Italian Bar Road Bridge Replacement

Presented by Mark Reno, PE - Quincy Engineering

QUINCY ENGINEERING

Today's Agenda

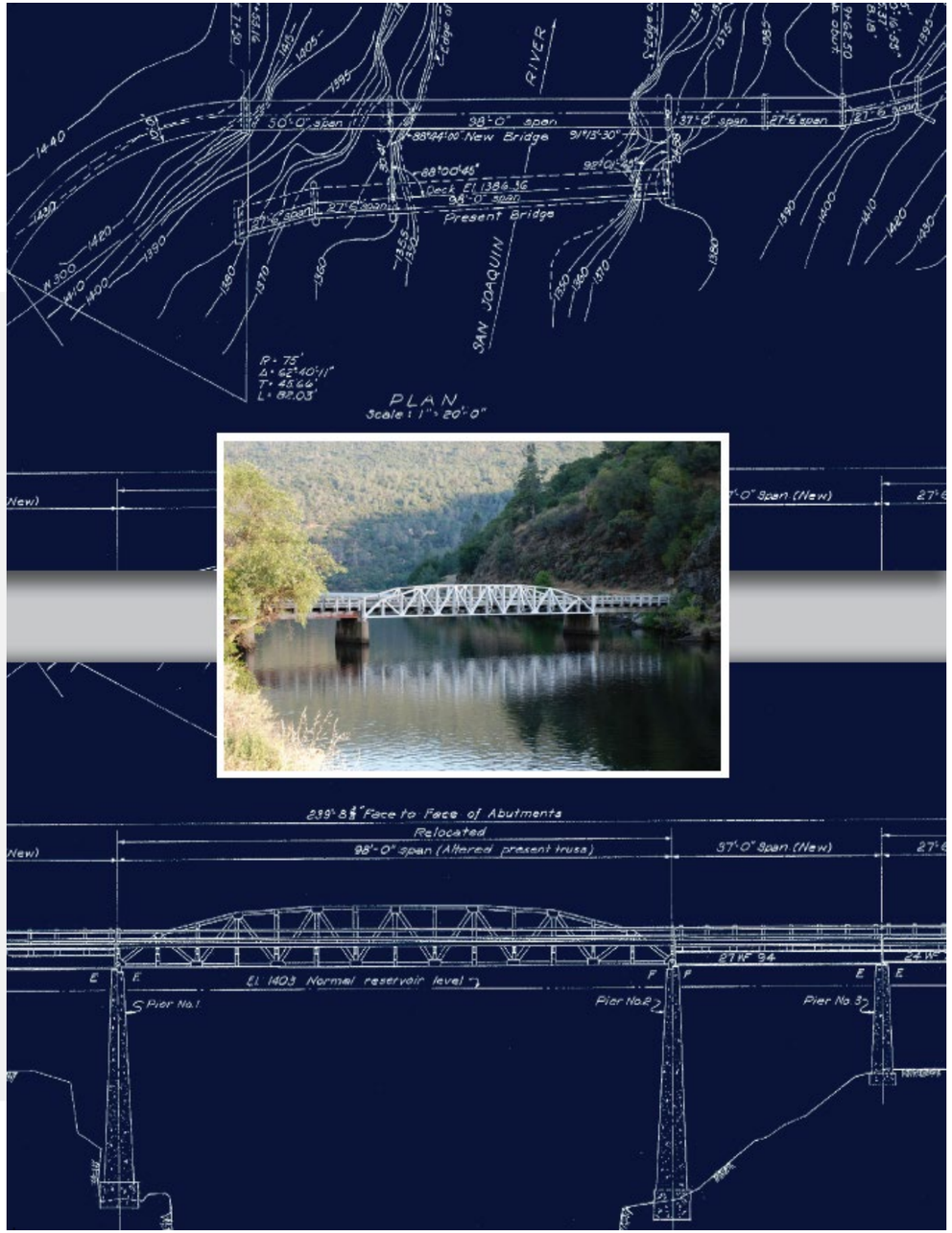
01 Existing Bridge

02 Project Initiation

03 Project Development

04 Key Challenges & Lessons Learned

05 Q & A



Existing Bridge

Project Location

- Crosses San Joaquin River
- Border of Madera-Fresno County
- Part of Big Creek Hydro-Electric Project

Existing Bridge

View of Existing Bridge

- *What are those concrete elements in front?*

Existing Bridge

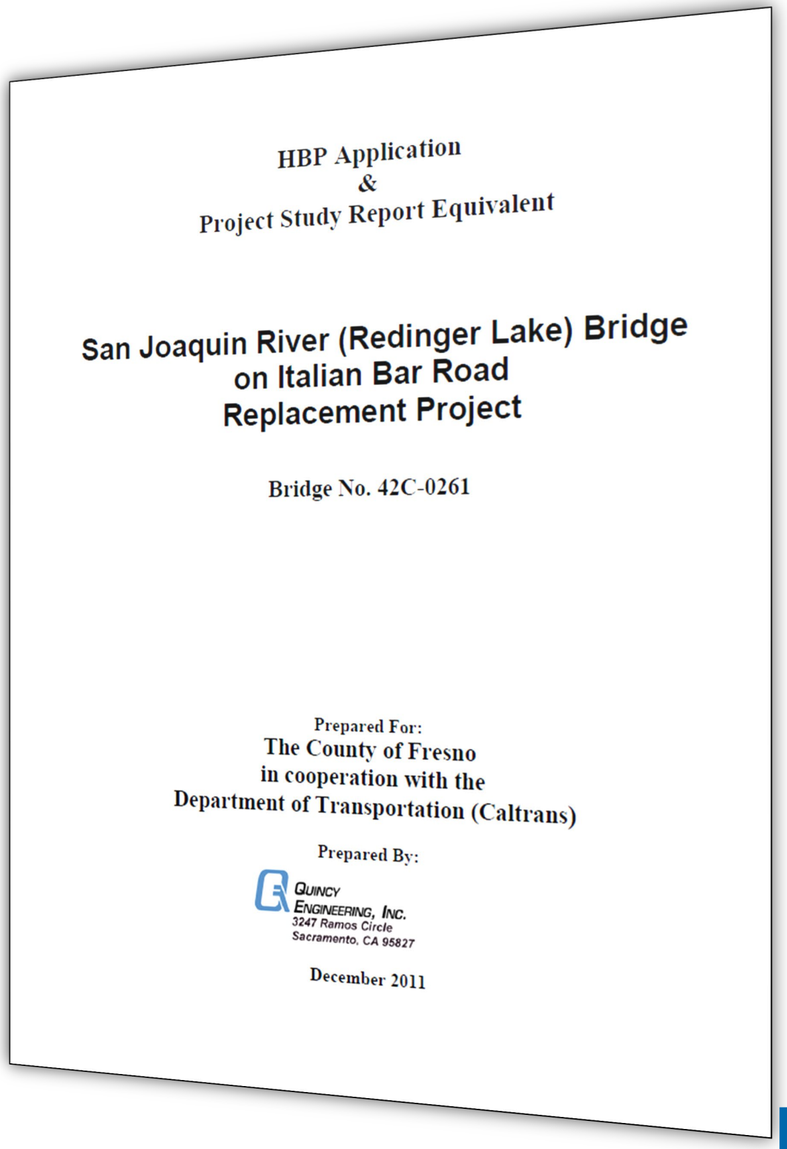
Start Back in the Beginning

- Original Built in 1927
  - 98 ft Bridge
- Rising Water Levels
- Relocated in 1950
  - 241 ft Bridge

Project Initiation

Meeting With Fresno County - *Who Wants a Free Bridge?*

- Explanation of HBP Toll Credit
- Offer to Complete Nomination
- Development of Report
- Acceptance by Caltrans



HBP Application
&
Project Study Report Equivalent

San Joaquin River (Redinger Lake) Bridge
on Italian Bar Road
Replacement Project

Bridge No. 42C-0261

Prepared For:
The County of Fresno
in cooperation with the
Department of Transportation (Caltrans)

Prepared By:

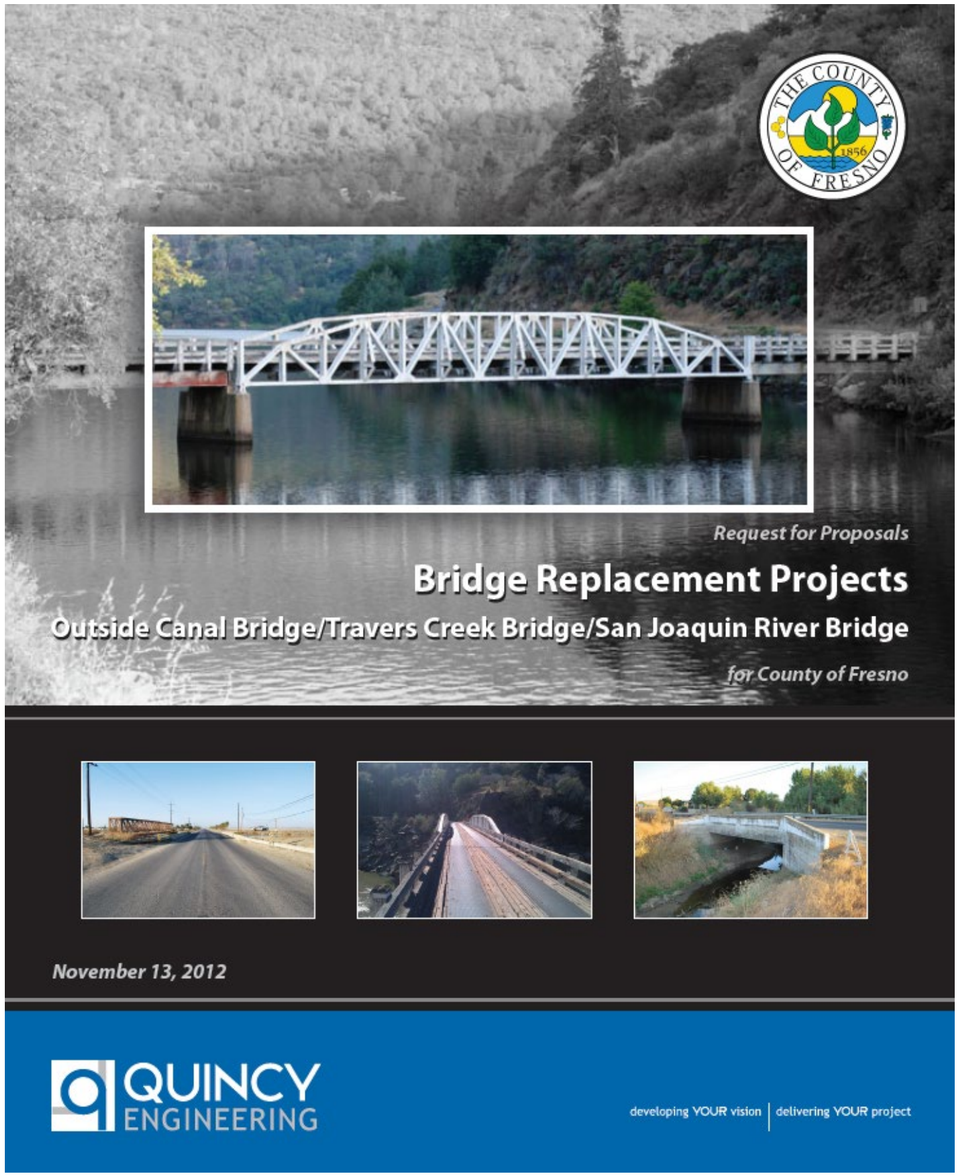
Quincy Engineering, Inc.
3247 Ramos Circle
Sacramento, CA 95827

December 2011

Project Initiation

Project Selection Process

- November 2012 RFP Submitted
- December 2012 Interviews
- July 2013 Caltrans Field Review
- Project Kickoff December 2013



Project Initiation

Project Team & Stakeholders

Consultant Team

QUINCY ENGINEERING

WRECO

AREA WEST ENVIRONMENTAL, INC.
EST 2000

KLEINFELDER
Bright People. Right Solutions.

ESP SURVEYING Inc.

Stakeholders

THE COUNTY OF FRESNO 1856

MADERA COUNTY

Caltrans

FOREST SERVICE US DEPARTMENT OF AGRICULTURE

SOUTHERN CALIFORNIA EDISON®
An EDISON INTERNATIONAL® Company

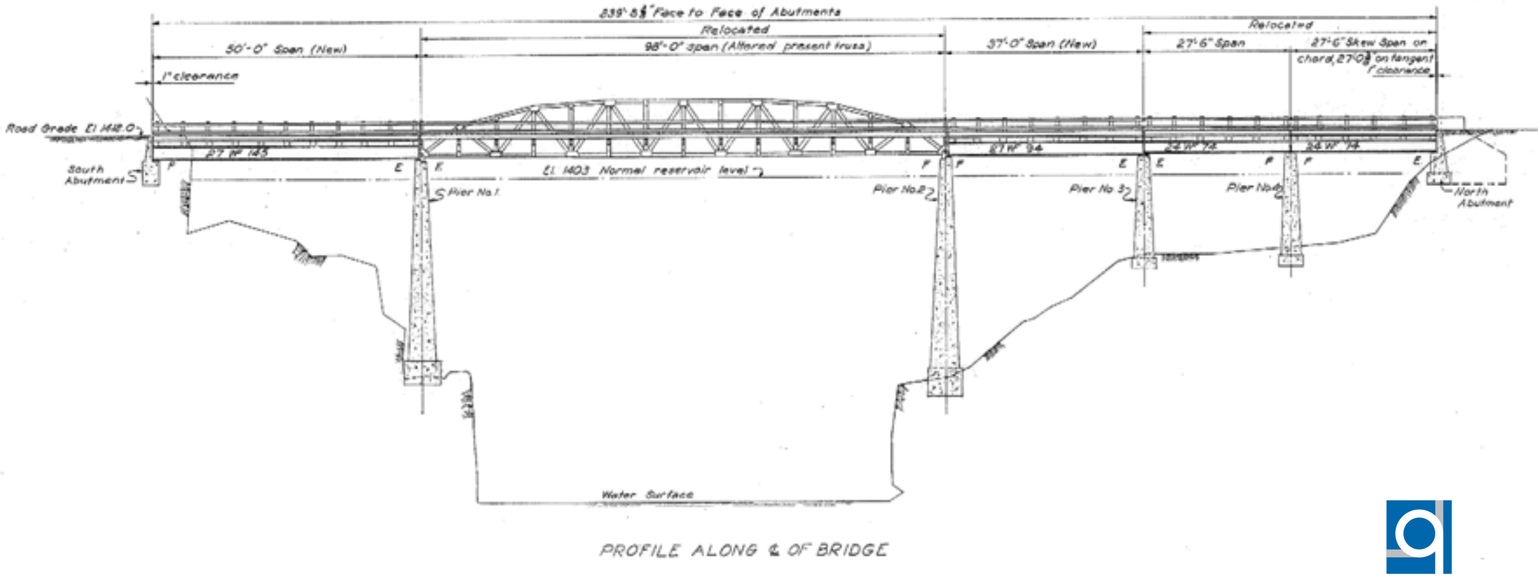
CALIFORNIA DEPARTMENT OF FISH & WILDLIFE

CALIFORNIA DEPARTMENT OF FORESTRY & FIRE PROTECTION
CAL FIRE
SINCE 1885

Project Development

Design Constraints

- Detour 35 Miles – ***Not Viable***
- Limited Planned Closures
- Built to Current Standards
- Profile Must Be Raised
- Low Maintenance Structure

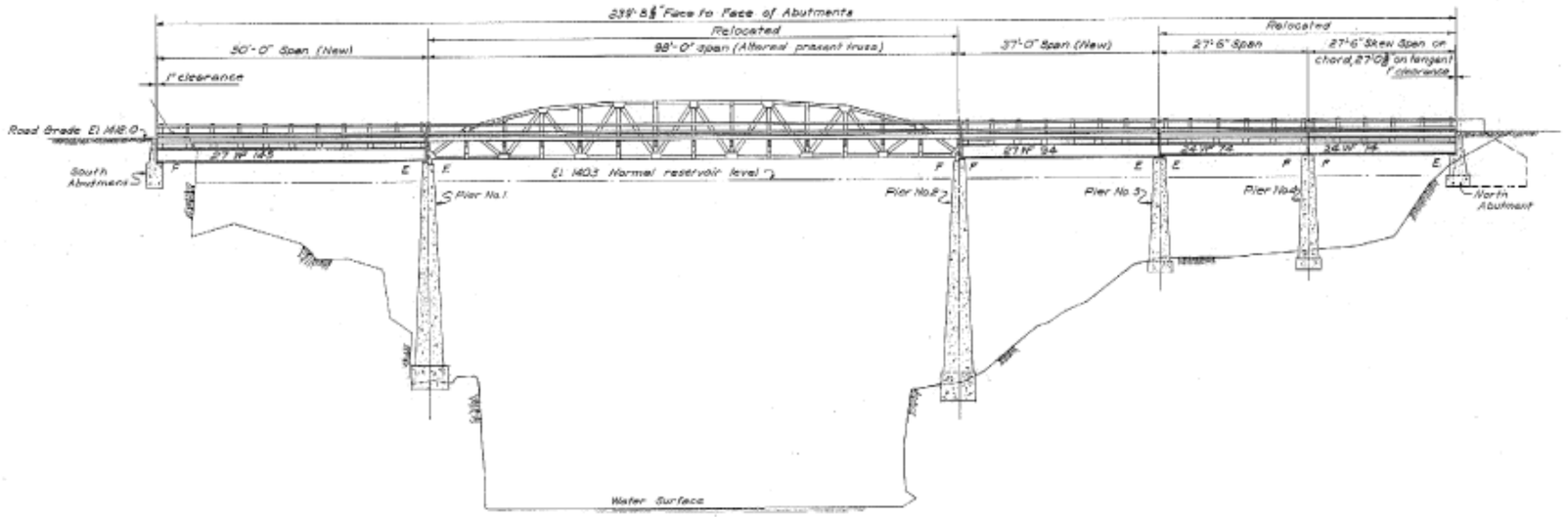


PROFILE ALONG ℄ OF BRIDGE

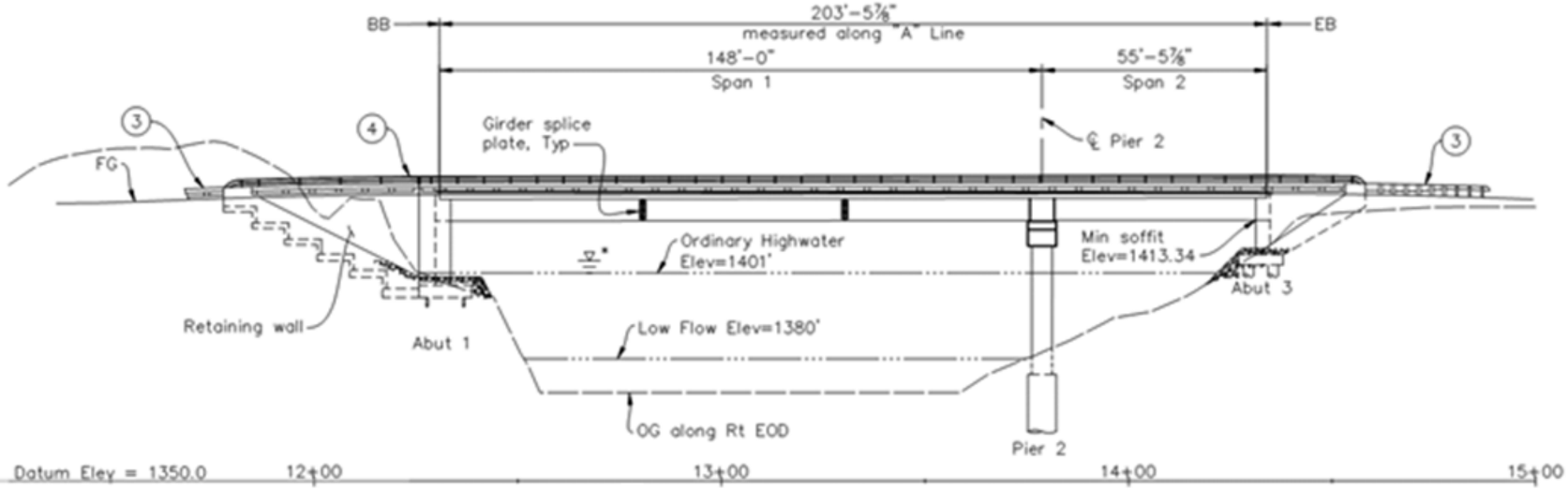
Project Development

Project Development

Why a Two Span Bridge? – Support Location Critical



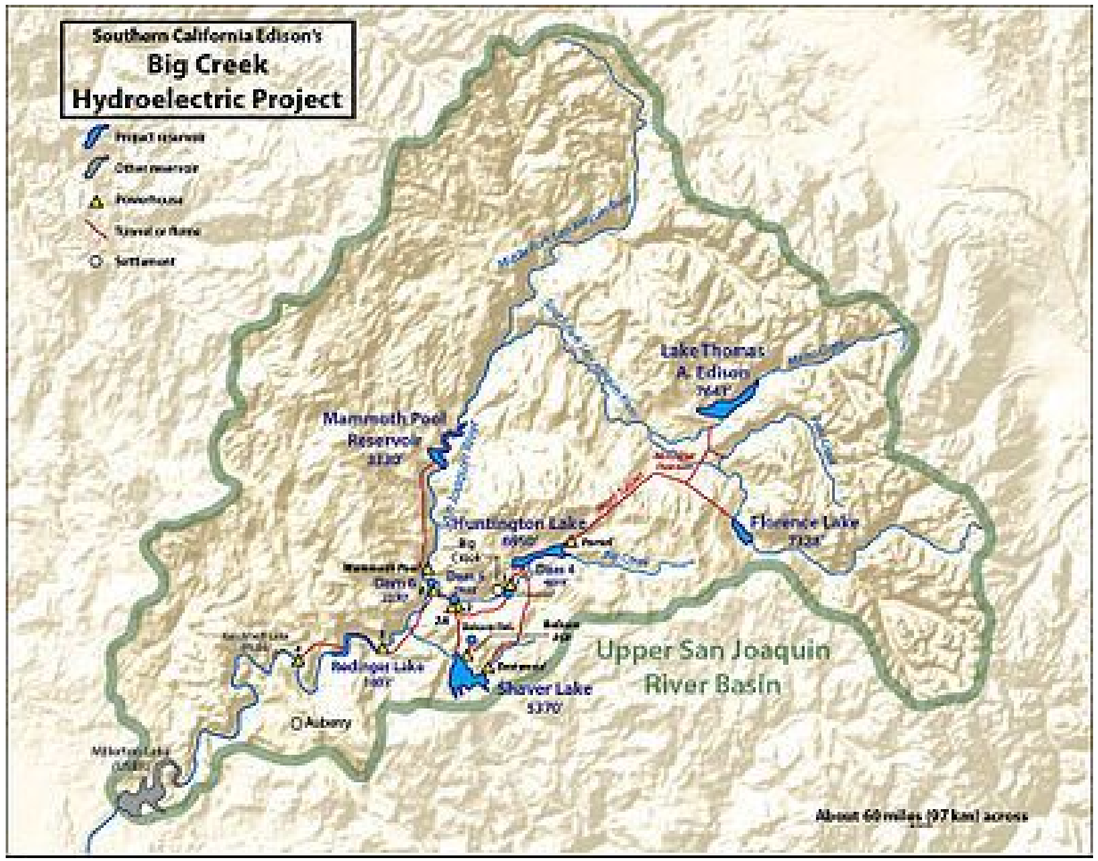
PROFILE ALONG ℄ OF BRIDGE
Scale: 1"=10'-0"



Project Development

Southern California Edison – Big Creek Hydro Electric Project

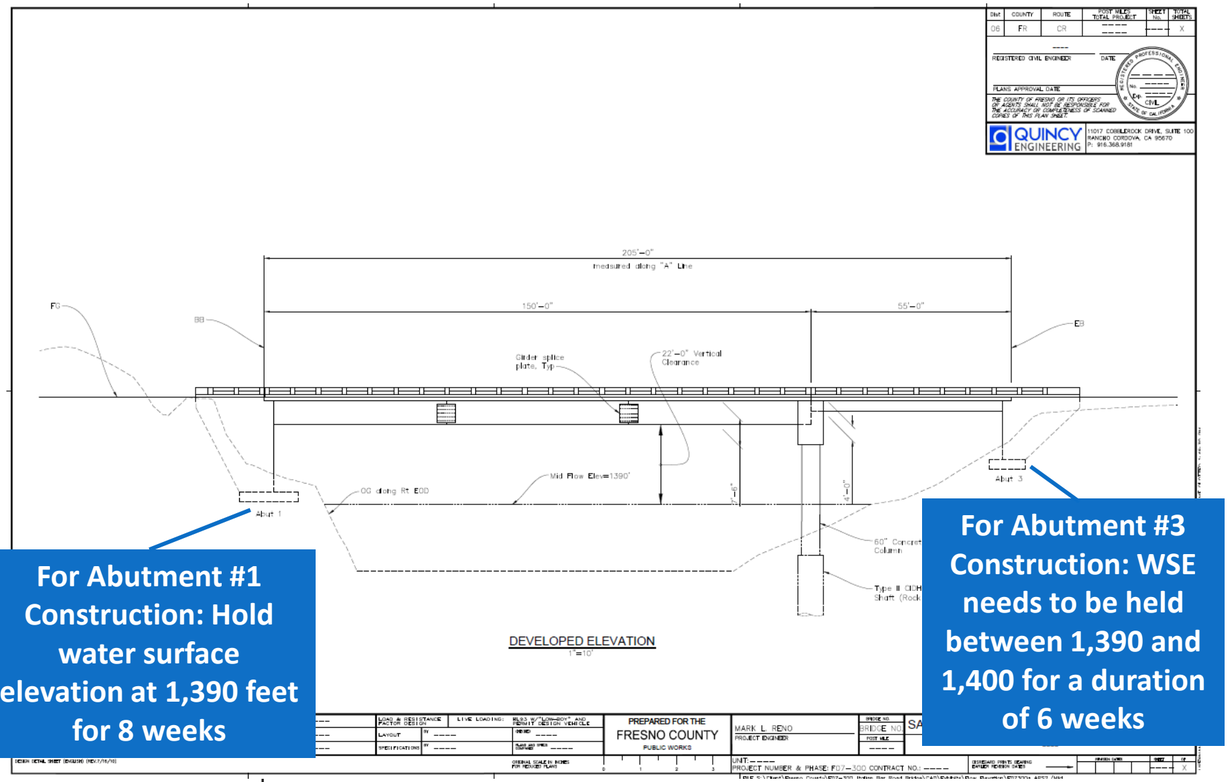
- ***Hardest Working Water in the World!***
- Coordination on Water Levels



Project Development

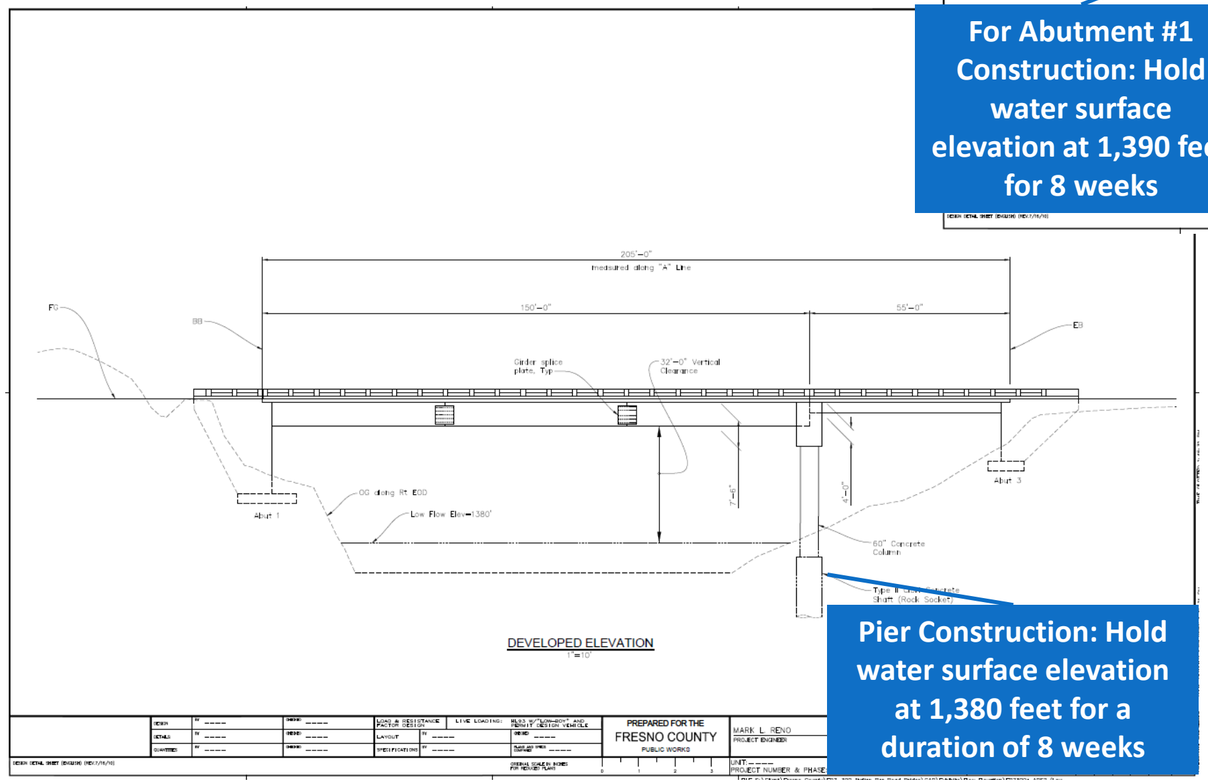
Meetings With SCE

- Watermaster
- Seasonal Forecasting
- Water Level Requirements



For Abutment #1 Construction: Hold water surface elevation at 1,390 feet for 8 weeks

For Abutment #3 Construction: WSE needs to be held between 1,390 and 1,400 for a duration of 6 weeks

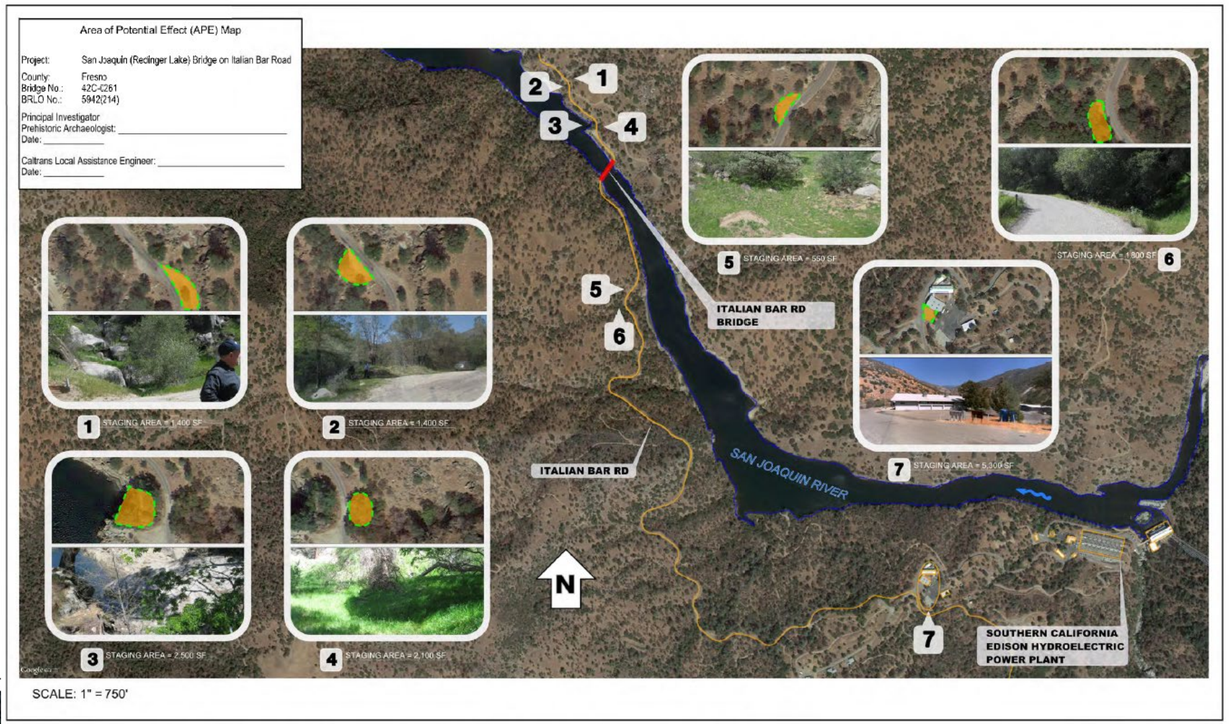


Pier Construction: Hold water surface elevation at 1,380 feet for a duration of 8 weeks

Project Development

Environmental Clearance

- APE Near Bridge
- Additional Staging Sites



APE MAP: SAN JOAQUIN (REDINGER LAKE) BRIDGE ON ITALIAN BAR ROAD
BRIDGE NUMBER: 42C-0261
SHEET 2 OF 2
QUINCY ENGINEERING

APE MAP: SAN JOAQUIN (REDINGER LAKE) BRIDGE ON ITALIAN BAR ROAD
BRIDGE NUMBER: 42C-0261
SHEET 1 OF 2
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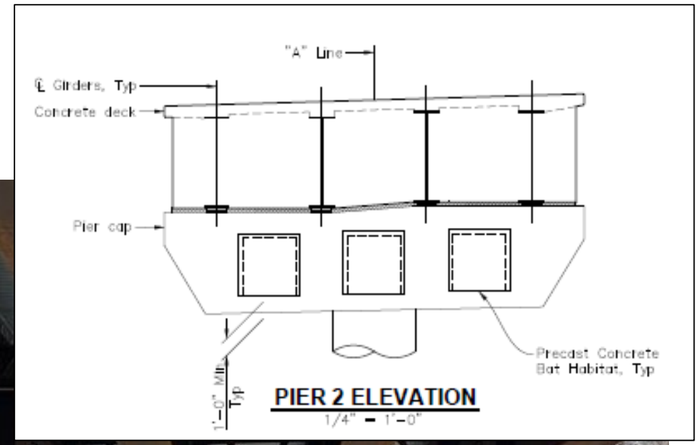
Project Development

Environmental Challenge – *Bats*

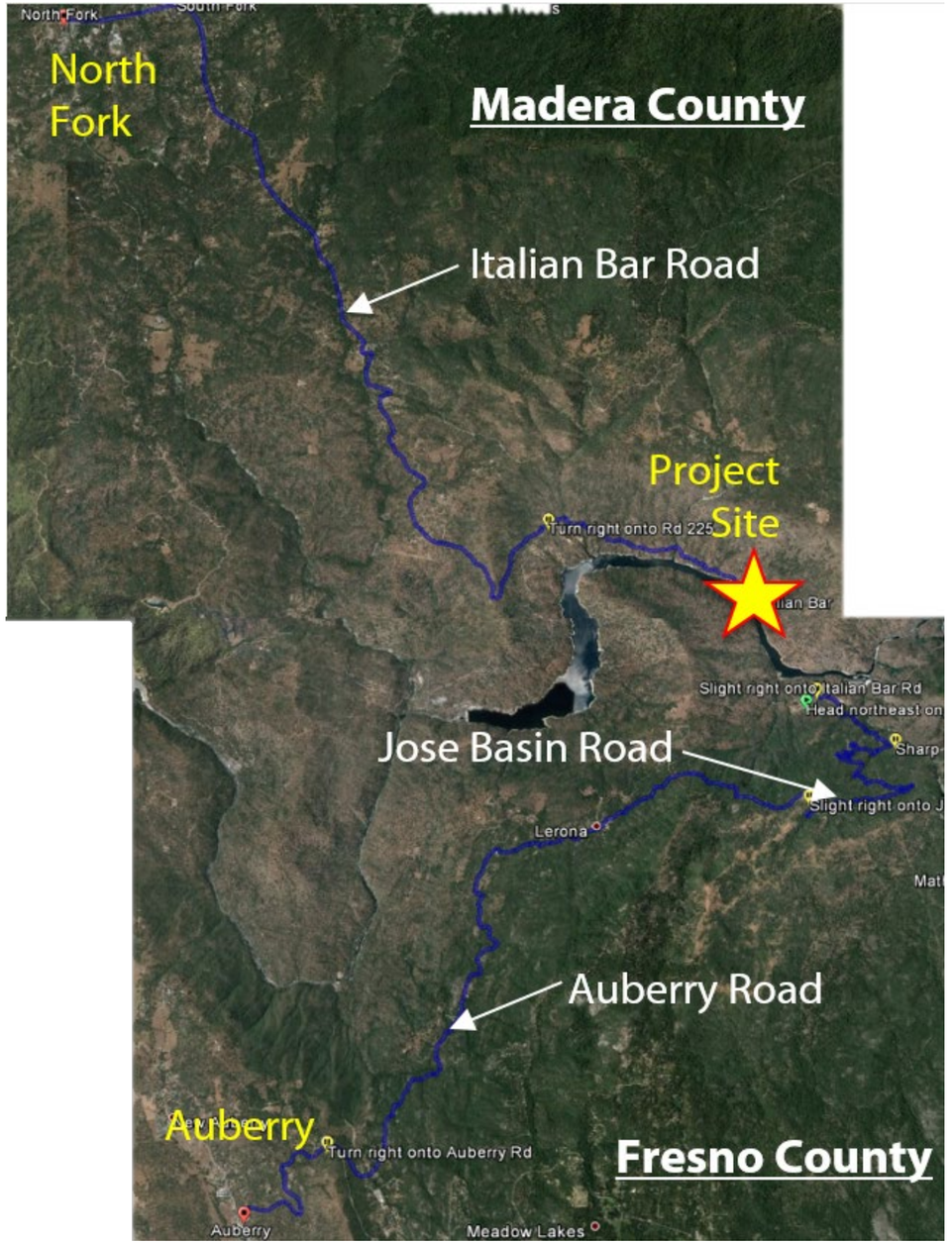
- Habitat in Rock
- Habitat in Existing Bridge
- Habitat in New Bridge



Project Development

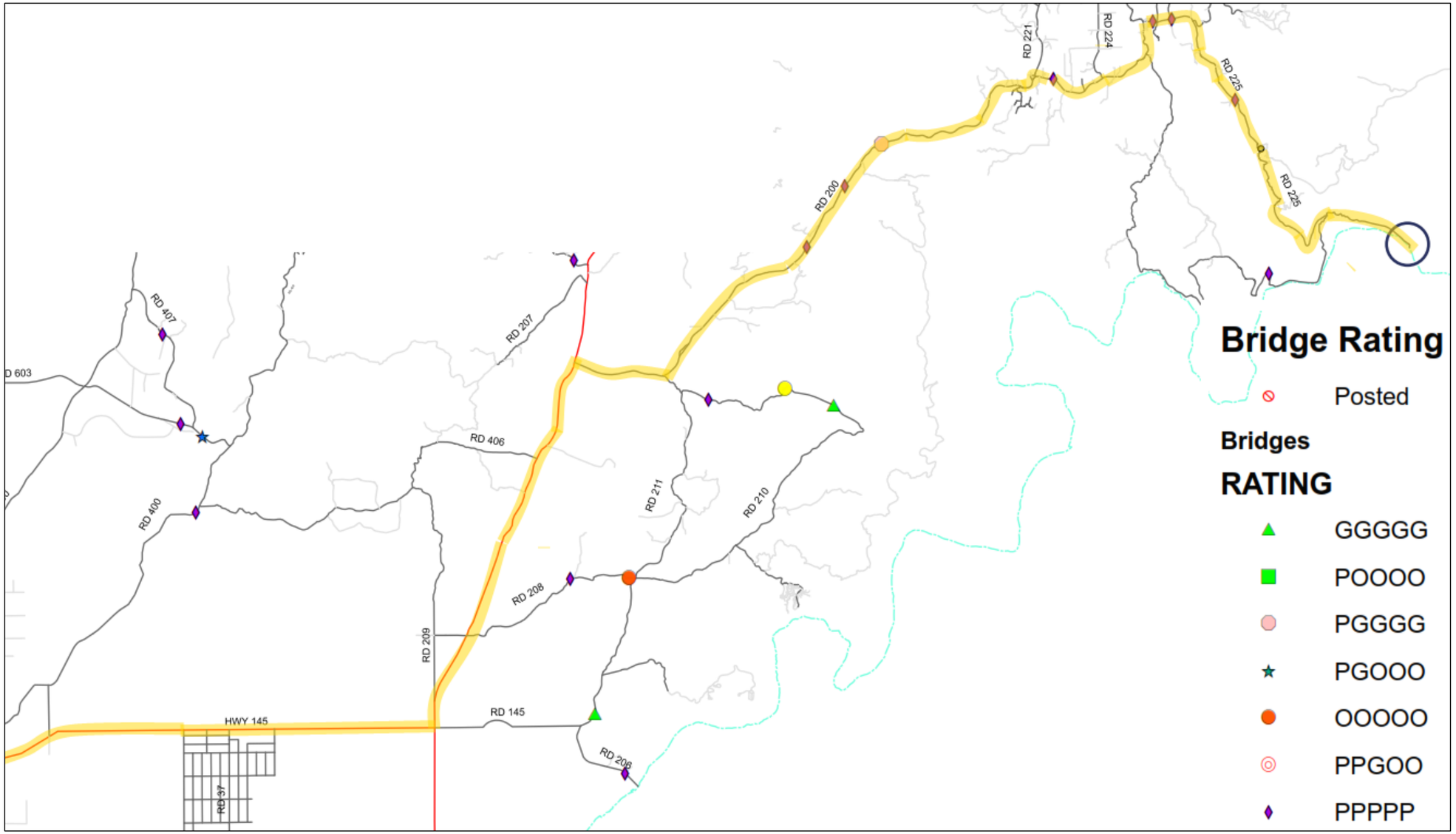
Access Routes to Project

- From Madera Route
- From Fresno Route
- Evaluating Terrain & Access



Project Development

Reviewed Bridge Ratings Along Routes



Project Development

Summary of Bridge Type & Ratings

Madera County Bridges

Bridge No.	Road Name	Permit Rating	Bridge Type	Posting	Operating Rating	Sufficiency Rating
41C-0212	Road 200	PPPPP	Reinforced Concrete Box Culvert (New)	Legal	54.1 tonnes	94.1
41C-0001	Road 200	PPPPP	Steel Stringer/Multi Beam or Girder	Legal	51.5 tonnes	57.6
41C-0023	Road 200	PGGGG	Concrete Tee Beam	Legal	43.1 tonnes	72.1
41C-0002	Road 200	PPPPP	Precast/Prestressed Inverted "U" Deck Units	Legal	93.3 tonnes	96.8
41C-0021	Road 225	PPPPP	Concrete Tee Beam	Legal	62.2 tonnes	65.4
41C-0022	Road 225	PPPPP	Concrete Tee Beam	Legal	54.1 tonnes	94.9
41C-0054	Road 225	PPPPP	Steel Stringer/Multi Beam or Girder	Legal	51.5 tonnes	75.0
41C-0138	Road 225	Other	Timber Stringer w Timber Decking < 20' length	17T,28T,34T	Not Known	Not Known

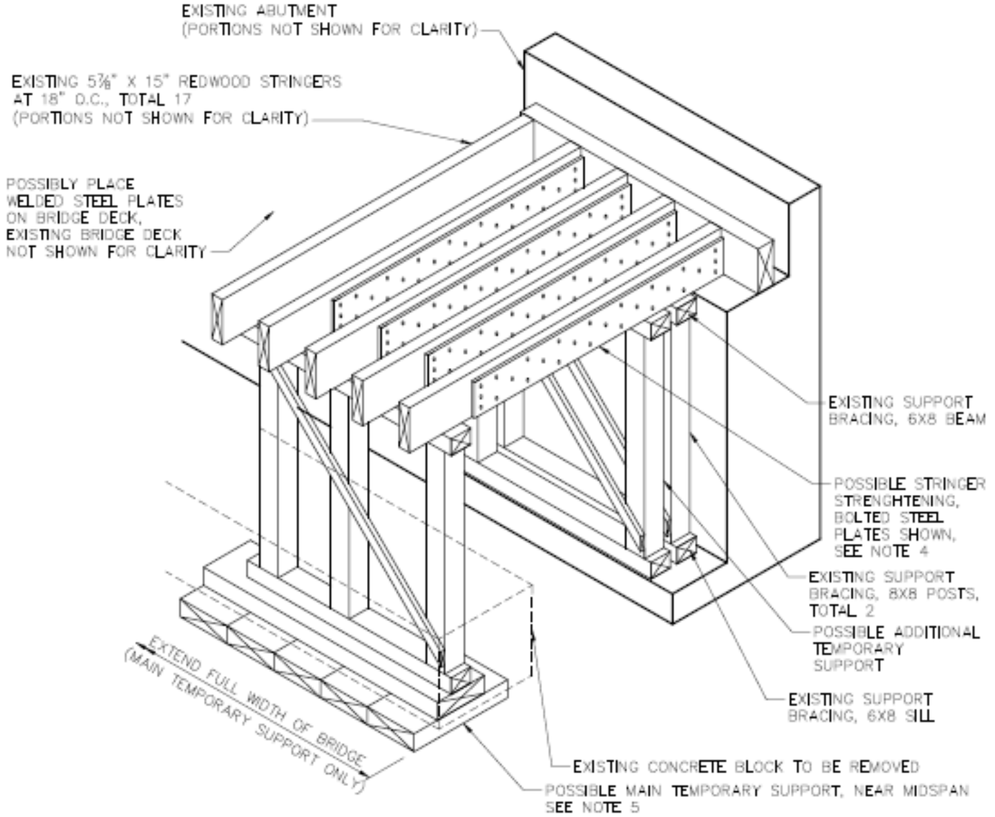
Fresno County Bridges

Bridge No.	Road Name	Permit Rating	Bridge Type	Posting	Operating Rating	Sufficiency Rating
42C-0264	Jose Basin Road	OOOOO	Bailey Truss	Legal	37.3 tonnes	71.4

Project Development

Whiskey Creek Tributary

- Posted at 17 Tons
- Inspection & Assessment
- Strengthening Concept
- Cleared Environmentally

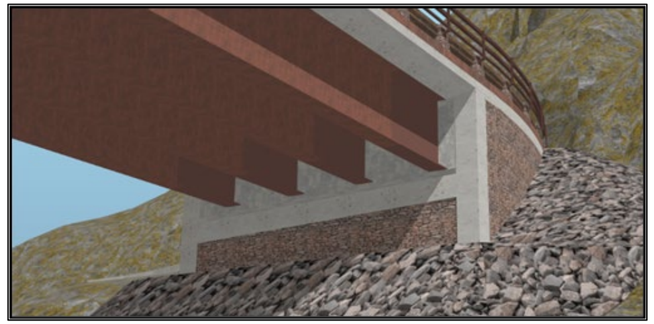


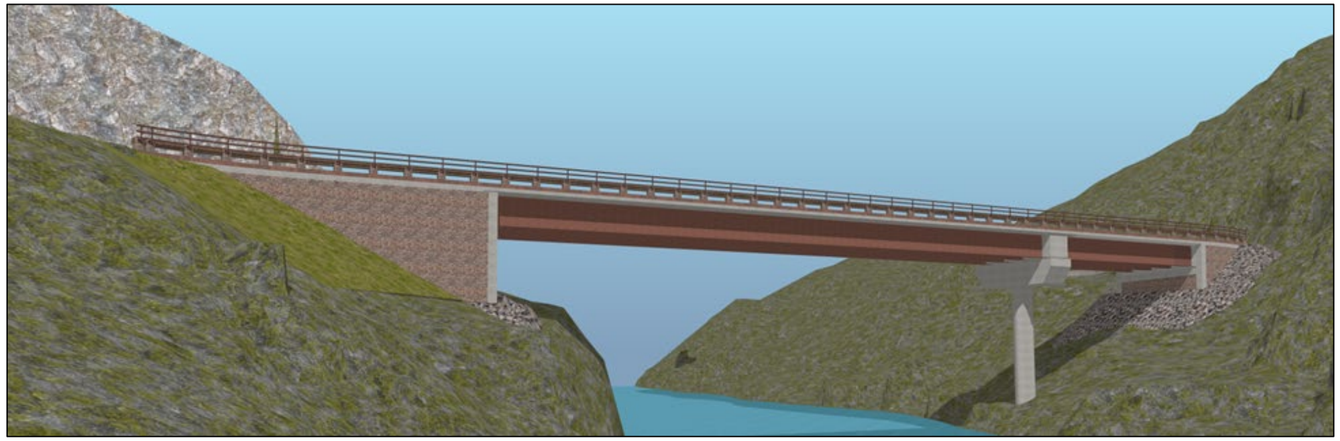
CONCEPTUAL STRENGTHENING DETAIL

Project Development

Aesthetic Memo

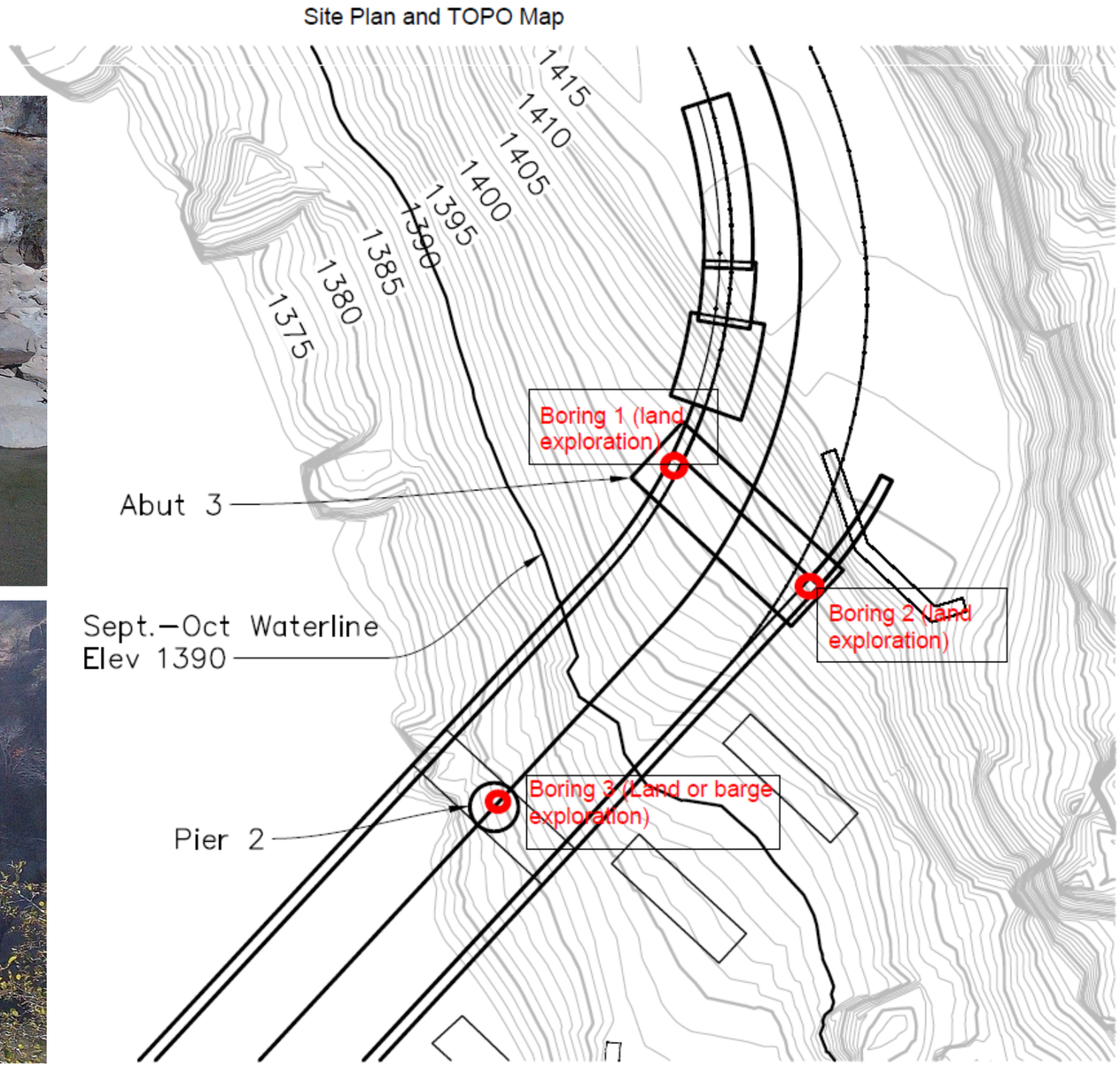
- Aesthetics Justification
- Caltrans Determined as Participating
- Weathering Steel
- Formliners
- Stained Concrete
- Barriers





Project Development

Caltrans Requirement for Additional Drilling



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Decision Matrix for Additional Geotechnical Borings

April 19th, 2018

Option		1 Construction Proceeds without Additional Geotechnical Borings	2 Additional Geotechnical Borings Prior to Construction	3 Additional Geotechnical Borings During Construction
Brief Description		The project would proceed with the current assumptions of bedrock quality and depth.	Quincy would coordinate with Kleinfelder to perform Additional borings, either by barge or by access ramp in low water.	Include Additional Geotechnical Borings as first phase of work in construction.
Assumptions		• Bedrock will be found close to the depths assumed by Kleinfelder. • Quincy has incorporated an additional 10' of working design length to the piles which is reflected on the plans and the estimate.	• A separate and independent CDFW permit for drilling would be submitted in mid-April. • Requires a subcontractor to pioneer a road for a track mounted drill rig for access to Pier 2 and Abutment 3. Subcontractor will then have to remove these access ramps. Depends on Lake levels. • Drilling from Barge can proceed as soon as July.	• Borings would be performed using the already permitted access ramp to Pier 2 and access to Abutment 3 required during construction, built by the contractor. • Additional borings would be performed by Kleinfelder. Borings would occur in **September** to maintain schedule. • If additional borings cannot be performed until October, Pier 2 construction occurs in **October 2019.**
Schedule Impacts	Duration	**August 2018 to December 2019** (No suspensions)	**August 2019 to December 2020** (No suspensions)	**August 2018 to December 2019** (if flows are low in August this year) **or: August 2018 to May 2021** (if flows are high in August this year)
	Known Impacts	None	• 90 days for CDFW permit. 30 days for potential redesign. • Would push Bid Opening date from late June to Mid-August (too late). • This will require project to slip a year. • Access Ramp Quantities (200 CY of cut / 75 CY of fill)	• 1 week for additional drilling during construction. 2 weeks to interpret data and incorporate design changes. • Can still potentially hold schedule this year, because CDFW permit can be piggy backed on current application. Still strive to build Pier 2 and Abutment 3 this year.
	Coordination with SCE	According to SCE, this is best year to build the bridge with location of Pier 2 near low-water	2018: SCE can lower lake levels for drilling for up to 5 days in mid to late September. 2019: SCE will notify County next May whether they can lower water level to desired location for Pier 2	SCE needs to provide low flow by August. To maintain construction schedule, access ramp construction by Contractor and additional borings need to occur in Late-August/ Early September.
	Unknown Impacts	• 0 days to 20 days additional construction. • Depends upon additional depth required. • Could push outside of low flow window.	None	Highly dependent upon lake levels
Cost Impacts	Additional PE	$0	$40,000 - Drilling cost including Barge $35,000 for additional borings and access ramp (Does not include additional Design)	$25,000 for additional borings (Does not include additional Design)
	CON Pile Installation	Approx. $73,000 = $30,000 at Abutment 3 and $43,000 at Pier 2 (incorporated into current Estimate)	$0 to $73,000 (assuming additional borings result in already assumed bedrock depth range)	$0 to $73,000 (depending upon bids and assuming additional borings result in already assumed bedrock depth range)
	CON Potential CCO	• $500 per pile foot at Abutment 3 • $4,300 per additional pile foot at pier 2. • If additional depth is required, the County would need to pay.	None	If additional depth is required, the HBP program may cover the additional costs. Additional discussion with Caltrans is required.
Qualitative Risk Assessment		• Medium risk to construction schedule delays • Medium risk to unknown construction costs.	• High risk to construction schedule delays • Low risk for increased to unknown construction costs.	• Medium for construction schedule delays • Medium risk for increased unknown construction costs

Project Development

History of Project Costs From Beginning to End

		Original Program December 2011	Back During Design June 2016	After Bid Opening June 2019	Current Projection July 2021
	PE	$1,097,111	$1,400,000	$1,400,000	$1,600,000
	RW	$50,000	$50,000	$50,000	$6,500
CON	**Con**	$4,388,444	$4,388,444	$7,558,000	$7,600,000
CON	**CE**	$658,266	$658,266	$1,133,700	$837,000
CON	**Contingency**	$1,097,111	$1,097,290	$377,900	
CON	**Subtotal**	$6,143,821	$6,144,000	$9,069,600	$8,437,000
	Total	**$7,290,932**	**$7,594,000**	**$10,519,600**	**$10,043,500**
			Whiskey Creek	Cost Escalation	
			Additional Site	Concrete Delivery	
			Additional Work	Water Delivery	
				Significant Cost	
				15%-20% year delay	

Key Challenges & Lessons Learned

Fresno County Approach Rock Excavation

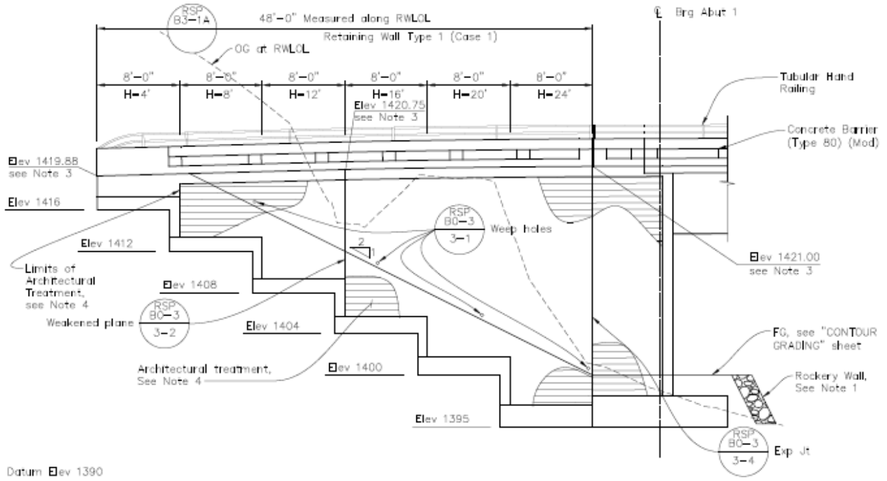
Key Challenges & Lessons Learned

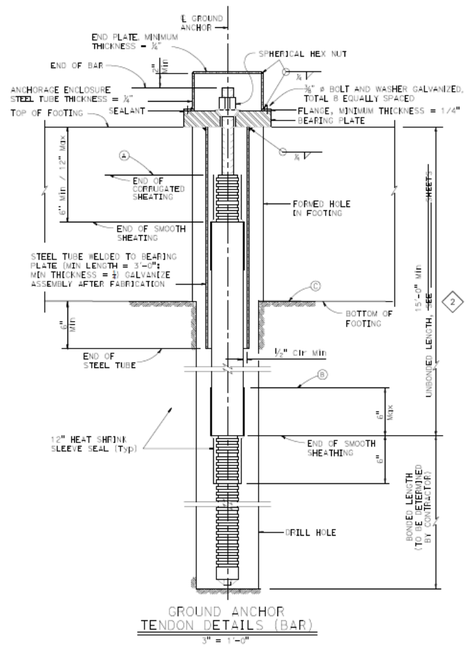
Blasting to Complete Rock Excavation

Key Challenges & Lessons Learned

Abutment 1 Design Considerations

- Spread Footing
- Stepped Walls
- Ground Anchor
- Rockery Wall





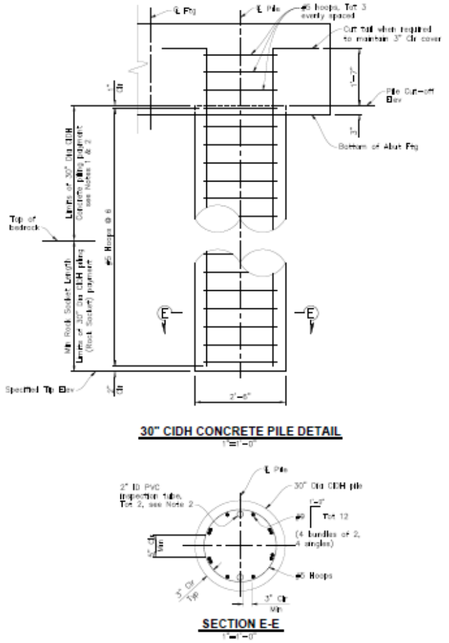
Key Challenges & Lessons Learned

Abutment 1 Construction

Key Challenges & Lessons Learned

Abutment 3 Construction

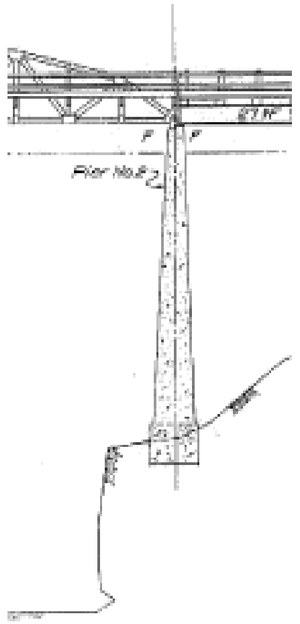
- 30” Cast-In-Drill-Hole (CIDH)
- Rocket Socket
- Grouted RSP

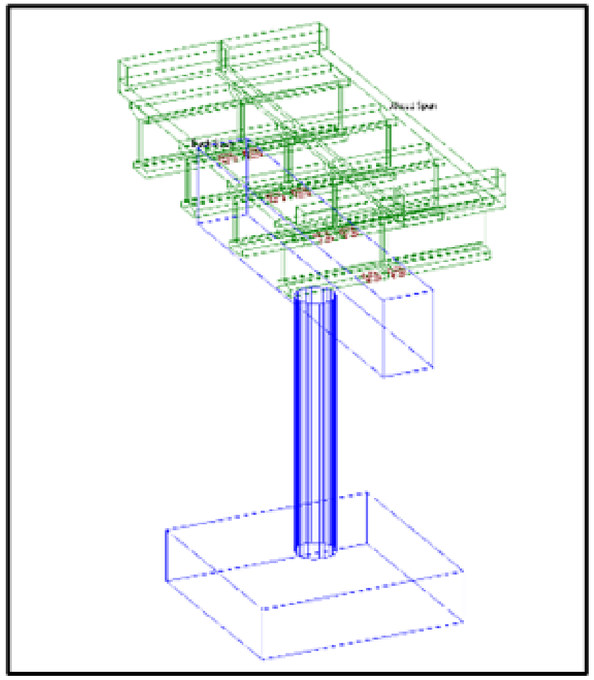


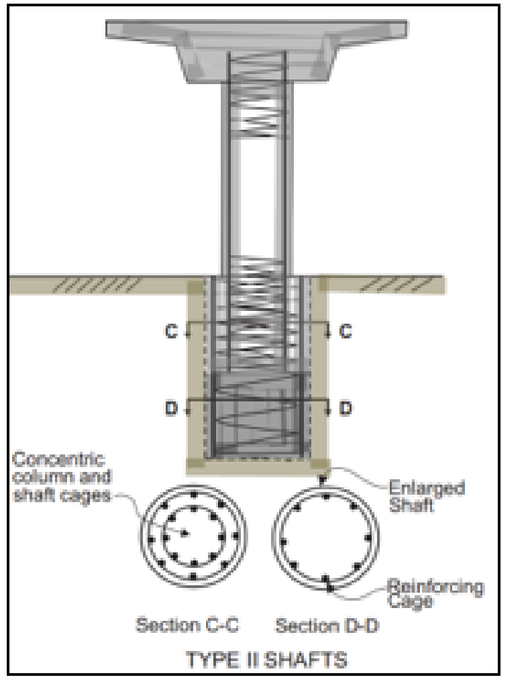
Key Challenges & Lessons Learned

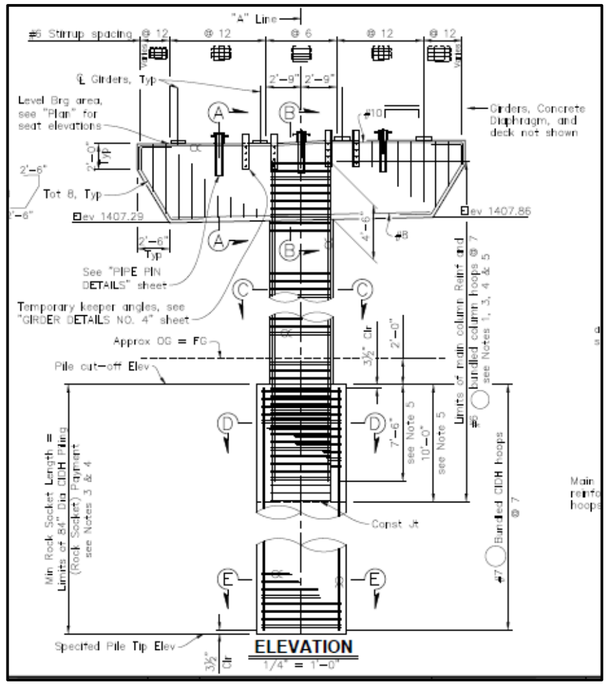
Pier 2 Design Considerations

- Existing Foundations
- Spread Footing
- 84” Cast-In-Drill-Hole (CIDH)
- Rock Socket



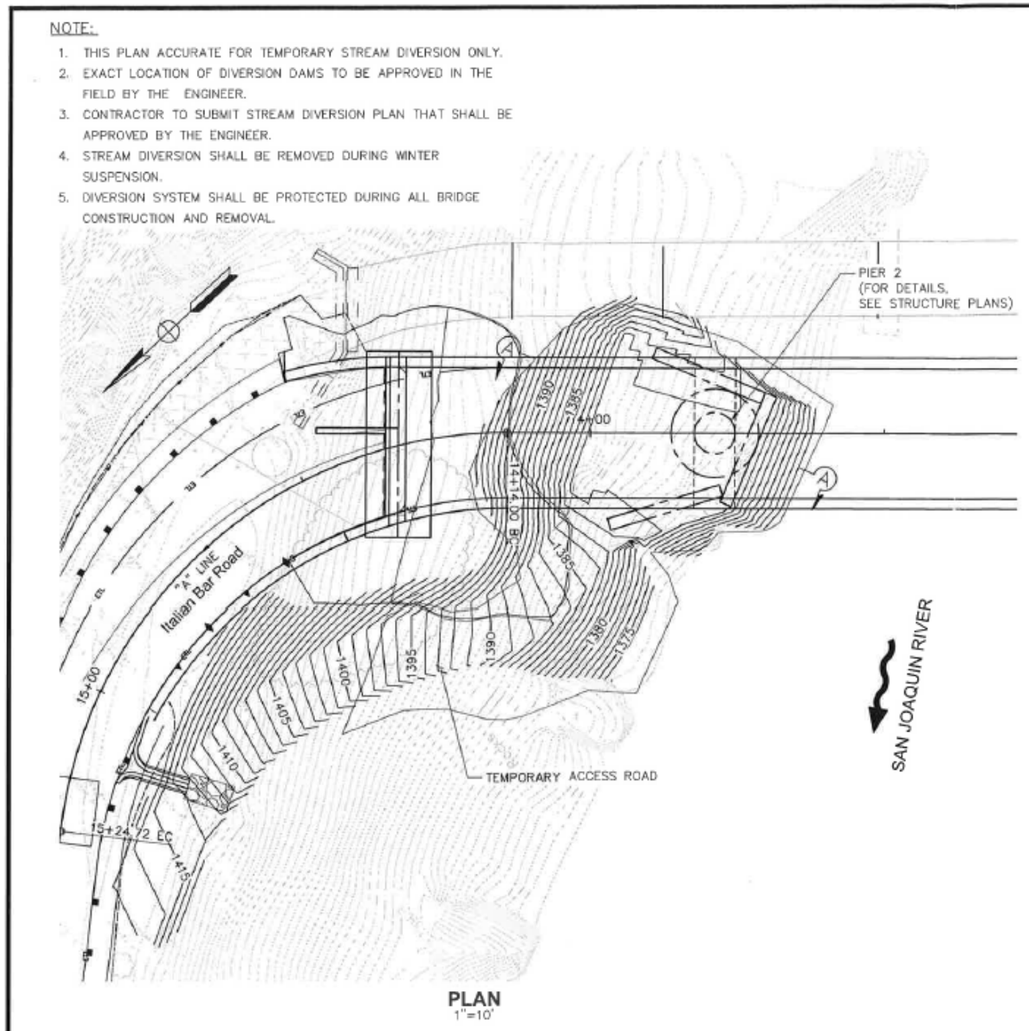






Key Challenges & Lessons Learned

Pier 2 Pile Construction



	DATE	RECORD DRAWING		SCALE
DESIGNED: E. MCPHERSON	DSN DATE	RESIDENT ENGINEER	DATE	
DRAWN: Y. WANG	DRAWN DATE			
CHECKED: C. GIBSON III	CHK DATE			

FOR RIGHT OF WAY DATA AND ACCURATE ACCESS DETERMINATION, SEE DOCUMENTS IN THE DEPARTMENT OF PUBLIC WORKS AND PLANNING.

Col H. Gibson III — REGISTERED CIVIL ENGINEER — 03/13/2018 DATE

PROJECT
SAN JOAQUIN RIVER (REDINGER LAKE) BRIDGE
FROM REDINGER LAKE RD. TO MILLION DOLLAR RD.
ROAD NO. M3660 BRIDGE NO. 42C0078

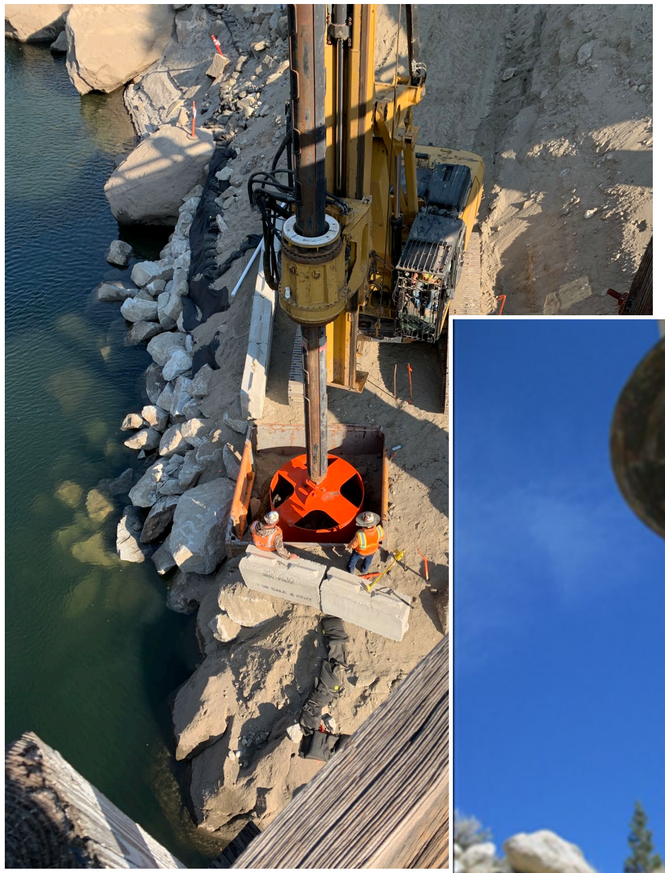
QUINCY ENGINEERING 11017 COBBLEROCK DRIVE, SUITE 100 RANCHO CORDOVA, CA 95670 P: 916.368.9181

DEPARTMENT OF PUBLIC WORKS AND PLANNING
TEMPORARY STREAM DIVERSION
BRIDGE REPLACEMENT PROJECT
DRAWING NO. TSD SHEET NO. X TOTAL 91

Key Challenges & Lessons Learned

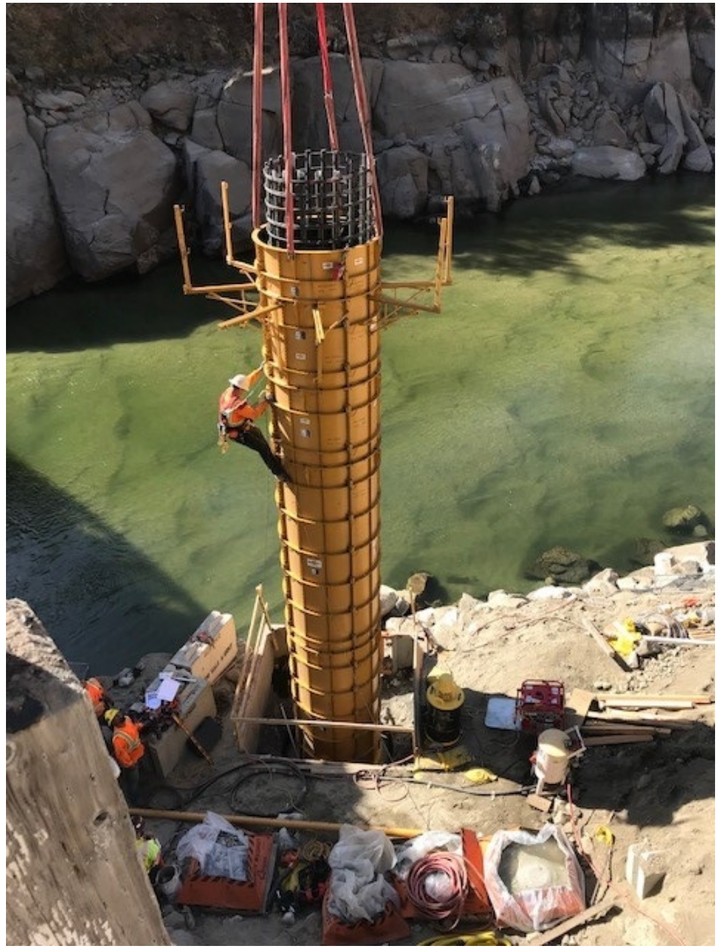
Pier 2 Design Construction

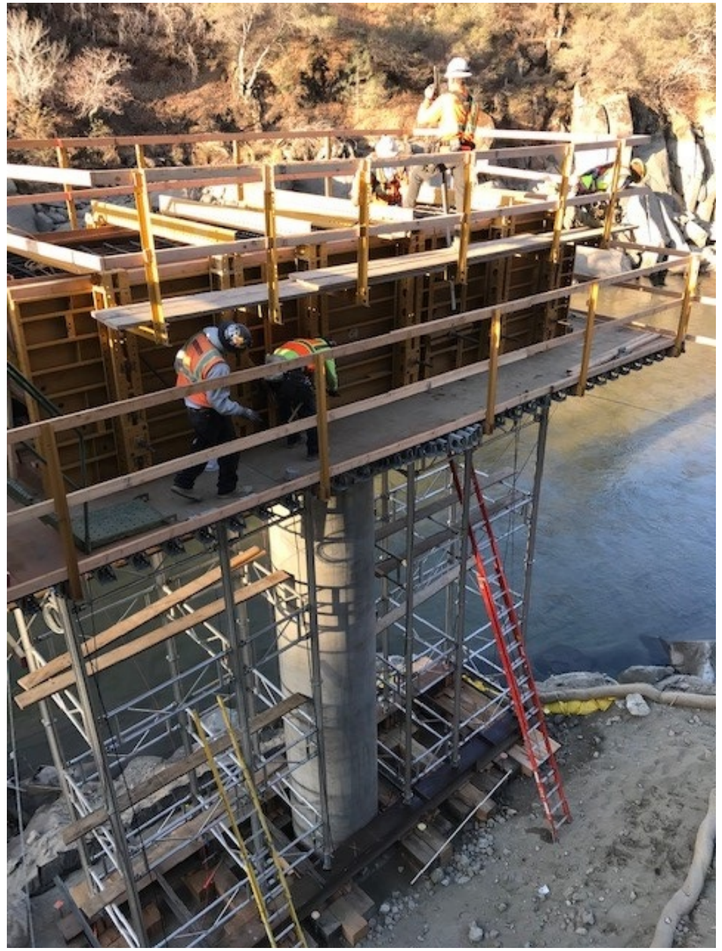
- Rock Fracture



Key Challenges & Lessons Learned

Pier 2 Construction – Column & Cap

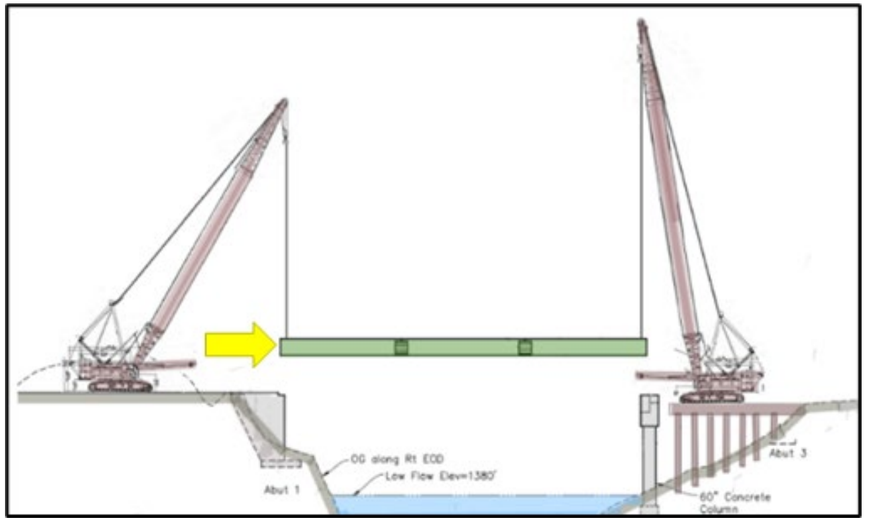


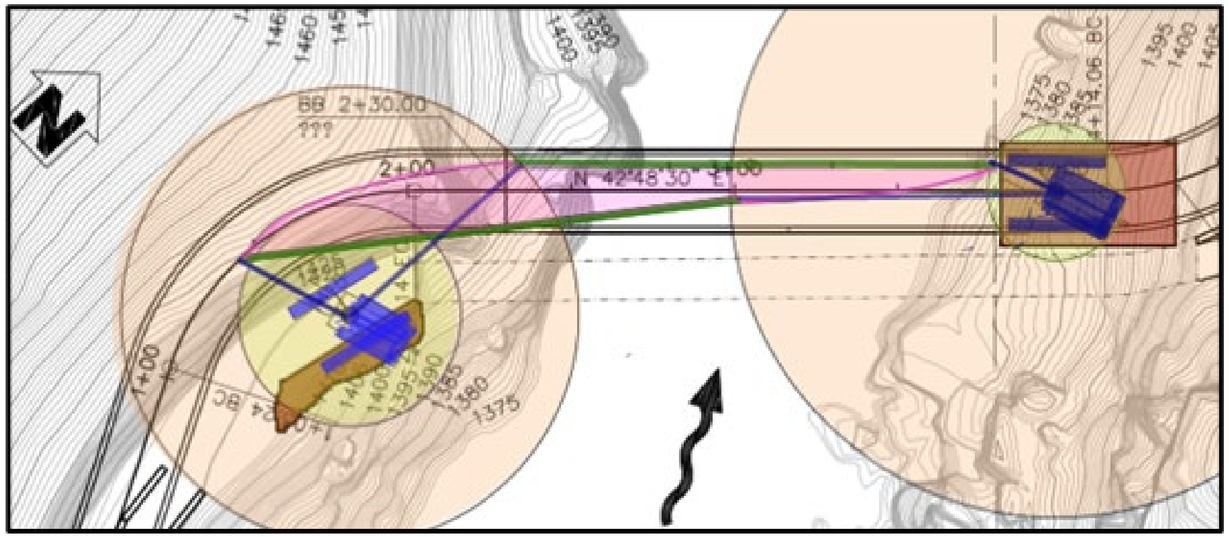


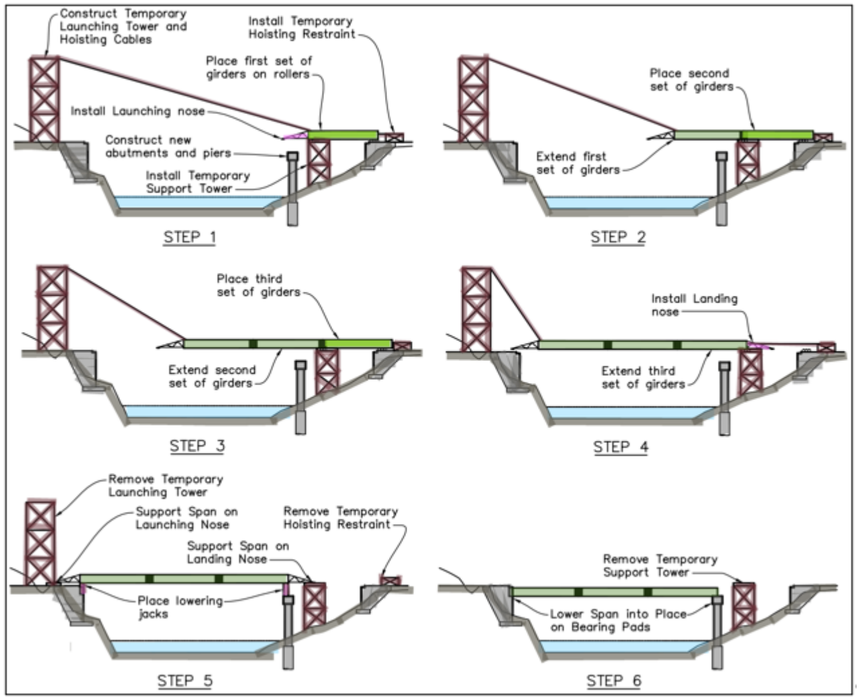
Key Challenges & Lessons Learned

Design Considerations

- Construction Staging
- Worked With Crane Companies
- Crane Picks
- Launched Girder





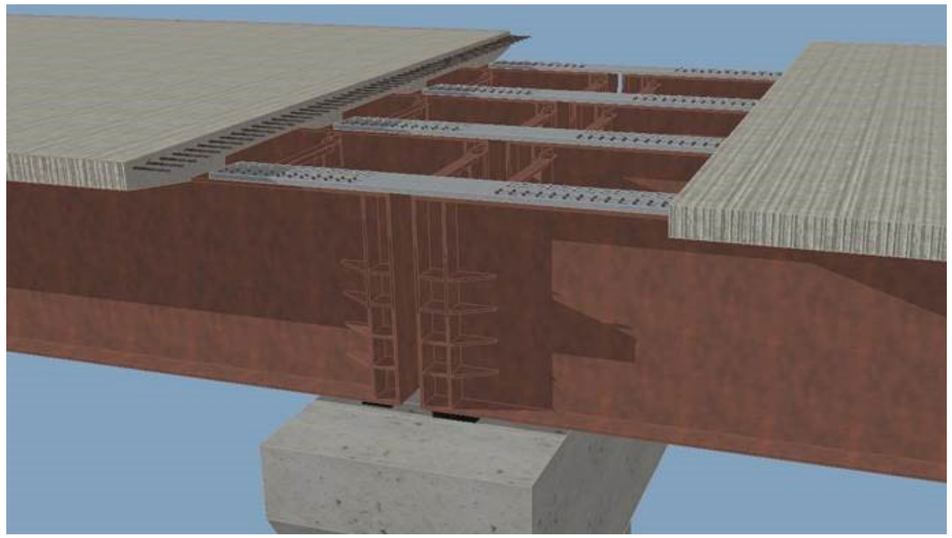


Project Elements

Steel Girder Erection – ***How it got built!***

Key Challenges & Lessons Learned

Design Considerations - ***Remember those imbalanced spans?***



Key Challenges & Lessons Learned

Deck Construction

Key Challenges & Lessons Learned

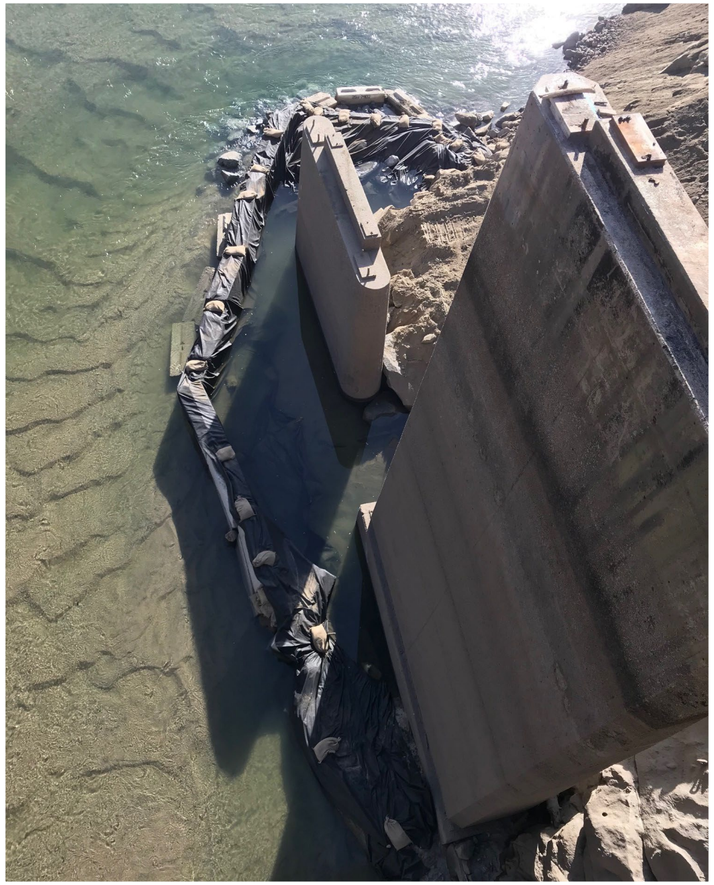
Deck Construction

Key Challenges & Lessons Learned

Bridge Removal

Key Challenges & Lessons Learned

Bridge Concrete Foundation Removal



Project Team

Q&A

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Thank you!