Attachment 3

[Sample Structure Type Selection Memo and Report]

STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION

STRUCTURE TYPE SELECTION MEMO

PROJECT IDENTIFICATION **HWY. 37 – FREEWAY CONVERSION PROJECT**						DATE **March 10, 1999**
DIST **04**	CO **SOL**	RTE **37**	PM **8.2/11.0**	EA **04-0T141**	EFIS	STRUCTURE DESIGN BRANCH: **8**
GP: **April 01, 1999**	SP&Q: **10/29/2000**	SPS&E: **11/24/2000**	RTL: **04/01/2001**			

Bridge Name	Bridge Number	PM	Structure Construction Cost	
Wilson Ave. OC	23-0217	8.3	$1,174,000	
Route 37/29 Sep.	23-0218	9.0	$11,640,000	
Broadway Ave. OH	23-0219	9.8	$3,973,000	
Mina Drive UC	23-0220	10.8	$1,490,000	
N29-E37 Conn	23-0221G	9.1	$646,000	
W37 – N&S Conn	23-0222F	9.2	$1,389,000	
S29-W37 Conn	23-0223F	9.3	$2,898,000	
Ret Wall No.1	23-Wall1		$1,734,000	
Ret Wall No.2	23-Wall2		$1,276,000	
Ret Wall No.3	23-Wall3		$349,000	
Ret Wall No.4	23-Wall4		$125,000	
PROJECT TOTAL			$26,694,000	

Executive Summary:

Routing List
(1) SR ARCHITECT
(2) STR MAINT ENG
(3) STR CONST MGR
(4) CHIEF, STR DESIGN

Attachments:
General Plan
General Plan Estimate

STRUCTURE PROJECT ENGINEER, [name, signature, date]
BRIDGE DESIGN BRANCH CHIEF, [[name, signature, date]]
BRIDGE DESIGN OFFICE CHIEF (Approval) [name, signature, date]
BRIDGE DESIGN OFFICE CHIEF (Approval) [[name, signature, date]

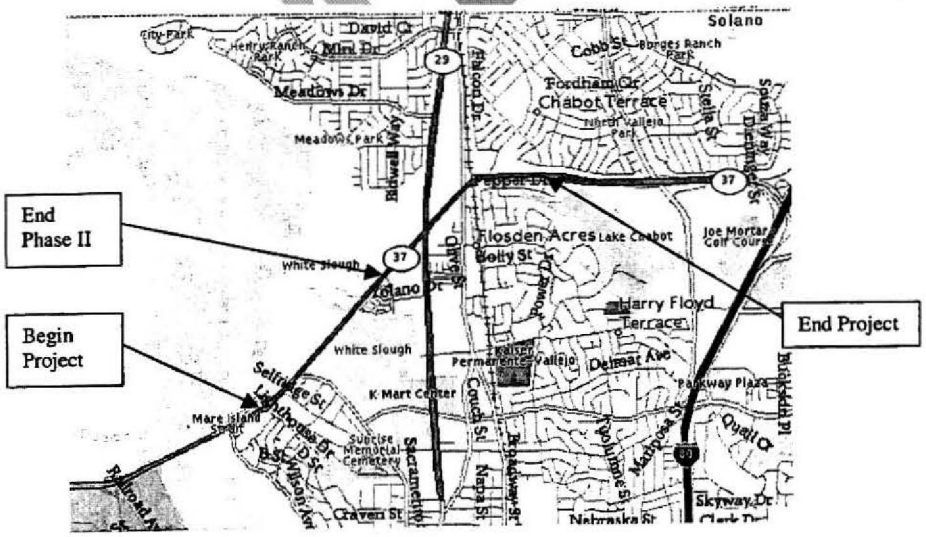
[Sample Structure Type Selection Report]

Structure Type Selection Report

Caltrans proposes to construct a four-lane freeway on State Route 37 from the Napa River Bridge to the existing freeway section of SR 37 that begins near Diablo Street, a distance of 2.48 miles. It will be constructed partially on the existing alignment and partially along a new alignment and will be built in three phases. The project is expected to reduce congestion of peak traffic flow periods by removing four signalized intersections and a railroad crossing from the interregional traffic corridor and eliminating an existing two lane bottleneck between Sacramento Street and Enterprise Street.

Accelerated Bridge Construction (ABC) was evaluated and will (not) be employed at xxxx bridge sites. See Bridge Construction Impacts section, and ABC Design Impact Questionnaire table and ABC Decision Flowchart for details.

Project Map



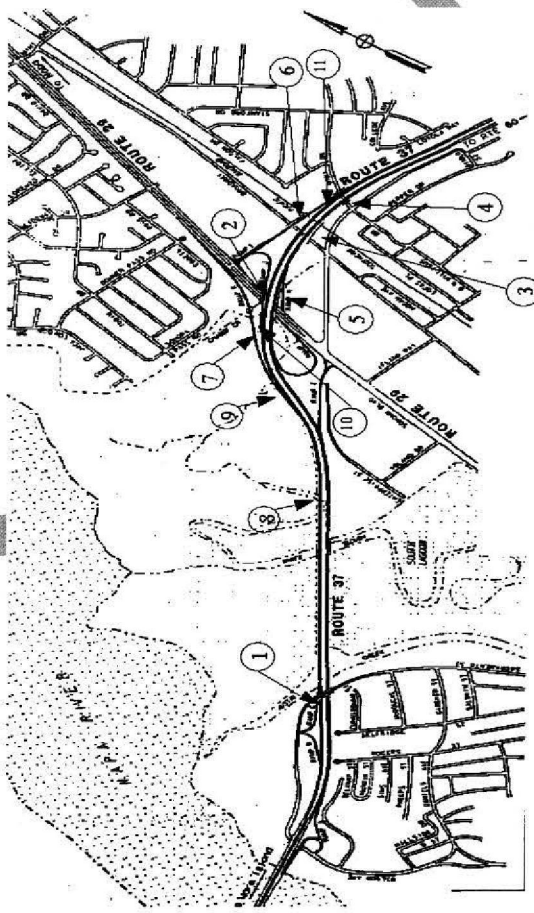
Project Costs

Phase I Environmental Mitigation at Guadal Canal Village	$ 4.70 million
Phase II Napa River Bridge to Enterprise Street	$40.75 million
Phase III Enterprise Street to Diablo Blvd	$41.50 million

Structures

	Bridge Name	Bridge Number	Width/ Height	Length	Comments
1	Wilson Ave OC	23-0217	46.7 ft	261 ft	2 span
2	Route 37/29 Separation	23-0218	125 ft	921 ft	6 span
3	Broadway OH	23-0219	112 ft	462 ft	3 span
4	Mini Drive UC	23-0220	131 ft	150 ft	1 span
5	N29-E37 Connector	23-0221G	26.5 ft	253 ft	3 span
6	W37-N&S29 Connector	23-0222F	38.3 ft	428 ft	3 span
7	S29-W37 Connector	23-0223F	26.5 ft	1000 ft	9 span
8	Ret. Wall No. 1	23-Wall 1	8 ft	1476 ft	16' Soundwall
9	Ret. Wall No. 2	23-Wall 2	36 ft	602 ft	
10	Ret. Wall No. 3	23-Wall 3	44 ft	40 ft	
11	Ret. Wall No.4	23-Wall 4	22 ft	389 ft	

Site Plan



Geology

Bridge Name	Upper Layer	Lower Layer	Foundation Types	Comments	Max Eq/Accel	ATC-32 Curve	Max ARS
Wilson Ave OC	18' fill over bay mud	sandy to clayey silt and soft to very stiff silty clay	PC/PS conc piles class 400 or 625 (no CIDH)	possible corrosion waiting periods req' for fills	Mw = 6.5 @ 5.5km 0.5g	Modified Type D	1.25g
Route 37/29 Separation and N29-E37 Connector (Ramp H)	13' soft to stiff clay and silt	med dense to dense cemented silt	driven steel H piles. 24" dia. min CIDH OK but not preferred	Pre-drilling may be required if PC concrete piles used	Mw = 6.5 @ 4.0km 0.5g	Modified Type D	1.25g
Broadway OH and W37-N&S29 Connector (Ramp I)	20-40' fill over stiff to hard silty to sandy clay at western portion	same as upper layer grades to weathered siltstone and sandstone in eastern portion	spread footings (1.5 to 2.5 tsf) or driven piles (class 400 or 625) or 24" dia. min CIDH piles	possible corrosion don't use spread footings at Abut 4 due to sewer line, use CIDH piles	Mw = 6.5 @ 4.0km 0.5g	Modified Type C	1.18g
Mini Drive UC	10' very stiff clayey to gravelly silt	weathered siltstone and shale	spread footings or PC/PS piles (class 400 or 625) or 24"min dia. CIDH piles	possible corrosion groundwater present	Mw = 6.5 @ 4.0km 0.5g	Modified Type C	1.18g
S29-W37 Connector (Ramp K)	13' soft to stiff clay and silt	med dense to dense cemented silt	driven steel H piles. 24" min dia. CIDH OK but not preferred	Pre-drilling may be required if PC concrete piles used	Mw = 6.5 @ 4.0km 0.5g	Modified Type D	1.25g

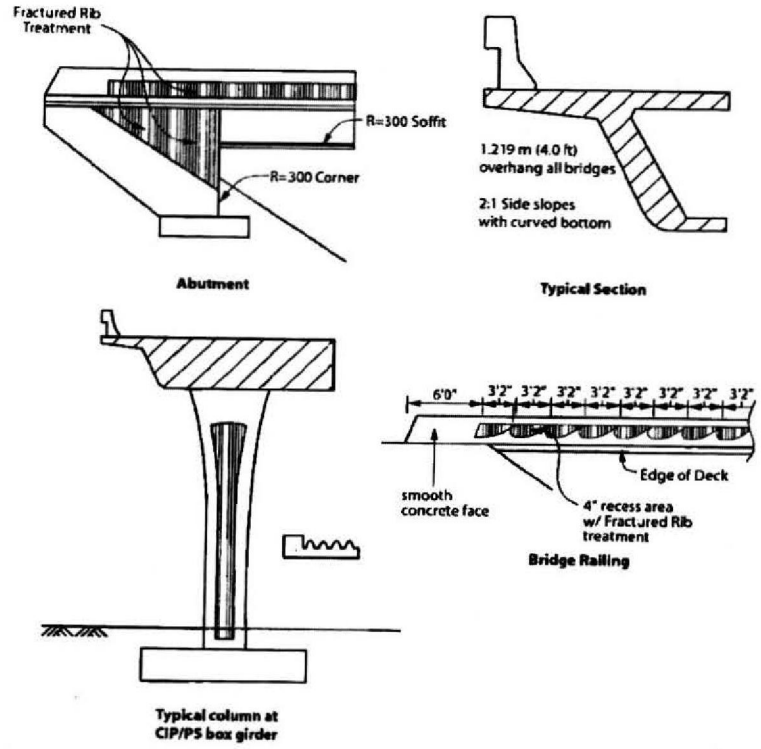
Notes:

1. Structures Foundations has completed all Preliminary Foundation recommendations for the bridges and the retaining walls. The Preliminary Seismic Design recommendations have been submitted to Structure Design.
2. Environmental permits are required to drill in the wetlands, but impacts on the protected Clapper Rail may delay drilling until August 15, 1999. Drilling to start in June 1999 where permits are not required.
3. Liquefaction potential is low and scour is not an issue at any site.
4. Approach fills may require special treatment (wick drains), surcharge, and long settlement periods. Expect large settlements (3-5 feet).

Aesthetics

The Final Environmental Report/Statement dated May 1998 stated in Section 4.7.1 that "Certain aesthetic elements utilized in the structure at Fairgrounds Drive Undercrossing will be incorporated into proposed structures to provide visual consistency of the portion of the Route 37 corridor between the I-80/Rt 37 Interchange and the north end of the Napa River Bridge."

Proposed treatments for CIP/PS Box Girders are shown below. Ramp K will utilize round columns with architectural treatment. Bent cap at Ramp K shall be tapered in elevation and in plan, and will have architectural treatment. Wing wall layout line shall be placed at edge of deck without offset. Cost estimates include $356,000 for aesthetic treatment.



Bridge Construction Impact- Superstructure

Bridge Name [Br #]	Structure Type Alternative	Location	Temporary Traffic Opening				Comments
			Traffic Type	Opening		Duration (months)	
				Height	Width*		
Wilson Ave OC	CIP	Route 37	Vehicle	15ft	42ft	6	
Route 37/29 Separation	CIP	Route 29 access rd		16ft	45ft	12	
Broadway OH	CIP Box Girders	Broadway Street	Vehicles	16ft	47ft	8	
			Pedestrian	12ft	10ft	10	
			Railroad	25ft	30ft	9	
Mini Drive UC		Mini Drive	Vehicles				

* Dimensions are between traffic faces of temporary railing

Falsework openings will have Type K railings adjacent to traffic and crash cushions adjacent to end of railings, when required. District has reviewed and approved falsework openings.

Bridge Construction Impact - Substructure

Bridge Name	Structure Type Alternative	Location	Column Size	Footing Size
Wilson Ave OC	CIP	Median of Route 37	4ft	10X10X4.5ft
Route 37/29 Seperation	CIP	Median of Route 329	7ft	16X16X4.5ft

Bridge Name	Structure Type Alternative	Location	Temporary Traffic Opening				Comments
			Traffic type	Opening		Duration (months)	
				Height	Width*		

* Dimensions are between faces of temporary railing traffic

Bridge Construction Impact- Estimated Construction Time

Bridge Name	Structure Type Alternative	Construction Completion Time		Comments
		Construction Method	Duration* (months)	
Wilson Ave OC	Alternative #1	CIP	24	
	Alternative #2	Precast	12	Precast Abutments and Superstructure
Route 37/29 Separation		CIP	15	
Broadway OH		CIP	18	
Mini Drive UC		CIP	11	

**The estimated bridge construction work time does not take into account contractor mobilization, roadway work, or traffic handling preparation. The estimate is not the Total Working Days provided by Cost Estimating Branch in the BEES. It is an approximate measure of construction operation duration and the measure is intended to provide the project stakeholder and District a general indication of the bridge work time. (The time measure is also intended to serve as a catalyst and a motivator for the District to conduct and evaluate the road work and total construction time at an early project development phase.)*

Bridge Construction Impact- Estimated Traffic Impact Time

Bridge Name	Structure Type Alternative	Traffic Impact Time		Comments
		Construction Method	Duration* (months)	
Wilson Ave OC	Alternative #1	CIP	18	
	Alternative #2	Precast	4	Precast Abutments and Superstructure
Route 37/29 Separation		CIP	12	
Broadway OH		CIP	15	
Mini Drive UC		CIP	9	

**The estimated traffic impact time. It is an approximate measure of construction operation duration that will result in reduced traffic lanes or falsework over traffic. The measure is intended to provide the project stakeholder and District a general indication of the traffic impact time. (The time measure is also intended to serve as a catalyst and a motivator for the District to conduct and evaluate the road work and total construction time at an early project development phase.)*

Construction Impacts

1. The EIR stipulates that construction activities, other than pouring concrete and road paving, shall not commence until September 1 and shall be completed prior to February 1 of each year within 700 feet from any suitable clapper rail breeding habitat. Chuck Morton, District 04 Environmental Planning Section indicates that the revised work dates, when construction noise is above 86 dba, is August 15 to January 1 for construction within 700 feet of clapper rail nests. The black rail and the harvest mouse are also protected species within the project site.
2. Chuck Morton, District 04 Environmental Planning Section, states that the only allowable time period for excavation in Chabot Creek is during May to August.

ABC DESIGN IMPACT QUESTIONNAIRE

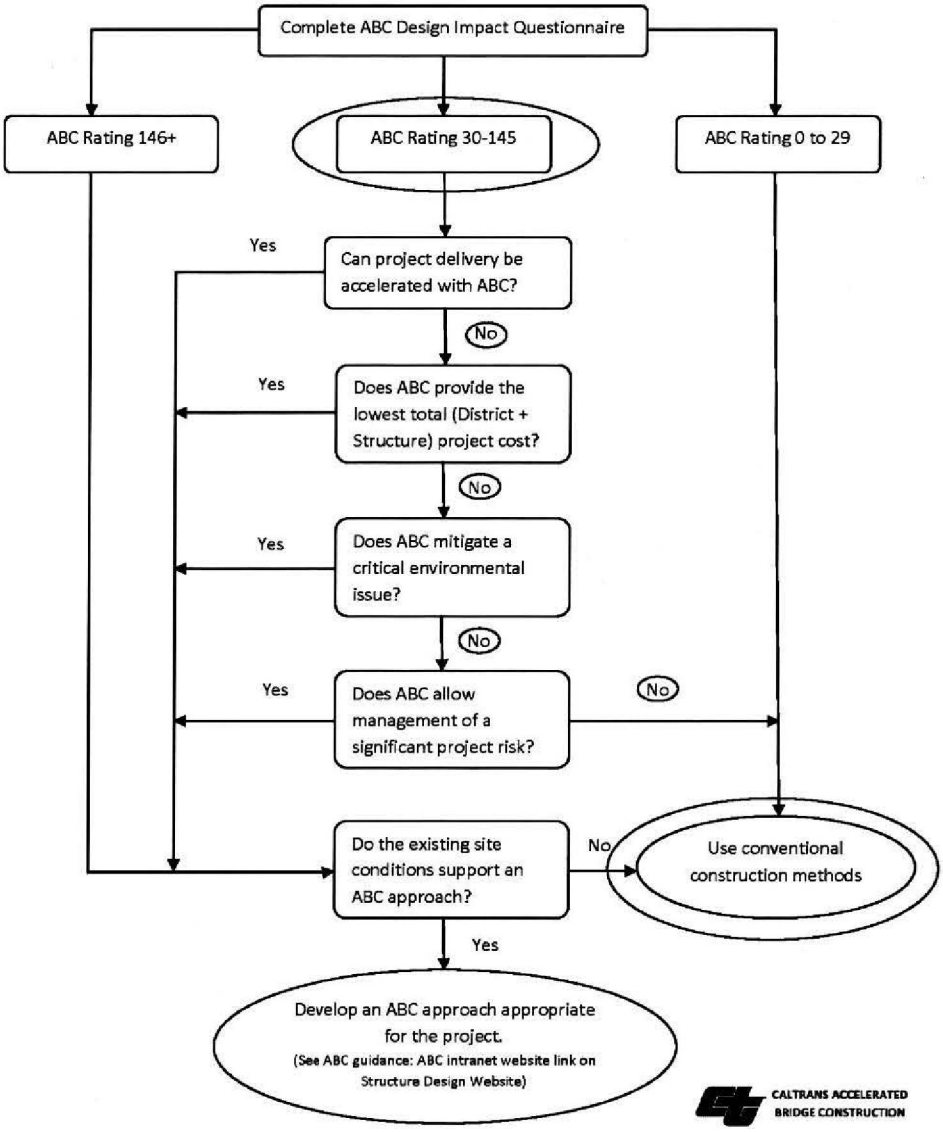
CALTRANS ACCELERATED BRIDGE CONSTRUCTION

Project: Route 37.29 Separation (#23-0218) Date: Completed by:		(R) Relevance Range 0 = NA 1 (Low) to 5(High)	(P) Priority Rating 1 = Low 2 = Med 3 = High	(RxP) Score
Category	**Decision Making Question**			
Construction Time	Are there weather limitations for conventional construction?	1	1	1
	Is there restricted construction time due to environmental schedules?	1	1	1
	Is there restricted construction time due to economic impact?	1	1	1
	Has the District expressed the desire to complete the bridge construction in one season?			
	Is the bridge construction on a critical path of the total project?	5	2	10
Environmental	Does ABC mitigate a critical environmental impact or sensitive environmental issue?	1	1	1
User Costs and Delays	Does the bridge carry or is it over a route with high ADT and/or ADTT?	5	1	5
	Would ABC significantly improve the traffic control/maintenance plan?	1	1	1
	Are only short term closures allowable?	5	1	5
	Will conventional bridge construction cause a significant delay/detour time?	5	1	5
	Will bridge construction have an adverse impact on the local economy?	1	1	1
Site Conditions	Are there existing railroads that impact the construction window or construction activities?	0	0	0
	Are there existing utilities that impact the construction window or construction activities?	5	1	5
	Does the site create problems for conventional construction methods?	1	1	1
	Is the bridge over a waterway?	0	0	0
Risk Management	Does ABC improve worker safety?	1	1	1
	Does ABC improve traveler safety?	1	1	1
	Does ABC allow management of a particular risk? If yes, identify risk here: _____	0	0	0
Other	Will repetition of elements allow for economy of scale?	0	0	0
		ABC Rating		39

form updated 11/19/13

ABC DECISION FLOW CHART

http://onramp.dot.ca.gov/hq/des/sd/
Example: Route 37/29 Separation (#23-0218)



Hydraulics/Hydrology

1. District 04 Hydraulics has provided design rainfall intensity.
2. Structures Hydraulics has reviewed the project for its impact on Chabot Creek and has found no hydrology or hydraulic problems associated with the project
3. District 04 Environmental Section has requested that columns not be placed within Chabot Creek as Fish and Game and the Corps of Engineers would strongly discourage such columns. Columns in the creek would also pose an impact to the wetlands mitigation.

Corrosion

Soil and water at the site may be corrosive. Corrosion potential and recommendations for mitigation will be addressed in final foundation recommendations for elements in contact with soil.

There are special requirements for elements in Marine Atmosphere, but the determination of whether the project site is considered within a Marine Atmosphere is unclear at this time. DES Corrosion Technology is currently researching the area and will make recommendations on whether the project site should be considered within the Marine Atmosphere. Marine Atmosphere includes both the atmosphere over land within 1000 feet of ocean or tidal water, and the atmosphere above the splash zone. Tidal water for this application is any body of water having a chloride content of 500 ppm or greater.

Permits and Agreements

California Endangered Species Act

California Department of Fish and Game

Bay Conservation and Development Commission (BCDC)

Regional Water Quality Control Board

National Pollutant Discharge Elimination System

US Army Corps of Engineers

State Reclamation Board Permit

Federal Endangered Species Act

Union Pacific Railroad (UPRR)

City of Vallejo

Caltrans Efforts

1. The Final Project Report was completed November 17, 1997.
2. The Final Environmental Report/Statement was completed May 1998.
3. A Draft Value Analysis Study was completed on July 10, 1997.
4. District 04 requested an APS on October 24, 1998, but it was quickly followed by a Bridge Site Submittal on November 2, 1998. Consequently the APS was shelved in favor of completing the General Plans.
5. District 04 submitted a Bridge Site Data submittal for Non-Standard Retaining Walls on January 14, 1999.
6. Preliminary Investigations started their work in mid February 1999 and expect to complete their work by the end of April 1999.

Hazardous Materials

Hazardous materials have not been identified at the site. No provisions have been included in the estimate to account for disposal of hazardous materials.

Project Risks

Risks have been added or retired on the Project Risk Register (see attached Risk Register)

General

1. Route 37 is in the State SHELL route system. There are no special construction loadings.
2. There are no restrictions for contractor storage facilities.

Project Milestones

Structures Design has not yet committed to completion dates as we were waiting for the General Plan Estimates to be completed before scheduling the work. The dates proposed by District 04 are:

Project EA	Structures P&Q Date	Structures PS&E Date
04-0T1411	10/29/2000	11/24/2000
04-0T1421	9/15/2000	11/10/2000

Route 37/29 Separation (#23-0218)

Structure Type	***CP/PS Box Girder***
Spans	145.5, 191.7, 129.0, 129.0, 126.7, 160.1, 168.5 ft
Structure Depth	8.25ft Depth/Span Ratio = 0.043
Abutment 1	High cantilever seat type abutment required as wetlands mitigation prohibits abutment approach fill. 100 ton driven piles. Battered piles at toe. Roadway fill slope set to start at face of abutment. 1:1.5 Abutment fill slope set to provide for future 12 ft lane on Route 29.
Abutment 7	Short seat type abutment on 100 ton driven piles. Battered piles at toe. Fill slopes = 1:1.5 Toe of fill set at edge of access road.
Bents	6.0 ft diameter Type 2R flared six column bents with pinned base and 100 ton driven piles. Outrigger bents with 10ft diameter circular columns with fixed base, pinned top and 70 ton driven piles used where required to produce equal spans. No columns permitted in Chabot Creek. Columns set to provide minimum 12 ft clearance from edge of shoulder on route 29 to provide for future widening.
Construction Sequence	Construct approach fills with surcharge and wick drains. Surcharge fill allowed to temporarily spill into wetlands. Settlement period required. Construct bridge with falsework over existing two lane Route 29, Chabot Creek and Access road. Detour required for construction of column foundation in median of Route 29.
Vertical Clearance	18.46 ft provided vs 16.73 ft minimum required.
Temporary Vertical Clearance	15.46 ft provided vs 15.09 ft minimum required.
Barriers	Type 732 at edge of deck and Type 60 at median.
Slope Paving	None
Approaches	PCC pavement on approaches. Structure Approach Slab Type N(30S)
Deck Protection	The proposed structure is located in Enviromental Area No.1. No special deck protection is required.
Drains	None on the structure
Temperature Range	35° F to 100° F
Joints	Type B joints at abutment. MR = 2"
Utilities	None. Provide one future utility opening. District will advise on necessity for irrigation supply lines and control conduit.
Future Widening	None

Broadway Overhead (#23-0219)

Structure Type	***CP/PS Box Girder***
Spans	149.0, 147.6, 165.4 ft
Structure Depth	6.56 ft Depth / Span Ratio = 0.040
Abutments	Short seat type abutments on 70 ton driven piles. Predrill through abutment fill. Fill slopes = 1:1.5. Toe of fills set to provide 10ft clear to R/W fences. Must avoid 54" sewer line Abut 4. (needs to be located)
Bent	5.5 ft diameter Type 2R flared four column bent. Pinned base. 70 ton driven piles. Footing excavation will not impact railroad.
Vertical Clearance	24.67 ft provided at railroad vs 23 ft minimum required. 28.87 ft provided at Broadway Street vs 16.73 ft minimum required.
Horizontal Clearance	42.17 ft provided between centerline railroad and face of column vs 25 ft required.
Temporary Vertical Clearance	24.67 ft provided at railroad vs 23 ft minimum required. 28.87 ft provided at Broadway Street vs 15.09 ft minimum required.
Barriers	Type 732 at edge of deck and Type 60 at median.
Slope Paving	None
Approaches	PCC pavement on approaches. Structure Approach Slab Type N(30S)
Deck Protection	The proposed structure is located in Enviromental Area No.1. No special deck protection is required.
Drains	At right edge of deck at Abutment No.1
Temperature Range	35° F to 100° F
Joints	Joint seal assembly at abutments. MR = 2.5"
Utilities	None. Provide one future utility opening. District will advise on necessity for irrigation supply lines and control conduit.
Safety Fence	None
Future Widening	None

Structure Costs

Bridge Name	Bridge No.	Type	Cost	Area sf	Cost/sf
Wilson Ave OC Alt#1	23-0217	CIP/PS Piles	$1,174,000	12,206	$96
Wilson Ave OC Alt#2	23-0217	CIP/PS Piles	$1,182,000	13,799	$86
Route 37/29 Separation	23-0218	CIP/PS Piles	$11,640,000	113,526	$103
Broadway OH	23-0219	CIP/PS Piles	$3,973,000	50,073	$79
Mini Drive UC	23-0220	CIP/PS Spread	$1,490,000	19,224	$78
N29-E37 Connector (Ramp H)	23-0221G	CIP/PS Piles	$646,000	6,705	$96
W37-N&S Connector (Ramp I)	23-0222F	CIP/PS Piles	$1,389,000	16,404	$85
S29-W37 Connector (Ramp K) Alt #1	23-0223F	Bathtub	$3,162,000	26,489	$119
S29-W37 Connector (Ramp K) Alt #2	23-0223F	Bulb Tee	$2,898,000	26,489	$109
S29-W37 Connector (Ramp K) Alt #3	23-0223F	Steel	$3,009,000	26,489	$114
Subtotal Bridges			$23,210,000	244,631	$95
Retaining Wall No.1	23-WALL1	Type 5SWB	$1,734,000	9,063	$191
Retaining Wall No.2 Alt #1	23-WALL2	Type 1 Piles	$2,706,000	18,201	$149
Retaining Wall No.2 Alt #2	23-WALL2	MSE	$1,276,000	18,201	$70
Retaining Wall No.3	23-WALL3	Type 1 Piles	$349,000	1,711	$204
Retaining Wall No.4 Alt #1	23-WALL4	Type 1 Spread	$351,000	6,189	$57
Retaining Wall No.4 Alt #2	23-WALL4	Type 5 Spread	$125,000	2,271	$55
Subtotal Retaining Walls			$3,484,000	31,247	$111
Total Bridges and Retaining Walls			$26,694,000		

Grey filled cells represent selected alternative

Risk Register

(http://onramp/hq/projmgmt/index.jsp?pg=65)

LEVEL 2 - RISK REGISTER				Project Name:	Route 37 near Napa River Bridge	DIST- EA	04-0T1410	Project Manager	PM Person					
Risk Identification						Risk Assessment					Risk Response			
Status	ID #	Type	Category	Title	Risk Statement	Probability	Cost Impact	Cost Score	Time Impact	Time Score	Strategy	Response Actions	Risk Owner	Updated
Active	161	Threat	Environmental	Challenge to EIR	Potential lawsuits may challenge the environmental report, delaying the start of construction or threatening loss of funding.	1-Very Low	4 -Moderate	4	8 -High	8	Mitigate	Address concerns of stakeholders and public during environmental process	EIR Person	11/23/2012
Active	163	Threat	Construction	Buried Objects	Unanticipated buried man-made objects uncovered during construction require removal and disposal resulting in additional costs.	3-Moderate	4 -Moderate	12	4 - Moderate	12	Accept	Include a Supplemental Work item to cover this risk.	PM	11/24/2012
Active	164	Threat	Design	Supplemental EIR	A design change that is outside of the parameters contemplated in the Environmental Document triggers a supplemental EIR which causes a delay due to the public comment period.	3-Moderate	4 -Moderate	12	8 -High	24	Avoid	Monitor design changes against ED to avoid reassessment of ED unless the opportunity outweighs the threat	Design Manager	11/24/2012
Active	165	Threat	Environmental	Nesting birds	Nesting birds, protected from harassment under the Migratory Bird Treaty Act, may delay construction during the nesting season.	2-Low	2 -Low	4	8 -High	16	Mitigate	Schedule contract work to avoid the nesting season or remove nesting habitat before starting work.	PM/RE	11/24/2012
Active	166	Threat	R/W	Additional R/W	Due to the complex nature of the staging, additional right of way or construction easements may be required to complete the work as contemplated, resulting in additional cost to the project.	3-Moderate	8 -High	24	8 -High	24	Mitigate	Re-sequence the work to enable R/W Certification	R/W Person	11/24/2012
Active	167	Threat	DES	Inaccurate Log of Test Borings (LOTB)	Relating old LOTB to the new alignment may provide inaccurate foundation recommendation requiring redesign	2-Low	4 -Moderate	8	8 -High	16	Mitigate	Drill new exploritory holes	PM	11/24/2012