TEX WASH RIGHT BRIDGE EMERGENCY REPLACEMENT

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INTRODUCTION

- I-10 Tex Wash Bridge emergency replacement project employing innovative ABC (Accelerated Bridge Construction) strategies to expedite the re-opening, in record time.
- Structure is a single-span adjacent precast box girder bridge with precast abutment and wingwall elements
- Fully precast bridge components eliminated any falsework and shortened the construction time
- If necessary, the special designed abutments can serve as a pier to accommodate the extra spans beyond both ends of the bridge without any major modification
- Caltrans, working with partners, reopen the bridge in 67 days from the day it collapsed.

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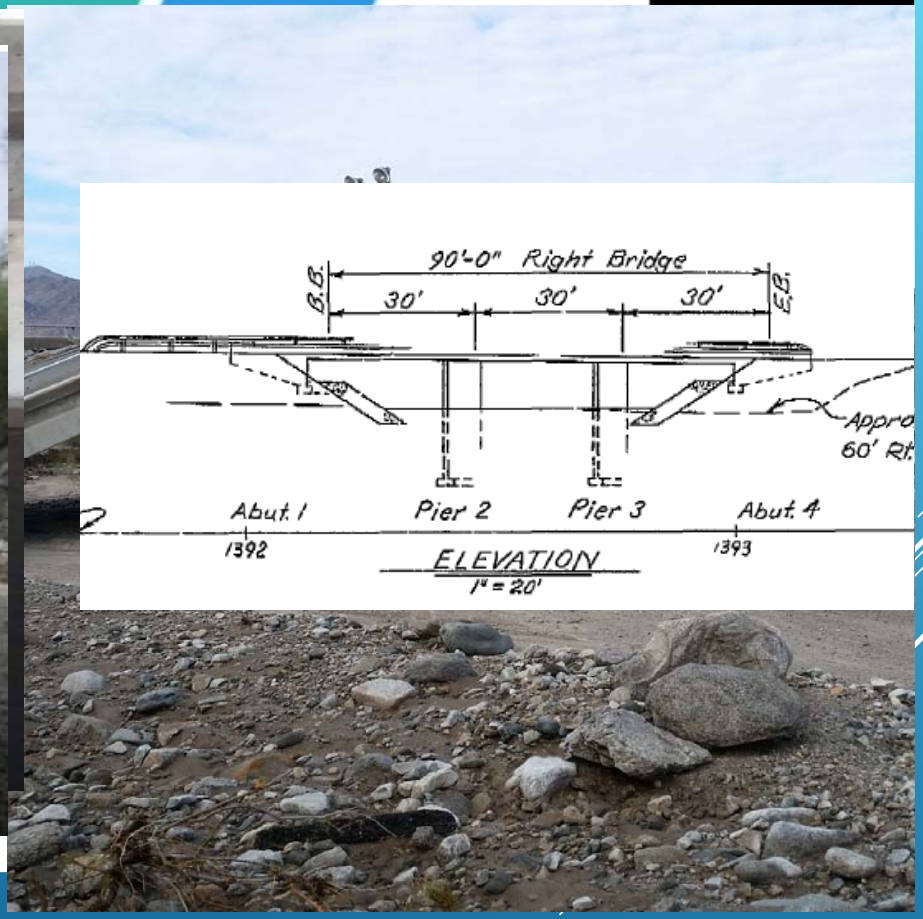
BACKGROUND


90'-0" Right Bridge
B.B.
E.B.
30'
30'
30'
Abut. 1
Pier 2
Pier 3
Abut. 4
1392
1393
ELEVATION
1" = 20'

EMERGENCY RESPONSE

- ABME performed investigation for both Tex Wash Right and Left Bridges on July 19, 2015, who found that:
  - The left bridge has significantly undermined at Abutment 1, but the structure was salvageable
  - The abutment 4 and span 3 of right bridge collapsed, restoration of the bridge function need significant efforts
- Both strategies, repair and replace, for restoring bridge functions of right and left bridges were investigated
- Decision was made: Repair left bridge and replace right bridge, of which the scope of work was included in the emergency project under the Director's Order

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BRIDGE DESIGN

- Design Requirements
  - Re-open Tex Wash Right in an expeditious manner
  - No collapse allowed for new structure in a similar event
  - New structure can be easily extended from both ends without any major modification required
- Accelerated Bridge Construction (ABC) Approach

BRIDGE DESIGN(CON'T)

- ABC Considerations
  - Use "ABC Design Impact Questionnaire". Total Score=136
  - Single span structure is selected to reduce foundation construction time

ABC DESIGN IMPACT QUESTIONNAIRE

ACCELERATED BRIDGE CONSTRUCTION

Project:	Tax Wask Right Bridge (Br.# 56-0882R)	(R) Relevance Range	(P) Priority Rating	(RxP) Score
Date:	7/27/2015			
Completed by:		0 = NA 1 (Low) to 5(Hi	1 = Low 2 = Med 3 = High	
Category	**Decision Making Question**			
Construction Time	Are there weather limitations for conventional construction?	0		
	Is there restricted construction time due to environmental schedules?	0		
	Is there restricted construction time due to economic impact?	5	3	15
	Has the District expressed the desire to complete the bridge construction in one season?	5	3	15
	Is the bridge construction on a critical path of the total project?	5	3	15
Environmenta	Does ABC mitigate a critical environmental impact or sensitive environmental issue?	0		
User Costs and Delays	Does the bridge carry or is it over a route with high ADT and/or ADTT?	3	3	9
	Would ABC significantly improve the traffic control/maintenance plan?	3	3	9
	Are only short term closures allowable?	5	3	15
	Will conventional bridge construction cause a significant delay/detour time?	5	5	25
	Will bridge construction have an adverse impact on the local economy?	0		
Site Conditions	Are there existing railroads that impact the construction window or construction activities?	0		
	Are there existing utilities that impact the construction window or construction activities?	0		
	Does the site create problems for conventional construction methods?	0		
	Is the bridge over a waterway?	0		
Risk Managemer	Does ABC improve worker safety?	4	3	12
	Does ABC improve traveler safety?	3	2	6
	Does ABC allow management of a particular risk? If yes, identify risk here:	0		
Other	Will repetition of elements allow for economy of scale?	5	3	15
		ABC Rating		136

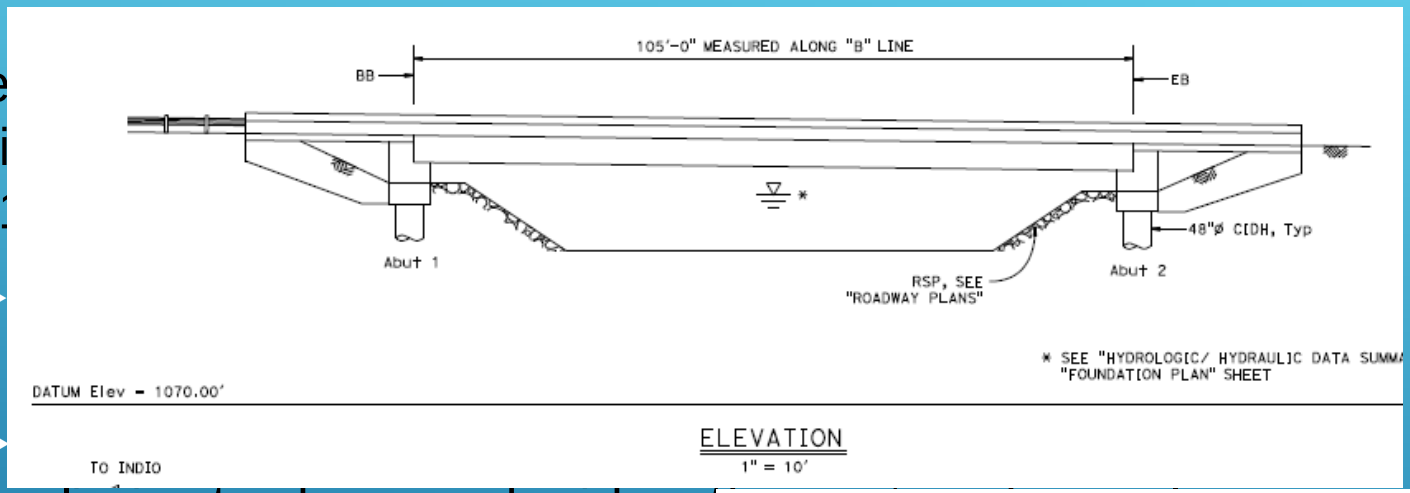
form updated 7/13/15

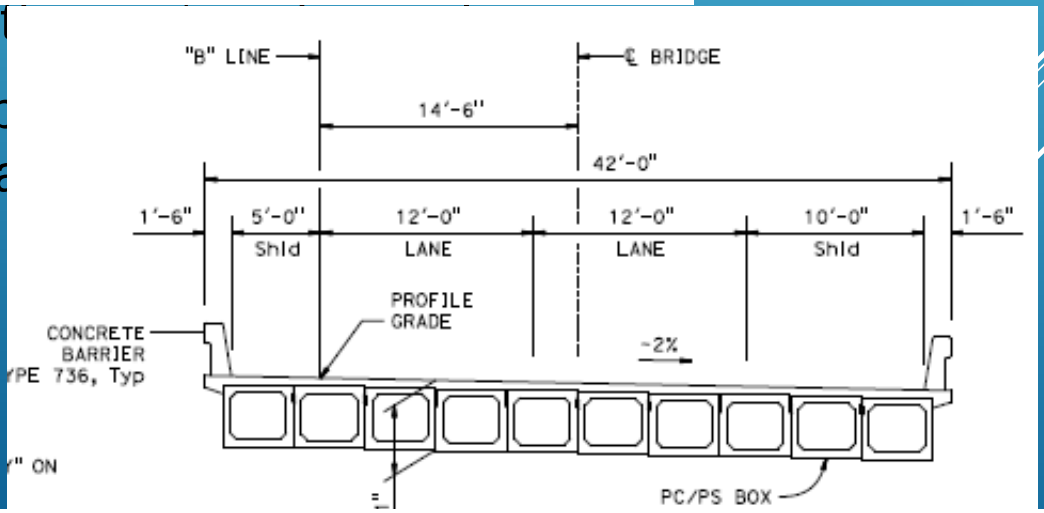
BRIDGE DESIGN(CON'T)

- Hydraulic Consideration
  - Office of Structure Hydraulic and Hydrology indicated the scour depth=13 feet, corresponding to elevation 1081.0 feet
  - For the portion of the pile above the elevation 1081.0, the bearing capacity is ignored in order to meet the requirement "No collapse allowed for new structure in a similar event"

DESIGN DETAILS

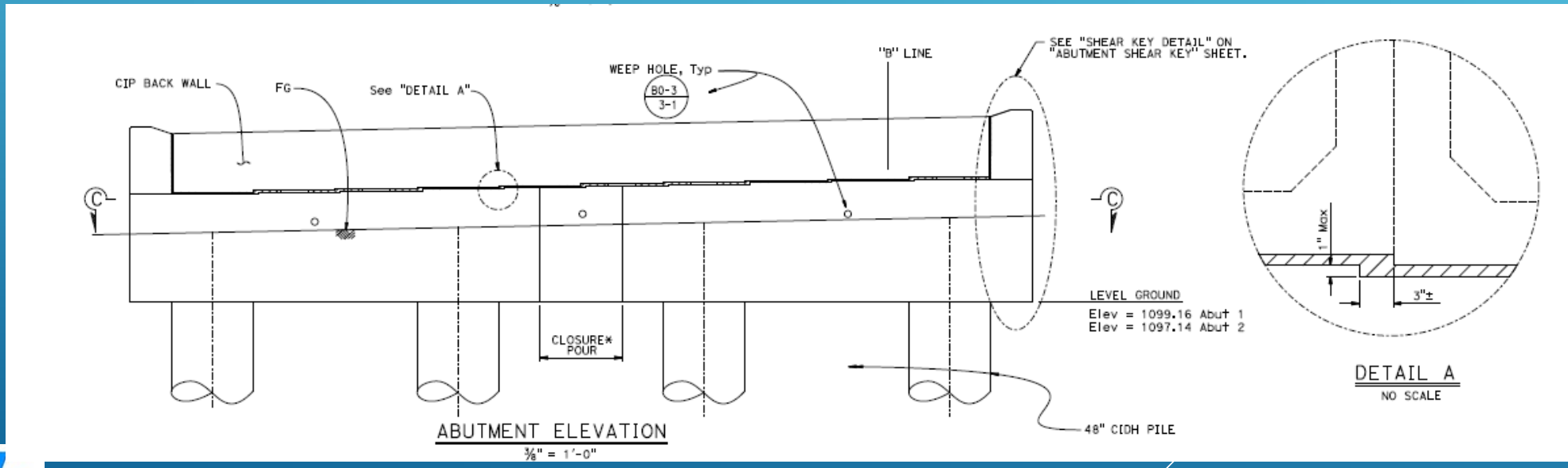
- Pe
  bri
  a 1
  -
  - eliminate skew and widen f
  - Precast major bridge comp
    wing walls, and girders, to a
    and control quality





DESIGN DETAILS

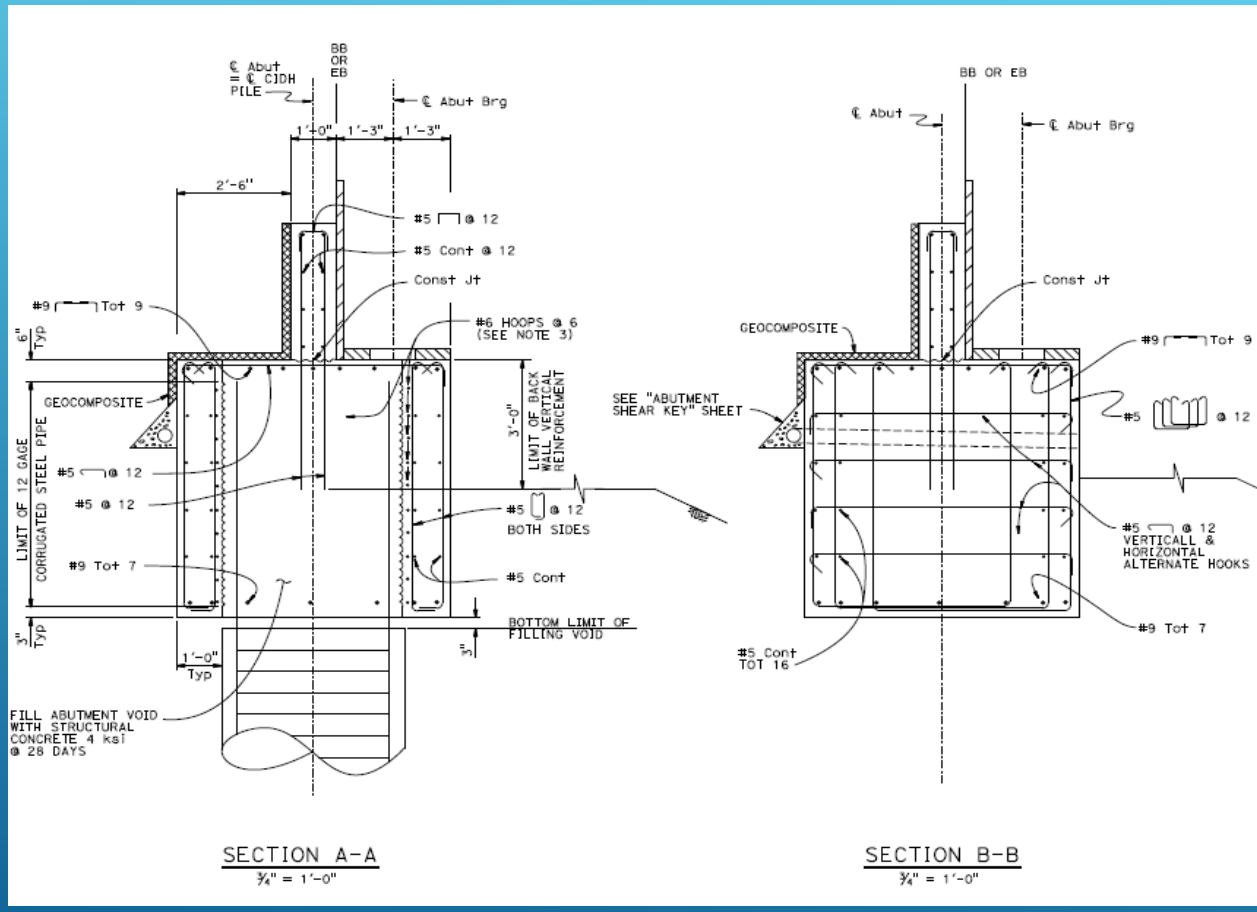
- Precast Abutment
  1. Match 2% transverse deck slope



DESIGN DETAILS

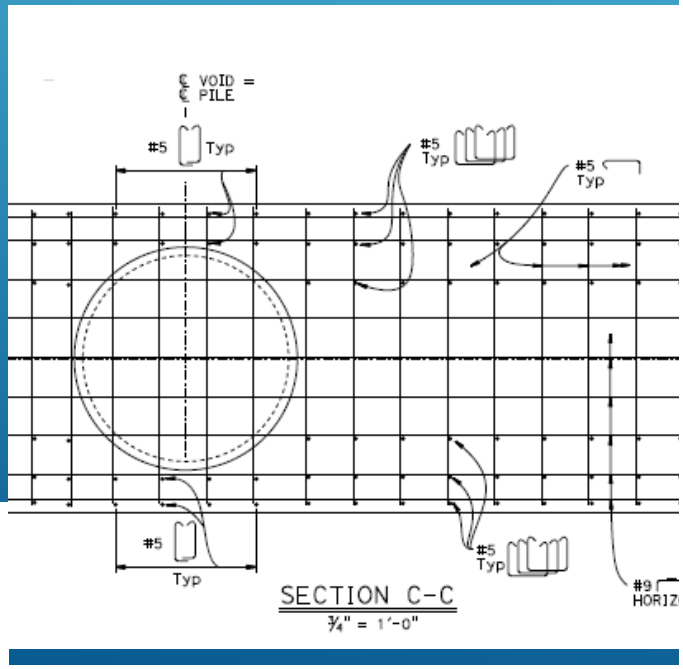
- Precast Abutment (Con't)

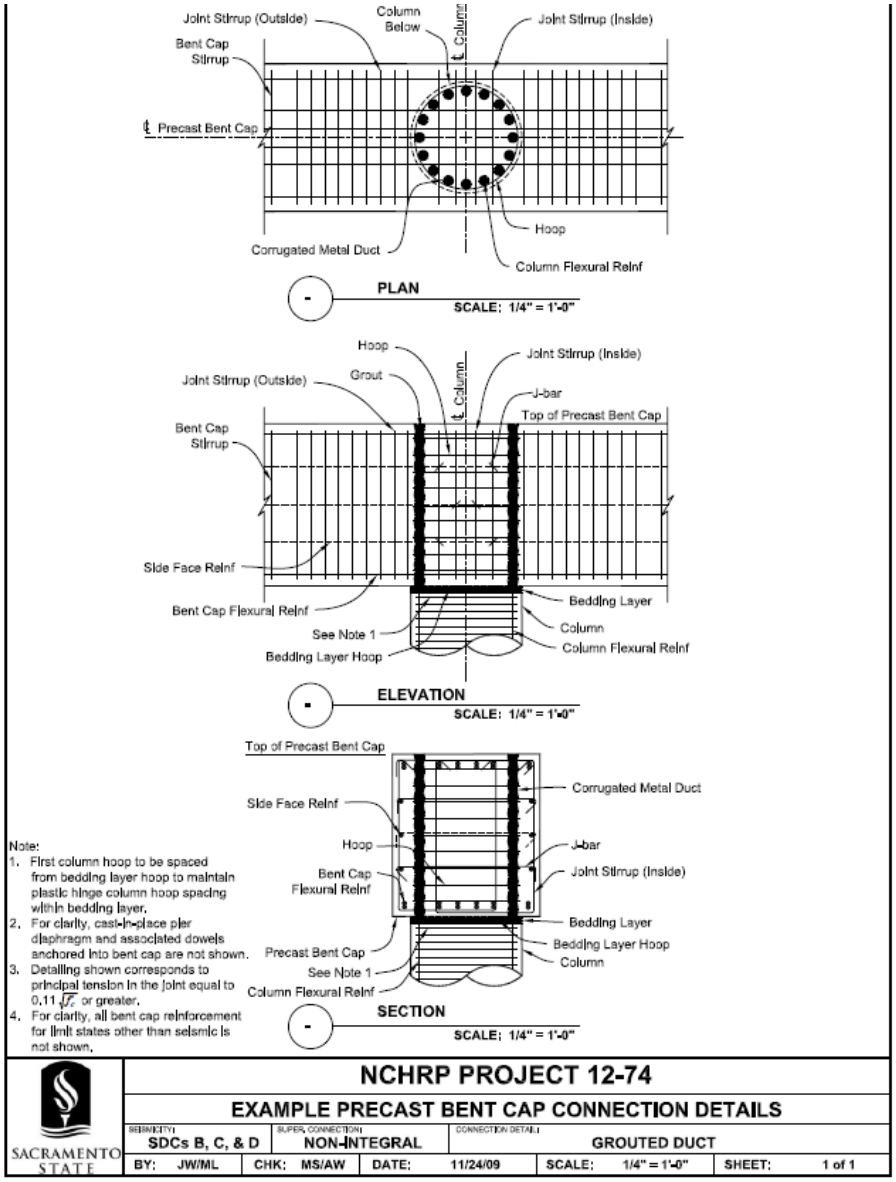
2. Can be easily converted to Bent Cap without any major modification

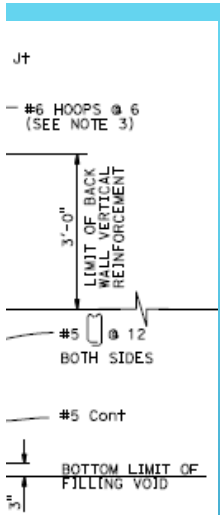


DESIGN DETAILS

- Precast Abutment (Con't)
  3. Joint shear consideration







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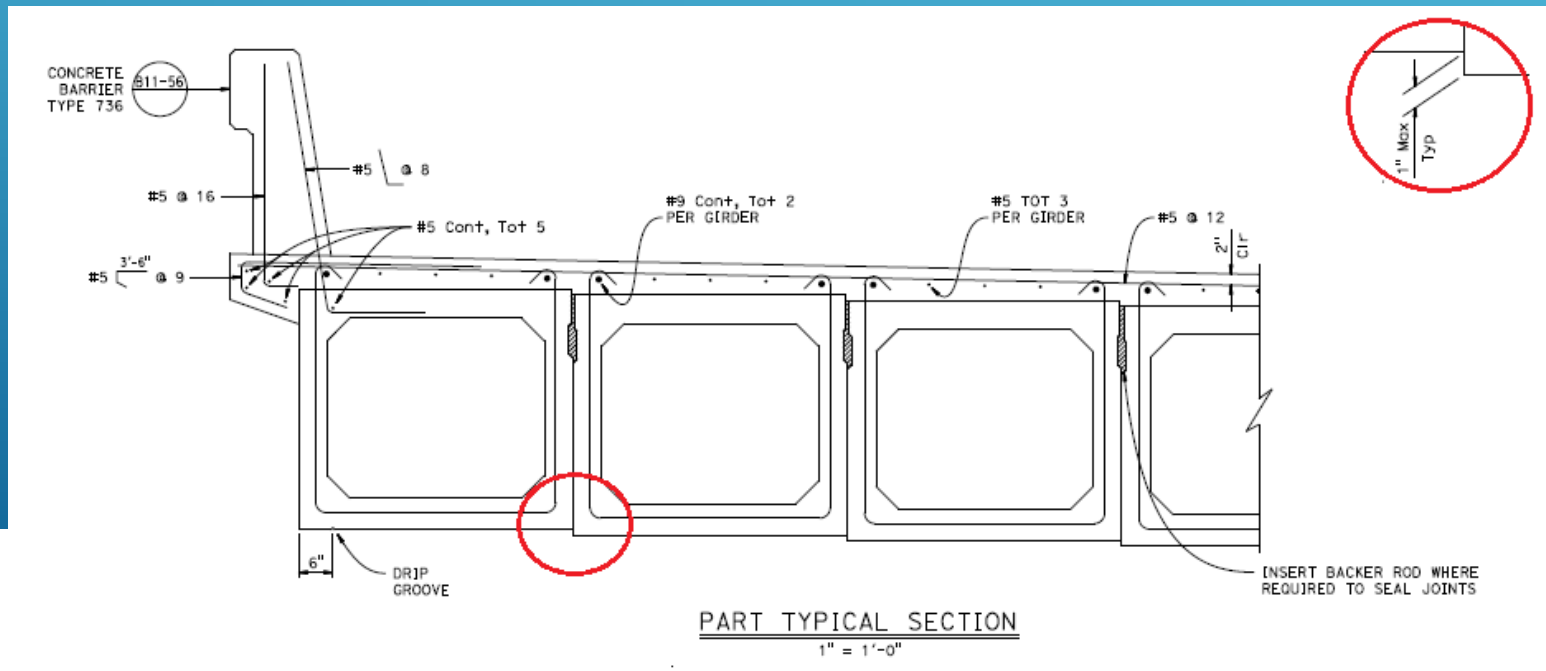
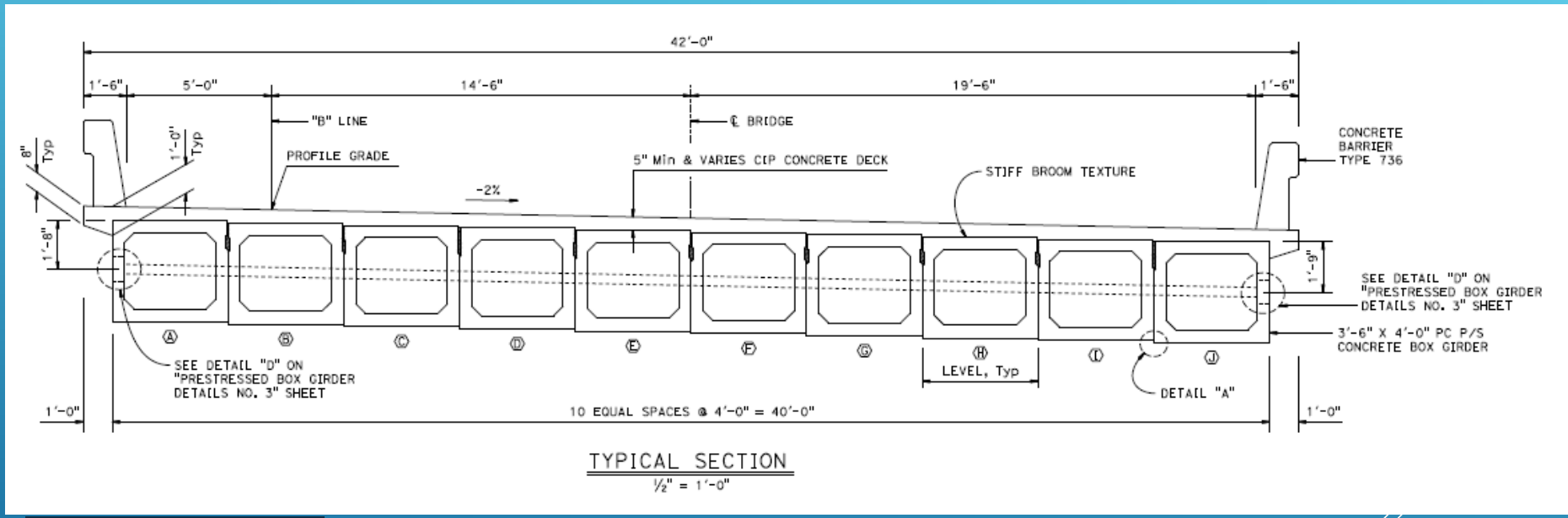
DESIGN DETAILS

- Precast Box Girders
  1. Ten rectangular box girders with 4 ft wide were placed side by side with one inch step to match 2% transverse slope



DESIGN DETAILS

- Precast Box Girders



TYPICAL SECTION
½" = 1'-0"

DESIGN DETAILS

- The full replacement decision was made on July 24, 2015
- Bridge width was revised and finalized on July 28, 2015
- The design was completed and stamped plans and spec delivered on 08/11/15

Total Design Duration: Two Weeks

STRUCTURE CONSTRUCTION

Record of Construction Progress			
	Item	Starting date	Completed date
1	Remove damaged bridge	7/29/2015	8/1/2015
2	Drill CIDH pile, place cages & pour concrete	8/19/2015	8/25/2015
3	Install PC Abutment	8/28/2015	8/29/2015
4	Install PC wingwalls	8/29/2015	8/29/2015
5	Place PC girders	9/4/2015	9/4/2015
6	Perform transverse post tensioning	9/5/2015	9/6/2015
7	Place deck rebars	9/8/2015	9/12/2015
8	Pour deck*	9/12/2015	9/13/2015
9	Build concrete barrier	9/14/2015	9/17/2015
10	Open to Public Traffic	9/24/2015	

*Deck pouring: 10:00PM, 9/22---4:00AM, 9/13

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STRUCTURE CONSTRUCTION

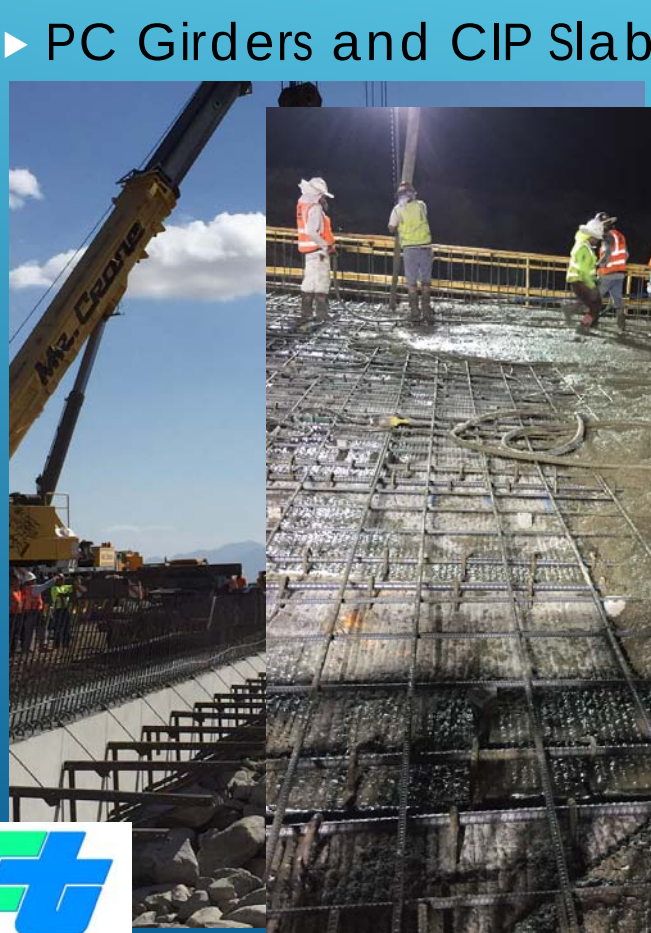
- Damaged bridge removal, site preparation, and piling

STRUCTURE CONSTRUCTION

- PC Abutments and Wingwalls

STRUCTURE CONSTRUCTION

- PC Girders and CIP Slab



04/28-09/17

BRIDGE OPENING & RIBBON CUTTING

- Open to Public Traffic (09/24/2015)

- Ribbon Cutting (09/30/2015)

Acknowledgement.

Thank You