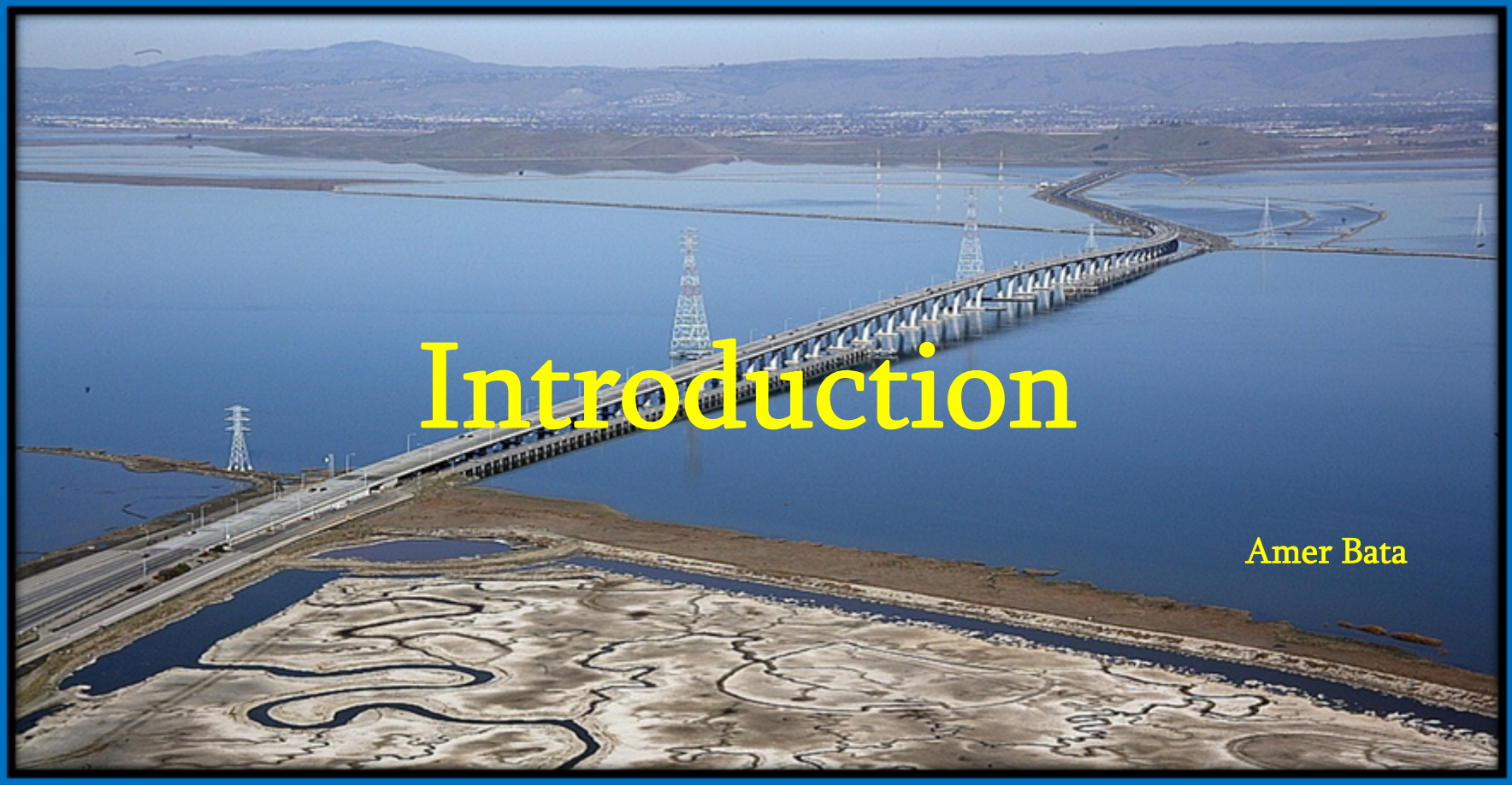
Welcome
Dumbarton Bridge
Contractors Technical Outreach



Introduction

Amer Bata

Agenda

- Registration
- Introduction
- Opening Remarks Addendum
- Project Overview / Lane Closures
- Structure Design
- Environmental
- Small Business
- Break
- Q/A
- Site Visit

Opening Remarks

Brain Maroney / Tony Anziano

Addendum

Steve Margaris

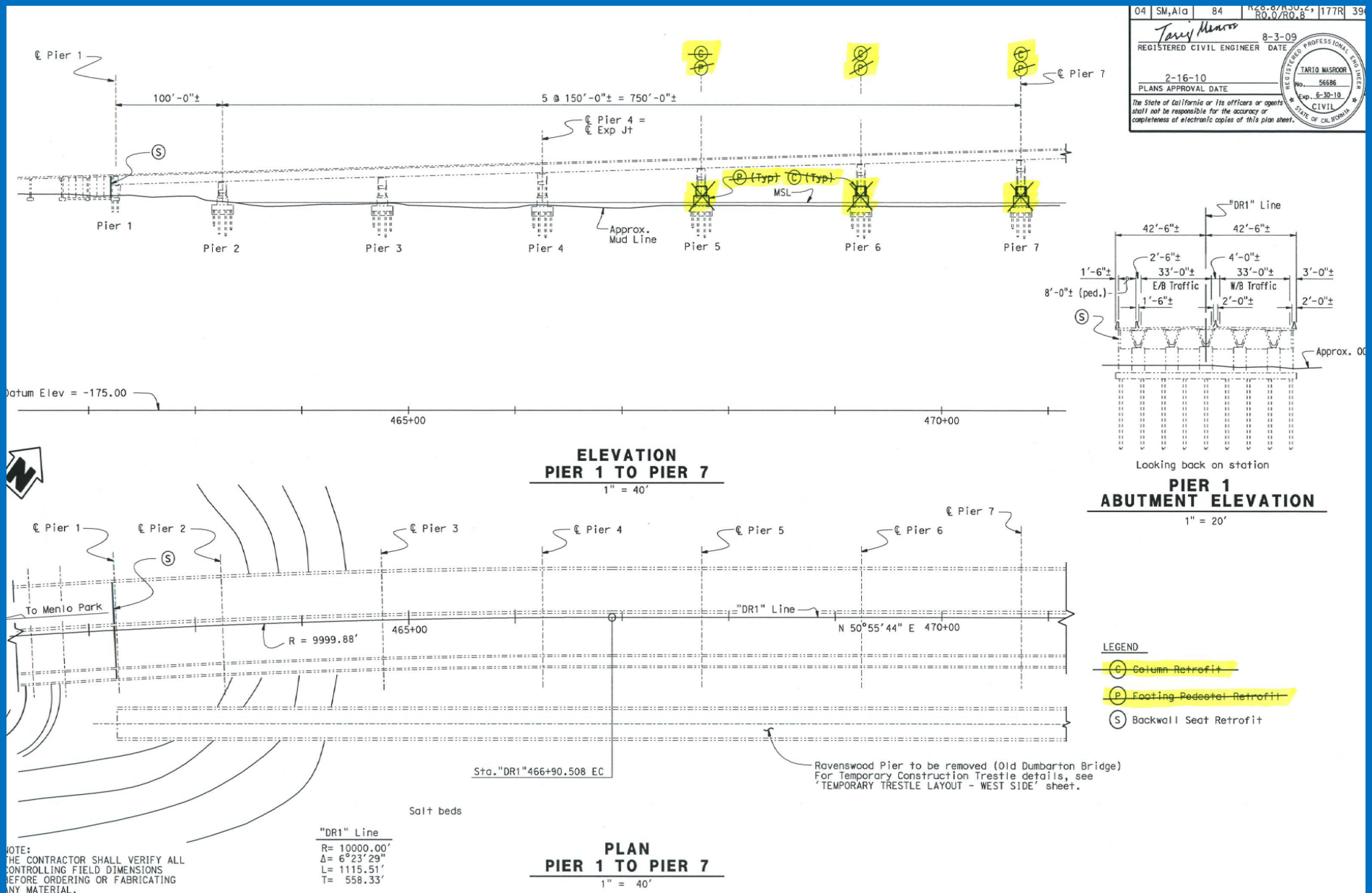
Addendum 1 – Major Changes

1. Eliminate retrofit work in approach spans (Piers 5-15 and 32-40 and portion of 16 & 31)
2. Add Hinge Joint Seal Replacement (Hinge 21 and 25)
3. Make miscellaneous plan revisions
4. Revise specifications, bid opening date
5. Revise item quantities, cost estimate and working days

DUMBARTON BRIDGE *Seismic Safety Retrofit Project*

Contractors Technical Outreach

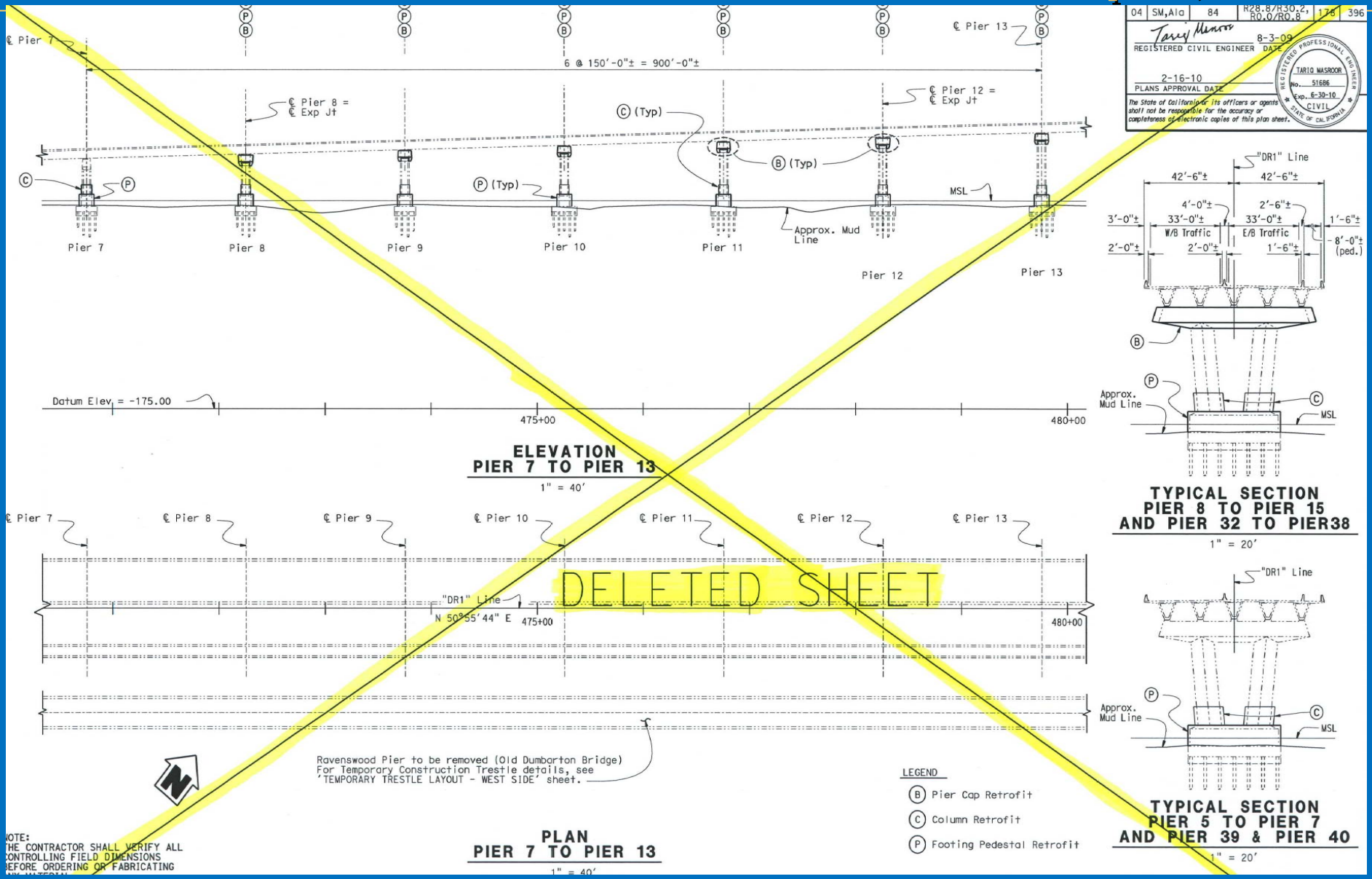
April 30, 2010



DUMBARTON BRIDGE *Seismic Safety Retrofit Project*

Contractors Technical Outreach

April 30, 2010



DUMBARTON BRIDGE *Seismic Safety Retrofit Project*

Contractors Technical Outreach

April 30, 2010

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	SM,Ala	84	R28.8/R30.2, R0.0/R0.8	179R	396

REGISTERED CIVIL ENGINEER 8-3-09 DATE

2-16-10
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER TARIQ MASROOR No. 51686 Exp. 6-30-10 CIVIL STATE OF CALIFORNIA

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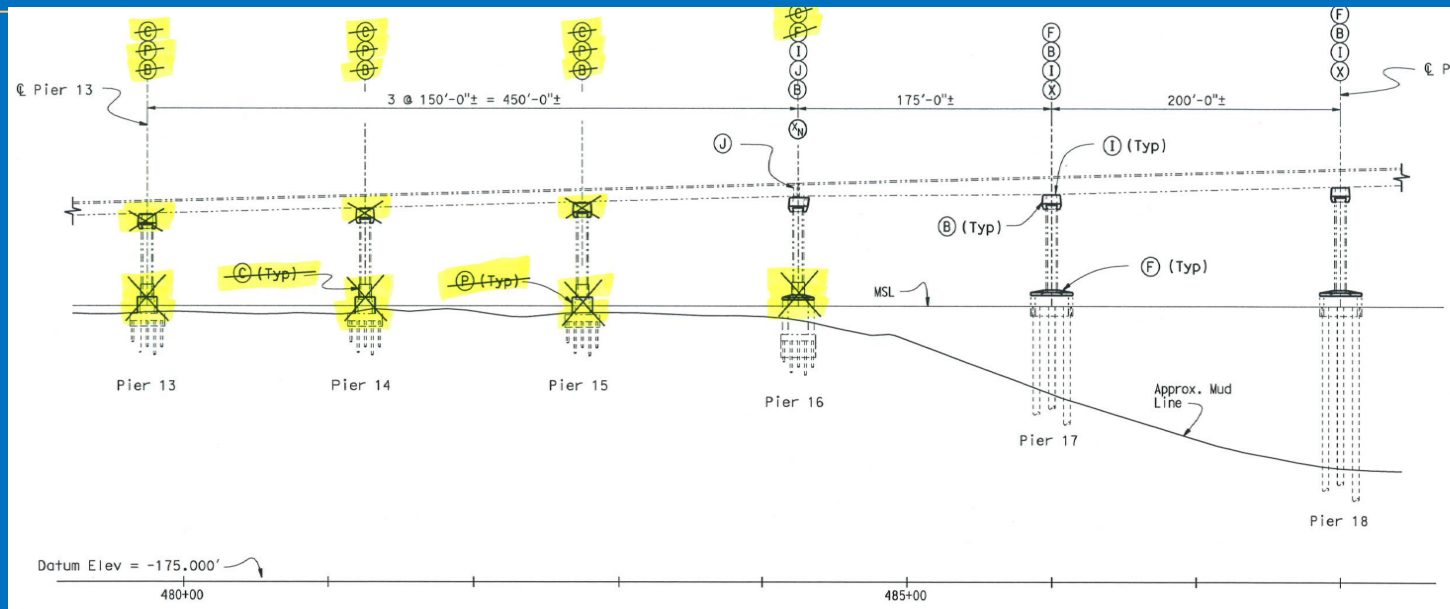
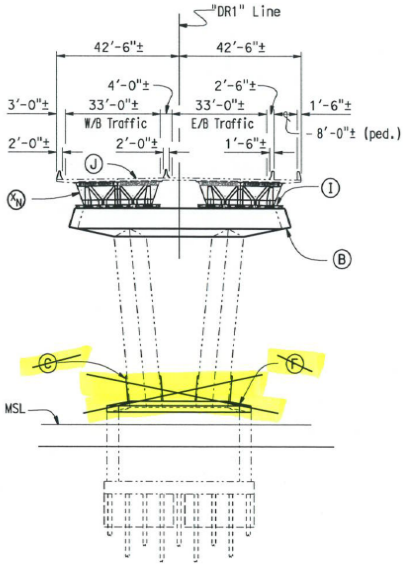
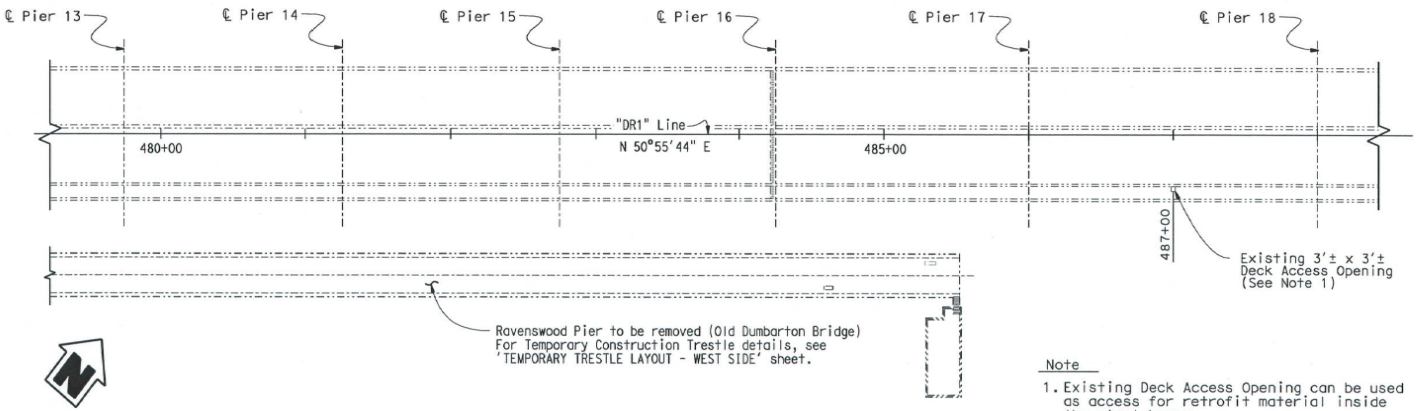


ELEVATION
PIER 13 TO PIER 18
1" = 40'



TYPICAL SECTION
PIERS 16 & 31
1" = 20'



PLAN
PIER 13 TO PIER 18
1" = 40'

Note
1. Existing Deck Access Opening can be used as access for retrofit material inside the steel boxes

LEGEND
- Ⓕ Footing Overlay
- ~~Ⓒ Column Retrofit~~
- Ⓑ Pier Cap Retrofit
- Ⓙ Seismic Joint
- Ⓘ Isolation Bearing
- ~~Ⓟ Footing Pedestal Retrofit~~
- Ⓧ Steel Cross Frame Retrofit
- Ⓧ_N New Steel Cross Frame

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

DUMBARTON BRIDGE *Seismic Safety Retrofit Project*

Contractors Technical Outreach

April 30, 2010

DIST	COUNTY	ROUTE	TOTAL PROJECT	No	SHEETS
04	SM,Ala	84	R28.8/R30.2, R0.0/R0.8	183R	396

REGISTERED CIVIL ENGINEER 8-3-09 DATE

2-16-10
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER TARIQ MASROOR No. 51686 Exp. 6-30-10 CIVIL STATE OF CALIFORNIA

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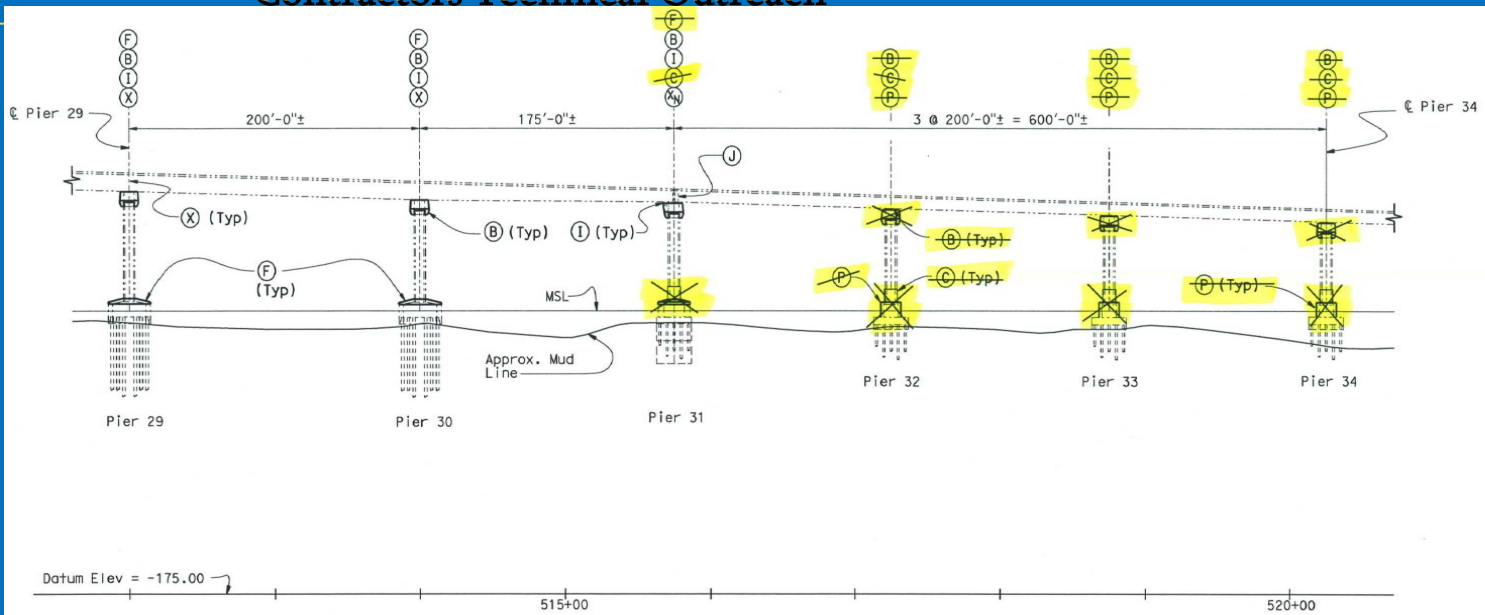
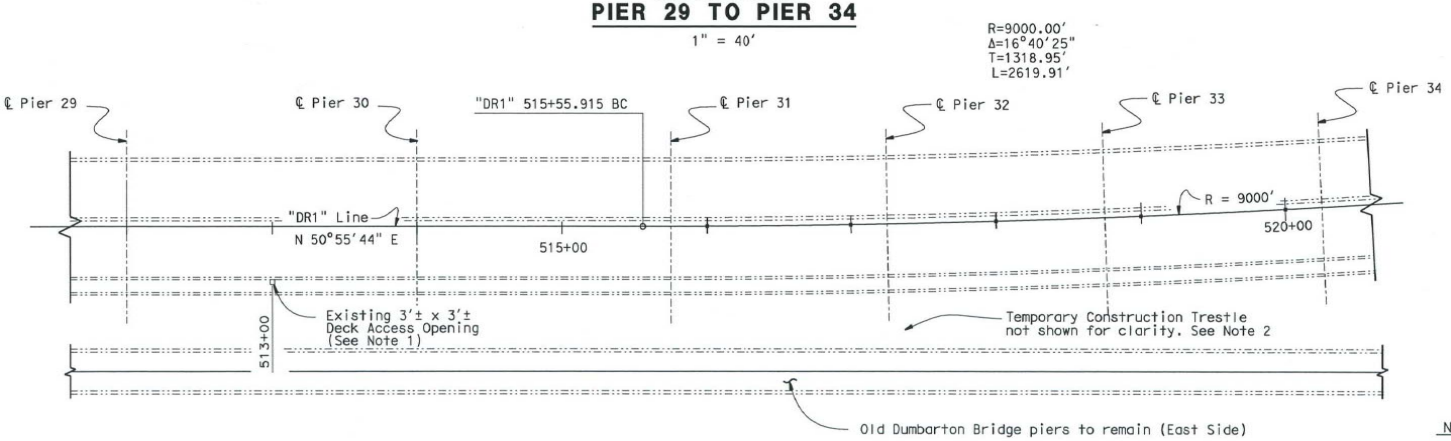


ELEVATION
PIER 29 TO PIER 34
1" = 40'



PLAN
PIER 29 TO PIER 34
1" = 40'

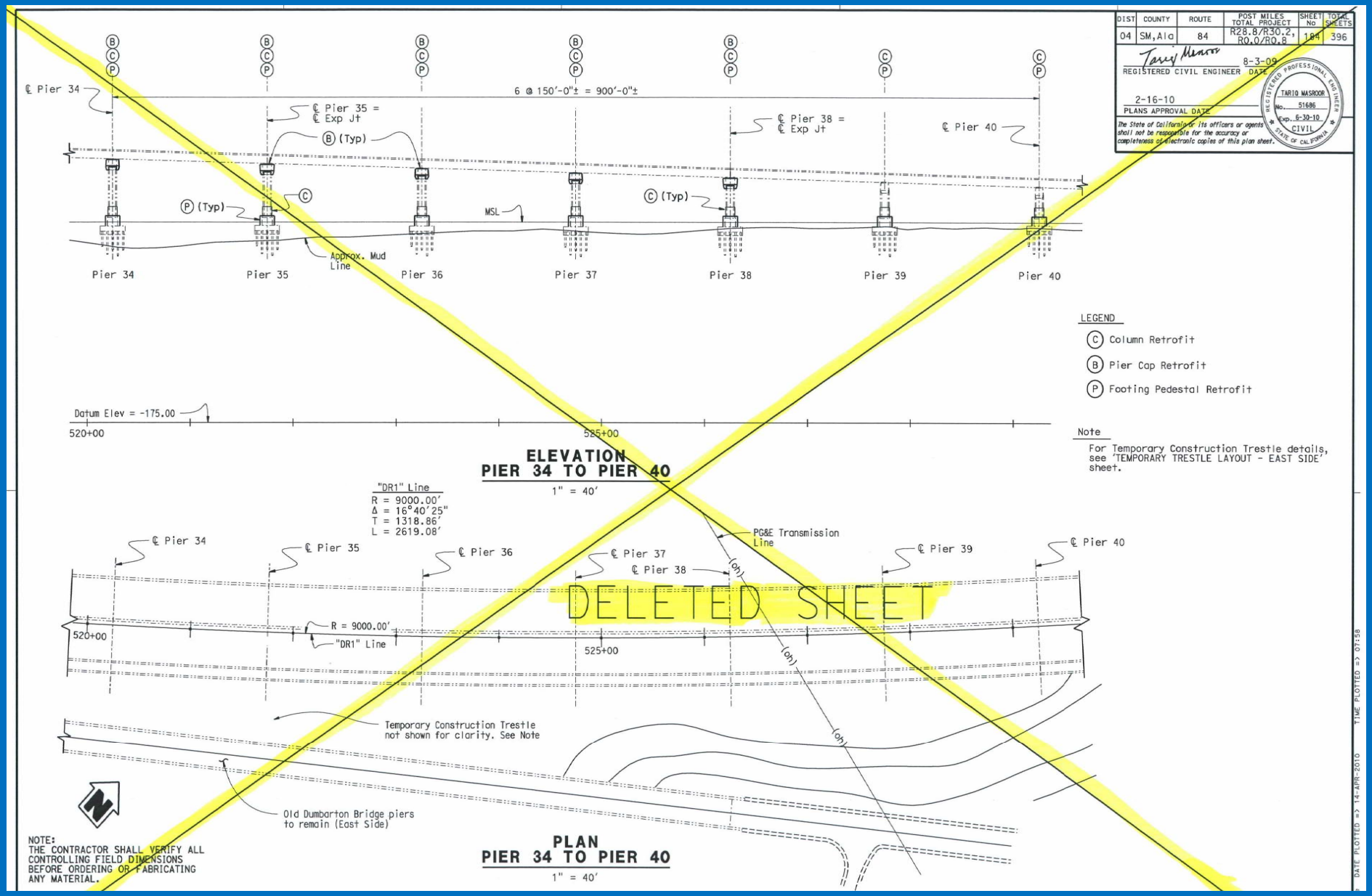
LEGEND

- (F) Footing Overlay
- ~~(C) Column Retrofit~~
- (B) Pier Cap Retrofit
- (J) Seismic Joint
- (I) Isolation Bearing
- (X) Steel Cross Frame Retrofit
- ~~(P) Footing Pedestal Retrofit~~
- (XN) New Steel Cross Frame

Note

1. Existing Deck Access Opening can be used for construction access inside the steel boxes.
2. For Temporary Construction Trestle details, see 'TEMPORARY TRESTLE LAYOUT - EAST SIDE' sheet.

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING


DELETED SHEET
ELEVATION
PIER 34 TO PIER 40
1" = 40'
PLAN
PIER 34 TO PIER 40
1" = 40'
6 @ 150'-0"± = 900'-0"±
℄ Pier 34
℄ Pier 35 = ℄ Exp Jt
℄ Pier 38 = ℄ Exp Jt
℄ Pier 40
Pier 34
Pier 35
Pier 36
Pier 37
Pier 38
Pier 39
Pier 40
MSL
Approx. Mud Line
Datum Elev = -175.00
520+00
525+00
"DR1" Line
R = 9000.00'
Δ = 16°40'25"
T = 1318.86'
L = 2619.08'
PG&E Transmission Line
Temporary Construction Trestle not shown for clarity. See Note
Old Dumbarton Bridge piers to remain (East Side)
LEGEND
Column Retrofit
Pier Cap Retrofit
Footing Pedestal Retrofit
Note
For Temporary Construction Trestle details, see 'TEMPORARY TRESTLE LAYOUT - EAST SIDE' sheet.
NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.
DIST 04
COUNTY SM, Ala
ROUTE 84
POST MILES TOTAL PROJECT R28.8/R30.2, R0.0/R0.8
SHEET No 184
TOTAL SHEETS 396
REGISTERED CIVIL ENGINEER DATE 8-3-09
PLANS APPROVAL DATE 2-16-10
TARIQ MASROOR No. 51686 Exp. 6-30-10 CIVIL STATE OF CALIFORNIA
The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.
DATE PLOTTED => 14-APR-2010
TIME PLOTTED => 07:58

DUMBARTON BRIDGE *Seismic Safety Retrofit Project*

Contractors Technical Outreach

April 30, 2010

			TOTAL PROJECT	NO	SHEET
04	SM,Alc	84	R28.8/R30.2, R0.0/R0.8	185R	396

Tario Masroor 8-3-09
REGISTERED CIVIL ENGINEER DATE

2-16-10
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER TARIO MASROOR No. 51686 Exp. 6-30-10 CIVIL STATE OF CALIFORNIA

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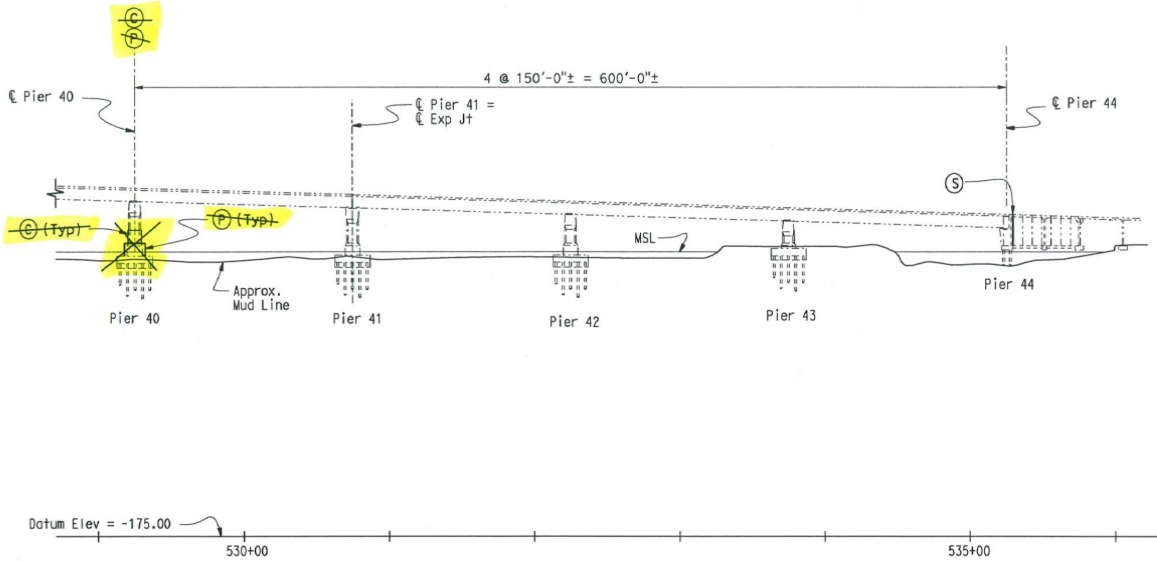
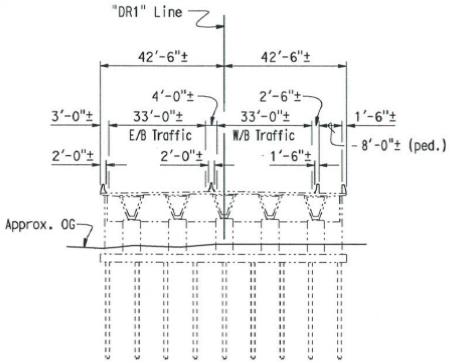
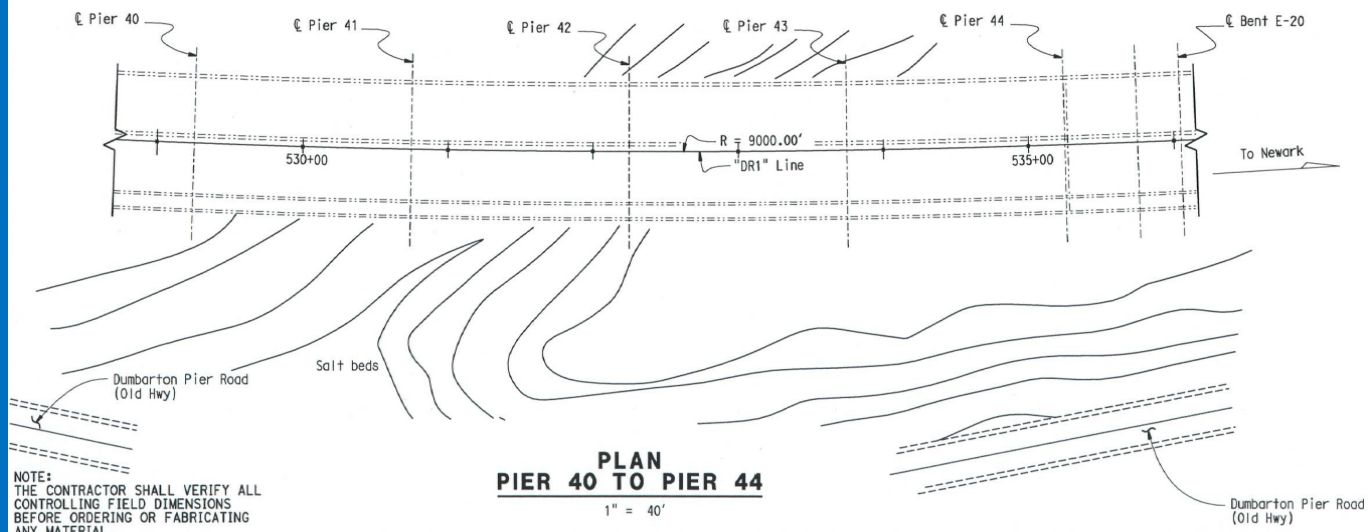


"DR1" Line
R = 9000.00'
Δ = 16°40'25"
T = 1318.86'
L = 2619.08'

ELEVATION
PIER 40 TO PIER 44
1" = 40'



PIER 44
ABUTMENT ELEVATION
1" = 20'



PLAN
PIER 40 TO PIER 44
1" = 40'

LEGEND
- ~~C Column Retrofit~~
- ~~P Footing Pedestal Retrofit~~
- S Backwall Seat Retrofit

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

04	SM,Alo	84	R28.8/R30.2, R0.0/R0.8	203R	396

Tariq Masroor 8-3-09
REGISTERED CIVIL ENGINEER DATE

2-16-10
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER Tariq Masroor No. 51686 Exp. 6-30-10 CIVIL STATE OF CALIFORNIA

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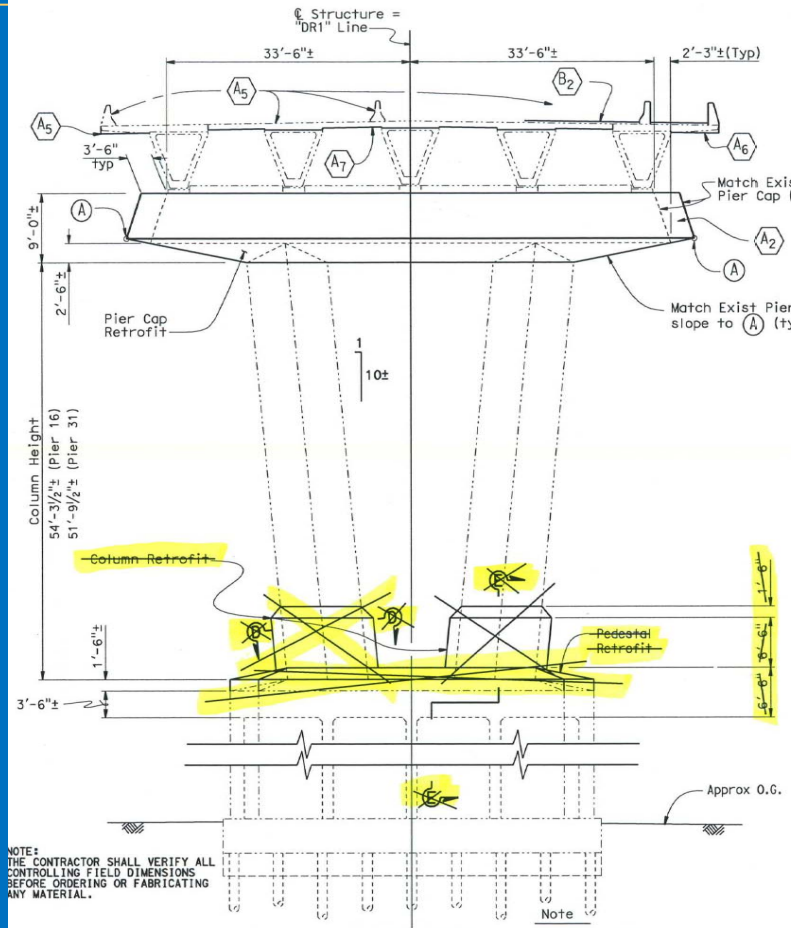
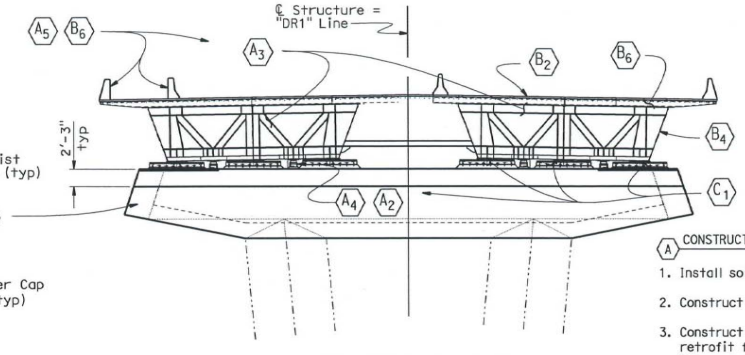


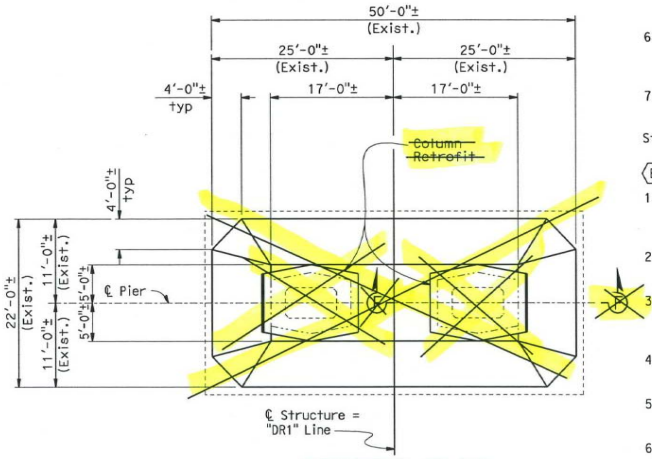
NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

ELEVATION
⅛" = 1'-0"

Note
Pier 16 shown, Pier 31 similar.



LOOKING BACK ON STATION
PIER CAP ELEVATION
⅛" = 1'-0"



FOOTING PLAN
⅛" = 1'-0"

Notes :

1. For Utilities relocation, see 'ROAD PLANS'
2. Construction sequence is shown for Pier 16, Pier 31 is similar and under separate bridge closure.
3. ~~Contractor shall construct cofferdams where necessary to dewater the retrofit work area.~~
4. Sole and jacking plates shall be welded prior to construction of Pier Cap Retrofit, see 'NEW STEEL CROSS FRAME SECTION' sheet.
5. For Pier Cap Retrofit, see 'PIER CAP DETAILS NO. 1' TO 'NO. 5' sheets.
6. ~~For "Section D-D" and "F-F", see 'FOOTING PEDESTAL AND COLUMN DETAILS NO. 1' sheet. For "Section E-E" and "F-F", see 'FOOTING PEDESTAL & COLUMN DETAILS NO. 2' sheet.~~
7. For New Steel Cross Frame and Steel Cross Frame Retrofit Construction see 'NEW STEEL CROSS FRAME CONSTRUCTION SEQUENCE' and 'STEEL CROSS FRAME RETROFIT CONSTRUCTION SEQUENCE' sheets.
8. Minimum clear cover shall be 3 inches unless otherwise shown.
9. All existing concrete surfaces in contact with new concrete shall be free of laitance with surface roughened to an amplitude of 0.25 inches.
10. (A) is the intersection of the slope of the existing cantilever soffit and the slope of the retrofit Pier Cap end face.

(A) CONSTRUCTION SEQUENCE

1. Install sole and jacking plate. See Note 4.
2. Construct Pier Cap Retrofit. See Note 5.
3. Construct New Steel Cross Frame and Steel Cross Frame retrofit for affected Piers, see Note 7 as required per "Temporary Support and Jacking Plan" sheet.
4. Install Jacks.
5. Remove and replace barrier Stages 1 and 2 at Spans 15, see 'BARRIER AND DECK LAYOUT' and 'BARRIER AND DECK DETAILS NO. 1' & 'NO. 2' sheets.
6. Replace Span 15 deck overhangs - Stages 1 and 2 , see 'BARRIER AND DECK LAYOUT' and 'BARRIER AND DECK DETAILS NO. 1' & 'NO. 2' sheets.
7. Remove joint concrete stage 1 - deck concrete at median, see 'BARRIER AND DECK DETAILS NO. 3' sheet.

Steps 2,3 and 5 may be performed simultaneously.

(B) CONSTRUCTION SEQUENCE - BRIDGE CLOSURE

1. Perform lift to final elevation at Pier 16 and affected Piers in the Main Channel structure as required per "Temporary Support and Jacking Plan".
2. Prepare deck surface at span 15 and place polyester concrete overlay.
3. Remove stage 3 overhangs, deck concrete and stage 3 & 4 barrier at Pier 16 - see 'BARRIER AND DECK LAYOUT' and 'BARRIER AND DECK DETAILS NO. 4' to 'NO. 6' sheets.
4. Cut and remove portion of the existing bridge - see 'JOINT REMOVAL DETAILS NO. 1' sheet.
5. Install Seismic Joint, see 'SEISMIC JOINT LAYOUT' and 'SEISMIC JOINT DETAILS NO. 1 to 'NO. 10' sheets.
6. Construct barrier - see 'BARRIER AND DECK DETAILS NO. 7' to NO. 10' and 'STEEL BARRIER DETAILS NO. 1' to 'NO. 8' sheets.

Steps 1, 2, and 3 may be performed simultaneously.

(C) CONSTRUCTION SEQUENCE

1. Install Isolation Bearings at Pier 16.

* For Pier 31, Span 15 shall be replaced with Span 31 in above Construction Sequence.

MAIN CHANNEL CROSSING
DUMBARTON BRIDGE SEISMIC RETROFIT
PIER 16 & 31 RETROFIT
CONSTRUCTION SEQUENCE

	BY	CHECKED
DESIGN	R Salazar / E Thimmhardy	T Masroor / J Quiogue
DETAILS	J. Thorne/G. Dickerson	E. Thimmhardy/J Quiogue
QUANTITIES	E. Thimmhardy / T. Ha	Jay Quiogue

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 4

BRIDGE NO. 35-0038
POST MILE R29.25-R30.15 /R0.0-R0.73

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	SM,Ala	84	R28.8/R30.2, R0.0/R0.8	284	396

REGISTERED CIVIL ENGINEER 8-3-09 DATE

2-16-10
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER TARIQ MASROOR No. 51686 Exp. 6-30-10 CIVIL STATE OF CALIFORNIA

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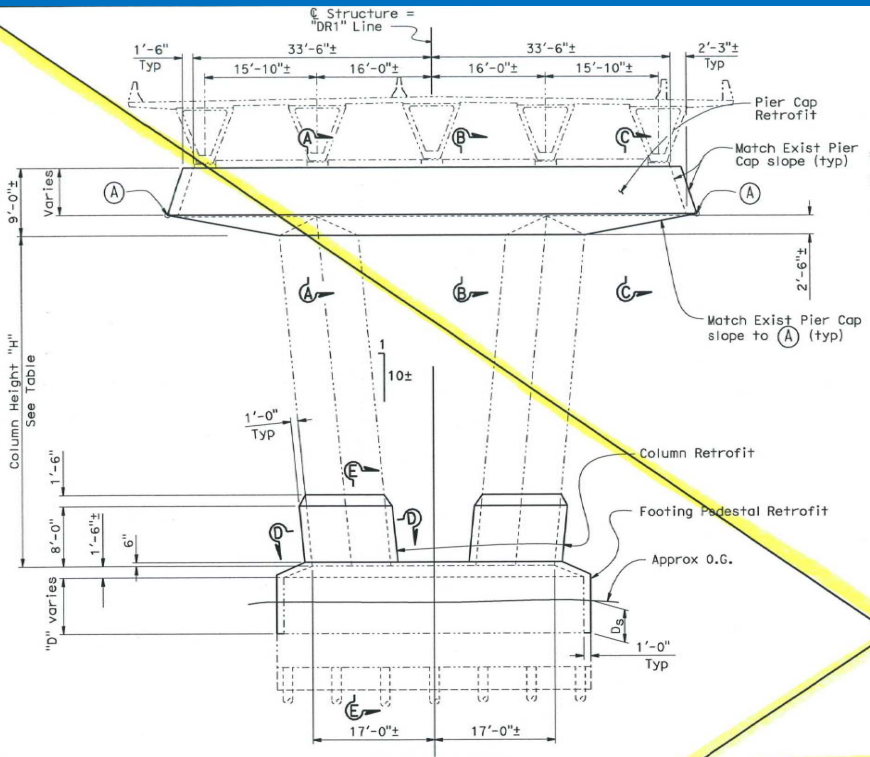
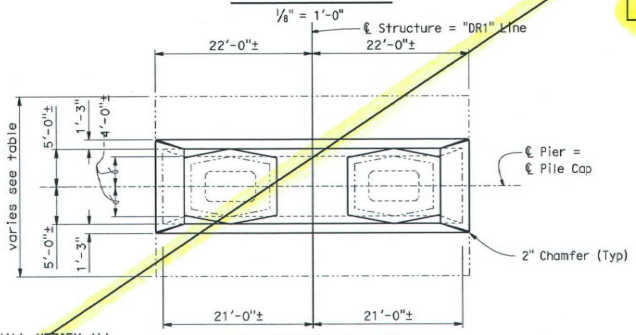


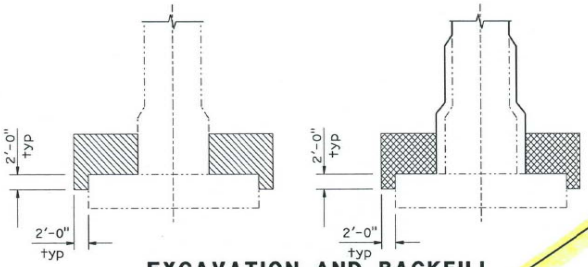
ELEVATION

1/8" = 1'-0"



FOOTING PLAN

1/8" = 1'-0"



EXCAVATION AND BACKFILL

No Scale

- Structure Excavation (Type D)
- Structure Backfill

Location	Exist. Pile cap size (ft)	Dimension "D" ft	Column Height "H" ft	Soil Depth "D_s" ft
Pier 5	20 x 44 ±	7.5 ±	13.42±	7
Pier 6	20 x 44 ±	8 ±	17.14±	7.5
Pier 7	20 x 44 ±	8 ±	20.86±	7.5
Pier 8	20 x 44 ±	8 ±	24.33±	7.5
Pier 9	20 x 44 ±	8 ±	28.30±	7.5
Pier 10	24 x 44 ±	8 ±	32.02±	6
Pier 11	24 x 44 ±	8.5 ±	35.74±	6.5
Pier 12	24 x 44 ±	8.5 ±	39.21±	6.5
Pier 13	24 x 44 ±	9 ±	43.18±	7
Pier 14	24 x 44 ±	9 ±	46.90±	7
Pier 15	24 x 44 ±	9.5 ±	50.62±	7.5
Pier 32	24 x 44 ±	8 ±	47.86±	5
Pier 33	24 x 44 ±	8 ±	43.90±	5
Pier 34	24 x 44 ±	7.5 ±	39.94±	4.5
Pier 35	24 x 44 ±	7 ±	35.73±	4
Pier 36	24 x 44 ±	7.5 ±	31.02±	4.5
Pier 37	24 x 44 ±	8 ±	28.06±	5
Pier 38	20 x 44 ±	8 ±	23.85±	8.5
Pier 39	20 x 44 ±	7.5 ±	20.14±	8.4
Pier 40	20 x 44 ±	6.5 ±	16.18±	17

	RETROFIT		
	Footing Pedestal	Column	Pier cap
Pier 5	x	x	
Pier 6	x	x	
Pier 7	x	x	
Pier 8	x	x	x
Pier 9	x	x	x
Pier 10	x	x	x
Pier 11	x	x	x
Pier 12	x	x	x
Pier 13	x	x	x
Pier 14	x	x	x
Pier 15	x	x	x
Pier 32	x	x	x
Pier 33	x	x	x
Pier 34	x	x	x
Pier 35	x	x	x
Pier 36	x	x	x
Pier 37	x	x	x
Pier 38	x	x	x
Pier 39	x	x	
Pier 40	x	x	

DELETED SHEET

Note

1. For Section A-A, B,B and C-C, see 'PIER 9-11, 13-15, 32-34, 36, 37 RETROFIT - PIER CAP DETAILS NO. 2' or 'PIER 8 & 12, 35 & 38 RETROFIT - PIER CAP DETAILS NO. 2' sheets.
2. For "SECTION D-D" and "SECTION E-E", see 'PIER 5-15, 32-40 RETROFIT - FOOTING PEDESTAL & COLUMN DETAILS NO. 2' sheet.
3. "X" Indicates retrofit is required.
4. All existing concrete surfaces in contact with new concrete shall be free of laitance with surface roughened to an amplitude of 0.25 inches.
5. Minimum clear cover shall be 3" unless otherwise noted.
6. Contractor shall construct coffer dams where necessary to dewater the retrofit work area.
7. (A) is the intersection of the slope of the existing cantilever soffit and the slope of the retrofit pier cap end face.

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

	BY	CHECKED
DESIGN	A M M Ibrahim / J Quiogue	T Ha/L Barnard
DETAILS	J Thorne/W Zhang/GD	A M M Ibrahim/T Masroor
QUANTITIES	Tuong Ha	Jay Quiogue

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN
DESIGN BRANCH 4

BRIDGE NO. 35-0038
POST MILE R29.25-R30.15 /R0.0-R0.73

WEST & EAST APPROACH SPANS
DUMBARTON BRIDGE SEISMIC RETROFIT PROJECT
PIER 5 -15, 32 - 40 RETROFIT
PIER DETAILS

DUMBARTON BRIDGE *Seismic Safety Retrofit Project*

Contractors Technical Outreach

April 30, 2010

04	SM, Alo	84	R28.8/R30.2, R0.0/R0.8	290A	396

Reynaldo J. Castro 3-26-10
REGISTERED ENGINEER - CIVIL
PLANS APPROVAL DATE
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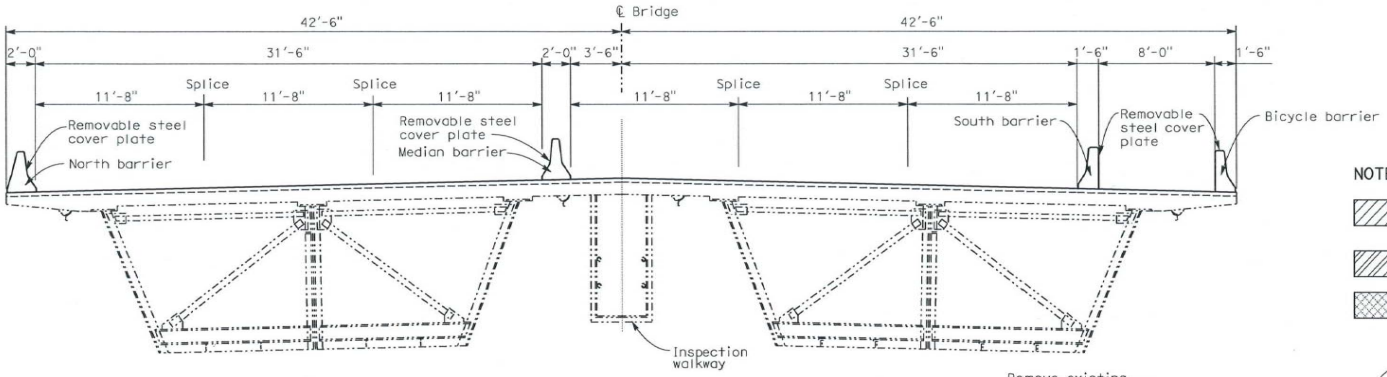
REGISTERED PROFESSIONAL ENGINEER REYNALDO J. CASTRO No. C36231 Exp. 6-30-10 CIVIL STATE OF CALIFORNIA

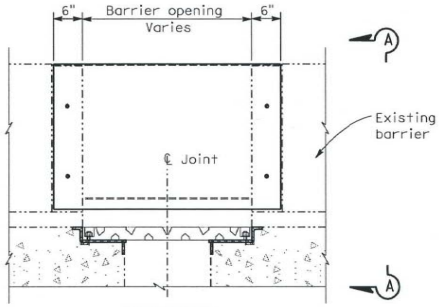


TYPICAL SECTION = HINGE 21 & 25 MR=7½"

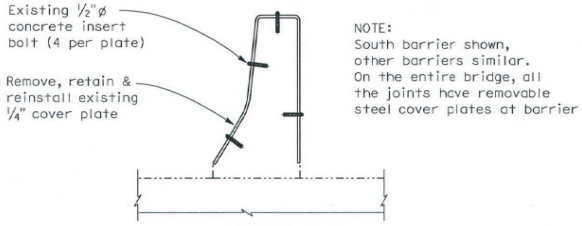
SCALE: ¼"=1'-0"

NOTES:

- Indicates limits of remove existing transflex elastomeric joint & threaded stud.
- Indicates steel shapes, plates and angles
- Indicates new transflex elastomeric joint



ELEVATION

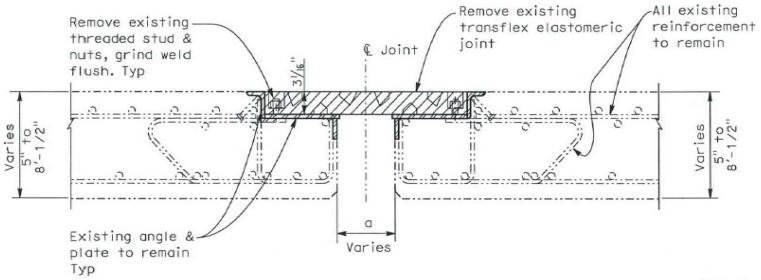


SECTION A-A

REMOVABLE STEEL COVER PLATE

SCALE: 1"=1'-0"

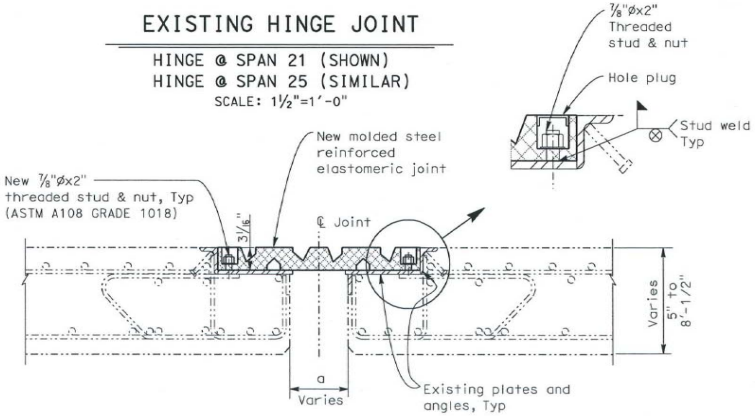
NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.



EXISTING HINGE JOINT

HINGE @ SPAN 21 (SHOWN)
HINGE @ SPAN 25 (SIMILAR)

SCALE: 1½"=1'-0"



RECONSTRUCT HINGE JOINT

SCALE: 1½"=1'-0"

DESIGN	BY R. Castro	CHECKED C. Lee	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF MAINTENANCE STRUCTURE MAINTENANCE AND INVESTIGATIONS	BRIDGE NO. 35-0038	DUMBARTON BRIDGE SEISMIC RETROFIT PROJECT
DETAILS	BY M. Yu	CHECKED R. Castro			POST MILE 29.25	HINGE JOINT SEAL ASSEMBLY @ SPANS 21 & 25 MR=7½"
QUANTITIES	BY R. Castro	CHECKED C. Lee				

DUMBARTON BRIDGE *Seismic Safety Retrofit Project*

Contractors Technical Outreach

April 30, 2010

DIST	COUNTY	ROUTE	TOTAL PROJECT	No	SHEETS
04	SM/Ala	84	R28.8/R30.2, R0.0/R0.8	252A	396

Tarig Masroor 8-3-09
REGISTERED CIVIL ENGINEER DATE

2-16-10
PLANS APPROVAL DATE

REGISTERED PROFESSIONAL ENGINEER TARIQ MASROOR No. 51686 Exp. 6-30-10 CIVIL STATE OF CALIFORNIA

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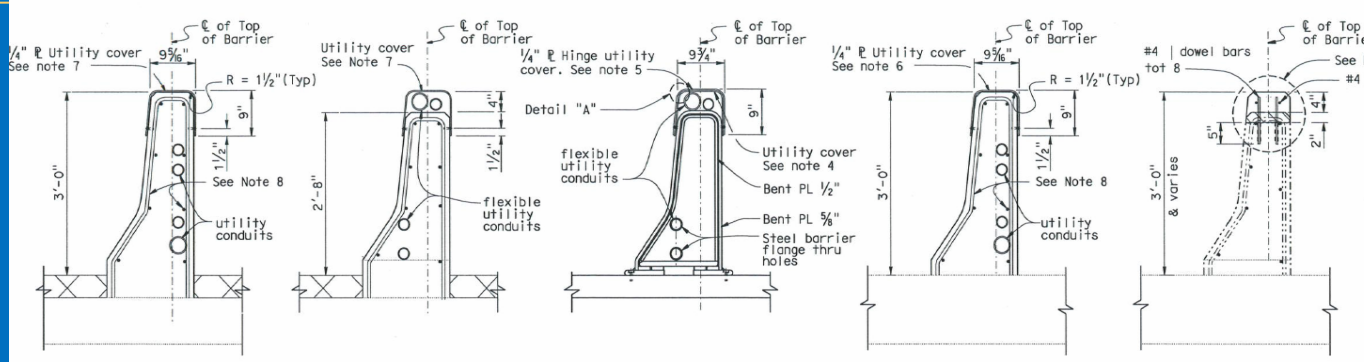
To get to the Caltrans web site, go to: http://www.dot.ca.gov



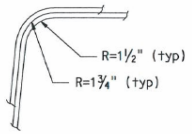
SECTION S-S 1"= 1'-0"

SECTION T-T 1"= 1'-0"

SECTION U-U 1"= 1'-0"

SECTION V-V 1"= 1'-0"

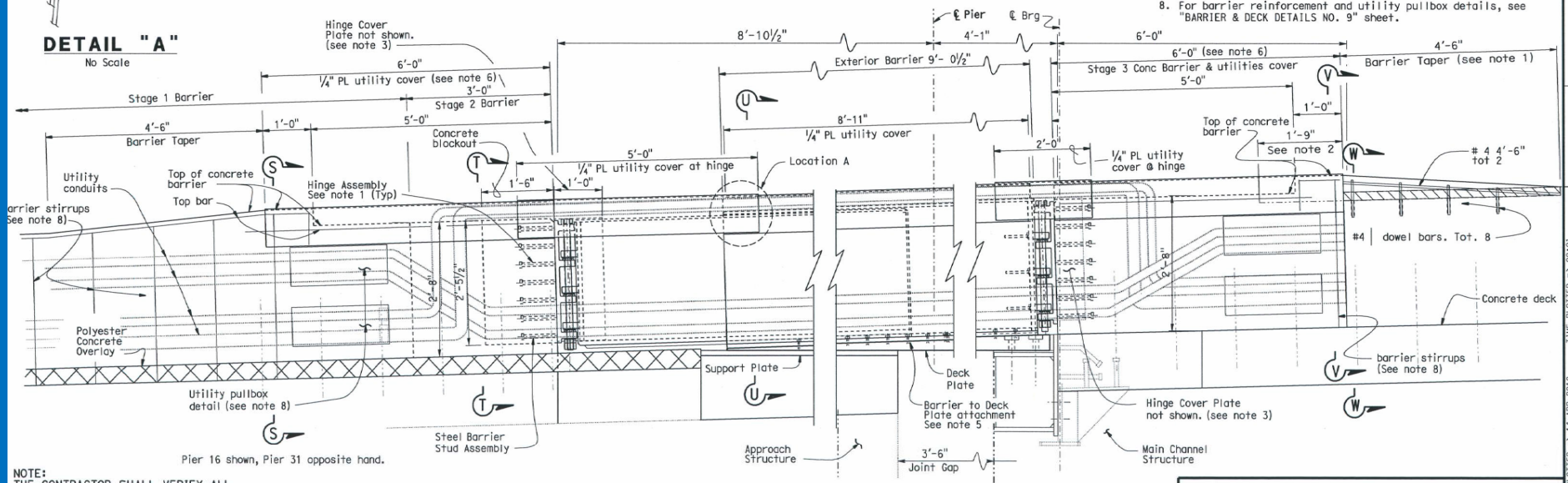
SECTION W-W 1"= 1'-0"



DETAIL "A"
No Scale

Notes

1. Remove 2" of concrete leaving reinforcement undamaged. Place #4 drill and bond dowels in 4" holes and top bars as shown. Form and place concrete. After concrete sets, remove forms.
2. Lap existing longitudinal bars. Bend bars that conflict with pull boxes.
3. For hinge cover plates, see "STEEL BARRIER DETAILS NO. 6" sheet.
4. Attach utility cover plates to Steel Barrier Assembly with 1/2" ø x 1" countersunk bolts @ 18" O.C. max. 1 1/2"± edge distance both sides of barrier (not shown).
5. Attach utility covers at hinges to utility covers using 1/2"ø x 1" countersunk bolts @ 6",1 1/2"± edge distance, both sides of barrier (not shown).
6. At location A attach utility covers at hinges to utility covers using 1/2" ø x 1 1/2" hex bolts @ 6" in slotted holes (4" slots). 1 1/2" ± edge distance, both sides of barrier (not shown). Hex bolt to be placed at center of slot.
7. Attach utility covers to concrete barrier using 1/2" ø x 2" drop-in anchors @ 18" O.C. max., both sides of hinge and barrier. 1 1/2"± edge distance, both sides of barrier (not shown).
8. For barrier reinforcement and utility pullbox details, see "BARRIER & DECK DETAILS NO. 9" sheet.



Pier 16 shown, Pier 31 opposite hand.

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

SOUTH BARRIER STAGES 2 & 3 & UTILITY DETAILS
1"=1'-0"

DESIGN	BY Rafael Salazar	CHECKED T Ha / T Masroor
DETAILS	BY Jeff Thorne	CHECKED Rafael Salazar
QUANTITIES	BY Rafael Salazar	CHECKED Tariq Masroor

STATE OF CALIFORNIA
DEPARTMENT OF TRANSPORTATION

DIVISION OF ENGINEERING SERVICES
STRUCTURE DESIGN
DESIGN BRANCH 4

BRIDGE NO. 35-0038
POST MILE 29.8/30.1

EAST & WEST APPROACH SPANS & JOINT
DUMBARTON BRIDGE SEISMIC RETROFIT
PIER 16 & 31 JOINT RETROFIT
STEEL BARRIER DETAILS NO. 6A

Special Provisions Major Changes

- Revise "Notice to Bidders"
  - Changes bid opening date to May 25, 2010, instead of May 27, 2010
  - Requires all bidders to attend prebid meeting to be held May 6, 2010
  - Reduces the maximum working days from 810 to 600
  - Reduces the estimated cost from $170,762,000 to $73,000,000
- Revise 5-1.15 "Species Protection" Specification
  - Requires use of vibratory methods of pile driving of in-water, marine access and pumping plant piles
  - Allows testing of in-water, marine access and pumping plant piles with impact hammer

- Replace 10-1.28 "Closure Requirements and Conditions" specification
  - Added requirement for submittal of Bridge Closure Activity plan
  - Requires listing of pre-closure activities
  - Requires sequence of activities during closure
  - Requires detailed schedule that demonstrates timely completion of planned work during the bridge closure
  - Requires a contingency plan should an unexpected delay occur
- Replace 10-1.59 "Raise Bridge" specification
  - Added requirement for lane closures during jacking operations
  - Added requirement for trial lift in advance of production jacking to verify uniform lifting at all jacking points
- Add 10-1.595 "Replace Hinge Joint Seal Assembly" specification
  - Remove existing joint seal
  - Clean and prepare existing joint surfaces
  - Install new joint seal assembly

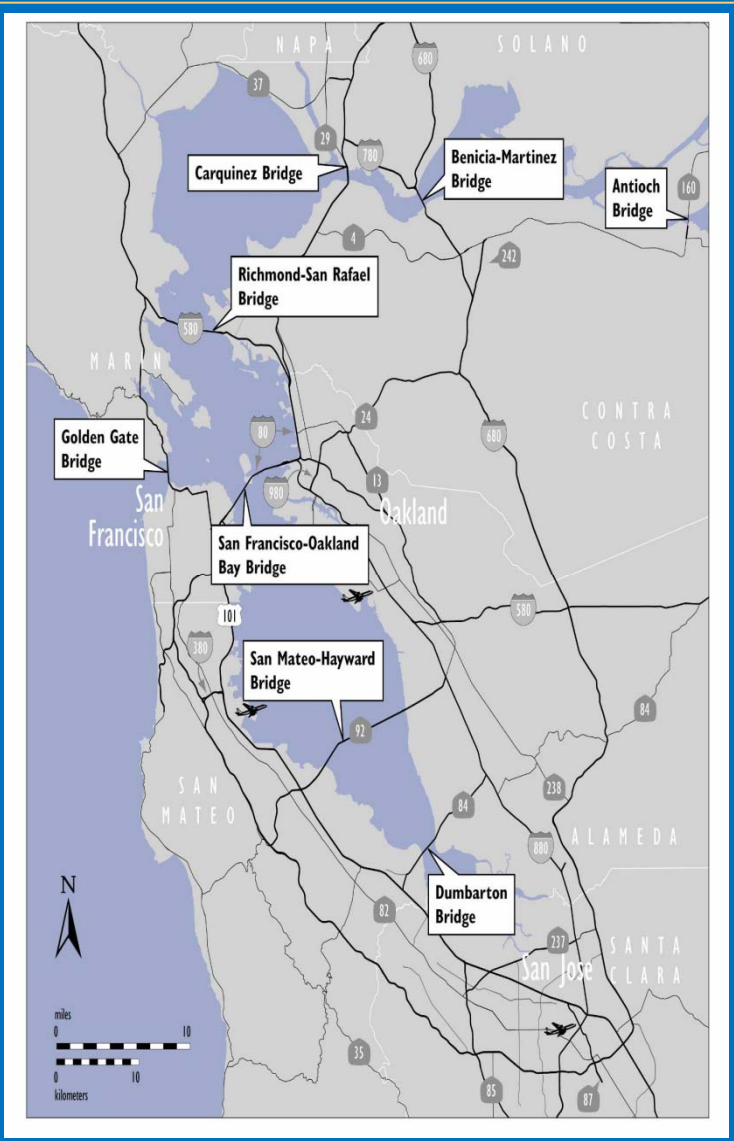
Bid Item List Revisions

- Revise item quantities
- Eliminate items for deleted work
- Add items for new work

Project Overview

Mo Pazooki

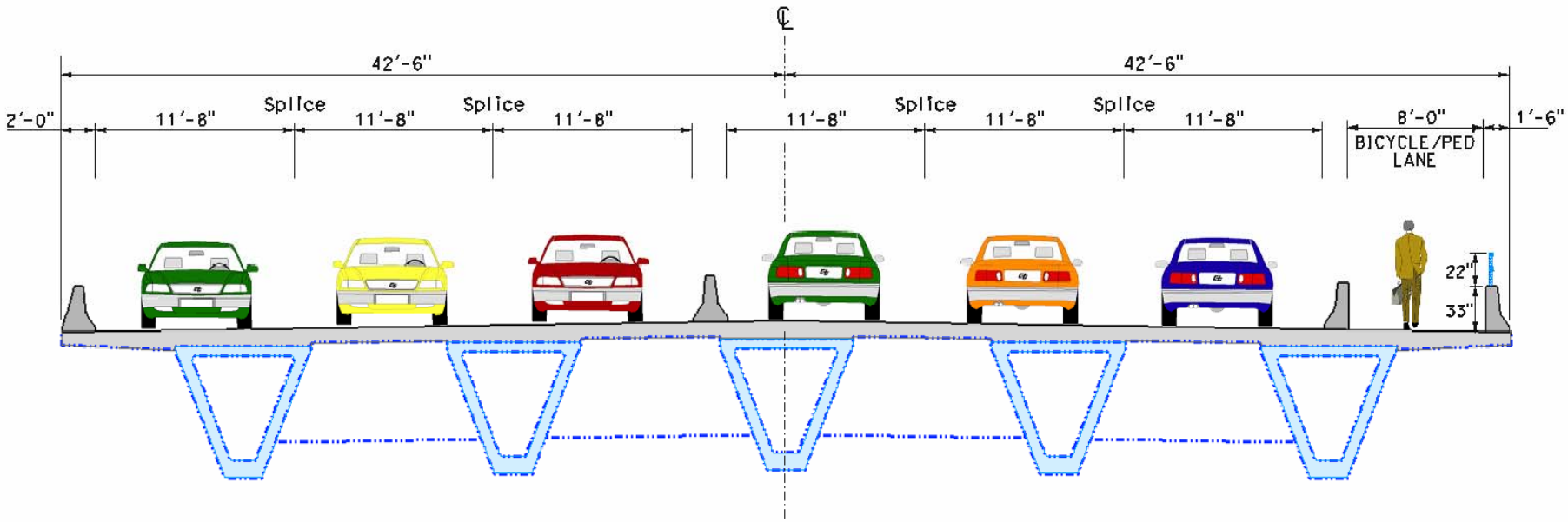
- **LOCATION: Route 84 connecting Alameda and San Mateo Counties**
- **STRUCTURE:**
  - **Land Approaches: Reinforce Concrete Slab Spans**
  - **Waterway Approaches: Precast/Prestressed Delta Girder**
  - **Main Channel: Steel Box Girder**
- **LENGTH: Total length 1.6 miles**
- **LANES: 3 in each direction – 1 bike/pedestrian path**
- **ADT: 64,000 (both directions)**
- **VERTICAL CLEARANCE: 85 feet**
- **CHANNEL SPAN: 340 feet**
- **OPENED: October 1982**
- **SEISMIC: Met seismic standard during design in mid 1970's**



Dumbarton Bridge Multiple Structure Types

Current Railing Configuration

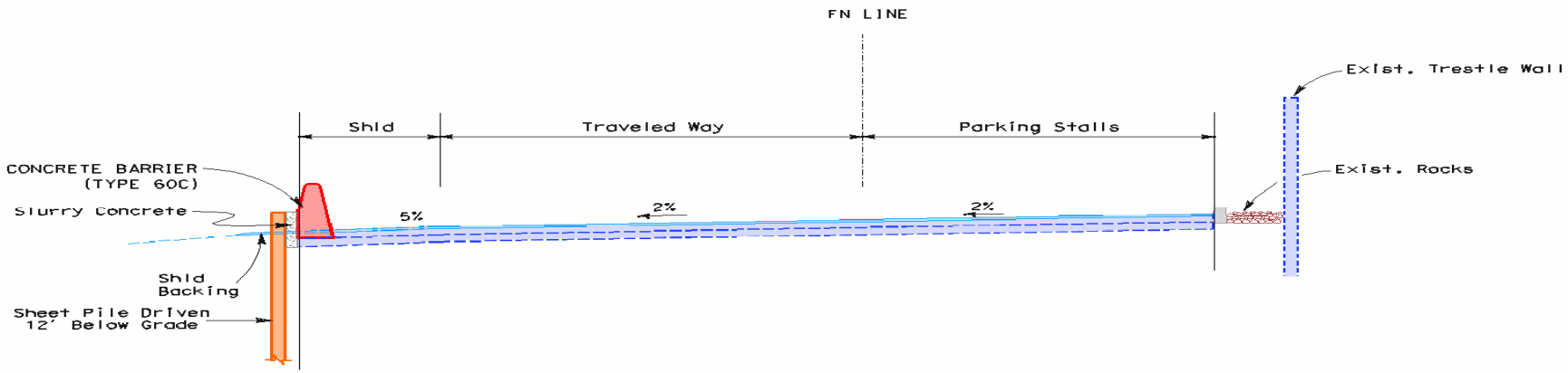
Westbound **Eastbound**



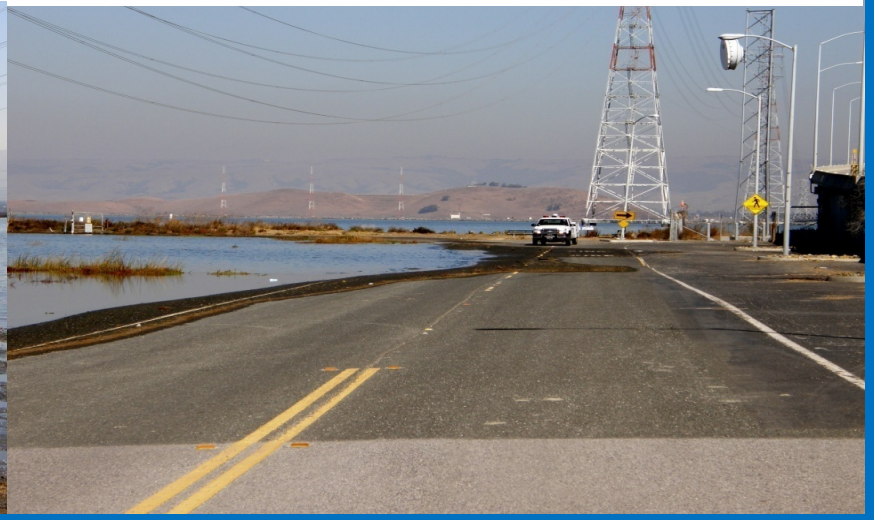
TYPICAL CROSS SECTION - CONCRETE BOX GIRDER

Current Railing Configuration

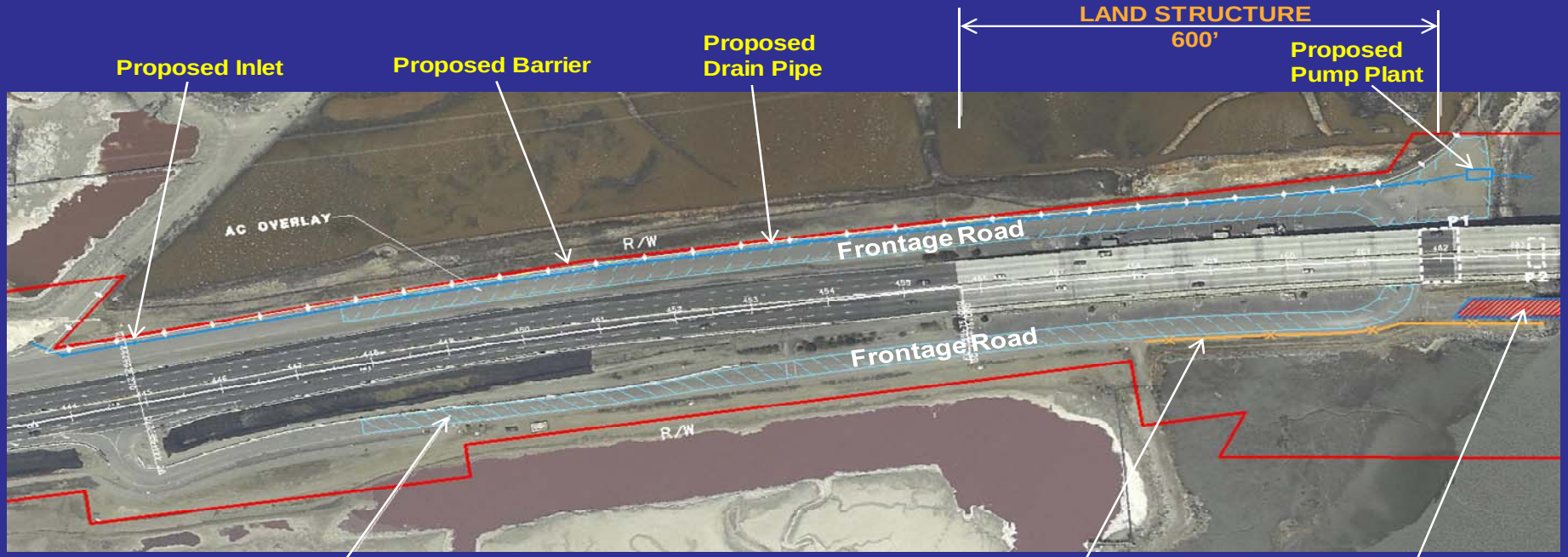
Proposed Temporary Barrier and Drainage (West)



TYPICAL SECTION: TEMP. DRAINAGE WALL

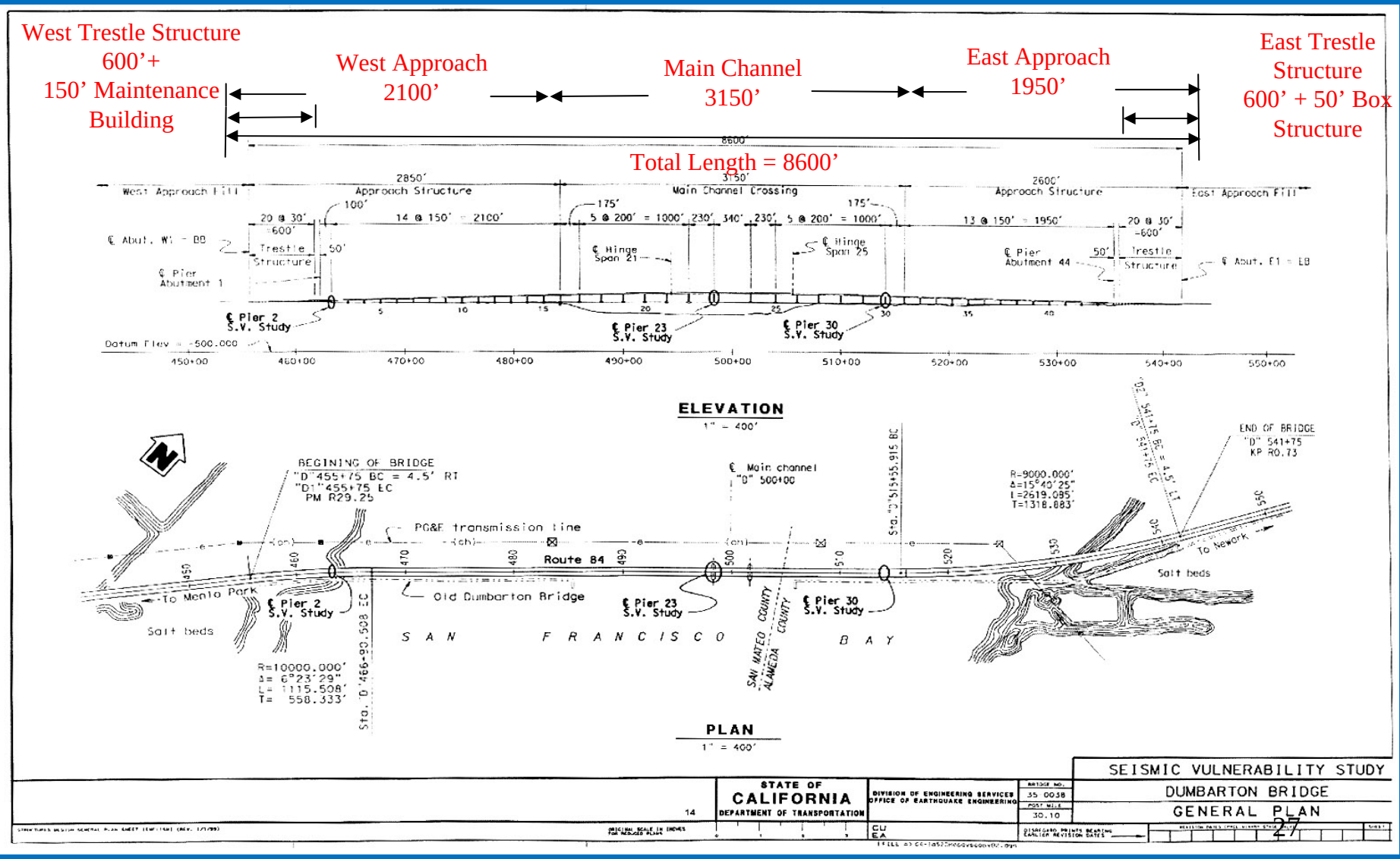


West Side Proposed Temporary Barrier and Drainage

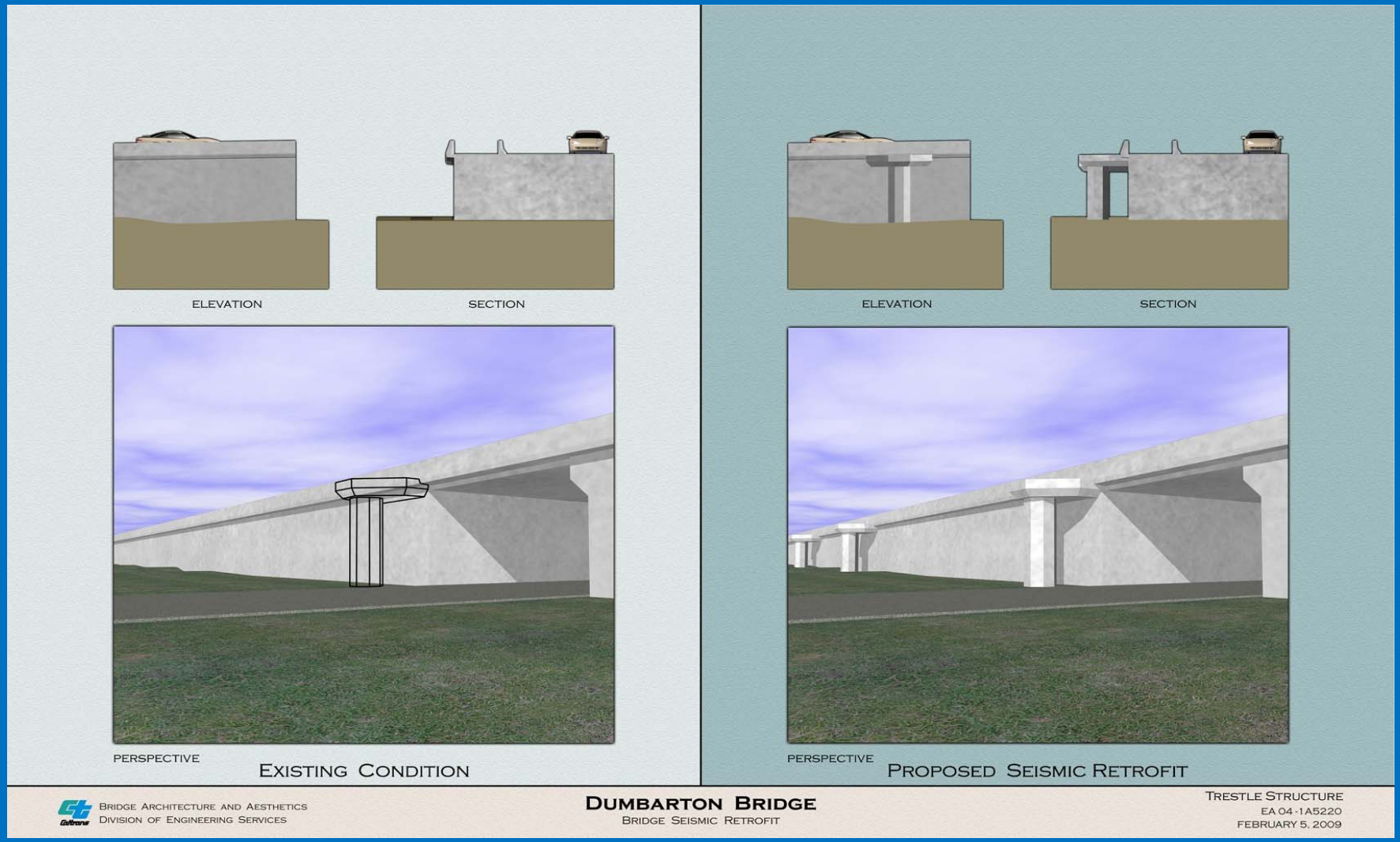


- A barrier is proposed along the edge of the frontage road to minimize the bay tidal impacts and reduce flooding to the parking lot.
- A drainage system with pump station are proposed to discharge the surface runoff to the bay.

General Plan

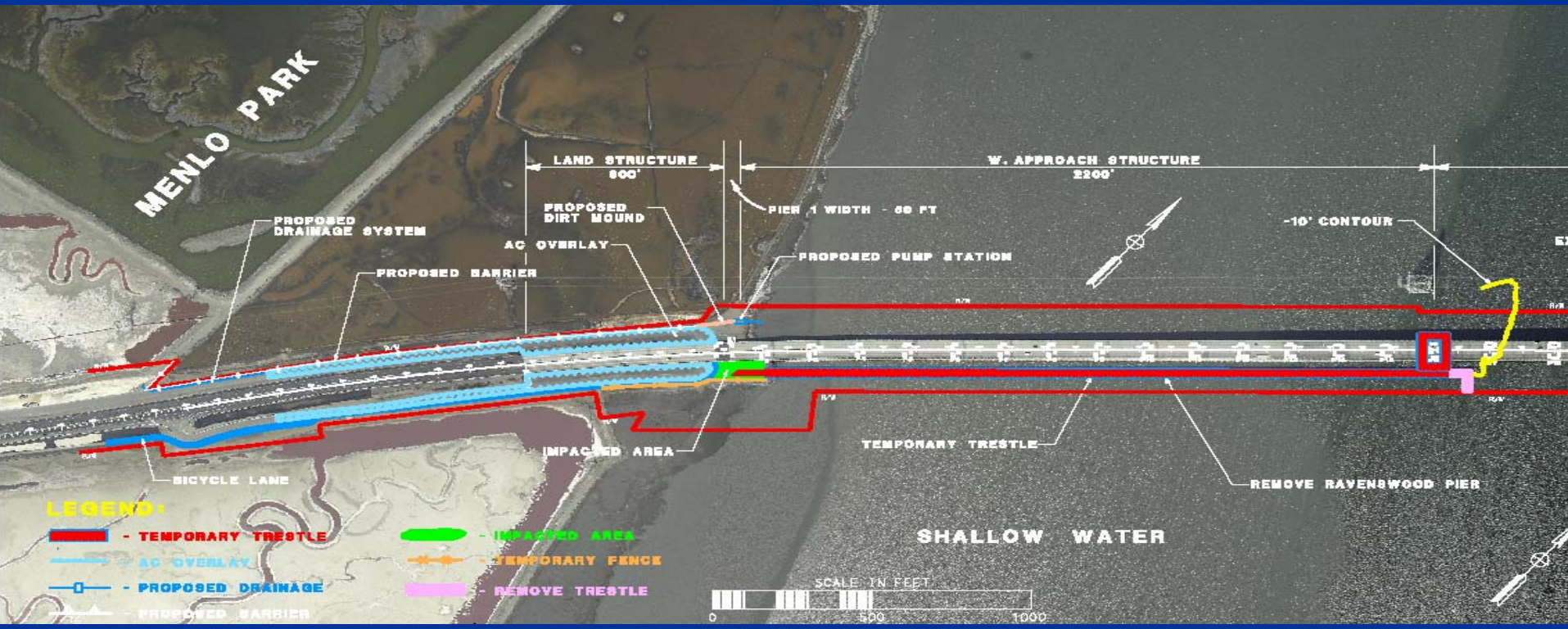


Aesthetics



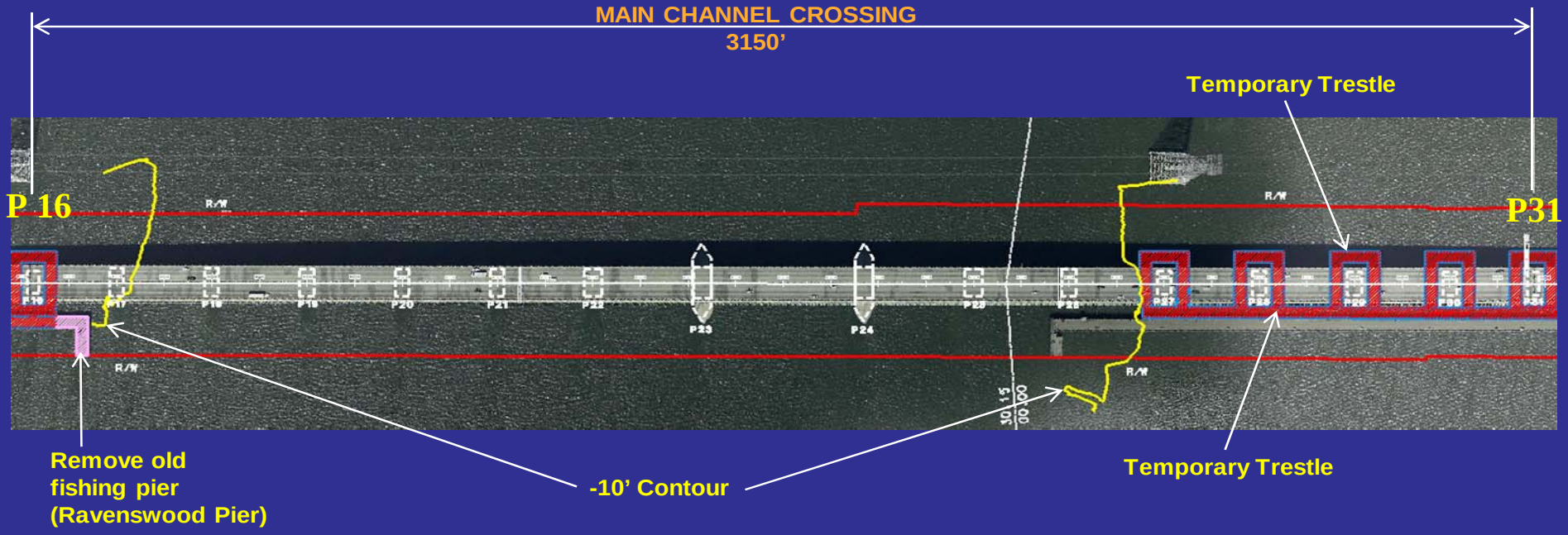
Trestle Structure

West Approach



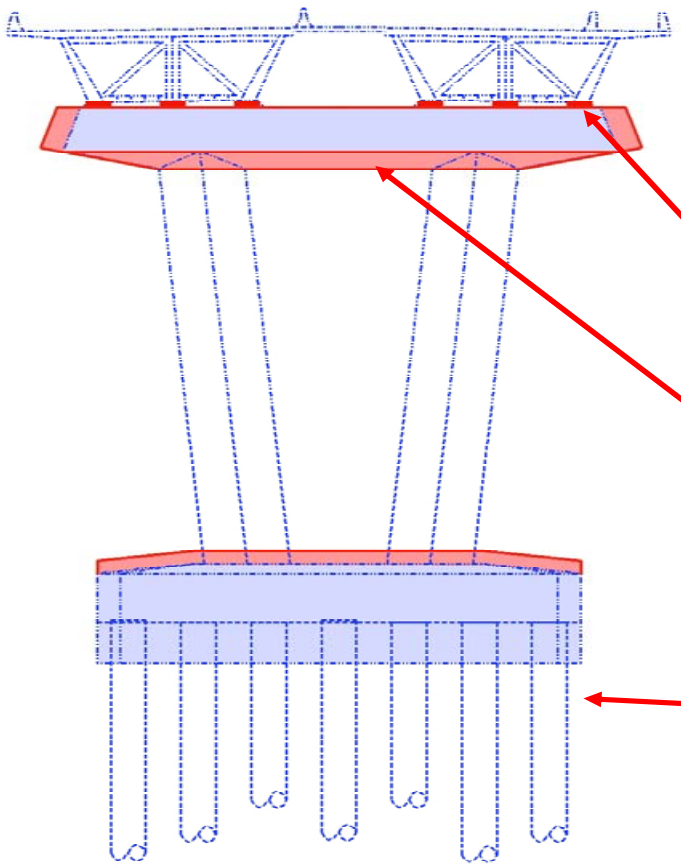
- Remove old fishing pier (Ravenswood Pier).
- Construct temporary trestles to retrofit main span.
- Overlay the existing access road and parking lot.

Main Channel Crossing



- All work within deep water in main channel will be done using barges.

Main Channel Crossing



Install Isolation Bearings

Bent Cap Strengthening

Existing Hollow Concrete Piles

TYPICAL SECTION: PIER 16 TO PIER 31 (PIER TABLE)

TYPICAL SECTION: PIER 17 TO PIER 30 (PILE CAP)

Construction Duration approximately 2.5 years

- Conventional Highway Partial Closures approx with one or two adjacent lanes open in direction of travel.
- Extended Weekend Full Closures – Two 79 hours over Labor Day and Memorial Day Holiday weekends .

Construction activities may require partial closure

- Transporting structural materials in the steel Box girder.
- Installing cross bracing within the steel box girder.
- Jacking and installing isolation bearings at the piers.
- Replacing expansion joints at pier 16 and 31 by seismic isolation joints.

Construction activity will require the full closure

- Two seismic joints will be created at pier 16 and pier 31.

Existing 8” fiber optic cable inside the steel box girder

Lane Closure Charts

Conventional Lane Requirement Chart in NB direction

Chart No. 1
Freeway/Expressway Lane Requirements

County: San Mateo / Alameda | Route/Direction: 84 Northbound | PM: SM/ALA-29.0-30.15/0.0-3.2

Closure Limits: At Dumbarton Bridge

FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	1	1	1	1	1	1																2	2	1	
Fridays	1	1	1	1	1	1																2	2	2	
Saturdays	1	1	1	1	1	1	1	1	1	2	2										2	2	2	1	
Sundays	1	1	1	1	1	1	1	1	1	1	1	2	2								2	2	1	1	

Legend:

1	Provide at least one through freeway lane open in direction of travel
2	Provide at least two adjacent through freeway lanes open in direction of travel
	Work permitted within project right of way where shoulder or lane closure is not required.

REMARKS:

Lane Closure Charts

Conventional Lane Requirement Chart in SB direction

Chart No. 2
Freeway/Expressway Lane Requirements

County: San Mateo / Alameda | Route/Direction: 84 Southbound | PM: SM/ALA-29.0-30.15/0.0-3.2

Closure Limits: At Dumbarton Bridge

FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	1	1	1	1	1																2	2	1	1	
Fridays	1	1	1	1	1																2	2	2	1	
Saturdays	1	1	1	1	1	1	1	1	2	2	2									2	2	2	2	1	
Sundays	1	1	1	1	1	1	1	1	1	2	2	2								2	2	1	1	1	

Legend:

1	Provide at least one through freeway lane open in direction of travel
2	Provide at least two adjacent through freeway lanes open in direction of travel
	Work permitted within project right of way where shoulder or lane closure is not required.

Lane Closure Charts

Lane Requirements for 79 hrs extended holiday weekend closure on Labor Day & Memorial Day

Lane Requirements for 79 hr holiday weekend closure with Monday being the holiday

Chart No. 3
Complete Freeway/Expressway Closure Hours

County: San Mateo/ Alameda | Route/Direction: SR-84 NB and SB | PM: SM/ALA-29.0-30.15/0.0-3.2

Closure Limits: At Dumbarton Bridge

FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	
Tuesdays	C	C	C	C	C																				
Wednesdays through Thursdays																									
Fridays																								C	C
Saturdays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Sundays	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C

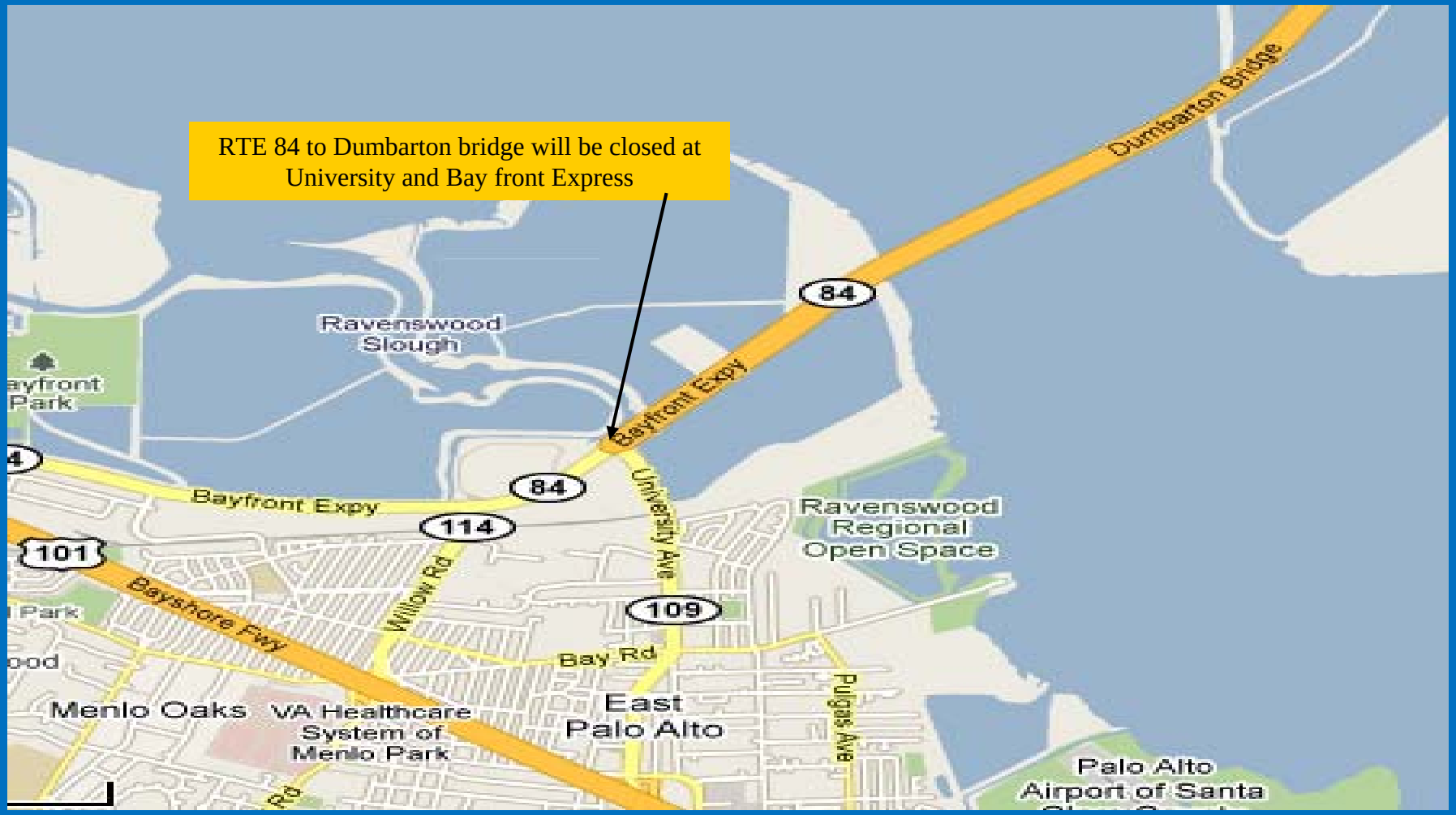
Legend:

C	Freeway or expressway may be closed completely.
	No complete freeway or expressway closure is permitted.

REMARKS:

1) 79 hr extended weekend closure with a Monday holiday. Beginning Friday @ 9pm and opening Tuesday @ 5am
2) See Detour map and description in the TMP

NB 84 will be closed at University Ave and Bayfront Expressway, Motorist going NB will have the option of using Route 237 or Route 92 from Highway 101.



SB 84 will be closed at Thornton Ave and Paseo Padre Parkway, Motorist going SB will have the option of using Route 237 or Route 92 from Interstate 880.

TMP Strategies

Construction Strategies

Coordination with other major construction projects and local jurisdictions regarding major events.

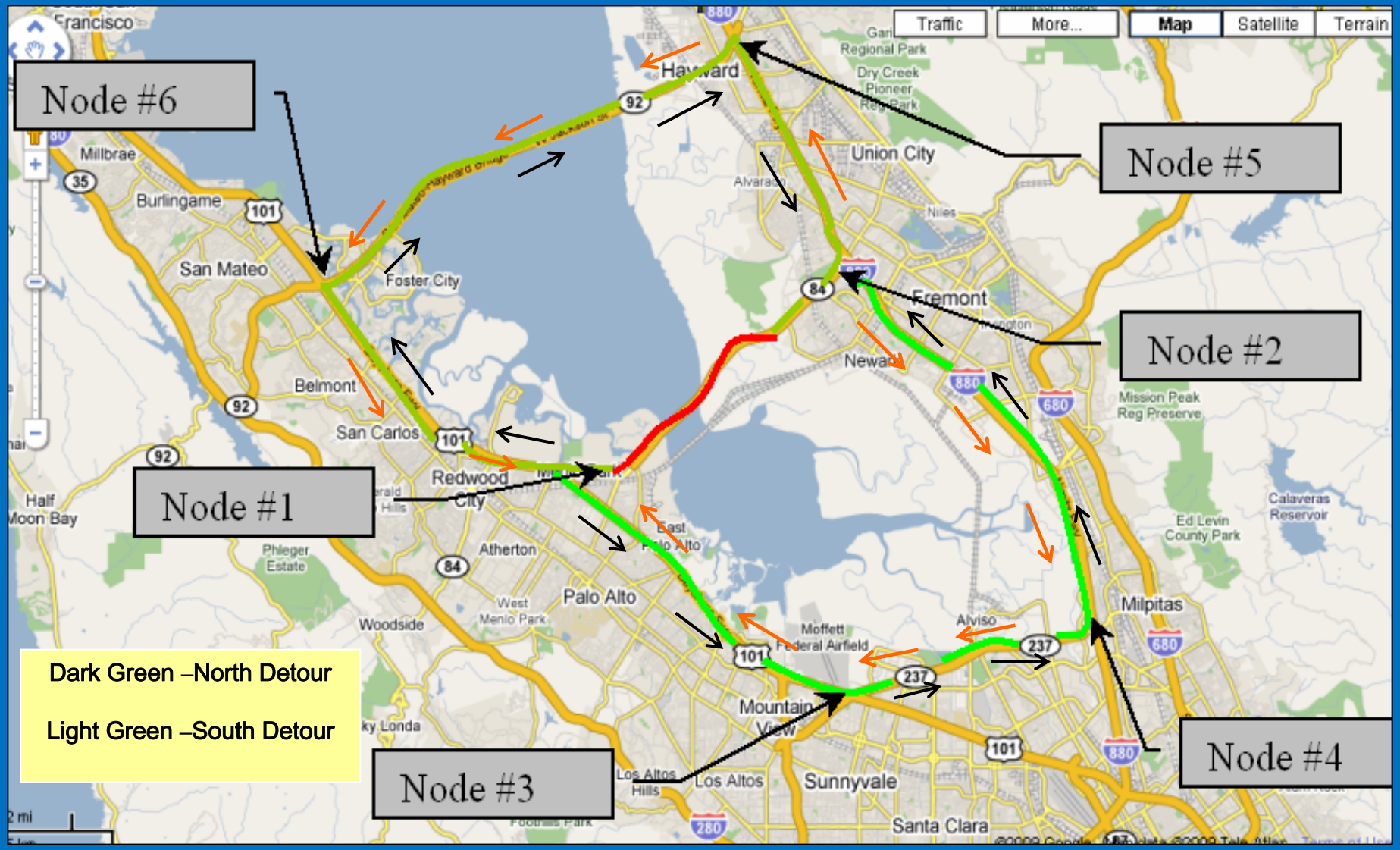
TMP Strategies

Alternate Route (Detour)

The detouring for this full closure scenario is two routes:

- A northern route along the Route 92.
- A southern route along Highway 237.

Available Detours for Full Closure



Contingency Plan

The contractor will be required to submit a traffic contingency plan at least 60 working days prior to full freeway closure and seven days prior to any standard lane closure. The traffic control plan shall contain a detailed contingency plan to ensure opening of the freeway by the designated time.

Traffic Contingency Plan
(CMS, FSP, TMT & COZEEP)

TMP Strategies

Construction Strategies

Liquidated damages for late re-opening of closures

Type of Facility	Route or Segment	Period	Damages/Interval ($)
Mainline	84 Complete Closure (NB)	1st half hour	$40,500 / 10 minutes
		2nd half hour	$60,800 / 10 minutes
		2nd hour and beyond	$81,000 / 10 minutes
Mainline	84 Complete Closure (SB)	1st half hour	$40,900 / 10 minutes
		2nd half hour	$61,600 / 10 minutes
		2nd hour and beyond	$83,000 / 10 minutes
Mainline	84 Nightly Partial Closure (NB)	1st half hour	$1,000 / 10 minutes
		2nd half hour	$1,200 / 10 minutes
		2nd hour and beyond	$1,600 / 10 minutes
Mainline	84 Nightly Partial Closure (SB)	1st half hour	$1,600 / 10 minutes
		2nd half hour	$2,200 / 10 minutes
		2nd hour and beyond	$2,900 / 10 minutes

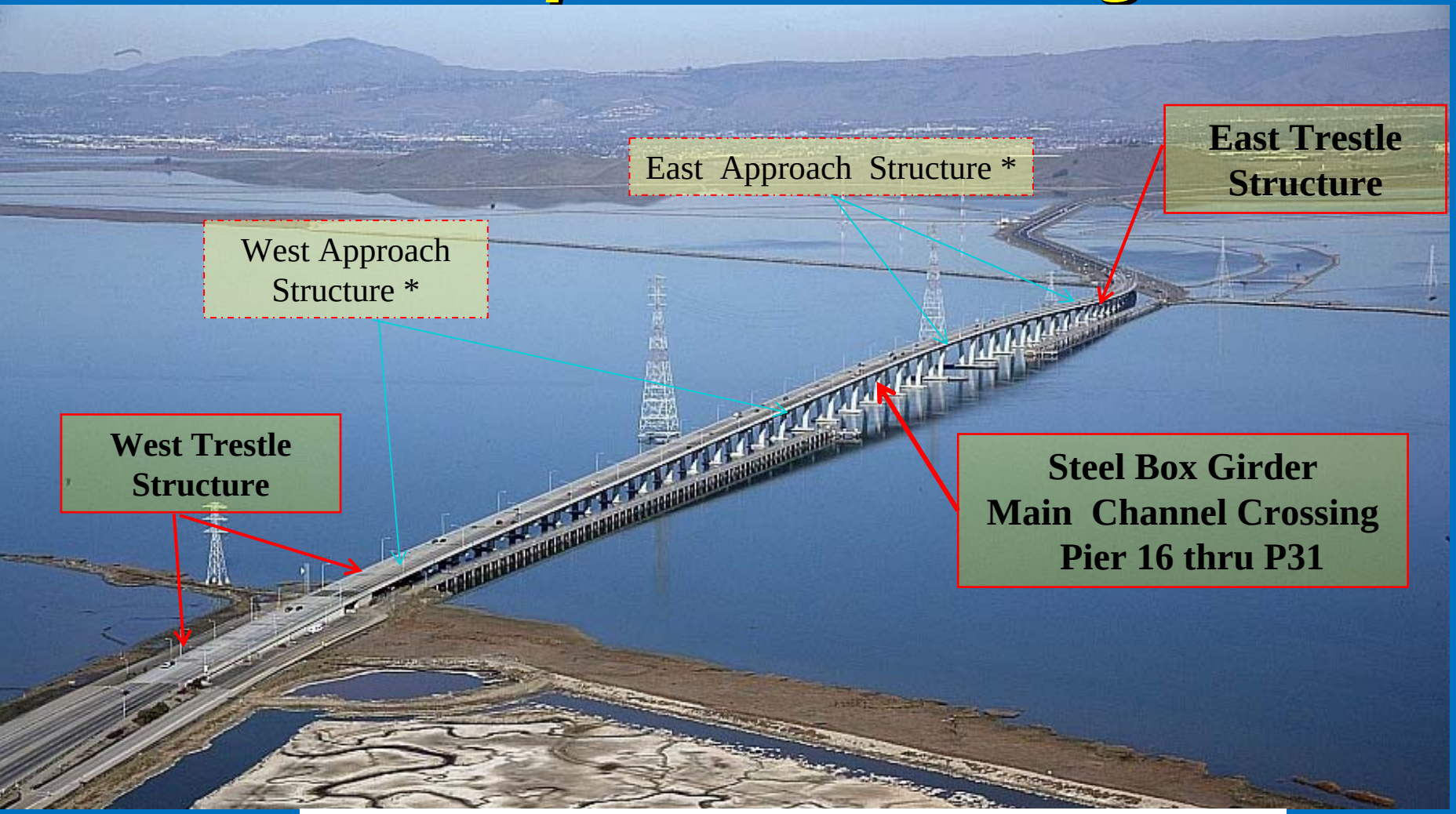
Damages are limited to five percent of project cost per occurrence and will not be assessed when the Engineer requests that closure remain in place beyond the scheduled pickup time.

Structure Design

Tariq Masroor
Eugene Thimmhardy
Rafael Salazar)

1. Description of Retrofit
2. Deck Access Openings
3. Raise Bridge
4. Steel Box Retrofit and Mock up
5. Seismic Joint at Pier16 and 31

Description of Bridge

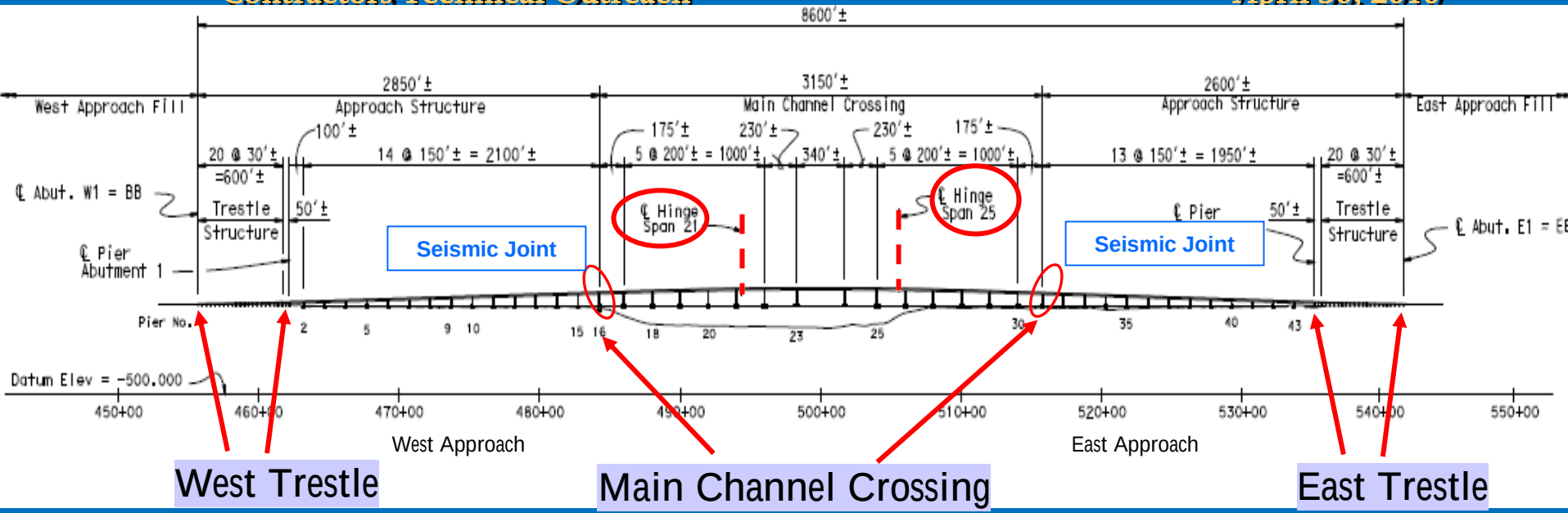


* East and West Approaches Retrofit Removed per Addendum 1 (Bent Cap Bolsters, and Column/Pedestal Jackets)

DUMBARTON BRIDGE *Seismic Safety Retrofit Project*

Contractors Technical Outreach

April 30, 2010



East – West Trestle

Install Piles/Cap @ Bents

Widen Seat Width at Abut1 & 44

Main Channel Crossing

Footing Overlay P17 to Pier 30

Pier Cap Strengthening Pier 16 to Pier31

Strengthen Steel Cross Frames Pier 17 to 30

Construct New Steel Cross Frame Pier 16 & 31

Replace Bearings with Isolation Bearings

Construct Seismic Joint at Pier 16 & pier 31

Hinge retrofit @ Span21 & 25

~~East - West Approach Retrofit Removed~~

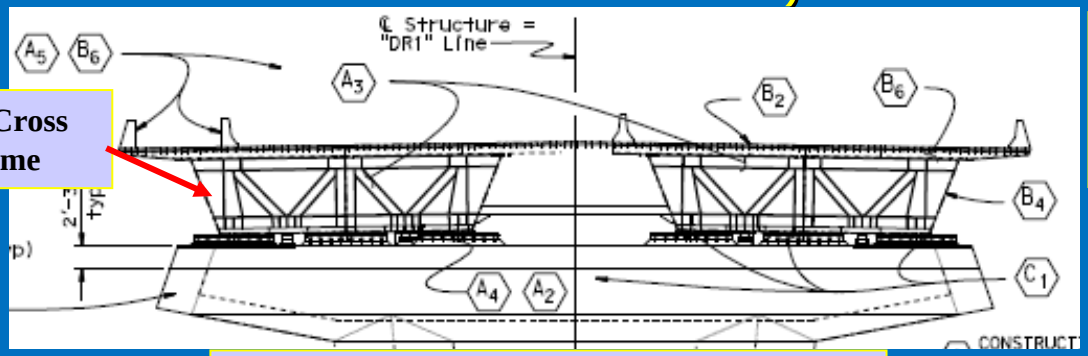
~~Bent Cap Strengthening~~

~~Column Concrete Jacket~~

~~Pedestal Retrofit~~

Main Channel Retrofit Pier 16, Pier 31 and Seismic Joint

New Cross Frame



Elevation @ Pier 16 - [203/396]

Super Structure - Two Steel Box Girders

New Steel Cross Frame @ Pier 16 & 31

[203R/396]

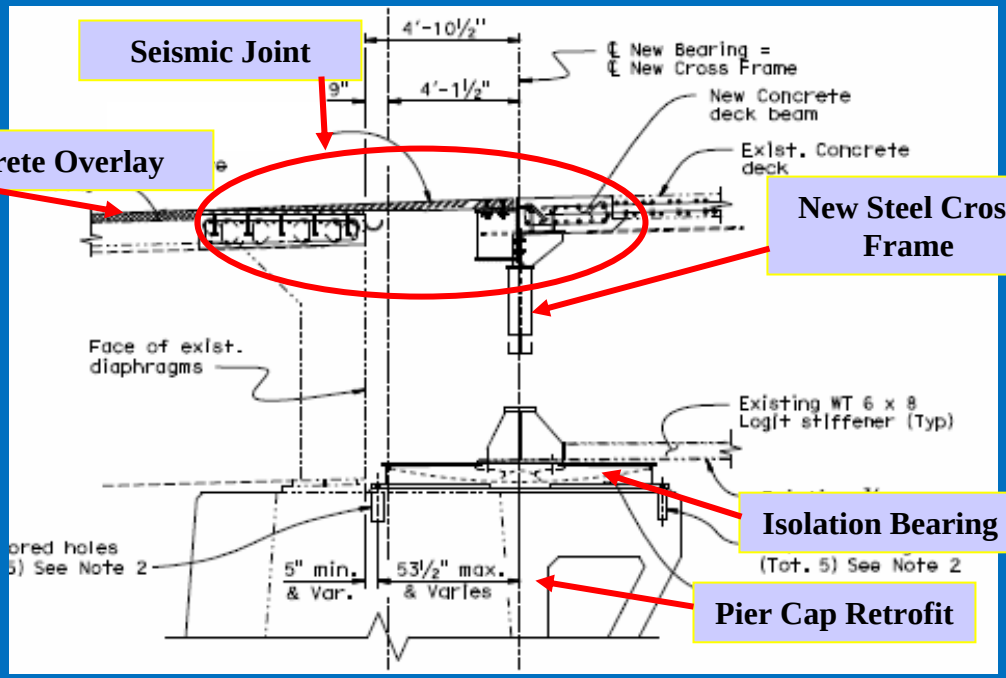
Seismic Joint

Polyester Concrete Overlay

New Steel Cross Frame

Isolation Bearing

Pier Cap Retrofit



Cross Section @ Pier 16 - [278/396]

Main Construction Activities

- Construct Pier Cap retrofit
- Construct new steel cross frame
- Raise bridge
- Install seismic joint
- Install steel barrier
- Polyester concrete overlay
- Install isolation bearings

[ ]Contract plans sheet number

Main Channel Crossing Retrofit

Access Inside the Steel Box Girder - Highlights:

Deck Access Openings – Haul retrofit material inside the steel box (SP 10-1.36)

- **Existing Deck Openings 3'x3'**
- **New Deck openings - maximum size 3'x4'**
  - **Opening construction/restoration sequence to match construction sequence inside the box**
  - **One deck opening per steel box cell in each span**
  - **No more than 2 deck openings in each span will be allowed at the same time**
  - **Openings shall be located at 1/5 span from support**
  - **Temporary steel deck plates shall be used to cover openings when open to traffic (bolted to deck)**

Main Channel Crossing Retrofit

Raise Bridge Pier 16 thru Pier 31 - Highlights :

Replace existing bearing with Low Profile Friction Isolators

- **Jacking and Temporary Support requirements specified on plans and special provisions** (SP 10-1. 59)
- **Trial lifts shall be done at least 7 days prior to beginning of bridge jacking**
- **Final profile grade of the bridge will be 5" higher than existing profile after all the isolation bearings are installed**
- **Two lanes in each direction shall be closed any time bridge is raised at Pier 23 and/or Pier 24**
- **One lane (right) in each direction shall be closed any time bridge is raised at remaining piers**
- **Vertical and horizontal displacement shall be monitored during jacking operation**
- **Raise bridge operation shall be stopped and structure stabilized in case any unanticipated displacements, cracking or damage occurs**

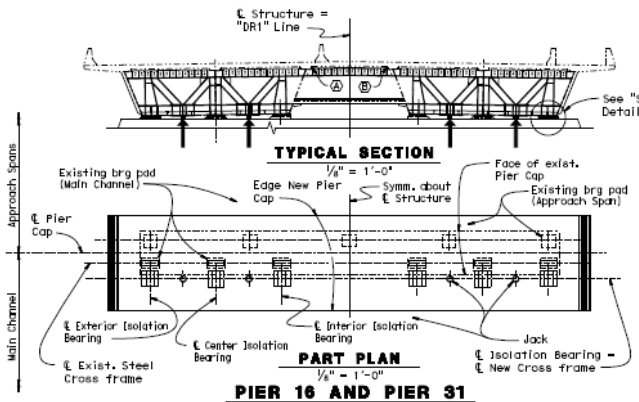
Main Channel Crossing Retrofit

Raise Bridge Pier 16 thru Pier 31 - Highlights :

Notes:

1. Bridge shall be raised 5" at any pier where isolation bearings are to be installed. Jacking at piers on either side of hinge 21 & 25 shall be done simultaneously. During Jacking of the bridge relative vertical displacement shall be as follows:
   a. Along the bridge - 1" maximum between any adjacent box girder supports.
   b. Along the Pier - 1/8" maximum between any two adjacent jacks.
   c. Relative deck slab displacement between the inner top flanges of the two steel boxes shall not be more than 1/4" (shown as point Ⓐ and Ⓑ in the Typical Section).
2. Any lifting sequence can be used as long as the relative vertical displacements comply with all the requirements specified above and with the written approval of the Engineer.
3. Jacking and shimming at the supports shall be performed simultaneously at locations shown on the plans and in compliance with above specified requirements of Note 1. The gap between the top of the shim and bottom of elastomeric pad / bevel plate shall not be more than 1/4". If thicker shims are used to replace equivalent thickness of thinner shims, the replacement shall be made at only one location under a steel box girder supported at any time by two jacks and two temporary supports (shims). Jacks shall be restrained against horizontal movement at all times.
4. Minimum size of shim shall be 16" x 30".
5. For exact location of the jacks and shims see " STEEL CROSS FRAME RETROFIT DETAILS NO. 1" and "NEW STEEL CROSS FRAME SECTION" sheets.
6. All loads shown are estimated without load factors.
7. Maximum bearing pressure on any portion of the pier cap is limited to 2500 psi
8. Jacking shall be done at the locations shown.
9. Initial jacking loads are the estimated vertical forces to be applied to the structure at the jacking points to achieve the displacement needed to free existing bearing pad. Initial jacking loads shall consist of estimated Dead Load and partial Live Load + Impact. Jacking system capacity shall include superstructure Dead Load, Live Load+Impact and Construction loads
10. Jacking loads shall not exceed Dead Load and Live Load plus Impact.
11. At any time during bridge jacking, bridge shall have positive connection between the superstructure and substructure to resist a minimum lateral load of 15% of the combination of total dead load (dead load times the number of jacks at pier) plus total live load (plus impact) plus construction loads.
12. Any structural system used to resist lateral loads shall be designed for a maximum lateral displacement of 1/4".
13. Existing structure and pipe shear keys can be used for temporary support during jacking and for providing lateral support, respectively.
14. Isolation Bearings shall be installed and shimmed one by one sequentially; interior, exterior and center at only one pier and only one steel box girder. Grout once all the isolation bearings under one steel box are installed. Remove jacks when grout under the three Isolation Bearings has set.Install isolation bearings under second steel box in same sequence as the first box.
15. Jacks to stay in place at all affected piers during jacking.
16. All Isolation Bearings installed shall be restrained against any horizontal displacement until grouted.
17. Contractor shall apply any horizontal jacking as needed any time during jacking of the bridge and Isolation Bearing replacement.
18. For bevel plate, existing and new sole plate sizes, see "ISOLATION BEARING DETAILS NO. 3" sheet, "PIERS 17 - 22 & 25 - 30 RETROFIT - STEEL CROSS FRAME DETAILS NO. 1, "PIERS 23 & 24 RETROFIT - STEEL CROSS FRAME DETAILS NO. 1" and "NEW STEEL CROSS FRAME DETAILS NO. 1" sheets, respectively.

NOTE:
THE CONTRACTOR SHALL VERIFY ALL CONTROLLING FIELD DIMENSIONS BEFORE ORDERING OR FABRICATING ANY MATERIAL.

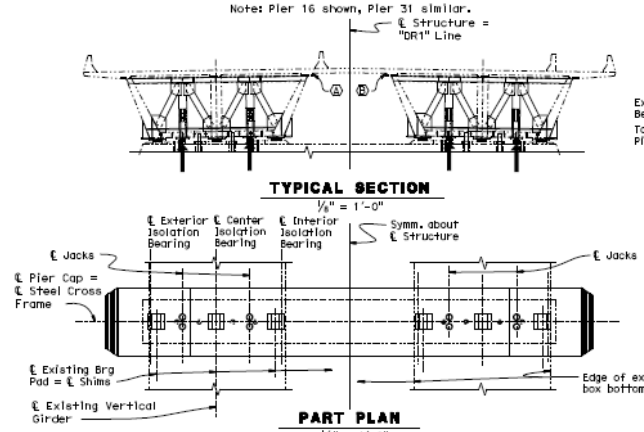


PIER 16 AND PIER 31

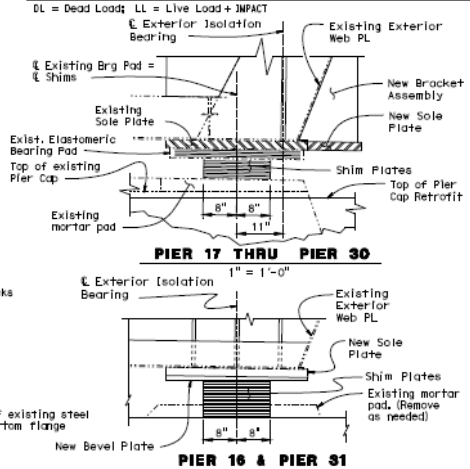
Note: Pier 16 shown, Pier 31 similar.

	No. of jacks	DL per Jack (kips)	LL per Jack (kips)		No. of jacks	DL per Jack (kips)	LL per Jack (kips)
Pier 16	4	233	238	Pier 24	8	555	189
Pier 17	8	342	147	Pier 25	8	310	162
Pier 18	8	325	152	Pier 26	8	336	155
Pier 19	8	330	153	Pier 27	8	324	153
Pier 20	8	323	153	Pier 28	8	330	152
Pier 21	8	337	155	Pier 29	8	326	151
Pier 22	8	310	162	Pier 30	8	341	146
Pier 23	8	555	190	Pier 31	4	234	239

DL = Dead Load; LL = Live Load + IMPACT



PIER 17 THRU PIER 30



SHIM DETAIL

Legend
- Shims / Temporary Support in plan
- Jacking point in plan
- Jacking point in elevation

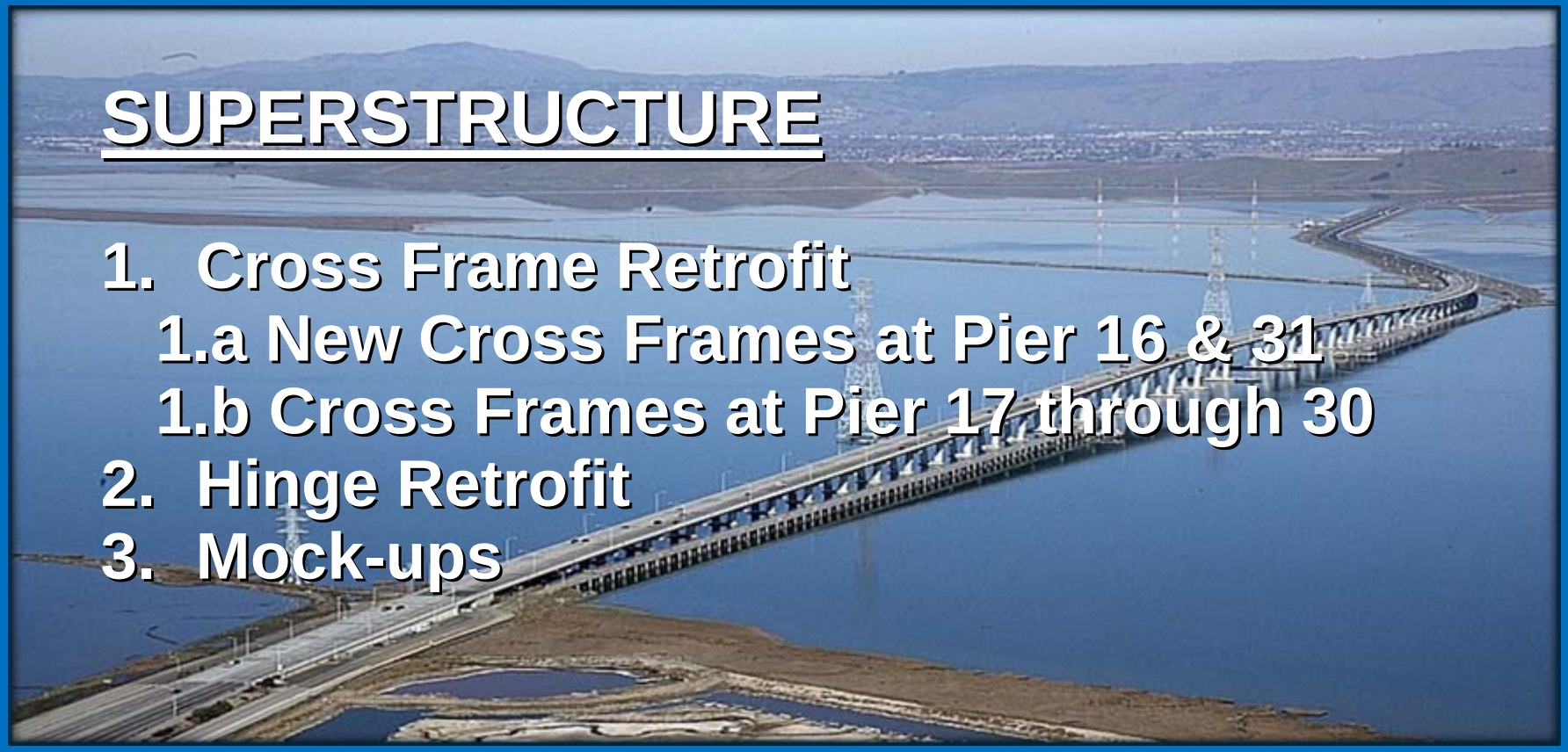
DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
04	SM,Ala	84	R28.8/R30.2, R0.0/R0.8	219R	396

REGISTERED CIVIL ENGINEER 8-3-09 DATE
2-16-10 PLANS APPROVAL DATE

MAIN CHANNEL CROSSING
DUMBARTON BRIDGE SEISMIC RETROFIT
PIER 16 THRU 31 RETROFIT
TEMPORARY SUPPORT & JACKING PLAN

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION
DESIGN BRANCH 4
BRIDGE NO. 35-0038
POST MILE R28.2-R30.15 /R0.0-R0.75
CU 04 EA 1A5201
SHEET 47 OF 140

Temporary Support & Jacking Plan - [219R/396]

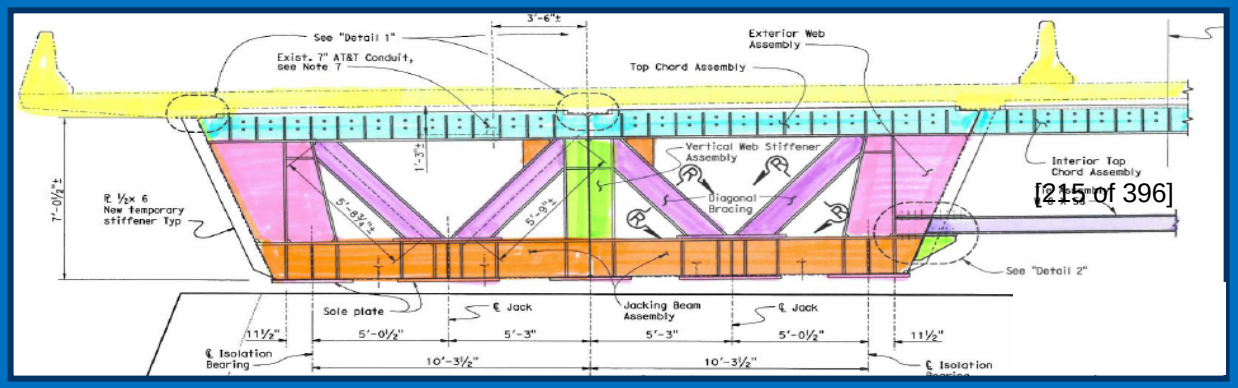


SUPERSTRUCTURE

1. Cross Frame Retrofit
   1.a New Cross Frames at Pier 16 & 31
   1.b Cross Frames at Pier 17 through 30
2. Hinge Retrofit
3. Mock-ups

Dumbarton Bridge - Seismic Safety Retrofit Project

NEW CROSS FRAMES @ PIER 16 AND 31



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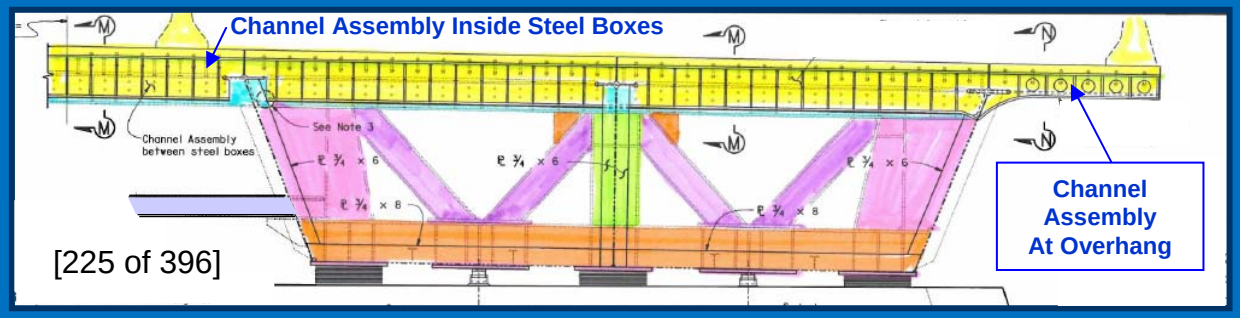
CONSTRUCTION

- Confined working space
- Extensive assembly and field welding
- High quality welding and welding inspection



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CHANNEL ASSEMBLY

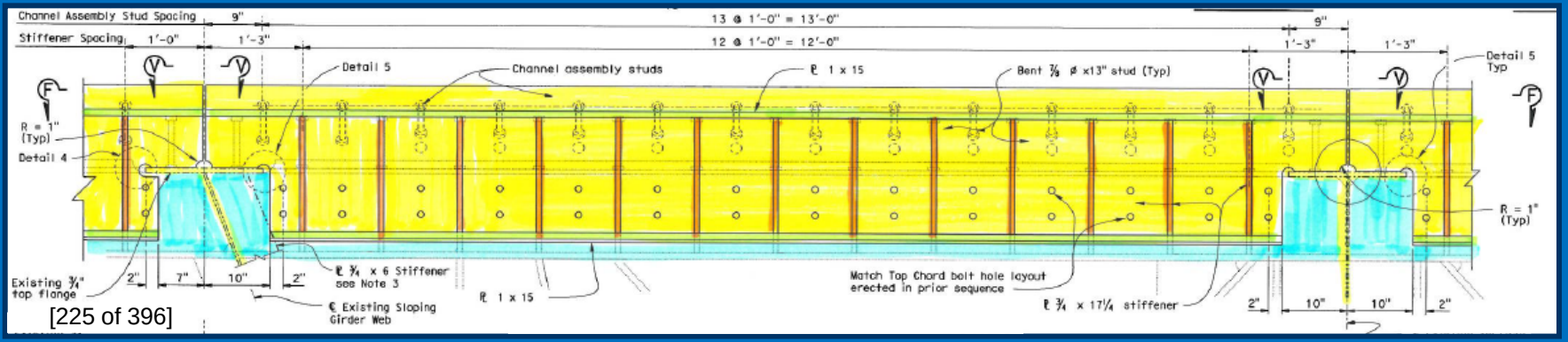
INSTALLATION (bridge closure)

- Time constraints
- Tight tolerances for field assembly
- Multiple tasks to be performed simultaneously

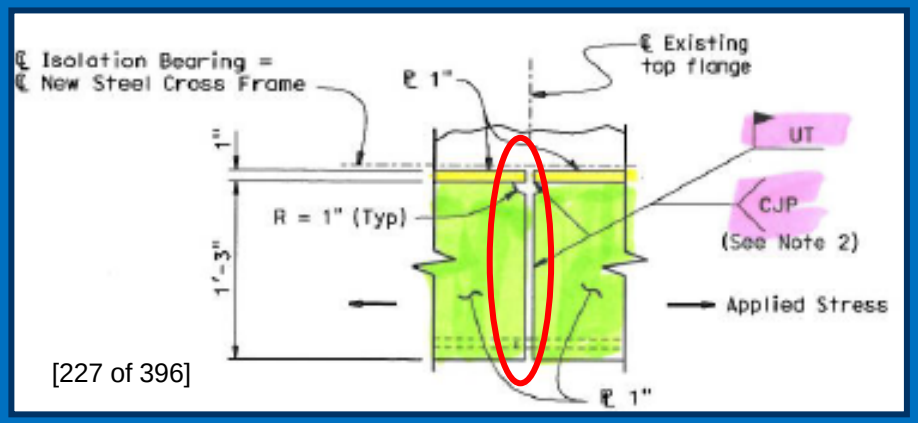
Legend

[.... of 396} – Contract Plans Sheet No.

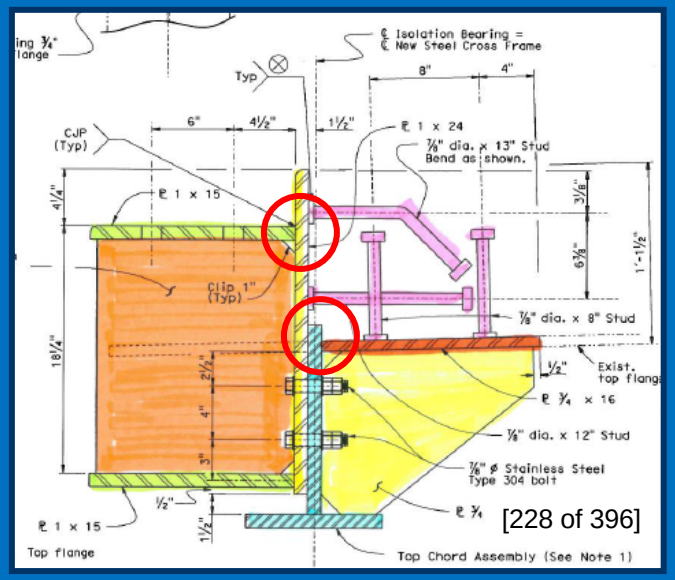
NEW CROSS FRAMES @ PIER 16 AND 31



CHANNEL ASSEMBLY INSIDE STEEL BOXES

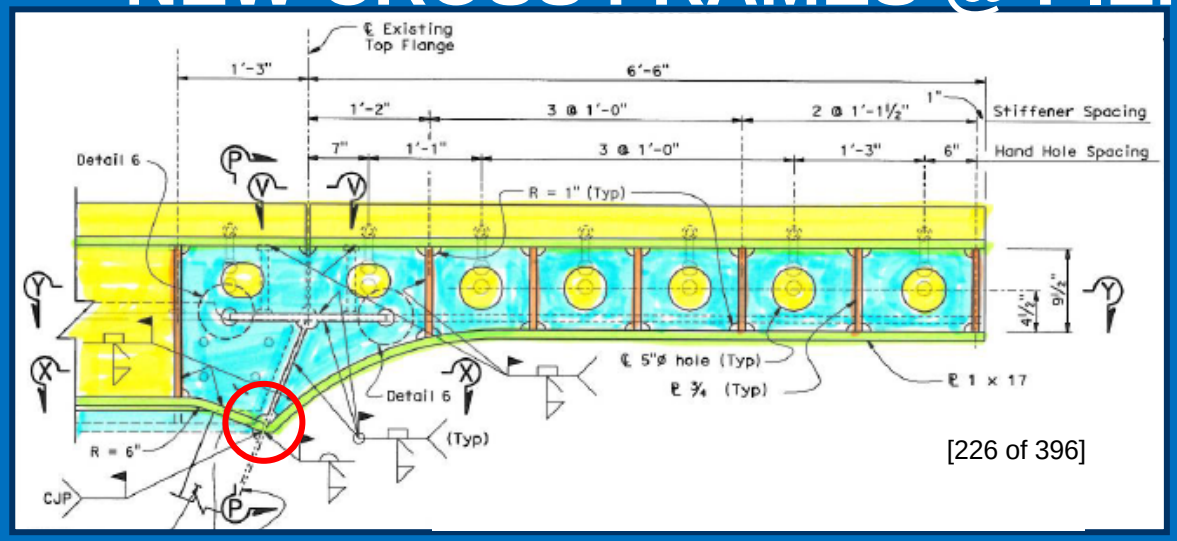


VIEW V-V

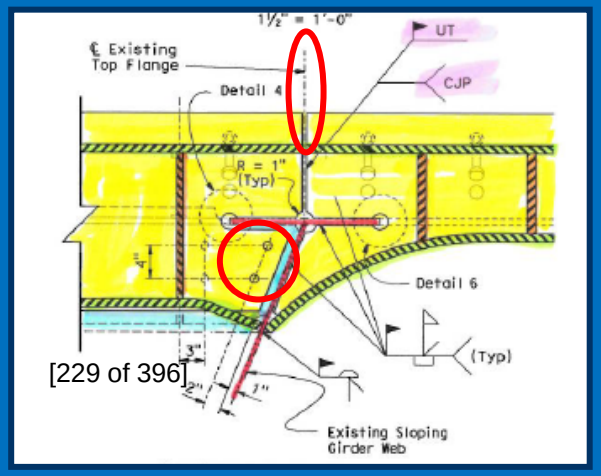


SECTION M-M

NEW CROSS FRAMES @ PIER 16 AND 31



CHANNEL ASSEMBLY AT OVERHANG



SECTION R-R

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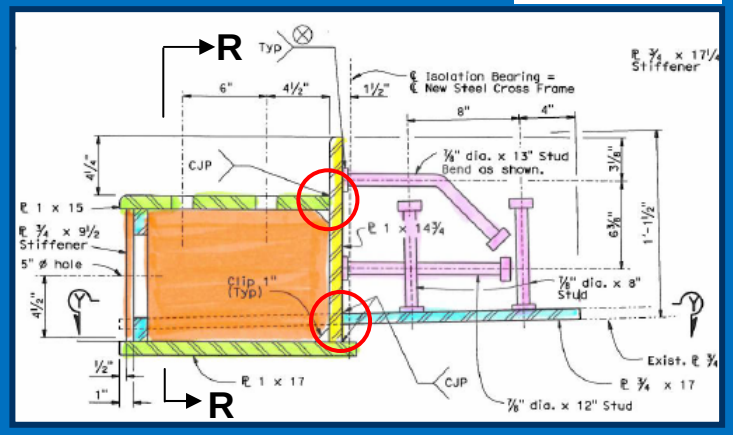
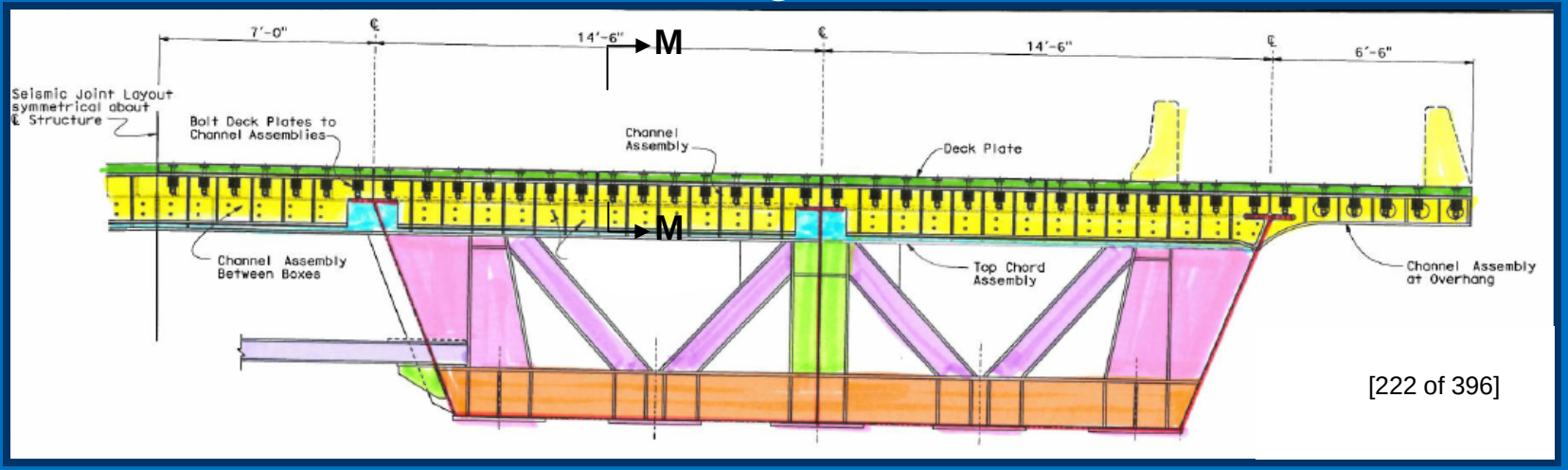


SECTION N-N

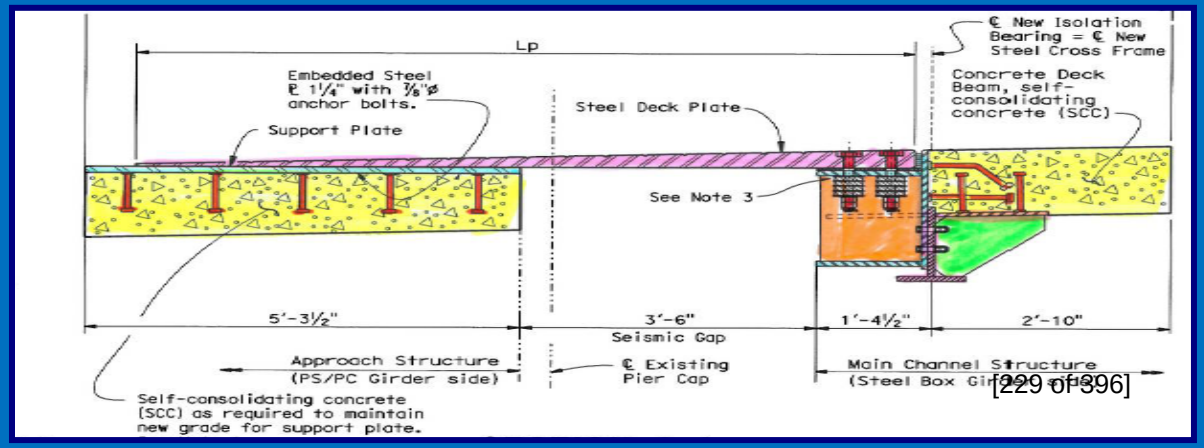
CONSTRUCTION

- Time constraints
- Confined working space
- Tight tolerances
- Extensive assembly and field welding
- High quality welding and welding inspection

NEW CROSS FRAMES @ PIER 16 AND 31

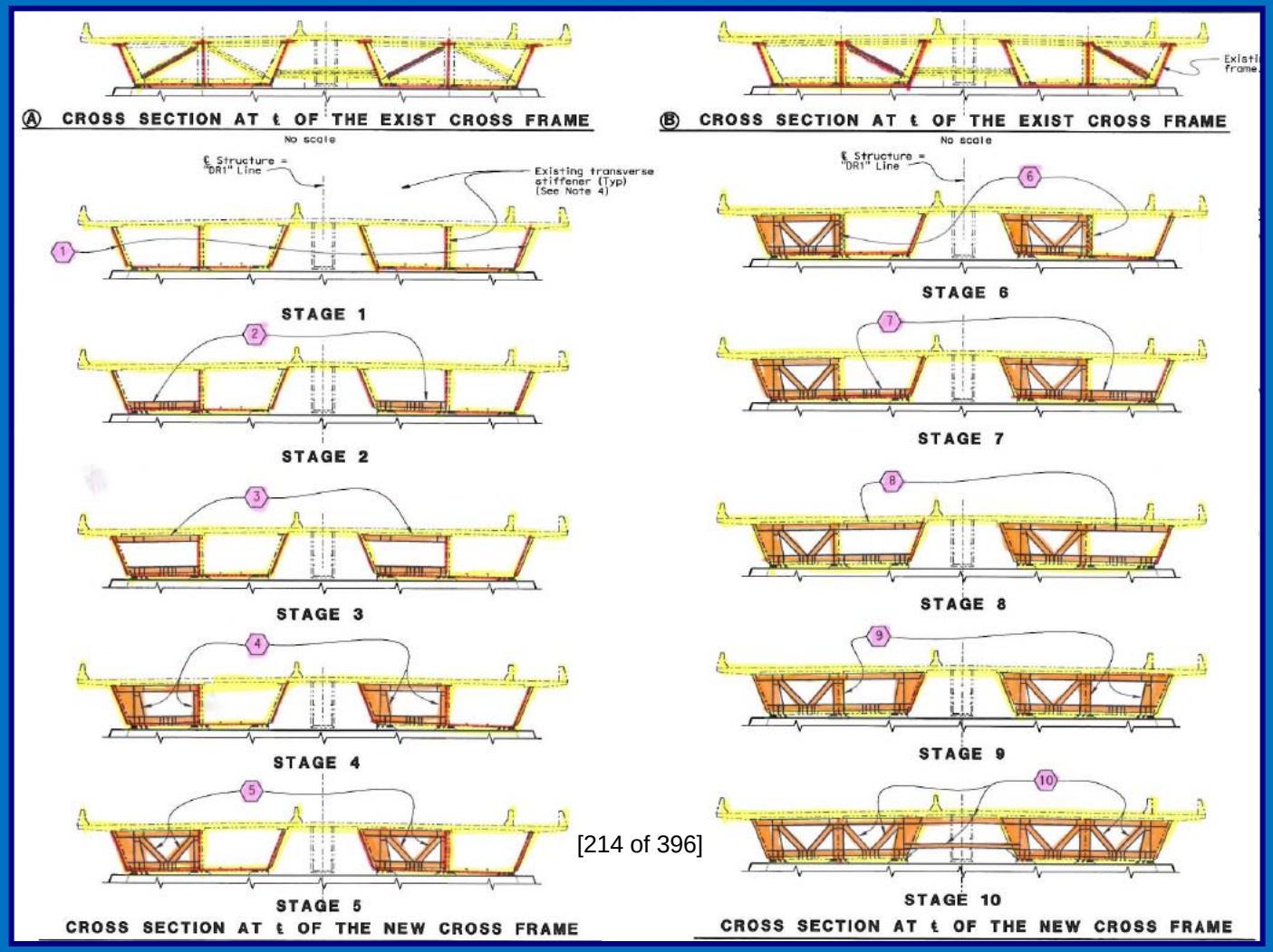


CHANNEL ASSEMBLY/SEISMIC JOINT



SECTION M-M

NEW CROSS FRAMES @ PIER 16 AND 31



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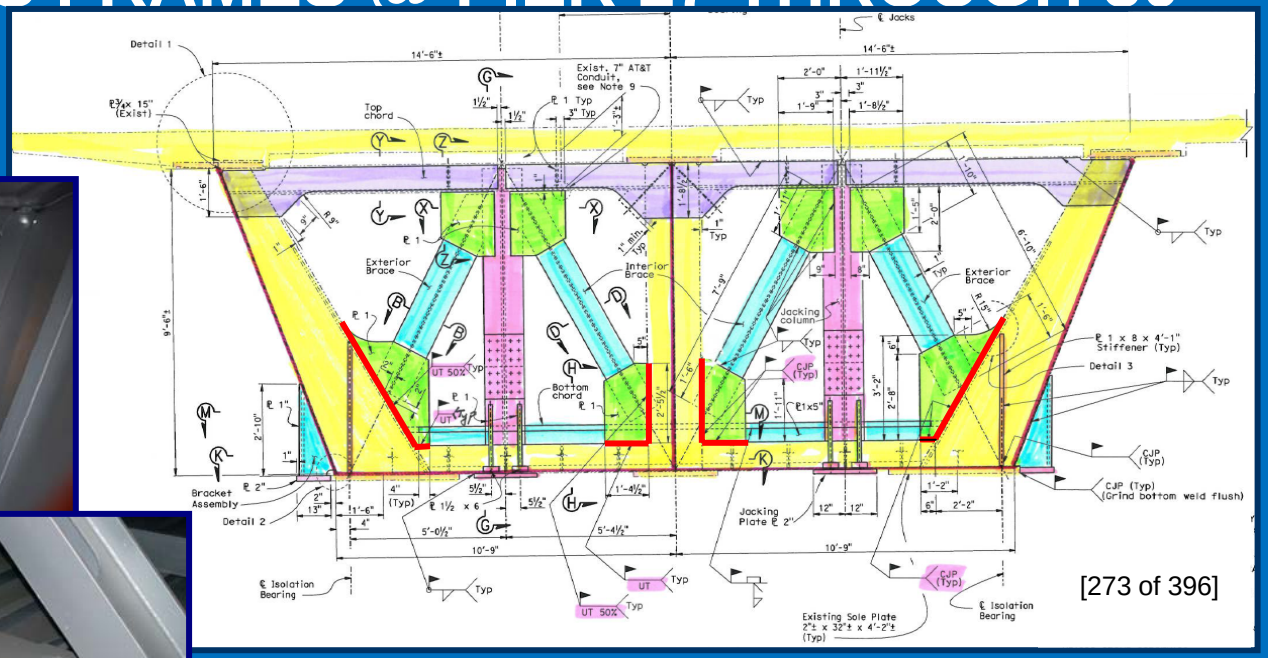
CONSTRUCTION SEQUENCE

CROSS FRAMES @ PIER 17 THROUGH 30

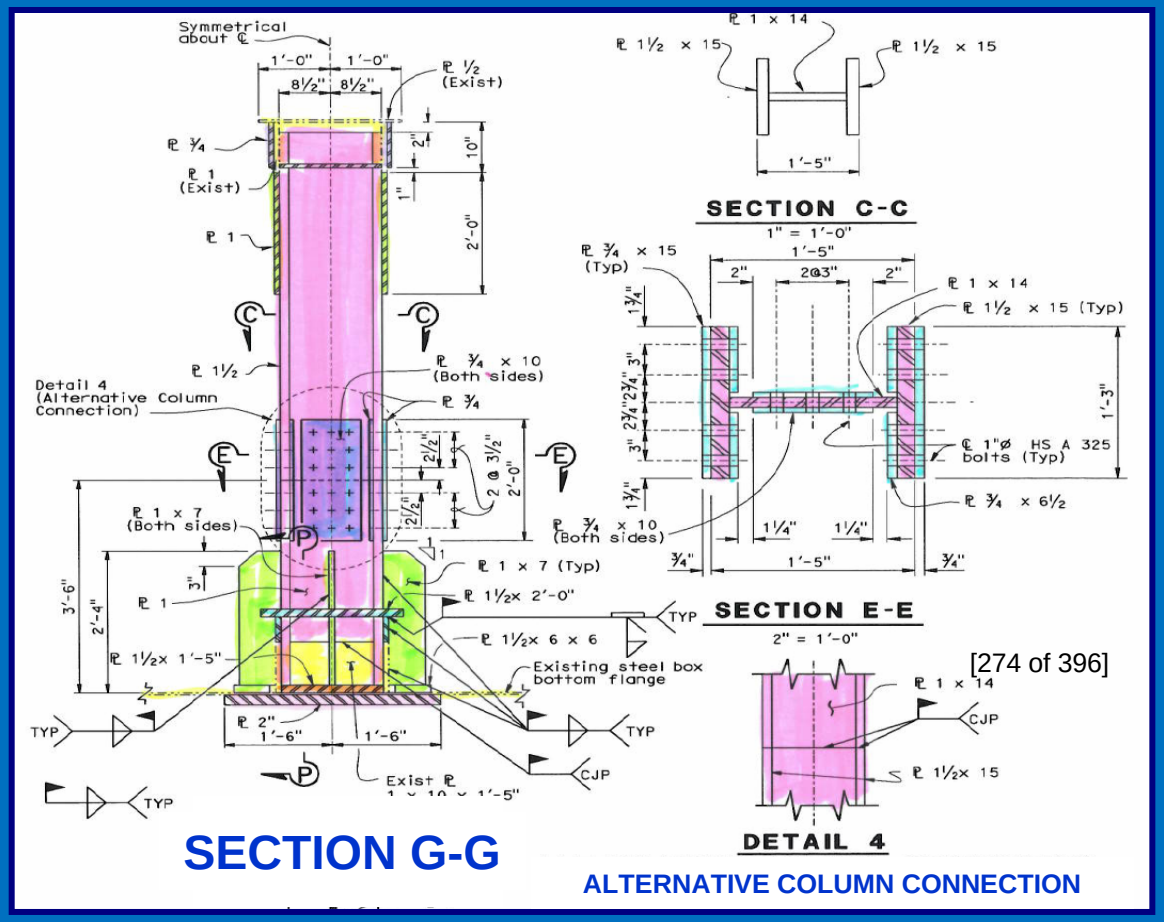


TYPICAL SECTION

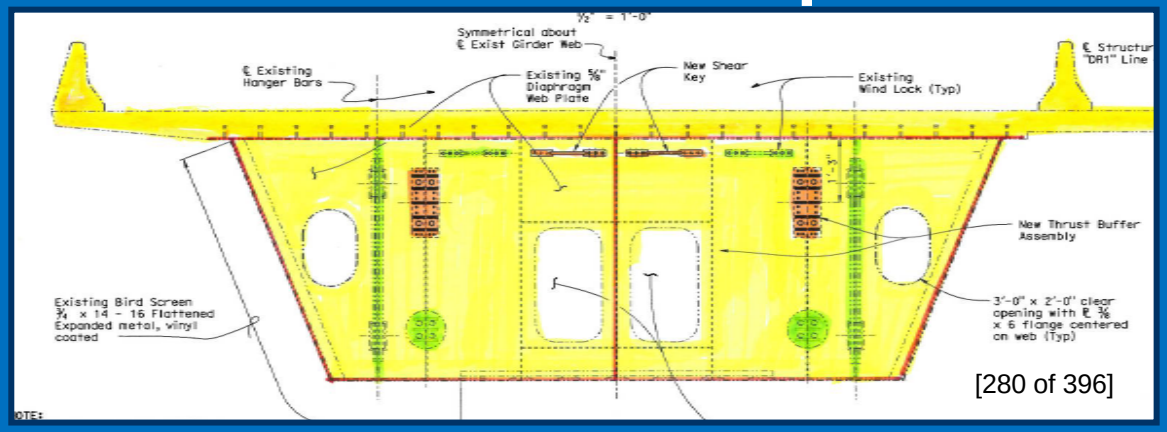
CONSTRUCTION

- **Handling/assembly of heavy steel members within a confined working space**
- **Matching the size of new cross frame members to the existing ones**
- **Extensive assembly and field welding**
- **High quality welding and welding inspection**

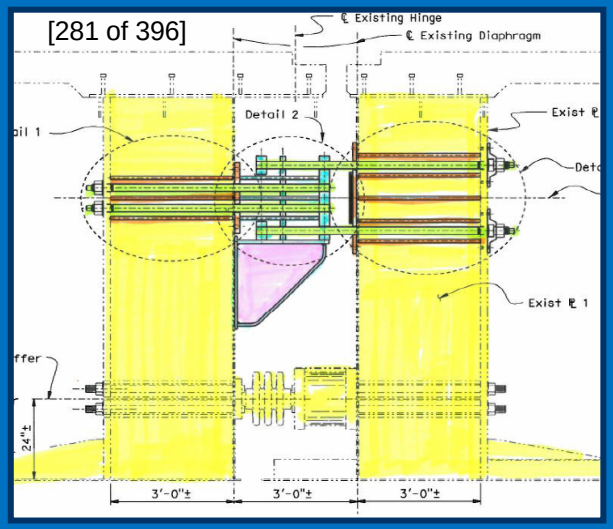
CROSS FRAMES @ PIER 17 THROUGH 30



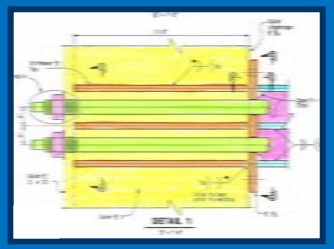
HINGES – Span 21 and 25



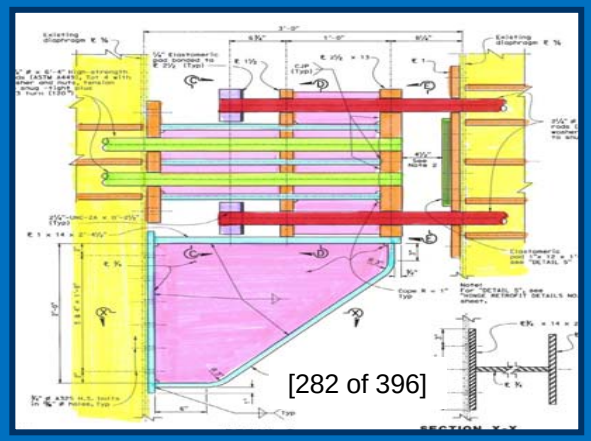
TYPICAL SECTION



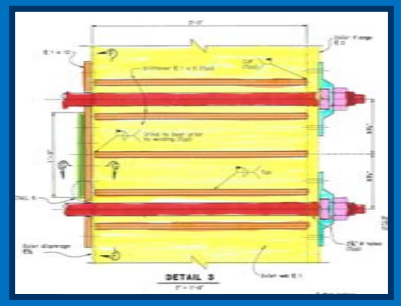
NEW THRUST BUFFER ELEVATION



DETAIL 1

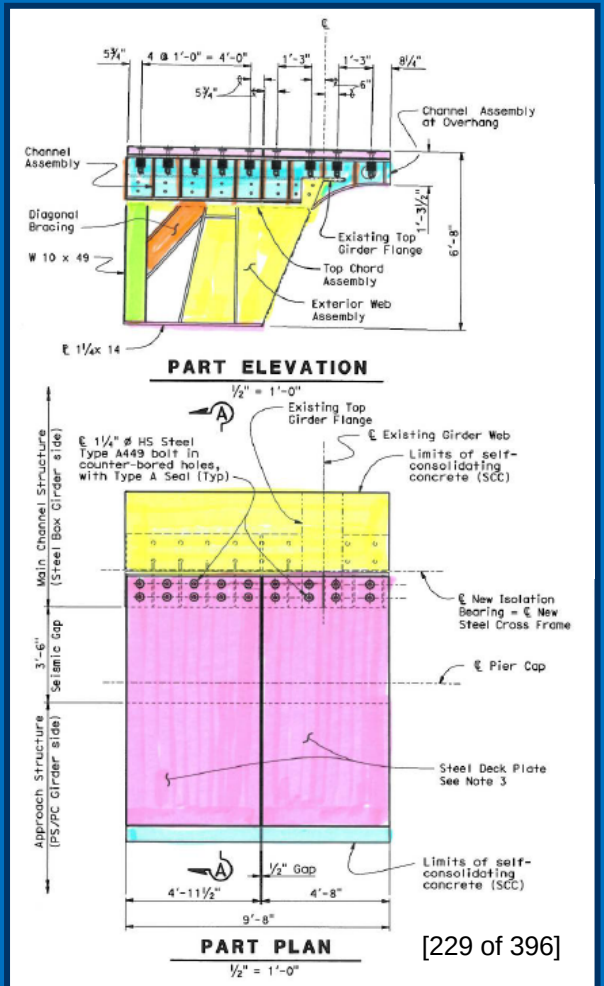


DETAIL 2

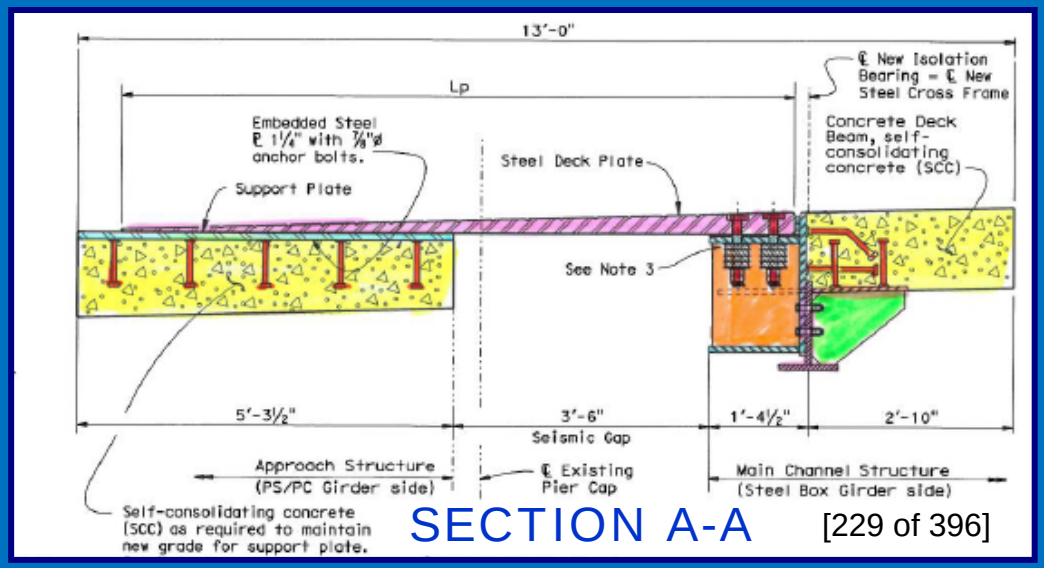


DETAIL 3

MOCK-UP – PIER 16 SEISMIC JOINT



[229 of 396]



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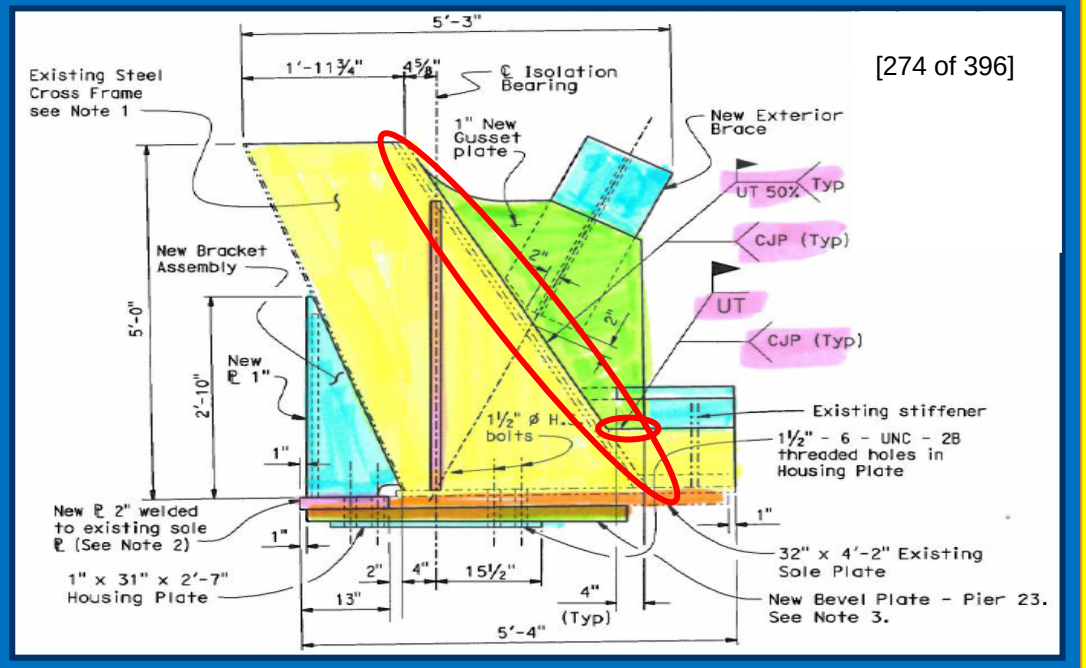
Full-scale mock-up

PURPOSE

- **Replicate complete fabrication and field assembly and installation of seismic joints within the time constraints of the seismic joint retrofit.**
- **Establish optimum assembly and welding procedures applicable to field installation of seismic joints.**

MOCK-UP – ISOLATION BEARING TO STEEL BOX GIRDER CONNECTION



TYPICAL SECTION

Full-scale mock-up

PURPOSE

Replicate:

- **Complete actual field fabrication, assembly and installation of new cross frame components**
- **Welding and inspection procedures intended to be used in the field.**

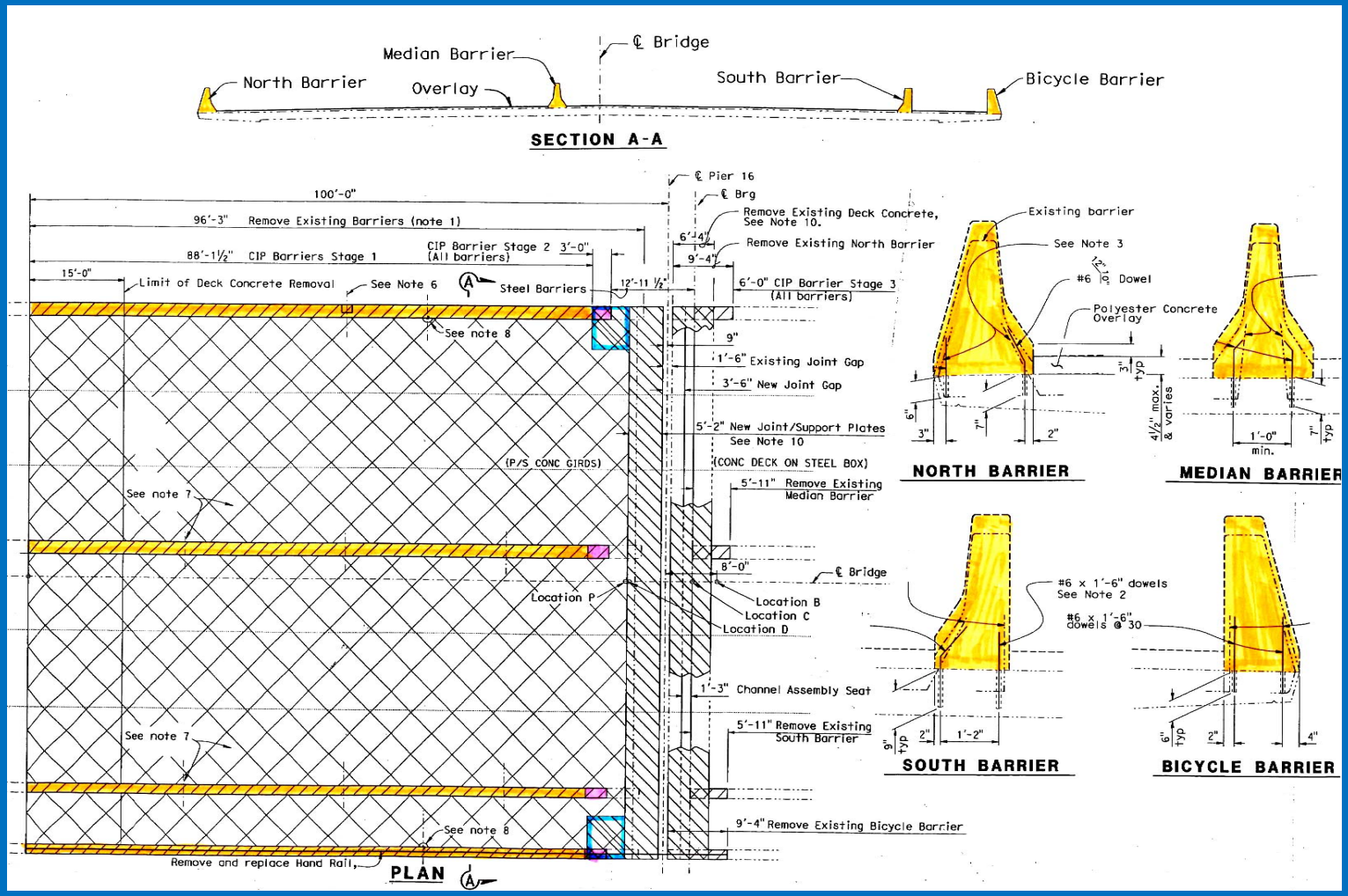
Establish:

- **Optimum assembly and welding procedures applicable to critical field connections**
- **Optimum procedures for locating and field drilling of holes required for installation of isolation bearings.**

SEISMIC JOINT - PIER 16 & 31

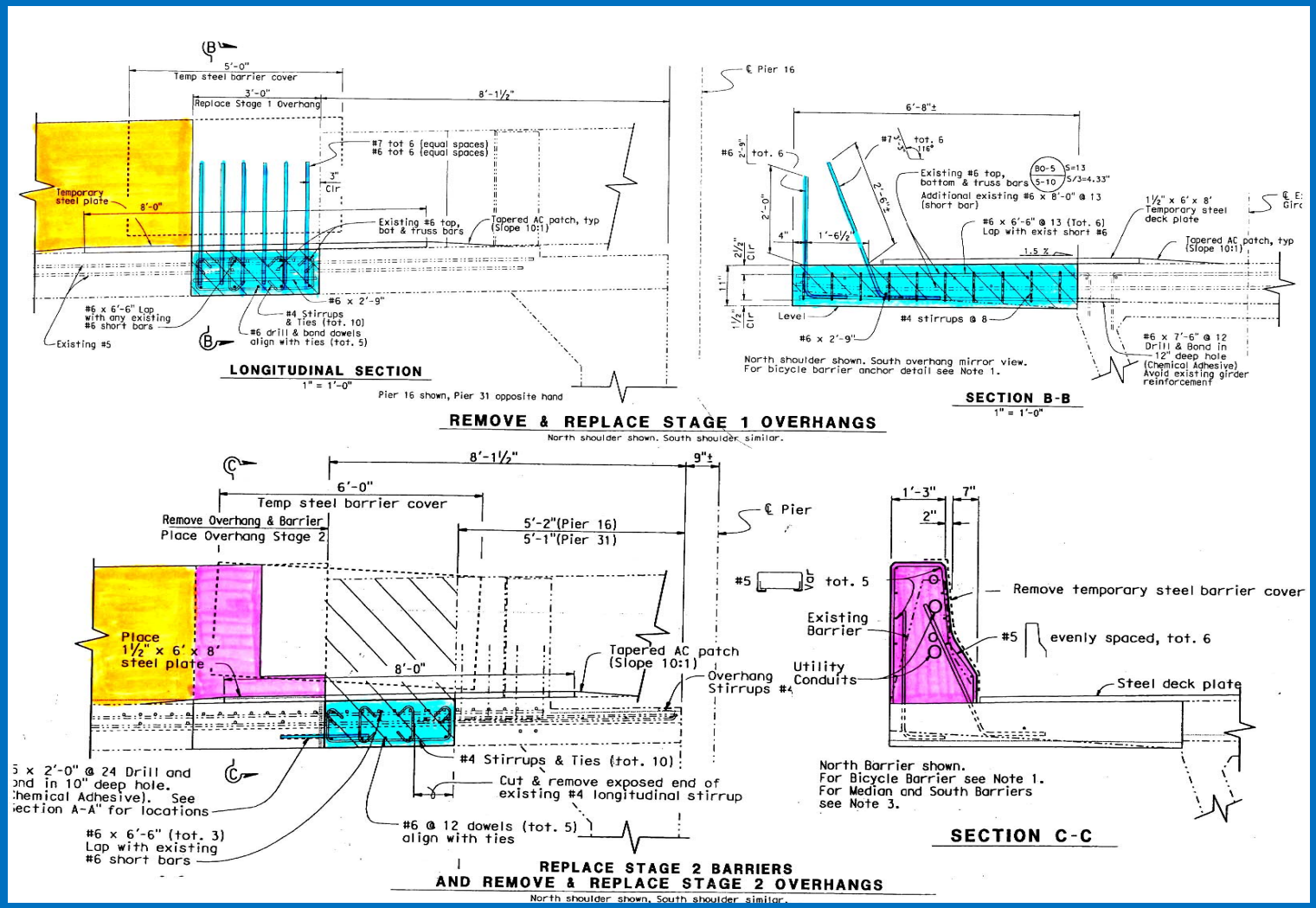
- LANE CLOSURES
- BRIDGE CLOSURE (79 HR)

LANE CLOSURES



- Stage 1 Barrier
- Overhang
- Stage 2 Barrier
- Item staging not construction sequence

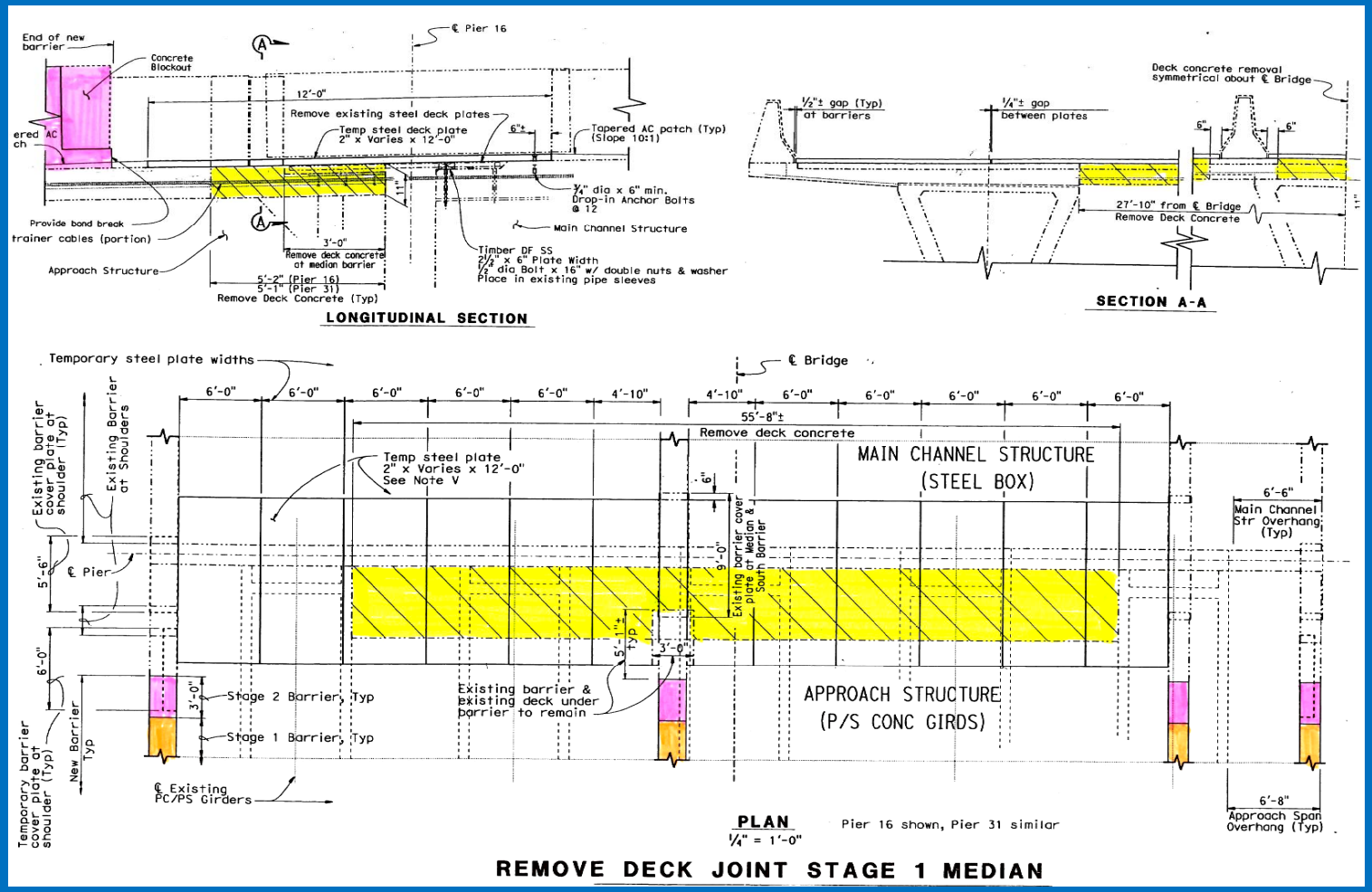
LANE CLOSURES



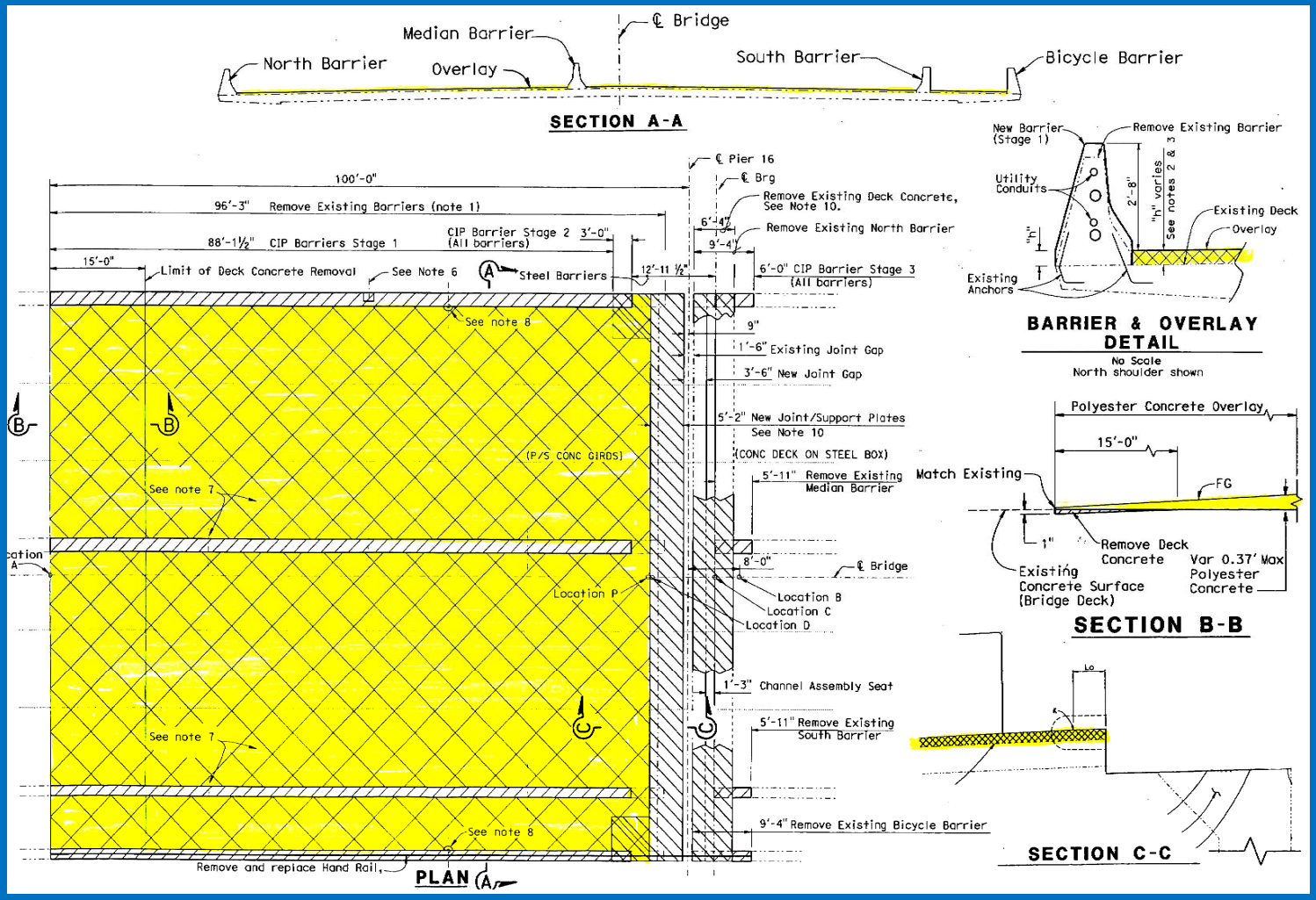
- Stage 1 Barrier
- Overhang
- Stage 2 Barrier

LANE CLOSURES

Remove Approach Deck Joint concrete (median)

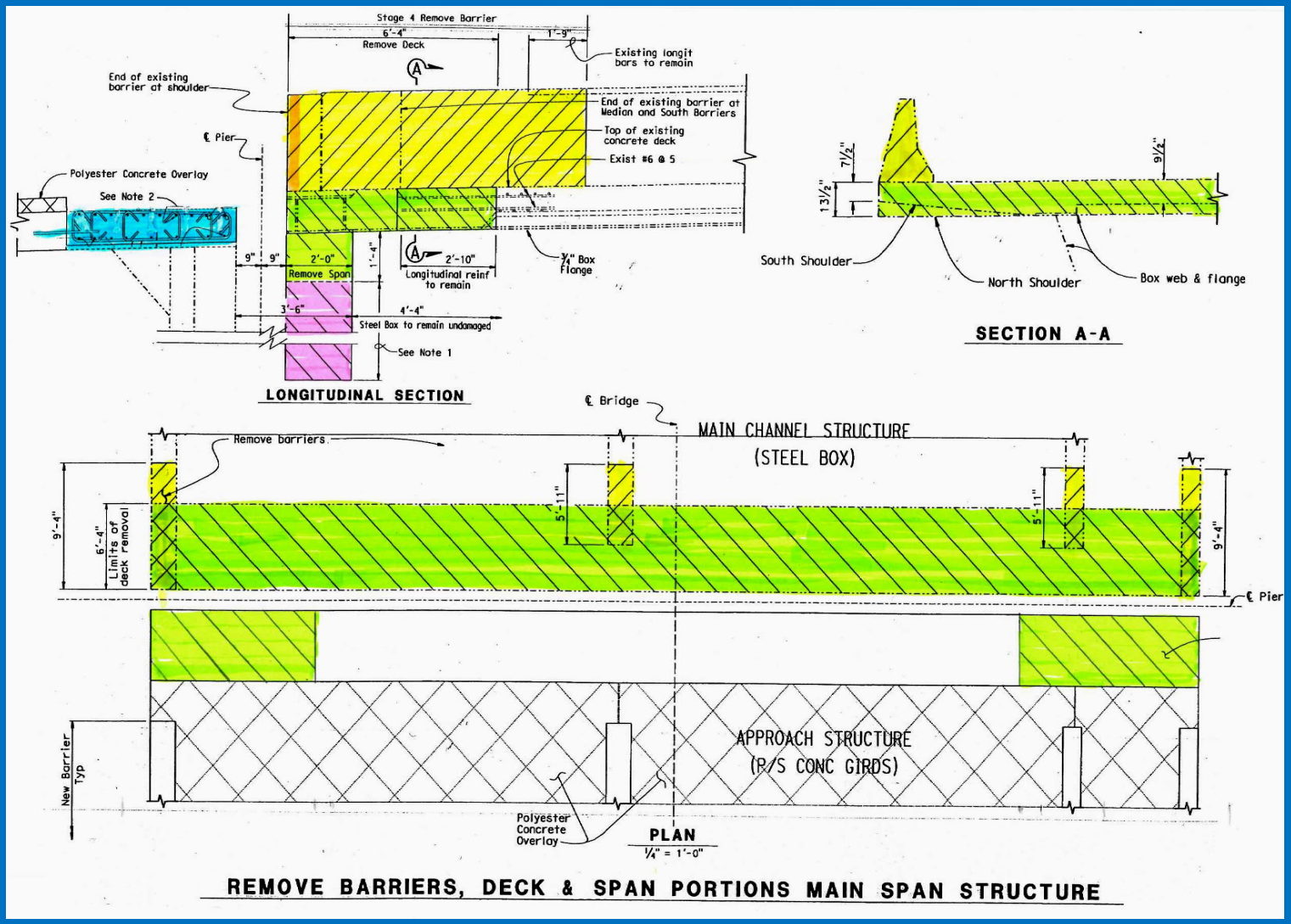


BRIDGE CLOSURE (79 HR)



- Raise bridge
- Items of work to be done simultaneously
- Re-grade Approach Deck (Polyester Concrete Overlay)

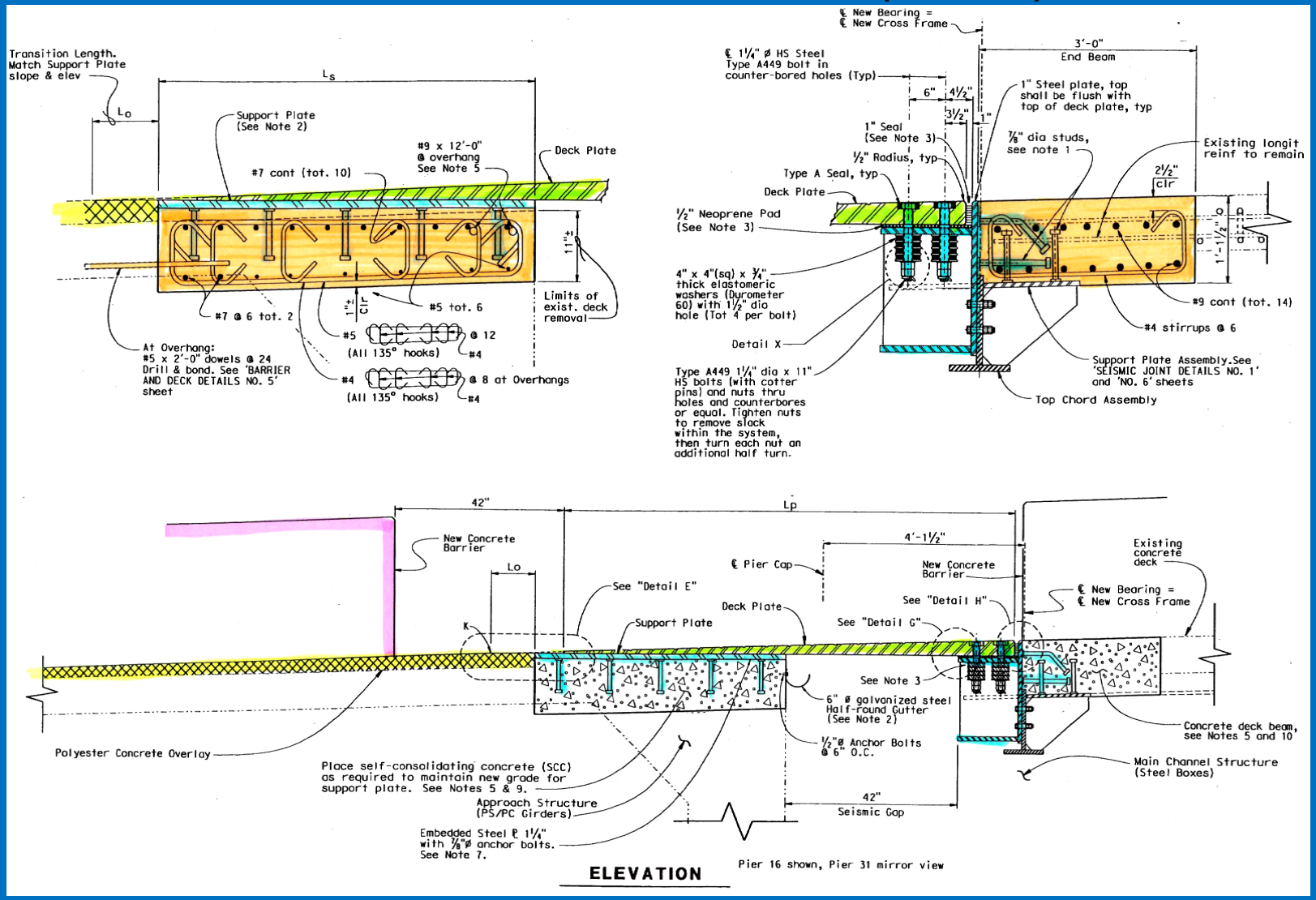
BRIDGE CLOSURE (79 HR)



Remove bridge portions:

- **Remove approach portions**
- **After lift, remove Main Channel Crossing bridge portions**

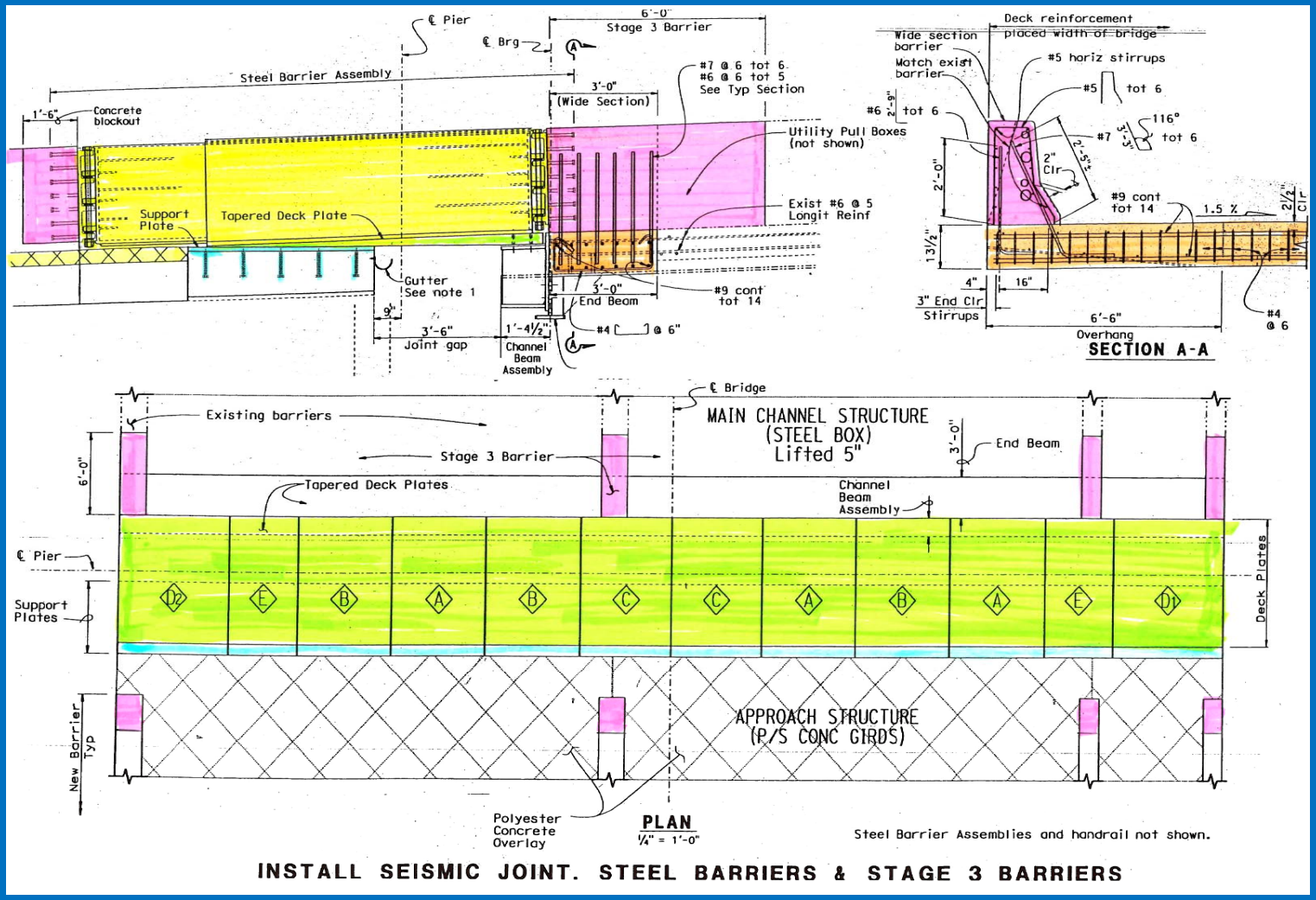
BRIDGE CLOSURE (79 HR)



Install the Seismic Joint

Don't forget your dowel bars

BRIDGE CLOSURE (79 HR)



- Install Deck plates
- Install Steel Barrier Assemblies
- Connect utility conduits
- Place Stage 3 barrier, and block-out
- Hinge covers

Environmental

Stefan Galvez

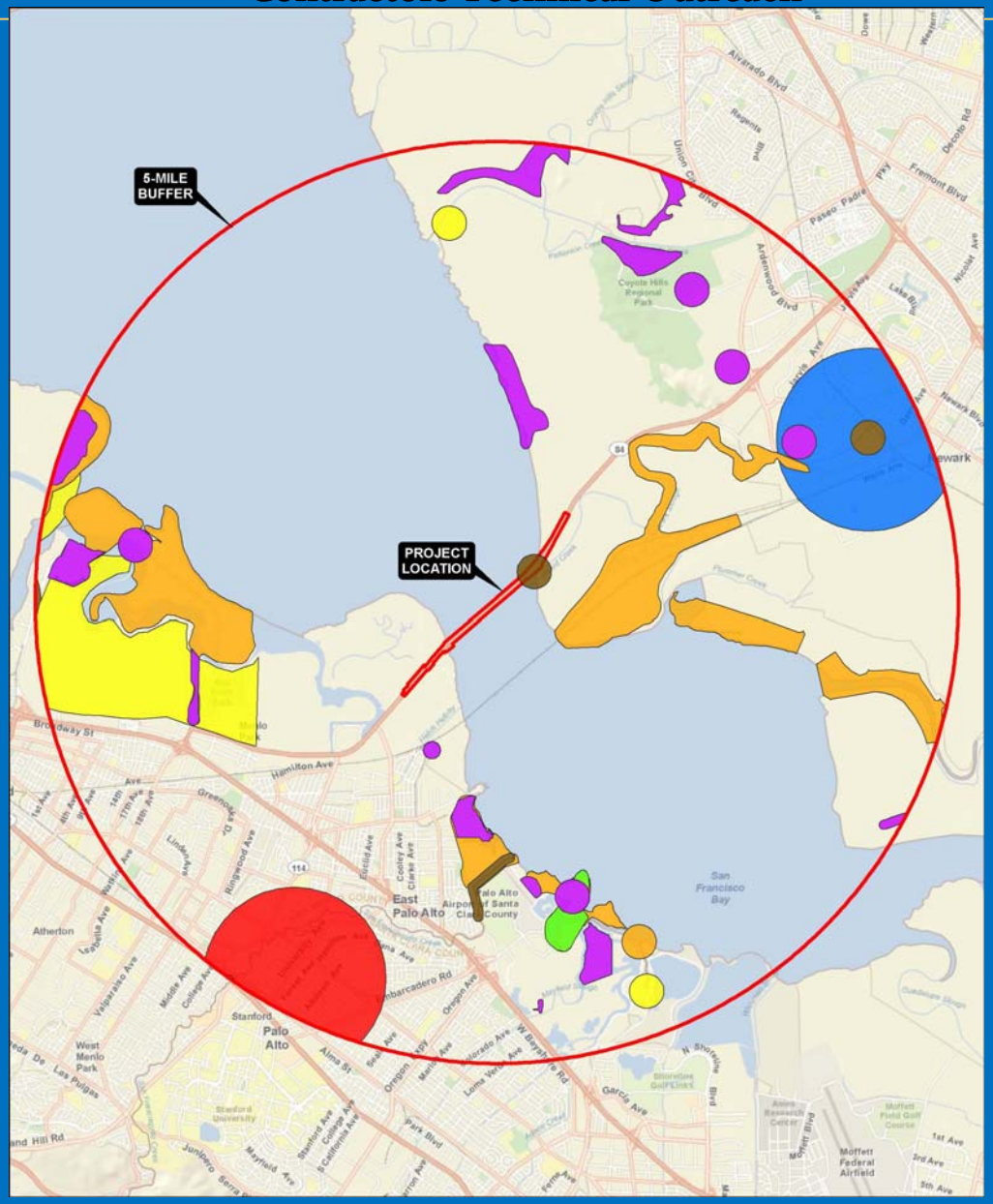
Environmental Setting

Southern part of San Francisco Bay:

- Don Edwards National Wildlife Refuge
- Tidal mud flats, native marshes, salt ponds
- Special Status plants
- Special Status fish, bird, and mammal species
- Protected marine mammals
- Migratory bird habitat

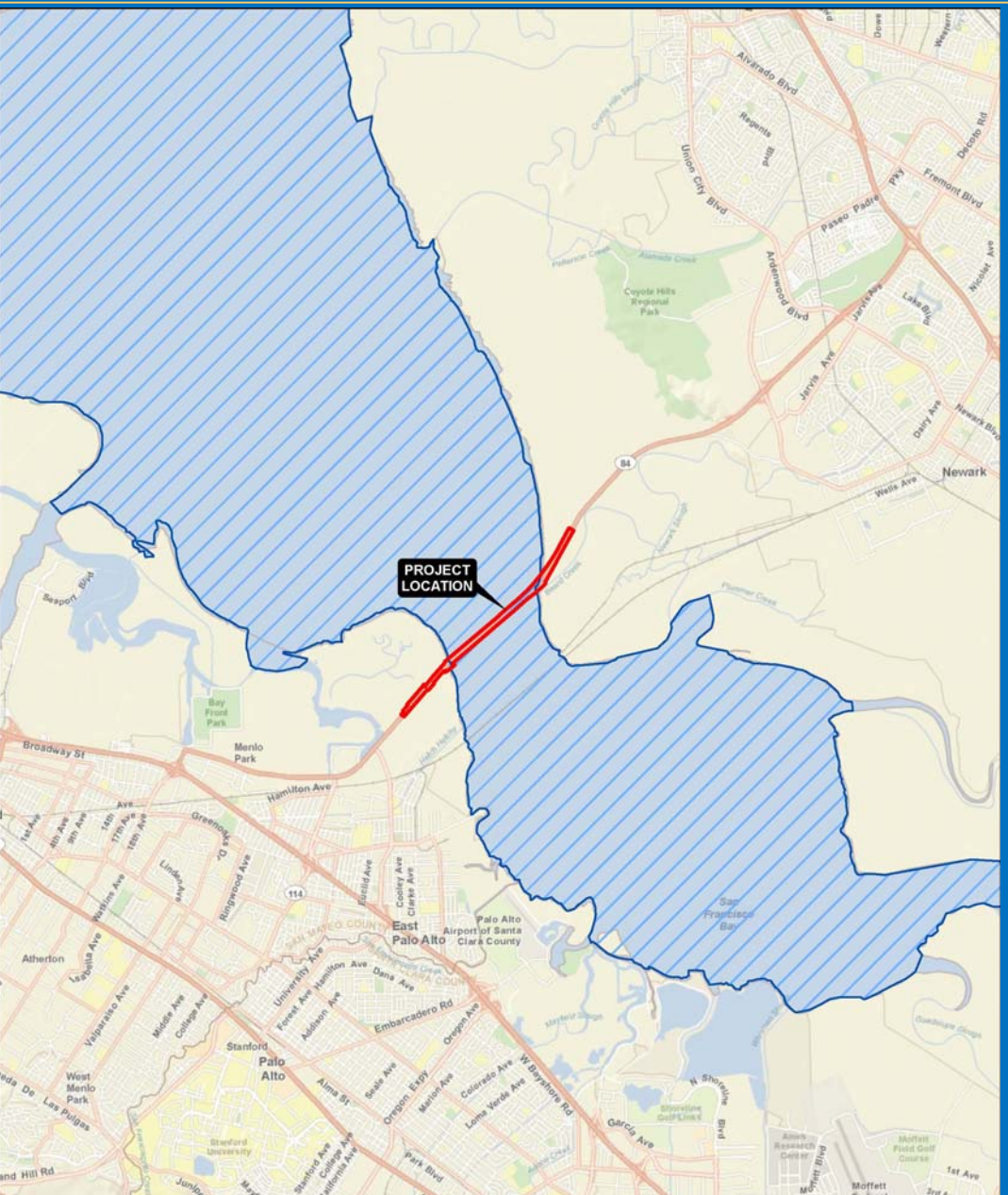
Protected and Special Status Species Onsite

- Salt marsh harvest mouse
- Clapper rail
- Snowy plover
- California least tern
- Cliff Swallows
- Green sturgeon
- Steelhead
- Marine mammals



Listed Species Distribution

- California clapper rail
- California least tern
- California seablite
- California tiger salamander
- Contra Costa goldfields
- salt-marsh harvest mouse
- western snowy plover



NMFS-managed species habitats

Green Sturgeon and Steelhead Habitat

Potential Environmental Considerations During Construction

Work Area	Activities	Environmental Issues
Structure	Permanent piles on land; Build & remove temporary trestle/s; Retrofit work on joints, bents, and hinges; Remove Ravenswood Pier	Noise (air and in water); Turbidity changes; Potential spills; Disruption of cliff swallows
Access Roads and Parking Areas	Parking lots to be used as laydown areas; Increased human and vehicle presence	Potential to encroach on wetlands and/or habitat for listed species

Environmental Permits

- USFWS Biological Opinion, August 2009
- NMFS Biological Opinion, August 2009
- NOAA Incidental Harassment Authorization
- USACE, Nationwide Permits 3 and 14, October 2009
- RWQCB, Water Quality Certification
- BCDC Permit, October 2009

Permit Conditions – General

See Special Provisions 5-1.15 to 5-1.19

- Exclusion fencing for special-status species
  - Standard ESA and wildlife exclusion fencing (5-1.19)
  - Bird exclusion fencing along Marshland Road (5-1.19)
  - Mouse-proof barrier (10-1.14)
- Storm Water and Spill Prevention BMPs (10-1.03, 10-1.04)
- Upland disposal of mud and materials (10-1.04)

Permit Conditions—Pile Driving

- All in-water piles must be driven with a vibratory hammer (soft start required)
- In-water piles installed during daylight hours
- Can be proofed with an impact hammer (1 pile per day)
- Temporary piles and pier supports removed or cut below mud line
- Seasonal restrictions for on-shore piles and in-Bay pile proofing with impact hammer

Pile Driving Seasonal Restrictions

J	F	M	A	M	J	J	A	S	O	N	D

OK to Drive Piles (land); proof in-Bay piles within 800 ft of shore
Pile Driving on land and in-Bay proofing within 800 ft of shore restricted (if nests present)

- Permanent piles on land must be installed October 1 to January 31
- Within 800 feet of shore: Proofing of in-Bay piles with impact hammer only Oct 1 to Jan 31 if nesting birds are present
- No seasonal restrictions on proofing in-bay piles farther than 800 ft from shore

Bird Nest Removal

- Bird Nest Removal Plan must be submitted (5-1.15)
- Nest removal techniques specified (5-1.15)
- Only unoccupied nests can be removed
- Netting or other techniques described in SP 5-1.15 should be used to keep birds (particularly cliff swallows) from re-nesting on bridge work areas.

Bird Protection Buffers

Special Status Species

Nesting Bird Non-Disturbance Buffers (5-1.16):
(If nests with young are present)

Species	Buffer Radius (ft)
California clapper rail	700
Western snowy plover	600
California least tern	300

Nesting Season: Feb 1 to Sept 30

Small Business

Derek Pool

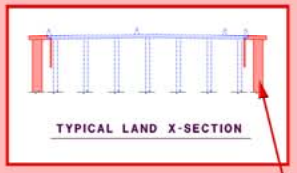
Break
All

Q/A
Panel

DUMBARTON BRIDGE *Seismic Retrofit Project*

Main Channel Crossing
(STEEL)

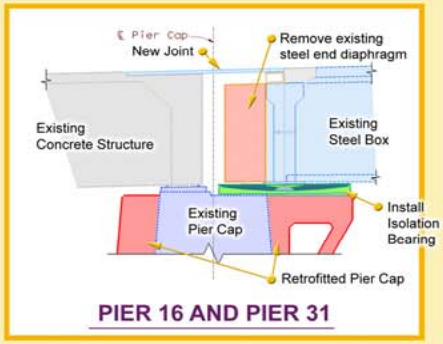
Land Structure
(CONCRETE)

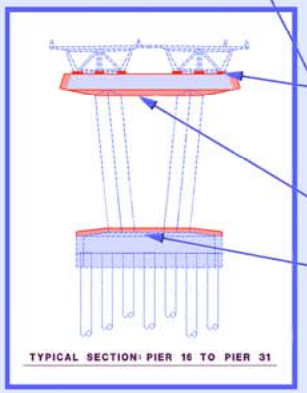


Strengthen trestle structure with steel pipe piles

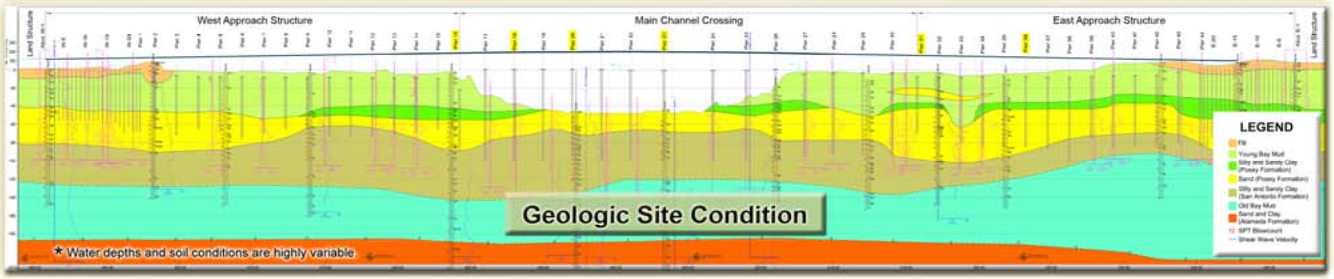
Replace selected existing deck joints

Superstructure Hinge





- Install isolation Bearing
  Raise main span by 5 inch
- Pier Cap Strengthening
- Footing Strengthening



Site Visit
All