



Western Bridge Engineers' Seminar

Accelerating Bridge Construction- Recent Applications in California



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California Acceleration Bridge Construction (ABC) mission

- Improve Mobility in a Expeditious Manner
- Speed up Project Delivery to meet increasing traffic demands
- Minimize roadway delay impact to the traveling public
- Minimize construction and reduce safety-related issues
- Minimize environmental impacts
- Meets “Every Day Counts” initiative



ABC Solutions

- Technical
 - ✓ Prefabricating Bridge Elements and Systems (PBES)
 - Precast concrete super- and sub-structure-
Majority of PBES in California
 - Steel & FRP superstructure
 - Segmental construction methods
 - ✓ Launch or Roll-in (SPMT) girders/superstructures
- Contract and Construction
 - Double shifts
 - Disincentives and Incentives



ABC Project Applications in California

1999-2006 notable projects

- San Mateo Bridge: precast girder/semi-precast bent caps

2006-2011 notable projects

- I-40 (Barstow) Emergency Bridge Replace: precast girders, precast abutments
- Oakland MacArthur Mace I-580 Connector Span Replace: Steel plate girders
- SFO Bay Bridge – East Span Viaduct Retrofit: Superstructure Roll-In Move- Total 2.5 days
- Hardscrabble Creek Bridge Replace (Del Norte County): Superstructure Roll-In Move- Total 8 hours

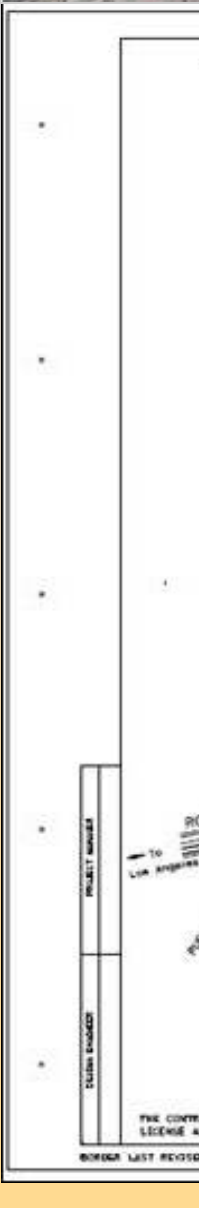
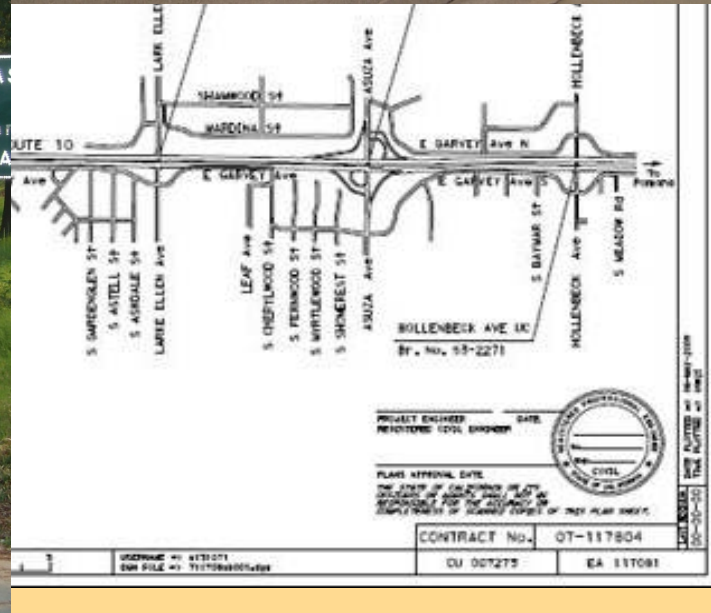


ABC Project Applications in California

2006-2011 notable projects [continued]

- I-5 (Santa Clarita) Truck Undercrossing Repair:
Precast girders
- Russian River Emergency Bridge Replace: Precast girders
- I-10 HOV Widen- Segments 2 and 3:
 - Precast/Prestressing girders
 - CIP bridge columns, bents, abutments and deck
 - Post tensioning to make continuity

I-10 HOV Widen- Segments 2 and 3



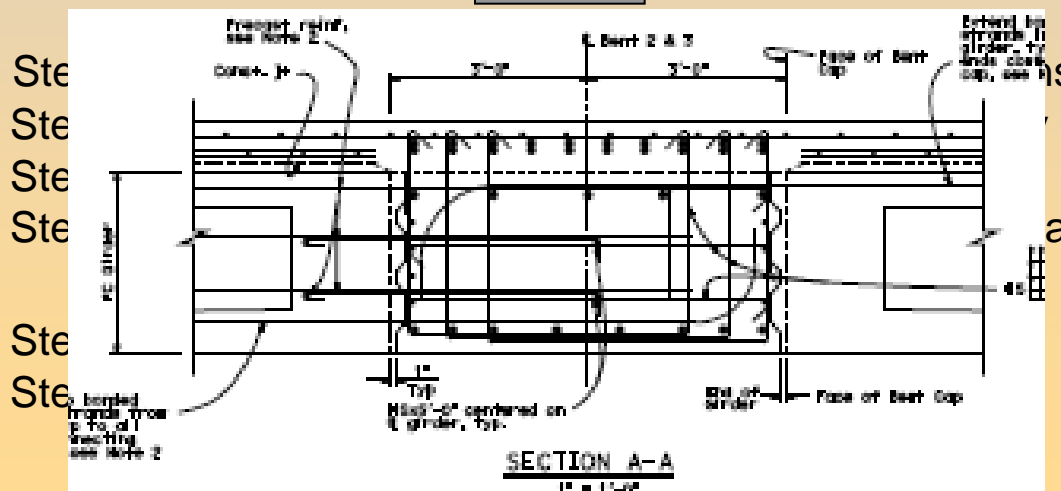
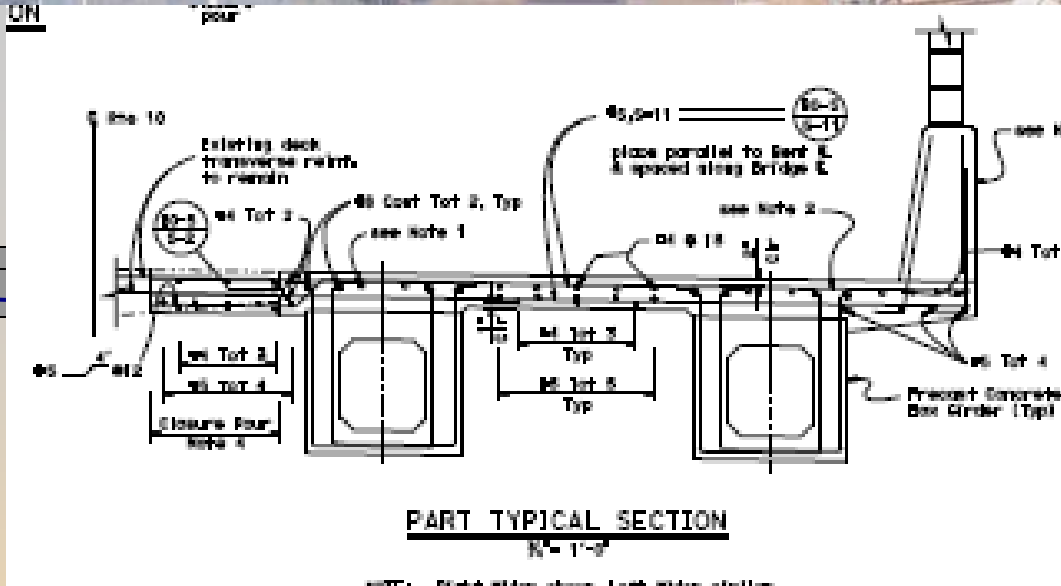


I-10 HOV Widening Segments 2 & 3

Widen and restripe the I-10's eastbound and westbound directions from Puente Avenue, City of Baldwin Park to City of Pomona, CA

- 14 bridges to be widened; 7 bridges use ABC
- Conventional CIP/PS is not feasible due to temporary clearance constraints
- Precast Girder/CIP Bent Cap- integral connections

Precast Girder/CIP Bent Cap Construction Sequence



Step 1
Step 2
Step 3
Step 4
Step 5
Step 6

supports
diaphragms

Oakland MacArthur Maze I-580 Connector Span

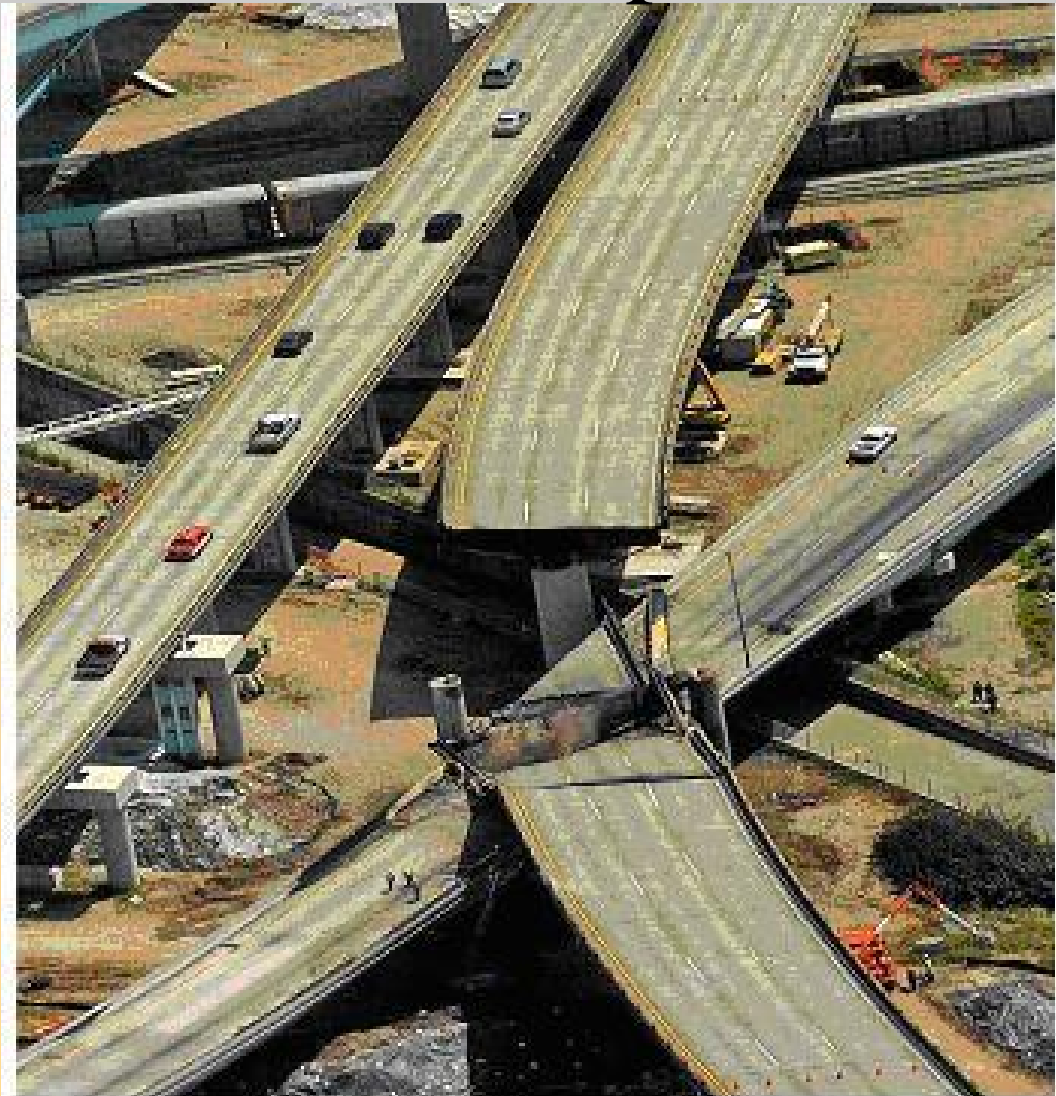


Figure 2: View of damage from above

Gasoline tanker
overturned on I-880 in
Oakland, California-

April 29, 2007 at 3:52 AM

– Fire and extreme heat from
the tanker fire

– Extreme heat caused the
collapse of 2-spans on I-580
Upper Connector: steel girders
and steel bent cap



I-40 (Barstow) Emergency Bridge Replace

- Precast abutment





I-40 (Barstow) Emergency Bridge Replace



Bridge completed in 28 days- from closure to reopening



Hardscrabble Creek Bridge (Replace)

District 1- North Region





Recent ABC Project in California

2011-present: notable projects

- I-10 HOV Widen (8 bridge structures)
- SR-60 Paramount Blvd OC Emergency Replace
- I-805N BRT/HOV: Rose Canyon Bridge Overhead Widen
- I-710 East Yard Overhead Widen
- I-15/I-215 Devore Interchange Improvement structures

SR-60 Paramount Blvd OC Emergency Replace

- ◆ Location :- Route 60, City of Montebello
- ◆ 4 span 250ft long and 96ft wide
- ◆ 4ft column & short diaphragm abutment



December 14, 2011 Tanker caught fire
8,800 gallons of fuel burned under the
bridge





- Took more than 2 ½ hr to extinguish the fire



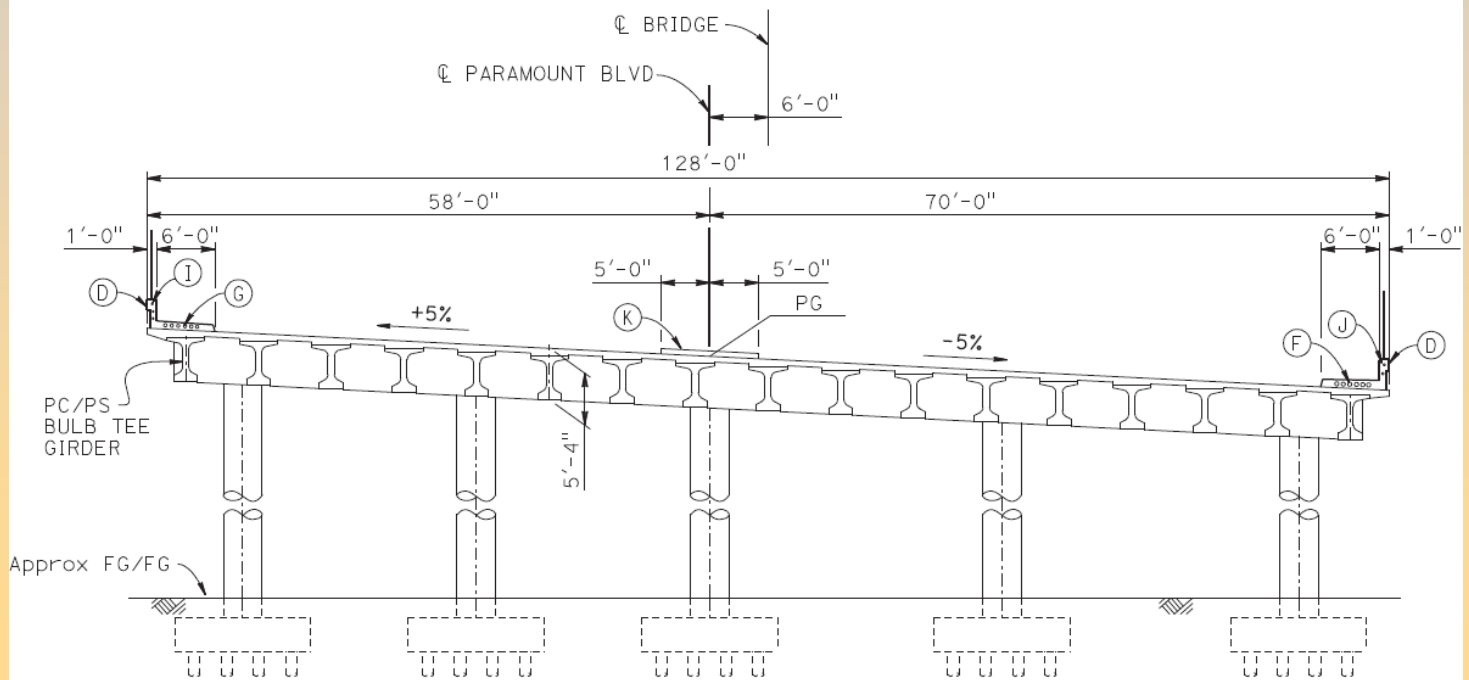
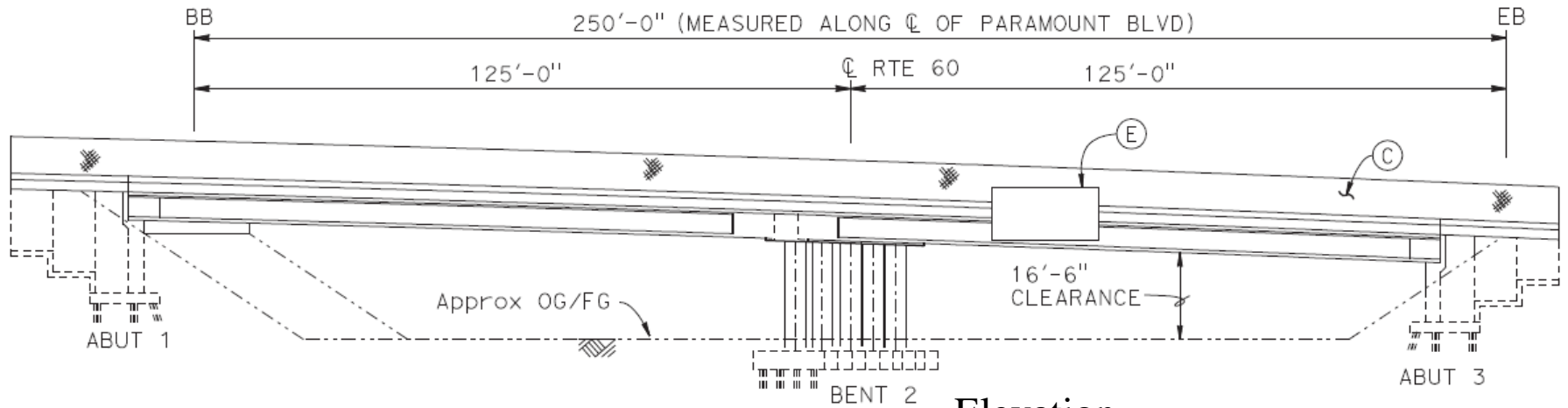




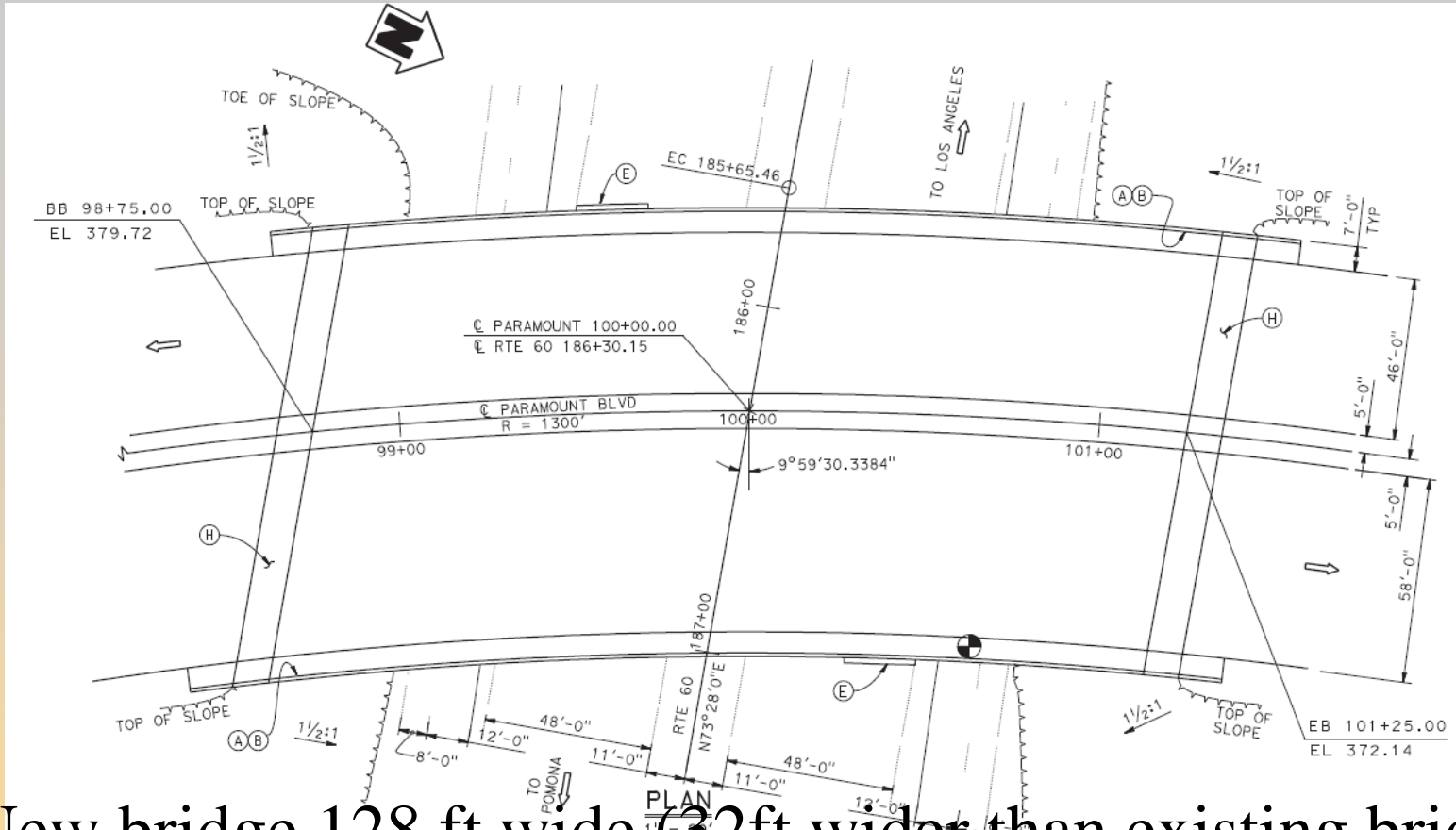
1st stage removal



New Paramount Bridge

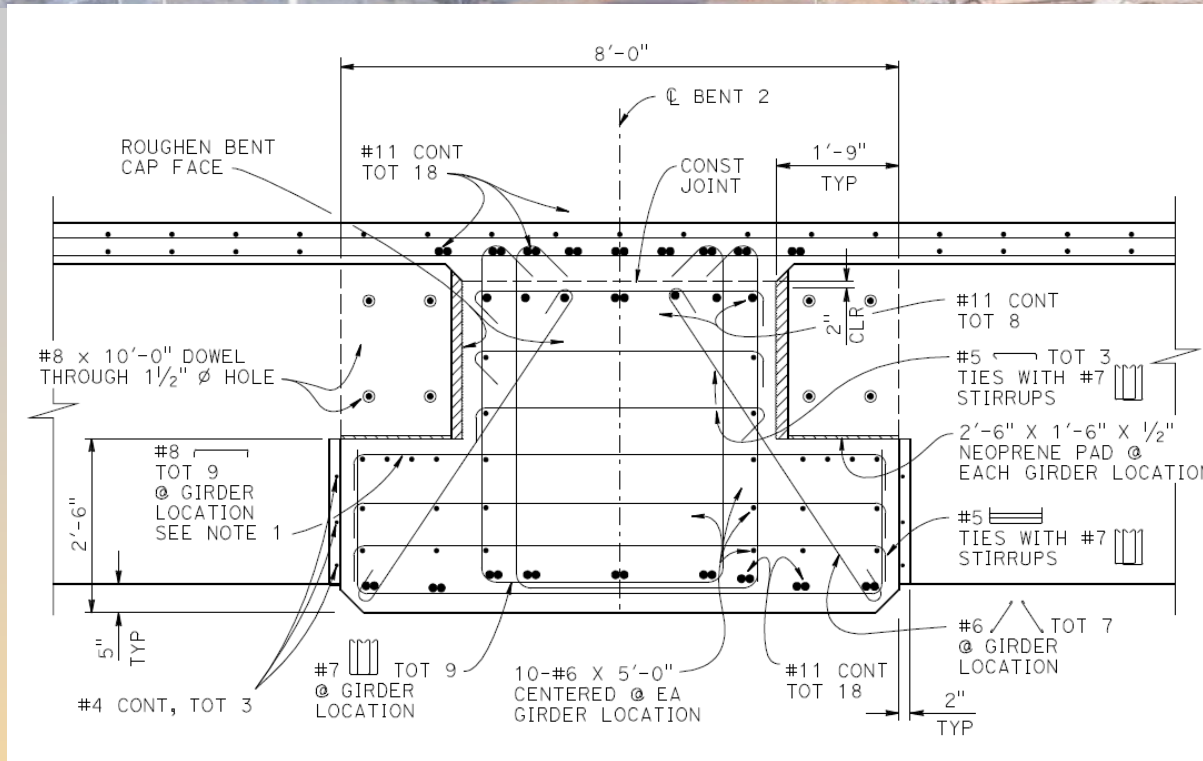


New Paramount Bridge



- New bridge 128 ft wide (32ft wider than existing bridge)
- PC Bulb-Tee girders-
- 2 Span bridge
- 5 Column bent

Girder/Inverted-T Cap Details



- Non Integral Inverted-T bent cap with fixed footing connections
 - Traffic operation during construction.
 - Faster construction advantage.

Milestone dates

- 12/15/2011 & 12/16/2011 Evaluation of existing Structure
- 12/16/2011 Bridge is Decided to be replaced 3:00PM
- 12/16/2011 Preliminary Geotechnical report ARS
- 12/17/2011 - 12/21/2011 Geotechnical drilling
- 12/21/2011 PDT meeting, bridge width was set at 108 ft.
- 12/28/2011 PDT meeting, bridge width increased 128 ft.
- 12/29/2011** **Type Selection**
- 1/2/2012 Revision of design for 128ft wide structure.
- 1/3/2012 *BSDS from District*
- 1/04/2012 *Constructability meeting with Prefab companies*
- 01/09/2012 *Structure P&Q*
- 01-20-2012** **S PS&E**
- 2/24/2012 *RTL'd*
- 2/24/2012 *AT&T Utility line Relocation and Addendum*
- 2/29/2012 **Bid Opening & Contract award**
- 3/1/2012 *Removal of remaining portion structure*
- 3/2/2012 *Replacement bridge construction work begin*
- 5/21/2012 **Open for Traffic**

34
Calendar
days

39
days

84
days



Bent Cap;
Abutment 3 Backfill; Abutment 1 forming
4/17/2012

Girder Placement

4/19/2012-4/28/2012



End Diaphragm & Shear Key Pour 5/ 2/2012



Bridge Opening Ceremony

5/18/2012

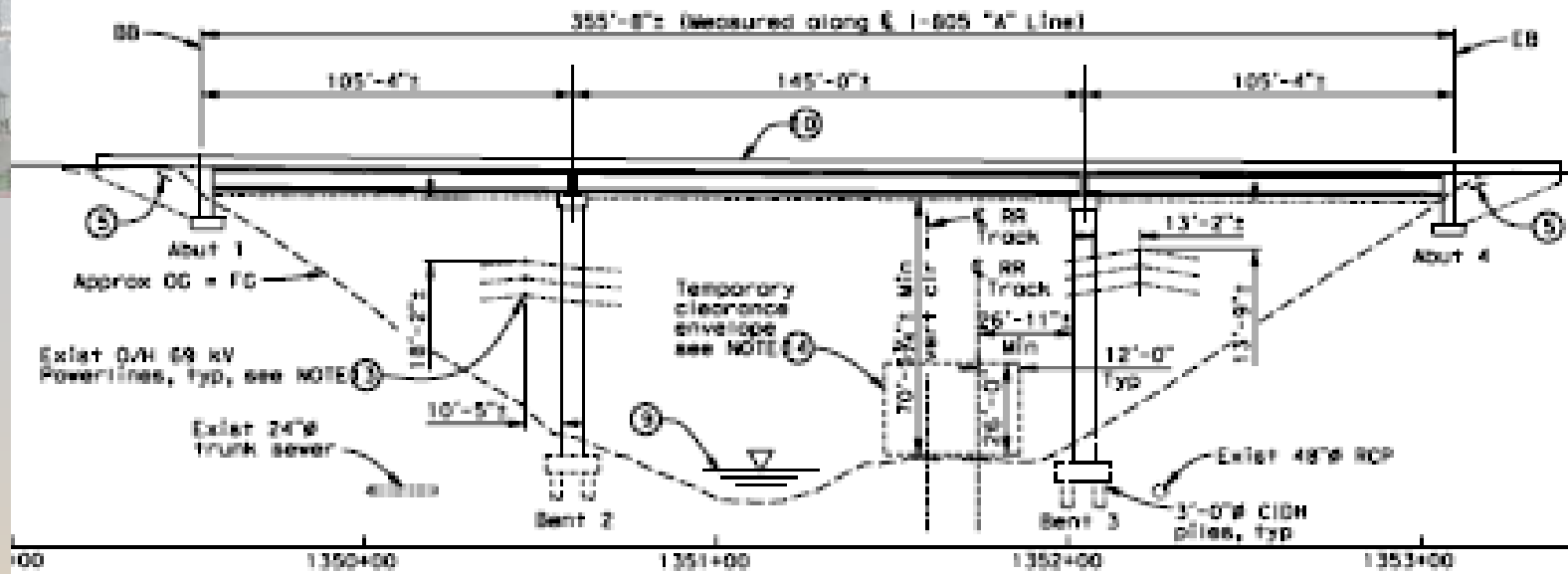


- Final Bid 4.77 Million + 500,000 incentive = 5.3 Million
- Actual Construction duration 82 Calendar Days

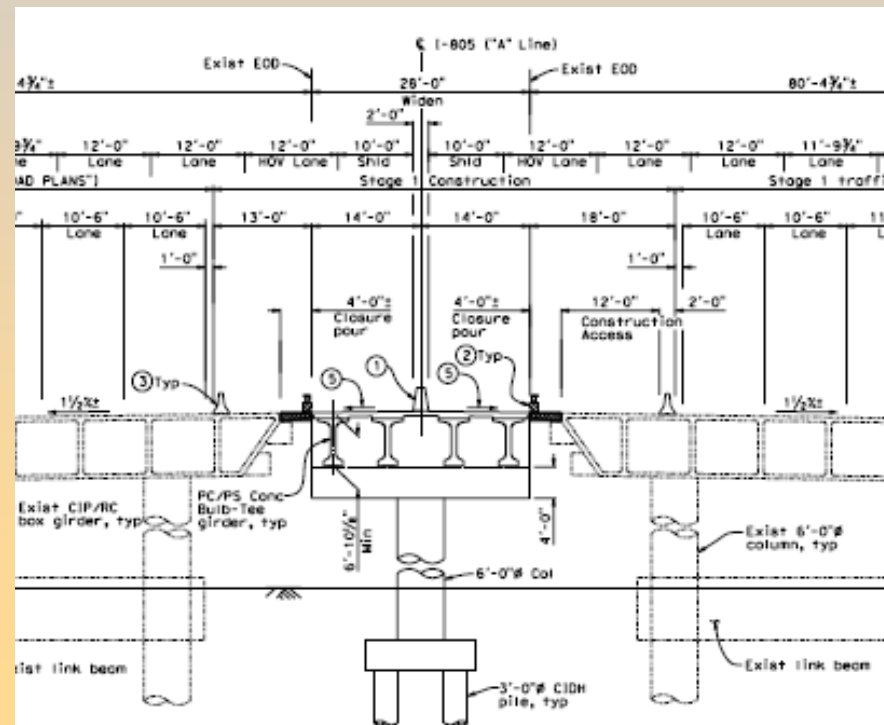
San Diego I-805N HOV/BRT Rose Canyon Bridge Overhead (Widen)

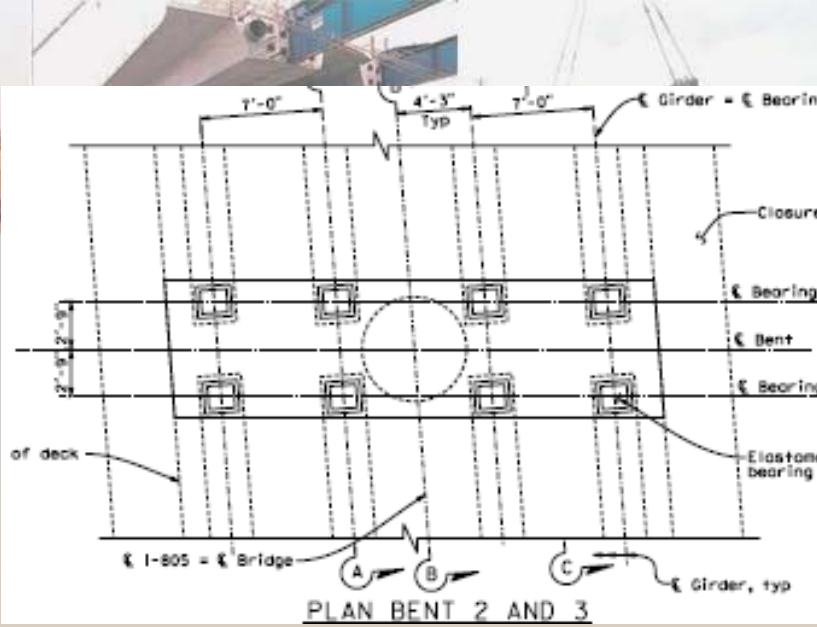
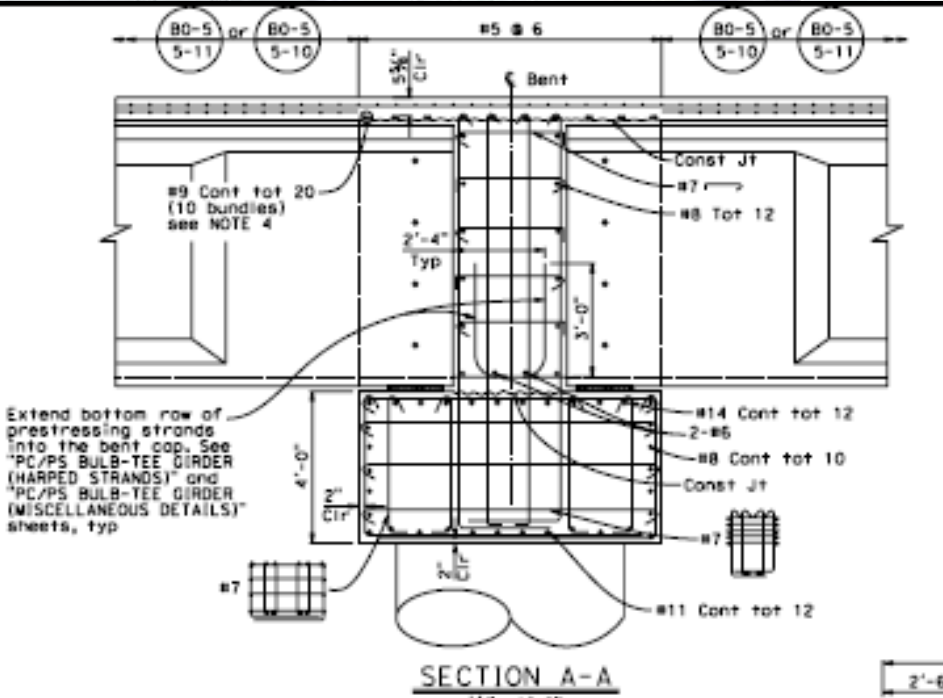


General Contractor: Skanska
Designer: AECOM

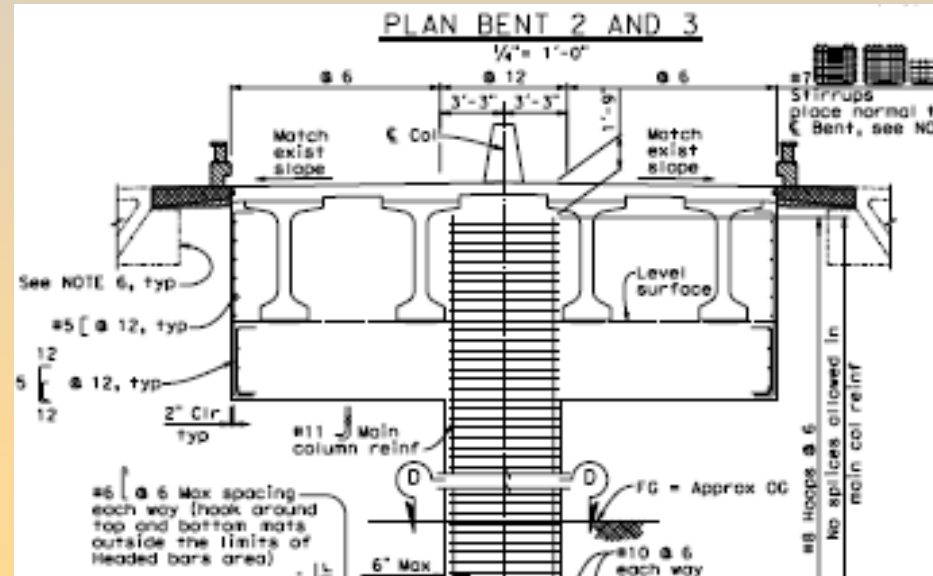


- Precast Girders
- CIP Inverted-T Bent
- Cap- partial drop
- Integral connection





- Improved girder/cap connections
- Integral connections

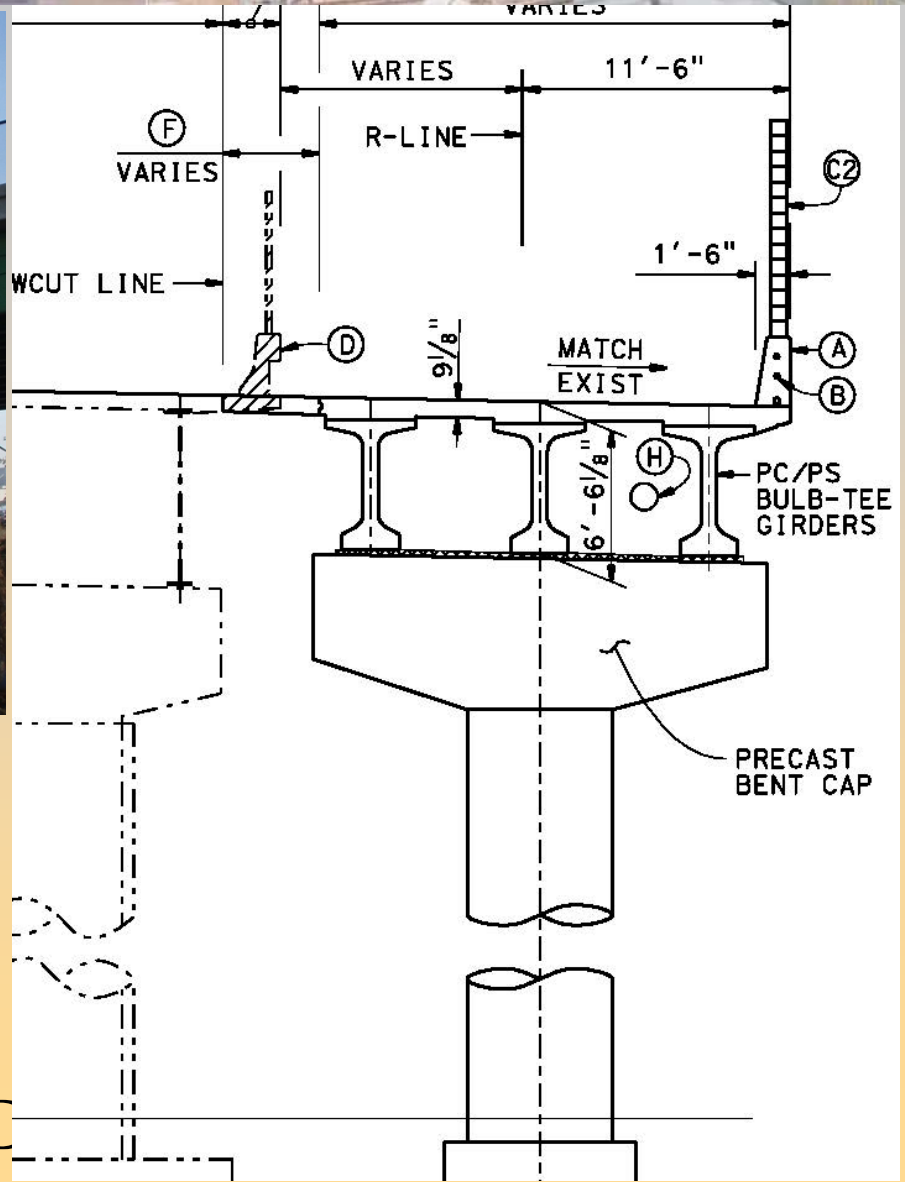


I-710 (Los Angeles) Long Life Pavement: East Yard OH (Widen)

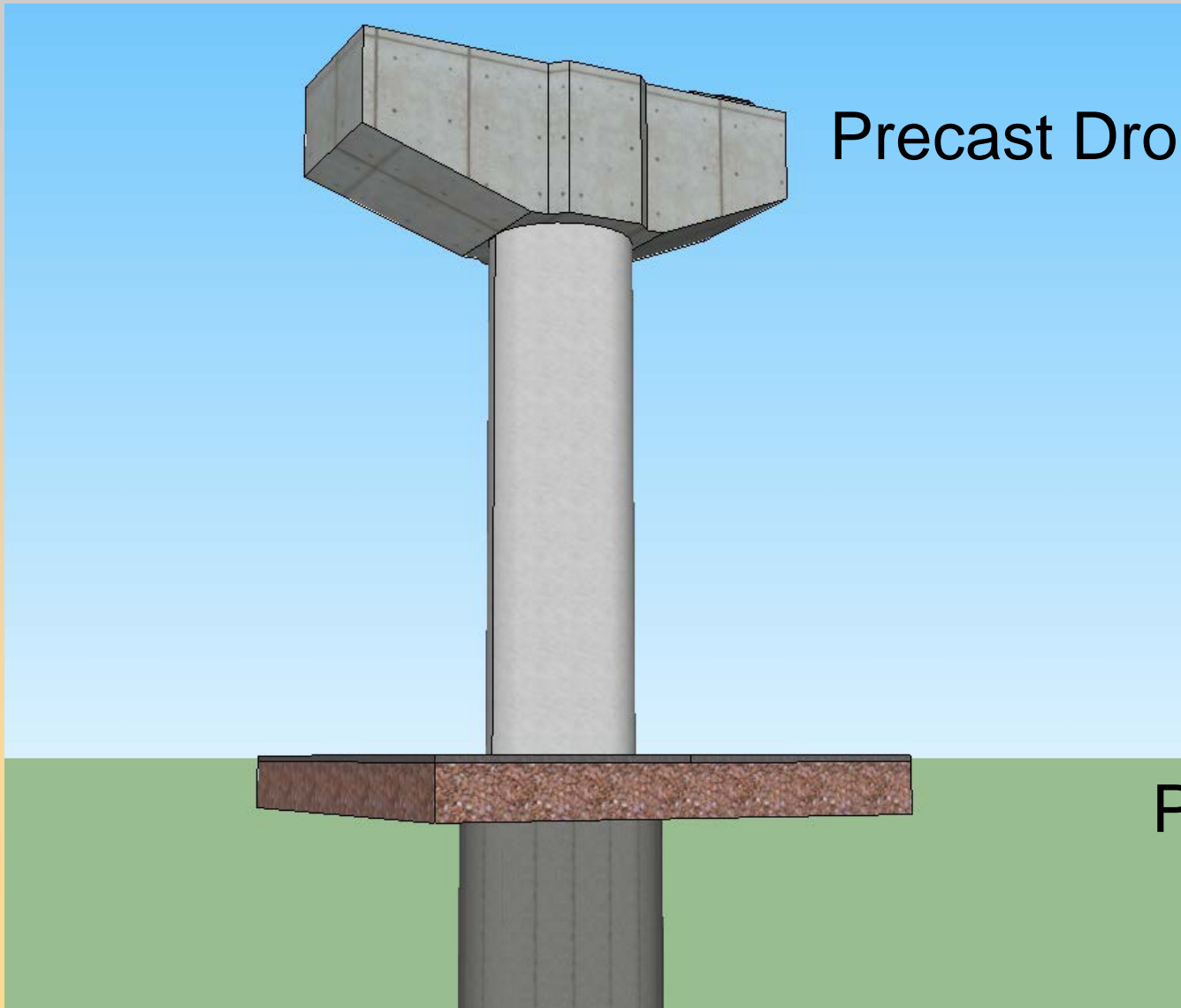


- Bridge over UPRR Yard, City of Commerce
- 1,395 ft long and 120 ft wide
- Current- 5 lanes in each direction 11 ft wide w/ no shoulders

East Yard OH (Widen)



PC/PS Bulb-Tee Girders
Precast Bent Cap
RR restrictions on FW & time
Total Deck Area= 72,328 ft²
Cost Estimate= \$21million USD



Precast Drop Bent Cap

Column

Pile Shaft

- **NCHRP 12-74: Precast Bent Cap connection tests**
- **UCSD/ Sac State**

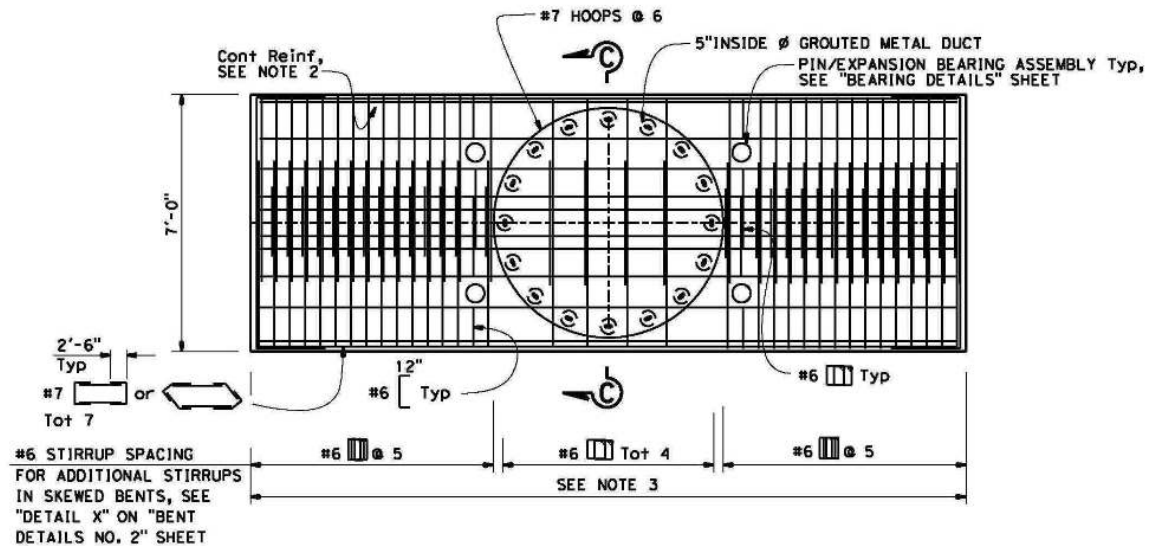


Photos by E. Matsumoto, Sac State U.

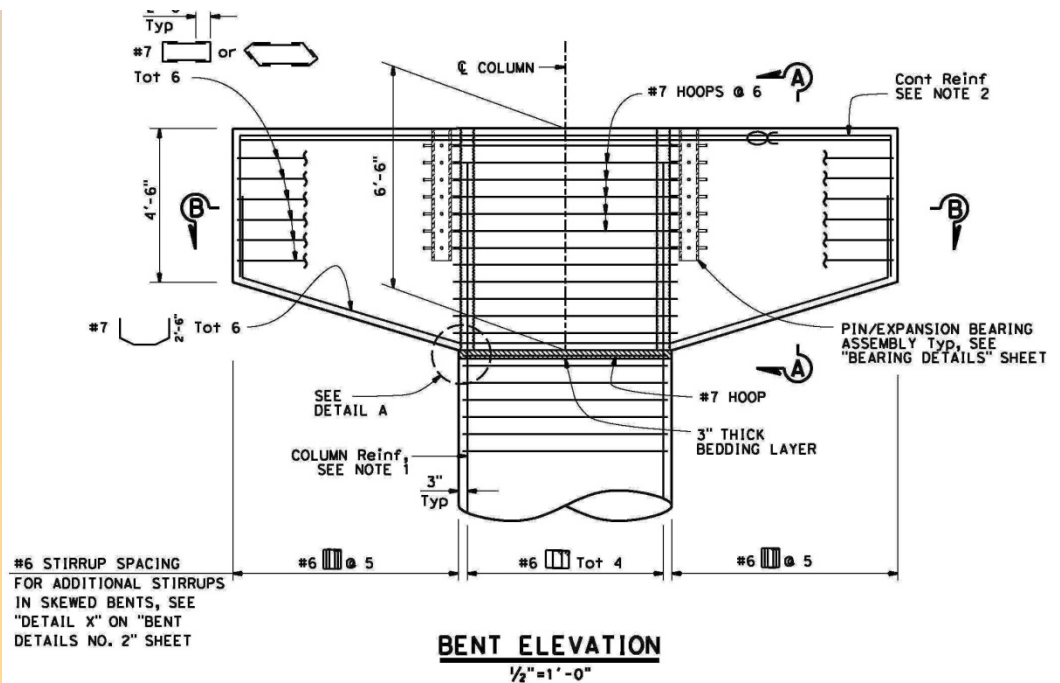
- NCHRP 12-74- Precast Bent Cap connection tests
- UCSD/ Sac State



Photos by E. Matsumoto, Sac State U.



- Final Plans 10/2013
- Construction targeted 2014

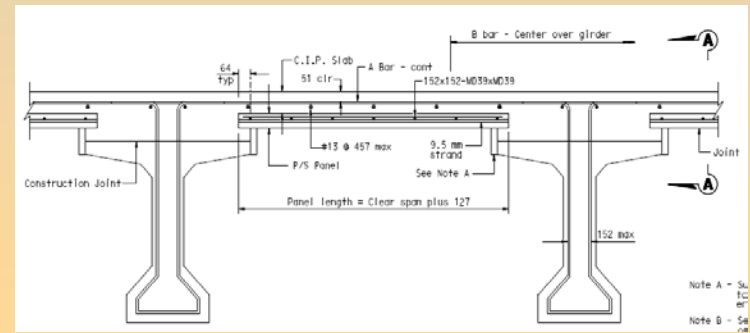
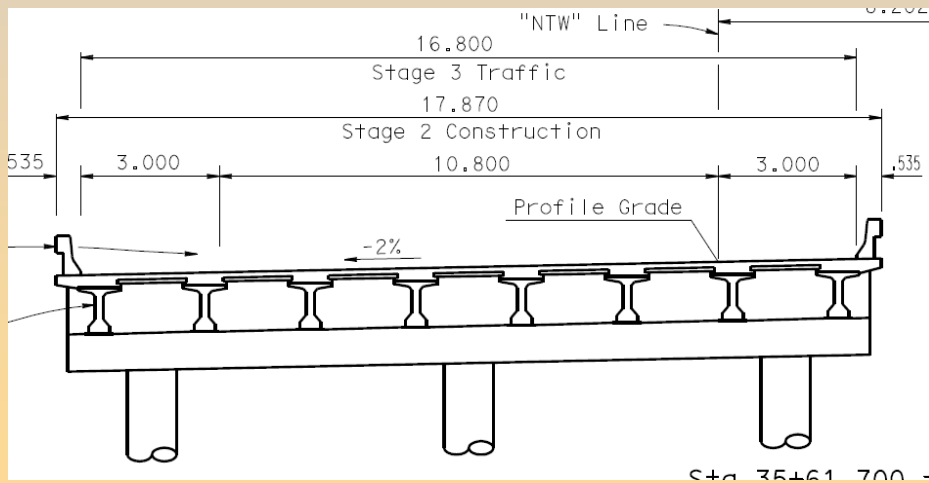
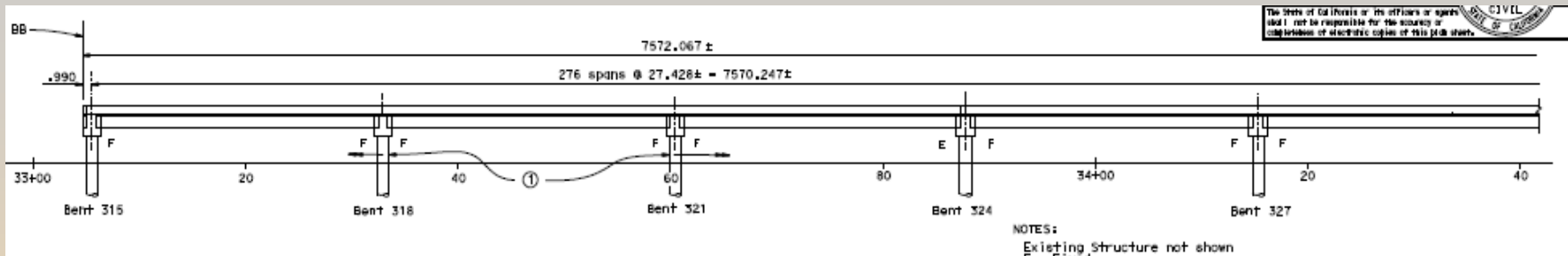


Thank you



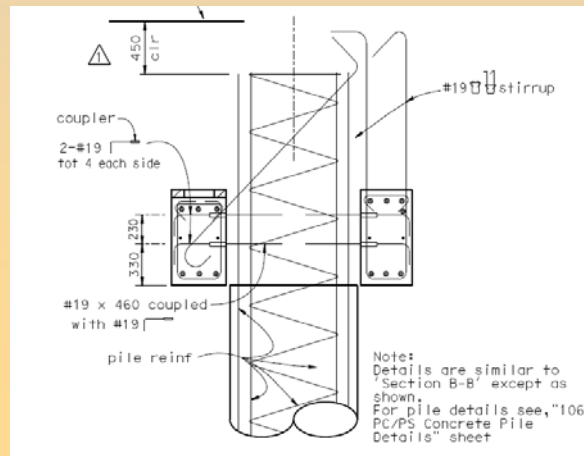
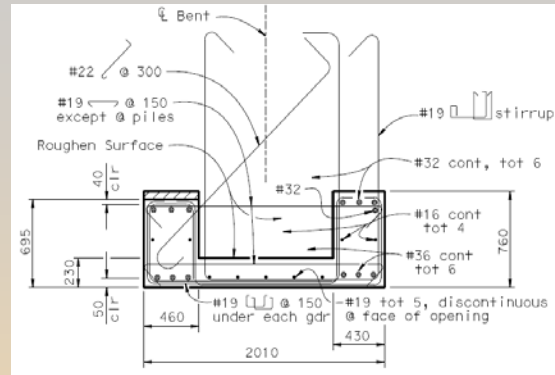
San Mateo Bridge, SF Bay Area

- Precast Girder
- Precast Bent Cap

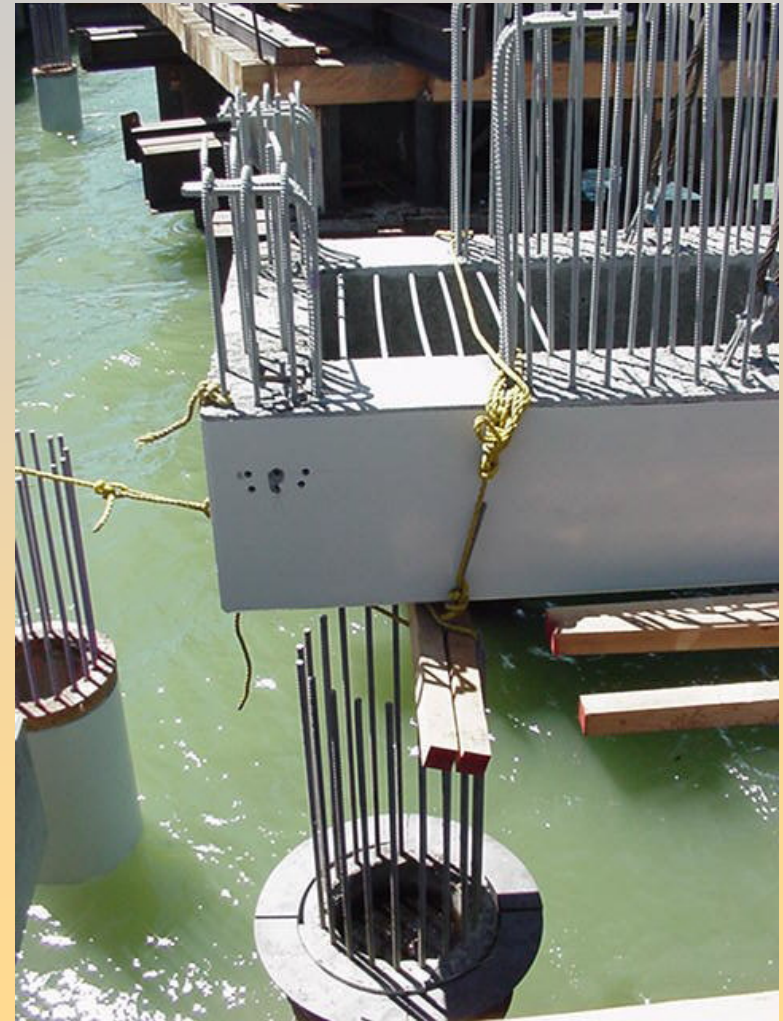




Caltrans- San Mateo Bridge



Caltrans- San Mateo Bridge Precast Bent Cap



Caltrans- San Mateo Bridge Precast Bent Cap-Column connections



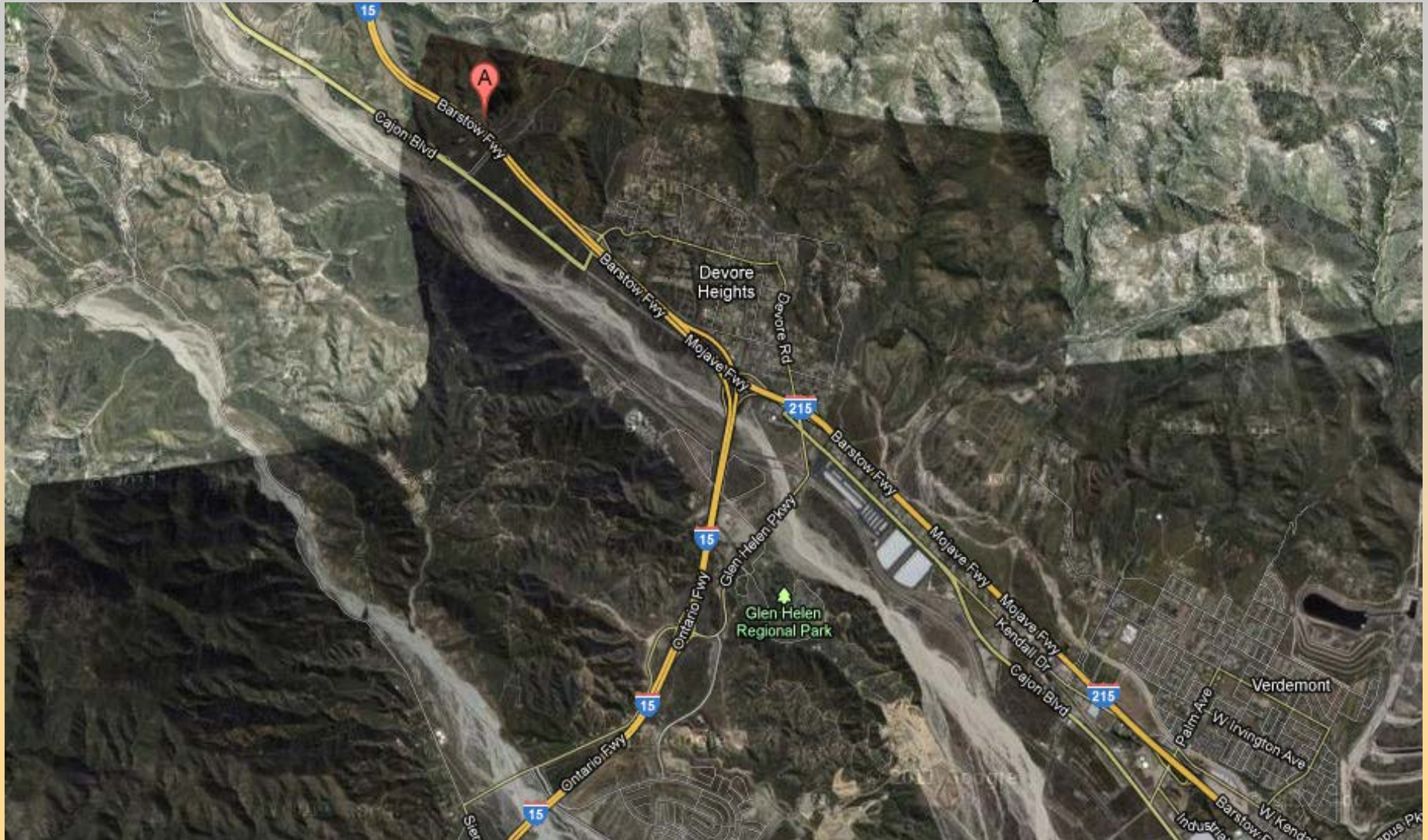
Caltrans- San Mateo Bridge Precast I-Girder placement



Caltrans- San Mateo Bridge



I-15/I-215 Devore Interchange- Layout San Bernardino County



Caltrans- San Mateo Bridge



I-15/I-215 Devore Interchange Design-Build Project



General Contractor: Atkinson Contractors
Primary Designer: URS



I-15/I-215 Devore interchange Structures- \$71 million USD

1. Kenwood Ave UC (left Widen)
2. Devore Rd (Replace)
3. West Connector (Widen)
4. 215/15 Separation (Widen)
5. W-S Connector
6. 215 Devore Rd Off-Ramp
7. SB 215 Connector
8. Kimbark Canyon Bridge (New)
9. SB 215 Over Kenwood (New)
10. NB15 Flyover (New)
11. NB 15 Truck Bypass (New)
12. Cajon Creek Br (widen) (LT/RT)
13. Glen Helen Rd (Widen)
14. Center Connector UC (widen)
15. Devore OH LT/RT (Widen)
16. Glen Helen Pkwy UC (LT/RT) widen
17. SB 15 Onramp connector (New)
18. Cajon Creek Bridge Ramp(widen)



Cajon Creek Br (widen) (LT/RT)

