CONSENT CALENDAR

Agenda Item # 3

AGENDA REPORT SUMMARY

Meeting Date: November 24, 2020

Subject: Professional Service Agreement for Fremont Avenue Pedestrian Bridge Rehabilitation Project, TS-01055

Prepared by: Kathy Kim, Assistant Civil Engineer
Reviewed by: Jim Sandoval, Engineering Services Director
Approved by: Chris Jordan, City Manager

Attachment(s):
1. Consultant Proposal
2. Fremont Avenue Pedestrian Bridge Feasibility Study

Initiated by:
City Council – CIP Project CF-01027, Fremont Avenue Pedestrian Bridge Feasibility Study

Previous Council Consideration:
None

Fiscal Impact:
The proposed agreement has a not-to-exceed price of $193,234.00.

- Breakdown of funds to be used:
  - $193,234 General Fund
- Amount already included in approved budget: No
- Amount above budget requested: $193,234

Staff recommends utilizing $193,234 from the General Fund to replenish project TS-01055 in FY-2020-21to carry out engineering work for this unforeseen safety project.

Environmental Review:
Not applicable.

Policy Question(s) for Council Consideration:
None

Summary:
- Fremont Avenue Pedestrian Feasibility Study was conducted in 2016 and the bridge was found to be in fair to good condition with isolated areas of recommended repair.

Reviewed By:

City Manager	City Attorney	Finance Director
CJ	JH	SE

Subject: Professional Service Agreement for Fremont Avenue Pedestrian Bridge Rehabilitation Project, TS-01055

- City released a request for proposal for engineering design services three times on 12/05/17, 04/24/18, and 09/27/18. But City did not receive any proposals from design firms.
- Staff contracted Drake Haglan and Associates who prepared the feasibility study for design and obtained the attached proposal. Drake Haglan and Associates was acquired by Dewberry Engineers., Inc., in 2019.
- Staff recommends awarding the agreement to Dewberry Engineers, Inc. Their lead engineer Dennis Haglan is intimately familiar with the bridge design and its maintenance issues since he did the 2016 feasibility study before his company was acquired by Dewberry.

Staff Recommendation:
Move to authorize the City Manager to execute a professional services agreement between City of Los Altos and Dewberry Engineers, Inc., with the amount not to exceed $193,234.00 for design, bidding and construction support, construction inspection, and optional engineering and arborist services for unforeseen conditions for CIP project TS-01055.

Purpose
Authorize the City Manager to execute a professional service agreement between City of Los Altos and Dewberry Engineers, Inc., with the amount not to exceed $193,234.00 for design and construction support services for CIP project TS-01055.

Background
A community outreach for Fremont Avenue Bridge Replacement project (i.e., the concrete vehicular bridge adjacent to the wooden pedestrian bridge) was held in 2009 to discuss the option of replacing the existing wood pedestrian/bicycle bridge with a concrete sidewalk and a bike lane on the north side of the new Fremont Avenue concrete bridge. The community was in favor of keeping the existing wood pedestrian/bicycle bridge and adding a new bike lane on the north side of the new concrete bridge. As result of the community outreach, the City committed to evaluating Fremont Avenue Pedestrian bridge as a follow up to the Fremont Avenue Bridge Replacement project.

On September 28, 2016, a community meeting was held for Fremont Avenue Pedestrian Bridge Feasibility Study. Following this community meeting, Drake Haglan and Associates conducted the feasibility study and concluded that rehabilitation is the most cost effective and recommended alternative. As a result, Fremont Ave Pedestrian Bridge Rehabilitation Project, TS-01055 was funded in Fiscal Year 2017/2018. The recommended rehabilitation includes but is not limited to replacement of timber decking, replacement of the end-spans middle glulam strings in-kind, replacement of structural blocking and cross bracing, replacement of timber railing, installation of a drainage system, and back filling of the first span to repair scour damaged and loss of backfill material. Existing bridge abutments are in good shape and will remain.

Subject: Professional Service Agreement for Fremont Avenue Pedestrian Bridge Rehabilitation Project, TS-01055

$250,000 in funding was originally available in the approved 5-year CIP under project TS-01055. During the FY 2020/21 budget process, the Council approved staff's recommendation to defer the design project because the overall structure of the bridge was confirmed to be in good condition. However, upon reports this past summer from a local resident regarding loose planks, staff did a more thorough investigation and discovered isolated areas of deterioration of the ledger-blocking timbers supporting some of the planks on the west end of the bridge, which need replacement and repair. For economies of scale, staff recommends hiring a bridge engineer to address all the long-range maintenance issues associated with the bridge, not just the immediate safety issue. For budget reasons, construction may need to occur in phases over several years, beginning with the immediate safety concerns.

Discussion/Analysis

City staff attempted to solicit proposals from engineering design firms three different times in the past. Request for proposals were released in December 2017, April 2018, and September 2018. However, the City did not receive any proposals.

Staff requested a proposal from Drake Haglan and Associates who prepared the Fremont Avenue Pedestrian Bridge Feasibility Study and negotiated a contract amount. Drake Haglan and Associates was acquired by Dewberry Engineers, Inc., in 2019. Based on the firm's experience with similar projects and Dennis Haglan's intimate familiarity with the wooden bridge's design and maintenance issues, staff recommends awarding the project to Dewberry Engineers, Inc., for the not-to-exceed amount of $193,234.00. Drake Haglan and Associates also served as the consultant engineer for two related City projects: Fremont Avenue Pedestrian Feasibility Study Project and Fremont Avenue Bridge Replacement Project (Construction Administration).

Dewberry's proposed scope of work and cost estimate is attached. The feasibility study completed by Drake Haglan and Associates is also attached for reference.

Options

1) Authorize the City Manager to execute a professional service agreement between City of Los Altos and Dewberry Engineers, Inc., with the amount not to exceed $193,234.00 for design, bidding and construction support, construction inspection, and optional engineering and arborist services for CIP Project TS-01055.

Advantages: The design and permitting phase of this project would start soon after the agreement is executed, and the construction of the first phase of this project (i.e., the more immediate repair of deteriorated areas of the bridge) is estimated to be completed by October 2021.

Disadvantages: None

2) Option #2

Advantages: Do not authorize the execution of the agreement for the design.

Disadvantages: Not authorizing the execution of the contract will result in a delay to the repair of the pedestrian safety issues

Recommendation
The staff recommends Option 1.

EXHIBIT A

SCOPE OF SERVICES

11/04/2020

Fremont Pedestrian Bridge Rehabilitation

SCOPE OF SERVICES – OUTLINE WITH BRIEF DISCUSSION

DEWBERRY has developed the following responsibility matrix to ensure that there is a clear understanding between the City and DEWBERRY on who has what responsibility.

CONSULTANT AND CITY RESPONSIBILITIES			
Work item	**CITY RESPONSIBILITIES**	**Consultant**	**CONSULTANT RESPONSIBILITIES**
Project Management and Review Meetings	✓ Process Invoices	✓ DEWBERRY	✓ Project Delivery, Schedule Management & Submit Invoices ✓ Kickoff Meeting, Meeting Minutes
Public Hearing/ Workshop	✓ Stakeholder database ✓ Notices ✓ Schedule and attend Meeting	✓ DEWBERRY	✓ Prepare Meeting materials and presentation ✓ Meeting Summary
CEQA Clearance and Permitting	✓ Council Approval/Circulation	✓ DEWBERRY	✓ Prepare and submit CEQA CE and Permits
PS&E	✓ Draft and Final PS&E Review	✓ DEWBERRY	✓ Prepare draft and final construction plans, specifications and estimate
Bidding and Construction Support	✓ Advertise Project ✓ Select Construction contractor	✓ DEWBERRY	✓ Assist with bid and construction questions, clarifications and submittals
Construction Inspection	✓ Resident Engineer, Administration	✓ DEWBERRY	✓ field inspections at 70% time
Bridge Lighting	✓ Review and Comment on Lighting Layout	✓ Y&C	✓ Design additional lighting for bridge deck
Utility Coordination	✓ Coordination and Review ✓ Contact Utility Owner and coordinate relocations/temporary shutdowns	✓ DEWBERRY ✓ Y&C	✓ Utility PS&E

Assumptions and Clarifications

1. Any and all Agency fees outside of scope shall be the sole responsibility of client.
2. It is assumed that a topographic survey is not needed.
3. All right of way and property boundaries will be mapped from readily available recorded maps and deed documents. No title reports are expected to be provided, which may include additional easements. It is assumed that the City of Los Altos will provide the title reports if a thorough property survey is required.
4. It is assumed that the condition of the inaccessible portions of the main glulam stringers are of a similar condition to the accessible portions DEWBERRY inspected. If the conditions of the glulam stringers vary, additional work will be required on a time and material basis.
5. Any additional work required in addition to those specifically mentioned in the scope of work will be made on a time and materials basis.
6. Hydraulic Analysis and rock slope protection sizing are not included in the scope and fee. RSP provided around the abutments will be a backing class size similar to what is used on drainage outlets.
7. City will provide the Wetland Delineation Map and Biological survey for the Fremont Ave Vehicular bridge to expedite the Wetland Delineation Map and Biological Survey required for the FWS Permit.

EXHIBIT A

SCOPE OF SERVICES 11/04/2020

Fremont Pedestrian Bridge Rehabilitation

Task 1: Project Management and Kickoff Meeting

Project Management

Dewberry Engineers Inc (DEWBERRY) will perform the activities necessary to plan, direct, and coordinate the work of the project.

Project Schedule: DEWBERRY will prepare a project schedule from the Notice to Proceed through construction completion.

Meetings (2 meetings):

Two meetings are scoped for this project.

Task Deliverables:

- Meeting Agendas
- Meeting Minutes
- Project Schedule
- Project Invoices

Task 2: Public Outreach

DEWBERRY will attend up to 1 meeting with the public. The DEWBERRY Project Manager will lead the workshop and DEWBERRY will prepare the presentation and/or Exhibits.

Task Deliverables:

- Public meeting Exhibits and/or presentations
- Outreach meeting summary

Task 3: CEQA Clearance & Permitting

This project would be exempt under the California Environmental Quality Act (CEQA). The following permits are expected to be required:

1. Fish and Wildlife Service: This is expected to also include Regional Water Quality Control Board Permits. The Army Corps of Engineers permit isn't anticipated since there is no work in the creek. This will require a revalidation of the existing Wetland delineation map and biological survey that was prepared for the construction of the Fremont Ave Vehicular Bridge.
2. Santa Clara Valley Water District (SCVWD)

Task Deliverables

- CEQA Categorical Exemption
- SCVWD permit application
- FWS Permit Application

Task 4a: Prepare PS&E

DEWBERRY will prepare the PS&E for the Full Rehabilitation Option outlined in the Feasibility Study dated November 18th, 2016. This includes:

1. Replacing the timber decking
2. Replacing all of the structural blocking and cross bracing used to support timber decking
3. Replace the end-spans middle glulam stringers (tot 2) in kind
4. Replacing the timber railing with a rail system that meets the current design code and can accommodate the preferred deck lighting alternative
5. Installing a drainage system
6. Backfilling the first span(west) to repair scour damage and loss of backfill material with backfill and a backing class rock to prevent the soil from scouring.
7. Backfilling and placing RSP on the south-east corner of east Abutment to protect against undermining.

Task Deliverables:

a. Draft Plans and Estimate (including Lighting and Barrier alternatives with associated cost estimates)
b. Draft Final Plans, Specifications and Estimate (incorporating the preferred Lighting and Barrier alternative)
c. Final Plans, Specifications and Estimate

Task 4b: Bridge Lighting

In response to the comments received from the public outreach meetings, additional bridge lighting was requested. DEWBERRY will coordinate with our traffic engineering subconsultant to provide additional bridge lighting to increase visibility along the deck without disrupting the adjacent traffic or creek below.

Our team will identify 2-3 lighting alternatives which will include the types of lighting available, cost, constructability and required maintenance.

Task Deliverables:

a. Lighting Alternatives and associated cost estimates
b. Draft Final Plans, Specifications and Estimate (incorporating the preferred Lighting alternative)
c. Final Plans, Specifications and Estimate

Task 5: Bidding & Construction Support

DEWBERRY will assist the City during the pre-bid opening by:

- Suggesting any pre-qualification criteria for the construction bidder
- Provide assistance to the City with responding to plans, specifications, and quantity estimates during the advertising process
- Preparing any required addenda to clarify the scope of the project for review and approval by the County and distribution to the bidders

During construction, DEWBERRY will:

- Respond to Contractor inquires through City request and prepare drawings and review change orders requested by the City.
- Make up to two (2) field visits to the construction site as requested by the City to answer questions regarding ongoing construction activities

DEWBERRY will provide bidding and construction support on a time and material basis.

Task 6: Construction Inspection

DEWBERRY will provide Construction Management and Inspection of field construction activities, on a time and material basis. It is anticipated that the project will run approximately 6 weeks to complete the rehabilitation work with some start-up/close-out activities. DEWBERRY anticipates contract management and project field activities can be managed primarily on a part-time basis. Administrative and contract management activities (project set-up, meeting coordination, schedule review, changes, issue management, submittal approvals, pay estimates, etc.) can be handled by the Resident Engineer with support from an Admin Assistant. Majority of field activities can be managed by a field inspector on a prioritized coverage basis. DEWBERRY estimates a level of effort of 70% coverage for a Senior Inspector.

Task Deliverables:

- Meeting Agendas/Minutes
- Submittal Logs
- Schedule review comments
- RFI responses/Logs
- Change Order Logs
- Field Reports/photos
- Material testing results/Logs
- Pay estimates for client processing

Task 7: Optional Tasks

DEWBERRY has assumed some costs in the event additional services will be required during design or construction. These funds will not be authorization until approval from the City's Engineering Director.

1. **As-Needed Engineering:** Additional hours have been provided in the event additional engineering services are required during design or construction due to unforeseen conditions.

2. **Licensed Arborist Services:** Dewberry has assumed $8000 in the event a licensed arborist is required as a subconsultant.

The actual costs of these Optional Tasks will be discussed with the City in the event the services are required.

FEE SCHEDULE
for the
Design and Construction Inspection
Fremont Pedestrian Bridge Rehabilitation

ATTACHMENT1

City of Los Altos - Fremont Avenue Pedestrian Bridge Feasibility Study Project, TS-01027

Dewberry | Drake Haglan

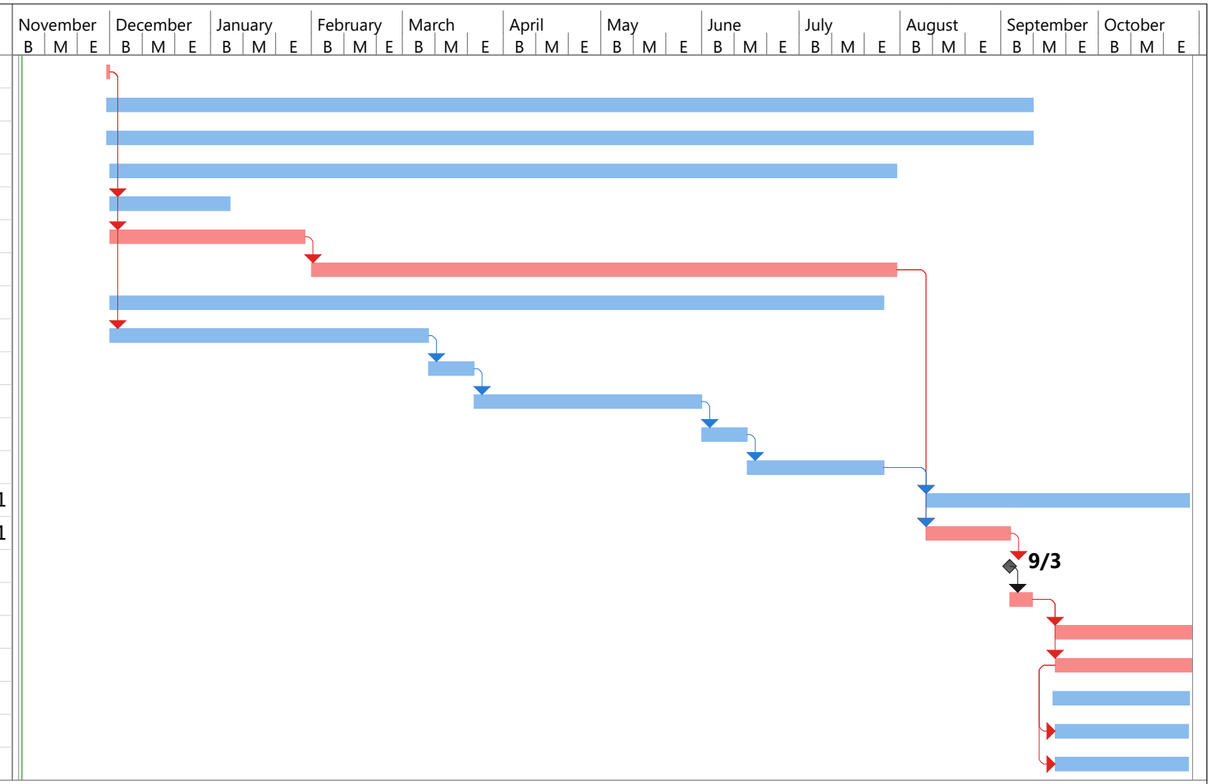
			Prime																		Subconsultants		
			Dewberry | Drake Haglan																				
			DESIGN							ENVIRONMENTAL					CONSTRUCTION			Admin			Sub - consultants		
		Name	D. Haglan	L. Kinnebrew	K. Ross	K.Lundblom	B.Schoppe		E.Cisneros	L. Tisch	L.Haglan	A. Manz	C. Redd	A. Piazzoni	R. Shackelford	TBD	TBD						Total Project Fee by Task
		Project Assignment	Principal In Charge/ Constructabili	Project Manager	QA/QC	Designer	Designer	Technician	CADD		Env. Project Manager	Public Outreach	Environmenta l QA/QC										
Task		Classification	Principal	Engineer VI	Principal	Engineer II	Engineer V	Designer IV	CADD Technical IV	Professional III	Professional VII	Professional IV	Professional VI	Professional I	Construction Professional VI	Inspector VI	Office Engineer	Admin Assistant	Total Dewberry Task Hours	Dewberry Task Amount	Y&C	TBD	
																			0	$ -			$ -
1		Project Management		24															24	$ 5,208			$ 5,208
2		Public Outreach	12	12					16									2	42	$ 8,622			$ 8,622
3		CEQA Clearance & Permitting								68	24		8	40					140	$ 20,516			$ 20,516
4		Prepare PS&E																					
	4.1	Design		80	6	120	24												230	$ 39,884			$ 39,884
	4.2	Drafting		8		12			100										120	$ 16,744			$ 16,744
	4.3	Specifications	4	12	6														22	$ 5,704			$ 5,704
	4.4	Estimate				10	8												18	$ 2,868			$ 2,868
	4.5	Bridge Lighting		4		4			4									2	14	$ 2,094	$ 12,500		$ 14,594
5		Bidding & Construction Support	2	32		24			12										70	$ 12,388			$ 12,388
6		Construction Inspection													40	148	45		233	$ 43,088			$ 43,088
7		Optional Tasks																					
	7.1	As-Needed Engineering	2	15		45			38										100	$ 14,997			$ 14,997
	7.2	Arborist																	0	$ -		$ 8,000	$ 8,000
		Total Hours:	18	172	12	170	32	0	132	68	24	0	8	40	40	148	45	4	680	**$ 114,028**	**$ 12,500**	0	**$ 169,616**
		2020 Labor Rate:	$ 310.00	$ 217.00	$ 310.00	$ 134.00	$ 191.00	$ 48.00	$ 134.00	$ 139.00	$ 232.00	$ 160.00	$ 192.00	$ 99.00	$ 263.00	$ 186.00	$ 112.00	$ 77.00					

Discipline Breakdown:	Base Cost	Optional	Total
Design	$ 79,651	$ 14,997	$ 94,648
Environmental	$ 20,516	$ -	$ 20,516
Lighting	$ 14,594	$ -	$ 14,594
Design Subtotal			$ 129,758
Construction	$ 55,476	$ 8,000	$ 63,476
Total	**$ 170,237**	**$ 22,997.00**	**$ 193,234**

Other Direct Costs	**$ 621.00**
Total Costs (w/o Optional)	**$ 170,237.00**
Optional Services Costs	**$ 22,997.00**
Total Combined Costs (With Optional)	**$ 193,234.00**

ATTACHMENT1

ID	Task Mode	Task Name	Duration	Start	Finish	Predecessors
1		0.0 NTP	1 day	Mon 11/30/20	Mon 11/30/20	
2		1.0 Project Management	205 days	Mon 11/30/20	Fri 9/10/21	
3		2.0 Public Outreach	205 days	Mon 11/30/20	Fri 9/10/21	
4		3.0 CEQA Clearance and Permitting	174 days	Tue 12/1/20	Fri 7/30/21	
5		3.1 CEQA CE	27 days	Tue 12/1/20	Wed 1/6/21	1
6		3.2 Environmental Permitting	44 days	Tue 12/1/20	Fri 1/29/21	1
7		3.3 Permit Approvals	6.5 mons	Mon 2/1/21	Fri 7/30/21	6
8		4.0 Prepare PS&E and Lighting	34 wks	Tue 12/1/20	Mon 7/26/21	
9		4.1 Draft P&E	14 wks	Tue 12/1/20	Mon 3/8/21	1
10		4.2 City Review	2 wks	Tue 3/9/21	Mon 3/22/21	9
11		4.3 Draft Final PS&E	10 wks	Tue 3/23/21	Mon 5/31/21	10
12		4.4 City Review	2 wks	Tue 6/1/21	Mon 6/14/21	11
13		4.5 Final PS&E	6 wks	Tue 6/15/21	Mon 7/26/21	12
14		5.0 Bidding and Construction Support	59 days	Mon 8/9/21	Thu 10/28/21	13FS+1 wk,7FS+1
15		5.1 Advertise	4 wks	Mon 8/9/21	Fri 9/3/21	13FS+1 wk,7FS+1
16		5.2 Bid Opening	0 days	Fri 9/3/21	Fri 9/3/21	15FS-1 min
17		5.3 Award Contract	5 days	Fri 9/3/21	Fri 9/10/21	16
18		5.4 Construction Support	30 days	Fri 9/17/21	Fri 10/29/21	17FS+1 wk
19		6.0 Construction Inspection	30 days	Fri 9/17/21	Fri 10/29/21	17FS+1 wk
20		7.0 Optional Tasks	30 days	Fri 9/17/21	Thu 10/28/21	
21		7.1 As-Needed Engineering	29 days	Fri 9/17/21	Thu 10/28/21	19SS
22		7.2 Aborist	29 days	Fri 9/17/21	Thu 10/28/21	19SS



Project: Fremont Schedule v1
Date: Wed 11/4/20

Task	Inactive Task	Manual Summary Rollup	External Milestone	Manual Progress	
Split	Inactive Milestone	Manual Summary	Deadline		
Milestone	Inactive Summary	Start-only	Critical		
Summary	Manual Task	Finish-only	Critical Split		
Project Summary	Duration-only	External Tasks	Progress		

REHABILITATION VERSUS REPLACEMENT FEASIBILITY STUDY FOR FREMONT AVENUE PEDESTRIAN BRIDGE OVER PERMANENTE CREEK

Prepared for:

City of Los Altos
Department of Public Works
Engineering Division

NOVEMBER 18, 2016

Prepared by:

11060 White Rock Road, Suite 200
Rancho Cordova, CA 95670
(916) 363-4210

Registered Civil Engineer Stamp

This Type Selection Report has been prepared under the direction of the following registered civil engineer. The registered civil engineer attests to the technical information contained herein and the engineering data upon which recommendations, conclusions, and decisions are based.

Dennis Haglan, P.E.

Drake Haglan and Associates

TABLE OF CONTENTS

APPENDICES

LOCATION MAP

EXECUTIVE SUMMARY

SCOPE OF STUDY

The purpose of this study is to assess the condition and approximate remaining life of the existing Fremont Avenue Pedestrian Bridge over Permanente Creek and determine whether rehabilitation or replacement is more cost effective. As part of this study, public outreach will be conducted prior to conducting the study.

SUMMARY AND CONCLUSIONS

Community Input and Consensus:

A community meeting was held on September 28, 2016 with approximately 20 community members in attendance. In addition, the community members attending were encouraged to bring comment cards to their neighbors and any interested that were unable to attend the meeting. A total of 17 comment cards were received. The community meeting was well received and there appeared to be consensus on the following:

1. Very strong desire to preserve (rehabilitate) the existing bridge with replacement in kind (i.e. timber deck, railing, etc.…). All comment cards received also preferred rehabilitation with timber.
2. Desire to keep the railing as close as possible to the existing railing.
3. Recommended that the City implement a maintenance program for the bridge.

Study Conclusions and Recommendations

1. Based on a visual bridge inspection, a cost comparison of rehabilitating the bridge vs. replacing the bridge, and a strong community desire to preserve the bridge, rehabilitation is the recommended alternative.
2. It is expected that with rehabilitation and regular maintenance the existing structure's service life will be another 25 to 35 years.
3. To preserve the existing bridge look and feel, it is recommended to replace the railing with a timber railing and deck, which again, was a strong desire of the community. However, in order to keep future maintenance to a minimum, the design should also consider other deck and rail materials for due diligence. All beneath deck elements replaced, are recommended to be pressure treated wood.
4. Rehabilitation is a more cost effective alternative than replacement. The cost of rehabilitation is approximately 40% of the cost of replacement, based on construction costs only (i.e., without design, environmental costs, etc.…).
5. The costs to rehabilitate the structure is estimated to be from $160,000 to $200,000, which includes design and environmental, construction, and construction inspection. Alternative, replacement costs are estimated to be from $470,000 to $515,000 inclusive.
6. The rehabilitation alternative was limited to include the work necessary to rehabilitate the existing structure in kind. Rehabilitation of the existing bridge includes:
    - Replacing timber decking

- Replacing structural blocking used to support timber decking
- Replacing timber railing
- Installing drainage system
- Backfilling first span to repair scour damage and loss of backfill material.

COMMUNITY INPUT – HISTORY AND SEPTEMBER 28, 2016 COMMUNITY MEETING

Chronology of Community Input and/or Design Development related to the Pedestrian Bridge

1. Council held a study session on September 16, 2008
2. Recently completed Fremont Avenue Bridge Replacement

The recently replaced roadway bridge included widening of bridge to meeting current standards which include wider lane, shoulder and sidewalk on both sides.

- As sidewalk would be provided on the new bridge, the existing wooden bridge was planned to be removed as part of the project.
- Residents raised concerns that a wider bridge would increase speeding and opposed the removal of the wooden bridge.
- Council directed staff to revisit the design of the bridge to make it narrower and the possibility of keeping the wooden bridge

3. Staff provided answers to the questions raised at the regular meeting of November 10, 2008
    - Based on consultation with Caltrans and bridge design consultant, it was believed that the new bridge design could be narrowed to eliminate sidewalk on one side (north side) and keeping the wooden bridge for pedestrian access
4. A public workshop was help on January 7, 2009
    - Keeping the wooden bridge was high priority for meeting attendees
5. At the regular meeting on March 24, 2009
    - Council approved the new roadway bridge design without sidewalk on the north side
    - The existing wooden pedestrian bridge will remain
    - The City committed to develop a follow-up capital improvement project to rehabilitate or replace the wooden bridge
6. A Community Meeting was held on September 28, 2016 to discuss the development of this feasibility study to assess the condition of the timber pedestrian bridge and the cost of rehabilitation (if possible) vs. replacement.

Approximately 20 community members in attendance. The community members attending were encouraged to bring comment cards to their neighbors and any interested that were unable to attend the meeting. A total of 17 comment cards were received. The community meeting was well received and there appeared to be consensus on the following:

1. Very strong desire to preserve (rehabilitate) the existing bridge
2. If it is possible to rehabilitate the bridge:
    - Replacement in kind (i.e. timber deck, railing, etc.…) is preferred. All comment cards received also preferred rehabilitation with timber to maintain the existing look and feel of the bridge.
    - Desire to keep the railing as close as possible to the existing railing.
3. If the bridge has to be replaced:
    - Replacement in kind is preferred

Other comments received include:

1. Recommend that the City implement a maintenance program for the bridge – especially since the City will be investing money into this bridge.
2. A question was raised if bicyclist will be allowed to use the bridge and there is a concern for the safety of pedestrians if bicyclist also use the bridge.
3. Keep the bridge as is; changing the railing and the deck will have a very different look and feel.
4. Preference is to refurbish the bridge in kind. An alternative deck material (i.e. trex, etc..) is generally not preferred
5. It was discussed that the railing had to change somewhat in order to meet current codes. The general preference is to keep the railing as a timber railing as close to the look of the current railing as possible.
6. Timber deck boards should be transverse (perpendicular) to the length of the bridge.
7. Protect and preserve the existing trees and shrubs.
8. Consider meeting the illumination standards with lights along the railing instead of lights on poles.
9. A question was raised should bicyclists be allowed to use the bridge. The intention sis that the bridge is for pedestrians, but should be designed for bicyclists as well, since it is likely some bicyclists will use the bridge. There is no City code preventing bicyclists on sidewalks.
10. Need to make sure the rehabilitated or replaced bridge meets ADA requirements.

EXISTING BRIDGE CONDITION ASSESSMENT

GENERAL DESCRIPTION

Fremont Avenue is a principle collector urban road within Los Altos, California. The Fremont Avenue Bridge was just replaced and a sidewalk on the north side was omitted given the existing timber pedestrian bridge located just north of the new bridge carries pedestrian and bicycle traffic crossing over Permanente Creek from East to West. The timber pedestrian bridge was constructed in the mid-1970's. The superstructure consists of three spans of timber stringers with timber decking and a curb-to-curb width of 11'. The main span consists of 3'-9" deep glulam beams. The two end spans consist of 6x12 timber stringers. The substructure consists of a single CIDH pile supporting a concrete cap beam which the glulam and timber stringers sit on. The end spans are supported on bin type abutments.

The structure is considered to be in overall good condition, but has isolated areas that need repair. No as-built drawings are available so DHA performed a site inspection of the bridge to identify potential damaged members and to estimate member sizes that were not accessible.

EXISTING STRUCTURAL MEMBER ASSESSMENT

Glulam Beams – The glulam beams were field measured to be approximately 3'-9" deep. They are in good condition per DHA's field review on June 1st, 2016.

Decking – The last 25' of timber decking shows signs of significant deterioration and requires replacing. The remainder of the timber decking shows various levels of deterioration and although does not need to be replaced currently, it will need to be replaced in the near future thus DHA recommends completely replacing the existing timber decking.

Blocking – The existing blocking is in various states of deterioration, with the tapered sections on each end showing significant deterioration, see Figures 4 and 5 in Appendix D. Due to the various stages of deterioration and how significantly the tapered blocking is deteriorated, DHA recommends replacing all of the existing blocking. It may be possible to salvage some of the blocking from the center of the bridge, once the members can be inspected with the deck removed.

Railing – The railing is heavily weathered and some significant deterioration was found below the deck where water runoff is running down the posts. Due to the deterioration of the posts, and weathering of the railing, DHA recommends replacing the entire railing system to insure the structural integrity, allow for a proper drainage system to be put in place, meet the California Building Code (CBC) Specification that a prohibits railing openings from being large enough to allow a 4-inch sphere to pass through, and to match the aesthetics of the replacement deck.

Deck Drainage – The existing structure drains down the length of the handrail posts, which is causing significant deterioration at the bottom of the posts. DHA recommends implementing a drainage system to carry water runoff, off of the bridge to protect the handrail posts and glulam members from future deterioration.

Backfill – There is a large amount of scour at the west abutment which has resulted in minor settling, see Figure 8 in Appendix D. DHA recommends backfilling the abutment with rock during the bridge deck replacement to prevent future scour and settlement.

Footings/Foundations – There are no signs of distress in the existing pile and concrete bent caps or abutment walls.

Hardware/Connections/Lateral Supports – The existing metal brackets, connections and lateral supports, see Figure 3 in Appendix D, are all in good condition per DHA's field review on June 1st, 2016.

REHABILITATION VS. REPLACEMENT ASSESSEMENT

REHABILITATION

The rehabilitation alternative was limited to include the work necessary to rehabilitate the existing structure in kind. Based on the existing bridge condition assessment, the rehabilitation alternative includes the following items:

1. Replacing the timber decking
2. Replacing all of the structural blocking and cross bracing used to support timber decking
3. Replace the end-spans middle glulam stringer (tot 2)
4. Replacing the timber railing
5. Installing a drainage system
6. Backfilling the first span to repair scour damage and loss of backfill material

For costs purposes, it was assumed that all of the structural blocking, middle glulam beam, and cross bracing would be replaced. However, several of the cross bracing members and the middle glulam beam are in good enough condition to remain, if a minimal rehabilitation is desired. It was necessary to assume complete rehabilitation since we could not see the condition of the top of these structural elements that support the deck boards. When the deck boards are removed, dry rot may be discovered at this connection that would require replacement of these structural supports.

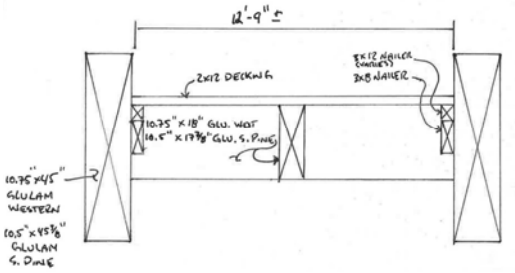


Figure 1 – Typical Section

Figure 2 – Deck Underside

COMPLETE REHABILITATION

A brief discussion follows describing which elements of the existing bridge would require replacement/modifications for the full rehabilitation alternative:

1. <u>Timber Deck Replacement:</u> For the purposes of the rehabilitation vs. replacement comparison, a complete deck replacement is assumed in order to have a more conservative cost estimate. However, the design phase should consider partial deck replacement vs. full deck replacement. While a composite deck could be considered in order to reduce future maintenance costs, the initial costs would be higher and the community will strongly prefer a timber deck, based on the September 2016 community meeting.

2. Structural Blocking and Cross Bracing Replacement: For the purposes of the rehabilitation vs. replacement comparison, all of the structural blocking and cross bracing is assumed to be replaced. Figure 2 shows the level of extent of the dry rot that exist in several of the lateral decking supports. It should be noted, however, that many of the cross bracing is in relatively good condition and may not necessarily need to be replaced.

3. Timber Railing Replacement: The timber railing needs to be replaced in its entirety as there are several railing supports that have dry rot and the railing does not meet current design codes. Specifically, the railing cannot pass over a 4" sphere through the rail. Figure 4 shows the existing rail configuration where the transverse members

4. Drainage System: Based on a visual inspection, much of the water drains along the deck to the south abutment. The water intrusion is causing severe dry rot at some of the railing posts and blocking beneath the structure. The design will need to address drainage in order to prevent this from occurring in the future.

5. Backfill for Scour: Both abutments are similar to bin type abutments which have a front wall and a back wall. In this case, the front wall is protecting the abutment backwall form erosion and scour until the water in the creek is high enough to overtop the front wall. This has occurred and the dirt area between the wall and back abutment on the south abutment is scouring. For rehabilitation, it is recommended to fill this void with rock to prevent future scour.

Figure 3 – Structural Blocking Dry Rot

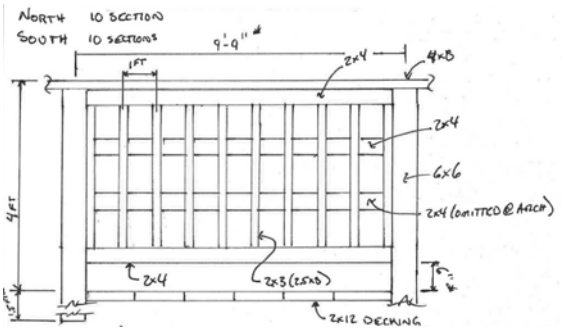


Figure 4 – Existing Railing Configuration

Minimal Rehabilitation

The costs for both the minimal rehabilitation and full rehabilitation are presented in the construction cost comparison, but the costs for the full rehabilitation are used when considering if rehabilitation or replacement is recommended. The minimal rehabilitation would entail the same scope of work as the full rehabilitation, with the exception that if there is not dry rot at the connection of the middle glulam beam and the cross bracing that is in good condition, these members would not need to be replaced. Quantities for the rehabilitation alternatives are shown in Appendix A.

COMPLETE REPLACEMENT

Several replacement structure type were presented at the Community Meeting held on September 28th, 2016.

Overall the community preferred replacement in kind with a timber bridge. Other cost-effective replacement alternatives would include a prefabricated "Corten Steel" Truss bridge (the steel has a sacrificial thickness that is allowed to rust with no future maintenance required) and a fiberglass truss bridge with a timber finish. In order to take the most conservative approach when comparing rehabilitation to replacement, the cheapest replacement alternative (the fiberglass truss) and the community preferred alternative (replacement in-kind) were used to compare whether rehabilitation or replacement is more cost-effective.

The replacement structure would be constructed on the existing alignment, with a single-span, prefabricated fiberglass truss bridge. The following is a brief summary of two replacement options considered:

A. Pre-fabricated fiberglass truss bridge: A new single span fiberglass truss bridge, with pressure treated 3x12 timber decking meeting current AASHTO and Caltrans standards. The fiberglass structure would be able to sufficiently span the creek in a single span, preventing intermediate supports within the creek.

Hiking Trail Bridge – 85' x 4' located in Loysburg, PA

The fiberglass can be colored in order to meet the desired aesthetics. During design, it can be determined if the existing abutments can be used completely or partially to support the fiberglass structure. The benefits of the fiberglass structure are the lightweight materials and simple design allowing the bridge to be delivered unassembled and constructed by City staff or an outside contractor. The design life of the fiberglass structure is far superior to any of the equivalent timber options.

B. Timber Bridge: A completely new single span timber bridge, similar to the existing structure that meets current AASHTO and Caltrans criteria. A new timber bridge will most likely require new abutments on pile foundations in order to meet the current design codes. This structure will look similar to the existing structure, utilizing large glulam stringers, pressure treated timber decking and timber handrails.

REHABILITATION VS. REPLACEMENT COMPARISON

1. Cost Analysis

A comparison of estimated construction costs for the various alternatives is provided in the following table.

Construction Cost Comparison				
Item	**Option A** Complete Rehabilitation	**Option A1** Minimal Rehabilitation	**Option B** Pre-fabricated Fiberglass Truss	**Option C** Timber Bridge
Construction				
Removal	$ 7,000	$ 7,000	$ 12,000	$ 12,000
Bridge	$ 130,000	$ 90,000	$ 237,000	$ 225,000
Foundation	$ 0	$ 0	$ 105,000	$ 105,000
Scour Repair	$ 8,000	$ 8,000	$ 8,000	$ 8,000
Total Construction	**$ 145,000**	**$ 105,000**	**$ 365,000**	**$ 350,000**

Notes:
1) Costs include 10% mobilization and 20% contingency.
2) Costs do not include escalation (for the construction year), since the costs are for comparison purposes only.
3) Costs DO NOT include Design costs, or Right of Way costs

Overall Cost Comparison				
Item	**Option A** Complete Rehabilitation	**Option A1** Minimal Rehabilitation	**Option B** Replacement: Pre-fabricated Fiberglass Truss	**Option C** Replacement: Timber Bridge
Design & Environmental	$40,000	$40,000	$60,000	$120,000
Construction				
Construction	$121,000	$88,000	$305,000	$292,000
Contingency (20%)	$24,000	$17,000	$60,000	$58,000
Construction Engineering (15%)	$18,000	$13,200	$46,000	$44,000
Total Costs	**$203,000**	**$160,000**	**$471,000**	**$514,000**

Notes:

1) Costs assume no right of way.
2) Rehabilitation design costs assume no hydraulic or geotechnical studies needed with adjacent bridge project information available. Replacement design costs assume geotechnical memo only needed.
3) Costs assume no federal funds (i.e. NEPA not required)

2. Rehabilitation vs. Replacement Alternative Comparison

Based on the cost analysis, rehabilitation is considered a more cost effective alternative than replacement and is the recommended alternative. The following is a summary of the various advantages and disadvantages of rehabilitation compared to replacement.

Rehabilitation Alternative:

Advantages:

- Approximately 60% lower construction cost than the replacement alternative (see above).
- Shorter construction period.
- Based on the existing deterioration, once the rehabilitation is complete an additional 40+ year life span is reasonable.
- Redwood or composite (wood/plastic materials) members could be used for the decking to increase the service life.
- No need to update or modify the existing foundation.

Disadvantages:

- The existing structure is approximately 40 years old, and the remaining life of the "rehabilitated" structure would be much less than that of a new structure.
- It can be expected that in another 40 years, the decking and hand railing will need to be completely replaced.
- Upgrading to Redwood decking would increase the service life by 30-50% and upgrading to a composite decking will provide a service life past the life of the existing glulam stringers, however these upgrades can cost as much as 2-4 times the cost of the pressure treated decking respectively.
- Drainage on a timber structure will always be an issue, and deterioration of exposed surfaces will require periodic inspections and potential replacement of specific members.

Replacement Alternative:

Advantages

- Fiberglass Truss Bridge:
  - The main structure and handrail will have a minimum service life of 100+ years.
  - Due to the light structure weight, standard decking is 3x12 pressure treated members which will have a longer service life than the 2x12 members of the timber bridge.
  - Meets all current design standards.
  - Structural system with current seismic detailing and reliable ductile performance.
  - Single span configuration eliminates piers within the creek, reducing environmental impacts during construction and hydraulic impacts from debris snags.
  - Will reduce annual maintenance costs considerably.

- Simple construction allows for construction to be performed by City staff or an outside contractor.
- Can be colored to meet aesthetic requirements.
- All or part of the existing substructure maybe usable due to the light weight of the structure.

- Replacement Timber Bridge:
  - A new timber structure should have a minimum 75-year life span for its structural components.
  - The aesthetics will match the existing timber structure.
  - Meets all current design standards.
  - Structural system with current seismic detailing and reliable ductile performance.
  - Single span configuration eliminates piers within the creek, reducing environmental impacts during construction and hydraulic impacts from debris snags.
  - Can reduce annual maintenance costs.
  - New abutments on pile foundations are likely to be required.

Disadvantages:

- Fiberglass Truss Bridge:
  - Approximately 60% higher construction cost than the rehabilitation alternative (see above).
  - The width of the bridge will need to be reduced to 10-feet (clear opening) or additional costs will be required for a special design.
  - Longer construction period than the rehabilitation option, yet shorter than the replacement timber option.
  - The City will need to obtain Caltrans approval to replace the existing structure.
  - Pressure treated decking will need to be inspected and may need replaced as soon as 20-years although it can be expected that the 3x12 members will have a longer service life than the 2x12 decking of the timber option.
  - If new abutments are required, pile installation will be difficult due to the existing utilities and trees.
- Replacement Timber Bridge:
  - Approximately 60% higher construction cost than the rehabilitation alternative (see above).
  - Longer construction period than the rehabilitation option.
  - New abutments on pile foundations are likely to be required.
  - Pile installation will be difficult with the existing utilities and trees.

- The City will need to obtain Caltrans approval to replace the existing structure.
- Pressure treated decking and handrail will need to be inspected and may need partially replaced as soon as 20-years, and expected to be fully replaced in 40-years.

3. Replacement Alternative Comparison

The main considerations of the replacement alternatives are construction costs and design life. The following consideration is a comparison of the replacement structures:

- The construction cost of the fiberglass structure is about 3% more than the replacement timber structure.
- The weight of the fiberglass structure should be significantly less than the replacement timber structure, which can significantly affect substructure costs.
- The design life of the fiberglass structure will far exceed the replacement timber structure.
- The design life of the 3x12 timber deck on the fiberglass structure should have a longer service life than the 2x12 timber deck of the replacement timber structure.
- Scaffolding will be required within the channel in order to construct both alternatives.
- It will be difficult to get the new glulam members across the channel for the replacement timber bridge due to the site constraints created by utility lines and trees.

Due to the presence and location of existing utility and existing trees, a replacement precast-prestressed concrete girder or steel girder structure wouldn't be feasible due to the site constraints. See Appendix D for the relative location of existing trees and utilities.

OTHER CONSIDERATIONS

Preliminary Environmental Analysis

Rehabilitation: The rehabilitation structure will have minimal environmental impacts (see the Preliminary Environmental Assessment Report in Appendix E. Bridge demolition activities will have to stay outside the limits of the creek and efforts will have to be taken to protect the existing trees and foliage. This project would be exempted under the California Environmental Quality Act (CEQA) and would be a Categorical Exclusion (CE) for NEPA (if federal funds are involved). No work will be done in the creek and minimal work will be done at the top of the creek banks to repair the scour between abutment walls. It should be noted that the adjacent bridge replacement project was also completed with a CE, and construction was completed in 2016. For NEPA, no technical studies are anticipated and a Preliminary Environment Study signed by Caltrans should suffice since there will be no excavation, no work in the creek, and the area has already been disturbed. The environmental process is expected to take 3 months.

Replacement: For the replacement option will result in a more significant environmental impacts to the surrounding biological resources, particularly due to having to excavate within the channel banks to construct new abutments. However, the project would also be exempted under the California Environmental Quality Act (CEQA) and would be a Categorical Exclusion (CE), with technical studies, for NEPA (if federal funds are involved). The environmental process is expected to take 6 months, and there is significant environmental information available with the recently completed (2016) bridge replacement project adjacent to the site.

Existing Utilities

An existing 2"ϕ steel utility line is attached to the inside face of the north glulam stringer. The utility line will have to be temporarily shut down during the rehabilitation. If a replacement bridge alternative was selected the utility line can be accommodated, but will have to be temporarily relocated to construct the replacement bridge. Existing overhead utility lines will make placing large stringers and piles more difficult. See Figures 1, 2 and 3 in Appendix D.

Impact on Roadways

Fremont Avenue, adjacent to the pedestrian bridge, may require temporary closures or traffic control in order to get the replacement members into the construction site and finish construction, depending on the selected alternative. The impacts to traffic on Fremont Avenue will be minimal. Pedestrian traffic will need to use the South side of the Fremont Avenue during construction.

Geotechnical

There shouldn't be any geotechnical issues unless a replacement structure is chosen, in which a geotechnical investigation will need to be conducted in order to design the new abutments.

Maintenance

Regardless of the selected alternative, the ease of future maintenance should be considered in the design. Additionally, it is recommended that the City develop a maintenance program for the bridge. At minimum, if the bridge is rehabilitated, the timber deck should be treated on a regular basis.

Pedestrian and Bicycle Design and Safety

Pedestrian and Bicycle design safety should be considered in the design of the project. If lighting is included, consideration should be given to deck lighting in order to minimize light pollution and glare. Documents such as "Vision Zero San Jose" and the "Santa Clara County Interjurisdictional Trail design, Use and Management Guidelines should be consulted.

CONCLUSIONS

The existing structure is in generally fair condition with select areas in need of repair. The deficiencies noted include deteriorating decking and handrail and severely deteriorated blocking.

Based on the condition of the existing structure, the above structural deficiencies and the high cost of replacement, rehabilitating the existing structure is the most cost effective alternative. The estimated rehabilitation construction cost is 40% of the bridge replacement construction cost and will minimize construction difficulties, environmental effects and construction impacts to Fremont Avenue, compared to the replacement options.

Appendix A: Cost Estimates

GENERAL PLAN ESTIMATE

TIMBER REHABILITATION

drake haglan AND ASSOCIATES

CHARGE		EX. AUTH.		BR. NO.	16C-0077		
BRIDGE		Fremont Ave Pedestrian Bridge				TYPE	Timber
DISTRICT	4	COUNTY	SCL	ROUTE		KILO. POST	
LENGTH	80'-0"	WIDTH	11'-9"	DEPTH	3'-9"	AREA	940 SF
LONG SPAN	65'-0"	SPANS	3	SKEW	0		

Quantities by:	L. Kinnebrew	Date: 2016-06-30
Checked by:		Date:
Revised by:		Date:

No.	BID ITEM No.	BID ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
1	157550	BRIDGE REMOVAL	LS	1	$ 5,100.00	$ 5,100.00
2	193003	STRUCTURE BACKFILL (BRIDGE)	CY	19.44	$ 275.00	$ 5,346.00
3	570120	TREATED LUMBER AND LAGGING	MFBM	10.44	$ 9,000.00	$ 93,960.00
4						$ -
5						$ -
6						$ -
7						$ -
8						$ -
9						$ -
10						$ -
11						$ -
12						$ -
13						$ -

SUBTOTAL		$ 104,406.00
MOBILIZATION (Incl)		$ 10,440.60
SUBTOTAL		$ 114,846.60
CONTINGENCIES	(@ 25%)	$ 28,711.65
PROJECT COST		$ 143,558.25
GRAND TOTAL		$ 143,558.25
FOR BUDGET PURPOSES - SAY		**$ 144,000.00**

COMMENTS:

Unit Costs from Caltrans District 8 Cost Data Website

Hardware costs built into lumber cost

GENERAL PLAN ESTIMATE

PREFABRICATED FIBERGLASS BRIDGE

drake haglan AND ASSOCIATES

CHARGE		EX. AUTH.		BR. NO.	16C-0077		
BRIDGE		Fremont Ave Pedestrian Bridge				TYPE	Timber
DISTRICT	4	COUNTY	SCL	ROUTE		KILO. POST	
LENGTH	80'-0"	WIDTH	11'-9"	DEPTH	3'-9"	AREA	940 SF
LONG SPAN	65'-0"	SPANS	3	SKEW	0		

Quantities by:	L. Kinnebrew	Date: 2016-06-30
Checked by:		Date:
Revised by:		Date:

No.	BID ITEM No.	BID ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
1	157550	BRIDGE REMOVAL	LS	1	$ 8,160.00	$ 8,160.00
2	192003	STRUCTURE EXCAVATION (BRIDGE)	CY	28.5	$ 450.00	$ 12,825.00
3	193003	STRUCTURE BACKFILL (BRIDGE)	CY	33	$ 275.00	$ 9,075.00
4	510053	STRUCTURAL CONCRETE, BRIDGE	CY	15	$ 3,900.00	$ 58,500.00
5	XXXXXX	PREFABRICATED FIBERGLASS BRIDGE	EA	1	$ 171,875.00	$ 171,875.00
6						$ -
7						$ -
8						$ -
9						$ -
10						$ -
11						$ -
12						$ -
13						$ -

SUBTOTAL		$ 260,435.00
MOBILIZATION (Incl)		$ 26,043.50
SUBTOTAL		$ 286,478.50
CONTINGENCIES	(@ 25%)	$ 71,619.63
PROJECT COST		$ 358,098.13
GRAND TOTAL		$ 358,098.13
FOR BUDGET PURPOSES - SAY		**$ 359,000.00**

COMMENTS:

Unit Costs from Caltrans District 8 Cost Data Website

Bridge costs includes assumed labor cost

GENERAL PLAN ESTIMATE

REPLACEMENT TIMBER BRIDGE

drake haglan AND ASSOCIATES

CHARGE		EX. AUTH.		BR. NO.	16C-0077		
BRIDGE		Fremont Ave Pedestrian Bridge				TYPE	Timber
DISTRICT	4	COUNTY	SCL	ROUTE		KILO. POST	
LENGTH	80'-0"	WIDTH	11'-9"	DEPTH	3'-9"	AREA	940 SF
LONG SPAN	65'-0"	SPANS	3	SKEW	0		

Quantities by:	L. Kinnebrew	Date: 2016-06-30
Checked by:		Date:
Revised by:		Date:

No.	BID ITEM No.	BID ITEM DESCRIPTION	UNIT OF MEASURE	ESTIMATED QUANTITY	UNIT PRICE	AMOUNT
1	157550	BRIDGE REMOVAL	LS	1	$ 8,160.00	$ 8,160.00
2	192003	STRUCTURE EXCAVATION (BRIDGE)	CY	28.5	$ 450.00	$ 12,825.00
3	193003	STRUCTURE BACKFILL (BRIDGE)	CY	33	$ 275.00	$ 9,075.00
4	510053	STRUCTURAL CONCRETE, BRIDGE	CY	15	$ 3,900.00	$ 58,500.00
5	570120	TREATED LUMBER AND LAGGING	MFBM	18.2	$ 9,000.00	$ 163,800.00
6						$ -
7						$ -
8						$ -
9						$ -
10						$ -
11						$ -
12						$ -
13						$ -

SUBTOTAL		$ 252,360.00
MOBILIZATION (Incl)		$ 25,236.00
SUBTOTAL		$ 277,596.00
CONTINGENCIES	(@ 25%)	$ 69,399.00
PROJECT COST		$ 346,995.00
GRAND TOTAL		$ 346,995.00
FOR BUDGET PURPOSES - SAY		**$ 347,000.00**

COMMENTS:

Unit Costs from Caltrans District 8 Cost Data Website

Hardware costs built into lumber cost

Summary of Timber Quantities

Existing Timber Inventory:

Existing Timber Deck, Railing and Major Blocking Quantities

Board	Number	Length		Volume	Description
2x 3	200	4.00 ft		57600 ci	(Railing Spindle)
2x 4	12	10.00 ft		11520 ci	(Horizontal Railing Bottom Half)
2x 4	20	10.00 ft		19200 ci	(Horizontal Railing under Handrail)
2x 4	20	10.00 ft		19200 ci	(Horizontal Railing Top Half)
2x 4	20	10.00 ft		19200 ci	(Horizontal Railing Bottom)
2x 12	85	12.75 ft		312120 ci	(Decking)
3x 8	20	9.75 ft		56160 ci	(Blocking / Nailer)
3x 12	4	14.00 ft		24192 ci	(Blocking / Nailer)
4x 8	20	9.75 ft		74880 ci	(Railing handrail)
6x 6	22	5.50 ft		52272 ci	(Railing Posts)

Existing Glulam Quantities

Glulam	Number	Length		Volume	Description
10.75x 18	6	12.75 ft		177633 ci	(Cross Member)
10.75x 18	6	14.00 ft		195048 ci	(Middle Stringer)
10.75x 18	4	14.00 ft		130032 ci	(Bin Abutment span Girder)
10.75x 45	2	80.00 ft		928800 ci	(Main Girder)*

*Main girders only replaced in option 3

Additional Timber Required to Meet railing code:

New Timber Railing

Board	Number	Length (ft)		Volume	Description
2x 3	360	4.00 ft		103680 ci	(Addit verticals for 4" rule)

Timber/Glulam Rehabilitation and Replacement Quantities**

Option A - Full Rehabilitation (replace all timber members except main glulam beams)
(some additional glulam members may be salvageable upon inspection after deck removal)

Vol =	1252737 ci
MFBM =	8.70 MFBM
20% Increase =	1.74 MFBM
Total =	**10.44 MFBM**

Option B - Prefabricated Fiberglass Truss Bridge Replacement

NA - Costs included in bridge costs as timber decking
is shipped with fiberglass bridge members from the

Option C - Timber Bridge Replacement

Vol =	2181537 ci
MFBM =	15.15 MFBM
20% Increase =	3.03 MFBM
Total =	**18.18 MFBM**

**Timber rehabilitation/replacement quantities reflect replacing the existing members, additional railing for 4" sphere rule and 20% overall increase to account for additional railing horizontal and handrail members, and flared end sections of bridge.

Additional Bridge Rehabilitation and Replacement Quantities:

Option A - Full Rehabilitation (replace all timber members except main glulam beams)

Description	Locations	Length	Width	Depth	Volume
Structure Backfill (Bridge)	1	14.00 ft	12.50 ft	3.00 ft	**19.44 cy**

Option B - Prefabricated Fiberglass Truss Bridge Replacement

Description	Locations	Length	Width	Depth	Volume
Structure Excavation (Bridge)	2	17.00 ft	5.00 ft	4.50 ft	**28.33 cy**
Structural Concrete, Bridge	2	15.00 ft	3.00 ft	4.50 ft	**15.00 cy**

	Locations	Length	Width	Depth	Volume
Structure Backfill (Bridge) (new Abuts)	2	20.00 ft	2.00 ft	4.50 ft	13.33 cy
Structure Backfill (Bridge) (Scour)	1	14.00 ft	12.50 ft	3.00 ft	19.44 cy
		Structure Backfill (Bridge)			**32.78 cy**

Option C - Timber Bridge Replacement

Description	Locations	Length	Width	Depth	Volume
Structure Excavation (Bridge)	2	17.00 ft	5.00 ft	4.50 ft	**28.33 cy**
Structural Concrete, Bridge	2	15.00 ft	3.00 ft	4.50 ft	**15.00 cy**

	Locations	Length	Width	Depth	Volume
Structure Backfill (Bridge) (new Abuts)	2	20.00 ft	2.00 ft	4.50 ft	13.33 cy
Structure Backfill (Bridge) (Scour)	1	14.00 ft	12.50 ft	3.00 ft	19.44 cy
		Structure Backfill (Bridge)			**32.78 cy**

Notes:

1. Concrete for the abutments of the replacement structures is assumed to be 15'L x 3'W x 4.5'H.
2. Backfilling the scour hole at the existing abutment is assumed to be 14'L x 12.5'W x 3'H.
3. Bridge Removal and the Prefabricated Fiberglass Bridge are lump sum items.

Appendix B: Rehabilitation Design Life

Existing Lifespan - 45" Glulam Loading: (Length = 65ft)

Glulam Properties:

L =	65.00 ft	
d =	3.75 ft	
b =	0.90 ft	
M =	433.07 k-ft	
V =	26.65 k	
x =	20	(20 for S. Pine, else 10)
S_x =	2.085 ft³	(NDS Table 1D)
l_u =	14.00 ft	(NDS 3.3.3)
Curved Radius:	300.00 ft	(Assumed)
$t_{laminated\ layer}$ =	1.50 in	(Assumed)
F_b =	2400 psi	(Assumed - NDS Table 5A)
F_v =	265 psi	(Assumed - NDS Table 5A)
E_{min} =	950000 psi	(Assumed - NDS Table 5A)

Wt On Glulam Stringers:

Sawn Lumber	Number	Length	Wt (plf) (NDS T. 1B)	wt (lbs)
2x3	160	4	0.911	583.04
2x4	8	10	1.276	102.08
2x4	16	10	1.276	204.16
2x4	16	10	1.276	204.16
2x4	16	10	1.276	204.16
2x12	80	12.75	4.102	4184.04
3x8	16	9.75	4.405	687.18
3x12	4	14	6.836	382.816
4x8	16	9.75	6.168	962.208
6x6	14	5.5	7.352	566.104

Glulam Depth	Number	Length	(S. Pine) Wt (plf)	wt (lbs)
18	4	12.75	46.9	2391.9
18	6	14	46.9	3939.6
45	2	80	119.1	19056

Total Load:	33467.45 lbs

Ex Load on Glulam:	33467.45 lbs
+ 10% (Hardware, add'l members…):	3346.74 lbs
Total:	36.81 k
Add 2 - 2x3 members per railing space - CBC 1013.3:	288
Wt:	1.05 k
Total Combined:	37.86 k
DL on Glulam:	**18.93 k/beam**
Ped LL on Glulam - 90psf:	**34.37 k/beam**

NDS Adjustment Factors:

ASD?	Y	
C_D =	0.9	(NDS T2.3.2)
C_{vr} =	0.72	(NDS 5.3.10)
Wet Service?	Y	
Sustained High Temps?	Y	T ≤ 100° F
	N	100° F < T ≤ 125° F
	N	125° F < T ≤ 150° F
Wet/ Dry Service Cond?	Wet	
Curved?	Y	
C_c =	1.00	

$$C_L = \frac{1+\left(F_{bE}/F_b^*\right)}{1.9} - \sqrt{\left[\frac{1+\left(F_{bE}/F_b^*\right)}{1.9}\right]^2 - \frac{F_{bE}/F_b^*}{0.95}}$$

l_e =	28.84 ft	(Assumes Single Span, distributed load)
R_b =	$(l_e d/b^2)^{0.5}$	
=	11.609	
F_b^* =	1728.000	

$$F_{bE} = \frac{1.20E_{min}'}{R_B^2}$$

=	7046.570	
C_L =	0.984	
Use C_L =	0.984	(NDS 3.3.3)

$$C_V = \left(\frac{21}{L}\right)^{1/x}\left(\frac{12}{d}\right)^{1/x}\left(\frac{5.125}{b}\right)^{1/x} \le 1.0$$

=	1.093	
Use C_V =	1.0	

	F	C_D	C_M	C_t	C_L	C_V	C_c	C_{vr}	Total
F_b':	2400	0.900	0.800	1.000	0.984*	1.000	1.000	-	1699.76 psi
F_v':	265	0.900	0.875	1.000	-	-	-	0.720	150.26 psi
E_{min}':	950000	-	0.833	1.000	-	-	-	-	791350.00 psi

*See NDS 3.3.3 for additioanl conditions that may not be accounted for.

Check Bending:

f_b = M/S_x
= 207.70 ksf
= 1442 psi

f_b ≤ F_b'
1442 psi ≤ 1699.76 psi **OK**

Check Shear:

f_v = $1.5V/A$
= 11.90 ksf
= 83 psi

f_v ≤ F_v'
83 psi ≤ 150.26 psi **OK**

Check Reduced Section Properties based on aging deterioration:

$t_{deterioration}$ = 0.375 in (Glulam deterioration over last 40 years)
$t_{Expected\ Deterioration}$ = 0.500 in (Expected deterioration over next 40 years)
$S_{x\ Expected}$ = 1.854 ft³

Check Bending:

f_b = $M/S_{x\ Exp}$
= 233.53 ksf
= 1622 psi

f_b ≤ F_b'
1622 psi ≤ 1699.76 psi **OK**

Check Shear:

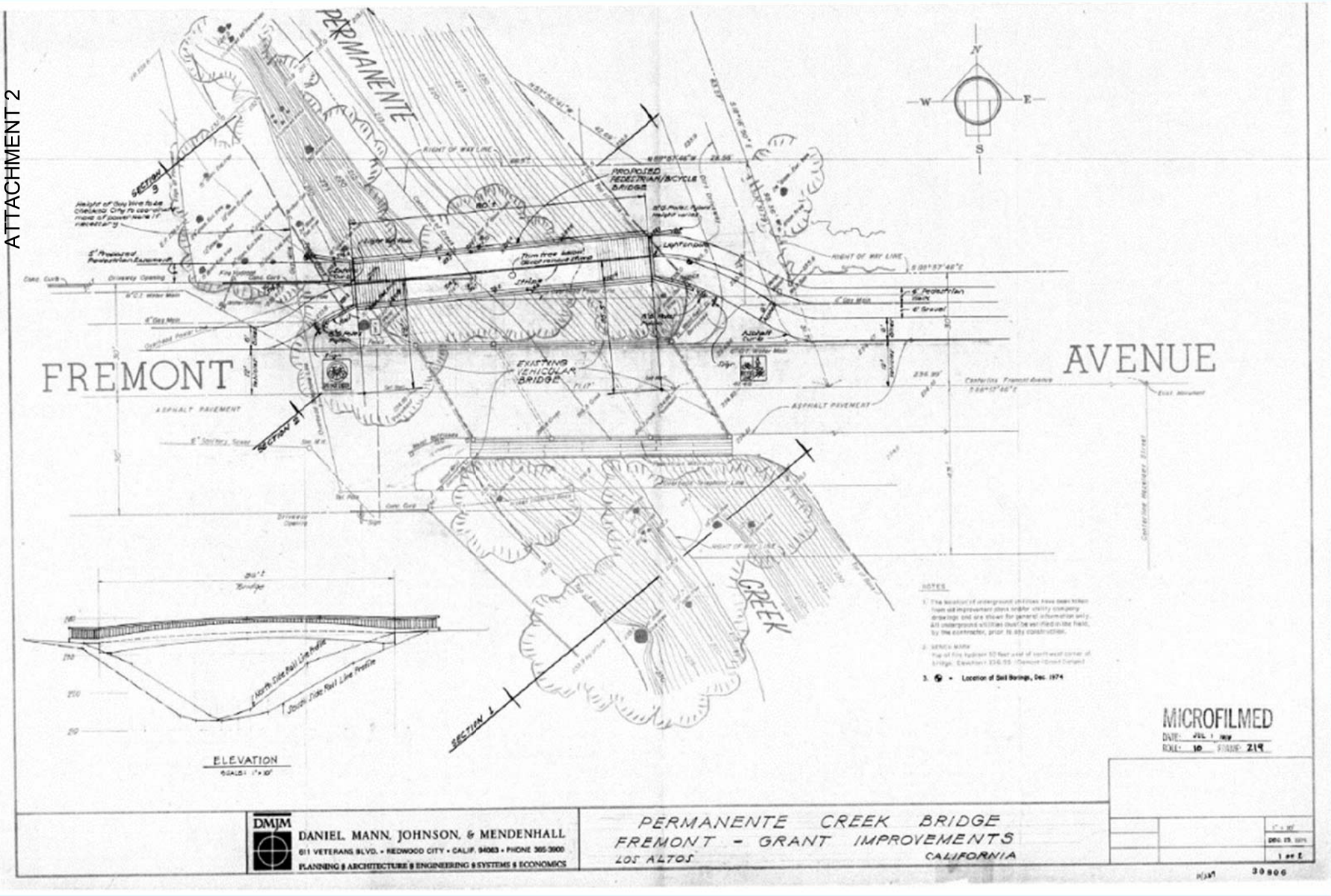
f_v = $1.5V/A_{reduced}$
= 13.21 ksf
= 92 psi

f_v ≤ F_v'
92 psi ≤ 150.26 psi **OK**

***Glulam Stringers should be structurally sound for an additional 40-years**

Appendix C: As-Built Plan

ATTACHMENT 2



1 Existing Timber Pedestrian Bridge As-Built

Appendix D: Photographs of Site

Figure 1 - Pedestrian Bridge looking east with close proximity to utilities

Figure 2 - Pedestrian Bridge looking west with close proximity to trees and overhead utility

Figure 3 - Pedestrian Bridge soffit looking east, with bracing and attached utility line

Figure 4 - Pedestrian Bridge blocking with severe deterioration

Figure 5 - Soffit of Pedestrian Bridge with blocking and handrail post deterioration and repaired section

Figure 6 - South side of Pedestrian Bridge with close proximity to vehicular bridge

Figure 7 - Northwest corner of Pedestrian Bridge with close proximity to existing trees and utility pole

Figure 8 - Pedestrian Bridge bin abutment with scour

Appendix E: Preliminary Environmental Analysis Study

Mini-Preliminary Environmental Analysis Report

Project Information

District: **04** County: **SCl** Route: **N/A** PM: **N/A**
EA: **N/A** EFIS Project ID:
Project Title: **Fremont Avenue Bridge Feasibility Study**
Project Manager: **Victor Chen** Phone # **(650) 947-2623**
Project Engineer: Phone #
Environmental Office Chief: Phone #

Project Description

Purpose and Need

The purpose is to rehabilitate the existing pedestrian bridge to ensure the safety of the public and users, and to improve the service life of the structure.

Description of work

Work includes replacing the timber deck and timber railing, replacing some timber blocking (cross stringers below the deck), providing deck drainage, and backfilling behind the bin-abutment wall with rock.

Anticipated Environmental Approval[1]

CEQA
- ☒ Categorical Exemption
- ☐ Statutory Exemption
- ☐ Initial Study/Negative Declaration
- ☐ Initial Study/Mitigated Negative Declaration
- ☐ Environmental Impact Report (EIR)

NEPA
- ☒ Categorical Exclusion
- ☐ "Routine" EA/FONSI
- ☐ "Complex" EA/FONSI
- ☐ Environmental Impact Statement (EIS)

Summary Statement (this statement will go directly into the PSR)

In order to identify environmental issues, constraints, costs, and resource needs, a Mini-PEAR was prepared for the project. Potential disposal, staging, and borrow sites will need to be identified in the PA&ED phase for complete environmental review. Field studies were not conducted and technical studies have been deferred to the PA&ED phase.

This project falls under the category of a Categorical Exemption for CEQA and a Categorical Exclusion (CE) for NEPA. No work will be done in the creek and minimal work will be done at the top of the creek banks to repair the scour between abutment walls. It should be noted that the adjacent bridge replacement project was also completed with a CE, and construction was completed in 2016. For NEPA, no technical studies are anticipated and a Preliminary Environment Study signed by Caltrans should suffice since there will be no excavation, no work in the creek, and the area has already been

[1] If the anticipated environmental document is an EIR and/or EIS, the preparation of a standard PEAR is recommended to avoid unanticipated costs and project delays.

disturbed by urban development in the area. The environmental process is expected to take 3 months.

Special Considerations

No special considerations exist at the site, other than the public desire to keep the timber bridge as close as possible to the existing bridge today.

Disclaimer

This report is not an environmental document or determination. The above information and recommendations are based on the project description provided in this report. The discussion and conclusions provided by this Mini-PEAR are approximate and based on a *cursory* review of existing records, databases, and mapping tools to estimate the potential for probable environmental effects. The purpose of this report is to provide a preliminary level of environmental analysis to support the Project Initiation Document. Changes in project scope, alternatives, existing environmental conditions, and/or environmental laws or regulations will require a re-evaluation of this report.

Approval

_____ Date: _____

Project Manager

ATTACHMENTS:

Attachment D: PEAR Environmental Commitments Cost Estimate

OPTIONAL ATTACHMENTS:

Attachment A: PEAR Environmental Studies Checklist
Attachment C: Schedule (Gantt Chart)

Attachment A: PEAR Environmental Studies Checklist

Rev. 11/08

Environmental Studies for PA&ED Checklist					
	Not anticipated	Memo to file	Report required	Risk* L M H	Comments
Land Use	☒	☐	☐	L	
Growth	☒	☐	☐	L	
Farmlands/Timberlands	☒	☐	☐	L	
Community Impacts	☒	☐	☐	L	May be required if not rehabilitated with a timber.
Community Character and Cohesion	☒	☐	☐	L	
Relocations	☒	☐	☐	L	
Environmental Justice	☒	☐	☐	L	
Utilities/Emergency Services	☒	☐	☐	L	
Visual/Aesthetics	☒	☐	☐	L	May be required if not rehabilitated with a timber.
Cultural Resources:	☒	☐	☐	L	
Archaeological Survey Report	☒	☐	☐	L	
Historic Resources Evaluation Report	☒	☐	☐	L	
Historic Property Survey Report	☒	☐	☐	L	
Historic Resource Compliance Report	☒	☐	☐	L	
Section 106 / PRC 5024 & 5024.5	☒	☐	☐	L	
Native American Coordination	☒	☐	☐	L	
Finding of Effect	☒	☐	☐	L	
Data Recovery Plan	☒	☐	☐	L	
Memorandum of Agreement	☒	☐	☐	L	
Other:	☒	☐	☐	L	
Hydrology and Floodplain	☒	☐	☐	L	
Water Quality and Stormwater Runoff	☒	☐	☐	L	
Geology, Soils, Seismic and Topography	☒	☐	☐	L	
Paleontology	☒	☐	☐	L	
PER	☒	☐	☐	L	
PMP	☒	☐	☐	L	
Hazardous Waste/Materials:	☒	☐	☐	L	
ISA (Additional)	☒	☐	☐	L	
PSI	☒	☐	☐	L	
Other:	☒	☐	☐	L	
Air Quality	☒	☐	☐	L	
Noise and Vibration	☒	☐	☐	L	
Energy and Climate Change	☒	☐	☐	L	
Biological Environment	☒	☐	☐	L	
Natural Environment Study	☒	☐	☐	L	
Section 7:	☒	☐	☐	L	
Formal	☒	☐	☐	L	
Informal	☒	☐	☐	L	
No effect	☒	☐	☐	L	
Section 10	☒	☐	☐	L	
USFWS Consultation	☒	☐	☐	L	
NMFS Consultation	☒	☐	☐	L	

Environmental Studies for PA&ED Checklist					
	Not anticipated	Memo to file	Report required	Risk* L M H	Comments
Species of Concern (CNPS, USFS, BLM, S, F)	☒	☐	☐	L	
Wetlands & Other Waters/Delineation	☒	☐	☐	L	
404(b)(1) Alternatives Analysis	☒	☐	☐	L	
Invasive Species	☒	☐	☐	L	
Wild & Scenic River Consistency	☒	☐	☐	L	
Coastal Management Plan	☒	☐	☐	L	
HMMP	☒	☐	☐	L	
DFG Consistency Determination	☒	☐	☐	L	
2081	☒	☐	☐	L	
Other:	☒	☐	☐	L	
Cumulative Impacts	☒	☐	☐	L	
Context Sensitive Solutions	☒	☐	☐	L	
Section 4(f) Evaluation	☒	☐	☐	L	
Permits:	☒				
401 Certification Coordination	☐	☐	☒	L	
404 Permit Coordination, IP, NWP, or LOP	☒	☐	☐	L	
1602 Agreement Coordination	☒	☐	☐	L	
Local Coastal Development Permit Coordination	☒	☐	☐	L	
State Coastal Development Permit Coordination	☒	☐	☐	L	
NPDES Coordination	☐	☐	☒	L	
US Coast Guard (Section 10)	☒	☐	☐	L	
TRPA	☒	☐	☐	L	
BCDC	☒	☐	☐	L	