



Item No. 16 Town of Atherton

CITY COUNCIL STAFF REPORT – REGULAR AGENDA

**TO: HONORABLE MAYOR AND CITY COUNCIL
GEORGE RODERICKS, CITY MANAGER**

**FROM: MICHAEL KASHIWAGI
COMMUNITY SERVICES DIRECTOR**

DATE: NOVEMBER 20, 2013

**SUBJECT: APPROVAL OF DESIGN ALTERNATIVE AND DIRECTION TO
NEGOTIATE A DESIGN CONTRACT WITH BIGGS CARDOSA
ASSOCIATES FOR THE MARSH ROAD RETAINING WALL
REPAIR**

RECOMMENDATION

1. Approve the selection of a concrete cast-in-place culvert option 2A to repair the Marsh Road Wall segment of the Atherton Channel and incorporate design elements to accommodate a future bike/pedestrian path,
2. Select a preferred concept for a possible bike/pedestrian path, and
3. Direct staff to negotiate an agreement for design with Biggs Cardosa Associates, Inc. to be brought to City Council for approval.

BACKGROUND

The purpose of this report is to summarize analyses performed on the Marsh Road portion of the Atherton Channel and to also review prior City Council direction, answer questions and provide sufficient information to allow for informed decisions.

The Marsh Road portion of the Atherton Channel not only provides one side of the Channel, which carries storm water, but also serves to support Marsh Road. The Town constructed emergency repairs in 2006 to reinforce a failing section of the Marsh Road Wall. Currently, both side walls and the bottom (invert) of the Channel have deteriorated and are in need of repair. In September, 2012, City Council authorized a contract with Biggs Cardosa Associates, Inc. (BCA) for analysis and preliminary design services for the Marsh Road Retaining Wall Design (Phase I). Their scope of work was to inspect the Channel and to recommend a repair alternative. In March 2013, BCA presented their analysis of the existing Channel's capacity and current conditions, which include cracks and voids behind and under the Marsh Road wall as well as the rock wall on the Channel's south side. BCA described four preliminary designs to fix the Channel walls. BCA analyzed factors including cost, construction impacts, longer-term impacts

and other qualitative factors. Two alternatives stood out as superior, based on their ability to implement repairs at least cost (both approximately \$2.1 million): Option 2A, Cast-in-place Wall and Option 3, Soil Nail Wall. Both options could accommodate a future cover. Council reached consensus to drop options 1 and 2B based on the consultant's recommendations. City Council requested analysis of two additional options: a steel pipe and a covered concrete box culvert (Option 4A), and also requested additional analysis of long-term impacts, including maintenance costs. At a workshop in October, 2013, BCA presented their findings that these options would be significantly more expensive than Options 2A and 3 and also would require more intensive environmental review and documentation, as well as more intensive environmental compliance measures.

At the October workshop, Council reached consensus to eliminate options 3 and 4B from further consideration, due to higher costs, limited future flexibility and other drawbacks as noted in the Table 1. Council then focused its interest on the two highest scoring remaining options, options 2A, cast-in-place walls and invert and option 4A, a box culvert. Table 1 summarizes BCA's conclusions.

TABLE 1			
OPTION	TYPE	SCORE	COMMENTS
1	Soldier pile	29	Higher cost
2A	Cast-in-place	30	Preferred, allows future 2 nd pipe
2B	Pre-cast	25	Higher cost, greater construction impacts
3	Soil nail	33	Desirable, same cost as 2A, precludes 2 nd pipe
4A	Box culvert	29	Same as 2A, but longer permitting time, higher cost
4B	Steel pipe	26	Higher cost, less durable

As a result of City Council discussion at the October workshop, staff and BCA performed additional analysis on the following items:

- Could a solid concrete cover be placed over the Channel, what are its costs, schedule impacts, and impact hydraulic capacity?
- Could an open cover supporting a boardwalk be placed over the Channel, what are its costs, schedule and hydraulic capacity impacts?
- If the Channel were repaired and not covered at this time, what would the additional cost be to place a cover in the future?
- Environmental, permitting and scheduling implications of covering the Channel
- Urgency of repairs?

FINDINGS

BCA prepared a supplemental report as a follow-up to their September 16, 2013 Type Selection Memorandum. In the follow-up, they performed additional analysis on three options, two of which are variants of Option 2A. In two alternatives, a cover is added later and in one, shown as option 4A, the cover is formed and cast along with construction of the Channel sides and bottom to form a box culvert. All three options restore structural integrity and address the risk of wall and road failure.

Cast-in-place Alternative with Possible Concrete Cover

Alternative 2A-1 would construct cast-in-place concrete walls and invert at a construction cost of \$2,384,000 in current dollars, which excludes a safety railing. It would be capable of having a cover added, at a cost in current dollars of \$1,057,000. The additional cost would be up to 20% higher, plus inflationary impacts, if the cover were built later than the initial construction. Replacement of the existing chain link fence would cost between \$160,000 and \$590,000, depending on the railing selected. The Channel capacity would initially remain unchanged at 467 cubic feet per second (cfs). Staff assumes that this repair project would be environmentally approved under a Negative Declaration. Staff also assumes that a CA Fish and Game permit could be relatively easy to acquire, and that no other regulatory permits are needed, since the Channel invert in this area is already paved with concrete. Without a cover, it is assumed that no additional environmental mitigation would be required.

Cast-in-place Alternative with Possible Boardwalk

Alternative 2A-2 would be the same construction of the walls and invert at the same cost of \$2,384,000. The cover, which could be added later, would be taller than the concrete lid, since the bottom would need to be raised higher above the Channel to avoid snagging debris. The boardwalk and supporting structure is estimated to cost \$2,006,000 in current dollars. The boardwalk would be suspended over the Channel and would allow light and air into the Channel. The Channel capacity would remain unchanged at 467 cubic feet per second (cfs) with or without the boardwalk.

Box Culvert

The last alternative to be considered, 4A, was previously discussed at the October workshop. It would have a concrete cover constructed at the same time as the Channel walls and invert. Its estimated construction cost is \$2,859,000 in current dollars. No safety railing would be installed. By connecting to the existing box culvert immediately west of Bay Road, the box culvert could carry 650 cfs if the culvert operated under pressure. However, BCA recommends that relief openings be installed so that there would be no change in hydraulic conditions. Alternative 4A, as well as Alternative 2A-1 with a cover, would therefore not change flooding north of Marsh Road in the Athlone Terrace neighborhood or west of Route 101.

If Council wants to consider changes to design which would increase hydraulic capacity, additional studies and environmental clearance concerns would need to be analyzed. Even without any change in hydraulics, construction of a cover over the existing open channel would require additional environmental analysis, at an estimated cost of \$400,000. In addition, regulatory agency permitting and environmental mitigation would probably be required. Staff has no estimate of these costs at this time. Engineering consultants have suggested that this effort could add 24 to 36 months to the project's schedule.

Possible Bike/Pedestrian Path and Funding

Council requested that consideration be given to the installation of a bike/pedestrian path atop the Channel. All three of the alternatives under consideration can accommodate a bike/ped path. However, some additional actions would need to be taken. In order to pursue grant funding, whether competitive or matching, a path would need to be incorporated into local and regional bikeway master plans showing connections at the beginning and end of the route. Not only is this essential for project funding, but it is also necessary as a practical matter for users. Without these connections, a path would terminate without a safe alternative for users. Staff is working with adjacent jurisdictions to develop alternatives. By the time the Channel repair project's design is nearly complete, an alternative may be adopted, thus allowing an additive alternate to the bid; however, at this time a possible path does not allow for regional connections. Also, as noted elsewhere, additional environmental and permitting activities would be required to implement a path.

Once the path is included in both Atherton's and the County's Bike Master Plan, staff would pursue funding for the path and for the Channel's cover, which would be required to support the path. Pursuit of funding would occur in parallel with design and permitting for the Channel repair.

ENVIRONMENTAL ANALYSIS

The Planning Department has determined that repair of the Marsh Road portion of the Atherton Channel is Categorically Exempt, pursuant to CEQA Guidelines Section 15302(c), replacement or reconstruction of existing utility systems and/or facilities involving negligible or no expansion of capacity.

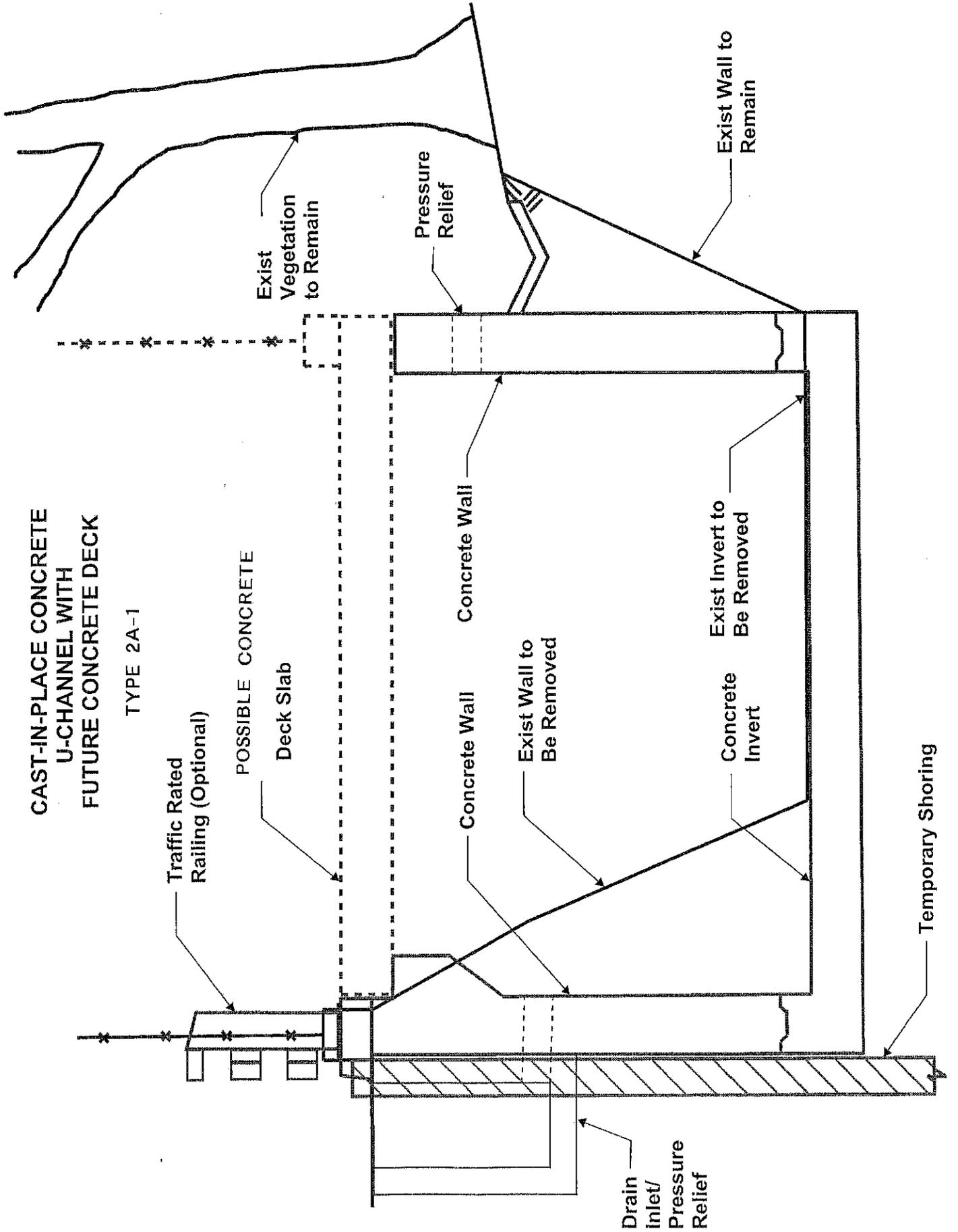
FISCAL IMPACT

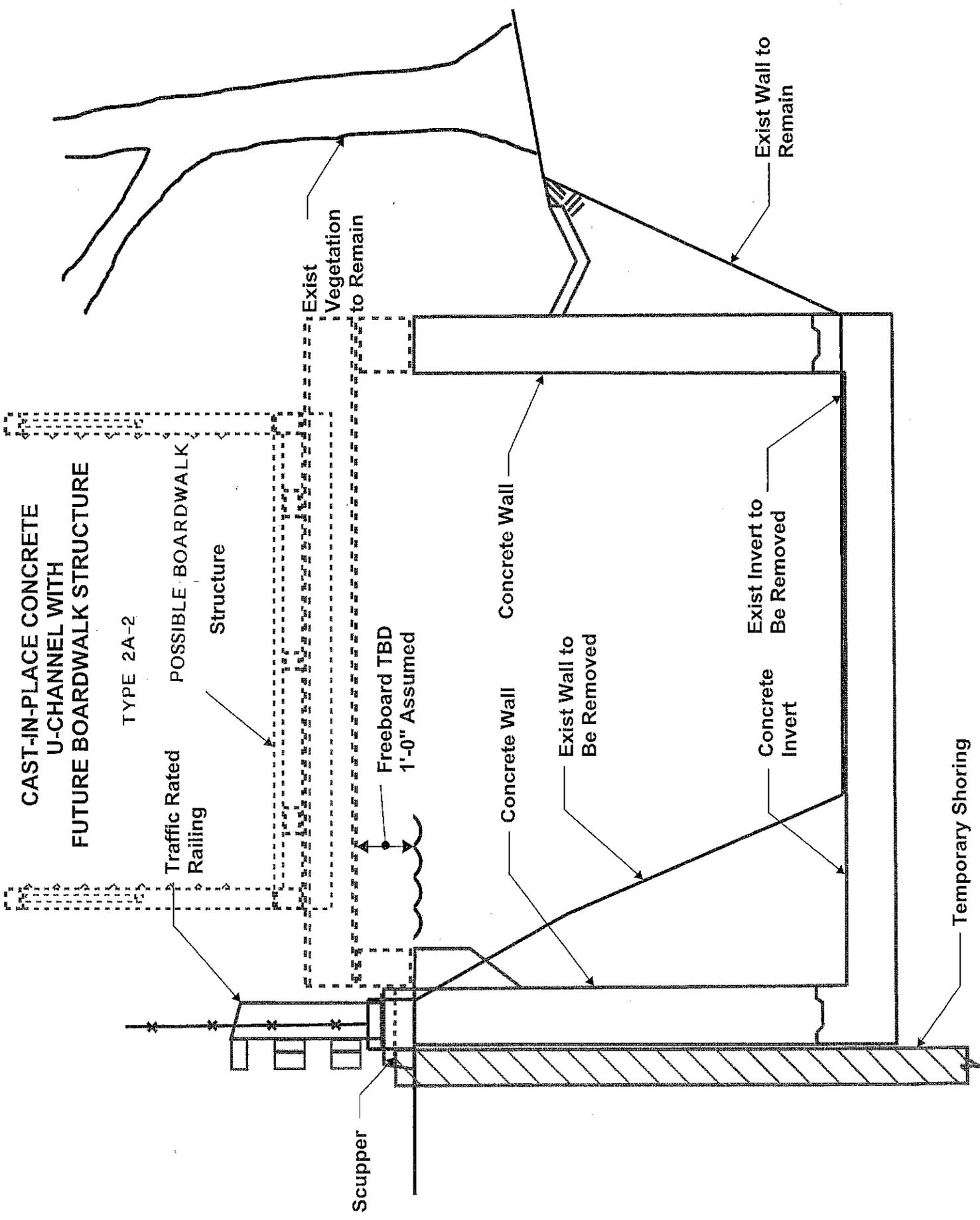
The project is included in the Five Year Capital Improvement Program with four sources of funds for a total of \$2,764,000. The current FY 13-14 budget is \$210,000. The major source is the Special Parcel Tax, with Road Construction Impact fees, Measure A and Atherton Channel funds making up the balance. These funds are adequate for construction of Alternative 2A with no cover or path. Funds would need to be identified and appropriated in the future for environmental analysis and mitigation and for construction of a cover, if this were directed by City Council.

Enc: Type Exhibit 2A-1
Type Exhibit 2A-2
Type Exhibit 4A
BCA Supplemental Memo dated 11/14/13

CAST-IN-PLACE CONCRETE
U-CHANNEL WITH
FUTURE CONCRETE DECK

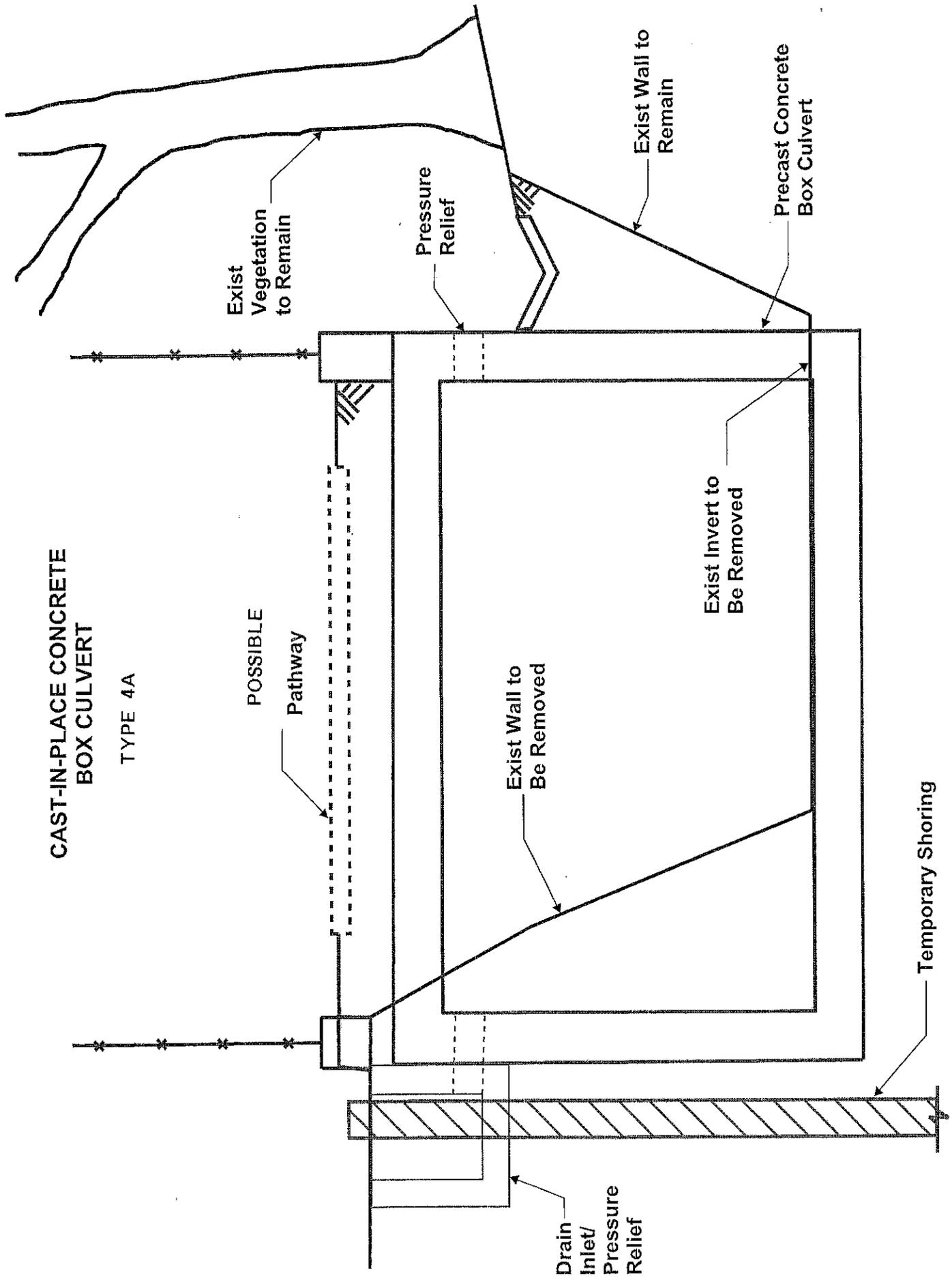
TYPE 2A-1





CAST-IN-PLACE CONCRETE BOX CULVERT

TYPE 4A



Re: Marsh Road Retaining Wall Project

To: Town of Atherton
91 Ashfield Road
Atherton, CA 94027

Attn: Gordon Siebert

Mr. Siebert:

Biggs Cardosa Associates, Inc. has prepared the following memorandum in response to questions raised by the Town of Atherton Council at a Special Council Meeting regarding the Marsh Road Channel Repair Project on Wednesday evening, October 2, 2013. The questions during this special session pertained to clarifying some specific hydraulic capacities within the channel. There was also a desire to expand on the closed channel options presented at the special session.

HYDRAULICS

With regards to the project hydraulics, further analysis was produced to define the amount of flow leaving the channel at the Fair Oaks Culvert. As was stated in the preliminary Hydraulics Report within our Type Selection Memorandum, the water during a 10-year event will overtop the existing bank along the east side of the channel along the project limits. A significant loss in channel flow is not anticipated due to this overtopping. This volume during the 10-year event flow leaving the channel at the Fair Oaks Culvert is approximately 230 cfs during the 10-year event.

Additionally, any revision to the existing outflow conditions may also incur additional studies and Environmental Clearance concerns. Restricting the channel will improve the local flooding issues within the project limits but may have an adverse impact to downstream flooding conditions. It is anticipated that constricting the flood situation within the project limits will cause increased flooding downstream of US101 for a 10 year or greater event occurrence. It may also have other impacts to other downstream areas.

As such, it is recommended that we maintain the existing flow and flood condition within the project limits so that we maintain the existing flow volumes downstream of the project. This will require that we place water pressure relief openings to allow the overflow to occur within the channel. This will basically simulate the open condition even though the channel is covered. It is likely that these pressure relief openings will be concentrated at the ends of the channel and then located intermittently throughout channel length. Under this condition, the additional environmental issues associated with the hydraulics concerns will not be significant for these options. There will still be potential issues for regulatory approval.

REFINED CHANNEL OPTIONS

As indicated in the special session, the Town council was inclined to cover the open channel segment and proposed reviewing two options for covering the channel, 1) Option 4A – Cast-in-place Reinforced Box Culvert, and 2) Option 2 – Cast-in-place Concrete U Channel modified to accommodate a future pedestrian and bicycle boardwalk structure. These items were later clarified with Town Staff at a subsequent meeting. After conversations with the Town Staff at a meeting on Oct 23, 2013, it was decided for this memorandum that we focus on cost and design comparisons of the following alternatives:

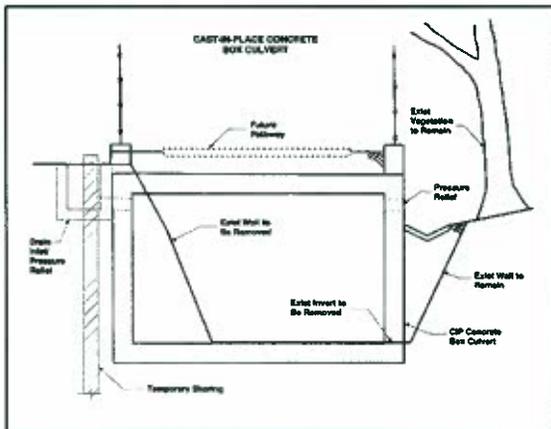
- Cast-In Place Concrete Box Culvert
- Cast-In Place Concrete U-Channel with Future Concrete Deck Slabs
- Cast-In Place Concrete U-Channel with Future Boardwalk Structure

Sketches of all three alternatives are attached for your review and reference. These options are basically modification of existing Options contained within our Type Selection Memorandum dated Sept 16, 2013 and as a result are all feasible. They will have the same pros and cons for those alternatives as contained within that document. The Concrete U-Channel Options have the advantage of being able to accommodate the repair work as originally scoped, but allows for the easy incorporation of the future pedestrian and bicycle facility that the Town is looking to include with the closed option.

As has been stated several times, the closed option systems are outside of the original direction of providing an open channel rehabilitation/replacement for the existing concrete lined and rock walled channel. While the closed system is a viable alternative and has been added to our Type Selection Memorandum, this option may incur additional cost and time delay to resolve potential Environmental Clearance and permitting concerns.

Cast-in-Place Concrete Box Culvert:

This alternative uses standard cast-in-place construction techniques to replace the existing channel with a cast-in-place, reinforced concrete box culvert. The west (left) wall would be removed and the new box culvert would be cast-in-place just to the west of the existing east (right) bank. By casting the new box culvert adjacent to the old wall, slope stability and tree impacts associated with removal of the wall are eliminated. It can accommodate a raised sidewalk and path in the future condition and the temporary chain link fence can remain in place or be removed

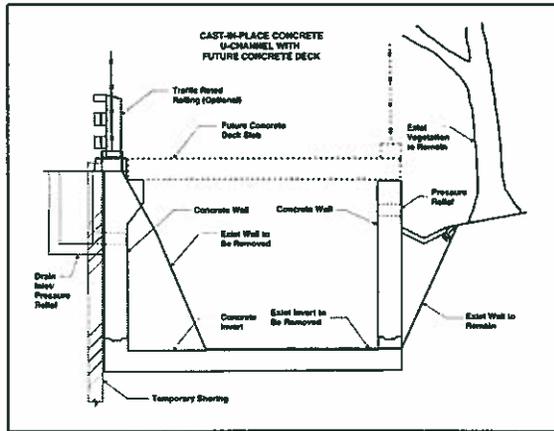


Pros and Cons:

- + Minimal impact to existing east bank trees/vegetation
- + Accommodates future pedestrian/bicycle pathway project
- + Cheaply incorporates pathway project
- + Majority of construction performed within the channel limits (minimal equipment staging on Marsh Road)
- Temporary shoring required to facilitate existing wall removal and in-channel construction
- Might not qualify as CatEx under CEQA

Cast-in-Place Concrete U-Channel with Future Concrete Deck:

This alternative uses standard cast-in-place construction techniques to replace the existing channel with a cast-in-place, reinforced concrete U-frame channel. A future deck can be constructed with poured cast-in-place concrete decking or erected precast concrete deck units.



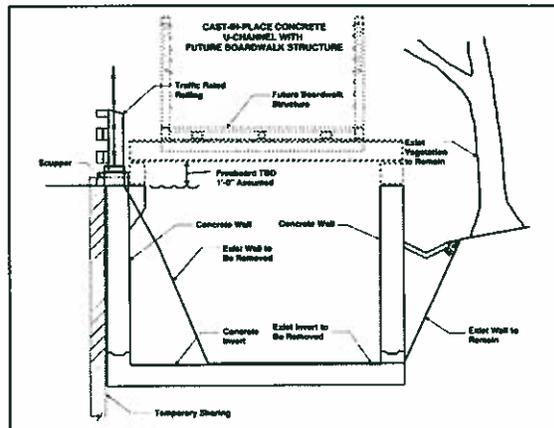
slab erection process

Pros and Cons:

- + Qualifies as CatEx under CEQA (initial construction)
- + Minimal impact to existing east bank trees/vegetation
- + Designed to accommodate future Pedestrian/Bicycle Pathway project
- + Majority of construction performed within the channel limits (minimal equipment staging on Marsh Road) (initial construction)
- Temporary shoring required to facilitate existing wall removal and in-channel construction (initial construction)
- May have a greater impact to trees during precast deck

Cast-in-Place Concrete U-Channel with Future Boardwalk Structure:

This alternative uses standard cast-in-place construction techniques to replace the existing channel with a cast-in-place, reinforced concrete U-frame channel. A future boardwalk structure can be constructed with prefabricated steel truss spans supported on steel beams spanning the channel.



Pros and Cons:

- + Qualifies as CatEx under CEQA (initial construction)
- + Minimal impact to existing east bank trees/vegetation
- + Designed to accommodate future Pedestrian/Bicycle Pathway project with separate boardwalk structure
- + May create more open feel within the channel
- + Majority of construction performed within the channel limits (minimal equipment staging on Marsh Road) (initial construction)
- Temporary shoring required to facilitate existing wall removal and in-channel construction (initial construction)

- May have greater impacts to the trees during prefabricated truss erection process

CHANNEL OPTION COSTS

Preliminary estimates of probable construction costs were prepared for each Option based on anticipated Contractor construction operations. Refer to Attached Engineer's Estimate for additional information:

Alternate	Project Cost	Channel Length (LF)	Cost/LF Channel
Concrete Box Culvert	\$2,859,000	1,805	\$1,584
Future Pathway above Box	\$150,000		\$83
Total	\$3,010,000		\$1,667
Cast-in-Place U-Channel (Future Concrete Deck)	\$2,384,000	1,805	\$1,321
Future Concrete Deck	\$1,057,000		\$585
Total	\$3,441,000		\$1906
Cast-in-Place U-Channel Only (Future Boardwalk)	\$2,384,000	1,805	\$1,321
Future Boardwalk Structure	\$2,006,000		\$1,111
Total	\$4,389,000		\$2,432

Above costs are based on past project experience and readily available industry cost data at time of report preparation. Estimated costs include structural items of work only and are limited to baseline aesthetics. Other non-structural, incidental work items, such as temporary fencing, site restoration, etc, are not included. The above estimates also include the cost of the future items of work

Projected additional costs for replacement of the chain link fencing with a steel railing are on the order of \$160,000 to \$590,000 depending on the railing selected.

Projected additional costs for colorizing and texturing the exposed concrete surfaces beyond standard concrete/shotcrete finishes are on the order of \$30,000 to \$300,000 depending on the treatments selected with the lower end cost being indicative of simple concrete coloring of the east wall and the upper end being indicative of more complex combination of texture and color such as a sculpted rock finish applied to both walls

Potential modification of the existing Fair Oaks Avenue Box Culvert head wall is not included in the channel repair project scope of work and therefore conceptual headwall modification cost estimates were not developed or included in the above Type Selection alternative costs.

ADDITIONAL CONCERNS

Deferring replacement runs the risk of additional channel deterioration leading to potential localized failures which would require emergency repair similar to the 2006 failure which

resulted in significant local traffic disruption and costs to the Town on the order of \$85,000. Additionally, the distressed wall is currently supporting Marsh Road, which is the major connecting road from the US101 into the Town of Atherton. As a result, any localized failure of the channel would have a major impact and inconvenience to the Town and its residents. Localized failures could occur under overstressing of the wall due to substantial vehicular loading or overloaded vehicles. This is a highly traveled thoroughfare and the main access into the Town. The distress levels can be exacerbated by fluctuating groundwater and flow conditions during regular and storm conditions.

If the Town wishes to defer the channel repairs to provide additional time to secure environmental clearance for covering the channel in concert with the repair, we recommend that the Town implement a more robust maintenance and inspection program during that period. It is recommended that regular channel inspection and maintenance be performed by the Town until the channel replacement is complete. Activities should include monitoring all significant cracks and bulges in the walls, and patching of all significant voids in the walls and invert slab. However, it needs to be clearly noted that even with regular high quality inspection and maintenance, it is our opinion that future degradation and localized failures may still occur during that period.

While the channel has virtually no biological value, the regulatory agencies will still be loath to permit a project that places an open channel into a buried culvert. The trend, especially in the Bay Area, is to pursue options for “day lighting” channels and the restoration of natural creek function in terms of wildlife habitat. This site is narrow, straight, and constrained on both sides. Opportunities for widening, creating meanders, riffles/pools, and revegetation are limited if not virtually non-existent. Such options may be what regulators will want the Town to explore.

Additionally, the desired alternative of placing this channel into a closed/covered box section will be difficult to obtain the necessary regulatory permits. It is also likely that they will treat the boardwalk in the same manner as it will essentially cover the channel, albeit in a different way. Typically, the agencies require compensatory mitigation for loss of linear features, even armored, urbanized channels like this one. It may be expected that the regulatory agencies may require a compensation of a linear foot of channel day lighted and restored for each linear foot of channel buried. There may be difficulties in accommodating these requirements so there may be some discussion about alternative meaningful enhancement/restorations along a channel or waterway, preferably along the same watershed. Other less preferable alternatives may be visited and negotiated, however this can draw out the Environmental and permitting processes. Therefore, if the Town wishes to pursue a covered option and construct concurrently with the repairs, it is anticipated that this would have the potential to extend the Environmental Clearance approval and permitting out an additional 24 to 36 months. The U-channel option that allows for future covering has the added flexibility to decouple the repair and future improvement projects allowing the repairs to proceed immediately with under a Categorical Exemption environmental clearance and still readily accommodates for the future pedestrian improvements.

RCVD BY: _____

IN EST: _____

OUT EST: _____

BRIDGE: Marsh Road Channel BR. No.: Option -

DISTRICT: 04

TYPE: Cast-In-Place Concrete Box Culvert w/ Future Pathway

RTE: LOCAL

CU: _____

CO: SM

EA: _____

PM: -

LENGTH: 1,805.00 Height Varies AREA (SF)= Varies

DESIGN SECTION: BCA
 # OF STRUCTURES IN PROJECT : 1 EST. NO. 35%
 PRICES BY : BCA COST INDEX:
 PRICES CHECKED BY : DATE:
 QUANTITIES BY: SOO DATE: 07/19/2013

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	PRICE	AMOUNT
1	REMOVE CONCRETE (CHANNEL)		CY	818	\$85.00	\$69,530.00
2	TEMPORARY SHORING		SF	15,024	\$20.00	\$300,480.00
3	STRUCTURE EXCAVATION (CULVERT)		CY	2,335	\$45.00	\$105,075.00
4	STRUCTURE BACKFILL (CULVERT)		CY	1,855	\$20.00	\$37,100.00
5	STRUCTURAL CONCRETE, CULVERT		CY	2,161	\$450.00	\$972,450.00
6	BAR REINFORCING STEEL (CULVERT)		LB	497,285	\$1.10	\$547,013.50
7	CHAIN LINK FENCE		LF	1,805	\$15.00	\$27,075.00
8	CONCRETE PAVEMENT		SF	14,440	\$7.50	\$108,300.00
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SUBTOTAL	\$2,167,024
MOBILIZATION (@ 10%)	\$240,780
SUBTOTAL BRIDGE ITEMS	\$2,407,804
CONTINGENCIES (@ 25%)	\$601,951
BRIDGE TOTAL COST	\$3,009,755
COST PER LINEAR FOOT	\$1,667.45
BRIDGE REMOVAL (CONTINGENCIES INCL.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	\$3,009,755
BUDGET ESTIMATE AS OF	\$3,010,000

ROUTING

- DES SECTION
- OFFICE OF BRIDGE DESIGN - NORTH
- OFFICE OF BRIDGE DESIGN - CENTRAL
- OFFICE OF BRIDGE DESIGN - SOUTH
- OFFICE OF BRIDGE DESIGN - WEST
- OFFICE OF BRIDGE DESIGN SOUTHERN CALIFORNIA

COMMENTS: _____

Escalated Budget Estimate to Midpoint of Construction *

Escalation Rate per Year 2.0%

Years Beyond Midpoint	Escalated Budget Est.
1	\$3,070,000
2	\$3,131,000
3	\$3,194,000

Years Beyond Midpoint	Escalated Budget Est.
4	\$3,258,000
5	\$3,323,000

* Escalated budget estimate is provided for information only, actual construction costs may vary. Escalated budget estimates provided do not replace Departmental policy to update cost estimates annually.

Revised - December 3, 2007

RCVD BY: _____

IN EST: _____

OUT EST: _____

BRIDGE: Marsh Road Channel BR. No.: _____ Option - _____

DISTRICT: 04

TYPE: Cast-In-Place Concrete Box Culvert w/ Future Pathway

RTE: LOCAL

CU: _____

CO: SM

EA: _____

PM: -

LENGTH: 1,805.00 Height Varies AREA (SF)= Varies

DESIGN SECTION: BCA
 # OF STRUCTURES IN PROJECT : 1 EST. NO. 35%
 PRICES BY : BCA COST INDEX: _____
 PRICES CHECKED BY : _____ DATE: _____
 QUANTITIES BY: SOO DATE: 07/19/2013

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	PRICE	AMOUNT
1	REMOVE CONCRETE (CHANNEL)		CY	818	\$85.00	\$69,530.00
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SUBTOTAL	\$2,058,724
MOBILIZATION (@ 10 %)	\$228,747
SUBTOTAL BRIDGE ITEMS	\$2,287,471
CONTINGENCIES (@ 25%)	\$571,868
BRIDGE TOTAL COST	\$2,859,338
COST PER LINEAR FOOT	\$1,584.12
BRIDGE REMOVAL (CONTINGENCIES INCL.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	\$2,859,338
BUDGET ESTIMATE AS OF	\$2,859,000

ROUTING

1. DES SECTION
2. OFFICE OF BRIDGE DESIGN - NORTH
3. OFFICE OF BRIDGE DESIGN - CENTRAL
4. OFFICE OF BRIDGE DESIGN - SOUTH
5. OFFICE OF BRIDGE DESIGN - WEST
6. OFFICE OF BRIDGE DESIGN SOUTHERN CALIFORNIA

COMMENTS: _____

Escalated Budget Estimate to Midpoint of Construction *

Escalation Rate per Year 2.0%

Years Beyond Midpoint	Escalated Budget Est.
1	\$2,916,000
2	\$2,974,000
3	\$3,033,000

Years Beyond Midpoint	Escalated Budget Est.
4	\$3,094,000
5	\$3,156,000

* Escalated budget estimate is provided for information only, actual construction costs may vary. Escalated budget estimates provided do not replace Departmental policy to update cost estimates annually.

Revised - December 3, 2007

RCVD BY: _____

IN EST: _____

OUT EST: _____

BRIDGE: Marsh Road Channel BR. No.: Option -

DISTRICT: 04

TYPE: Cast-In-Place Concrete Box Culvert w/ Future Pathway

RTE: LOCAL

CU: _____

CO: SM

EA: _____

PM: -

LENGTH: 1,805.00 Height Varies AREA (SF)= Varies

DESIGN SECTION: BCA
 # OF STRUCTURES IN PROJECT : 1 EST. NO. 35%
 PRICES BY : BCA COST INDEX:
 PRICES CHECKED BY : DATE:
 QUANTITIES BY: SOO DATE: 07/19/2013

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	PRICE	AMOUNT
1	REMOVE CONCRETE (CHANNEL)		CY		\$85.00	
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4	STRUCTURE BACKFILL (CULVERT)		CY		\$20.00	
5	STRUCTURAL CONCRETE, CULVERT		CY		\$450.00	
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SUBTOTAL	\$108,300
MOBILIZATION (@ 10%)	\$12,033
SUBTOTAL BRIDGE ITEMS	\$120,333
CONTINGENCIES (@ 25%)	\$30,083
BRIDGE TOTAL COST	\$150,417
COST PER LINEAR FOOT	\$83.33
BRIDGE REMOVAL (CONTINGENCIES INCL.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	\$150,417
BUDGET ESTIMATE AS OF	\$150,000

ROUTING

- DES SECTION
- OFFICE OF BRIDGE DESIGN - NORTH
- OFFICE OF BRIDGE DESIGN - CENTRAL
- OFFICE OF BRIDGE DESIGN - SOUTH
- OFFICE OF BRIDGE DESIGN - WEST
- OFFICE OF BRIDGE DESIGN SOUTHERN CALIFORNIA

COMMENTS: _____

Escalated Budget Estimate to Midpoint of Construction *

Escalation Rate per Year 2.0%

Years Beyond Midpoint	Escalated Budget Est.
1	\$153,000
2	\$156,000
3	\$159,000

Years Beyond Midpoint	Escalated Budget Est.
4	\$162,000
5	\$165,000

* Escalated budget estimate is provided for information only, actual construction costs may vary. Escalated budget estimates provided do not replace Departmental policy to update cost estimates annually.

Revised - December 3, 2007

RCVD BY: _____

IN EST: _____

OUT EST: _____

BRIDGE: Marsh Road Channel BR. No.: Option -

DISTRICT: 04

TYPE: Cast-In-Place Concrete U-Channel with Future Concrete Deck

RTE: LOCAL

CU: _____

CO: SM

EA: _____

PM: -

LENGTH: 1,805.00 Height Varies AREA (SF)= Varies

DESIGN SECTION: BCA
 # OF STRUCTURES IN PROJECT : 1 EST. NO. 35%
 PRICES BY : BCA COST INDEX:
 PRICES CHECKED BY : DATE:
 QUANTITIES BY: SOO DATE: 11/13/2013

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	PRICE	AMOUNT
1	REMOVE CONCRETE (CHANNEL)		CY	818	\$85.00	\$69,530.00
2	TEMPORARY SHORING		SF	15,024	\$20.00	\$300,480.00
3	STRUCTURE EXCAVATION (RETAINING WALL)		CY	2,335	\$45.00	\$105,075.00
4	STRUCTURE BACKFILL (RETAINING WALL)		CY	941	\$20.00	\$18,820.00
5	STRUCTURAL CONCRETE, RETAINING WALL		CY	1,863	\$450.00	\$838,350.00
6	BAR REINFORCING STEEL (RETAINING WALL)		LB	217,971	\$1.10	\$239,768.10
7	TRAFFIC RATED RAILING		LF	1,805	\$80.00	\$144,400.00
8	FURNISH AND PLACE PRECAST CONCRETE DECK UNIT		SF	21,740	\$35.00	\$760,900.00
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SUBTOTAL	\$2,477,323
MOBILIZATION (@ 10 %)	\$275,258
SUBTOTAL BRIDGE ITEMS	\$2,752,581
CONTINGENCIES (@ 25%)	\$688,145
BRIDGE TOTAL COST	\$3,440,727
COST PER LINEAR FOOT	\$1,906.22
BRIDGE REMOVAL (CONTINGENCIES INCL.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	\$3,440,727
BUDGET ESTIMATE AS OF	\$3,441,000

ROUTING

1. DES SECTION
2. OFFICE OF BRIDGE DESIGN - NORTH
3. OFFICE OF BRIDGE DESIGN - CENTRAL
4. OFFICE OF BRIDGE DESIGN - SOUTH
5. OFFICE OF BRIDGE DESIGN - WEST
6. OFFICE OF BRIDGE DESIGN SOUTHERN CALIFORNIA

COMMENTS: _____

Escalated Budget Estimate to Midpoint of Construction *

Escalation Rate per Year

2.0%

Years Beyond Midpoint	Escalated Budget Est.
1	\$3,510,000
2	\$3,580,000
3	\$3,652,000

Years Beyond Midpoint	Escalated Budget Est.
4	\$3,725,000
5	\$3,800,000

* Escalated budget estimate is provided for information only, actual construction costs may vary. Escalated budget estimates provided do not replace Departmental policy to update cost estimates annually.

Revised - December 3, 2007

RCVD BY: _____

IN EST: _____

OUT EST: _____

BRIDGE: Marsh Road Channel BR. No.: Option -

DISTRICT: 04

TYPE: Cast-In-Place Concrete U-Channel with Future Concrete Deck

RTE: LOCAL

CU: _____

CO: SM

EA: _____

PM: -

LENGTH: 1,805.00 Height Varies AREA (SF)= Varies

DESIGN SECTION: BCA

OF STRUCTURES IN PROJECT : 1 EST. NO. 35%

PRICES BY : BCA COST INDEX:

PRICES CHECKED BY : DATE:

QUANTITIES BY: SOO DATE: 11/13/2013

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	PRICE	AMOUNT
1	REMOVE CONCRETE (CHANNEL)		CY	818	\$85.00	\$69,530.00
2	TEMPORARY SHORING		SF	15,024	\$20.00	\$300,480.00
3	STRUCTURE EXCAVATION (RETAINING WALL)		CY	2,335	\$45.00	\$105,075.00
4	STRUCTURE BACKFILL (RETAINING WALL)		CY	941	\$20.00	\$18,820.00
5	STRUCTURAL CONCRETE, RETAINING WALL		CY	1,863	\$450.00	\$838,350.00
6	BAR REINFORCING STEEL (RETAINING WALL)		LB	217,971	\$1.10	\$239,768.10
7	TRAFFIC RATED RAILING		LF	1,805	\$80.00	\$144,400.00
8	FURNISH AND PLACE PRECAST CONCRETE DECK UNIT		SF		\$35.00	
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SUBTOTAL	\$1,716,423
MOBILIZATION (@ 10%)	\$190,714
SUBTOTAL BRIDGE ITEMS	\$1,907,137
CONTINGENCIES (@ 25%)	\$476,784
BRIDGE TOTAL COST	\$2,383,921
COST PER LINEAR FOOT	\$1,320.73
BRIDGE REMOVAL (CONTINGENCIES INCL.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	\$2,383,921
BUDGET ESTIMATE AS OF	\$2,384,000

ROUTING

- DES SECTION
- OFFICE OF BRIDGE DESIGN - NORTH
- OFFICE OF BRIDGE DESIGN - CENTRAL
- OFFICE OF BRIDGE DESIGN - SOUTH
- OFFICE OF BRIDGE DESIGN - WEST
- OFFICE OF BRIDGE DESIGN SOUTHERN CALIFORNIA

COMMENTS: _____

Escalated Budget Estimate to Midpoint of Construction *

Escalation Rate per Year

2.0%

Years Beyond Midpoint	Escalated Budget Est.
1	\$2,432,000
2	\$2,481,000
3	\$2,531,000

Years Beyond Midpoint	Escalated Budget Est.
4	\$2,582,000
5	\$2,634,000

* Escalated budget estimate is provided for information only, actual construction costs may vary. Escalated budget estimates provided do not replace Departmental policy to update cost estimates annually.

Revised - December 3, 2007

RCVD BY: _____

IN EST: _____

OUT EST: _____

BRIDGE: Marsh Road Channel BR. No.: Option -

DISTRICT: 04

TYPE: Cast-In-Place Concrete U-Channel with Future Concrete Deck

RTE: LOCAL

CU: _____

CO: SM

EA: _____

PM: -

LENGTH: 1,805.00 Height Varies AREA (SF)= Varies

DESIGN SECTION: BCA
 # OF STRUCTURES IN PROJECT : 1 EST. NO. 35%
 PRICES BY : BCA COST INDEX:
 PRICES CHECKED BY : DATE:
 QUANTITIES BY: SOO DATE: 11/13/2013

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	PRICE	AMOUNT
1	REMOVE CONCRETE (CHANNEL)		CY		\$85.00	
2	TEMPORARY SHORING		SF		\$20.00	
3	STRUCTURE EXCAVATION (RETAINING WALL)		CY		\$45.00	
4	STRUCTURE BACKFILL (RETAINING WALL)		CY		\$20.00	
5	STRUCTURAL CONCRETE, RETAINING WALL		CY		\$450.00	
6	BAR REINFORCING STEEL (RETAINING WALL)		LB		\$1.10	
7	TRAFFIC RATED RAILING		LF		\$80.00	
8	FURNISH AND PLACE PRECAST CONCRETE DECK UNIT		SF	21,740	\$35.00	\$760,900.00
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SUBTOTAL	\$760,900
MOBILIZATION (@ 10 %)	\$84,544
SUBTOTAL BRIDGE ITEMS	\$845,444
CONTINGENCIES (@ 25%)	\$211,361
BRIDGE TOTAL COST	\$1,056,806
COST PER LINEAR FOOT	\$585.49
BRIDGE REMOVAL (CONTINGENCIES INCL.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	\$1,056,806
BUDGET ESTIMATE AS OF	\$1,057,000

ROUTING

1. DES SECTION
2. OFFICE OF BRIDGE DESIGN - NORTH
3. OFFICE OF BRIDGE DESIGN - CENTRAL
4. OFFICE OF BRIDGE DESIGN - SOUTH
5. OFFICE OF BRIDGE DESIGN - WEST
6. OFFICE OF BRIDGE DESIGN SOUTHERN CALIFORNIA

COMMENTS: _____

Escalated Budget Estimate to Midpoint of Construction *

Escalation Rate per Year

2.0%

* Escalated budget estimate is provided for information only, actual construction costs may vary. Escalated budget estimates provided do not replace Departmental policy to update cost estimates annually.

Years Beyond Midpoint	Escalated Budget Est.
1	\$1,078,000
2	\$1,100,000
3	\$1,122,000

Years Beyond Midpoint	Escalated Budget Est.
4	\$1,144,000
5	\$1,167,000

Revised - December 3, 2007

RCVD BY: _____

IN EST: _____

OUT EST: _____

BRIDGE: Marsh Road Channel BR. No.: Option -

DISTRICT: 04

TYPE: Cast-In-Place Concrete U-Channel with Future Boardwalk Structure

RTE: LOCAL

CU: _____

CO: SM

EA: _____

PM: -

LENGTH: 1,805.00 Height Varies AREA (SF)= Varies

DESIGN SECTION: BCA

OF STRUCTURES IN PROJECT : 1 EST. NO. 35%

PRICES BY : BCA COST INDEX: _____

PRICES CHECKED BY : _____ DATE: _____

QUANTITIES BY: SOO DATE: 11/13/2013

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	PRICE	AMOUNT
1	REMOVE CONCRETE (CHANNEL)		CY	818	\$85.00	\$69,530.00
2	TEMPORARY SHORING		SF	15,024	\$20.00	\$300,480.00
3	STRUCTURE EXCAVATION (RETAINING WALL)		CY	2,335	\$45.00	\$105,075.00
4	STRUCTURE BACKFILL (RETAINING WALL)		CY	941	\$20.00	\$18,820.00
5	STRUCTURAL CONCRETE, RETAINING WALL		CY	1,863	\$450.00	\$838,350.00
6	BAR REINFORCING STEEL (RETAINING WALL)		LB	217,971	\$1.10	\$239,768.10
7	TRAFFIC RATED RAILING		LF	1,805	\$80.00	\$144,400.00
8	FURNISH PREFABRICATED STEEL TRUSS BRIDGE		SF	14,440	\$100.00	\$1,444,000.00
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SUBTOTAL	\$3,160,423
MOBILIZATION (@ 10%)	\$351,158
SUBTOTAL BRIDGE ITEMS	\$3,511,581
CONTINGENCIES (@ 25%)	\$877,895
BRIDGE TOTAL COST	\$4,389,477
COST PER LINEAR FOOT	\$2,431.84
BRIDGE REMOVAL (CONTINGENCIES INCL.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	\$4,389,477
BUDGET ESTIMATE AS OF	\$4,389,000

ROUTING

1. DES SECTION
2. OFFICE OF BRIDGE DESIGN - NORTH
3. OFFICE OF BRIDGE DESIGN - CENTRAL
4. OFFICE OF BRIDGE DESIGN - SOUTH
5. OFFICE OF BRIDGE DESIGN - WEST
6. OFFICE OF BRIDGE DESIGN SOUTHERN CALIFORNIA

COMMENTS: _____

Escalated Budget Estimate to Midpoint of Construction *

Escalation Rate per Year 2.0%

Years Beyond Midpoint	Escalated Budget Est.
1	\$4,477,000
2	\$4,567,000
3	\$4,658,000

Years Beyond Midpoint	Escalated Budget Est.
4	\$4,751,000
5	\$4,846,000

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Revised - December 3, 2007

RCVD BY: _____

IN EST: _____

OUT EST: _____

BRIDGE: Marsh Road Channel BR. No.: Option -

DISTRICT: 04

TYPE: Cast-In-Place Concrete U-Channel with Future Boardwalk Structure

RTE: LOCAL

CU: _____

CO: SM

EA: _____

PM: -

LENGTH: 1,805.00 Height Varies AREA (SF)= Varies

DESIGN SECTION: BCA
 # OF STRUCTURES IN PROJECT : 1 EST. NO. 35%
 PRICES BY : BCA COST INDEX:
 PRICES CHECKED BY : DATE:
 QUANTITIES BY: SOO DATE: 11/13/2013

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	PRICE	AMOUNT
1	REMOVE CONCRETE (CHANNEL)		CY	818	\$85.00	\$69,530.00
2	TEMPORARY SHORING		SF	15,024	\$20.00	\$300,480.00
3	STRUCTURE EXCAVATION (RETAINING WALL)		CY	2,335	\$45.00	\$105,075.00
4	STRUCTURE BACKFILL (RETAINING WALL)		CY	941	\$20.00	\$18,820.00
5	STRUCTURAL CONCRETE, RETAINING WALL		CY	1,863	\$450.00	\$838,350.00
6	BAR REINFORCING STEEL (RETAINING WALL)		LB	217,971	\$1.10	\$239,768.10
7	TRAFFIC RATED RAILING		LF	1,805	\$80.00	\$144,400.00
8	FURNISH PREFABRICATED STEEL TRUSS BRIDGE		SF		\$100.00	
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SUBTOTAL	\$1,716,423
MOBILIZATION (@ 10 %)	\$190,714
SUBTOTAL BRIDGE ITEMS	\$1,907,137
CONTINGENCIES (@ 25%)	\$476,784
BRIDGE TOTAL COST	\$2,383,921
COST PER LINEAR FOOT	\$1,320.73
BRIDGE REMOVAL (CONTINGENCIES INCL.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	\$2,383,921
BUDGET ESTIMATE AS OF	\$2,384,000

- ROUTING**
- DES SECTION
 - OFFICE OF BRIDGE DESIGN - NORTH
 - OFFICE OF BRIDGE DESIGN - CENTRAL
 - OFFICE OF BRIDGE DESIGN - SOUTH
 - OFFICE OF BRIDGE DESIGN - WEST
 - OFFICE OF BRIDGE DESIGN SOUTHERN CALIFORNIA

COMMENTS: _____

Escalated Budget Estimate to Midpoint of Construction *

Escalation Rate per Year		2.0%	
Years Beyond Midpoint	Escalated Budget Est.	Years Beyond Midpoint	Escalated Budget Est.
1	\$2,432,000	4	\$2,582,000
2	\$2,481,000	5	\$2,634,000
3	\$2,531,000		

* Escalated budget estimate is provided for information only, actual construction costs may vary. Escalated budget estimates provided do not replace Departmental policy to update cost estimates annually.

Revised - December 3, 2007

RCVD BY: _____

IN EST: _____

OUT EST: _____

BRIDGE: Marsh Road Channel BR. No.: Option -

DISTRICT: 04

TYPE: Cast-In-Place Concrete U-Channel with Future Boardwalk Structure

RTE: LOCAL

CU: _____

CO: SM

EA: _____

PM: -

LENGTH: 1,805.00 Height Varies AREA (SF)= Varies

DESIGN SECTION: BCA
 # OF STRUCTURES IN PROJECT : 1 EST. NO. 35%
 PRICES BY : BCA COST INDEX:
 PRICES CHECKED BY : DATE:
 QUANTITIES BY: SOO DATE: 11/13/2013

	CONTRACT ITEMS	TYPE	UNIT	QUANTITY	PRICE	AMOUNT
1	REMOVE CONCRETE (CHANNEL)		CY		\$85.00	
2	TEMPORARY SHORING		SF		\$20.00	
3	STRUCTURE EXCAVATION (RETAINING WALL)		CY		\$45.00	
4	STRUCTURE BACKFILL (RETAINING WALL)		CY		\$20.00	
5	STRUCTURAL CONCRETE, RETAINING WALL		CY		\$450.00	
6	BAR REINFORCING STEEL (RETAINING WALL)		LB		\$1.10	
7	TRAFFIC RATED RAILING		LF		\$80.00	
8	FURNISH PREFABRICATED STEEL TRUSS BRIDGE		SF	14,440	\$100.00	\$1,444,000.00
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SUBTOTAL	\$1,444,000
MOBILIZATION (@ 10%)	\$160,444
SUBTOTAL BRIDGE ITEMS	\$1,604,444
CONTINGENCIES (@ 25%)	\$401,111
BRIDGE TOTAL COST	\$2,005,556
COST PER LINEAR FOOT	\$1,111.11
BRIDGE REMOVAL (CONTINGENCIES INCL.)	
WORK BY RAILROAD OR UTILITY FORCES	
GRAND TOTAL	\$2,005,556
BUDGET ESTIMATE AS OF	\$2,006,000

ROUTING

1. DES SECTION
2. OFFICE OF BRIDGE DESIGN - NORTH
3. OFFICE OF BRIDGE DESIGN - CENTRAL
4. OFFICE OF BRIDGE DESIGN - SOUTH
5. OFFICE OF BRIDGE DESIGN - WEST
6. OFFICE OF BRIDGE DESIGN SOUTHERN CALIFORNIA

COMMENTS: _____

Escalated Budget Estimate to Midpoint of Construction *

Escalation Rate per Year

2.0%

Years Beyond Midpoint	Escalated Budget Est.
1	\$2,046,000
2	\$2,087,000
3	\$2,129,000

Years Beyond Midpoint	Escalated Budget Est.
4	\$2,172,000
5	\$2,215,000

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