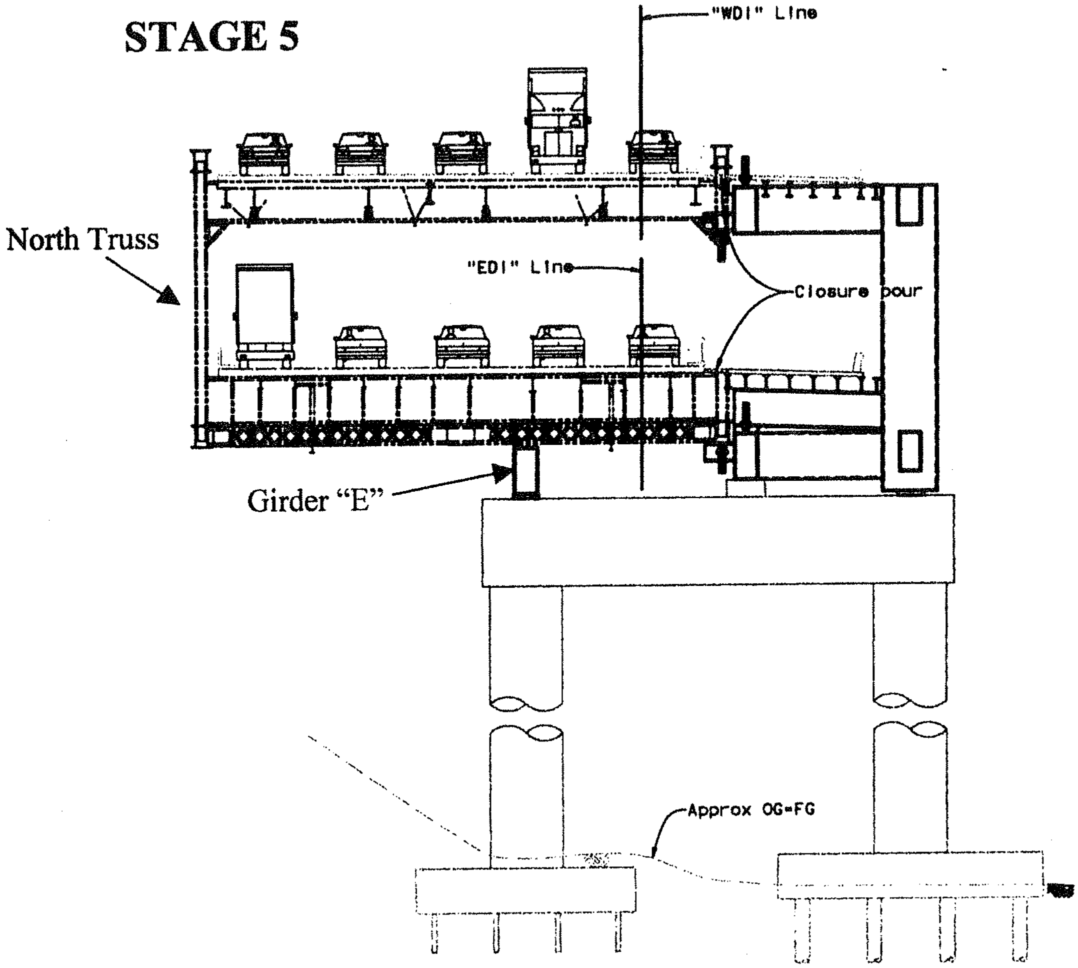


Figure 11.5: Stage 5 – Closure Pour for South Segment

As shown in Figure 11.5 this stage includes the closure pour between the South Segment and the south edge of the existing Span YB4. Note that the existing North Truss is still in position in the as-built condition. There is no load transfer to Box E during this stage.

STAGE 6

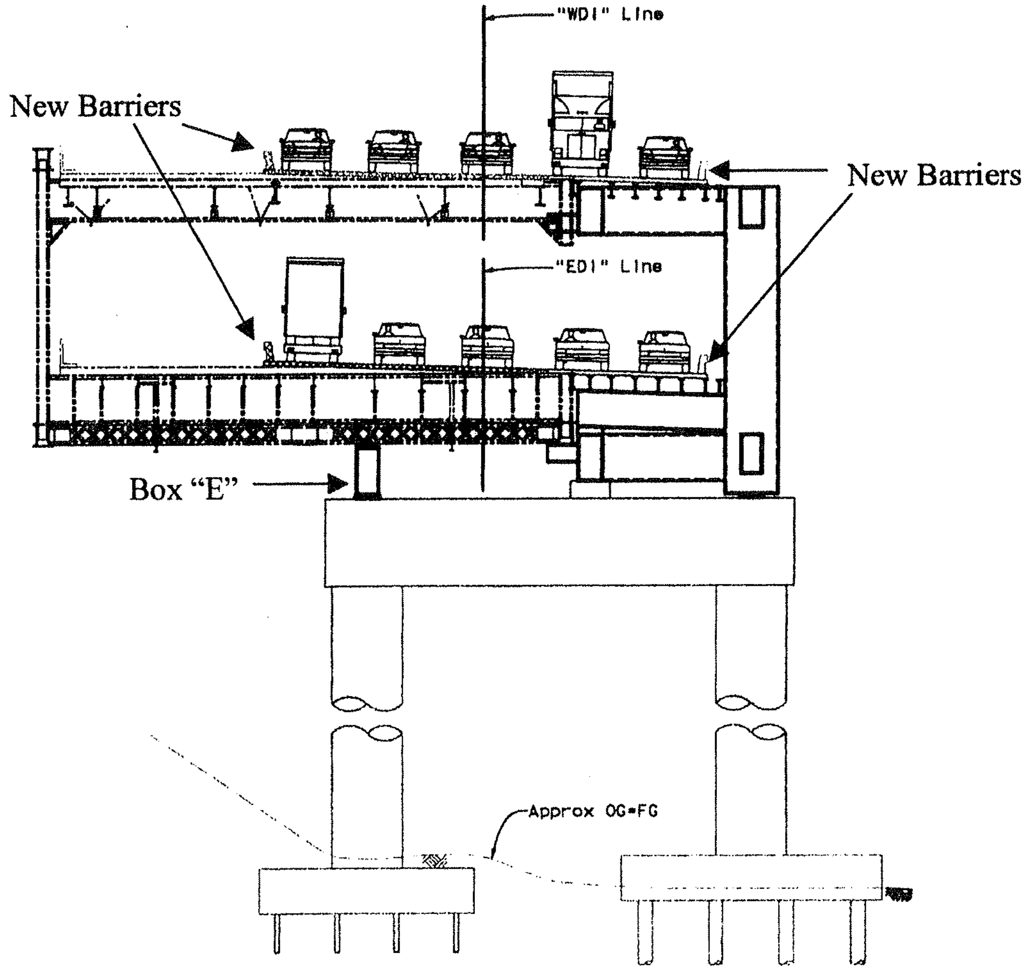


Figure 6: Stage 6 – Traffic Shift

Stage 6 is the barrier change on the north side and the traffic change onto the new South Segment. The existing North Truss in the existing condition is still in service. The pedestals are shimmed to snuggly fit against the floor beams for fastening. A small portion of the live loading will be transferred to Box E at this stage.

STAGE 7

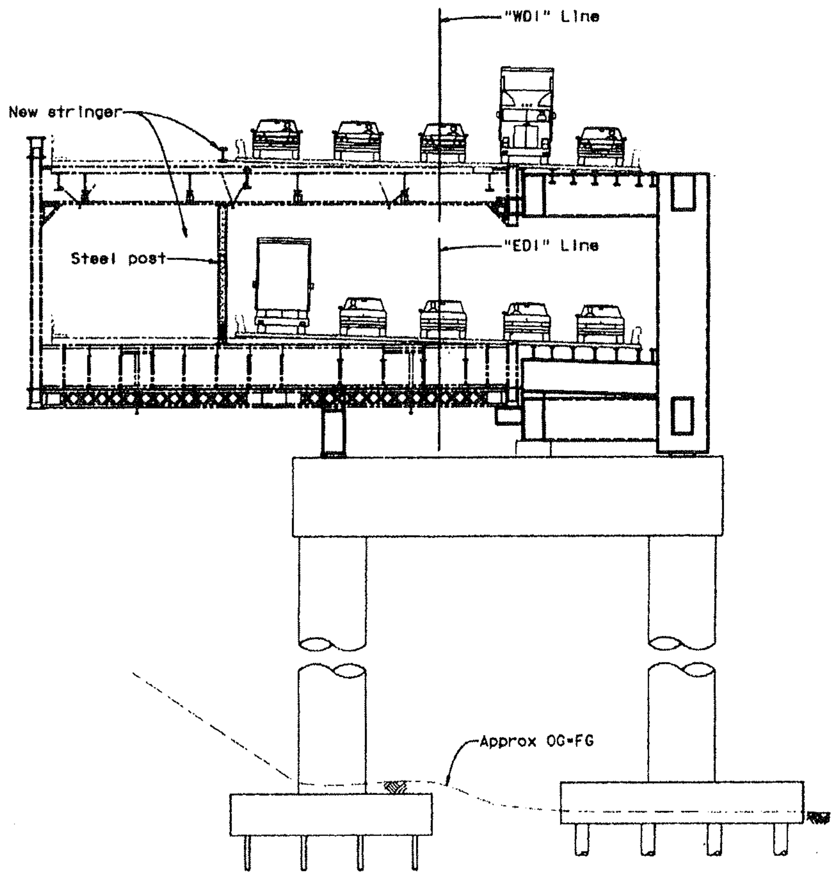


Figure 11.7: Stage 7 – Placement of Upper Deck Support

Stage 7 as shown in Figure 11.7 includes the placement of the stringers on the upper and lower decks, which are tied to the concrete deck. The steel posts are erected to fit snuggly between the upper and lower floor beams. Following the placement of the vertical posts the steel cross bracing and brackets shall be installed to provide stability to the post both in plane and out of plane of the braced frame system. The load transfer from the upper deck to the lower deck and ultimately to the Box E is limited at this stage with the North Truss still a major part of the total load resisting mechanism.

DL:	+Existing YB4 Truss	
	+Entire Existing Deck	
	- Jacking Dead Loads,	Existing
LL:	+ X Lanes of Traffic	

DL	+New Steel Frame	
	+New Concrete Deck	
	+New Barriers	
	+Jacking Dead Loads,	New
	+ Full Weight Deck Closure,	

LL: +Tributary Live Load, Transfer due to Jacking,
+4 Lanes of Traffic

<u>Description:</u>

- Existing north truss in as-built condition still in service.
-The steel posts are erected by lightly jacking to fit between the floor beams above and below.
- The steel cross-bracings and brackets are installed to provide stability of post in both in-plane and out of plane of the braced frame system.
- Erect new stringer and anchor to deck to support north portions of the deck prior to demolition.
-Load transfer from upper and lower deck to box 'E' is assumed limited, considering that the north truss is still in service and mainly carrying the loads.

STAGE 8

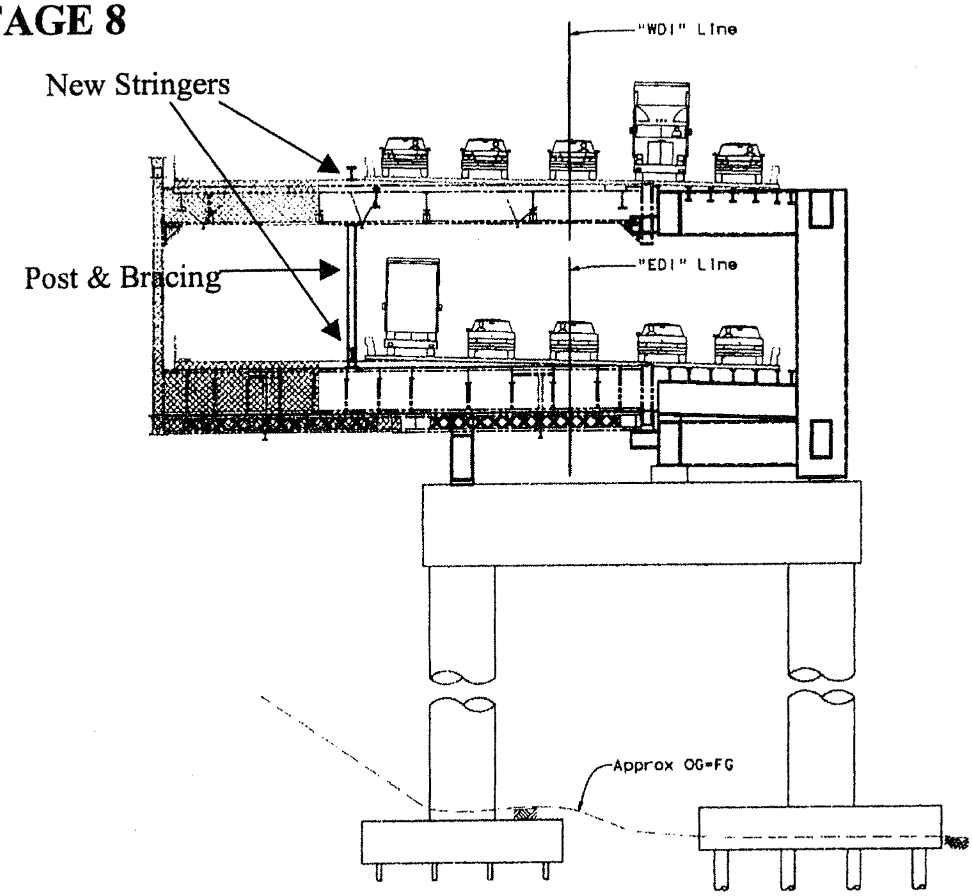


Figure 11.8: Stage 8 – Load Transfer and Demolition of the North Portion of the Span

This stage includes the load transfer from the existing North Truss to Box Girder E and removal of the north portions of the upper and lower decks and the North Truss.

DL: +Remaining South Portions of Existing Deck

- Reduced Jacking Dead Loads, Existing
LL: + X Lanes of Traffic

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Reduced Jacking Dead Loads, New
+ Full Weight Deck Closure,
LL: +Tributary Live Load, Transfer due to Jacking,
+ Y Lanes of Traffic

Description:

- Demolish north portions of the upper and lower decks.
- Flame cut north portions of upper and lower deck floorbeams while adequately bracing the north truss.
- Upon cutting of the floor beams and removal of the north truss, all dead and live loads of the remaining portions of the existing truss will be carried by box E.

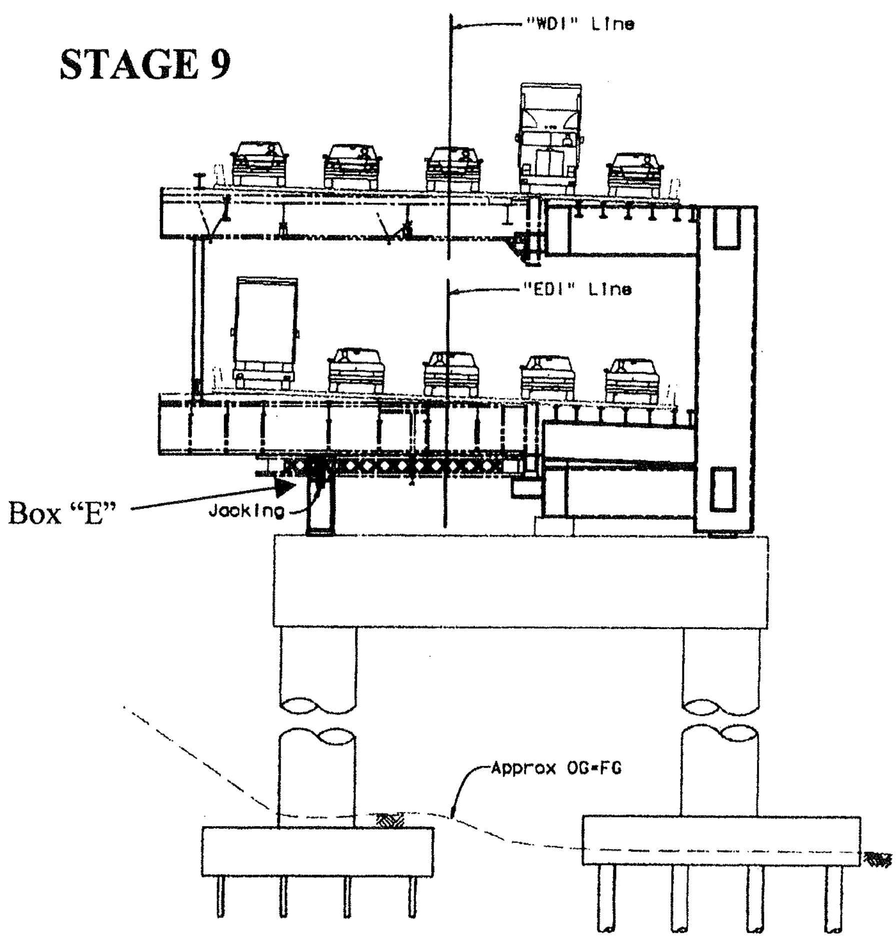


Figure 11.9: Stage 9 –
Adjust Profile and Superelevation

DL: +Remaining South Portions of Existing Deck
- Reduced Jacking Dead Loads, Existing
LL: + X Lanes of Traffic

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Reduced Jacking Dead Loads, New
+ Full Weight Deck Closure,
LL: +Tributary Live Load, Transfer due to Jacking,
+ Y Lanes of Traffic

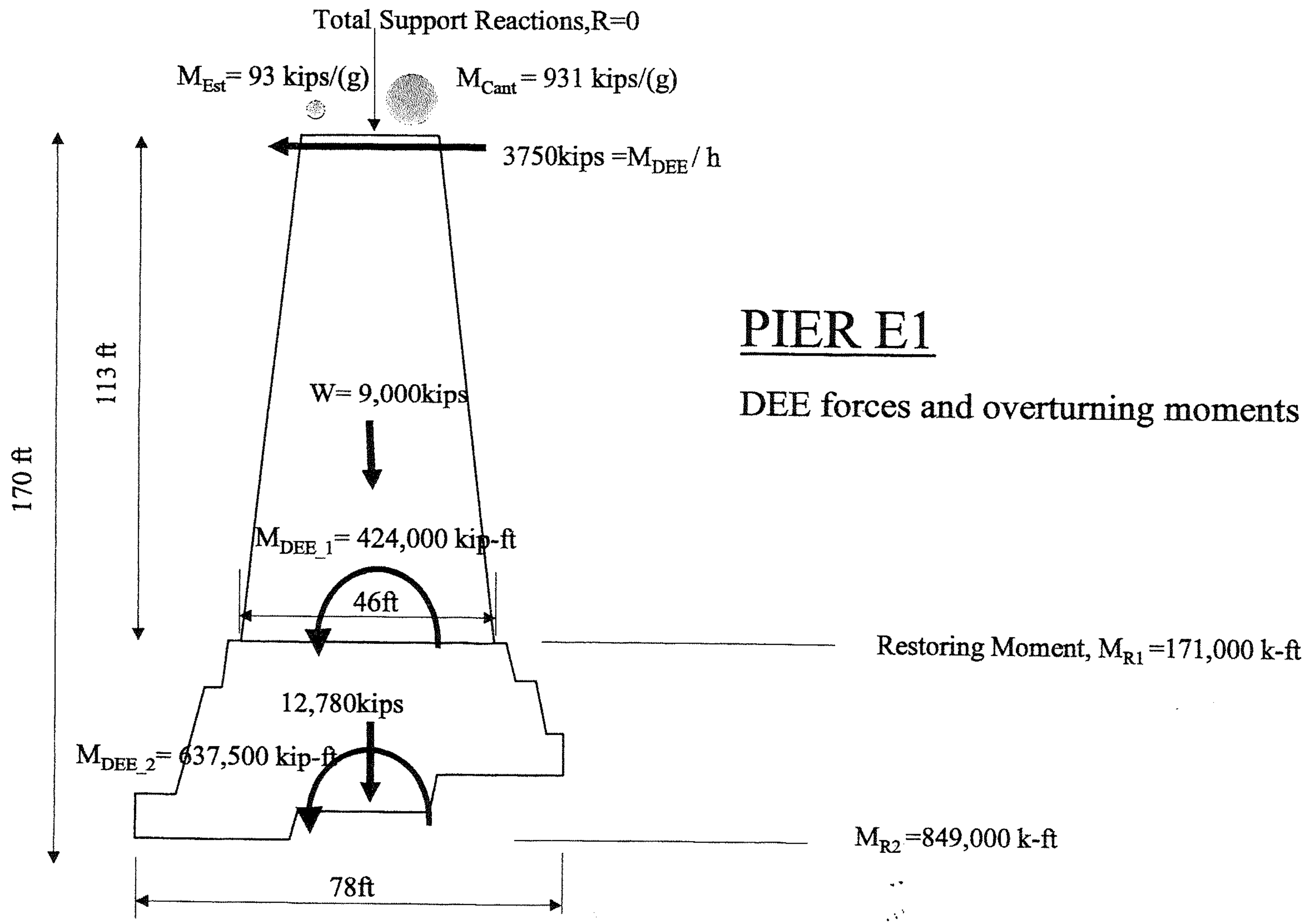
Description:

-Adjusting the elevation of the lower and upper deck floor beams by simultaneously jacking at all floor beam pedestals supported on Box E.
-Placing shim plates and permanently bolting of pedestals to Box E.

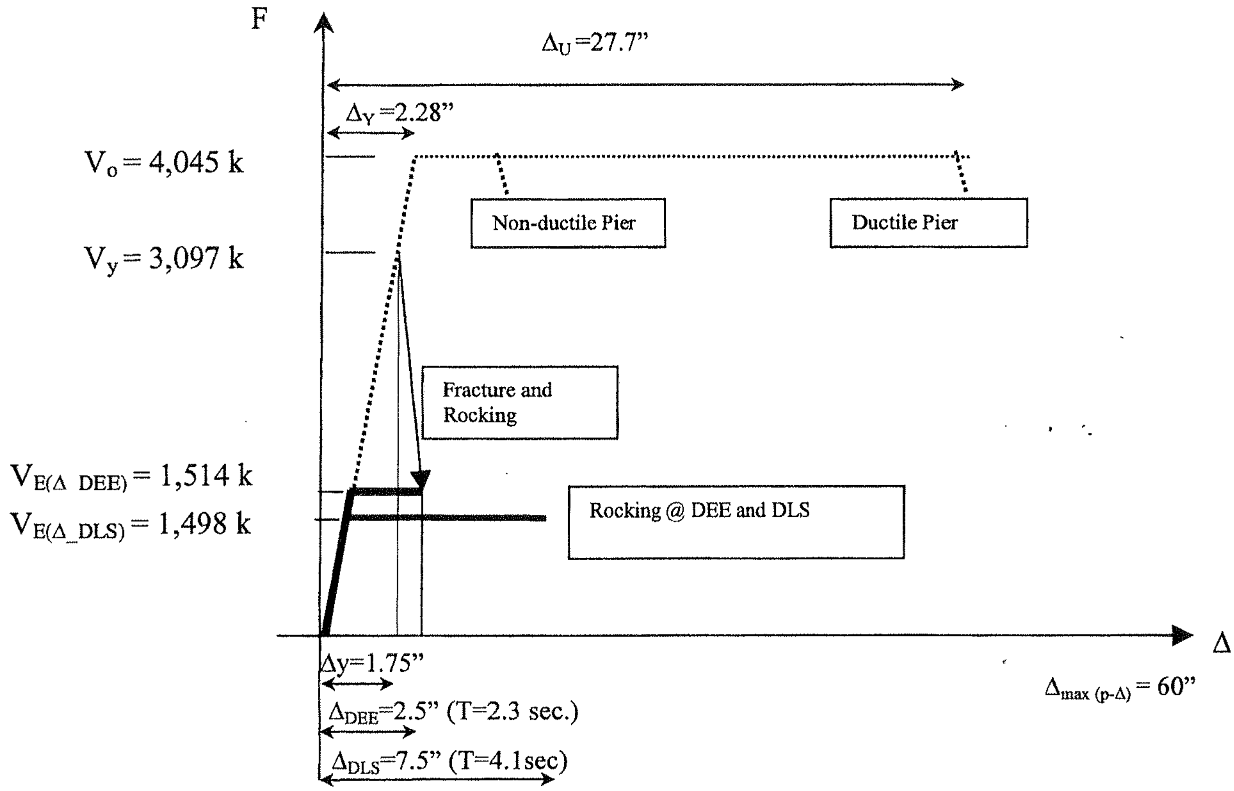
APPENDIX A

PIER E1

DEE forces and overturning moments



Rocking analysis and pier pushover displacements



Δ_U = Displacement Capacity of Pier E1, assuming full ductility
Δ_Y = Idealized yield displacement of Pier E1
Δy = yield displacement at initiation of steel bar yielding
Δ_{DEE} = Rocking displacement response at DEE
Δ_{DLS} = Rocking displacement response at DLS (3 x DEE)
V_o = Overstrength Shear Capacity of Pier E1
V_o = Shear Capacity corresponding to initial Yielding of Pier E1
$V_{E(\Delta\_DEE)}$ = Overturning Rocking Force at DEE Displacement
$V_{E(\Delta\_DLS)}$ = Overturning Rocking Force at DLS Displacement

Capacity check of Pier E1

1. Demand forces and bending moment at bottom of Pier E1

Table 1: Forces and bending moments at bottom of Pier E1 (either south or north side)

	DL	EQ1 = L+0.3(T+V)	EQ2 = T+0.3(L+V)	EQ3 = V+0.3(L+T)	DL+EQ1	DL+EQ2	DL+EQ3
P (kips)	-12300	10100	13900	5800	-2200	1600	-6500
QL (kips)	0	4500	3170	1800	4500	3170	1800
QT (kips)	0	2100	2830	1200	2100	2830	1200
ML (kip-ft)	0	424000	300000	172000	424000	300000	172000
MT (kip-ft)	0	60000	77200	33000	60000	77200	33000

In table 1, P is the axial force, minus means in compression and plus means in tension. The values under the load cases EQ1, EQ2 and EQ3 could be in tension and compression. QL and QT are the shear forces in longitudinal and transverse directions, respectively. ML and MT are the bending moments in longitudinal and transverse directions, respectively. The critical load case is DL+EQ1 shown in table 1, which has 2000 kips tension forces and has the largest bending moment (424,000 kip-ft) in longitudinal directions at the bottom of Pier E1.

2. Bending moment capacity at bottom of pier E1 based on section analysis

Section analysis was carried out using the program XTRACT. The material properties used in the section analysis are:

Yield stress of rebar: 36ksi
Failure strain of rebar: 9%
Concrete 28-day compression strength: 4ksi (unconfined concrete)
Tension strength of concrete: 0.4ksi
Failure strain of concrete: 0.5%

Because there is no sufficient transverse reinforcement, no confined concrete was considered in the section analysis.

Based on the forces and bending moment shown in table 1, the net axial force associated with the maximum bending moment in the load case of DL+EQ1 is 2000 kips compression. The section and moment curvature obtained from the XTRACT program output are shown in Figure 1 and 2. There are 336 longitudinal reinforcement bars with 1.25 X 1.25 inches square section. The total concrete section area is 924 square feet. The total reinforcement area is 3.642 square feet. Then the reinforcement ratio is only 0.39%.

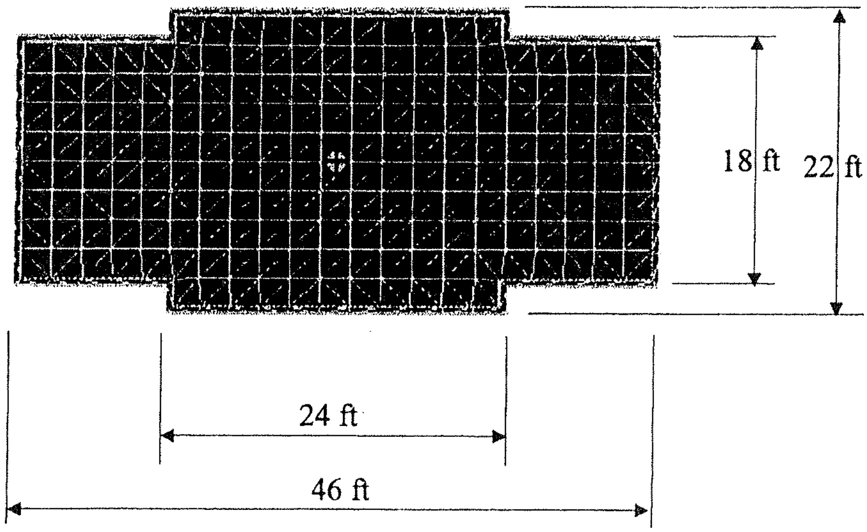


Figure 1: Section shape at bottom of Pier E1 (either south or north side)

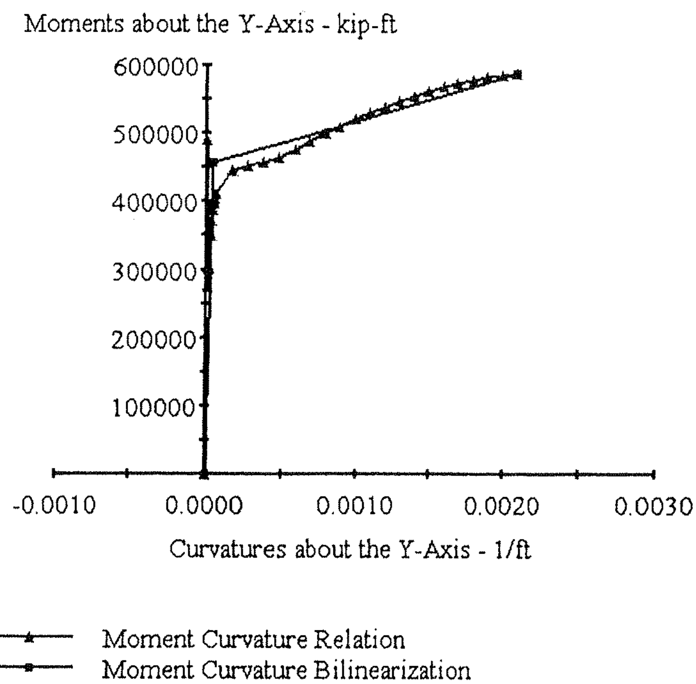


Figure 2: Bending moment vs. curvature at axial force 2000 kips

The bending moment capacity when the rebar begins to yield is 350,000 kip-ft. The nominal bending **moment when** maximum stress at extreme concrete fiber reaches rupture stress 475psi is 455,000 kip-ft.

Ductility evaluation using pushover analysis

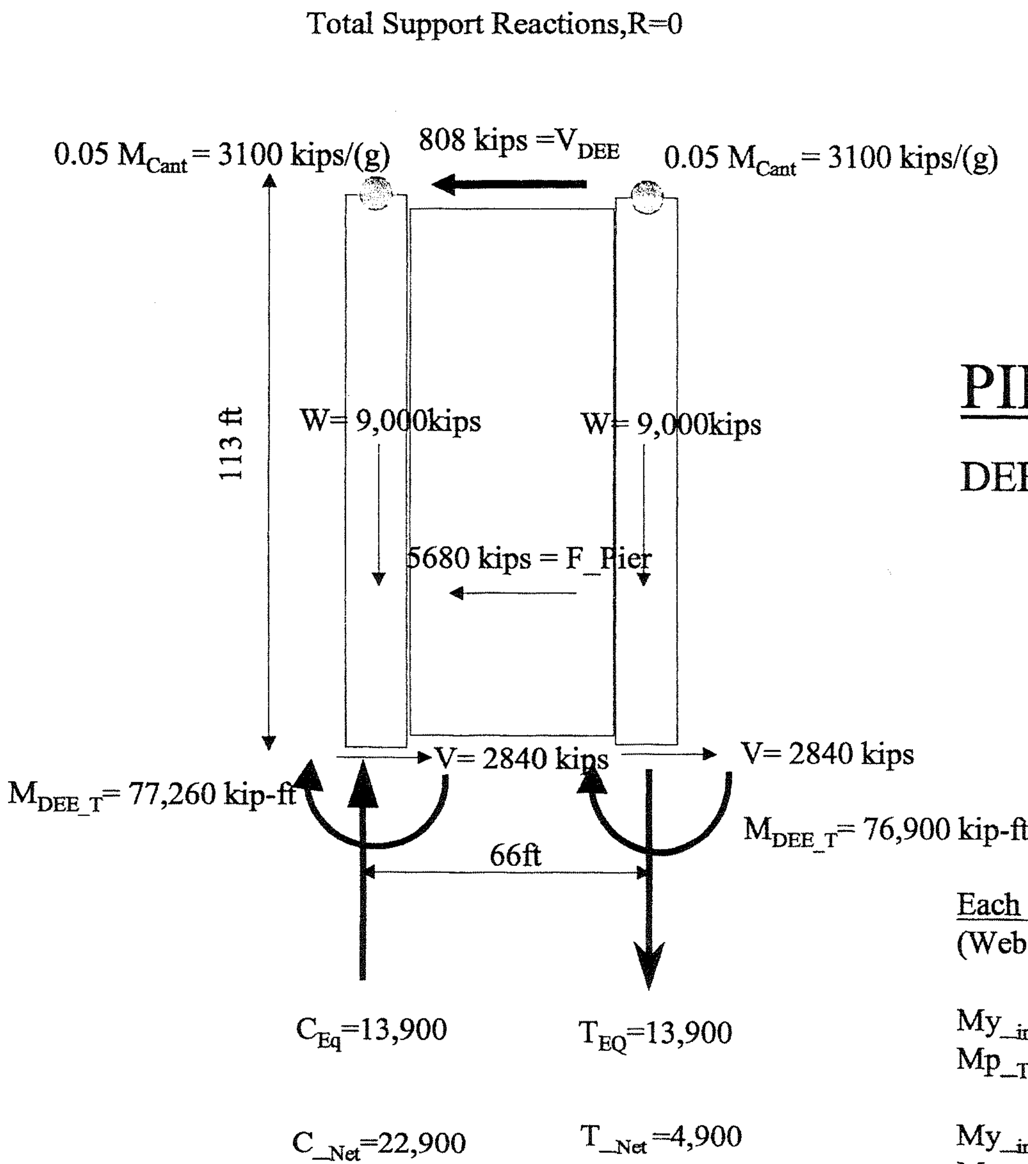
1	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
P(kips)	Rebar	L(ft)	d (in)	Lp(ft)	ϕ_y	ϕ_u	Mp(kip-ft)	$(EI)_{eff}$	K_{eff}	Vp(kips)	Δy(ft)	θp	Δp(in)	Δu(in)	DEE(in)	3*DEE(in)
2000	0.39%	113	1.27	9.61	4.48E-05	0.00208	457100	1.021E+10	21238	4045	2.28	0.0196	25.4	27	3.27	9.82

Note that:

1) P is axial load acting at either top or base of the column under DL+EQ
2) D is the diameter of the column
3) Rebar means the longitudinal rebar ratio
4) L is the column length between column top and top face of footing
5) d is the diameter of the longitudinal rebar
6) Lp is the plastic hinge length that calculated from $Lp=0.08L+0.15f_yd$
7) ϕ_y is the effective yield curvature from section analysis
8) ϕ_u is the ultimate curvature obtained from section anlaysis
9) M_p is effective plastic moment
10) $(EI)_{eff}$ is effective bending stiffness of the column = M_p / ϕ_y
11) K_{eff} is effective shear stiffness of the column = $3(EI)_{eff} / L^3$
12) V_p is shear force based on the effective plastive moment divided by column length = M_p/L
13) Δ_y is the elastic deformation capacity = V_p / K_{eff}
14) θ_p is rotation angle of the plastic hinge = $L_p(\phi_u - \phi_y)$
15) Δ_p is the plastic deformation capacity due to the rotation of plastic hinge = $\theta_p(L-L_p/2)$
16) Δ_u is the total deformation capacity of the column = $\Delta_y + \Delta_p$
17) 3*Spect is 3 times of the deformation demand under project spectrum
18) 0.10g is the deformation demand under 0.1g static force
19) Wind is the deformation demand under wind load
20) D/C is the maximum deformation demand (here is under 0.1g) divided by deformation capacity Δ_u

PIER E1- Transverse

DEE forces and Capacities



Overturning Moment, Mo_1 =1,070,000 k-ft

Restoring Moment, M_{R1} =594,000 k-ft

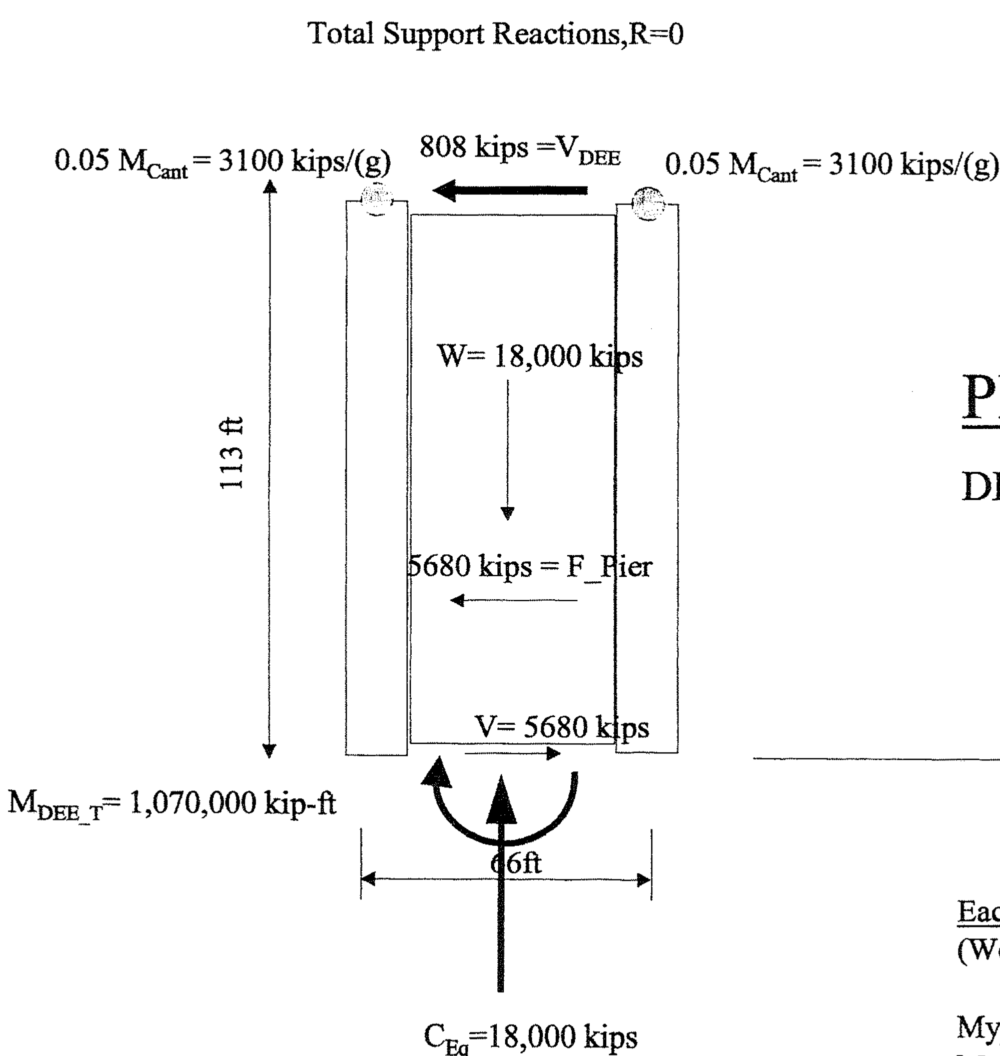
<u>Each Piers Section Capacity</u>
(Web wall capacity excluded)

$My_{\_init}$ = 122,600 kip-ft (Due to Combined T)
$Mp_{\_T\_}$ = 177,000 kip-ft (Due to Combined T)

$My_{\_init}$ = 349,200 kip-ft (Due to Combined C)
$Mp_{\_C\_}$ = 400,000 kip-ft (Due to Combined C)

PIER E1- Transverse

DEE forces and Capacities



Overturning Moment, Mo_1 =1,070,000 k-ft

Restoring Moment, M_{R1} =594,000 k-ft

<u>Each Piers Section Capacity</u>
(Web wall included)

$My_{\_init}$ = 1,995,000 kip-ft
$Mp_{\_T\_}$ = 2,400,000 kip-ft

C.C. MYERS, INC.
An Equal Opportunity / Affirmative Action Employer

51 MACALLA ROAD
SAN FRANCISCO, CA 94130

415-399-0175
FAX 415-399-0587

SUBMITTAL

Document No: 215-SUB.00061 - 00	
Dated: Nov 30 2004	**Job No.:** 215
Attention: Mr. Lourdes David	
RE: 04-0120R4	
San Francisco Oakland Bay Bridge	
Temporary Bypass Structure	

To: State of California
Department of Transportation
333 Burma Road
Oakland CA 94607

Item	Date	Copies	Description	Drawing No	Rev	Status	Pages
01	Nov 22 2004	6	East Tie-In Draft Design Criteria		0	Pending	

Remarks:

Copy To: Main Office

File: 215-101

Signed: <<< Original Signed >>>
Robert W. Coupe
Project Manager

3286 Fitzgerald Road, Rancho Cordova, CA 95742, Tel No. 916-635-9370 Fax No. 916-635-1527

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company
9912 Business Park Drive, Suite 130
Sacramento, CA 95827
(916) 366-0632 FAX (916) 366-1501

LETTER OF TRANSMITTAL

Lance

48

TO: C.C.Myers, Inc.
P.O. Box 2948
3286 Fitzgerald Road
Rancho Cordova, CA 95742

DATE: November 30, 2004

IMBSEN JOB NO.: 1295

ATTENTION: Mr. Bob Coupe

RE: East Tie-In Informational Package Submittal

cc: File
Majid

WE ARE SENDING YOU ☒ **Attached** ☐ **Under separate cover via** _____ **the following items:**

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of Letter ☐ Change order ☐

COPIES	DATE	NO.	DESCRIPTION
4	11/30/2004		CD's with electronic files of East Tie-In Design Plans
5	11/30/2004	83	11x17 East Tie-In Design Plans
2	11/30/2004	3	Binder of Design Calculations ETI Superstructure
2	11/30/2004	1	Binder of Check Calculations ETI Superstructure

THESE ITEMS ARE TRANSMITTED as checked below:

☐ For approval
☒ For your use
☐ As requested
☐ For review and comment
☐ FOR BIDS DUE _____

☐ Approved as submitted
☐ Approved as noted
☐ Returned for corrections
☐
☐ PRINTS RETURNED AFTER LOAN TO US

☐ Resubmit _____ copies for approval
☐ Submit _____ copies for distribution
☐ Return _____ corrected prints

REMARKS:

Attached are the additional copies which you requested.

cc: File 1295.540.03

SIGNED Roy A. Imbsen
Dr. Roy Imbsen
Project Manager

 If enclosures are not as noted, kindly notify us at once.

CC MYERS INC.

(49)

Document No.: 215-STL.00058

December 01, 2004

State of California
Department of Transportation
333 Burma Road
Oakland, CA 94607

Temporary Bypass Structure
Contract No. 04-0120R4
CCM Job # 215

Attn: Mr. Lourdes David
Resident Engineer

Re: East Tie-In Design Criteria Submittal

Dear Mr. David,

We have submitted to you for your approval via our document 215-SUB.00061 the design criteria for the East Tie-In. Please understand that we believe that the required submittal of this document is beyond the scope of the contract. Further, there are requirements in this document that we believe are also beyond the scope of the contract. However, in the interest of moving ahead with the project, we have submitted this design criteria to you, for approval, as requested. Be advised that the submittal of this document in no way implies that we accept the cost for those requirements that we believe are beyond the scope of the contract and we hereby reserve our right to pursue additional compensation for the cost of developing and implementing these additional requirements.

Very Truly Yours,
C. C. MYERS, INC.

Robert W. Coupe
Project Manager

cc: MO
JG
JM.V

File: 215-101
215-9903

P.O. Box 2948, Rancho Cordova, CA 95741 • 3286 Fitzgerald Rd., Rancho Cordova, CA 95742 • 916•635•9370 • Fax 916•635•1527

STATE OF CALIFORNIA-BUSINESS TRANSPORTATION AND HOUSING AGENCY
ARNOLD SCHWARZENEGGER, Governor

50

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

December 09, 2004

CC Myers
51 Macalla Road
San Francisco, CA 94130

Contract No. 04-0120R4
04-SF-80-12.6, 13.2
Temporary Bypass Structure

Attn: Mr. Bob Coupe

Letter No. 05.03.01-000237

Ref: 215-STL.00058, 215-STL.00060, 215-SUB.00061-00

Subject: Request for Design Criteria Change

Dear Mr. Coupe,

This Office has received and is in the process of reviewing the East Tie-In Design Criteria submittal, 215-SUB.00061, dated November 30, 2004. Once this document has been approved and a Contract Change Order has been initiated, the review for acceptance of the previously submitted Foundation plans shall resume. Until such time that the Design Criteria is approved, review times for East Tie-In Design submittals shall not start. This was previously discussed during our meeting of December 8, 2004 at CC Myer's Design Campus in Sacramento.

It is acknowledged that CC Myers reserves the right to pursue additional compensation for generating the criteria as was previously indicated in Notice of Potential Claim No. 3.

If you have any question, please contact me at (510) 286-0511.

Sincerely,

Gary Lai

Gary Lai
Structures Representative
for
Resident Engineer
Lourdes David

cc: E. Rufino
D. Adams
A. Bata

file: 05.03.01, 62.03

CC MYERS INC.

(51)

Document No.: 215-STL.00072

December 23, 2004

State of California
Department of Transportation
333 Burma Road
Oakland, CA 94607

Temporary Bypass Structure
Contract No. 04-0120R4
CCM Job # 215

Attn: Mr. Lourdes David
Resident Engineer

Re: Seismic Design Strategy Review

Dear Mr. David,

The C. C. Myers, Inc./Imbsen & Associates, Inc. Design Team would like to meet with the Seismic Peer Review Board to review the seismic design strategy for the viaduct and east tie-in structures. We therefore request that the State arrange such a meeting at the earliest convenience of the Board Members. We would prefer a meeting during the first half of January so that any of the Board's recommendations that are accepted by the State for incorporation into the project can be included in the final design of the subject structures.

From an earlier conversation with your design team leaders, it is our understanding that we have an open invitation to meet with the Board. We would like to take advantage of that invitation. We believe it is in the State's best interest that the Board have a clear understanding of the seismic design strategy being implemented for the viaduct and east tie-in structures. The best way to convey this information is to have members of our design team, those responsible for the actual analysis and design, make a presentation to the Board. We believe the Board should have an opportunity to express their opinion on the acceptability of the proposed strategy and make recommendations based on the information provided.

In order to facilitate your arrangement of the meeting we have enclosed a copy of our suggested meeting agenda.

Very Truly Yours,
C. C. MYERS, INC.

Robert W. Coupe
Project Manager

cc: JM.V
MO
JG

File: 215-101

P.O. Box 2948, Rancho Cordova, CA 95741 • 3286 Fitzgerald Rd., Rancho Cordova, CA 95742 • 916•635•9370 • Fax 916•635•1527

San Francisco-Oakland Bay Bridge
East Span Seismic Safety Project

Yerba Buena Island
Temporary Bypass Structure

MEETING AGENDA

1. Review Viaduct Seismic Design Strategy
   - Project Design Criteria
   - Structural Configuration
   - Behavior of Bents 48B through 52

2. Review East Tie-in Structure Seismic Design Strategy
   - Project Design Criteria
   - Structural Configuration
   - Behavior of Bents 53 and Pier E1

3. Summary and Recommendations

52

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION - District 4 Toll Bridge Program
333 Burma Rd.
Oakland, CA 94607
(510) 622-5660, (510) 286-05[illegible]

RECEIVED

JAN 04 2005

CC MYERS, INC.
JOB 215 TEMP. BYPASS STRUCTURE
IC - 1289
215-103

CC Myers
51 Macalla Road
San Francisco, CA 94130

January 03, 2005

Contract No. 04-0120R4
04-SF-80-12.6, 13.2
Temporary Bypass Structure

Attn: Mr. Bob Coupe

Ref: 215-SUB.00061-00

Letter No. 05.03.01-000263

RC
JG
IAI (fax)
JV

Subject: East Tie-In Design Criteria - Draft

Dear Mr. Coupe,

This Office has received and reviewed CC Myers / Imbsen and Associates Inc. (IAI)'s draft East Tie-In Design Criteria. At this time, this Office cannot provide approval. Please see the attached comment sheet. In addition, the State has generated an edited version of the submitted design criteria titled, "Proposed Changes to the Design Criteria No. 1 thru No. 10 Sheets – For the Temporary Bypass Structure – East Tie-In". This document was edited with comments from the Design Review Team and is separate from the comment sheet.

Please review the attached documents and resubmit for approval. If requested, a meeting can be arranged between, CC Myers, IAI, and this Office to discuss the comments. Once a final document is approved, a Contractor requested Contract Change Order will be processed to formalize the changes made to the contract Design Criteria for IAI's East Tie-In design.

If you have any questions, please contact me at (510) 286-0511.

Sincerely,

Gary Lai

Gary Lai
Structure Representative
for
Resident Engineer
Lourdes David

Attachments

cc: D. Adams, A Bata, E Rufino
file: 05.03.01, 58.45, 62.02.03

EA: 04-0120R4

Temporary Bypass Structure, SFOBB East Span Seismic Safety Project
East Tie-In Design Criteria

No.	Comment Date	Section number	Title	ETI Design Criteria COMMENTS	Response Date	Status	*Response by Oversight Engineer to Reviewer's comment, if required.	Verify
East Tie-In Design Criteria, comments by Structure Construction								
		10		The last paragraph of Section 10 prior to Section 10.1 makes mention of Figure 4.7.1b. Where is this figure located?				
		11		Please expand more upon the procedures by which sensitivity studies will be conducted. What is meant by using variation of 25% of predicted jacking values.				
		11.2		What points along the bridge will be surveyed to determine the baseline condition before jacking, load transfer and lowering takes place?				
		11.2/11.5		As it is expected that there will be displacement of the bridge while jacking, load transfer and lowering, has the regrading of Span YB4 already taken into account the final resting position of the bridge after the load transfer has taken place?				
		11.3		As discussed during 10-15-04 meeting, please provide provisions for how the North Truss will be monitored for displacement during the load transfer process of the South Truss.				
		11.5		As re-grading will be necessary to conform with the ETI, what type of material (AC or Polyester Concrete) will be applied as overlay. Will grinding be also necessary to facilitate with conform?				
		11.5		Since re-grading of the existing portion of Span YB4 will be necessary to conform with the ETI contour grades, the staging of this process needs to be expanded upon more clearly in the criteria.				
		11.7		Please explain what is meant by "lightly jacking"				
		11.7		Before the bridge removal of the northern portion of Span YB4, how will it be determined that nearly zero loading has taken place on the North Truss? A process should be called out before proceeding with Stage 8.				
		11.7/11.8		Stage 7 shows new stringers to be provided to augment the post/brace system, but this detail has been revised as called out in the ETI Information Drawings. Please revise accordingly.				
		11.9		In the final process of adjusting the elevation of the bridge, the displacement monitoring and control should be addressed also.				

PROPOSED CHANGES TO THE DESIGN CRITERIA NO. 1 THRU NO. 10 SHEETS

FOR THE TEMPORARY BYPASS STRUCTURE – EAST TIE-IN (ETI)

PREPARED BY

IMBSEN & ASSOCIATES, INC.
9912 BUSINESS PARK DRIVE, SUITE 130
SACRAMENTO, CALIFORNIA 95827

NOVEMBER 22, 2004

UNLESS OTHERWISE NOTED, THE TBS – ETI SHALL BE DESIGNED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS

1. GENERAL

1.1 Definition of Terms:

Temporary Bypass Structure (TBS)
The Temporary Bypass Structure (TBS) is the West Tie-In, Viaduct and East Tie-In segments

Temporary Structures
Temporary Structures are those used to build the TBS, or remove portions of existing bridge structure to facilitate TBS construction. Temporary Structures are classified as Ordinary or Important.

Ordinary Construction

Falsework
Shoring
Bridge Removal Location A – Falsework and Bracing

Important Construction (for operations of High Consequence)

Load Transfer from the existing YB4 truss to the new East Tie-In structural steel frame and removal of the South Truss of Span YB4 including jacking system installation and support locks if used.

Placement of the North Support System and Removal of the North Truss and portions of Existing Floor Beams.

Temporary Shoring – Excavation bracing adjacent to the foundations for the Existing YBI Viaduct and East Tie-In. Shoring shall be either Braced or Restrained with Tie-Back's.

2. DESIGN LOADS

2.3.6 Live Load- East Tie-In

Live loads shall be applied to each stage carrying traffic. The East Tie-in needs to be designed for the full live load (all 5 lanes top and bottom) during all stages. Any reduction in the applied force can only be evaluated if the time duration and loading of each stage is clearly defined.
ww

2.5 Wind – W

On Finished ETI: in accordance with Caltrans BDS

On Structures during construction: in accordance with SEI/ASCE 37-02 with companion ANSI/ASCE 7-95 and Caltrans BDS.

3. MATERIALS

3.3 Structural Steel for ETI

3.3.2 Fasteners

ASTMA325, high strength bolts with approved corrosion mitigation or A490, high strength bolts approved corrosion mitigation unless noted otherwise (pending CCO).

3.3.5 Fatigue

Components shall be checked per BDS to withstand fatigue induced by 500,000 cycles of loading.

All existing members of the YB4 span which are to be incorporated into the ETI shall be evaluated for their fatigue resistance to 2,000,000 cycles of loading in their projected Lifetime taking into account their total history of loading.

4. SEISMIC DESIGN

4.2 Segments and Articulation

The Temporary Bypass Structure shall consist of three distinct structures:

i) The West Tie-In
ii) The Viaduct
iii) The East Tie-In

The distinct structures shall be separated by expansion joints located at the beginning of Viaduct (Sta. 51+23 top deck, Sta. 51+33 bottom deck) and at the Viaduct span 52 hinge In support (Sta. 54+61).

East Tie-In

The East Tie-In may be a two-span continuous double-deck structure anchored to Pier E-1. The anchorage shall be designed to resist forces resulted from overstrength of a ductile fusing mechanism with a safety factor of not less than 3 The anchorage shall be designed to resist the total design seismic force of the East Tie-In span only.

4.2.4 Dynamic Characteristics - East Tie-In

The articulation of the East Tie-In is defined in Figure 4.2.

The ETI structure shall be tied to Pier E-1 and be allowed to move along with Pier E-1 in the longitudinal direction. At Pier E1 the superstructure shall be capacity-protected against forces associated with the load limiting devices attached to Pier E-1. The anchorage shall be designed to resist forces resulted from overstrength of a ductile fusing mechanism with a safety factor of not less than 3 (3xDEE).

For structural modeling purposes Pier E1 is assumed to move 50mm for the D_{EE} event and 150 mm at D_{LS}.

The Superstructure shall be attached to Pier E1 with approved load limiting devices. The load limiting devices shall be designed to protect the superstructure against maximum seismic forces developed.

At intermediate support to ETI structure, the superstructure shall have capacity protection against the maximum forces (longitudinal and transverse) to develop in the substructure..

4.3 Performance Criteria

4.3.7 Collapse Avoidance

For seismic loading during construction, the performance objective shall be to avoid collapse. See Sections 4.12 and sections 8,9, & 11 for performance objectives involved with High Consequence Operations.

9. TEMPORARY STABLIZATION FOR SPANS YB4 & YB3

9.1 General

Existing YBI Span YB3 (Pier YB3 – Pier YB4) and Span YB4 (Pier YB4 – Pier E1) shall be stabilized prior to release of any existing anchorage or jacking of Span YB4.

All connections to existing steel truss members shall be bolted. For connection design to existing truss, use allowable tensile stress of 140 MPa (20 ksi).

9.2 Anchorage of Span YB4 at Pier E1

Minimum temporary anchorage for span YB4 at Pier E1 prior to releasing existing anchorage (cut through shoe) shall be:

i) 2400 kN at each bottom chord of N. & S. truss in the transverse direction

ii) 2400 kN in each bottom chord of N. & S. truss in the longitudinal direction.

9.3 Anchorage of Span YB4 at Pier YB4

Minimum temporary anchorage for span YB4 at Pier YB4 prior to releasing existing anchorage (cut through shoe) shall be:

i) 2400 kN at each bottom chord of N. & S. truss in the transverse direction

ii) 2400 kN in each bottom chord of N. & S. truss in the longitudinal direction.

9.4 Restraint of Span YB3 at Piers YB3 & YB4

Minimum temporary restraint for span YB3, prior to releasing existing anchorage of Span YB4 and until complete removal of the span, shall be:

i) at Pier YB4, 2400 kN at each bottom chord of N. & S. truss in the transverse direction

ii) at Pier YB3, 2400 kN tie across each bottom chord of N. & S. truss between Spans YB2 and YB3, in the longitudinal direction.

REPLACE SECTIONS 10 AND 11 WITH THE FOLLOWING:

10. INCORPORATING THE EXISTING YB4 SPAN INTO THE EAST TIE-IN DESIGN

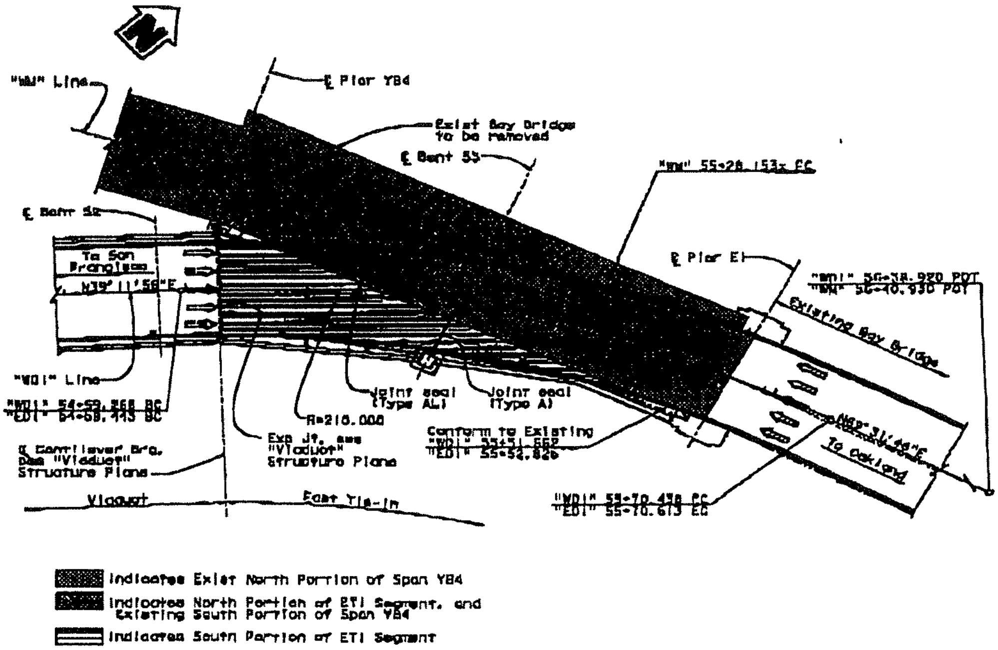


Figure 10.1: Plan View of the East Tie-In

The East Tie-In structure as shown in Figure 10.1 includes:

a) South Portions of East Tie-In
b) North Portions of East Tie-In (South Portion of existing South YB4 to remain)
c) North Portions of Existing YB4 to be removed

The East Tie-In consists of a new section, which is joined to the east end of the Viaduct and is connected to the south side of Span YB4 as shown in Figure 10.1. The truss opening is sufficient to maintain the horizontal alignment and to provide for five (5) lanes of traffic. Prior to the shifting of traffic and removal of the effected truss members the entire load of the South Truss will be transferred to the new structure as described in more detail for Stages 1 thru 5.

Shifting of traffic as called for in Stage 6 will be completed within the 24 hour allotted closure period. Having shifted traffic onto the new TBS the north side support of the East Tie-In will be constructed and portions of the north side of Span YB4 will be removed along with the north truss as shown in Stages 1 thru 9.

The East Tie-In is supported at its West End by a cantilever section extending beyond Bent 52, a new bent designated Bent 53 and existing Pier E-1. A modular expansion joint shall be at its West End placed to provide for both thermal and seismic longitudinal movements. The East Tie-In is tied both longitudinally and transversely to Bent E1.

The East Tie-In is composed of a structural steel frame supported by cantilevered arms of the steel viaduct, concrete Bent 53 and the existing E-1. The structural steel frame is composed of large steel box girder sections, which provide support for both the upper and lower decks. The superstructure is continuous from the cantilever end to Pier E1. The anchorage at Pier E1 shall be designed for 3 X DEE providing a safety factor of 3 for the design earthquake of the East Tie-In. It is assumed that Pier E1 will resist the imposed seismic forces of the East Tie-In and the cantilever truss to the east of Pier E1 for DLS design earthquake. The longitudinal design displacement of Pier E1 for this event will be 50mm for DEE and 150 mm for DLS. The transverse design displacement is assumed to be zero.

A load limiting device as shown in Figure 4.7.1b is placed at the connection between Pier E1 and the East Tie-In. Where is Figure 4.7.1b?The load limiting device is unidirectional and will limit the loads imposed on the East Tie-In in the transverse direction.

10.1 Existing YB4 Span (Note that allowable strength limits are in accordance with Load Factor Design methods specified in BDS)

10.1.1 Reinforced Concrete Original 1934 (Assumed)

Concrete: $f_c' = 3000psi,\ f_c = 1200psi,\ n = 10$

Reinforcement: $f_y = 33ksi$

Unit weight (reinforced) = 150 pcf

Steel: f_y = *36,000 psi, fu = 55,000 psi*

10.1.2 Structural Steel Original 1934: (Assumed)

$f_y = 37,000psi,\ f_u' = 62,000psi$ (carbon steel)

$f_y = 45,000psi,\ f_u' = 80,000psi$ (silicon steel)

10.1.3 Lightweight Concrete 1964 Modifications:

$f_c' = 4500psi,\ f_c = 1800psi,\ n = 15$

Reinforcement – Intermediate Grads:

$f_y = 40ksi$ per CRSI (As-Builts)

10.1.4 Structural Steel 1964 Modifications:

A440: f_y = *45,000 psi, fu = 55,000 psi*

T1: f_y = *100,000 psi, fu = 115,000 psi*

(Note test samples maybe taken for portions of YB4 Span to be removed)

Unique elements of the existing YB4 span that are to be reutilized for the East Tie-In shall be tested by the Contractor to verify assumed properties listed above.

11. EAST TIE-IN CONSTRUCTION STAGING AND OPERATIONS

The East Tie-In shall be constructed in stages as described herein. Each stage shall be designed to resist the imposed service loads and seismic loads. A typical section of the roadway at Bent 53 is shown in Figures 11.1 thru 11.9 to demonstrate the various stages. A typical section of the existing roadways supported by the YB4 Span Truss is shown in Figure 11.0. There are five (5) lanes of traffic in each direction, the upper deck carrying west bound traffic and the lower deck carrying east bound traffic.

11.1 Monitoring and Contingency Plan

The Contractor shall submit a monitoring plan for continuous monitoring and documenting the jacking operations on the YB4 span. The Contractor shall identify the major risks associated with the jacking operations and develop a contingency plan to mitigate these risks. Contingency actions such as requirements for reliable power sources, and adequate staffing shall be included in the plans. Back up equipment and alternative plans for safety and time-critical operations shall be provided. The plan shall also include the following:

Sensitivity Studies:
Prior to jacking from box girder beams, contractor shall verify estimated dead load by performing lift-off at Pier E1. Based upon the actual load on structure, designer shall determine what adjustments are needed for tolerances of forces and displacements at each panel point. The monitoring and contingency plan shall provide tolerances to ensure no member is overstressed. The calculated force, displacement and associated tolerances shall be provided incrementally for each 1/2" displacement at midspan.

Stress Consideration:

Throughout the jacking and demolition operations, stresses due to a combination of dead loads and jacking loads in the existing truss members and their end connections shall not exceed 90% of their allowable strength limits All existing posts, diagonals, floor beams and primary load carrying members shall be protected from any permanent damage even if they are not utilized in the completed ETI. Strain gauges shall be provided on all posts and diagonals to ensure member forces are relieved to zero stress during the jacking operation.

Stability Considerations:

Throughout the jacking and demolition operations, stability of existing truss verticals shall be ensured by providing temporary or permanent lateral supports or positive connections to other stable members.
Deactivations and Demolitions:

Deactivation of truss members shall not be allowed unless the member has returned to a zero stress state.

11.2 Construction Staging

Construction Staging shall be modified to incorporate the following:

1) **South and North truss shall be jacked simultaneously to prevent any racking of the truss system. Both trusses shall jacked from directly below the chord members.**

2) **Support system on north and south side shall be similar. (ie. Provide box girder support beam and C-Bent configuration on north side to match south side.)**

This section describes the construction staging that shall be used for the East Tie-In structure. A survey will be conducted, prior to final design, jointly by Caltrans and the Contractor's Engineer to establish the existing condition of Span YB4. All components will be inspected to determine their condition and adequacy for the entire staging process and final configuration. The survey will establish a base line from which to determine any damage that could result from the load transfer. Contractor shall repair any components that are damaged as a result of the jacking operation.

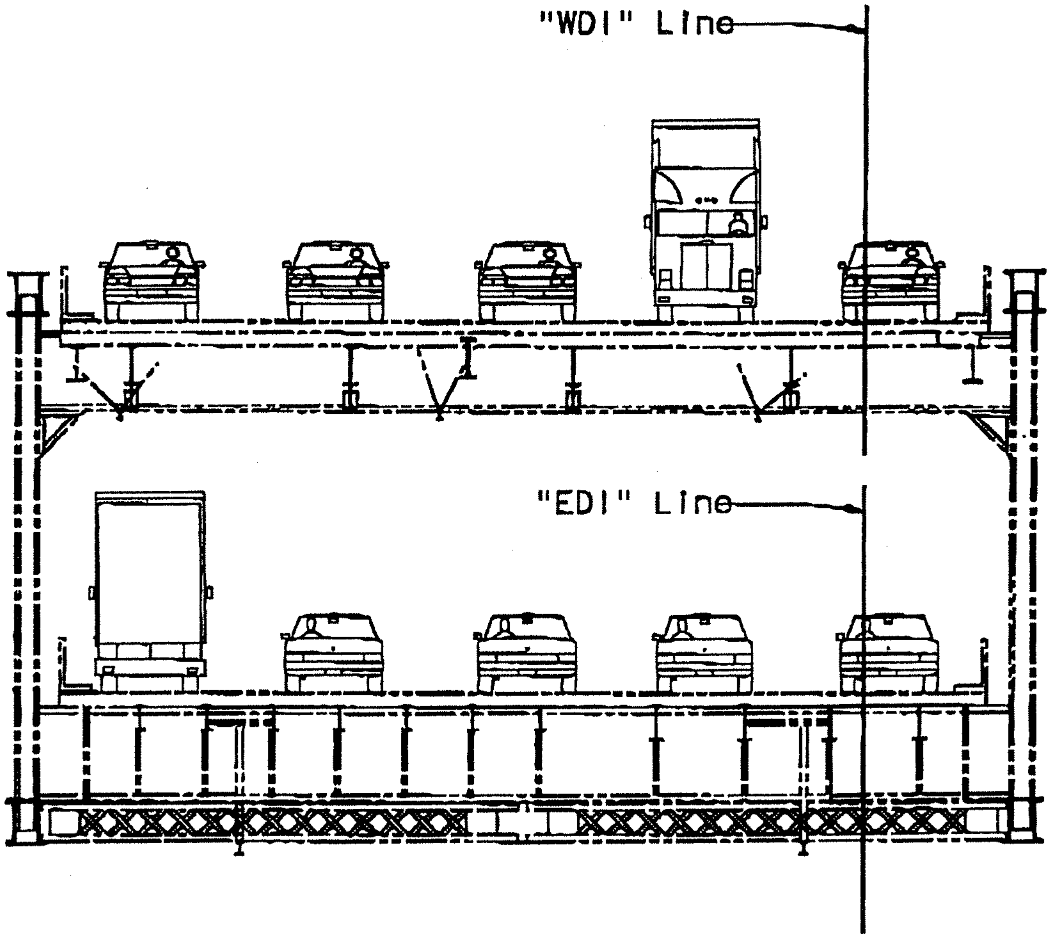


Figure 11.0: Typical Section-Existing YB4 Truss Span

STAGE 1

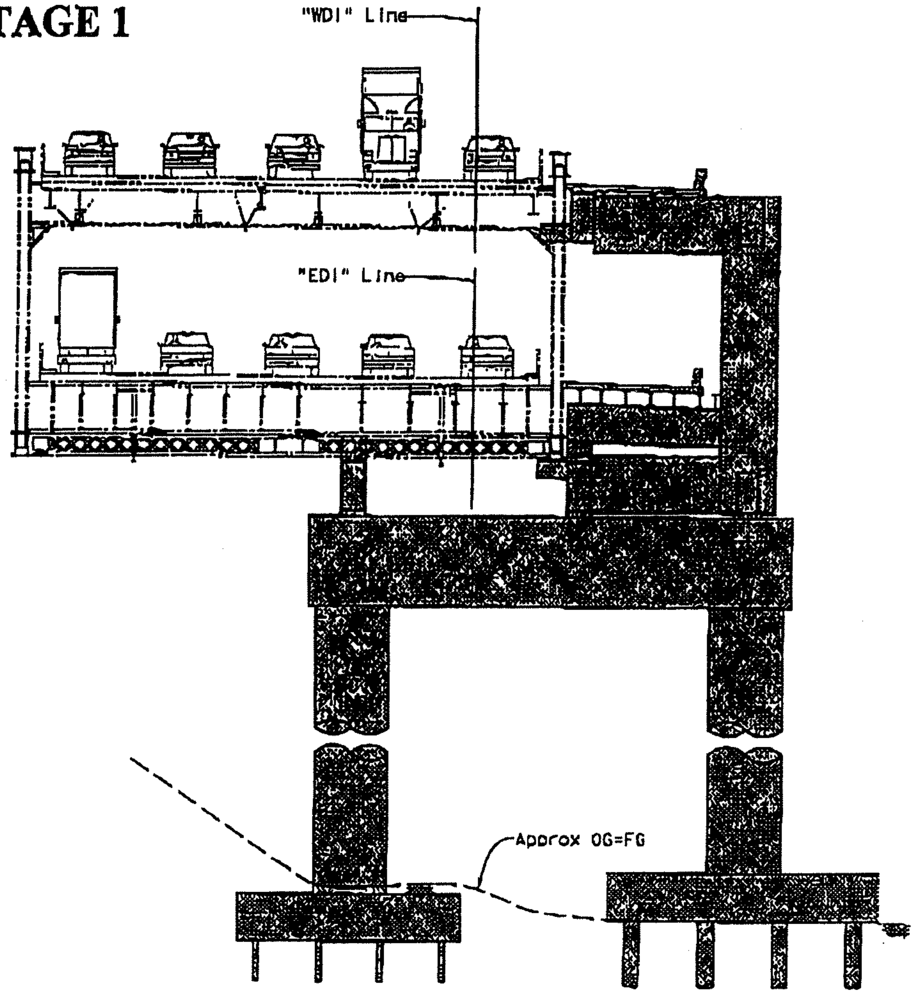


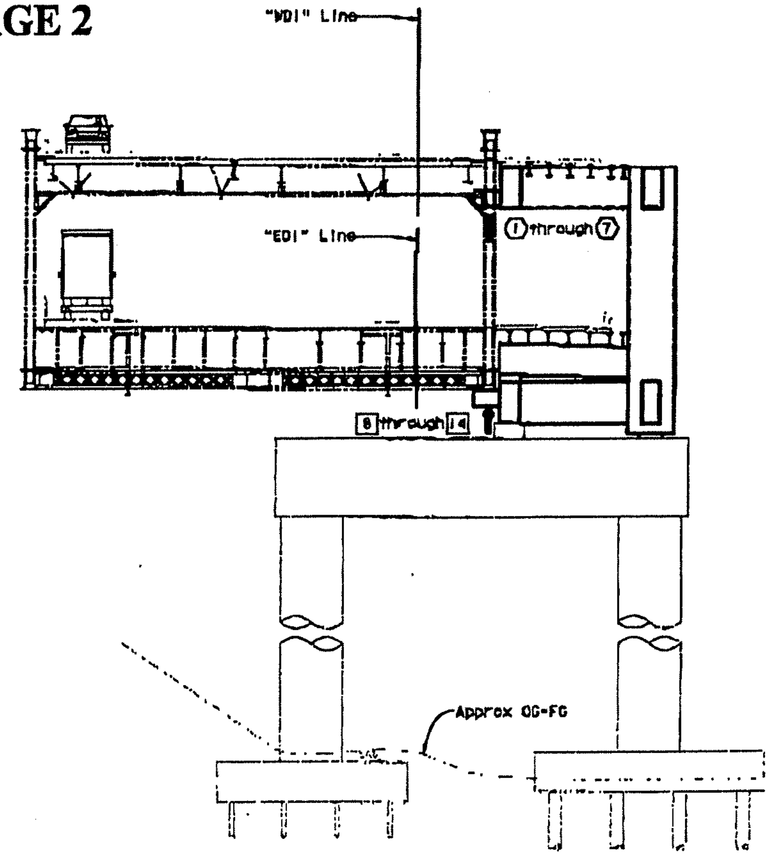
Figure 11.1: Stage 1 – Construction of South Segment Prior to Connection

Stage 1 as shown in Figure 11.1 basically includes the construction of the new South Segment prior to the connection to the existing Span YB4. At this stage the existing span is in its as-built condition. The South Segment is complete with decking to the closure pour. The construction of the concrete Bent 53 is complete and supporting the steel box sections are in place. The barriers along the south edge of the roadway are also in place. The connections to existing YB4 includes:

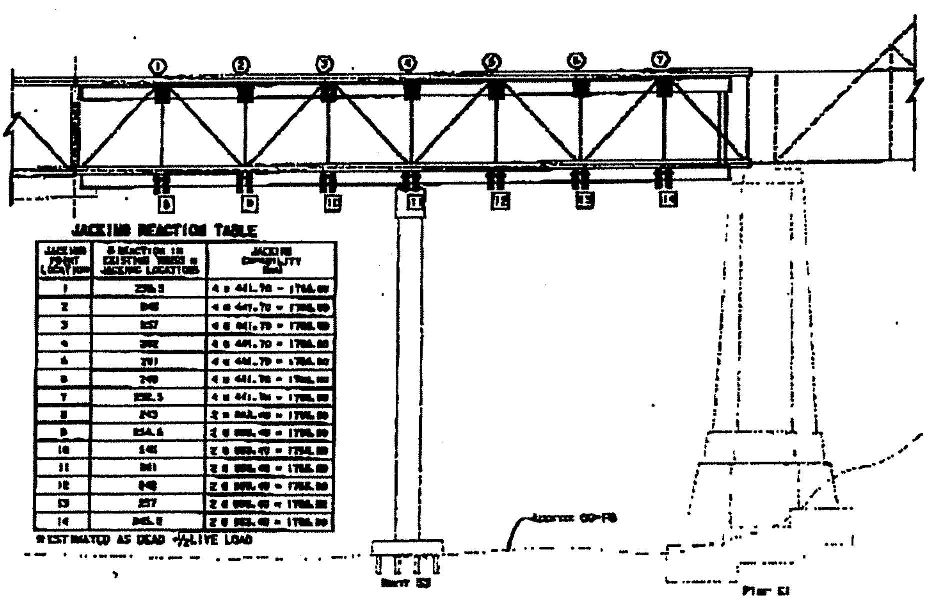
Upper Deck Jacking Brackets and Pedestals
Lower Deck Jacking Brackets and Pedestals
Steel Posts and Bracket connections to Existing Floor Beams
Steel Pedestals Supporting Lower Deck Floor Beams

At the completion of this stage there is no connection between the new and the existing structures.

STAGE 2



a) Typical Section View



JACKING POINT LOCATION	* REACTION IN EXISTING TRUSS @ JACKING LOCATIONS	JACKING CAPABILITY [illegible]
1	[illegible]	4 x 441.70 = [illegible]
2	[illegible]	4 x 441.70 = [illegible]
3	[illegible]	4 x 441.70 = [illegible]
4	[illegible]	4 x 441.70 = [illegible]
5	[illegible]	4 x 441.70 = [illegible]
6	[illegible]	4 x 441.70 = [illegible]
7	[illegible]	4 x 441.70 = [illegible]
8	[illegible]	2 x [illegible] = [illegible]
9	[illegible]	2 x [illegible] = [illegible]
10	[illegible]	2 x [illegible] = [illegible]
11	[illegible]	2 x [illegible] = [illegible]
12	[illegible]	2 x [illegible] = [illegible]
13	[illegible]	2 x [illegible] = [illegible]
14	[illegible]	2 x [illegible] = [illegible]

*ESTIMATED AS DEAD +½ LIVE LOAD

b) Elevation View

Figure 11.2: Load Transfer of South Segment
Stage 2

Stage 2, as shown in Figure 11.2, involves the load transfer of the South Truss from the YB4 span to the new South Segment. The North Truss will be jacked along with the South Truss to prevent racking of the truss system. This stage begins with the installation of the jacking system and the geometry monitoring system. The jacking system consists of lock nut hydraulic cylinders (jacks), calibrated pressure gauges, a hydraulic pressure source (pump) and the jacking control system (distribution manifold(s) and valves). The geometry monitoring system shall consist of strategically placed control point targets and optical surveying instruments with distance measuring capabilities (total station). The jacking and geometry monitoring systems shall be such that the jacking pressures and the structure geometry can be measured at any time during the load transfer.

Calibrated pressure gauges for each jacking location will be used to monitor the total jacking load applied. The total jacking load applied at a jacking point will be determined as the product of the effective cylinder area(s) and the calibrated pressure. Each pressure gauge will be calibrated and certified at the manufacturer's facility and the corresponding documents submitted for field use. The effective cylinder areas will be certified by the jack manufacturer. The jacking control system shall be capable of isolating any and all jacking locations for individual adjustment of the applied jacking load. A schematic drawing shall be provided showing all components of the jacking system and the hydraulic circuits.

Absolute structure displacements shall be kept within ±150mm of the current roadway position and the induced roadway superelevation must be maintained. During the jacking operation the hydraulic jack pistons cannot be extended more than 10mm above the hydraulic cylinder without a redundant support system. When public traffic will be carried over the bridge during jacking operations, the Contractor's jacking method shall include provisions for blocking up the superstructure from the new beams or falsework such that there will be a gap of less than one inch between the falsework and the superstructure during all phases of the jacking operations.

The superstructure shall be jacked and adjusted to grade uniformly and in such a manner that a roadway satisfactory for the used of public traffic is provided in conformance with the provisions in Section 7-1.08, "Public Convenience," of the Standard Specifications.

Description of Stage 2 Construction Activities:
- Existing truss in its as-built condition still in service
- Jacking system installed includes jacking brackets
-Jacking is performed simultaneously at all jacking points to raise the south and north truss and reduce the predicted pre-existing dead load and anticipated live load member forces to nearly zero. This zero member-force condition exists when the trusses are raised by applying prescribed jacking loads not to exceed the fabricated no-load camber as determined from the archives of design and shop drawings. Once this condition is achieved, the lock nuts on the jacks are seated. Any additional live load will be carried by the mechanically locked jacks. The jacking loads are established from the dead loads of existing YB4 (i.e., dead load shears of existing floor beams and tributary weight of truss members at every panel point plus to appropriate live load as described below.

-Pressure transducers for each jack will be used to monitor the total jacking load applied to be:

- Not more than the estimated dead load reactions if the bridge is temporarily closed to traffic
- Not more than the estimated dead load reactions plus 50% of the live load if the bridge is partially closed
- Less than or equal to the dead load reactions plus the full live load.

-Displacement transducers will be used to monitor and adjust elevations and relative displacements of the two structures at each jacking point.
-Traffic on the bridge shall be significantly reduced for the jacking operation (Through 3 or more lane closures, after midnight) for a few hours.

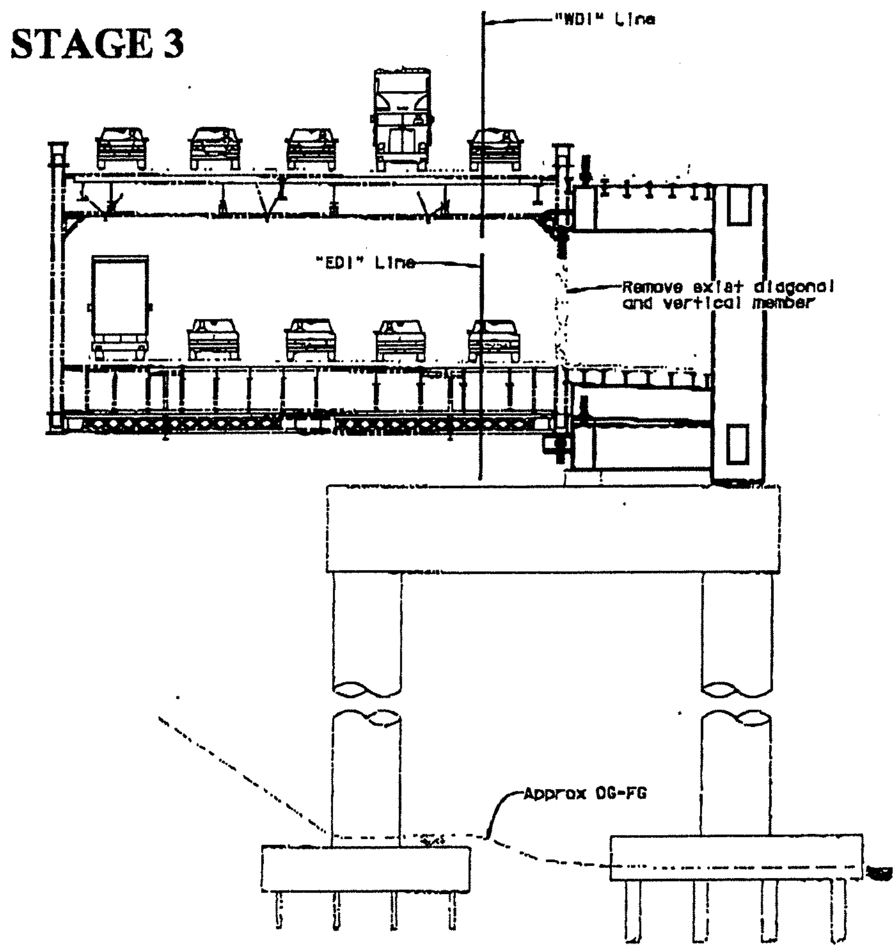


Figure 11.3: Stage 3 – Removal of Portions of South Truss

<u>Description</u> of Stage 3 Construction Activities:

-Diagonal, vertical and top chord members of the south truss will be deactivated (cut) in a predetermined sequence while each jacking point is supported by the mechanically locked jacks. At any time during the deactivating process the applied jacking load at any point can be determined by performing a hydraulic lift-off of the locking nut(s). Load and geometry adjustments can be performed at any time during the deactivation process. -Upon removal of a truss member, the hydraulic Jacks in the locked condition will carry any new live loads and any dead loads (in addition to those estimated) of the south truss. After cutting, comparison of the actual jacking with the analytical results will be made and necessary adjustment will be made for subsequent cutting.

DL: +Existing YB4 Truss
+Entire Existing Deck
- Jacking Dead Loads, Existing
LL: - Reduced Lanes of Traffic (Maximum 5)

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Jacking Dead Loads, New
LL: +Tributary Live Load Transfer due to Jacking, (Maximum 1/2 of full 5 lane of traffic)

STAGE 4

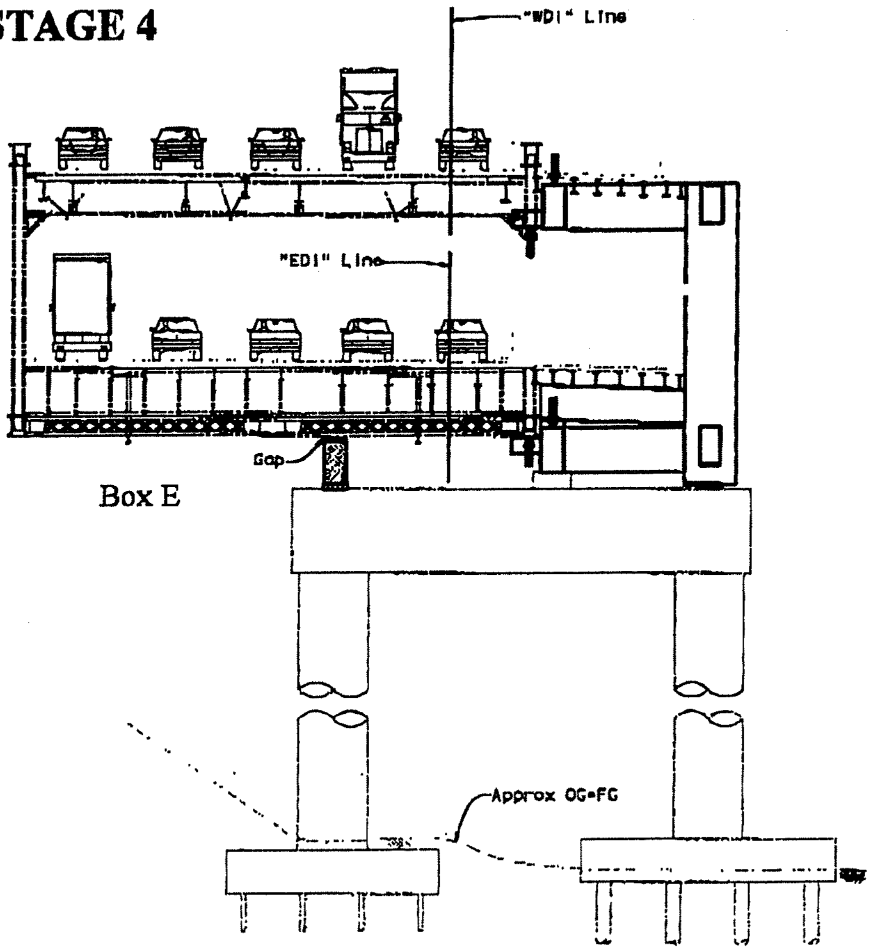


Figure 11.4: Stage 4 – Construction of North Segment Support System

Stage 4 will include the placement of the North Box Girder E as shown in Figure 11.4. The existing North Truss will remain in service. No load transfer to girder "E" will occur in this stage. The pedestals will be placed, but not yet bolted to the floor beams.

- Description of Stage 4 Construction Activities:

-Existing north truss in its as-built condition still in service
-The north box girder 'E' is erected.
-Pedestals are erected but not bolted to floor beams.
- During this stage, no load transfers from lower deck to box 'E' is assumed.

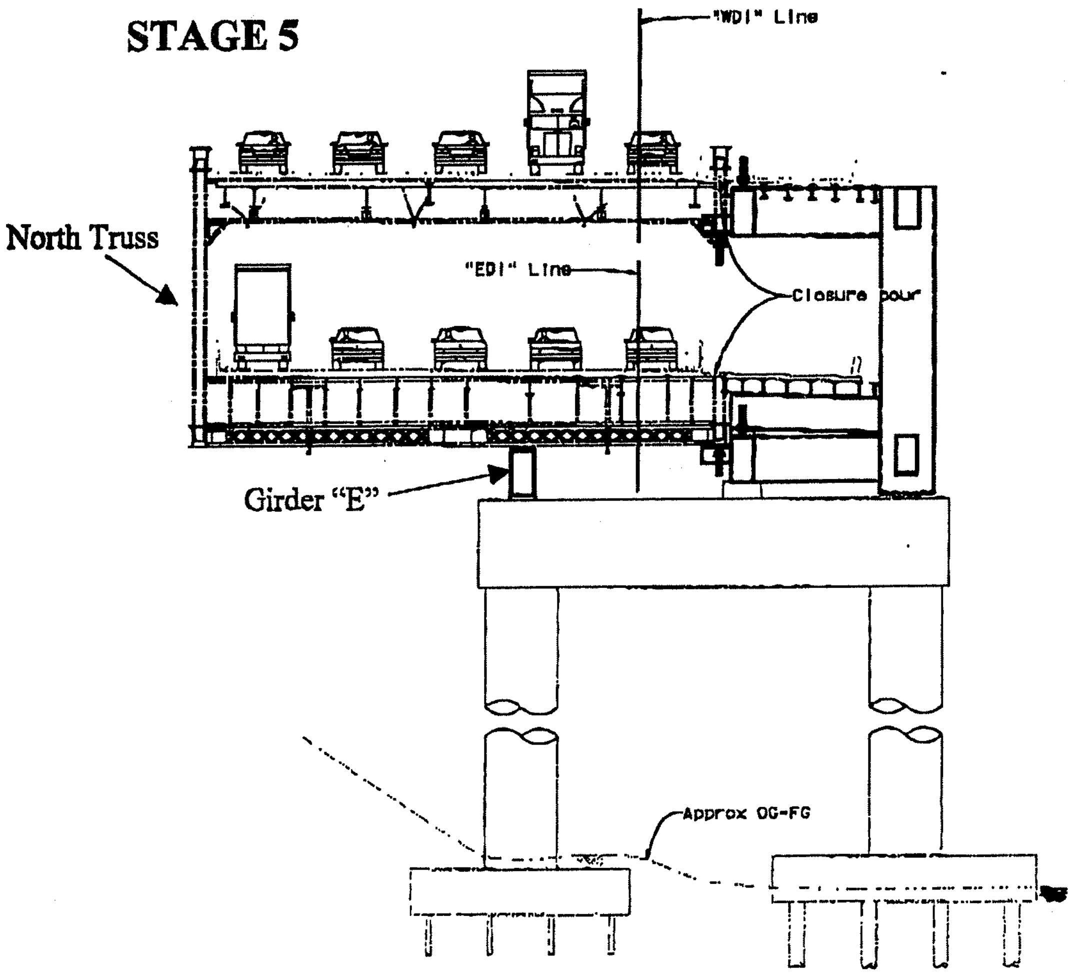


Figure 11.5: Stage 5 – Closure Pour for South Segment

As shown in Figure 11.5 this stage includes the closure pour between the South Segment and the south edge of the existing Span YB4.

STAGE 6

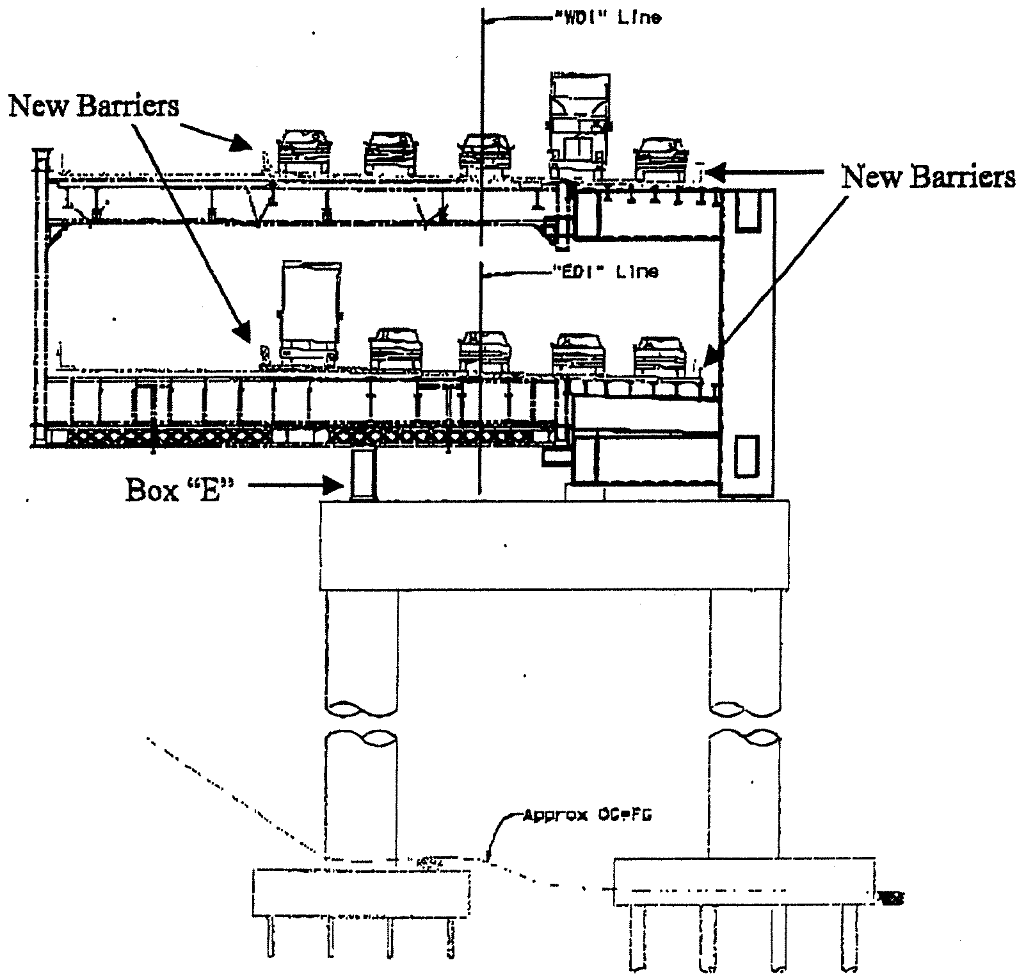


Figure 6: Stage 6 – Traffic Shift

Stage 6 is the barrier change on the north side and the traffic change onto the new South Segment. The existing North Truss in the existing condition is still in service. The pedestals are shimmed to snuggly fit against the floor beams for fastening. A small portion of the live loading will be transferred to Box E at this stage.

STAGE 7

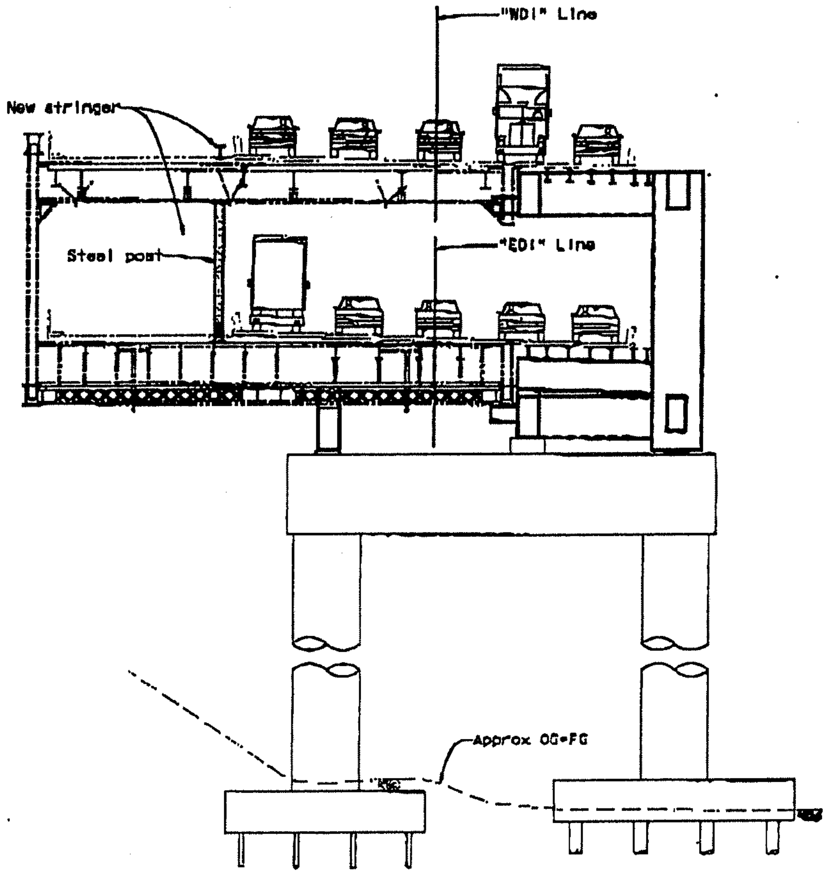


Figure 11.7: Stage 7 – Placement of Upper Deck Support

Stage 7 as shown in Figure 11.7 includes the placement of the stringers on the upper and lower decks, which are tied to the concrete deck. The steel posts are erected to fit snuggly between the upper and lower floor beams. Following the placement of the vertical posts the steel cross bracing and brackets shall be installed to provide stability to the post both in plane and out of plane of the braced frame system. The load transfer from the upper deck to the lower deck and ultimately to the Box E is limited at this stage with the North Truss still a major part of the total load resisting mechanism.

DL: +Existing YB4 Truss
+Entire Existing Deck
- Jacking Dead Loads, Existing
LL: + X Lanes of Traffic

DL +New Steel Frame
+New Concrete Deck
+New Barriers
+Jacking Dead Loads, New
+ Full Weight Deck Closure,

LL: +Tributary Live Load, Transfer due to Jacking,
+4 Lanes of Traffic

Description:

- Existing north truss in as-built condition still in service.
-The steel posts are erected by lightly jacking to fit between the floor beams above and below.
- The steel cross-bracings and brackets are installed to provide stability of post in both in-plane and out of plane of the braced frame system.
- Erect new stringer and anchor to deck to support north portions of the deck prior to demolition.
-Load transfer from upper and lower deck to box 'E' is assumed limited, considering that the north truss is still in service and mainly carrying the loads.

STAGE 8

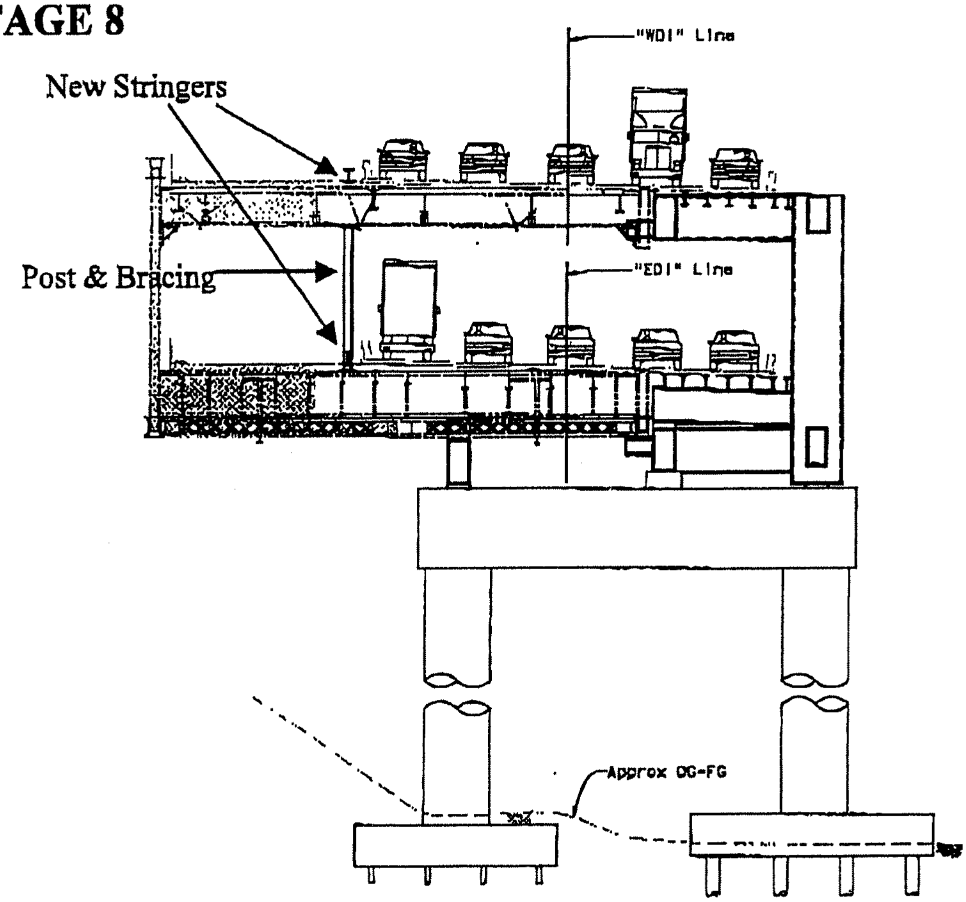


Figure 11.8: Stage 8 – Load Transfer and Demolition of the North Portion of the Span

This stage includes the load transfer from the existing North Truss to Box Girder E and removal of the north portions of the upper and lower decks and the North Truss.

DL: +Remaining South Portions of Existing Deck

- Reduced Jacking Dead Loads, Existing
LL: + X Lanes of Traffic

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Reduced Jacking Dead Loads, New
+ Full Weight Deck Closure,
LL: +Tributary Live Load, Transfer due to Jacking,
+ Y Lanes of Traffic

Description:

- Demolish north portions of the upper and lower decks.
- Flame cut north portions of upper and lower deck floorbeams while adequately bracing the north truss.
- Upon cutting of the floor beams and removal of the north truss, all dead and live loads of the remaining portions of the existing truss will be carried by box E.

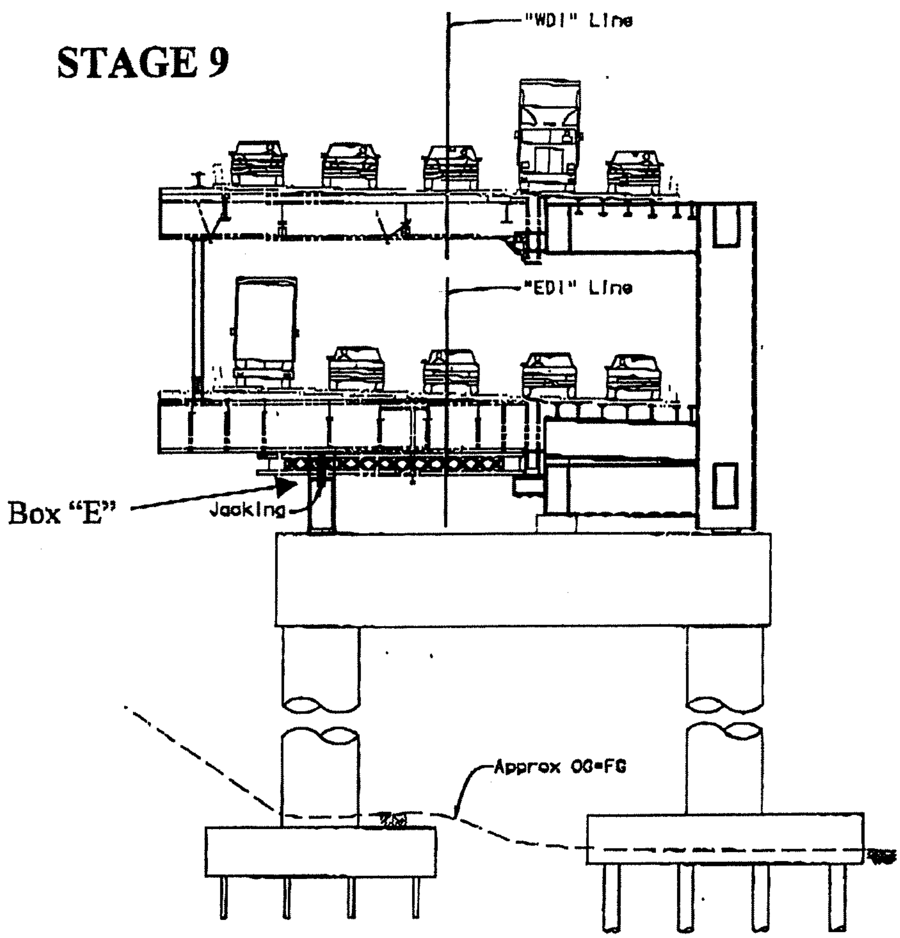


Figure 11.9: Stage 9 –
Adjust Profile and Superelevation

DL: +Remaining South Portions of Existing Deck
- Reduced Jacking Dead Loads, Existing
LL: + X Lanes of Traffic

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Reduced Jacking Dead Loads, New
+ Full Weight Deck Closure,
LL: +Tributary Live Load, Transfer due to Jacking,
+ Y Lanes of Traffic

Description:

-Adjusting the elevation of the lower and upper deck floor beams by simultaneously jacking at all floor beam pedestals supported on Box E.
-Placing shim plates and permanently bolting of pedestals to Box E.

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FILE COPY
JAN 5 2005
Project # 1295

C.C. MYERS INC.

cc: Roy
Lance
Majid

CCM Job # 215: Temporary Bypass Structure
San Francisco/Oakland Bay Bridge
(415) 399-0175 Fax: (415) 399-0587

51 MACALLA ROAD
SAN FRANCISCO, CA 94130

FAX

Date: 05-Jan-2005 **Document #: 215-FAX.00255**

To: **Mr. Raymond Imbsen**
Imbsen & Associates, Inc.

Fax#: 916-366-1501

From: **Andy Chan**

Fax#: 916-635-1527
Phone#: 916-635-9370

Subject: **East Tie-In Design Criteria - Draft**

Message: Please see the attached Caltrans Letter No. 05.03.01.000263 regarding the above.

cc: JM.V
RW.C
JG
MO

file: 215-201

Total pages sent including this one: 25 Original to follow: No

P.O. Box 2948, Rancho Cordova, CA 95741 • 3286 Fitzgerald Road, Rancho Cordova, CA 95742 • 916-635-9370 • Fax 916-635-1527

(53)

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION - District 4 Toll Bridge Program
333 Burma Rd.
Oakland, CA 94607
(510) 622-5660, (510) 286-5550 fax

RECEIVED

JAN 11 2005

CC MYERS, INC.
JOB 215 TEMP. BYPASS STRUCTURE
IC-1323
215-103
RC
JG
JV

January 10, 2005

CC Myers
51 Macalla Road
San Francisco, CA 94130

Contract No. 04-0120R4
04-SF-80-12.6, 13.2
Temporary Bypass Structure

Attn: Mr. Bob Coupe

Letter No. 05.03.01-000272

Ref: 215-STL.00072

Subject: Seismic Peer Review Committee Presentation

Dear Mr. Coupe,

This Office has received and reviewed the request by CC Myers to make a presentation to the Seismic Peer Review Committee (SPRC) regarding the Viaduct and East Tie-In Seismic Design strategies. As the original developer of the Temporary Bypass Structure Design Criteria, the State has the sole responsibility for the criteria and for any changes that may be made to its content. Any meetings with the SPRC are then solely between the State and the SPRC. At this time, there are no plans to extend an invitation to CC Myers / Imbsen and Associates Inc. to make a presentation with the State to the SPRC.

Sincerely,

Gary Lai
Structure Representative
for
Resident Engineer
Lourdes David

cc: E. Rufino
D. Quintana
A. Bui
D. Adams
A. Bata

file: 05.03.01

54

C.C. MYERS INC.

51 Macalla Road
(415) 399-0175

San Francisco, CA 94130
Fax (415) 399-0587

January 11, 2005

Document No.: 215-STL.00076

State of California
Department of Transportation
333 Burma Road
Oakland, CA 94607

Temporary Bypass Structure
Contract No. 04-0120R4
CCM Job # 215

Attn: Mr. Lourdes David
Resident Engineer

Re: Pier E1 Behavior and Dynamic Characteristics

Dear Mr. David,

The criteria in the contract documents specify that the anchorage at Pier E1 shall be designed to resist the total seismic force of the East Tie-in span, and that the anchorage at this pier is to be designed with a safety factor of three. The State's response to RFI No. 215-RFI-001.00009-0 clarified that the factor of safety for the anchorage design was to be applied to the design evaluation earthquake, DEE. Furthermore, Section 4.2.4, "Dynamic Characteristics – East Tie-in," of the contract design criteria specifies, via Figure 4.2, that the bearings at Pier E1 are to be restrained in both the longitudinal and transverse direction. No other dynamic characteristics are specified for Pier E1.

Preliminary analyses performed by our design consultant indicated that when the inertial effects of the cantilever truss spans were included in the analysis of the East Tie-in span the seismic demands at Pier E1 exceeded the flexural capacity of the pier. The State's response to RFI No. 215-RFI-001.00007-0 requesting clarification on Pier E1's behavior and capacity stated that Pier E1 had not been analyzed by the State relative to the design evaluation earthquake forces or the displacement limit state, and that the intent of the contract was not to retrofit the pier to the performance criteria set forth for the Temporary Bypass Structure. The State's response did not establish the flexural capacity of Pier E1, nor did it clarify the dynamic characteristics and deformational capacity of the pier.

The State did acknowledge during a meeting held in our design campus on January 6, 2005, that analyses performed by the State indicated that Pier E1 is seismically deficient and would require retrofitting to withstand the forces imposed by a maximum credible earthquake. We do not know the relationship between the maximum credible earthquake and the earthquake demand represented by the contract's displacement limit state. This leads to a conclusion that Pier E1 may be potentially vulnerable to an earthquake event represented by the contract's displacement limit state.

In order to rectify the apparent deficiencies of Pier E1 our design consultant investigated rocking about the base of the pier's shaft as an acceptable response to seismic demands. Our consultant's analyses indicated that the pier would rock and displace two inches under the design evaluation earthquake and six inches under the displacement limit state. However, pier shaft rocking falls outside the requirements of the design criteria specified in the contract documents since rocking is not addressed in the plans nor the State's "Seismic Design Criteria." Not withstanding this, the results of our design consultant's analyses were acknowledged by the State as sufficiently significant to initiate a contract change order to increase the movement rating of the modular expansion joint at the West End of the East Tie-in span.

The need to establish an unspecified behavioral mechanism outside the limits of the contract documents is a changed condition of the contract and represents a differing site condition in accordance with Section 5-1.116 of the Standard Specifications. Furthermore, the uncertainties surrounding Pier E1's behavior creates an unmanageable risk for our team. There is a potential for larger than anticipated horizontal movements that could lead to unseating at the East Tie-in span's West End. There is uncertainty regarding the magnitude of the seismic demands at Pier E1, and there is an unknown damage level at Pier E1 that could lead to a collapse of the East Tie-in span.

We request that the State issue a contract change order to address the unspecified behavioral mechanism used to establish the movement rating at the East Tie-in's West End, and to address the uncertainties associated with Pier E1. Our team is due compensation for the preliminary analyses that established that an alternative mechanism for Pier E1 is required, as well as the costs associated with the movement rating change. In addition, before we can manage and quantify the risks associated with Pier E1 and assume responsibility for the East Tie-in span's behavior, the State needs to address and define Pier E1's behavior and dynamic characteristics under the earthquake event represented by the contract's displacement limit state, and incorporate said behavior and dynamic characteristics, along with the associated impact costs, into the contract through the change order.

Very Truly Yours,
C. C. Myers, Inc.

Robert W. Coupe
Project Manager

cc: JMV
MO
JG

File: 215-101

55

C.C. MYERS INC.

51 Macalla Road
(415) 399-0175

San Francisco, CA 94130
Fax (415) 399-0587

January 12, 2005

Document No.: 215-STL.00077

State of California
Department of Transportation
333 Burma Road
Oakland, CA 94607

Temporary Bypass Structure
Contract No. 04-0120R4
CCM Job # 215

Attn: Mr. Lourdes David
Resident Engineer

Re: East Tie-In Final Foundation Submittal

Dear Mr. David,

The East Tie-In Final Foundation Submittal was not accepted by the State via letter no. 05.03.01-000195 because the load path was being transmitted through a superstructure element that was not in conformance with the design criteria shown on the plans. Since, we have provided, and you have reviewed our proposed alternate design criteria for the East Tie-In segment. Based on the existence and level of acceptance of this document, we hereby request that the State now accept the above noted submittal and begin the review process. This was discussed with your staff in meetings held on January 3, 2005 and January 6, 2005. Please understand that resubmittal of this package is not necessary as the one provided via our document 215-SUB.00060 is still valid.

Please advise us as to how you will proceed with this matter.

Very Truly Yours,
C. C. Myers, Inc.

Robert W. Coupe
Project Manager

cc: JMV
CMW
MO
JG

File: 215-101

56

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor
DEPARTMENT OF TRANSPORTATION - District 4 Toll Bridge Program
333 Burma Rd.
Oakland, CA 94607
(510) 622-5660, (510) 286-0550 fax

January 24, 2005

CC Myers, Inc.
51 Macalla Road
San Francisco, CA 94130

Attn: Mr. Bob Coupe

Ref: 215-SUB.00061-00

Contract No. 04-0120R4
04-SF-80-12.6, 13.2
Temporary Bypass Structure

Letter No. 05.03.01-000287

Subject: Revised East Tie-In Design Criteria dated 11-22-2004

Dear Mr. Coupe:

The above referenced submittal regarding the revised East Tie-In Design Criteria has been received by the Department. Verbal discussions and meetings have taken place between the Department and CCM/IAI in regards to matters pertaining to the submittal's acceptance. Please be informed, however, that the submittal cannot be accepted by this Office at this time. There is a substantial amount of outstanding issues that need to be resolved with the East Tie-In Design Criteria before the Office can begin its process of review.

Please contact me at (510) 286-0511 for any additional questions.

Sincerely,

EBRufino

FOR Gary J. Lai
for
Lourdes David
Resident Engineer

cc: D.Adams,DQ,AB,WK
file: 5.3,58.61,62.3

172

FILE COPY

2005

Project #

cc: Roy
Lance
Majid

C.C. MYERS INC.

CCM Job # 215: Temporary Bypass Structure
San Francisco/Oakland Bay Bridge
(415) 399-0175 Fax: (415) 399-0587

51 MACALLA ROAD
SAN FRANCISCO, CA 94130

FAX

Date: 24-Jan-2005

Document #: 215-FAX.00282

To: Dr. Roy Imbsen
Imbsen & Associates, Inc.

Fax#: 916-366-1501

From: Gayle Carrigan

Fax#: 415-399-0587
Phone#: 415-399-0175

Subject: **Revised East Tie-In Design Criteria dated 11-22-04**

Message: Please see the attached document from Caltrans regarding the above.

cc: BC, AC, MO
file:215-201

Total pages sent including this one: 3

Original to follow: No

57

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor
DEPARTMENT OF TRANSPORTATION • District 4 Toll Bridge Program
333 Burma Rd.
Oakland, CA 94607
(510) 622-5660, (510) 286-0550 fax

RECEIVED
JAN 24 2005
CC MYERS, INC.
JOB 215 TEMP. BYPASS STRUCTURE
IC- 1385
215-103
RC
JG
JV
AC
(fax)

CC Myers
51 Macalla Road
San Francisco, CA 94130

January 24, 2005

Contract No. 04-0120R4
04-SF-80-12.6, 13.2
Temporary Bypass Structure

Letter No. 05.03.01-000288

Attn: Mr. Bob Coupe

Ref: 215-STL.00077, 215-SUB.00060

Subject: East Tie-In Final Foundation Submittal

Dear Mr. Coupe,

This Office cannot accept the above referenced submittal at this time. Until outstanding issues are more substantially resolved with the East Tie-In Design Criteria submittal (215-SUB.00061), this Office will not begin the process for review.

If you have any questions, please contact me at (510) 286-0511

Sincerely,

Gary Lai
Structure Representative
for
Resident Engineer
Lourdes David

cc: B. Young
E. Rufino
D. Adams
A. Bata

file: 05.03.01, 58.44, 58.45

CC: Roy
Lance
Mark
Ray
Majid
Dick

C.C. MYERS INC.

FILE COPY
25 2005
Project #________

CCM Job # 215: Temporary Bypass Structure
San Francisco/Oakland Bay Bridge
(415) 399-0175 Fax: (415) 399-0587

51 MACALLA ROAD
SAN FRANCISCO, CA 94130

FAX

Date: 24-Jan-2005 **Document #: 215-FAX.00283**

To: Dr. Roy Imbsen Fax#: 916-366-1501
Imbsen & Associates, Inc.

From: Gayle Carrigan

Fax#: 415-399-0587
Phone#: 415-399-0175

Subject: East Tie-In Final Foundation Submittal

Message: Please see the attached correspondence fro Caltrans regarding the above.

cc: BC, AC, MO
file:215-201

Total pages sent including this one: 2 Original to follow: No

(58)

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

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

RECEIVED
FEB 17 2005
CC MYERS, INC.
JOB 215 TEMP. BYPASS STRUCTURE
IC - 1498
2/15-103

CC Myers
51 Macalla Road
San Francisco, CA 94130

Attn: Mr. Bob Coupe

Ref: 215-STL.00076

February 15, 2005

Contract No. 04-0120R4
04-SF-80-12.6, 13.2
Temporary Bypass Structure

Letter No. 05.03.01-000312

RC
AC
JG
JV

IAI (Fax)

Subject: East Tie-In - Pier E1 Analysis

Dear Mr. Coupe,

The requirements contained within the Design Criteria do not specify that an analysis be performed on the existing Pier E1. The East Tie-In (ETI) structure is specified to attach to this pier with an anchorage designed to resist the total design seismic force of the ETI with a factor of safety of three (3). As indicated in response to RFI-0001.00007-0, it is not the intent of this contract to retrofit Pier E1 but rather to limit the portion of the Temporary Bypass Structure (TBS) that is to be anchored to Pier E1. The completion of the TBS will result in one less double deck span being anchored to Pier E1, which further reduces the demands upon the pier.

With regards to the joint located at the West end of the ETI, the Caltrans Design Review Team concurred that the dimensions calculated were reasonable but were initially unaware of the rocking analysis that was performed. Imbsen and Associates Inc. elected to perform a "rocking" analysis when a calculation based upon the stiffness of Pier E1 could have sufficed. No Contract Change Order resulting from this "rocking" analysis was initiated nor directed by this Office for sizing the joints. During discussions regarding the sizing of the joint, IAI referred to Article 5.1 "Expansion Joints", of the Design Criteria, which discusses designing the joints to support live loads during the "opening cycle" of the DLS. IAI assumed that the joints were then allowed to "bang" during the "closing cycle". This is erroneous and the Design Review Team corrected IAI in their interpretation.

Referencing past meetings held regarding this topic, it should be clear to C.C. Myers that there is no direction from this Office to perform the level of analysis already executed on Pier E1. The Design Criteria only requires that the ETI be analyzed up to the point in which it attaches to Pier E1. As the Engineer of Record, IAI appears to have appropriately pursued an analysis of Pier E1 to satisfy their concerns but this shall be without any contribution from the State as it is not a requirement of the contract. Any risks associated with Pier E1 have already been addressed through these past discussions. Further, this Office does not see the applicability made by the reference to Section 5-1.116 "Differing Site Conditions" of the Standard Specifications in light of the above comments. Should C.C. Myers continue to disagree, please provide further clarification as to the applicability of this specification to the issue being discussed.

For these reasons, no change order shall be forthcoming to address the requests made by C.C. Myers.

If you have any questions, please contact me at (510) 286-0511.

Sincerely,

Gary Lai
Structure Representative
for
Resident Engineer
Lourdes David

cc: E. Rufino
D. Allred
D. Adams
A. Bata

file: 05.03.01, 58.45

59

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company

February 23, 2005

RECEIVED

FEB 23 2005

CC MYERS, INC.
JOB 215 TEMP BYPASS STRUCTURE

IC-1519
215-201
STATE - SOB 6.1-1
DCC 1

#1295-320

IAI Letter #:51

Mr. Bob Coupe
C.C. Myers, Inc.
3286 Fitzgerald Road
Rancho Cordova, CA 95742

Subject: East Tie In Supplemental Design Criteria

Dear Mr. Coupe:

Attached, please find the revised Supplemental Design Criteria for the East Tie In. Per your request, we have incorporated you're comments into this latest revision.

If you have any questions give me a call at (916) 366-0632.

Sincerely,

Roy A. Imbsen

Roy A. Imbsen, P.E., D.Engr.
Project Manager

cc: IAI File,MS,EA

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Oakland, Ca 94607
(510) 267-1835 Phone

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company

February 23, 2005

RECEIVED

FEB 2 3 2005

#1295-320

IAI Letter #:51

CC MYERS, INC.
JOB 215 TEMP BYPASS STRUCTURE

IC-1519
215-201
STATE - SUB 61-1
DCC 1

Mr. Bob Coupe
C.C. Myers, Inc.
3286 Fitzgerald Road
Rancho Cordova, CA 95742

Subject: East Tie In Supplemental Design Criteria

Dear Mr. Coupe:

Attached, please find the revised Supplemental Design Criteria for the East Tie In. Per your request, we have incorporated you're comments into this latest revision.

If you have any questions give me a call at (916) 366-0632.

Sincerely,

Roy A. Imbsen

Roy A. Imbsen, P.E., D.Engr.
Project Manager

cc: IAI File,MS,EA

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167 Filbert Street
Oakland, Ca 94607
(510) 267-1835 Phone

SUPPLEMENTAL DESIGN CRITERIA

FOR THE TEMPORARY BYPASS STRUCTURE - EAST TIE-IN (ETI)

PREPARED BY:

IMBSEN & ASSOCIATES, INC.
9912 BUSINESS PARK DRIVE, SUITE 130
SACRAMENTO, CALIFORNIA 95827

FEBRUARY 22, 2005

1. GENERAL

This supplemental design criteria has been developed to augment the design criteria shown in the project plans as it relates to the East Tie-In segment of the Temporary Bypass Structure. The sections contained herein that have the same number as in the project plan criteria contain modified information that pertains to the East Tie-In only. Sections that are omitted from this supplemental design criteria remain as written in the project plan criteria, except that sections 9, 10 and 11 in the project plan criteria are omitted in their entirety and replaced with the criteria contained in this supplemental design criteria document.

1.1 Definition of Terms:

Temporary Bypass Structure – East Tie-In (TBS- ETI)
The Temporary Bypass Structure – East Tie-In includes in the East segment of TBS spanning between existing Piers E1, to the new Bent #53, continued to the cantilever truss support near new Bent#52 of Viaduct Structure. The ETI structure includes new structural framing as well as southern portion of existing YB4 Truss Bridge.

- Temporary Structures
- Temporary Structures are those used to build the TBS, or remove portions of existing bridge structure to facilitate TBS construction. Temporary Structures are classified as Ordinary or Important.

Ordinary Construction

- Falsework
- Shoring

Important Construction (for operations of High Consequence)

- Load Transfer from the existing YB4 truss to the new E TI structural steel frame and removal of the South Truss of Span YB4.
- Placement of the North Support System and Removal of the North Truss and portions of Existing Floor Beams.

2. DESIGN LOADS

The design loads are the same as those specified in the contract documents and Caltrans BDS except as noted in the following section.

2.3 Live Load- East Tie-In

Live loads shall be applied to each stage carrying traffic. ETI shall be designed for the full live load (all five lanes upper and lower decks) during all the stages. Any reduction in this requirement will be allowed for a given stage if the time duration and loading are less than full live load described above.

2.3.5 Live Load Contribution Under Seismic Conditions
See Section 4.1.1 and Caltrans BDS.

3. MATERIALS

3.3 Structural Steel for ETI

3.3.1.1 Structural Steel

Structural steel shall conform to the requirements of Caltrans BDS, or their equivalents.

3.3.1.2 Existing YB4 Truss

See Section 10.1.2

3.3.5 Fatigue

All new components shall be checked per BDS to withstand fatigue induced by 500,000 cycles of loading.

4. SEISMIC DESIGN

Seismic design shall be performed in accordance with BDS, modified by or augmented with provisions of Caltrans Seismic Design Criteria Version 1.2 (SDC) December 2001, the Caltrans Guide Specifications for Seismic Design of Steel Bridges (GSSDSB) December 2001, the AASHTO Guide Specification for Seismic Isolation Design, 2000, and project specific criteria as detailed in this document within the scope of applicability of the above.

The structures shall be designed for the DEE force demands, or the minimum lateral load as per section 4.1.3. In addition, it shall be evaluated for DLS displacement capacity, or displacement associated with the minimum lateral loads, whichever is greater.

4.1 Seismic Demand for ETI Structure

4.1.3 Minimum Lateral Strength

Substructure and superstructure columns (i.e. columns supporting the upper-deck) shall have a minimum lateral flexural capacity (based on expected material properties) to resist a lateral force of 0.1 Pdl. Where Pdl is the tributary dead load applied at the center of gravity of the supported structure.

4.2 ETI Segment and Articulations

East Tie-In

The East Tie-In will be a two-span continuous double-deck structure. On the West side, it will be supported at the tip of the cantilever truss of Viaduct at WD1 Sta. 54+ 66, near Bent #52, continuous over intermediate Bent#53, and supported on the East side on the existing Pier E-1 at WD1 Sta. 55+51.

Moment resisting frames shall support the south portions of ETI along top and bottom chords of the existing truss.

Remaining north portions of YB4, shall be supported by steel posts, supporting the upper-deck floor beams, and girder beam directly supporting lower deck floor beams.

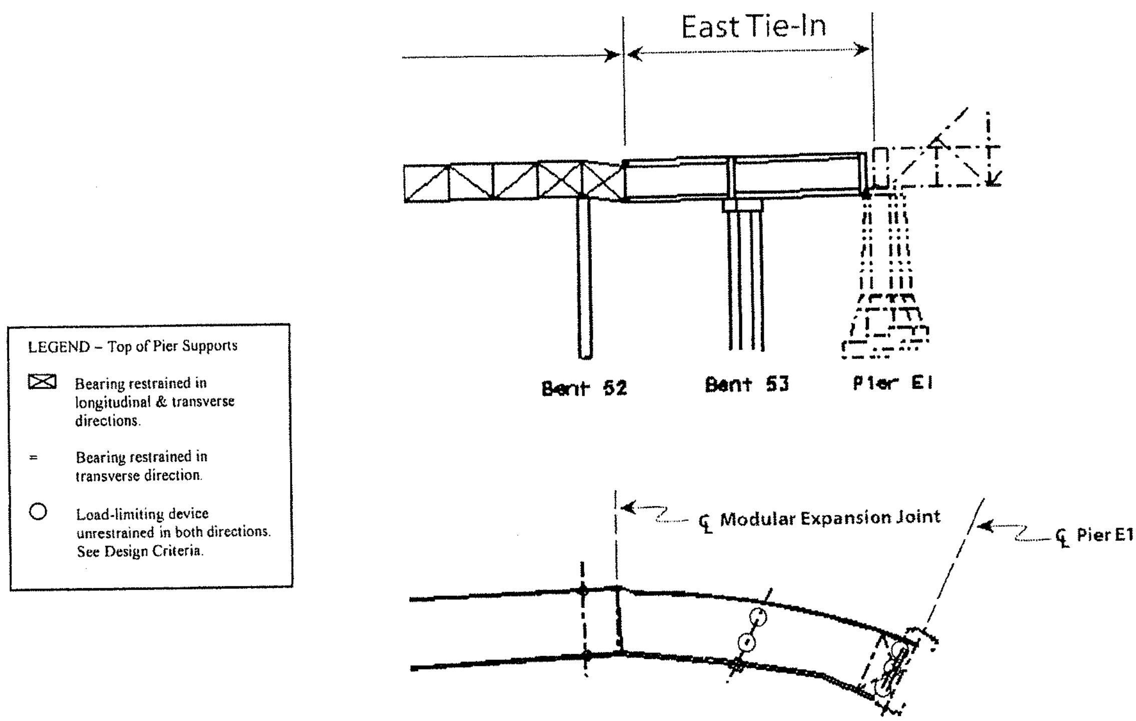


Figure 4.2: Schematics Elevation and plan-Articulation of Temporary Bypass Structure

At Pier E1:

Vertical supports to both existing and new components of ETI will include direct bearing on support systems connected to existing concrete Pier E1. The longitudinal and transverse restraint (i.e. anchorage) of ETI will include an elastic restraint for the service loads and a ductile device to limit the seismic forces which are greater than the service loads. For the seismic response and design requirement see section 4.2.4.

At Bent #53:

Longitudinal and transverse movement of ETI superstructure relative to the substructure will be restrained using fixed bearings, allowing only relative rotation to take place.

At Cantilever Truss (Adjacent to Bent #52):

Transverse movement of ETI superstructure relative to the substructure will be restrained using fixed bearings.

4.2.4 Dynamic Characteristics - East Tie-In

The articulation of the East Tie-In is defined in Section 4.2.

The ETI structure shall be tied to Pier E-1 and be allowed to move along with Pier E-1 in the longitudinal direction. The superstructure and anchorage shall be capacity-protected against longitudinal force associated with Pier E-1.

The dynamic characteristics of Pier E-1 were determined by considering the inertia effects of the cantilever truss to the east of Pier E-1 and the inertia effects of the East Tie-In. Stiffness, mass and strength will be considered in evaluating the dynamic characteristics of the pier. Pier E-1 will have a displacement longitudinally for the D_{EE} event of 50mm and 150mm for the D_{LS} event.

4.6 Capacity Design

Structural elements, other than members constituting the "ductile" horizontal load resisting part of the structure, or load-limiting devices, shall be designed to resist the over-strength capacity of the "ductile" elements, only when yielding of such component at DLS is expected.

4.7.1 Structural Fuses

Approved Load-Limiting devices are elastomeric bearings, lead-rubber bearings and PTFE bearings.

Viaduct and East Tie-In structural fuses are shown in Fig. 4.7.1 (b).
These include:

i) Plastic hinges at the bases of concrete piers or bents via ductile seismic detailing
ii) Steel frames and members configured and proportioned for inelastic response.
iii) Load-limiting devices when very stiff piers are used.

In all cases with the use of fuses, capacity design (with over-strength) shall be employed so that the fuse is mobilized prior to failure modes (brittle) that have not been provided for; i.e., in order to prevent inelastic response of capacity – protected structural components.

5. EXPANSION JOINTS AND SEAT WIDTHS

5.1 Expansion Joints in ETI

Bridge Superstructure Expansion Joints: Transverse joint at the cantilever truss (near Bent # 52),

Deck Joints: Transverse joint at the mid-span of the upper deck and lower deck of existing YB4 in line with a transverse joint along the centerline of Bent#53, and the transverse joint over the last F.B. of YB4 over Pier E1.

Seismic Modular Joint: Transverse modular joint at the cantilever truss (near Bent # 52). They shall be designed to span the gap between segments and for movement demands from temperature rise and fall, creep and shrinkage, and the design evaluation earthquake (DEE) and DLS displacements. Temperature movements need not be combined with seismic movements.

Modular expansion joints shall be sized to be functional (water seals may be damaged) throughout the range of movement (translations & rotation) associated with the DEE.

9. TEMPORARY STABILIZATION FOR SPANS YB4 &YB3

The stability of existing YB4 and YB3 spans shall be provided through positive connections between the decks of existing YB4 and new ETI structure prior to removal of portions of YB4.

10. INCORPORATING THE EXISTING YB4 SPANS INTO EAST TIE-IN DESIGN

The East Tie-In structure as shown in Figure 10.1 includes:

a) South Portions of East Tie-In (New Structure)
b) North Portions of East Tie-In (Existing South portion of YB4 to remain)
c) North Portions of Existing YB4 to be removed

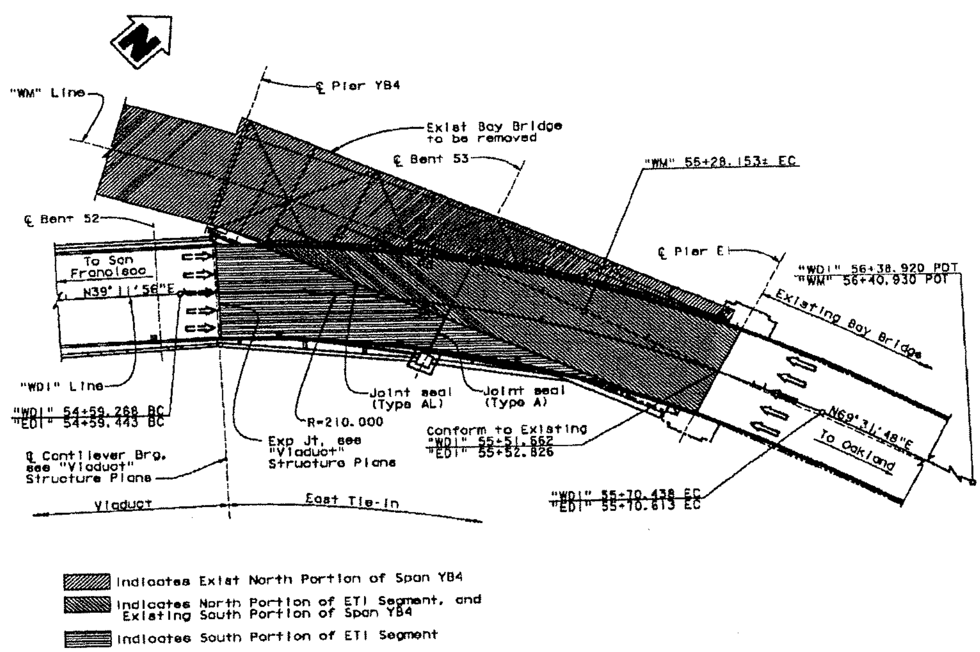


Figure 10.1: Plan View of the East Tie-In

The East Tie-In consists of a new section, which is joined to the east end of the Viaduct and is connected to the south side of Span YB4 as shown in Figure 10.1. The truss opening is sufficient to maintain the horizontal alignment and to provide for five (5) lanes of traffic. Prior to the shifting of traffic and removal of the effected truss members the entire load of the South Truss will be transferred to the new structure as described in more detail for Stages 1 thru 5.

Shifting of traffic as called for in Stage 6 will be completed within the 24 hour allotted closure period. Having shifted traffic onto the new TBS the north side support of the East Tie-In will be constructed and portions of the north side of Span YB4 will be removed along with the north truss as shown in Stages 1 thru 9.

The East Tie-In is supported at its West End by a cantilever section extending beyond Bent 52, a new bent designated Bent 53 and existing Pier E-1. A modular expansion joint shall be at its West End placed to provide for both thermal and seismic longitudinal movements. The East Tie-In is tied longitudinally to Pier E1. South and North portions of East Tie-In are interconnected along existing South YB4 truss by providing continuity in the deck closure.

The East Tie-In is composed of a structural steel frame supported by cantilevered arms of the steel viaduct, concrete Bent 53 and the existing E-1. The structural steel frame is composed of steel box girder sections, which provide support for both the upper and lower decks along South truss of existing YB4. On the North side the upper deck is supported on the steel posts, and lower deck support on new steel box framing into the framing system of ETI. The superstructure is continuous from the cantilever end to Pier E1.

The connections to existing YB4 includes:

- Upper deck jacking brackets and pedestals
- Lower deck jacking brackets and pedestals
- Steel posts and bracket connections to existing upper deck and lower deck floor beams
- Steel pedestals supporting lower deck floor beams
- Concrete Decks

It is assumed that Pier E1 will resist the imposed seismic forces of the East Tie-In and the cantilever truss to the east of Pier E1 for DLS design earthquake. The longitudinal design displacement of Pier E1 for this event will be 50mm for DEE and 150 mm for DLS. The transverse design displacement is assumed to be zero.

Load limiting devices will be placed at the connection between Pier E1 and the East Tie-In. The anchorage assembly and their connections shall be designed for the over strength of the load limiting device.

10.1 Existing YB4 As-Built Material Properties

The properties of the materials of existing YB4 shall be those shown on the as-built drawings as summarized in the sections below. Use of higher values may be warranted if substantiated by test data resulted from field or laboratory testing of the material of the existing YB4.

10.1.2 Structural Steel Original 1934:

$f_y = 37{,}000 psi,\ \ f_u' = 62{,}000 psi$ (carbon steel)

$f_y = 45{,}000 psi,\ \ f_u' = 80{,}000 psi$ (silicon steel)

10.1.3 Lightweight Concrete 1964 Modifications:

$f_c' = 4500 psi,\ \ f_c = 1800 psi,\ \ n = 15$

Reinforcement – Intermediate Grads:

$f_y = 40 ksi$ per CRSI

10.1.4 Structural Steel 1964 Modifications:

A440: $f_y = 45{,}000\ psi, fu = 55{,}000\ psi$

T1: $f_y = 100{,}000\ psi, fu = 115{,}000\ psi$

11 EAST TIE-IN CONSTRUCTION STAGING AND OPERATIONS

The East Tie-In shall be constructed in stages as described herein. Each stage shall be designed to resist the imposed service loads and seismic loads. A typical section of the roadway at Bent 53 is shown in Figures 11.1 thru 11.9 to demonstrate the various stages. A typical section of the existing roadways supported by the YB4 Span Truss is shown in Figure 11.0. There are five (5) lanes of traffic in each direction, the upper deck carrying west bound traffic and the lower deck carrying east bound traffic.

11.1.1 Monitoring and Contingency Plan

A force and displacement monitoring plan for load transfers during stages of construction shall be employed and included as part of the erection plans. Means and methods to execute incremental loading and displacements shall be developed and incorporated as part of erection plans.

Contingency plans for the risk associated with deactivation of truss members and load transfer operations shall be described and furnished as part of the erection plans.

11.1.2 Sensitivity Considerations

The means and methods as provided on the erection plans for the load transfer and deactivations of the truss members shall be developed with due considerations to minimizing the sensitivity and reducing the risks associated with deviations of field operations from the prescribed staging and loading operations based on analysis.

11.1.3 Stress Considerations:

Throughout the jacking and demolition operations, stresses due to combination of jacking loads, dead loads and the permitted live load for a given stage, imposed on the existing truss members and their end connections shall be limited such that they will have sufficient capacity to resist long-term service loads as part of a completed ETI.

Stability Considerations:

Throughout the jacking, member deactivation and demolition operations, stability of existing truss members shall be ensured by providing temporary or permanent supports when such a need is substantiated through analysis.

Deactivations and Demolitions:

Existing members of YB4 structure and its support may be carefully deactivated or demolished when performing such operations do not impair the intended performance of the completed ETI, or adversely affect its resistance to the design loads.

11.1 Construction Staging

This section describes the construction staging that shall be used for the East Tie-In structure.

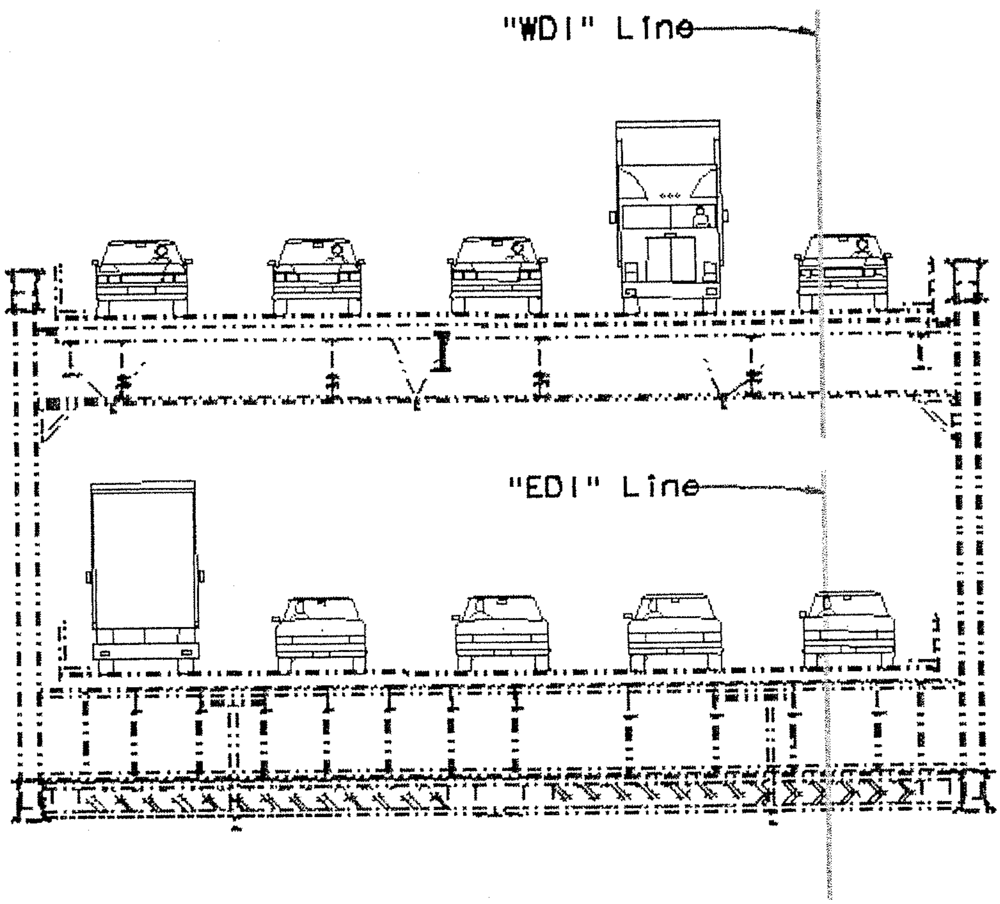


Figure 11.0: Typical Section-Existing YB4 Truss Span

An inspection shall be conducted, jointly by Caltrans, the Contractor, and Contractor's Engineer to evaluate the existing condition of YB4 structure. All accessible components of YB4 to be incorporated in the final design will be inspected to determine their existing conditions and adequacy for the staging and final configuration. This inspection will establish a baseline from which to determine any damage that could result from load transfer operations.

STAGE 1

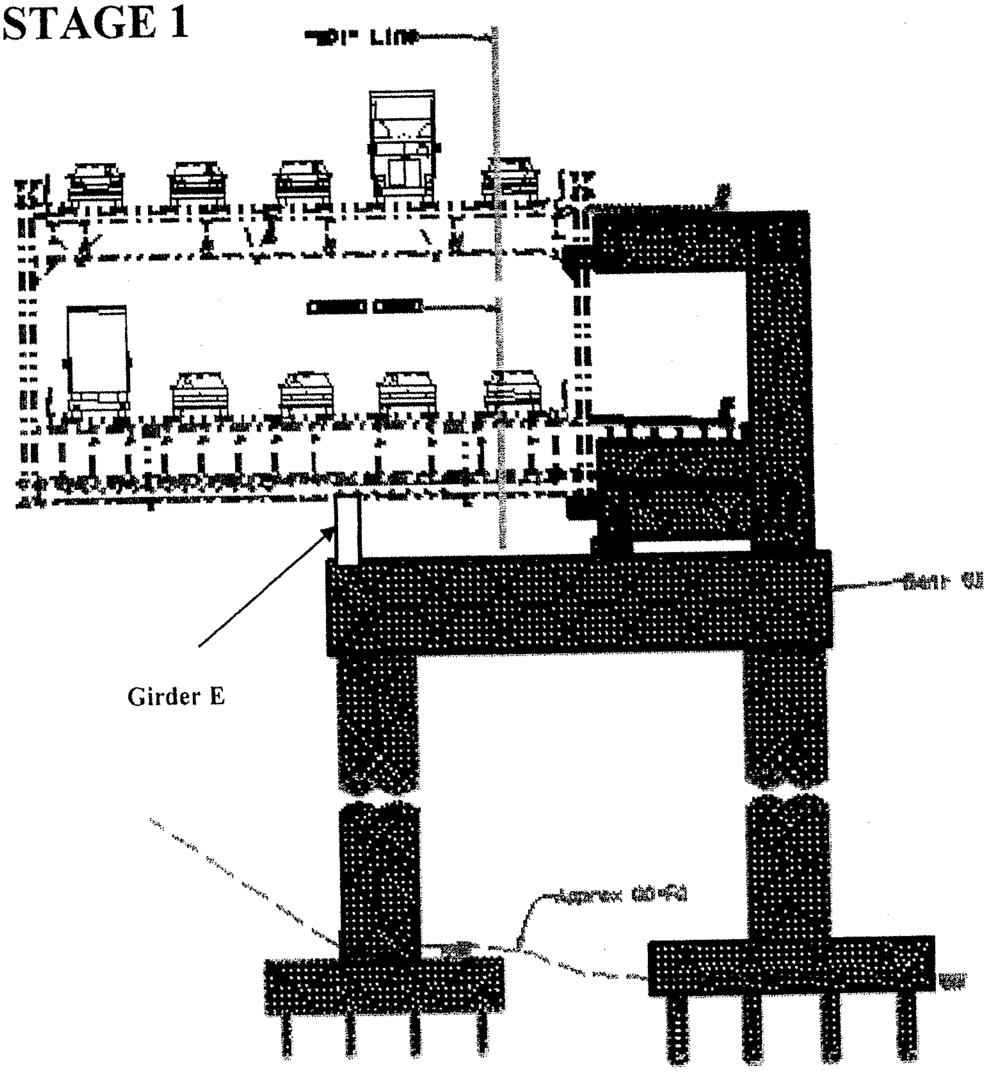


Figure 11.1: Stage 1 – Construction of South Segment Prior to Connection

Stage 1 will include the placement of the North Box Girder E as shown in Figure 11.1. The existing North Truss will remain in service. The pedestals shall be erected, but not be connected to the floor beams at this stage. Thus, no load transfer to girder "E" shall occur in this stage.

Stage 1 as shown in Figure 11.1 basically includes the construction of the new South Segment prior to the connection to the existing Span YB4. At this stage the existing span is in its as-built condition. The South Segment is complete with decking to the closure pour. The construction of the concrete Bent 53 is complete and supporting the steel box sections are in place. The connections to existing YB4 as prepared for the next stage, include:

- Upper Deck Jacking Brackets and Pedestals
- Lower Deck Jacking Brackets and Pedestals

At the completion of this stage there is no connection between the new and the existing structures.

STAGE 2-OPTION (a)

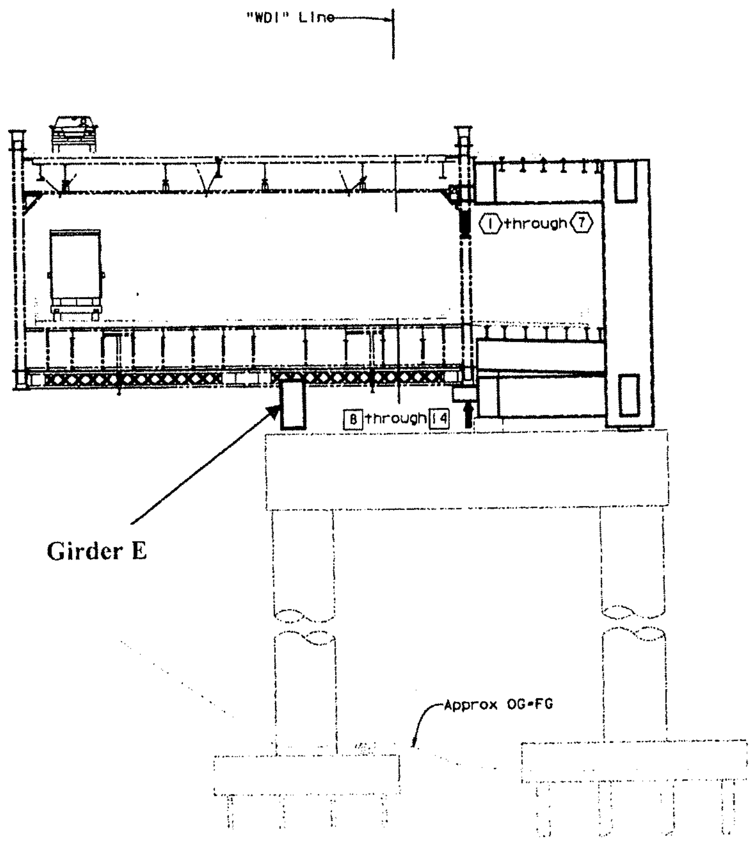
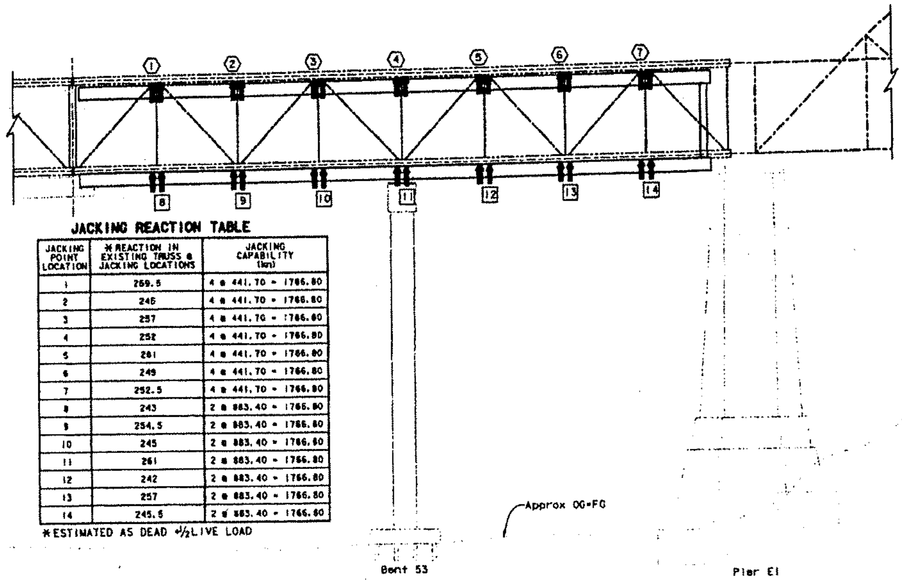


Figure 11.2.a: Load Transfer of South Segment Stage, Typical Section View



JACKING REACTION TABLE

JACKING POINT LOCATION	* REACTION IN EXISTING TRUSS @ JACKING LOCATIONS	JACKING CAPABILITY (kN)
1	269.5	4 @ 441.70 = 1766.80
2	246	4 @ 441.70 = 1766.80
3	257	4 @ 441.70 = 1766.80
4	252	4 @ 441.70 = 1766.80
5	261	4 @ 441.70 = 1766.80
6	249	4 @ 441.70 = 1766.80
7	252.5	4 @ 441.70 = 1766.80
8	243	2 @ 883.40 = 1766.80
9	254.5	2 @ 883.40 = 1766.80
10	245	2 @ 883.40 = 1766.80
11	261	2 @ 883.40 = 1766.80
12	242	2 @ 883.40 = 1766.80
13	257	2 @ 883.40 = 1766.80
14	245.5	2 @ 883.40 = 1766.80

* ESTIMATED AS DEAD +½ LIVE LOAD

Figure 11.2.b: Load Transfer of South Segment
Stage 2, Elevation View

Stage 2, as shown in Figure 11.2, this stage involves the load transfer of the South Truss from the existing YB4 span to the new South segment. This stage begins with the installation of the jacking system and the geometry monitoring system. The jacking system consists of lock nut hydraulic cylinders (jacks), calibrated pressure gauges, a hydraulic pressure source (pump) and the jacking control system (distribution manifold(s) and valves). The geometry monitoring system shall consist of strategically placed control point targets and optical surveying instruments with distance measuring capabilities (total station). The jacking and geometry monitoring systems shall be such that the jacking pressures and the structure geometry can be measured at any time during the load transfer.

Calibrated pressure gauges for each jacking location will be used to monitor the total jacking load applied. The total jacking load applied at a jacking point will be determined as the product of the effective cylinder area(s) and the calibrated pressure. Each pressure gauge will be calibrated and certified at the manufacturer's facility and the corresponding documents submitted for field use. The effective cylinder areas will be certified by the jack manufacturer. The jacking control system shall be capable of isolating any and all jacking locations for individual adjustment of the applied jacking load. A schematic drawing shall be provided showing all components of the jacking system and the hydraulic circuits.

Absolute structure displacements shall be kept within ±150mm of the current roadway profile and the induced roadway superelevation must be maintained to within ±0.8 percent. During the jacking operation the hydraulic jack pistons cannot be extended more than 10mm above the hydraulic cylinder without a redundant support system. If public traffic is carried over the bridge during jacking operations, the Contractor's jacking method shall include provisions for blocking up the superstructure from the new beams or supporting elements such that there will be a gap as small as 25 mm between the supporting elements and the superstructure during all phases of the jacking operations.

Description of the Stage 2 of Construction Activities:

- Existing truss in its as-built condition still in service while public traffic is reduced to zero.

-Jacking is performed simultaneously at all jacking points to raise the south truss and reduce the predicted pre-existing dead load induced member to the analytically determined zero stress condition. This zero member-force condition exists when the south truss is raised by applying prescribed jacking loads. Once this condition is achieved, the lock nuts on the jacks are seated. Any additional live load will be carried by the mechanically locked jacks.

The jacking loads are estimated based on the dead loads of the existing YB4 (i.e. Dead load shears of existing floor beams and tributary weight of truss members at every panel point) plus one half of the live load on the North Truss and no live load on the South truss.

-Pressure gages for each jack will be used to monitor the total jacking load applied to be:

- Not more than estimated dead load reactions.
- Less than Full Dead Reactions + Full Live Load

Loading conditions on YB4 Truss:

DL: +Existing YB4 Truss
+Entire Existing Deck
-Jacking Dead Loads,
LL: +Construction Equipment Only

Loading conditions on South Segment of ETI:

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Jacking Dead Loads,
LL: None

STAGE 2-OPTION (b)

An alternative procedure for performing the load transfer may be devised which involves the load transfer of the South Truss from the YB4 Span to the new South Segment of ETI. In this option, South Truss jacking will be minimal to minimize the risk associated with racking of the truss system . This stage begins with the installation of the jacking system and the geometry monitoring system. The jacking system consists of lock nut hydraulic cylinders (jacks), calibrated pressure gages, a hydraulic pressure source (pump) and the jacking control system (distribution manifold(s) and valves). The geometry monitoring system shall consist of strategically placed control point targets and optical surveying instruments with distance measuring capabilities (total station). The jacking and geometry monitoring systems shall be such that the jacking pressure and the structure geometry can be measured at any time during the load transfer.

Calibrated pressure gauges for each jacking location will be used to monitor the total jacking load applied. The total jacking load applied at a jacking point will be determined as the product of the effective cylinder area(s) and the calibrated pressure. Each pressure gauge will be calibrated and certified at the manufacturer's facility and the corresponding documents submitted for field use. The effective cylinder area will be certified by the jacking manufacturer. The jacking control systems shall be capable of isolating any and all jacking locations for individual adjustment of the applied load. A schematic drawing shall be provided showing all components of jacking system and the hydraulic circuits.

Absolute structure displacement shall be kept within ±50mm of the current roadway position. During the jacking operation the hydraulic jack pistons cannot be extended more than 10mm above the hydraulic cylinder without a redundant support system.

Public traffic shall be reduced to zero.

Description of Stage 2 (Option 2) Construction Activities:

- Existing truss in its as-built condition still in service
-Jacking is performed at all jacking points to raise the south truss based on the specified jacking forces on drawing. Existing member forces due to dead load of structure and external jacking force are predetermined by an analytical model. Once the condition is achieved, the lock nuts on the jacks are seated. Any additional live load will be carried by the mechanically locked jacks. The jacking loads are established from small percentage of dead loads of existing YB4 (i.e. for example 20% of tributary dead load of deck and truss members at every panel point plus.)

- Pressure gage for each jack will be used to monitor the total jacking load applied to be
  - Not more than the estimated dead load reactions when the bridge is temporarily closed to traffic.
  - Less than or equal to the dead load reactions plus the full live load.

Loading conditions on YB4 Truss:

DL: +Existing YB4 Truss
+Entire Existing Deck
-Jacking Loads (Percentage of dead load),
LL: +Construction Equipment Only

On South Segment of ETI:

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Jacking Dead Loads,
LL: None

STAGE 2-OPTION (c)

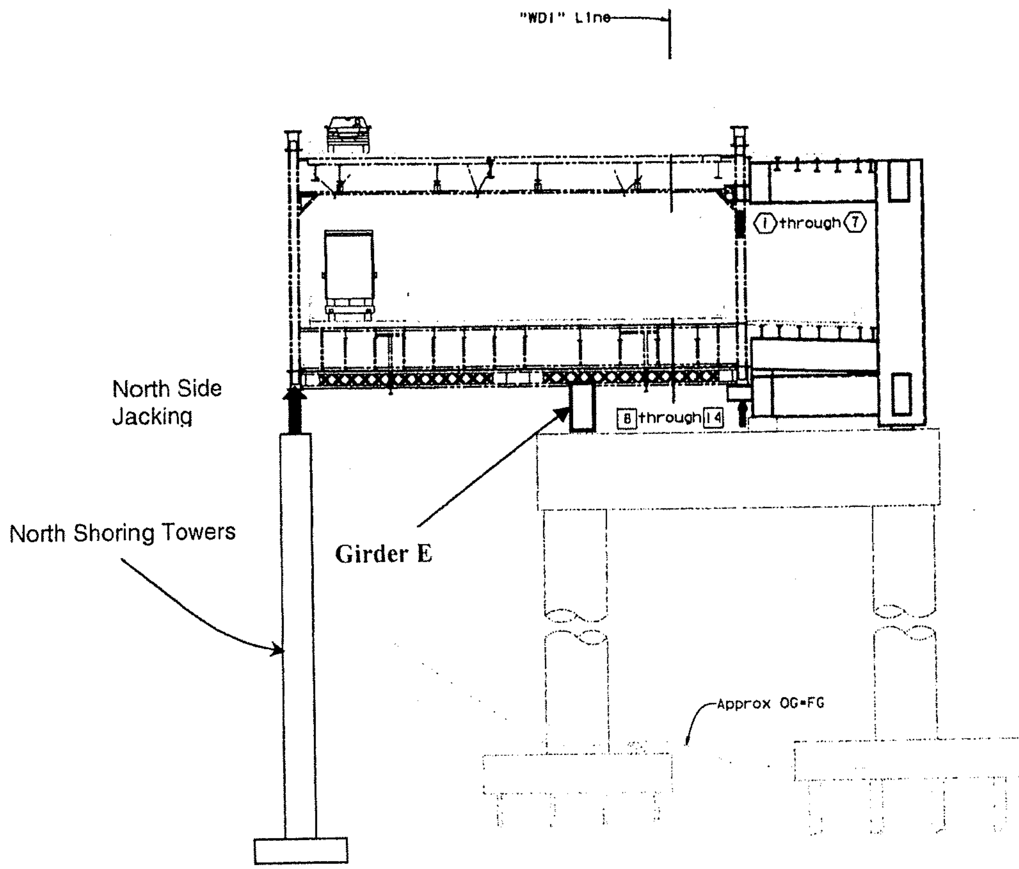


Figure 11.3: Load Transfer of South Segment
Stage 3, Option C, Typical Section View

As shown in Figure 11.3, this options may be used to eliminate racking of the existing YB4 during jacking and load transfers. A shoring tower and jacking system shall be provided under the North truss of YB4, which allows simultaneous and symmetric jacking of the entire YB4. Any required retrofit to accommodate prescribed jacking loads along selected locations of the North Truss shall be determined.

This stage begins with the installation of the jacking system and the geometry monitoring system. The jacking system consists of lock nut hydraulic cylinders (jacks), calibrated pressure gauges, a hydraulic pressure source (pump) and the jacking control system (distribution manifold(s) and valves). The geometry monitoring system shall consist of strategically placed control point targets and optical surveying instruments with distance measuring capabilities (total station). The jacking and geometry monitoring systems shall be such that the jacking pressures and the structure geometry can be measured at any time during the load transfer.

Calibrated pressure gauges for each jacking location will be used to monitor the total jacking load applied. The total jacking load applied at a jacking point will be determined as the product of the effective cylinder area(s) and the calibrated pressure. Each pressure gauge will be calibrated and certified at the manufacturer's facility and the corresponding documents submitted for field use. The effective cylinder areas will be certified by the jack manufacturer. The jacking control system shall be capable of isolating any and all jacking locations for individual adjustment of the applied jacking load. A schematic drawing shall be provided showing all components of the jacking system and the hydraulic circuits.

Absolute structure displacements shall be kept within ±150mm of the current roadway profile and the induced roadway superelevation must be maintained to within ±0.2 percent. During the jacking operation the hydraulic jack pistons cannot be extended more than 10mm above the hydraulic cylinder without a redundant support system. When public traffic will be carried over the bridge during jacking operations, the Contractor's jacking method shall include provisions for blocking up the superstructure from the new beams or falsework such that there will be a gap as small as 25 mm between falsework and the superstructure during all phases of the jacking operations.

Description of the Stage 2 of Construction Activities:

- Existing truss in its as-built condition still in service while public traffic is reduced to zero.

-Jacking is performed simultaneously at all <u>North and South</u> jacking points to raise both North and South trusses and minimize the predicted pre-existing dead load induced member forces to the stresses. The upward displacement imposed under such loading condition shall not exceed the fabricated no-load camber as determined from archive design and shop drawings. Once this condition is achieved, the lock nuts on the jacks are seated. Any additional live load will be carried by the mechanically locked jacks.

The jacking loads are estimated based on the dead loads of the existing YB4 (i.e. Dead load shears of existing floor beams and tributary weight of truss members at every panel point) plus one half of the live load on the North Truss and no live load on the South truss.

-Pressure gages for each jack will be used to monitor the total jacking load applied to be:

- Not more than estimated dead load reactions in case of temporary full closure of the bridge;
- Less than Full Dead Reactions + Full Live Load

Loading conditions on YB4 Truss:

DL: +Existing YB4 Truss
+Entire Existing Deck
-Jacking Dead Loads,
LL: +Construction Equipment Only

Loading conditions on South Segment of ETI:

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Jacking Dead Loads,
LL: None

STAGE 3, OPTIONS (a) and (c)

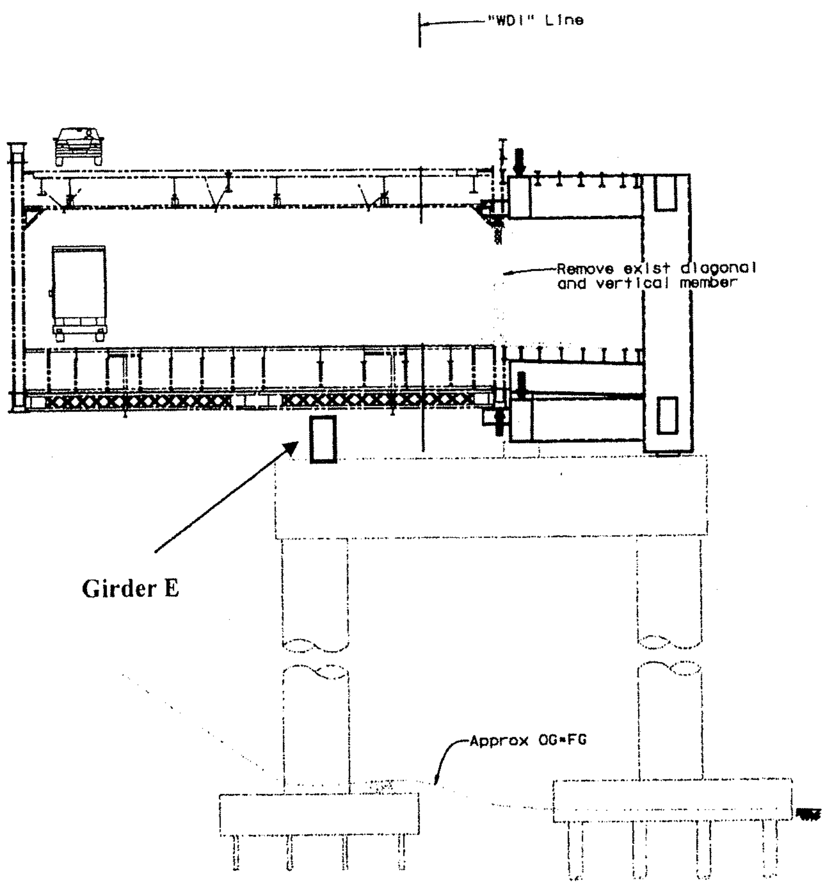


Figure 11.4: Stage 3 – Deactivation and removal of South Truss members

Description of Stage 3 (Options a and c) Construction Activities:

As shown in Figure 11.4, the diagonal, vertical and top chord members of the south truss will be deactivated (cut) in a symmetric fashion. At any time during the deactivating process the applied jacking load at any point can be determined by performing a hydraulic lift-off of the locking nut(s). Load and geometry adjustments can be performed at any time during the deactivation process.

-Upon removal of a truss member, the hydraulic Jacks in the locked condition will carry any new live loads and any dead loads (in addition to those estimated) of the south truss, however the north truss will still be carrying its share of the loads.
After cutting each member, comparison of the actual jacking with the analytical results will be made and necessary adjustment will be made for subsequent cutting.

Loading conditions on YB4 Truss:

DL: +Existing YB4 Truss
+Entire Existing Deck
- Jacking Dead Loads,
LL: +Construction Equipment Only

Loading conditions on South Segment of ETI:

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Jacking Dead Loads,
LL: None

STAGE 3, OPTION (b)

As shown in Figure 11.4, this stage involves the cutting of diagonal and vertical members of South Truss. Strengthening of some truss members and their end connections may be required as predicted by staged-analysis of the YB4 truss for a given sequence of member removal and prescribed initial jacking loads. The sequence of member deactivation, anticipated jack reactions, and possible adjustments of jacking load, their associated relative displacements throughout the operations shall be prescribed for field operations.

Description of Stage 3, Option (b) Construction Activities:

- Diagonal, vertical and top chord members of the south truss will be deactivated (cut) in a predetermined sequence while jacking point is supported by the mechanically locked jacks. After deactivating of the vertical members anticipated dead load at the panel point can be verified by performing a hydraulic lift-off of the locking nut(s). Load and geometry adjustments may be performed at any time during the deactivation process.

- Upon removal of a truss member, the hydraulic jacks in the locked condition will carry any dead load (in addition to those estimated) of the south truss. After cutting of each member, comparison of the actual jacking with the analytical results shall be made and necessary adjustment will be made for subsequent cutting:

Loading conditions on YB4 Truss:

- Existing YB4 Truss
- Entire Existing Deck
- Jacking Dead Load
- Construction Equipment Only

Loading conditions on South Segment of ETI:

- New Steel Frame
- New Concrete Deck
- New Barriers
- Jacking Dead Load
- Tributary Live Load Transfer due to jacking, (Maximum of one lane of traffic on north side)

STAGE 4

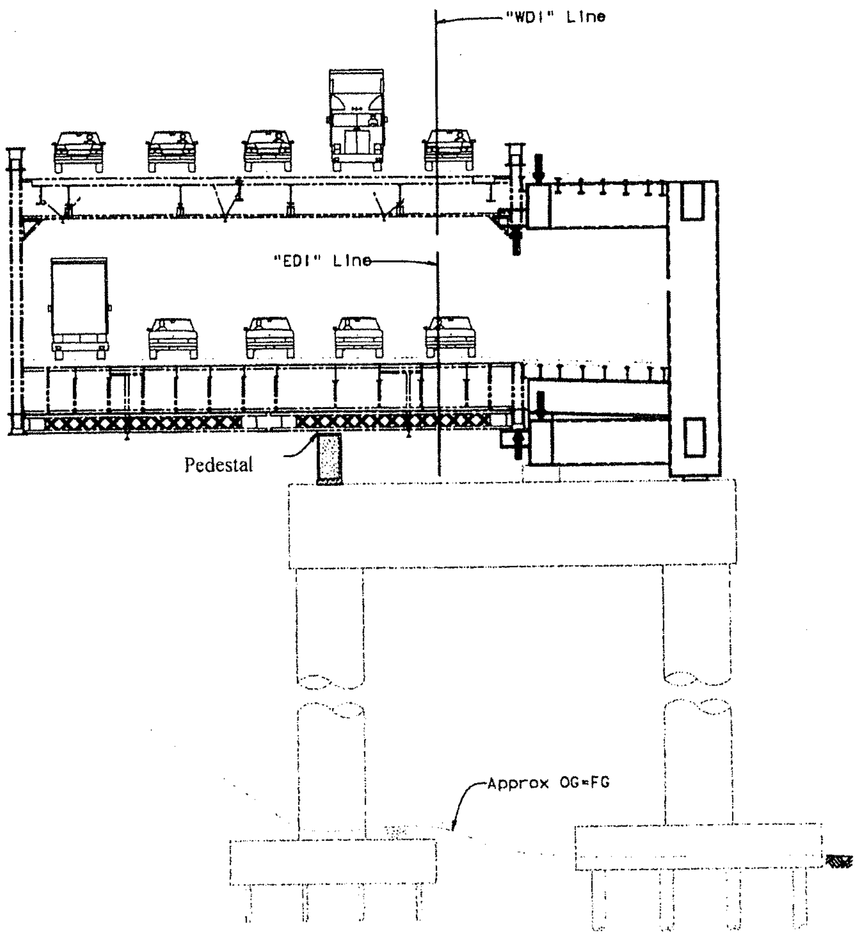


Figure 11.5: Stage 4 – Construction of North Segment Support System

- <u>Description of Stage 4 Construction Activities:</u>

- Stage 4 will include the placement of the Pedestal as shown in Figure 11.5.
-Existing north truss in its as-built condition still in service
-The north box girder 'E' is erected in Stage 1.
-Pedestals are erected but not bolted to floor beams.
- During this stage, no load transfers from lower deck to box 'E' is assumed.

Loading conditions on YB4 Truss:

DL: +Existing YB4 Truss
+Entire Existing Deck
- Jacking Dead Loads,

LL: - Full 5 Lanes of Traffic, both upper and lower decks

Loading conditions on South Segment of ETI:

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Jacking Dead Loads,

LL: Tributary Live load on the south Truss

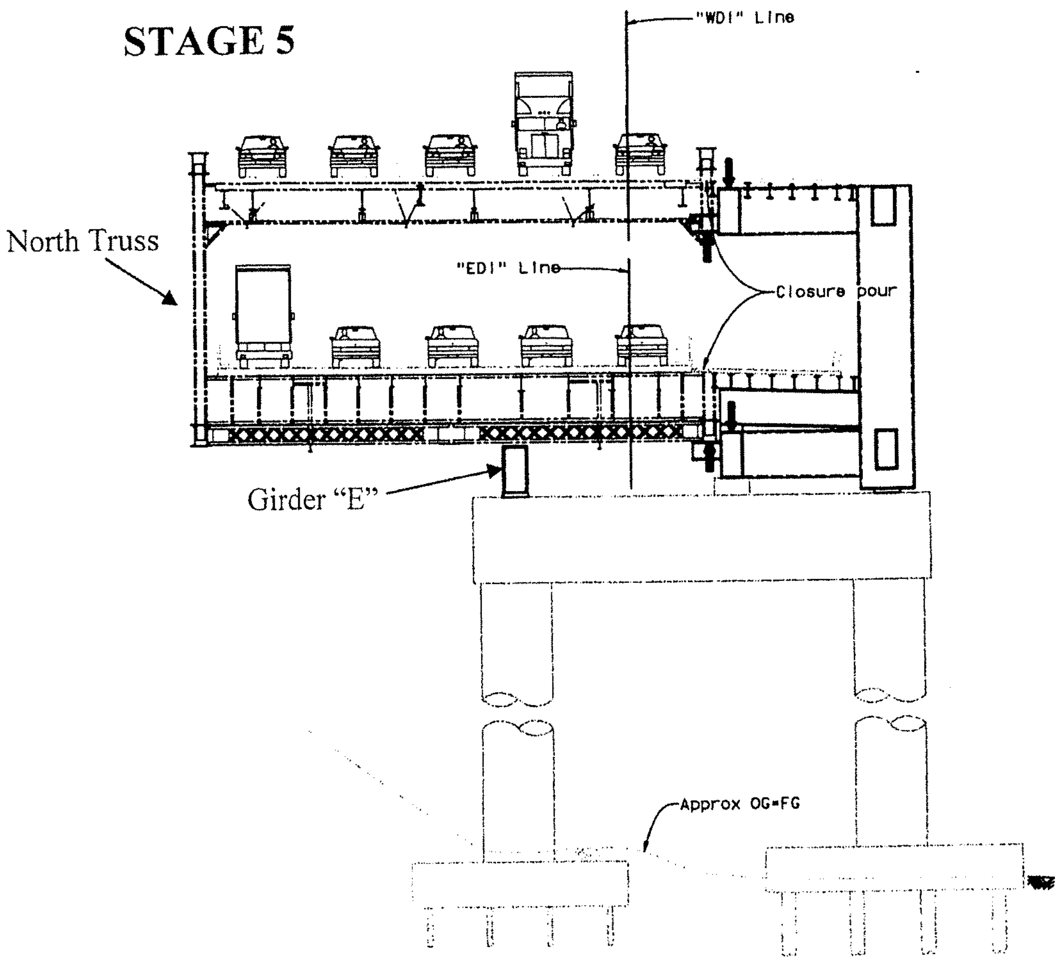


Figure 11.6: Stage 5 – Closure Pour for South Segment

- Description of Stage 5 Construction Activities:

As shown in Figure 11.6 this stage includes the closure pour between the South Segment and the south edge of the existing Span YB4.

Loading conditions on YB4 Truss:

DL: +Existing YB4 Truss
+Entire Existing Deck
+Deck closure pour and overlays
- Jacking Dead Loads,

LL: - Full 5 Lanes of Traffic, both upper and lower decks

Loading conditions on South Segment of ETI:

DL: +New Steel Frame
+New Concrete Deck
+Deck Closure Pours
+Tributary dead Load of overlays on south truss
+New Barriers
+Jacking Dead Loads,

LL: Tributary Live load on the south Truss

<u>Description of Stage 6 Construction Activities:</u>

As shown in Figure 11.7, the barriers are relocated on both North and South side, the existing lower deck asphalt concrete deck overlay is performed to match the contract deck contours, and the traffic is shifted to new South Segment. The existing North Truss in the existing condition is still in service. The pedestals are shimmed to snuggly fit against the floor beams for fastening. A small portion of the live loading will be transferred to Box E at this stage.

Loading conditions on YB4 Truss:

DL: +Existing YB4 Truss
+Entire Existing Deck
+Deck closure pour and overlays
- Jacking Dead Loads,

LL: - Partial Lanes of Traffic, both upper and lower decks

Loading conditions on South Segment of ETI:

DL: +New Steel Frame
+New Concrete Deck
+Deck Closure Pours
+Tributary dead Load of overlays on south truss
+New Barriers
+Jacking Dead Loads,

LL: Partial lanes of traffic directly applied to upper deck and lower deck

- **STAGE 6**

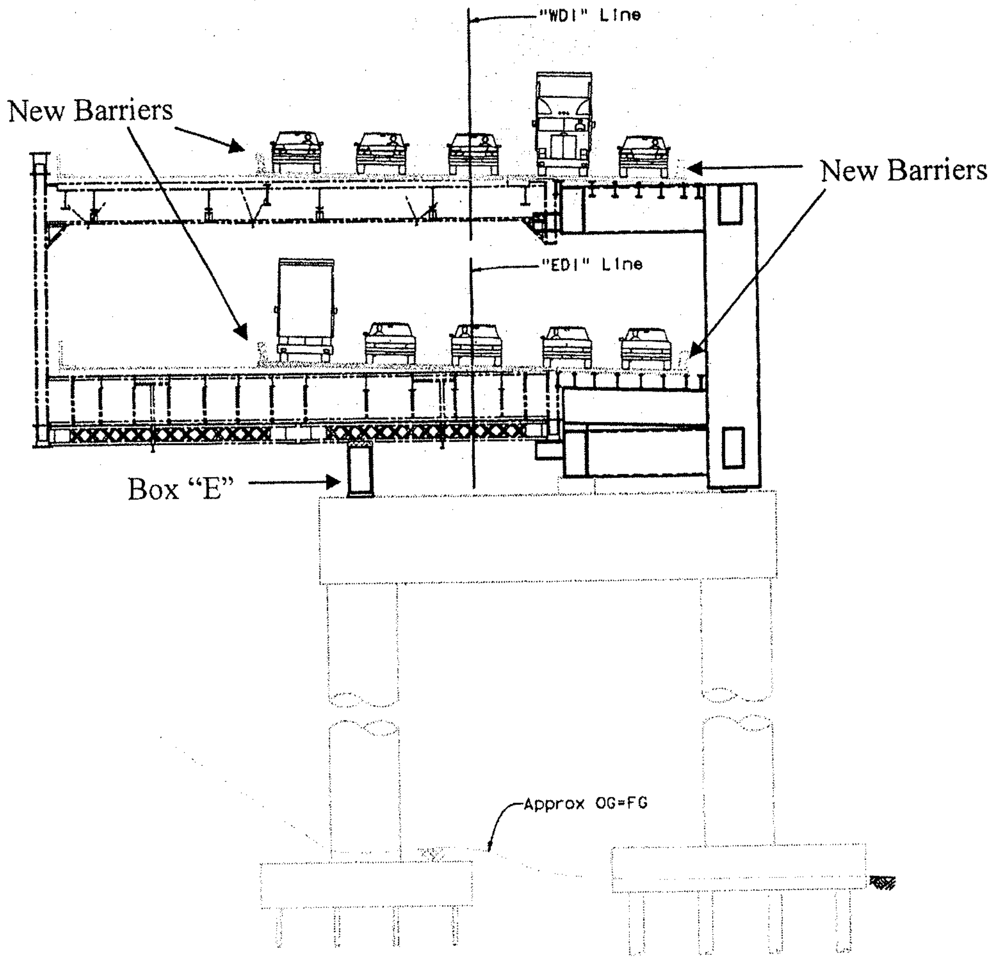


Figure 11.7: Stage 6 – Traffic Shift

STAGE 7

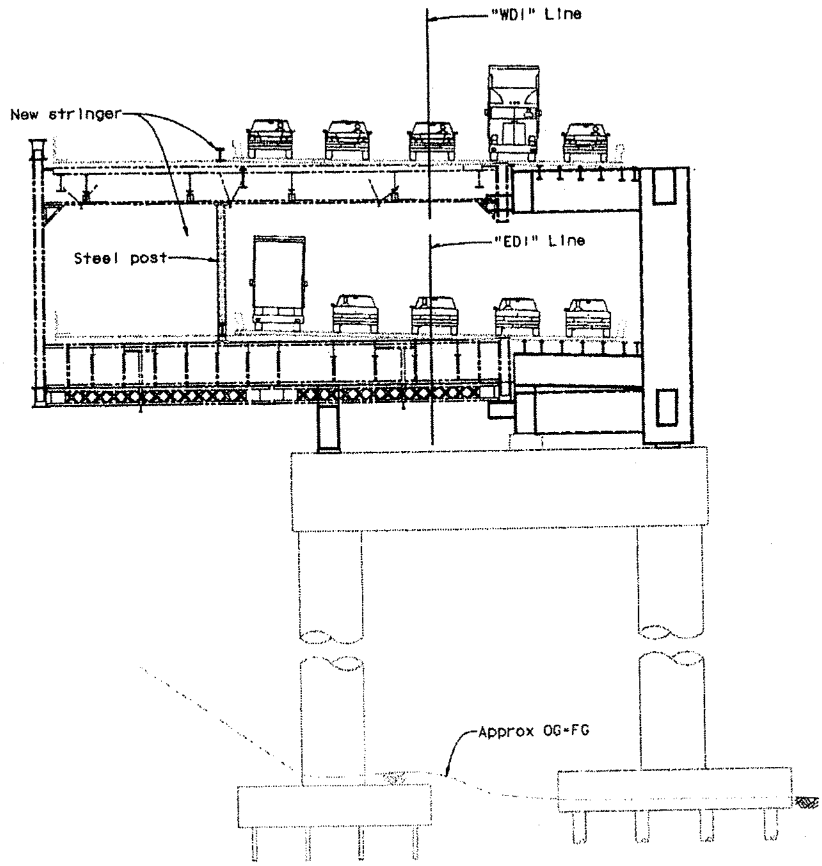


Figure 11.8: Stage 7 – Erection of Deck Support Systems

As shown in Figure 11.8, The Stage 7 includes the placement of the stringers on the upper and lower decks, which are tied to the concrete deck. The steel posts are erected to fit snuggly between the upper and lower floor beams. Following the placement of the vertical posts the steel cross bracing and brackets shall be installed to provide stability to the post both in plane and out of plane of the braced frame system. The load transfer from the upper deck to the lower deck and ultimately to the Box E is limited at this stage with the North Truss still a major part of the total load resisting mechanism.

<u>Description of Stage 7 Construction Activities:</u>

- Existing north truss in as-built condition still in service.
-The steel posts are erected by lightly jacking to fit between the floor beams above and below.
- The steel cross-bracings and brackets are installed to provide stability of post in both in-plane and out of plane of the braced frame system.
- Erect new stringer and anchor to deck to support north portions of the deck prior to demolition.
-Load transfer from upper and lower deck to box 'E' is assumed limited, considering that the north truss is still in service and mainly carrying the loads.

DL: +Existing YB4 Truss
+Entire Existing Deck
+Deck closure pour and overlays
- Jacking Dead Loads,

LL: - Partial Lanes of Traffic, both upper and lower decks

Loading conditions on South Segment of ETI:

DL: +New Steel Frame
+New Concrete Deck
+Deck Closure Pours
+Tributary dead Load of overlays on south truss
+New Barriers
+Jacking Dead Loads,

LL: Partial lanes of traffic directly applied to upper deck and lower deck

STAGE 8

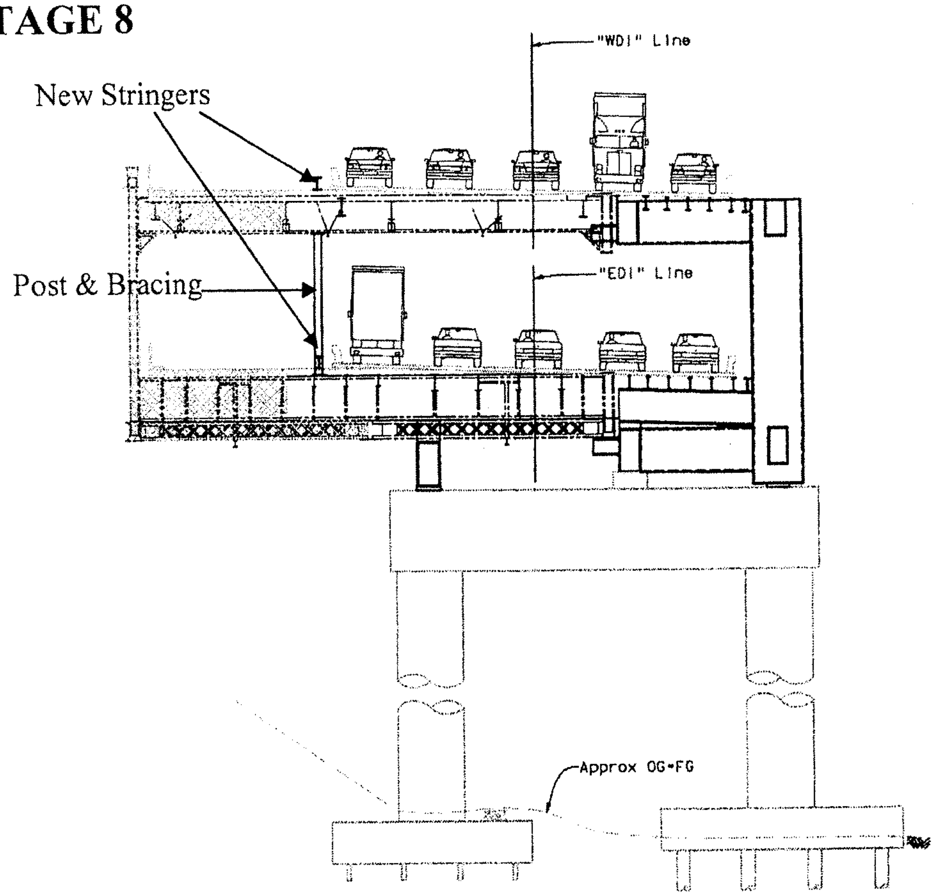


Figure 11.9: Stage 8 – Load Transfer and Demolition of the North Portion of the Span

As Shown in Figure 11.9, this stage includes the load transfer from the existing North Truss to Box Girder E and removal of the north portions of the upper and lower decks and the North Truss.

DL: +Remaining South Portions of Existing Deck
- Reduced Jacking Dead Loads,
LL: + X Lanes of Traffic

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Reduced Jacking Dead Loads,
+ Full Weight Deck Closure,
LL: +Tributary Live Load, Transfer due to Jacking,
+ Y Lanes of Traffic

Description of Stage 8 Construction Activities:

- Demolish north portions of the upper and lower decks.
- Flame cut north portions of upper and lower deck floorbeams while adequately bracing the north truss. The details of this operation will be submitted under a separate submittal (demolition plan).
- Upon cutting of the floor beams and removal of the north truss, all dead and live loads of the remaining portions of the existing truss will be carried by box E.

STAGE 9

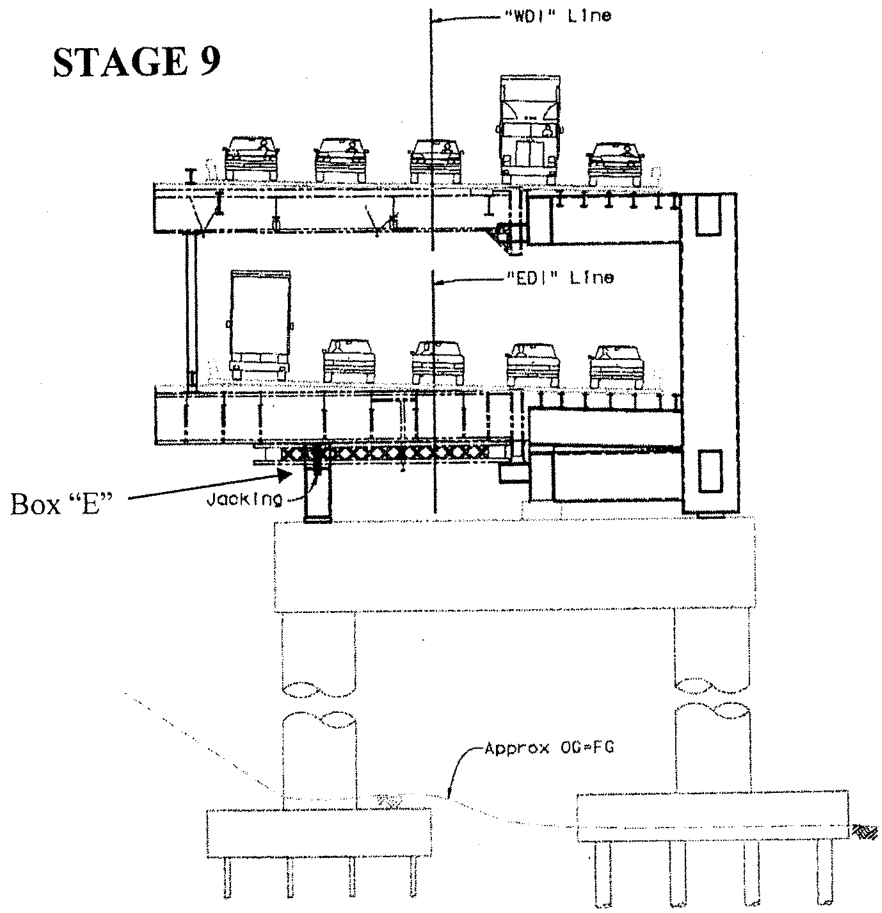


Figure 11.10: Stage 9 – Adjust Profile and Superelevation

Description of Stage 9 Construction Activities:

-Adjusting the elevation of the lower and upper deck floor beams by simultaneously jacking at all floor beam pedestals supported on Box E.
-Placing shim plates and permanently bolting of pedestals to Box E.

DL: +Remaining South Portions of Existing Deck
- Reduced Jacking Dead Loads

LL: + X Lanes of Traffic

DL: +New Steel Frame
+New Concrete Deck
+New Barriers
+Reduced Jacking Dead Loads
+ Full Weight Deck Closure

LL: +Tributary Live Load, Transfer due to Jacking,
+ Y Lanes of Traffic

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company

RECEIVED

JUN 2 2 2004

CC MYERS, INC.
JOB 215 TEMP BYPASS STRUCTURE
IC-00277
215-201

June 21, 2004

#1295-

Mr. Bob Coupe
C.C. Myers, Inc.
3286 Fitzgerald Road
Rancho Cordova, CA 95742

Subject: TBS - Response to Correspondence of June 11, 2004

Dear Mr. Coupe:

We are in receipt of three items of correspondence dated June 11, 2004. Responses to each follow:

RFI #215-rfi-0001.00014-0 Availability of East Tie-in Roll-out Roll-in Design Criteria Calculations at Caltrans.
We attended two meetings with Caltrans last week to present our recommended design criteria. We have reached conceptual agreement with Caltrans on this criteria. As a result of our efforts, we are able to reduce the loads for which we must design. We are modifying the design at this time for these reduced loads. Roy discussed the basics of our approach with Mr. Myers at your office last Friday. Attachment A contains a brief summary of the results of our meetings with Caltrans.

State Letter SL#24: Viaduct Preliminary Design Acceptance
We have received their acceptance of our 5/20/04 submittal, and thus expect comments to be provided in 3 weeks plus 5 days from our submittal, which was June 15, 2004. Have you received their comment letter yet? When we receive the comments we will make the necessary changes and submit the Viaduct Final Foundation Design Submittal. As a reminder, for that submittal, we need the following information from C.C. Myers:

1. Final Quantity Calculations, per page 89 of the contract specs (we assume for pile-related items only).
2. Engineering basis for certain "non-standard" supplemental technical special provisions requested by C.C. Myers and its subcontractors. Refer to Viaduct Preliminary Design Submittal comment numbers 6 and 7 for a description of Caltrans requirements in this regard (we again assume for piling-related work items only).
3. Structure construction sequencing plan.
4. Special falsework or shoring concept plans for the R.E. Pending File.

CCM Doc. No. 215-LET.00016 Construction Engineer

We do not have a problem with CCM reassignment of a Construction Engineer. We understand from your letter than no additional time will be spent by Imbsen in the field, other than that originally budgeted in our agreement. If you believe that Caltrans will not require written verification that the structure is constructed according to approved plans and specs except for at the conclusion of the job, then that is your position. We are fine with that as long as Caltrans is fine with that. Please reply if we have misinterpreted the intent of this letter.

Additionally we have one other item to discuss:

West Tie-in SSL C and D

Please provide the necessary information regarding the design of West Tie-in SSL C & D so we can complete our West Tie-in Preliminary Design Submittal. We understand you are meeting at our office on Monday June 21 to discuss this matter.

Summary

1. Please forward the State Letter regarding Viaduct Preliminary Design comments that was according to our records due on June 15.
2. Please provide information listed for the upcoming Viaduct Final Foundation Design submittal.
3. Please provide SSL C & D component information.

We look forward to a successful completion of this project. Please contact us if you need clarification or wish to discuss any of these or other project issues.

Sincerely,

Roy A. Imbsen, P.E., D.Engr.
Project Manager

MAI/tm/jlh

Attach.

cc: IAI File
1295.320
Schrey, Lance
Imbriani, Mark

Attachment A

We have met with Caltrans on several occasions this week to discuss the East Tie-In. The primary topic has been the decreased force levels that are induced into the superstructure at the upper and lower deck levels due to elastic response of the substructure to the 3 D_{EE} (D_{LS}) level. They have agreed to permit the use of a lower level in the longitudinal direction to account for the rocking of Pier E-1. They have expressed some concern about the uncertainty of this damage and rocking of the pier and requested that we provide an additional backup yielding mechanism in the longitudinal direction to ensure the reduced seismic force. We have resolved that issue with them by allowing a plastic hinge to form in the transverse beam at the pin connection as illustrated in a figure given to C.C. Myers Friday, June 18. We are currently designing that beam and plastic hinging mechanism. Additionally, we have devised a concept to release the transverse force at the Pier to lower the shear force transmitted to the substructures.

(60)

Job 215 - TBS

C. C. Myers, Inc

Memo

To: Gary Lai

From: Juan C. Gray

CC: Erwin Rufino

Date: March 25, 2005

Re: Meeting 03/24/05- Modeling for Pier E1

Attendants:

Dan Himick	Tom Ostrom	Roy Imbsen
Bob Coupe	Dan Adams	Eli Aramouni
Juan Gray	Ali Asnaashari	Mehrdad Varzandeh
	Randy Bains	Majid Sarraf
		Darryl Matson

The purpose of the meeting was to inform the participants on how Caltrans Design sees the behavior of Pier E1, and how does this reflect on the ETI design.

Tom Ostrom explained how they saw Pier E1 as a highly irregular structure, with very complex behavior parameters. Roy explained how they had modeled the pier as a spring, in series with another spring that represents the ductile link beam. Tom said that they did not feel very confident about this approach. Caltrans would prefer to see the pier as a spring up to DEE (or more), and the ductile link would kick in as a fuse mechanism to protect the elements of the structure. There shouldn't be any inelastic action prior to DEE. IAI will look into this, and see how it affects the forces on the structural elements. There is some concern on how to accommodate the movement after the fuse starts to work; Dan Adams noted the difficulty of providing an expansion joint in the deck without disrupting traffic.

Darryl Matson suggested not using any expansion joints; just allowing the decks to pound against each other. There will be some concrete cracking and rubble, but this can be mitigated by placing steel plates after the event without any long term traffic disruption. It was agreed by everyone that this would be a feasible solution, and Caltrans will study it more carefully. In the meantime, IAI will check their design for the conditions suggested by Caltrans, and will provide some results in 2 weeks.

It was a general comment from Caltrans that they would like a more detailed explanation of the boundary conditions in the model, to be able to provide a more refined judgment.

(61)

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

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

March 24, 2005

CC Myers, Inc.
51 Macalla Road
San Francisco, CA 94130

Attn: Mr. Bob Coupe

Ref: 215-SUB.00061-01

Contract No. 04-0120R4
04-SF-80-12.6, 13.2
Temporary Bypass Structure

Letter No. 05.03.01-000330

Subject: East Tie-In Design Criteria

Dear Mr. Coupe:

This Office has received and reviewed the East Tie-In Design Criteria as submitted on Feb 23, 2005. At this time, this Office generated a list of comments, which must be resolved prior to accepting this document. Please see the enclosed attachments for additional details.

If you have any questions, please contact me at (510) 286-0511.

Sincerely,

E B Rufino

FOR Gary Lai
Structures Representative
for
Lourdes David
Resident Engineer

cc: E. Rufino, D. Quintana
file: 5.03.01

PROPOSED MODIFIED DESIGN CRITERIA

FOR THE TEMPORARY BYPASS STRUCTURE
EAST TIE-IN (ETI)

PROPOSAL MODIFIED BY:

STATE OF CALIFORNIA, DEPARTMENT OF TRANSPORTATION
1801 30TH STREET
SACRAMENTO, CA 95816

MARCH 24, 2005

ORIGINALLY PREPARED BY:

IMBSEN & ASSOCIATES, INC.
9912 BUSINESS PARK DRIVE, SUITE 130
SACRAMENTO, CALIFORNIA 95827

FEBRUARY 22, 2005

1.01

This amended design criteria has been developed to augment the design criteria shown in the project plans as it relates to the East Tie-In segment of the Temporary Bypass Structure. The sections contained herein that have the same number as in the project plan criteria shall supercede the project plan criteria as they pertains to the East Tie-In only. Sections that are omitted from this amended design criteria remain as written in the project plan criteria, except that sections 10 and 11 in the project plan criteria are omitted in their entirety and replaced with the criteria contained in this supplemental design criteria document.

1.1 Definition of Terms:

Temporary Bypass Structure – East Tie-In (TBS- ETI)
The Temporary Bypass Structure – East Tie-In includes in the East segment of TBS spanning between existing Piers E1, to the new Bent #53, continued to the cantilever truss support near new Bent 52 of Viaduct Structure. The ETI structure includes new structural framing as well as the southern portion of existing YB4 Truss Spa n.

- Temporary Structures
- Temporary Structures are those used to build the TBS, or remove portions of existing bridge structure to facilitate TBS construction. Temporary Structures are classified as Ordinary or Important.

Ordinary Construction

- Falsework
- Shoring

Important Construction (for operations of High Consequence)

- Load Transfer from the existing YB4 truss to the new E TI structural steel frame and removal of the South Truss of Span YB4.
- Placement of the North Support System and Removal of the North Truss and portions of Existing Floor Beams.
- Stabilization and removal of spans YB3 and YB4

3. MATERIALS

3.3 Structural Steel for ETI

3.3.1.1 Existing YB4 Truss

See Section 10.1.2

3.3.5 Fatigue

Portions of the existing SFOBB that will be incorporated into the ETI shall be checked per BDS to withstand fatigue induced by 2,000,000 cycles of loading. New components shall be checked per BDS to withstand fatigue induced by 500,000 cycles of loading.

4. SEISMIC DESIGN

4.2a ETI Segment and Articulations

East Tie-In

The East Tie-In may be a two-span continuous double-deck structure. On the West side, the ETI may be supported by a superstructure hinge at the end of the Viaduct segment (Fig. 4.2 need not apply to the ETI). The connection between the ETI superstructure and Pier E1 may fuse after the forces associated with the DEE and all service load combinations.

Any attachments to Pier E1 that are necessary to support the superstructure of the ETI shall be designed with a safety factor not less than 3.0. The anchorage shall be designed to resist the total design seismic force of the ETI span only.

4.2.4 Dynamic Characteristics - East Tie-In

The alternative articulation of the ETI is defined in Section 4.2a

9. TEMPORARY STABILIZATION FOR SPANS YB4 &YB3

9.2 Delete this section from the design criteria in the project plans.

9.3 Delete this section from the design criteria in the project plans.

10. INCORPORATING THE EXISTING YB4 SPANS INTO EAST TIE-IN DESIGN

10.1 Existing YB4 As-Built Material Properties

The properties of the materials of existing YB4 shall be those shown on the as-built drawings as summarized in the sections below. Use of these values shall be substantiated by test data resulted from field or laboratory testing of the material of the existing YB4.

10.1.2 Structural Steel Original 1934:

$f_y = 37{,}000\,psi,\ \ f_u' = 62{,}000\,psi$ (carbon steel)

$f_y = 45{,}000\,psi,\ \ f_u' = 80{,}000\,psi$ (silicon steel)

10.1.3 Lightweight Concrete 1964 Modifications:

$f_c' = 4500\,psi,\ \ f_c = 1800\,psi,\ \ n = 15$

Reinforcement – Intermediate Grads:

$f_y = 40\,ksi$ per CRSI

10.1.4 Structural Steel 1964 Modifications:

A440: $f_y = 45{,}000\,psi, fu = 55{,}000\,psi$

T1: $f_y = 100{,}000\,psi, fu = 115{,}000\,psi$

10.2 Monitoring and Contingency Plan

10.2.1 Jacking System Operation

Plans and a written procedure shall be prepared for the load transfer operations from the existing YB4 span to the new ETI structural steel frame. Plans shall show and describe the jacking system, equipment, all load carrying components and anticipated construction load to be applied to span (for structural analysis). The system shall have provisions for adjustment of the position of the jacked span at final location (lateral and vertical). The procedures shall include: proposed jacking control, manifolding arrangements and hydraulic pressures; calibration procedures and certification; description of fail-safe control system; proof testing of the system; rehearsal of the operation; and description of the required monitoring system. Rehearsal shall exercise all equipment and involve all personnel planned for use in the load transfer operation. The plans and written procedures shall be submitted for review and approval prior to the commencement of load transfer operations.

10.2.2 The contractor shall submit a monitoring plan for continuous automatic monitoring and documenting the operations for all load transfer activities from the existing YB4 span to the new ETI structural steel frame. The Contractor shall identify the major risks associated with these operations and develop a contingency plan to mitigate these risks. Contingency actions such as requirements for reliable power sources, and adequate staffing shall be included in the plans. Back up equipment and alternative plans for safety and time-critical operations shall be provided. The monitoring plan and contingency plan submittals shall be reviewed and approved prior to the commencement of load transfer operations.

10.2.3 At a minimum, the monitoring plan for the load transfer processes shall include detailed analysis to establish safe tolerances for applied forces, displacements – translations and rotations, stresses, strains, rate of loading etc.

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STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

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

CC Myers, Inc.
51 Macalla Road
San Francisco, CA 94130

Attn: Mr. Bob Coupe

Ref: 215-SUB.00061-01

March 28, 2005

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

Letter No. 05.03.01-000352

Subject: ETI Design Criteria (2-22-05) - Supplemental Response, Clarification of Existing Design Criteria Requirements

Dear Mr. Coupe:

This letter serves as a supplement to previous State Letter #330, transmitted on 3-24-05. In addition to the comments contained in that previous letter, this Office clarifies some points brought up in discussion concerning CCM/IAI's interpretation of the existing design criteria requirements.

(1) All components of the ETI shall satisfy the design criteria already contained in the plans (including compliance with the SDC and current version of BDS 2000); components of the existing YB4 span must also meet this criteria.

(2) For Section 4.6, Capacity Design: "Structural elements, other than members constituting the ductile horizontal load resisting part of the structure, or load-limiting devices, shall be designed to resist the over-strength capacity of the ductile elements." This statement means that the proposed ETI superstructure and foundation elements must be designed for capacity protection up to the over-strength capacity of the columns.

The attachment previously transmitted represents an edited version of IAI's design criteria which integrates the State's comments and are by no means to be construed as direction to the Contractor.

If you have any questions, please contact me at (510) 286-0511.

Sincerely,

EBRufino

FOR Gary J. Lai
Structures Representative
for
Lourdes David
Resident Engineer

cc: E. Rufino
W. Kwan
D. Adams
A. Bata

file: 05.03.01

(63)

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company

April 5, 2005

#1295-320

IAI Letter #: 70

Mr. Bob Coupe
C.C. Myers, Inc.
3286 Fitzgerald Road
Rancho Cordova, CA 95742

Subject: East Tie-In Design Criteria

Dear Mr. Coupe:

We are in receipt of Caltrans letter No. 05.03.01-000330 dated March 24, 2005, in which they have modified and imposed several conditions on the East Tie-In Design Criteria. Currently, we are proceeding with our final design for the ETI which incorporates the Caltrans imposed conditions as we understand it. However, in order to avoid any confusion, we are requesting clarification for the following items:

1. Section 4.2a ETI Segment and Articulations:

There is no language in the current version of the criteria addressing the boundary conditions of Pier E-1. There have been numerous discussions and many meetings regarding the behavior of Pier E-1, its mass, stiffness and strength characteristics which will have significant impacts on dynamic response of ETI. The criteria does not address how Caltrans wants IAI to model the interaction between Pier E1, the existing cantilever truss (E1-E-4) and the ETI. As we understand it, Caltrans would want IAI to model the interface as follows:

- Model Pier E1 with cracked section properties;
- Include Pier E1's weight/mass;
- Model the base of pier E1 as fully fixed (i.e. no rocking);
- Do not include any mass or stiffness participation of the existing cantilever truss (E1-E-4) in the analysis.

Please verify if this is correct.

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167 Filbert Street
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(510) 267-1835 Phone

2. Section 3.3.5 Fatigue

In this section Caltrans has introduced a new requirement stating that:

> *"Portions of the existing SFOBB that will be incorporated into the ETI shall be checked per BDS to withstand fatigue induced by 2,000,000 cycles of live loading".*

The portions of the existing bridge that will be incorporated into the final ETI structure include mainly deck elements (stringers, laterals, floorbeams). In the final condition, the exiting trusses (diagonals, posts) are removed. However, during the transition from the existing condition to the final condition, there are several stages that include the exiting truss members. It is not clear from the current direction from Caltrans whether they require IAI to check all portions of the existing structure, at each stage of construction, for fatigue induced by 2,000,000 cycles of live loading, or whether this provision only applies to the components of the existing bridge that will be incorporated in the final configuration of the ETI. Additionally, it is not clear if this section applies to members of the existing truss remaining in the same configuration and will be subjected to same loading condition as the original structure (e.g. stringers and cross beams), or those members which will have different length and loading conditions (e.g. portions of existing floor beams to remain and utilized as cantilevers).

Please provide a clarification regarding the extent of this additional requirement.

3. Section 10.1 Existing YB4 As-Built Material Properties

In this section Caltrans is requiring the yield and ultimate capacities of the existing YB4 (steel and concrete members) be verified and substantiated by test data obtained from field or laboratory testing. There are additional components of the existing bridge, other than those listed in the current version of the criteria that are shown on the as-built drawings. These components are:

- 1934 lightweight concrete
- 1934 regular weight concrete
- 1934 rivets
- 1964 bolts

These existing items will be used in the final design of the ETI, and for consistency, may be required to be included in the testing program. Please provide clarification as to whether the material properties for these components shall be substantiated by field or laboratory testing.

Although we believe C.C. Myers is not under a duty to conduct an independent investigation of the adequacy of specifications, it is imperative that C.C. Myers substantiate all of the required properties as soon as possible so as to minimize any impact to our design schedule for the ETI.

The intent of this letter is to better understand Caltrans requirements as it relates to the East Tie-In Design criteria. It is important to note that we consider all of these additional requirements to be above and beyond our scope of work at the time of bid. We specifically disagree with Caltrans position regarding the modeling interaction of Pier E1 and the cantilever span, the added requirement of 2,000,000 live load cycles, and we do not consider it necessary to test any of the existing materials as now required by Caltrans.

Please be advised that IAI will seek recovery of all costs, damages and impacts arising out of or resulting from Caltrans imposed mandates for the East Tie-In Design criteria. IAI will incorporate the additional costs and impacts as a part of NOPC #3 which was submitted to C.C. Myers on October 22, 2004.

Please feel free to contact me at (916) 366-0632 should you have any questions.

Sincerely,

Roy A. Imbsen

Roy A. Imbsen, P.E., D.Engr.
Project Manager

cc: IAI File, MV, MS, DM

139

Job 215 -TBS

C. C. Myers, Inc.

64

Memo

4/8/05 MTG MINUTES

To: Robert W. Coupe

From: Juan C. Gray

CC: Dan Adams, Eli Aramouni, Mehrdad Varzandeh, Darryl Matson, Majid Sarraf

Date: April 11, 2005

Re: Meeting 04-08-05

Attendants:

Bob Coupe, Dan Adams, Eli Aramouni, Mehrdad Varzandeh, Majid Sarraf, Darryl Matson. Juan Gray

Discussion:

- West Tie-In:

  Caltrans Design will provide comments on the March 1 submittal to Construction by next week.

- Viaduct:

  IAI expects to make a submittal of the viaduct superstructure by the end of next week. Dan Adams noted that they have some concerns with the design, and IAI says they have already addressed this. Mehrdad asked Dan about the request to meet with Eugene Thimmhardy; Dan said Eugene has been involved in WTI. Regarding the foundation submittal, Dan said we should get comments next week; he also requests a meeting with IAI to review the substructure calculations, as there is some confusion there. CT has agreed with the wind load reduction. On Bent 52L, the redesign shall proceed, adding notes on the drawings regarding the assumptions made for the shoring system. Eli is looking into the additional pile tip elevation, to check if it can be reduced.

- East tie-In:

  IAI has listed their assumptions on the design, and these will be forwarded to CT. They want to discuss the number of load cycles with CT; there is also concern with the testing of the existing steel. IAI says that some existing members are overloaded, and they have had excellent behavior; in this line of thought, they think if they are going to be exposed to the same stress lever or lower, there would not be a need for retrofit. Dan Adams said that CT position is that any member used in the new structure has to comply with the design code. IAI also said that there are some problems with the top deck floor beams regarding their composite action properties.

Actions:

1-CCM will forward IAI's letter on the design criteria to CT.

2-CT will schedule a meeting to review the Viaduct substructure calculations.

(65)

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

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CC Myers
51 Macalla Road
San Francisco, CA 94130

Attn: Mr. Bob Coupe

Ref: 215-STL.00117, 215-SUB.00061-01

April 18, 2005

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

Letter No. 05.03.01-000379

Subject: East Tie-In Design Criteria

Dear Mr. Coupe,

This Office has the following responses to the questions posed by C.C. Myers, Inc. and Imbsen and Associates, Inc. (IAI) regarding the East Tie-In (EIT) design criteria:

1. Section 4.2a ETI Segment and Articulations:

   Omit the fourth bullet which addresses the mass and stiffness participation of the cantilever truss. There are several reasonable approaches to account for the mass and stiffness of the cantilever when analyzing the ETI.

2. Section 3.3.5 Fatigue

   At this time, no comments can be provided regarding this matter.

3. Section 10.1 Existing YB4 As-Built Material Properties

   The Contractor's Engineer shall verify the section size and properties of the components that will be incorporated into the ETI. The Department cannot assure that the member properties are the same as depicted on the As-Built drawings. It is expected that the section properties used for the design will be substantiated prior to the traffic switch. The Department is not requiring any field or laboratory testing of the materials.

If you have any questions, please contact me at (510) 286-0511.

Sincerely,

Gary Lai
Gary Lai
Structure Representative
for
Resident Engineer
Lourdes David

cc: E. Rufino, D. Adams, A. Bata

file: 05.03.01, 58.45

Mehrdad

66

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company

April 28, 2005 #1295-320

IAI Letter #: 85

Mr. Bob Coupe
C.C. Myers, Inc.
3286 Fitzgerald Road
Rancho Cordova, CA 95742

Subject: **East Tie-In Design Criteria**

Dear Mr. Coupe:

Reference is made to State Letter 05.03.01-000379 received on April 20, 2005, and State Letter 05.03.01-000352 received on March 29, 2005 regarding the above subject matter. The following is a formal response to State Letter 05.03.01-000379:

1. Section 4.2a ETI Segment and Articulations:

Caltrans has stated that there are several reasonable approaches to account for the mass and stiffness of the existing cantilever truss (E1-E-4) in the analysis. Based on the articulation of the cantilever truss, we plan to include 100% of the mass of the cantilever truss between E1-E2 in the transverse direction and 50% of the mass of the cantilever truss between E1-E4 in the longitudinal direction. The justification is that if the drop-in span was made continuous, including only 50% in the longitudinal direction is conservative (we could use 100%), however we have been unable to determine the actual articulation of the cantilever span, and we therefore consider 50% to be appropriate). In our model, we plan to ignore the stiffness participation of the existing cantilever truss in both directions. Our reasoning for this is that in the longitudinal direction, the stiffness of the flexible piers that support the cantilever will be insignificant compared to the stiffness of pier E1, and in the transverse direction the lateral stiffness of the cantilever back-span will also be insignificant compared to the lateral stiffness of pier E1. Please advise if this is acceptable to Caltrans.

2. Section 3.3.5 Fatigue

Caltrans has stated that at this time, no comments can be provided regarding this matter. In order to avoid any more additional costs and impacts to our design efforts and schedule for the ETI, the extent of this new requirement must be provided.

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(916) 366-1501 Fax	(858) 505-9515 Fax		(559) 449-4591 Fax	

3. Section 10.1 Existing YB4 As-Built Material Properties

On the subject of existing YB4 As-Built material properties, Caltran's position on March 24, 2005, was that the *"Use of these values shall be substantiated by test data resulted from field or laboratory testing of the material of the existing YB4."* As of today, it appears that Caltrans has relaxed its position regarding substantiating the existing material properties. As such, we will not incorporate any language in the design criteria regarding verification of material properties by test data obtained from field or laboratory testing.

Additionally, per Letter 05.03.01-000352 received on March 29, 2005, Caltrans has stated that components of the existing YB4 span must comply with the SDC and the current version of BDS 2000. BDS is not applicable for calculating compression capacities of non compact members of the existing bridge (e.g. the top chords of span YB4). Please clarify how we should proceed with this requirement.

We are proceeding with our final design for the ETI which incorporates the Caltrans imposed conditions as we understand it. Per our agreement on Friday April 22, 2005, the stage construction including the load transfer analysis from the existing YB4 span to the new East Tie-in steel frame would not be part of the East Tie-In superstructure submittal. The load transfer analysis will be part of a future submittal which must be reviewed and approved prior to the commencement of load transfer operations.

Please be advised that the Caltrans imposed mandates continue to hamper our design efforts. Imbsen and Associates Inc. (IAI) will seek recovery of all costs, damages and impacts arising out of or resulting from Caltrans imposed mandates for the East Tie-In Design criteria. IAI will incorporate the additional costs and impacts as a part of NOPC #3 which was submitted to C.C. Myers on October 22, 2004.

Please feel free to contact me at (916) 366-0632 should you have any questions.

Sincerely,

Roy A. Imbsen

Roy A. Imbsen, P.E., D.Engr.
Project Manager

cc: IAI File, EA, MS, MV, DM, DE, TF

(67)

cc: Roy
Mehrdad
Majid
Eli

C.C. MYERS INC.

FILE COPY
' 0 3 2005
Project #________

CCM Job # 215: Temporary Bypass Structure
San Francisco/Oakland Bay Bridge
(415) 399-0175 Fax: (415) 399-0587

51 MACALLA ROAD
SAN FRANCISCO, CA 94130

FAX

Date: 03-May-2005 **Document #: 215-FAX.00428**

To: Dr. Roy Imbsen
Imbsen & Associates, Inc.

Fax#: 916-366-1501

From: Gayle Carrigan for Andy Chan

Fax#: 415-399-0587
Phone#: 415-399-0175

Subject: **East Tie-In Design Criteria**

Message: Attached please find correspondence from Caltrans regarding the above.

cc: BC, AC, JG, MO
file:215-201

Total pages sent including this one: 2 Original to follow: NO

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF TRANSPORTATION - District 4 Toll Bridge Program
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RECEIVED
MAY 02 2005

CC MYERS, INC.
JOB 215 TEMP. BYPASS STRUCTURE
IC - 01837
215-103
RC
JAG
IAI (fax)

April 29, 2005

CC Myers
51 Macalla Road
San Francisco, CA 94130

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

Attn: Mr. Bob Coupe

Ref: 215-STL.00117, 215-SUB.00061-01

Letter No. 05.03.01-000394

Subject: East Tie-In Design Criteria

Dear Mr. Coupe,

This Office has the following response to the remaining question posed by C.C. Myers, Inc. and Imbsen and Associates, Inc. (IAI) regarding the East Tie-In (ETI) design criteria:

2. Section 3.35 Fatique

The existing YB4 span shall be checked for 2,000,000 cycles of loading in its final state after being incorporated into the ETI. The Contractor's Engineer shall determine the appropriate number of loading cycles based on the components' previous design stress range, duration of temporary condition, and the anticipated stress ranges during the load transfer stages.

If you have any questions, please contact me at (510) 286-0511.

Sincerely,

Gary Lai
Structure Representative
for
Resident Engineer
Lourdes David

cc: D. Quintana
D. Adams
A. Bata

file: 05.03.01, 58.45

Mehrdad

(68)

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company

May 6, 2005

#1295-320

IAI Letter #:89

Mr. Bob Coupe
C.C. Myers, Inc.
3286 Fitzgerald Road
Rancho Cordova, CA 95742

Subject: East Tie In Supplemental Design Criteria

Dear Mr. Coupe:

Attached, please find the revised Supplemental Design Criteria based on Caltrans comment for the East Tie In. The attached document is essentially the same document that Caltrans had forwarded to us on March 24, 2005 with the addition of the clarification items regarding fatigue.

The issue raised in IAI letter No. 85 regarding the applicability of BDS 2000 for calculating compression capacities of non compact members of the existing bridge remains outstanding. Per your direction, we have excluded this item from the design criteria.

If you have any questions give me a call at (916) 366-0632.

Sincerely,

Roy A. Imbsen

Roy A. Imbsen, P.E., D.Engr.
Project Manager

cc: IAI File, MS, EA, MV, DM
Attachment: East Tie In Supplemental Design Criteria (dated May 6, 2005)

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SUPPLEMENTAL DESIGN CRITERIA

FOR THE TEMPORARY BYPASS STRUCTURE

EAST TIE-IN (ETI)

PREPARED BY:

IMBSEN & ASSOCIATES, INC.
9912 BUSINESS PARK DRIVE, SUITE 130
SACRAMENTO, CALIFORNIA 95827

May 6, 2005

1.01

This amended design criteria has been developed to augment the design criteria shown in the project plans as it relates to the East Tie-In segment of the Temporary Bypass Structure. The sections contained herein that have the same number as in the project plan criteria shall supercede the project plan criteria as they pertain to the East Tie-In only. Sections that are omitted from this amended design criteria remain as written in the project plan criteria, except that sections 10 and 11 in the project plan criteria are omitted in their entirety and replaced with the criteria contained in this supplemental design criteria document.

1.1 Definition of Terms:

Temporary Bypass Structure - East Tie-In (TBS- ETI)
The Temporary Bypass Structure - East Tie-In includes in the East segment of TBS spanning between existing Piers E1, to the new Bent #53, continued to the cantilever truss support near new Bent 52 of Viaduct Structure. The ETI structure includes new structural framing as well as the southern portion of existing YB4 Truss Span.

- Temporary Structures
- Temporary Structures are those used to build the TBS, or remove portions of existing bridge structure to facilitate TBS construction. Temporary Structures are classified as Ordinary or Important.

Ordinary Construction

- Falsework
- Shoring

Important Construction (for operations of High Consequence)

- Load Transfer from the existing YB4 truss to the new E TI structural steel frame and removal of the South Truss of Span YB4.
- Placement of the North Support System and Removal of the North Truss and portions of Existing Floor Beams.
- Stabilization and removal of spans YB3 and YB4

MATERIALS

3.3 Structural Steel for ETI

3.3.1.1 Existing YB4 Truss

See Section 10.1.2

3.3.5 Fatigue

The existing YB4 shall be checked for 2,000,000 cycles of loading in its final state after being incorporated into the ETI. Contractor's Engineer shall determine the appropriate number of loading cycles based on the components previous design stress range, duration of temporary condition, and the anticipated stress ranges during the load transfer stages.

New components shall be checked per BDS to withstand fatigue induced by 500,000 cycles of loading.

4. SEISMIC DESIGN

4.2a ETI Segment and Articulations East

Tie-In

The East Tie-In may be a two-span continuous double-deck structure. On the West side, the ETI may be supported by a superstructure hinge at the end of the Viaduct segment (Fig. 4.2 need not apply to the ETI). The connection between the ETI superstructure and Pier El may fuse after the forces associated with the DEE and all service load combinations.

Any attachments to Pier El that are necessary to support the superstructure of the ETI shall be designed with a safety factor not less than 3.0. The anchorage shall be designed to resist the total design seismic force of the ETI span only.

4.2.4 Dynamic Characteristics - East Tie-In

The alternative articulation of the ETI is defined in Section 4.2a

9. TEMPORARY STABILIZATION FOR SPANS YB4 &YB3

9.2 Delete this section from the design criteria in the project plans.

9.3 Delete this section from the design criteria in the project plans.

10. INCORPORATING THE EXISTING YB4 SPANS INTO EAST TIE-IN DESIGN

10.1 Existing YB4 As-Built Material Properties

The properties of the materials of existing YB4 shall be those shown on the as-built drawings as summarized in the sections below. The Contractor's Engineer shall verify the section size and properties of the components that will be incorporated into the ETI.

10.1.2 Structural Steel Original 1934:

$f_y = 37,000$ *psi*, = 62, 000 *psi* (carbon steel)

= 45, 000 *psi*, *1*, = 80, 000 *psi* (silicon steel)

10.1.3 Lightweight Concrete 1964 Modifications: *f*= 4500 *psi*, f_L, =1800 *psi*, *n* =15

Reinforcement - Intermediate Grads: =

40ksi per CRSI

10.1.4 Structural Steel 1964 Modifications:

A440: f = 45,000 *psi*, f_u = 55,00 *psi* T1

: f_y = *100, 000 psi*, f_u = *115, 000* psi

10.2 Monitoring and Contingency Plan

10.2.1 Jacking System Operation

Plans and a written procedure shall be prepared for the load transfer operations from the existing YB4 span to the new ETI structural steel frame. Plans shall show and describe the jacking system, equipment, all load carrying components and anticipated construction load to be applied to span. The system shall have provisions for adjustment of the position of the jacked span at final location. The procedures shall include: proposed jacking control, manifold arrangements and hydraulic pressures; calibration procedures and certification; description of fail-safe control system; rehearsal of the operation; and description of the required monitoring system. Rehearsal shall involve all equipment and personnel planned for use in the load transfer operation. The plans and written procedures shall be submitted for review and approval prior to the commencement of load transfer operations.

10.2.2 The contractor shall submit a monitoring plan for monitoring and documenting the operations for all load transfer activities from the existing YB4 span to the new ETI structural steel frame. The Contractor shall identify the major risks associated with these operations and develop a contingency plan to mitigate these risks. Contingency actions such as requirements for reliable power sources, and adequate staffing shall be included in the plans. Back up equipment and alternative plans for safety and time-critical operations shall be provided. The monitoring plan and contingency plan submittals shall be reviewed and approved prior to the commencement of load transfer operations.

10.2.3 At a minimum, the monitoring plan for the load transfer processes shall include detailed analysis to establish safe tolerances for applied forces and displacements.

(69)

STATE OF CALIFORNIA-BUSINESS, TRANSPORTATION AND HOUSING AGENCY ARNOLD SCHWARZENEGGER, Governor

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San Francisco, CA 94130

May 17, 2005

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

Letter No. 05.03.01-000415

Attn: Mr. Bob Coupe

Ref: 215-SUB.00061-02, 215-SUB.00061-01, 215-SUB.00061-00

Subject: East Tie-In - Design Criteria

Dear Mr. Coupe,

This Office has received and reviewed the East Tie-In Design Criteria as submitted on May 11, 2005. At this time, this Office only has the following comment:

- Title of the document shall be revised to read “Amended Design Criteria” and not “Supplemental Design Criteria”

With this minor change, there will be no further comments regarding this document. C.C. Myers, Inc. and Imbsen and Associates, Inc. are reminded that a Contractor requested change order must be requested, processed, and approved before final acceptance of the East Tie-In scheme can be provided. As previously stated, this Office will only consider this change at no cost to the State.

It is this Office's understanding that the previous East Tie-In Final Foundation and Final Substructure design submittals (215-SUB.00060-00 & 215-SUB.00071-00) are no longer considered to be correct. Based upon this fact, this Office will not be accepting nor making reviews of these packages. Please indicate in writing otherwise if this is not the correct interpretation of discussions from past design coordination meetings.

Sincerely,

Gary Lai
Structure Representative
for
Resident Engineer
Lourdes David

cc: E. Rufino
D. Quintana
D. Adams
A. Bata
S. Morrison

file: 05.03.01, 58.45

IMBSEN & ASSOCIATES, INC.
Engineering Consultants
A TRC Company

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May 20, 2005

#1295-320

IAI Letter #: 95

Mr. Bob Coupe
C.C. Myers, Inc.
3286 Fitzgerald Road
Rancho Cordova, CA 95742

Subject: **ETI Design Criteria**

Dear Mr. Coupe:

Per State Letter 05.03.01-000352 received on March 29, 2005, Caltrans has required that components of the existing YB4 span must comply with the SDC and the current version of BDS 2000.

Per our IAI Letter #85, dated April 28, 2005, it is IAI's belief that BDS cannot be used for calculating compression or bending capacities for some of the members of the existing bridge. Specifically, some members of the existing structure (e.g. top chords and verticals of span YB4) are built up sections with components that exceed the maximum allowable b/t ratio specified by the code (i.e. these members do not meet the requirements for non-compact sections). Since the capacity formulas in the code are applicable only for members that meet the b/t requirements, BDS is not applicable for calculating the capacity of these members.

Since the Caltrans requirement to meet BDS 2000 is not possible, please provide clarification on what Caltrans intend for us to use regarding the capacities of members that do not satisfy the b/t requirements of BDS.

Please feel free to contact me at (916) 366-0632 should you have any questions.

Sincerely,

Roy A. Imbsen

Roy A. Imbsen, P.E., D.Engr.
Project Manager

cc: IAI File, EA, DM, MS

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