Appendix A
Three Creeks Trail Pedestrian Bridge Project
Scoping Report and Materials

Scoping Report
Environmental Impact Report on the Three Creeks Trail Pedestrian Bridge Project

Prepared for
City of San José

November 2014

CH2MHILL®
2485 Natomas Park Drive, Suite 600
Sacramento, CA 95833

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Acronyms and Abbreviations

CEQA	California Environmental Quality Act
CFR	*Code of Federal Regulations*
EIR	Environmental Impact Report
NOP	Notice of Preparation

SECTION 1
Introduction

As the California Environmental Quality Act (CEQA) lead agency, the City of San José intends to develop an Environmental Impact Report (EIR) for the "Three Creeks Trail Pedestrian Bridge Project" (proposed project). The EIR will evaluate the environmental effects of replacing the Willow Glen railroad trestle with a steel truss bridge.

As part of the environmental review process, the City of San José held a public scoping meeting to obtain public and stakeholder input, and to comply with environmental regulations. This scoping report documents the scoping process that occurred for the Three Creeks EIR, including the public scoping meetings that were held to solicit public comments. This report also provides a summary of all comments received by November 13, 2014.

1.1 Scoping Purpose and Process

Scoping is generally defined as "early public consultation," and is one of the first steps of the CEQA environmental review process. The purpose of scoping is to involve the public, stakeholders, and other interested agencies early on in the environmental compliance process to help determine the range of alternatives, environmental effects, and mitigation measures to be considered in an environmental document. The results of scoping help guide an agency's environmental review of a project.

As part of the scoping process, agencies often conduct public meetings. Scoping is not limited to public meetings; however, public meetings allow interested persons to listen to information about a proposed project or action, and express their concerns and viewpoints to the implementing agencies. During scoping meetings, the lead agency generally outlines the proposed project, defines the area of analysis, identifies issues to be addressed in the environmental compliance document, and solicits public comments. Agencies also establish a scoping comment period to accept scoping comments submitted in writing.

Scoping comments are considered by the agencies during the formulation of alternatives and are used to determine the scope of the environmental issues to be addressed in the environmental document.

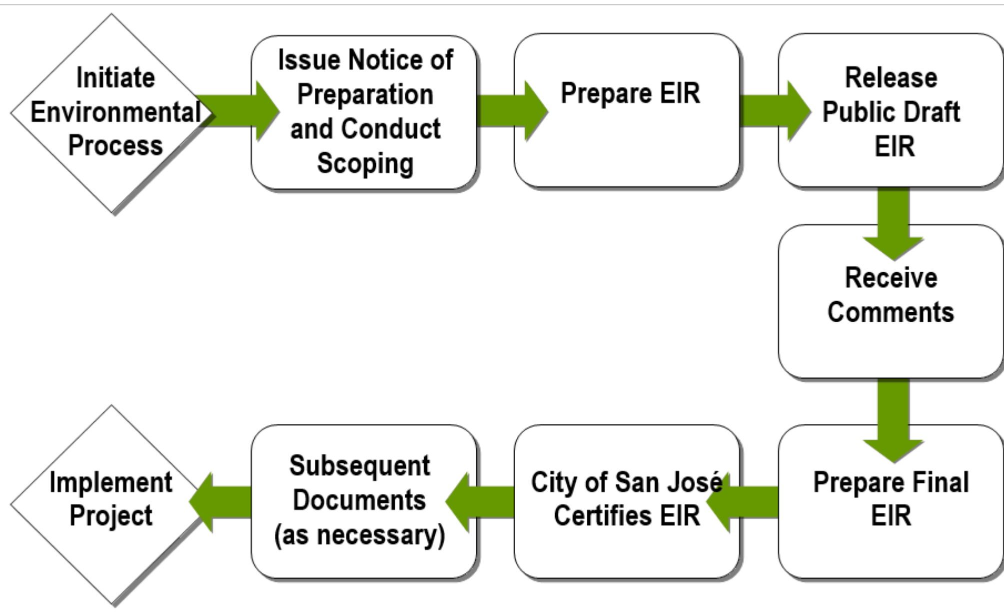


FIGURE 1-1
CEQA Process

1.2 California Environmental Quality Act

CEQA encourages early public consultation with affected parties. This early consultation can often identify and help to resolve potential problems before they turn into more serious problems further on in the process. CEQA describes two other benefits for early consultation, as follows:

a. "Scoping has been helpful to agencies in identifying the range of actions, alternatives, mitigation measures, and significant effects to be analyzed in depth in an EIR and in eliminating from detailed study issues found not to be important.

b. Scoping has been found to be an effective way to bring together and resolve the concerns of affected federal, state, and local agencies, the proponent of the action, and other interested persons including those who might not be in accord with the action on environmental grounds" (CEQA Guidelines Section 15083).

According to Section 15082 of the CEQA Guidelines, a lead agency must conduct at least one scoping meeting for a project of statewide, regional, or area-wide significance. A scoping meeting held pursuant to CEQA in the city or county in which the project is located satisfies this CEQA requirement as long as notification of the scoping meetings has been carried out according to the CEQA Guidelines. Section 15082 (c)(2) of the CEQA Guidelines requires the lead agency to provide notice of the scoping meeting to all of the following:

a) Any county or city that borders on a county or city within which the project is located, unless agreed otherwise;

b) Any responsible agency;

c) Any public agency that has jurisdiction by law with respect to the project; and

d) Any organization or individual who has filed a written request for the notice.

CEQA requires public notification of the initiation of an EIR through a Notice of Preparation (NOP) (CEQA Guidelines Section 15082) that is submitted to the State Clearinghouse through the Governor's Office of Planning and Research. With regard to the proposed project's EIR, City of San José published an NOP for the project on Friday, October 10, 2014. A copy of the NOP is included in Appendix A of this scoping report.

SECTION 2

Project Overview

This chapter describes the basis for the overall actions that will be addressed in the proposed project's EIR, presents the draft purpose and need/project objectives, and summarizes the alternatives introduced during scoping for the EIR.

2.1 Project Background

The City of San José is in the process of developing the Los Gatos Creek Trail and the Three Creeks Trail as part of a citywide effort to improve the pedestrian and bicycle trail system. The proposed project would be a component of the Three Creeks Trail, which will follow the former Western Pacific railroad alignment recently acquired by the City, and would provide a connection between the Los Gatos Creek, Guadalupe River, and Coyote Creek trail systems. A dirt trail along the proposed Three Creeks Trail alignment is currently open to the public, but the existing Willow Glen railroad trestle is fenced off due to safety concerns.

In 2004, the City of San José completed an environmental impact assessment for the Los Gatos Creek Trail, Reach 4 project, including retrofit of the Willow Glen trestle focusing on deck repair and replacement (City Project File No. PP04-01-014). Subsequent to that action, the City further studied the potential to retrofit the trestle and determined that the extent of a retrofit project would be much greater than anticipated. Based on the relative merits of a retrofit versus a replacement project, the City decided to advance the replacement project and conducted a new environmental analysis. The City adopted an Initial Study/Mitigated Negative Declaration (City Project File No. PP13-085) on January 14, 2014, and obtained regulatory permits for the replacement project in early 2014. The Initial Study/Mitigated Negative Declaration was the subject of legal action, which resulted in a judicial determination that there was substantial evidence in the record supporting a fair argument that the project may have a significant effect on the environment. The court ordered that an EIR be prepared.

2.2 Project Objectives

CEQA requires an EIR's project description to include a statement of the objectives sought by the proposed project. The CEQA project objectives for the proposed project are as follows:

- The structure must be constructed to appropriate engineering standards that provide for safe bicycle and pedestrian use, in consideration of son-site geological and hydrological conditions.
- The structure must be consistent with design standards of the Three Creeks Trail Master Plan, including enhancement of community identity, aesthetics, and respect for historical and biological resources.
- The structure must be cost effective in terms of both up-front capital costs and long-term operations and maintenance costs, and so that it remains eligible for grant funding.

2.3 Proposed Project and Alternatives

Three potential alternatives were presented at the scoping meeting and are summarized below. Input received during the scoping process, including comments related to these preliminary alternatives, will be considered by the City of San José in determining the characteristics and the range of alternatives to be addressed in the EIR.

2.3.1 Proposed Project (Bridge Replacement)

The bridge replacement alternative would replace the existing wood railroad trestle with a pre-fabricated, 210-foot-long, single-span steel truss bridge with a poured concrete deck. The new bridge would be on the same alignment as the existing bridge. The wood abutments would be replaced with new concrete abutments supported on driven H-piles. There would be no permanent supports in the creek channel. Temporary supports might be needed for erection of the new bridge. Small retaining walls would be installed adjacent to the new bridge abutments to allow for the future Los Gatos Creek trail connection to the northeast and for a viewing area on the south side of the new bridge.

2.3.2 No Project Alternative

The No Project Alternative represents the state of the environment without the Proposed Action. It is the future foreseeable conditions in the absence of the Project. Under this alternative no bridge retrofit or replacement activities occur, but ongoing maintenance would be required for safety such as fence repair, brush clearing, and fire suppression.

2.3.3 Bridge Retrofit Alternative

The Retrofit Alternative would preserve the existing Willow Glen trestle. Construction activities would occur under a Retrofit Alternative in order to make the trestle safe for pedestrian and bicycle use. These activities include repairs to many of the individual wooden piles, pile caps, and horizontal wooden braces; repairs to the abutments on the north and south ends of the bridge; and a complete replacement of the bridge deck. The new bridge deck is expected to be concrete, with railing details and other architectural features to be determined. In order to accommodate this construction activity, a temporary work lane would be established in the creek corridor similar to the proposed project. In addition, preservation of the wooden trestle would require ongoing maintenance activities such as fire suppression and brush clearing in the creek channel to clear obstructions following storms.

SECTION 3

Scoping Meetings

The City of San José held a public scoping meeting on October 21, 2014, regarding preparation of the EIR. This chapter presents a summary of the scoping meeting.

3.1 Scoping Meeting Date and Location

One scoping meeting was held on October 21, 2014 at 6:30 pm at the Willow Glen Community Center, 2175 Lincoln Avenue, San Jose CA 95125.

3.2 Scoping Meeting Notification

The City of San José provided notifications for the scoping meeting, as required by CEQA. Copies of all scoping meeting notifications are provided in Appendix B of this scoping report.

3.2.1 Notice of Preparation

City of San José filed an NOP on Friday, October 10, 2014, with the State Clearinghouse (State Clearinghouse # 2013112050); copies of the NOP were sent to affected agencies in accordance with CEQA requirements. The NOP contained information on the location, date, and time of the scoping meetings, and is included in Appendix A of this scoping report.

As described in Section 1.2.2, the NOP was sent to the following state agencies:

- State Clearinghouse
- Department of Fish and Wildlife, Region 3
- Native American Heritage Commission
- Office of Historic Preservation
- Department of Parks and Recreation
- Public Utilities Commission
- Regional Water Quality Control Board, Region 2
- State Lands Commission
- Department of Toxic Substances Control

3.2.2 Social Media Announcement

Social media announcements providing the date and location of the scoping meeting were published via Twitter on the following accounts:

- San Jose Trails @SanJoseTrails (October 9 and 21, 2014)
- Save Our Trails @sotscc (October 9 and 21, 2014)
- SV Bicycle Coalition @bikesv (October 9 and 21, 2014)

Copies of all social media advertisements are included in Appendix B of this scoping report.

3.2.3 Website

The City of San José provided project notifications, updated project information, and provided information about the scoping meeting on the Three Creeks page of their website (http://www.sanjoseca.gov/index.aspx?NID=2883), all accessible to the general public.

3.3 Scoping Meeting Format and Content

This section describes the overall scoping meeting format and content.

3.3.1 Agenda

The scoping meeting began with registration at the door, where attendees were asked to sign in. Appendix C includes the sign-in sheets from the scoping meetings. Not all attendees used the sign-in sheets.

A formal introduction was provided by one of the representatives of the City, who explained the format of the scoping meeting and instructions for filling out comment cards. After the presentation, attendees were given the opportunity to attend 5 stations and talk with experts to gain a better understanding of the project.

3.3.2 Meeting Format

The scoping meeting operated in an open house format; there were five stations with an expert at each one to talk with attendees and clarify anything related to the project. Attendees were instructed to write all comments and suggestions down on comment cards provided. In addition to experts stationed at each table, there were also poster boards and informational materials provided for viewing. Visitors were asked to stop by each of the tables, gather information, and ask questions with the experts. Each station provided comment cards, where people were encouraged to either submit their comments in a box or to post their comments on a board for others to see.

3.3.3 Meeting Comment Methods

Written comments were the only form of comment submission permitted at the scoping meeting. A comment box was provided for submittal of written comments, in addition to posting the comments on a posterboard for public viewing. These comments were collected by the City and will become part of the scoping comment record.

3.4 Staff

Table 3-1 lists the agency and consultant staff that attended the public scoping meetings.

TABLE 3-1
Agency Staff and Consultants at Scoping Meeting

Name	Affiliation
John Davidson	City of San José
Yves Zsutty	City of San José
Jan Palajac	City of San José
Sarah Fleming	City of San José
Steve Mikesell	Mikesell Historical Consulting
Dave Von Rueden	CH2M HILL
Meabon Burns	CH2M HILL
Matt Franck	CH2M HILL
Yassaman Sarvian	CH2M HILL

SECTION 4

Scoping Comment Summaries

This chapter summarizes all comments received during the scoping period. As described in Chapter 1, the scoping comments are considered by the lead agencies in determining the scope of the EIR analysis; written responses to the scoping comments are not required for or provided within a scoping report.

4.1 Scoping Comment Overview

Written comments were accepted by City of San José and CH2M Hill during the scoping meeting. The City of San José also accepted written comments via mail or email throughout the scoping period of October 10, 2014 through November 13, 2014. No additional comments were received after November 13, 2014. Tables 4-1 and 4-2 list all individuals and entities that provided comments during the comment period, although some individuals chose to remain anonymous when submitting their comments at the scoping meeting.

TABLE 4-1
Written Comment Documents Received

Name	Affiliation
Federal Agencies	
None	Not applicable
State	
None	Not applicable
Native American	
None	Not applicable
Local	
Kathrin I. Turner	Santa Clara Water District
Businesses/Organizations	
None	Not applicable
Individuals	
Robert Jakovina	Not applicable
Cathy Rubin	Not applicable
Larry Ames	Not applicable
Scott Miller and Janet Burdick	Not applicable
Martha Heinrichs	Not applicable
Susan M. Landry	Not applicable

TABLE 4-2
Individuals Providing Written Comments at Public Scoping Meeting

Name	Affiliation
Larry Ames	Friends of Willow Glen Trestle
Jack D. Nadeau	Save Our Trails
Chris Dresden	None indicated
Dan Chapman	Shasta/Hanchet Park Neighborhood Association (SHPNA)

TABLE 4-2
Individuals Providing Written Comments at Public Scoping Meeting

Name	Affiliation
Dick Silva	None indicated
Taisia Memahon	Friends of Three Creeks Trail
Diane Solomon	None indicated
Emily Chen	None indicated
Peter Miron-Conk	None indicated
Bruce Tichinin	Friends of Three Creeks Trail
Carolyn S. Rogozen	None indicated
Liv Ames	None indicated
Heather Lerner	Happy Hollow Foundation
Gayle Frank	None indicated

4.2 Comment Summary

All comments received were reviewed for the specific issues or recommendations raised by the commentor. The comments received ranged from requests to keep the existing bridge to requests to continue the Three Creeks Trail Plan, requests to be added to the mailing list to recommendations for preparation and content of the EIS/EIR. Each comment letter is included in Appendix D.

4.2.1 Comments from Individuals/Organizations

The following summarizes comments by individuals and organizations. General comments referred to a number of issues, including but not limited to the following:

- Several individuals at the scoping meeting expressed that they would like to see the existing trestle preserved and listed as a historic landmark. There were several requests from individuals to research the history and physical status of the Willow Glen trestle. These specific requests included the following:
  - Find original photos and architectural drawings of the trestle
  - If the trestle were kept, create new drawings and renditions of what the restoration would look like and how it will look in the future
  - Research the status of the piers (how many are original, how many need to be replaced)
  - Research the trestle’s relation to the railroad history and its impact on the economy and Willow Glen and San José (particularly local canneries).
- A few individuals requested to have the hydrology and water flow of Los Gatos Creek studied in comparison with each of the proposed alternatives.
- Two individuals asked about creosote and other hazardous chemical measurements and thresholds. One of these individuals also suggested to compare the trestle’s creosote measurements with those from a San Francisco Bay study of creosote hazards.
- Several individuals and organizations expressed support for the proposed project (bridge replacement).
- One individual asked about biological impacts to wildlife and bird migration if the trestle was removed, and what those impacts would be on the Los Gatos Creek if the trestle were to be replaced.

- Individuals asked about the number of alternatives studied and suggested some other alternatives to consider.
- One individual commented that 2 of the 7 educational components in the City's Three Creeks Trail Master Plan mentions railroad alignment and history, and emphasized the importance of making the trestle historic.
- A few submitted letters emphasized support for maintaining the current trestle and illustrated the historical potential the bridge has in the founding of the Town of Willow Glen, its importance in developing the area's agricultural economy, and the unique structure of the trestle in maintaining the City's cultural identity.
- One letter suggested including additional alternative plans to the No Project, Retrofit, and Replacement Bridge Alternatives. Additionally the letter asked many detailed questions relating to the trestle's history, alternatives, hydrology, fire, pests, contamination, maintenance; questions about the steel bridge's structure, environmental impacts (i.e., carbon footprint, impacts on landfill), trail safety, aesthetics of the structure, in addition to other questions.

4.2.2 Comments from Agencies

The Santa Clara Valley Water District emphasized that while the project does not require a District permit (since the District does not have any land rights within the project's area), the project does have approval for a District grant. Funding for a District grant is dependent on the project's compliance with CEQA and Standards for Land Use Near Streams; the District asked that the Draft EIR needs to address freeboard requirements for the installation of the new bridge. They also commented on the design of the proposed viewing platform.

Appendix A
Notice of Preparation

NOTICE OF PREPARATION OF A DRAFT ENVIRONMENTAL IMPACT REPORT FOR THE THREE CREEKS TRAIL PEDESTRIAN BRIDGE PROJECT

As the Lead Agency, the City of San José will prepare an Environmental Impact Report (EIR) for the Three Creeks Pedestrian Bridge Project **(File Number PP13-085)**. The City welcomes your input regarding the scope and content of the environmental information that is relevant to your area of interest, or to your agency's statutory responsibilities in connection with the proposed project.

The project description, location, and probable environmental effects that will be analyzed in the EIR for the project are attached.

According to State law, the deadline for your response is 30 days after receipt of this notice; however, we would appreciate an earlier response, if possible. Please identify a contact person, and send your response to:

City of San José, Planning Division, Attn: John Davidson
City Hall, 200 East Santa Clara Street, 3rd Floor, San José CA 95113-1905
Phone: (408) 535-7895, e-mail: john.davidson@sanjoseca.gov

The Department of Planning, Building and Code Enforcement of the City of San José will hold a Public Scoping Meeting for the EIR to describe the proposed project and the environmental review process and to obtain your verbal input on the EIR analysis for the proposal. This EIR Public Scoping Meeting is scheduled for **Tuesday, October 21, 2014 at 6:30 p.m. at the Willow Glen Community Center (2175 Lincoln Avenue, San Jose CA).** You are welcome to attend and give us your input on the scope of the EIR so that it addresses all relevant environmental issues.

John Davidson, Senior Planner
Planning Division

John Davidson

Deputy

Date: October 9, 2014

NOTICE OF PREPARATION
OF AN
ENVIRONMENTAL IMPACT REPORT
FOR THE THREE CREEKS PEDESTRIAN BRIDGE PROJECT

October 9, 2014

Introduction

The purpose of an Environmental Impact Report (EIR) is to inform decision-makers and the general public of the environmental effects of a proposed project that an agency may implement or approve. The EIR process is intended to provide information sufficient to evaluate a project and its potential for significant impacts on the environment, to examine methods of reducing adverse impacts, and to consider alternatives to the project.

The EIR for the proposed project will be prepared and processed in accordance with the California Environmental Quality Act (CEQA) of 1970, as amended. In accordance with the requirements of CEQA, the EIR will include the following:

- A summary of the project;
- A project description;
- A description of the existing environmental setting, potential environmental impacts, and mitigation measures;
- Alternatives to the project as proposed; and
- Environmental consequences, including (a) any significant environmental effects which cannot be avoided if the project is implemented; (b) any significant irreversible and irretrievable commitments of resources; (c) the growth inducing impacts of the proposed project; (d) effects found not to be significant; and (e) cumulative impacts.

Project Background

The City of San José is in the process of developing the Los Gatos Creek Trail and the Three Creeks Trail as part of a citywide effort to improve the pedestrian and bicycle trail system. The proposed project would be a component of the Three Creeks Trail, which will follow the former Western Pacific railroad alignment recently acquired by the City, and would provide a connection between the Los Gatos Creek, Guadalupe River, and Coyote Creek trail systems. A dirt trail along the proposed Three Creeks Trail alignment is currently open to the public, but the existing Willow Glen railroad trestle is fenced off due to safety concerns.

In 2004, the City of San José completed an environmental impact assessment for the Los Gatos Creek Trail, Reach 4 project, including retrofit of the Willow Glen trestle focusing on deck repair and replacement (City Project File No. PP04-01-014). Subsequent to that action, the City further studied the potential to retrofit the trestle and determined that the extent of a retrofit project would be much greater than anticipated. Based on the relative merits of a retrofit versus a replacement project, the City decided to advance the replacement project and conducted a new environmental analysis. The City adopted an Initial Study/Mitigated Negative Declaration (SCN 2013112050, City Project File No. PP13-085) and obtained regulatory permits for the replacement project in early 2014. The Initial Study/Mitigated Negative Declaration was the subject of legal action, which resulted in a judicial determination that there was substantial evidence in the record supporting a fair argument that the project may have a significant effect on the environment. The court ordered that an EIR be prepared.

Project Location

The Three Creeks Trail Pedestrian Bridge Project is in Willow Glen, a neighborhood of San José. The project is situated between a residential neighborhood and a commercial/industrial area on a crossing over Los Gatos Creek between Lonus Street and Coe Avenue (latitude 37°18’53.16”N, longitude 121°54’13.00”W) (see Figure 1). Existing land uses adjacent to the project site include: Residential Neighborhood, Neighborhood/Community Commercial, Light Industrial, and Downtown.

Project Description and Alternatives

The proposed project includes the replacement of the existing wood railroad trestle with a pre-fabricated, 210-foot-long, single-span steel truss bridge with a poured concrete deck. The new bridge would be on the same alignment as the existing bridge. The wood abutments would be replaced with new concrete abutments supported on driven H-piles. There would be no permanent supports in the creek channel. Temporary supports might be needed for erection of the new bridge. Small retaining walls would be installed adjacent to the new bridge abutments to allow for the future Los Gatos Creek trail connection to the northeast and for a viewing area on the south side of the new bridge.

Aesthetic treatments are included in the bridge design. The pedestrian bridge will include design elements that recall the former Western Pacific Railroad operations and trestle structure, including two large emblems inset in the pavement representing the Western Pacific and Union Pacific Railroads, and an interpretive display panel focusing on the timeline and history of the trestle as it relates to the surrounding community. The final aesthetic treatments are continuing to be refined.

The demolition of the existing bridge would require operation of cranes, excavators, and loaders along the length of the bridge. A work lane, approximately 20 feet wide, would be established along the upstream side of the bridge running parallel to the full length of the bridge. The existing trestle deck is supported by a total of 81 wood piles, with additional support from wood braces. Pile removal techniques would include the following complete- and partial-removal methods:

- Vertical pulling involves gripping the pile with a chain, cable, or collar, and pulling with an excavator or hydraulic crane.
- Vibratory extraction involves attaching a vibratory hammer to the pile to break the seal between the pile and the soil and pulling with a crane or excavator from the top of the existing bridge deck.
- Horizontal snapping or breaking typically involves pushing or pulling the pile laterally to break off the pile near the ground line.
- Subsurface cutting involves using hydraulic or pneumatic saws or shears attached to an excavator to cut the pile below the ground line.

The piles and bridge deck are composed mostly of creosote-treated wood, and demolition would generate a large amount of treated wood waste. Construction debris would be disposed of in accordance with California Department of Toxic Substances Control regulations for treated wood waste.

The construction of the new bridge would involve excavating ground for the abutments and retaining walls using backhoes and excavators, pile driving of H-piles, placement of reinforcing steel and concrete, assembly of a pre-fabricated steel truss bridge using large cranes, and placement of a concrete deck on the bridge using a concrete pump truck. The approaches to the bridge would be prepared by placing sub-base and then placing concrete pavement. Aggregate paving would be provided to connect the new bridge approaches to the existing dirt trails.

There are no large-diameter trees directly under the trestle, but some nearby tree branches hang over the trestle.

Overhanging branches would need to be pruned, and in some cases nonnative trees would be removed to allow equipment access. It is not expected that any native trees would be removed.

The EIR also will include an evaluation of an alternative that would preserve the existing Willow Glen trestle – a Retrofit Alternative. Construction activities would occur under a Retrofit Alternative in order to make the trestle safe for pedestrian and bicycle use. These activities include repairs to many of the individual wooden piles, pile caps, and horizontal wooden braces; repairs to the abutments on the north and south ends of the bridge; and a complete replacement of the bridge deck. The new bridge deck is expected to be concrete, with railing details and other architectural features to be determined. In order to accommodate this construction activity, a temporary work lane would be established in the creek corridor similar to the proposed project. In addition, preservation of the wooden trestle would require ongoing maintenance activities such as fire suppression and brush clearing in the creek channel to clear obstructions following storms.

The EIR also will consider a No Project Alternative – no bridge retrofit or replacement activities occur, but ongoing maintenance would be required for safety such as fence repair, brush clearing, and fire suppression.

Potential Environmental Impacts of the Project

The EIR will describe the existing environmental conditions on the project site and will identify the significant environmental impacts anticipated to result from development of the project as proposed. Where potentially significant environmental impacts are identified, the EIR will also discuss mitigation measures that may make it possible to avoid or reduce significant impacts, as appropriate. The analysis in the EIR will include the following specific categories of environmental impacts and concerns related to the proposed project. Additional subjects may be added at a later date, as new information comes to light.

1. Aesthetics

The EIR will discuss the visual setting and any impacts that would potentially occur as a result of the project.

2. Air Quality

The EIR will describe the existing air quality conditions in the Bay Area and will evaluate the project's potential air quality impacts, including short-term air quality impacts associated with construction.

3. Biological Resources

The EIR will discuss the potential for the project to result in impacts to biological resources on the site, including impacts from creosote.

4. Cultural Resources

The EIR will provide a comprehensive discussion on the historic significance of the existing bridge structure, the potential for archaeological resources to be present on the site, and the project's potential impacts on those resources.

5. Geology and Soils

The EIR will discuss the existing geologic and soil conditions, including potential impacts from seismic activity, on the project site, and will discuss the potential for the project to result in impacts to geology and soils on the site.

6. Greenhouse Gases

The EIR will examine the potential for the project to result in global climate change impacts due to greenhouse gas emissions.

7. Hazardous Materials

The EIR will discuss the potential for soil contamination from project construction as well as other hazardous materials in the project area.

8. Hydrology and Water Quality

The EIR will discuss the hydrologic and hydraulic conditions on the project site as well as drainage conditions in the project area and the potential for flooding. Water quality impacts and conformance with the Santa Clara Valley Urban Runoff Pollution Prevention Program as well as other Regional Water Quality Control Board requirements will be addressed.

9. Land Use

The EIR will discuss the proposed project's consistency with adopted plans and policies.

10. Noise

The EIR will include a discussion of noise impacts primarily resulting from project construction. The analysis will identify the existing setting and the noise levels associated with construction activities; post-construction project operations are not expected to increase noise levels beyond what is currently occurring at the site. Conformance to the City of San José's noise guidelines will be analyzed.

11. Transportation

The EIR will describe the existing roadway conditions in and around the site, including the local streets and intersections, and provide an analysis of impacts including those impacts that would occur during construction.

12. Utilities and Service Systems

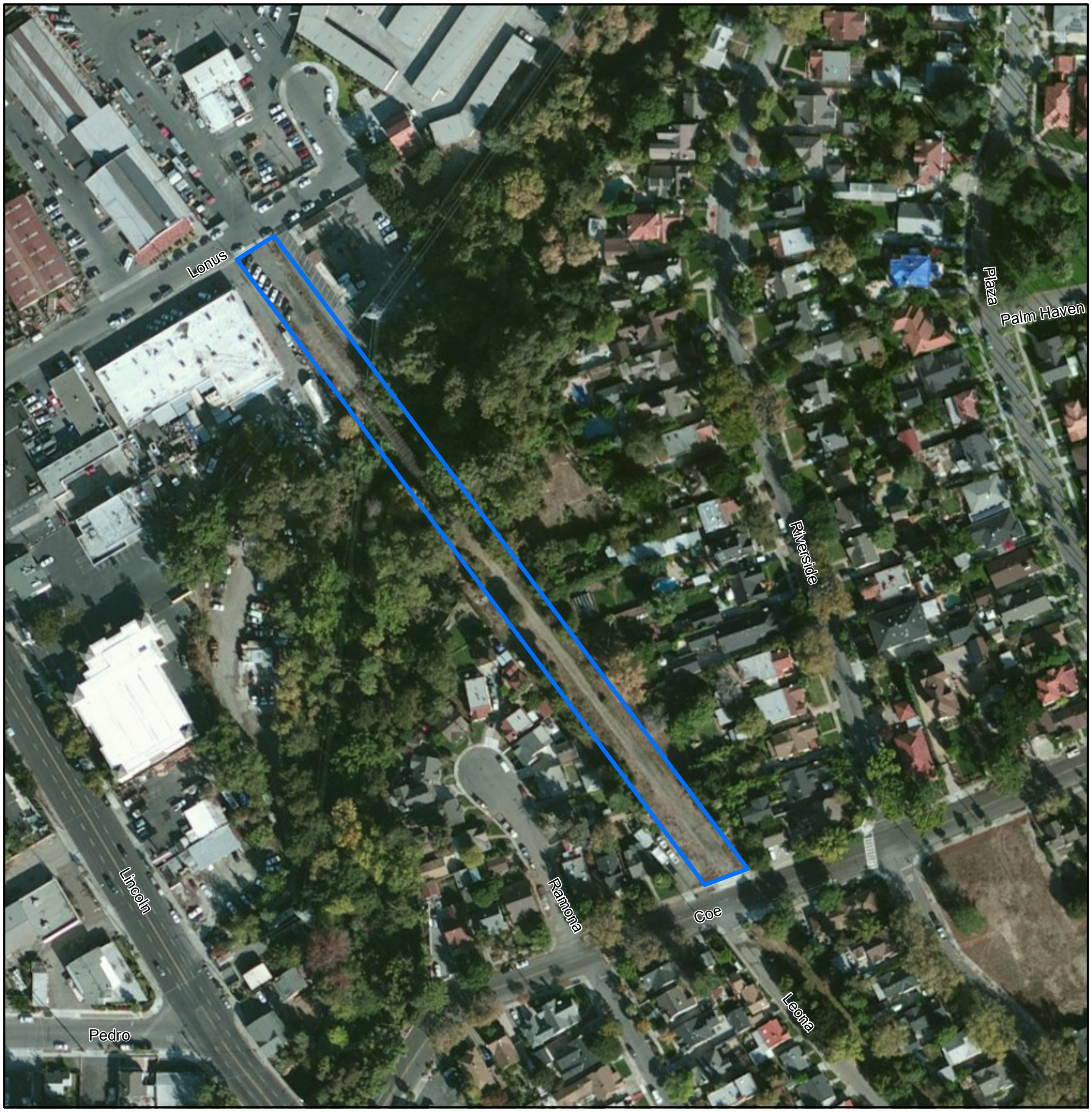
The EIR will discuss how the project may impact adjacent utilities during construction.

13. Cumulative Impacts

The EIR will include a discussion of the potentially significant cumulative impacts of the project when considered with other past, present, and reasonably foreseeable future projects in the area. The analysis will include a discussion of all projects for which applications have been filed. This section will cover all relevant subject areas discussed in the EIR and will specify which of the areas are anticipated to experience significant cumulative impacts.

14. Other Required Sections

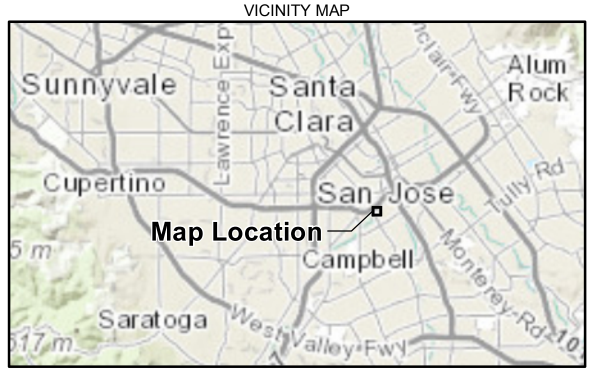
The EIR will also include, as appropriate, other information typically required for an EIR. These other sections include the following: 1) Growth Inducing Impacts; 2) Significant, Unavoidable Impacts; 3) Significant Irreversible Environmental Changes; 4) References; and 5) EIR Authors. Relevant technical reports will be provided in a technical appendix.



Source: Esri (2010).

LEGEND
Project Location

VICINITY MAP



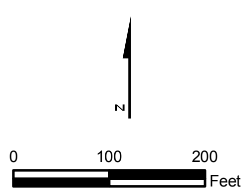


FIGURE 1
Project Location Map
Three Creeks Trail Pedestrian Bridge Project
City of San Jose, CA

Appendix B
Notifications of Public Scoping Meeting

http://www.sanjoseca.gov/index.aspx?NID=2883 | San Jose, CA - Official Web...

- Montgomery Hill
- Penitencia Creek
- River Oaks Parkway
- Ryland Parkway
- Saratoga Creek
- Lower Silver Creek Trail
- Silver Creek (Barberry Lane)
- Silver Creek (Umbarger Road)
- Silver Creek, Upper
- Silver Creek Valley
- Thompson Creek
- Three Creeks (was Willow Glen Spur)
- Yerba Buena Creek

Environmental Docs

Trestle Structure/Pedestrian Bridge

Initial Study--Los Gatos Creek Trail Reach 4 (includes trestle and Coe Avenue gateway) (29MB)
Mitigated Negative Declaration--Los Gatos Creek Trail Reach 4 (includes trestle)
Informational memo (May 20, 2013)
Informational memo Regarding EIR (September 16, 2014)
NEW! Notice of Preparation and Notice of Community Meeting --The City of San José will be developing an EIR for the Three Creeks Pedestrian Bridge Project. A related Community Meeting will be held on **October 21st at 6:30 p.m at the Willow Glen Community Center, 2175 Lincoln Ave, San Jose**. The purpose of the meeting is to collect input on the EIR Report for pedestrian bridge project.

Three Creeks Trail Master Plan (western alignment)

Initial Study --Three Creeks Trail Master Plan (public comment period closed April 08, 2014)
The above link points you to the Planning Department's webpage. Scroll to find File No. PP14-012: Three Creeks Trail Master Plan--Western Alignment.

Master Plan (western alignment) - Approved by City Council on November 4, 2014

NOTE: Final version to be posted over the next few weeks - links below are for the draft viewed by the Council. No major changes to be made to the document.

NEW! The Three Creeks Trail Draft Master Plan was approved by the City's Parks and Recreation Commission at its October 1, 2014 meeting. The Master Plan will be presented to San José City Council for adoption at its November 4, 2014 meeting.

Due to its large size, the Three Creeks Trail Draft Master Plan has been broken into five (5) parts for easier download. Follow the links below to download the various parts of the document:

Part 1: Click here to download
-Table of Contents, List of Figures and List of Abbreviations
-Section 1: Executive Summary
-Section 2: Site Setting
-Section 3: Goals and Objectives

Part 2: Click here to download
-Section 4: Planning Process
-Section 5: Interagency Coordination

Part 3a & 3b

12:06 PM 11/20/2014

Event Details

Return to Previous

Three Creeks Trail Pedestrian Bridge Scoping Meeting

Tuesday, October 21

Date:	October 21, 2014
Time:	6:30 PM - 8:00 PM
Location:	Willow Glen Community Center
Address:	2175 Lincoln Ave. San Jose, CA 95125
Links:	Meeting Notice

Invite Friends

View all calendars is the default. Choose Select a Calendar to view a specific calendar.

Back to top

10/22

San Jose Trails @SanJoseTrails

Three Creeks Trail: Thanks to those who attended last night's EIR Notice of Preparation Meeting.@sotscc

San Jose, CA, United States

10/21

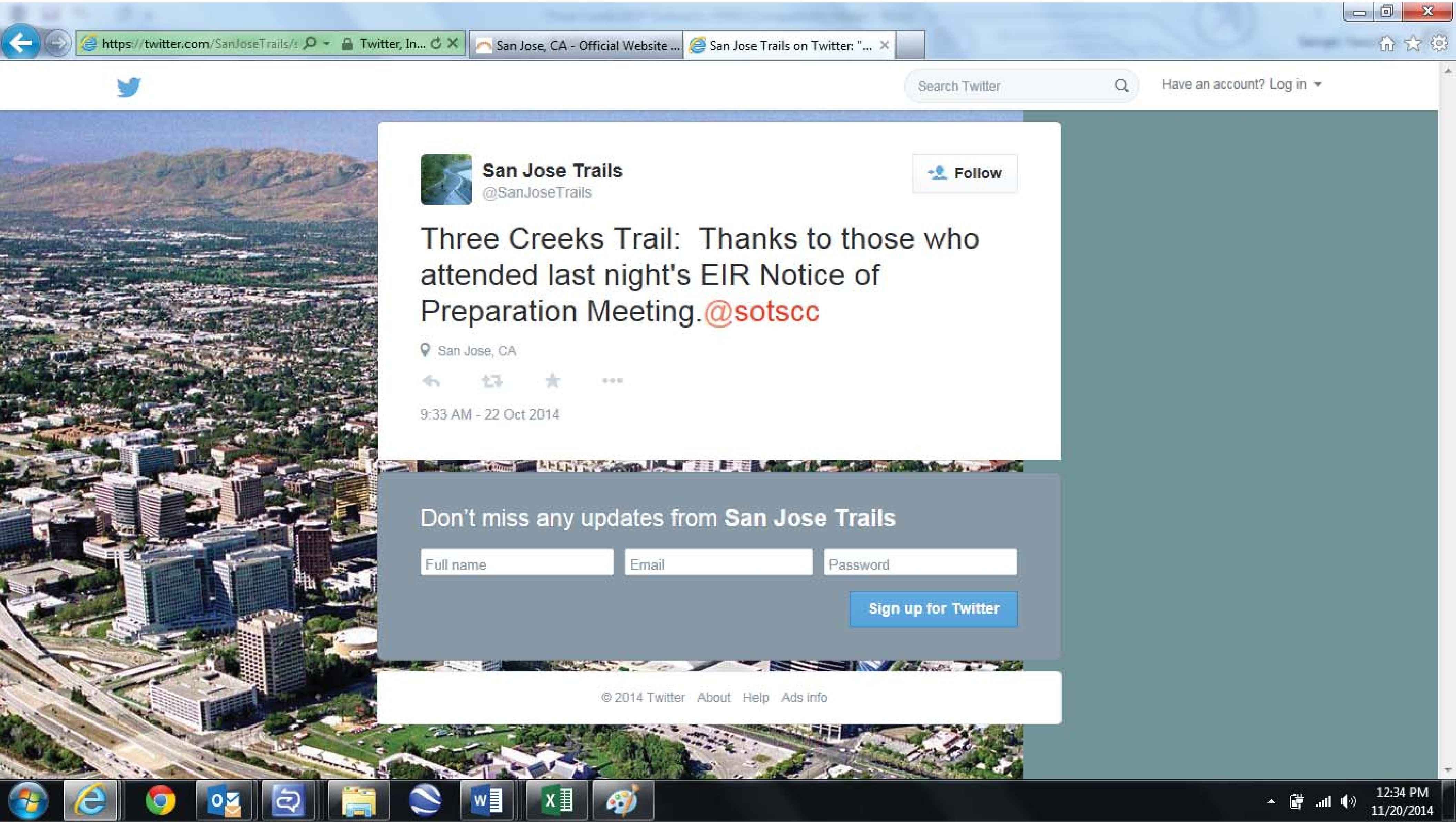
San Jose Trails @SanJoseTrails

Three Creeks Trail: Notice of Preparation - EIR Meeting for Pedestrian Bridge this evening, 6:30 at Willow Glen Community Center.

10/09

San Jose Trails @SanJoseTrails

Three Creeks Trail - Pedestrian Bridge EIR: Notice of Preparation Meeting on October 21 - @sotscc @bikesv Details: http://www.sanjoseca.gov/index.aspx?NID=2434 …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San Jose, CA

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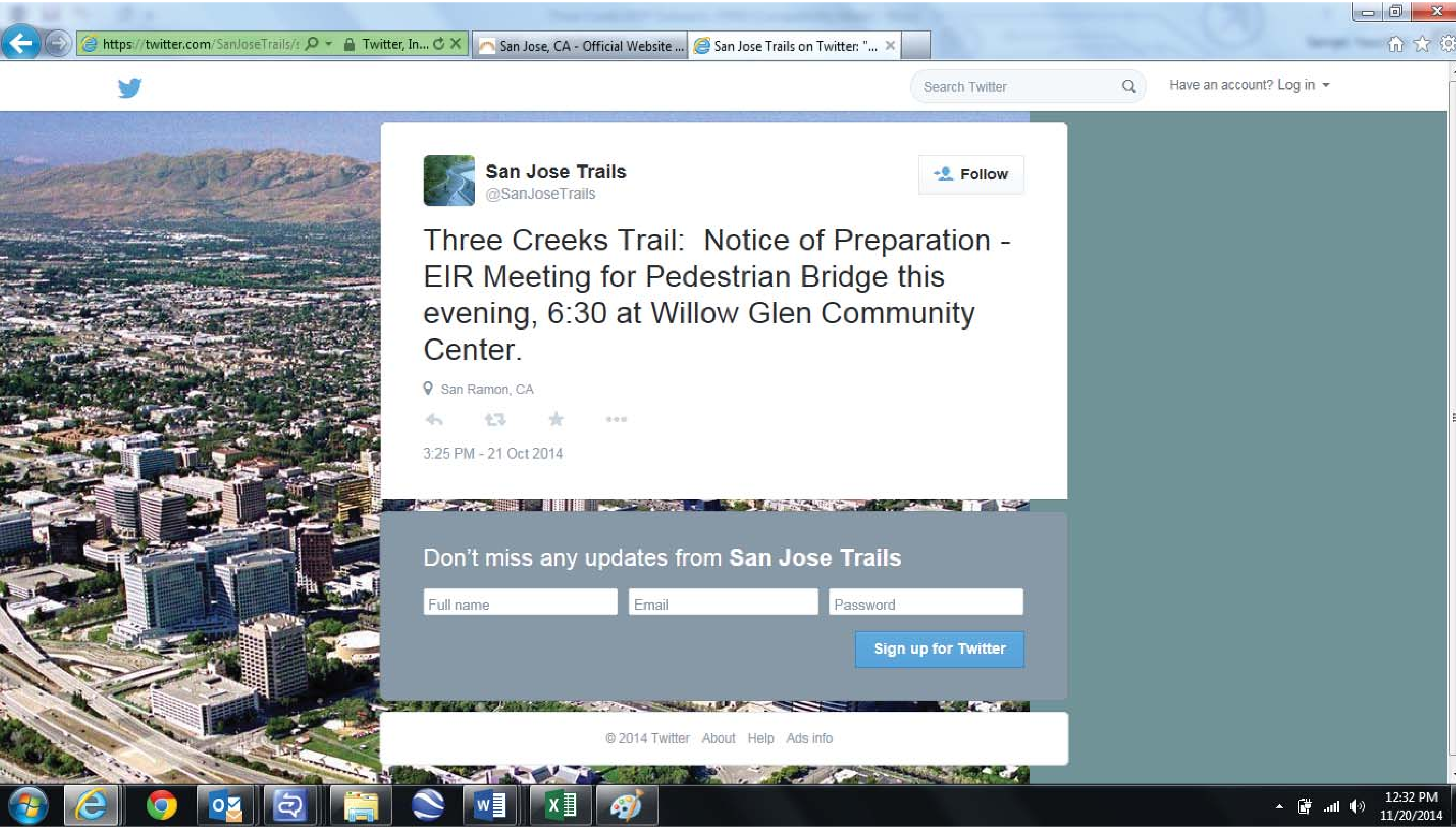

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1

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San Jose Trails @SanJoseTrails · Oct 9

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San Jose Trails @SanJoseTrails · Oct 10

Excited to show San Jose Trails as part of webinar next week - hope you can join us. @apbp @sotscc apbp.org/events/event_d...

1 1

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San Jose Trails @SanJoseTrails · Oct 7

Trail Repairs start today along Calero Creek Trail near Harry Road, working north along Los Alamitos this week. @bikesv @sotscc

2 1

Save Our Trails retweeted

San Jose Trails @SanJoseTrails · Oct 1

Three Creeks Trail: Draft Master Plan and Initial Study posted on the website. @sotscc @bikesv sanjoseca.gov/index.aspx?nid...

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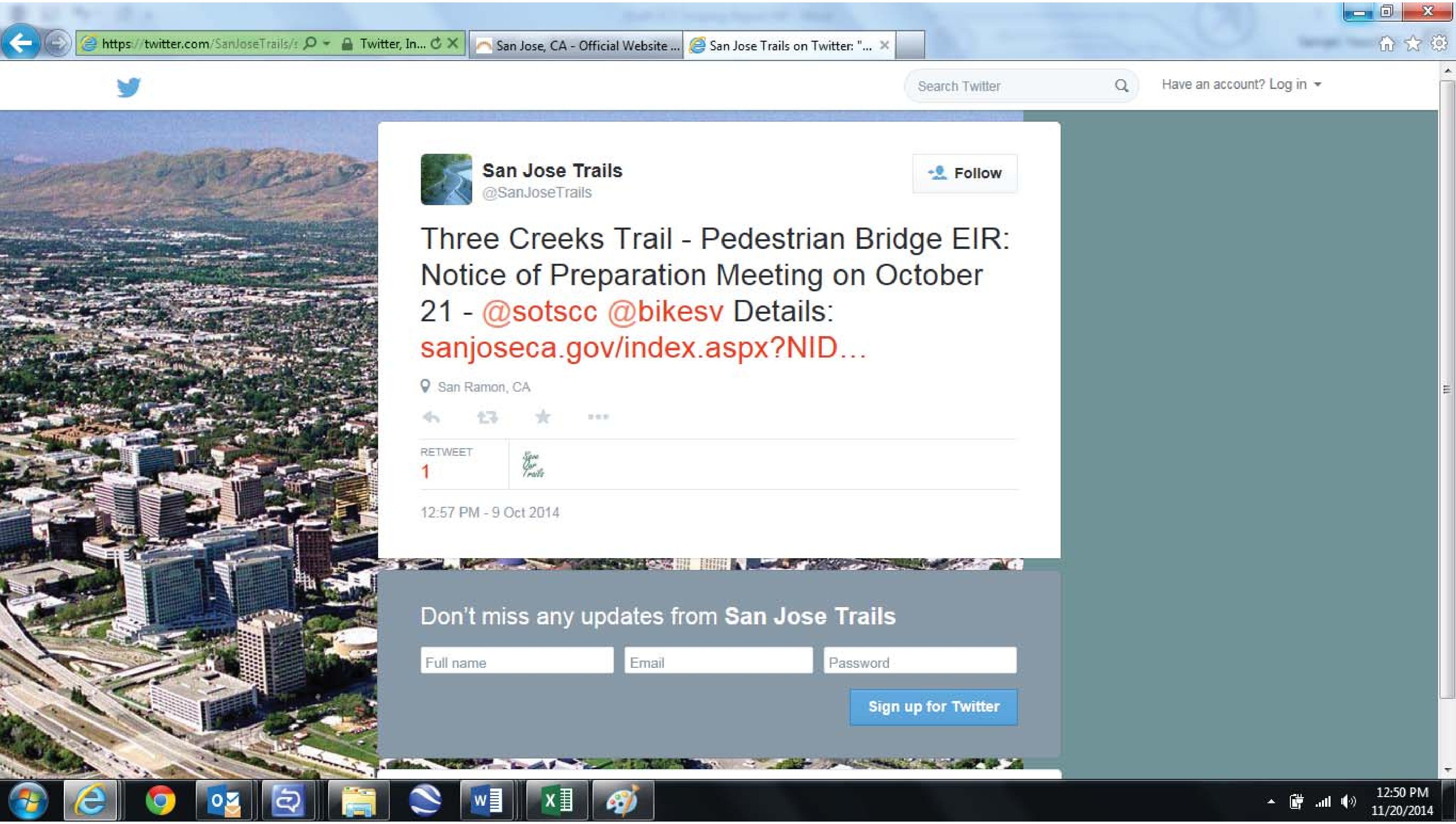
11/20/2014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Appendix C
Scoping Meeting Sign-In Sheet

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Sign in Sheet

Meeting: Three Creeks Ped Bridge EIR
Date: October 21, 2014

Name	Organization (if applicable)	E-mail Address	Phone
SILVA, DICK	VALLEY OF DIABLO HAATS	DICKSILVA@GMAIL.COM	408-266-2793
Eric Chan			408 996 2670
Jack Nadeau	SaveOurTrails	gingerjax@aol.com	408 280-0908
Khoi Nguyen			
Terry Reilly	DCE	terrence.Reilly@sanjoseca.gov	—
Soren Riis			408 334 4850
Gayle Frank		gaylefrankca@gmail.com	—
DAN CHAPMAN	SHPNA	dchapman59@gmail.com	

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Sign in Sheet

Meeting: Three Creeks Ped Bridge EIR
Date: October 21, 2014

Name	Organization (if applicable)	E-mail Address	Phone
BRIAN GRAYSON	PAC SJ	BRIAN@Preservation.org	
Martha Heinrichs	W.G. Trestle	ichs@earthlink.net	
Taisia McMahon	Friends of 3CT	taisia@comcast.net	
Liz Giarratana		bobandlizg@aol.com	
Bruce Tichinin	Friends/3 Creeks Trail	tichinin@garlic.com	(408) 429-8415
Peter Hamilton	D9 Council Office	peter.hamilton@sanjoseca.gov	(408) 535-4972

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Sign in Sheet

Meeting: Three Creeks Ped Bridge EIR
Date: October 21, 2014

Name	Organization (if applicable)	E-mail Address	Phone
Larry Ames	Friends of WG Trestle	LAmes@AOL.com	408·279·0266
Severn Edmonds	Self	nutsplitter@gmail.com	408-216-0609
Lisle Cohen		lislecohen@sbcglobal.net	408-287-7880
HEATHER LERNER	HAPPY HOLLOW FOUNDATION	HEATHERLERNER@GMAIL.COM	408 993-4343
Peter & Norma Mirnoff	[illegible]	PeterCon@yahoo.Com	298-1387
Diane Solomon		diane_solomon@sbcglobal.Net	

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Sign in Sheet

Meeting: Three Creeks Ped Bridge EIR
Date: October 21, 2014

Name	Organization (if applicable)	E-mail Address	Phone
Janet Burdick	–	millerburdick@att.net	408-292-5375
Carolyn Rogozen	–	crogozen@gmail.com	–
John Fernandez	–		
Liv Ames	–		
Carol Arnoldy		carnoldy@att.net	
Debbie Erwin		debbie_erwin@sbcglobal.net	
Bill Rankin	SOT	Bill@networds.com	
Chris Dresden		cdresdez@yahoo.com	408-947-0936

Appendix D
Scoping Meeting Comment Letters

5750 Almaden Expressway, San Jose, CA 95118-3614 | (408) 265-2600 | www.valleywater.org

Santa Clara Valley Water District

File: 32926
Los Gatos Creek

November 7, 2013

Mr. John Davidson
City of San Jose
Planning Division
200 East Santa Clara Street, 3rd Floor
San Jose, CA 95113-1905

Subject: Notice of Preparation of a Draft Environmental Impact Report – Three Creeks Trail Pedestrian Bridge Project

Dear Mr. Davidson:

Santa Clara Valley Water District (District) staff received the Notice of Preparation of a Draft Environmental Impact Report (DEIR) for the Three Creeks Trail Pedestrian Bridge Project on October 14, 2014.

The District does not have any land rights within the project limits and therefore, in accordance with the District's Water Resources Protection Ordinance, a District permit is not required for this project; however, this project received approval for District funding via a District grant. Funding is dependent on compliance with California Environmental Quality Act (CEQA) and does not imply District support for any particular alternative for replacing or retaining the existing structure.

To be in conformance with The Guidelines and Standards For Land Use Near Streams, the DEIR needs to address freeboard requirements with respect to the installation of the new bridge. Additionally, previous plans for the bridge replacement showed a viewing platform below the top of bank that is inconsistent with the Guidelines and Standards and standard practice for bridges over the creek.

Please provide a copy to the District for review once the DEIR becomes available. Please reference District File No. 32926 on any future correspondence regarding this project. If you have any questions, please contact me at (408) 630-2586.

Sincerely,

Kathrin A. Turner
Assistant Engineer II
Community Projects Review Unit

cc: S. Tippets, C. Haggerty, K. Turner, File

32926_57192kt11-07

From: Robert Jakovina <r.jakovina@comcast.net>
Sent: Tuesday, October 21, 2014 9:25 AM
To: john.davidson@sanjoseca.gov
Cc: Robert Jakovina
Subject: Fwd: Three Creeks Trail

Begin forwarded message:

From: Robert Jakovina <r.jakovina@comcast.net>
Subject: Three Creeks Trail
Date: October 21, 2014 at 9:18:29 AM PDT
Cc: Robert Jakovina <r.jakovina@comcast.net>
To: john.davldson@sanjoseca.gov

John,

My wife and I have supported the Three Creeks trail for years. We have lived in Willow Glen for 50 years and had hope to travel the trail from our home to Alviso before we became infirm .Let's put up the new bridge and get the trail built now not later. Build the trail portion now and worry about the bridge portion later. The holdup by a small disgruntle group is unacceptable.

Bob & Harriet Jakovina

From: crubin@aol.com
Sent: Sunday, November 02, 2014 4:45 PM
To: John.Davidson@SanJoseCA.gov
Subject: Scoping for draft EIR -- Three Creeks Bridge

Dear Mr. Davidson,
I feel compelled to write to you about the Three Creeks Bridge, especially since the City has now decided to appeal the ruling of Judge Huber, who ordered the City to set aside its approval of demolition and to prepare an environmental impact report.

We have lost so many pieces of San Jose history, whether by fire, earthquake, neglect, or intentional destruction. Why must we lose
another? Really, WHY must we lose this bridge? Its presence tells so much more than simple words on a plaque or in a book can convey about a bygone era. Add to that the fact that it seems that it will cost less to restore it than it would to build the new steel structure that the City wants, and it seems like a "no-brainer." So the City's fight to tear it down is a real puzzle to me. Just why is the City so intent on getting rid of it? Who is out to gain what?

Are there other similar bridges within San Jose that we could visit that would tell the same story? Are they in walking distance for San
Jose citizens? Are they in biking distance? Or must we get into our cars and drive who knows how far?
And how would those bridges tell the same story?

I have a particular interest/perspective in the issue of keeping and restoring San Jose history. Back in January, my husband's and my1911 craftsman bungalow home, in the Naglee Park area of San Jose, was destroyed by an arsonist. We loved our house, and the feeling that we were living in, and guardians for, a piece of San Jose history. We spent countless hours stripping paint and repairing it. We would love to have our house back, but we know that can't happen. It's too late. It's gone. Once something is done, it can't be undone

It's not too late for the Three Creeks Bridge. We need to do our best to preserve it for our own enjoyment, and for the generations of
citizens to come. There are plenty of modern buildings, etc. to look at. I know more will be coming, but I just can't see any reason that there needs to be a new bridge for the Three Creeks area.

Sincerely,

Cathy Rubin
Formerly of 123 South 17th St.

From: LAmes@aol.com
Sent: Tuesday, November 04, 2014 6:12 PM
To: John.Davidson@SanJoseCA.gov
Cc: Harry.Freitas@sanjoseca.gov; Rodney.Rapson@SanJoseCA.gov; SJ-D6NL@yahoogroups.com; sot_board@saveourtrails-scc.org; info@WGTrestle.org; friendslgcreek@yahoo.com; info@CalSJ.org; heather.lerner@gmail.com; leslee@grpg.org; BKeegan@ValleyWater.org; syoung@valleywater.org; STippets@ValleyWater.org; julie.edmonds-mares@sanjoseca.gov; Matt.Cano@SanJoseCA.gov; Yves.Zsutty@sanjoseca.gov; Sara.Fleming@SanJoseCA.gov; Hans.Larsen@SanJoseCA.gov; John.Brazil@SanJoseCA.gov; Von Rueden, Dave/SJC; jammon@jammondesign.com; bcjimmy@aol.com; shani@scvas.org; rmcmurtry@baymoon.com; tbalandr@apr.com; alice@greenfoothills.org; jsegall@mac.com; mulvey@ix.netcom.com; brian@preservation.org; slc91@yahoo.com; diridon@mti.sjsu.edu; david.ginsborg@asr.sccgov.org; susanb@cityofcampbell.com; aprilhalb@gmail.com; MWDonaldson13@yahoo.com; susanbh@preservationlawyers.com; BMarshman@mercurynews.com; crosen2025 @yahoo.com; jkrombeck@aol.com; agelhaus@community-newspapers.com; lballester@community-newspapers.com; Larry@WGTrestle.org
Subject: Scoping Questions for DEIR for 3-Crks Bridge (PP13-085)
Attachments: DEIR-Scoping_LLA.pdf; LLA-comments-to-IS-MND.pdf

John Davidson
City of San Jose Planning Dept.
200 E. Santa Clara St
San Jose, CA 95113
via email: John.Davidson@SanJoseCA.gov
sent Nov. 4, 2014

re: Scoping Questions for the Draft Environmental Impact Report (DEIR) for the Three Creeks Bridge Project (PP13-085)

Dear Mr. Davidson,

I'd like to submit the follow items to be included in the scope of the Draft Environmental Impact Report (DEIR) for the Three Creeks Trail Bridge Project (PP13-085).

I appreciated that the City held a public meeting Tuesday, Oct. 21st, at the Willow Glen Community Center. I'm pleased that you were able to attend, as were Yves Zsutty, Sara Fleming, Rodney Rapson, and others from the City of San Jose. Additionally, David Von Ruedon from CH2M-Hill and team-members Matt Franck (biologist) and Steve Mikesell (historian) were present to answer questions. It was a well-attended and informative meeting.

At that meeting, I submitted some comments for the DEIR Scoping that I cryptically scribbled on slips of paper. This email repeats many of those comments and expands on some of them (and, at the very least, makes them easier to read!) I have also added some additional comments for inclusion in the scoping of the DEIR. (Sorry there are so many! – this is a complex project with a lot of aspects, and a thorough analysis is needed to enable an informed decision.)

Note: some nomenclature (from the 2012 City-commissioned Engineering Report by CH2M-Hill): the existing trestle consists of a “superstructure” and a “substructure”.

- The superstructure is the deck and the railing. The deck is top surface, used by the trestle-user: ties and rails in the case of the railroad, or concrete slabs (or other surface) for the trail.
- The trestle’s substructure consists of piles (the main vertical timbers), braces (diagonal beams bolted to the piles), sashes (horizontal beams bolted to the piles), caps (the large beams across the top of the piles), and stringers (the two 32" × 20" beams that run the entire 210' length of the trestle). A “bent” is a set of piles in a row, the cap on top of them, and possibly braces and sashes tying them together. The Willow Glen (WG) Trestle has 13 bents, plus an abutment at either end.

Scope

- In addition to issues that Staff already plans to address, the DEIR should also address the various issues raised by the public, both in this current phase and also those that were raised during last year’s Initial Study and Mitigated Negative Declaration (IS/MND) process. For your convenience, I attach a copy of the letter I submitted on the IS/MND dated 12/19/13. (Some of the comments from last year may have been repeated here…)

Alternatives

An EIR needs to evaluate several alternative scenarios, including:

- “Project” – the 210' free-span prefabricated steel truss bridge that is currently being proposed
- “No Project” – the “do-nothing” alternative: the trestle is left as-is and there is no trail connection.

There need to be additional alternatives for comparison. I recommend the following:

- “Restored Trestle, 2012 plans” – the trestle is repaired and adapted as per the plans in the City-commissioned 2012 Engineering Report by CH2M-Hill. This involves stripping the ties, catwalk, and guywire railings from the trestle, stabilizing and repairing the substructure, and placing decking (e.g., concrete slabs) on top of the stringers, with fencing/hand-rails on top.
- “Restored Trestle, 2004 plans” – the trestle is repaired and adapted as per the 2004 CEQA documents. This keeps more of the trestle more intact: the catwalk and guywire railings are stripped but the ties are kept/repaired/replaced, and the trail decking and railing are placed on top of the ties.
- “Paralleled” – the trestle is stabilized but not adapted for trail use, and a trail bridge (e.g., the 210' free-span prefabricated steel truss bridge) is installed parallel to the trestle to provide trail continuity.

I am interested in the relative construction costs, maintenance costs, hazards, and historic integrity between the Restored-2012 and Restored-2004 alternatives. The 2004 design would keep some more of the trestle (i.e., the ties), but have those ties been replaced over the years and could they also increase the fire hazard? On the other hand, the support offered by the ties might allow for a thinner and less-costly decking options.

- What are the best decking options? The Engineering Report discussed precast concrete slabs and Ipe (a South American hardwood): which is best? Are there other alternatives to consider, such as recycled-plastic planks, plate metal, or the dense-mesh grating sometimes used on drawbridges? What are the relative merits of each (e.g., cost, environmental impacts, maintenance, aesthetics, …)

I have heard various members of the public ask about the Paralleled alternative, so I include it in this list.

- Is there enough city-owned land available to include the parallel bridge within the right-of-way?
- Can additional land be bought or easement obtained if needed?
- Can the trestle be preserved as a historic artifact and remain safely fenced off? With a parallel new bridge providing trail connectivity, would the trestle still tempt people to climb on it and thus become “an attractive nuisance”?

History

From what I've learned, the WG Trestle was built in 1921 for the Western Pacific Railroad Company, and it has a unique design in that it has a "substandard" configuration that precluded its use for heavy freight and for higher speed passenger trains. This raises a number of topics that should be researched as part of the DEIR:

- What was the impact of the 1906 Earthquake? I've heard that the Santa Cruz Mountains were heavily lumbered to provide wood for the rebuilding of San Francisco and surrounding areas.
  - Was the lumber industry well-established there prior to the 1906 Earthquake?
  - Did the timbers in the WG Trestle come from the Santa Cruz Mountains?
  - Are the WG Trestle timbers of standard dimensions, or are they smaller-diameter and "substandard" because all the larger lumber had already been harvested a decade earlier for the rebuilding of SF and environs?
- The construction of the WG Trestle was delayed by World War I.
  - Was the delay due to the Government temporarily taking over the railroads for the war?
  - Was the delay due to financial impacts of recovering from the war?
  - Was the design impacted by a shortage or the high cost of steel for the bolts?
- Was the trestle deliberately designed in a manner so that it could not be shared with Southern Pacific, either for competition or company rivalry?
- Or was the trestle "substandard" simply because Western Pacific was "cheap", and the trestle design was "good enough" for the purpose at-hand?

From what I've read, Southern Pacific had served San Jose for decades with tracks running right through the center of town (down 4th St.). Around the turn of the last century, the 75-year-old "franchise" allowing that alignment had expired, and City officials were pressuring Southern Pacific either to provide grade-separated crossings downtown, or else to construct an alignment around town that did not impact downtown traffic. I've heard that the California Railroad Commission or Board(?) recommended that Southern Pacific share the route around town with Western Pacific.

- What was the relationship between Western Pacific and its larger rival, Southern Pacific?
- Did Western Pacific deliberately design the trestle in a manner that would preclude it from having to share with Southern Pacific?
- Given that Southern Pacific couldn't share the alignment and therefore had to construct its own tracks and creek crossing (still in use near San Carlos St.), did that added cost noticeably effect the relative fortunes of the two companies?
- Did the time-delay in Southern Pacific's construction of the around-town alignment affect the profitability of Western Pacific, which was able to service the local canneries in the interim?

Regarding finances:

- How did the WG Trestle and the Willow Glen Spur track impact Western Pacific financially?
- Was the route profitable?
- Did it help Western Pacific relative to its rival?
- Did it impact Western Pacific's survival and future viability?
- Was there an impact on the development of Northern California by having competition between rail service providers?

The Willow Glen Spur line served a number of canneries, including Del Monte.

- Which canneries were served by the WG Trestle?
- What fraction of their produce arrived by rail?
- What fraction of their product distribution was by means of the trestle?
- What tonnage of product was transported over the trestle?

- I recall hearing that, at least for some period of time, all of Del Monte's canned fruit cocktail was produced at the Auzerais plant. Is that correct? For what time period? What market share did Del Monte have in canned fruit cocktail? At the peak, what fraction of the country's fruit cocktail was transported over the WG Trestle?

The trestle is comprised of dozens of piles (vertical timbers).

- Please find and produce the "as-built" plans for the trestle
- How deep are the piles driven into the ground?
- Are some of the original piles old-growth redwood or old-growth fir?
- What number of piles have been replaced?
- What number of piles have been added to the original configuration? Is the current design significantly different or basically the same as the original configuration?
- What would be the cost to get a comparable quantity of old-growth redwood today? Would it even be possible?
- How many of the braces and sashes are original? What type of wood are they? Are they locally harvested and milled old-growth wood?
- How many of the cap beams are original? What type of wood are they? Are they locally harvested and milled old-growth wood?
- How much of the stringers are original? What type of wood are they? Are they locally harvested and milled old-growth wood?
- Are the ties original or have they been replaced over the years?
- Is there a significant difference, historically, between options "Restore 2012" and "Restore 2004"? Do the ties add significantly to the historic authenticity of the trestle substructure?
- Would the historic character of the trestle be better preserved if it were stabilized and preserved, but not adapted for trail use (the "Paralleled" alternative)?

The trestle crosses the Los Gatos at one of its widest points, where it is roughly three times wider than it is nearby upstream and downstream.

- Why is the channel wide there – is it natural, or was this once a quarry?
- What is the explanation for the train crossing there: did the tracks parallel some existing roadway that once forded the creek there?

Trestle "Issues":

The idea of replacing the trestle with the new steel bridge has been advocated by some in part because of perceived issues with the existing structure: fire, flood, pestilence, and poison. For a fair evaluation of alternatives, these issues should be examined, both for the existing wood trestle and also for the proposed steel bridge, so that the tradeoffs can be fairly evaluated.

Fire

Fire safety has been a big topic of discussion. Some basic information would prove most helpful.

The trestle is comprised of large timbers: like a yule log or a telephone pole, they are not extremely flammable and cannot simply be ignited with a single match. They are made of wood, however, and can eventually be ignited by sustained heat, such as from a brush or bonfire.

- What is the "char rate" of redwood pilings? Large wood beams will burn on the outer surface, but the wood is insulating and so the inner portion of the beam is not immediately burned: there is a rate (inches per hour under some standard fire condition, such as when surrounded by a large brush fire) at which the wood is burned inward from the outside surface.

- Given the “margin of safety” in the trestle design, how long could the pilings burn before they become too thin to safely support the load? (For example, if the timbers are 12" in diameter, and need to be at least 8" to carry the load, then two inches could be lost from the outer surface without compromise. If the wood burned at 1"/hr., then it could burn for 2 hours without serious damage. Please provide the actual numbers for these calculations.)
- Does the creosote treatment make the timbers easier or harder to ignite? What is the ignition temperature for wood? For creosote? Would the fire-retardant treatment that is proposed in the City-commissioned Engineering Report have an impact on these ignition temperatures?
- Would the fire suppression sprinkler system proposed for the restored wood trestle be adequate to suppress brush fires and to reduce the probability that the structure would become involved in the fire?
- Given the redundancy in the trestle design, would it remain structurally sound even if one or two pilings were totally compromised by fire?
- Is the “Restore 2004” alternative more susceptible to fire than “Restore 2012”, given the retention of the wood ties at the top?
- Is any added risk from the “Restore 2004” alternative adequately mitigated by the planned sprinkler system?

Steel structures can “buckle” when excessively heated: the metal does not melt, but it does lose its strength, resulting in structures “yielding”. The metal conducts the heat, and so the thickness of the metal doesn’t provide protection against failure.

- What type of steel is used in the prefabricated bridge?
- What is the “specific yield strength vs. temperature” profile for the bridge’s structural steel?
- What is the truss’ design margin?
- At what temperature does the steel’s reduced strength offset the design margin?
- What is the temperature of a large brush fire (e.g., of a clump of dried arundo – “bamboo”)?
- How long would it take before a metal structure in or above such a fire would fail?
- If there were a localized fire (e.g., from a brush fire), would the entire single-span truss collapse, or would the damage be localized to specific truss members?
- If there were a brush fire beneath the steel bridge, how long would it take to inspect and repair the heat damage to the bridge, certify the structural integrity, and restore the bridge to service?
- Is a fire suppression sprinkler system proposed for the prefabricated steel bridge?
  - If “yes”, would it be adequate to prevent the structure from becoming compromised in a brush fire? Is the cost of the fire suppression system included in the cost estimates?
  - If “no”, then what other measures (e.g., routine channel maintenance) are being proposed to mitigate the fire hazard for the steel bridge? Are those costs included in the budget?

Concerning the available fire protection:

- What are the response times of the nearest three fire stations?
- Do the fire engines routinely carry the materials and equipment needed to suppress an oil-based fire (e.g., the creosote-treated timbers)?
- Do the fire respondents have adequate access to the entire length of the structure? Can the trestle be reached from the top-of-bank, and/or do the fire-suppression personnel and equipment have adequate access to enter the channel?

Hydrology

The Project Bridge is clear-span: it crosses the 210' distance without any in-channel obstructions. In comparison, the existing wood trestle has a number of bents (sets of vertical piles, braces, and sashes) within the channel.

The trestle crosses the Los Gatos Creek at about its widest point: it is roughly three times wider at the trestle than it is immediately upstream (at the Lincoln Ave. bridge) or downstream (at the Southern Pacific bridge near San Carlos St.). At the same time, the channel has roughly the same depth throughout, with the same top-of-bank elevation and water level.

- What is the volume flow-rate of the 100-year flood, in cubic feet per second?
- What is the speed of the 100-year flood in the normal channel (e.g., at Lincoln Ave. or the SP bridge), in feet per second?
- What is the speed of the 100-year flood at the trestle, in feet per second?

A concern has been expressed that the trestle bents will catch debris (e.g., fallen trees from upstream) and cause a flood:

- What would the water speed be at the trestle if debris were to block half the entire channel (width and depth), relative to the water speed for the clear-channel case?
- Where does the debris come from?
- What would the water level be in a 100-year flood at the trestle without debris caught on the trestle?
- What would the water level be in a 100-year flood at the trestle with debris blocking half the entire channel (width and depth)?
- What would the water level be in a 100-year flood with the Project clear-span truss bridge?
- Where would the debris in the stream go if not caught on the trestle?
- What would happen if the debris were to catch on an obstruction downstream, such as the SP train bridge by San Carlos Street or the culverts under Park Avenue and Montgomery Street?
- What would the 100-year flood level be at the SP bridge if a comparable amount of debris were to catch on that structure?
- As the channel is roughly three times smaller at the SP Bridge, would the channel be entirely blocked by the debris that would half-way block the channel by the trestle?
- Historically, how much debris has flowed down the channel and been caught by the trestle?
- Who is responsible for maintaining the channel by the trestle: the City or the SCVWD?
- How often is the channel maintained?
- If there are no in-stream structures and the creek channel is unmaintained, would debris still collect, for example, on clumps of arundo ("bamboo")?

<u>Pests</u>

At least one Councilmember has raised the issue of termites, but the City-commissioned engineering report apparently makes no mention of any insect damage.

- What is the current state of the wood in the trestle?
- Is it infested with termites?

<u>Contamination</u>

The trestle timbers are treated with creosote.

- What is the State-defined allowable level of contamination (e.g., in part-per-million PPM) from creosote in a stream?
- What is the leach-rate of 90+ year-old timbers in the stream: how much contamination do they contribute under normal flow? How much under high flow?
- How much contamination is there in the creek water from other in-stream structures upstream of the trestle?
- Are there additional creosote-treated structures in the Los Gatos or the Guadalupe downstream of the trestle?
- How much contamination is there in the creek water from other sources, such as rain runoff from telephone poles, wood sheds, fence posts, etc.?

- What fraction of the total contamination load is due to the trestle?
- What are the plans for mitigating the contamination from other sources? What is the schedule for these mitigations? What is the cost and the source of funding?

There are over 30,000 creosote-treated timbers in the waters of San Francisco Bay. There are studies on how to deal with them (for example, see http://www.sfei.org/sites/default/files/ReportNo605_Creosote_Dec2010_finalJan13.pdf):

- What is the consensus on what to do with timbers that are free-floating and shedding toxics as they are moved by the tides and bump into things: are they to be removed?
- What about timbers in structures presently in use, such as piers and bridges: are they being removed or replaced? What is the schedule for replacing the various piers in SF Bay? What is the cost and the source of funding?
- What about timbers in structures that are no longer in use and have no value: are they being removed? What is the schedule for their removal? What is the cost and the source of funding?
- What about timbers in structures that are no longer in use but do have historic value (e.g., the pier of former ferry terminals, or the loading docks where armaments were packed for shipping off to war): are they being preserved or removed?

Old wooden railroad trestles are adapted for trail use across the country by many public agencies and private organizations. (For example, see the trestle in Anacortes, Washington, or the Canon River Trail in Minnesota.)

- How do these groups and agencies deal with the issue of creosote contamination?
- What maintenance efforts are needed to keep the structures safe and intact?

Can the creosote contamination be mitigated?

- Can the creosote be “encapsulated”, much like lead paint or asbestos, with an overcoat of an appropriate paint or other coating?
- Can the leach-rate be reduced by protecting the timbers from the water flow by means of cladding (e.g., wrapping the timbers in the water with aluminum flashing or plastic wrap)?

In case of the Project Bridge:

- How much contamination will get into the creek during the removal of the trestle?
- How are the contamination impacts mitigated?
- How much contamination will result from the disturbance of the soils around the trestle?
- How much contamination will result from the scrapping and chipping of the surface of the timbers as they are disassembled and removed?
- How much does it cost to take the required measures to reduce the contamination during the trestle removal? Are these costs included in the overall budget?
- Does the steel bridge contaminate? What is in the rain runoff from the structure?
- Does the steel bridge contaminate the water with iron compounds?
- Does the steel bridge contaminate the water with other compounds, such as welding fluxes, surface treatments, galvanized coatings, etc.?

Maintenance:

The issue of maintenance seems to be exceptionally important to the City. We hear comments that the trestle is many times more expensive than the replacement bridge to maintain, yet elsewhere we see that no maintenance is budgeted for the replacement bridge, and thus even a single dollar for trestle maintenance technically would be well over twice the new bridge’s nothing.

- Are the cost estimates for maintenance, given in the City-commissioned Engineering Report by CH2M-Hill, reasonable? (Table 16 on page 3.5 gives an estimate of $20k every 5 years, or an average of $4,000/year.)

- How many years' worth of maintenance can be paid for with the roughly $700,000 savings in "design and construction" costs of a restored trestle relative to the Project Bridge?
- What is the estimated useful lifetime of a properly restored and maintained trestle for use as a bike/pedestrian bridge?
- The Community has expressed a willingness to help. Has the community been contacted about setting up a "Friends" account at some non-profit (e.g., with the San Jose Parks Foundation) so that donations and fund-raisers could help defray the maintenance cost?

Truss "Issues":

There are a number of issues concerning the prefabricated single-span steel truss bridge as well:

Structural

During the public design meetings last year, members of the public asked if it would be feasible to have a mid-stream viewing area – a wider area where trail users could stop and admire the view without being in the through traffic path. We were told that that would not be feasible with the steel truss design since it required structural integrity in the truss-work and unbroken stress paths to remain standing. Recall that, a few years ago, a modern freeway bridge in Minneapolis (I-35W) collapsed due to a single-point-failure: a gusset rusted out due to bird-droppings collecting on a single critical joint.

- Is the prefabricated steel bridge "single-point-failure" tolerant? Rephrased: would the truss collapse if an individual structural member or joint were to fail?
- If the structure doesn't fail completely, what is the margin-of-safety for when any individual structural member were to be compromised, such as by overheating or by rust?
- What are the inspection and maintenance plans to assure that there is not a build-up of debris at junctions that could promote rust or corrosion?
- What are the plans for maintenance and repair should a joint become compromised?
- Are the costs of these inspections, maintenance and repairs included in the budget?
- What is the anticipated useful lifetime of the steel truss bridge if it is not routinely maintained?
- What is the anticipated useful lifetime of the steel truss bridge if it is given optimal routine maintenance? Is that maintenance scheduled and included in the budget?

The Project steel bridge is proposed to have a "natural rust" patina. I understand that the bridge keeps its appearance by having the rust wash off in the rains, and, as a result, the structural members become thinner over time. I have heard reports of a steel bike/ped bridge in San Mateo County (or was it Santa Cruz?) that failed after only a couple decades, far short of its advertised lifetime. This was due to rust caused by the moisture in the air. While the climate in San Jose is drier, it may still be humid in the microclimate within the creek channel.

- What is the design margin on the structural elements?
- Will the bridge be inspected periodically to assure that structural elements have not become too thin due to rust and corrosion?
- Can the truss be repaired if individual structural members become compromised? How much would it cost? Are these repair costs budgeted? How long would the bridge be out-of-service and closed to the public?

Carbon Footprint

The State of California is committed to minimizing the impact on global warming. Doesn't AB-32 discuss methods of reducing the Carbon footprint and set conditions and processes in evaluating projects and proposals? All of the alternatives for the Three Creeks Trail crossing, other than "No Project", are "beneficial" in that they provide for non-motorized transportation. Nonetheless, there are differences between the alternatives:

- What is the carbon impact of patching the damaged piles (vertical timbers) of the existing trestle, repairing or replacing damaged sashes and braces, and repairing/replacing damaged ties? ("Restored 2004")
- What is the carbon impact of removing all the ties and disposing of them in an appropriate manner (e.g., transporting to a landfill qualified to receive contaminated materials)? (upgrade to "Restored 2012")
- What is the carbon impact of removing the entire trestle and transporting the material to a qualified landfill?
- What is the carbon impact of mining the iron ore, smelting the steel, fabricating the structural members, transporting the materials from mine to smelter to fabricator to assembler to site?
- What is the carbon impact of the concrete-slab decking? Is the quantity of concrete (and thus the carbon impact) the same or different for the various Alternatives?

Impacts on Landfill

- Where is the landfill that is designated to receive the contaminated trestle materials (ties, damaged braces and sashes, and perhaps the entire structure)?
- What is the capacity of that landfill?
- Would the different Alternatives have different impacts on the remaining lifetime of the landfill?

Trail Safety

The trail needs to be safe to use.

- Will the decking material be smooth enough for the various anticipated trail users, including bicyclists, skateboarders, roller-skates, baby carriages, etc.?
- Will the decking be free of grooves, dips, patterns, or other surface features that might cause the wheel of a bicycle to be guided in an undesired manner?
- Will the bridge be ADA accessible? Free of steps, obstructions, mazes or posts?
- Will the railing be adequate to keep trail users from falling from the bridge?
- Will the railing be designed in a manner that is safe for bicyclists? For example, smooth horizontal railing along the inner side is fine, whereas verticals along the inner side could snag a handlebar.
- Will the trail be wide enough to allow safe passage of users?

Members of the public have expressed a desire to be able to pause midstream and admire the view of the riparian habitat: can they do so without blocking the trail or risk being struck by fast-moving trail users?

- Will the trail be wide enough to allow viewing of the creek channel?
- Can the Project Alternative accommodate a mid-span viewing area? (I seem to recall that the truss configuration required continuous structural members and thus was not accommodating: are there reasonably priced viable alternative configurations for a steel bridge?)
- Would the Restore-2012 or the Restore-2004 Alternative be better for a mid-span viewing area? Concepts have been presented by others that would utilize the full width of the piling caps to allow out-of-path viewing areas.

Aesthetics of the structure:

- Will the steel bridge be "pretty"?
- Will the City be able to procure a bridge with "character" and a pleasant design, or are we getting the "Basic" design?
- Will the design be evocative of the region and representative of historic Willow Glen?
- Would visitors to San Jose be tempted to go out of their way to see the Project Bridge?
- Would visitors be tempted to go out of their way to see a restored trestle?

Additional questions:

I doubt that the following are officially part of a CEQA review, but they still are of practical interest:

- Has the steel bridge already been purchased?
- Are there alternative sites where it could be used?
- The City is trying to use a Prop. 40 Roberti-Z'Berg grant, which will expire in mid-2015. Can the City use that grant for other purposes, such as for acquiring land near Tamien Station that could serve as a trailhead for the Three Creeks Trail?
- Are there other funding sources available (e.g., from the State's "Cap & Trade" program) that might be used for the Three Creeks Trail crossing beside the Prop. 40 grant?
- If the City is not interested in preserving, adapting, and maintaining the trestle, would it be willing to transfer the ownership and responsibility to some other agency, such as possibly Santa Clara County Parks, the Open Space Authority, or the State of California?
- Is the City interested in involving the Community in funding and/or design aspects of the project?

I apologize once again for asking so many questions: it is not my intent to inundate you with needless questions, but rather to prod the process so that we all have enough information gathered for the decision-makers so that they can make a well-informed decision.

Please feel free to contact me if you have any questions. I'd be pleased to help however I can.

~Larry Ames
Larry@WGTrestle.org

cc: San José: Planning Director Harry Freitas, Public Works Rodney Rapson
the Community: District 6 Neighborhood Leaders Group (D6NLG)
Creek & Trail Advocates: Save Our Trails; Friends of the Willow Glen Trestle;
Friends of the Los Gatos Creek; Citizens for a Livable San José (CalSJ);
Happy Hollow Foundation; Guadalupe River Conservancy
SCVWD: Boardmember Barbara Keegan; staff Sarah Young, Sue Tippets
San José Parks, Recreation & Neighborhood Services (PRNS): Director Julie
Edmonds-Mares; Deputy Director Matt Cano; trails Yves Zsutty, Sara Fleming
San José Transportation Dept.: Director Hans Larsen, bikes John Brazil
Engineers: CH2M-Hill: Program Manager David Von Rueden; SJ State: Jim Ammon
Fire: Deputy SJ Fire Chief (retired) Jim Carter
Environmental: Shani Kleinhaus (Audubon Society); Richard McMurtry; Terri Balandra;
Alice Kaufman & Jeff Segall (Committee for Green Foothills); Trish Mulvey
Historians: Jean Dresden (Willow Glen), Brian Grayson (PAC*SJ), Steve Cohen (SJ),
Susan Blake (Campbell), April Halberstadt (County), Wayne Donaldson (State)
Railroads: California Trolley and Railroad Corporation
Legal: Susan Brandt-Hawley, CEQA
Media: Barbara Marshman, Carol Rosen, Anne Gelhaus, Leeta-Rose Ballester

From: Scott Miller and Janet Burdick <millerburdick@att.net>
Sent: Wednesday, November 05, 2014 4:33 PM
To: john.davidson@sanjoseca.gov
Subject: Public Comment- Three Creeks Pedestrian Bridge

When my husband and I took our children on a cross country trip on AmTrak with stops along the way, the observation we all made most was, "This could be anywhere." Many places had almost only chain stores, identical malls were more common than town centers, and there often appeared to be nothing of geographical or historical significance. Occasionally, we were happily surprised by a regional feel to a city or town, a sense of place and history. In contrast, when we traveled in Europe and Australia, there was a unique significance to almost every place we visited.

When I lived in Southern California, after growing up in Oregon and living in the Bay Area, I couldn't get over the sense that there was no history there, that the old was mostly knocked down in favor of the new or for simple expediency.

I have seen the metal pedestrian bridge that already exists on the Three Creeks Trail. It is adequate, but it won't excite the imagination of my grandson when we walk over it the way a train trestle would. I can't think of it as being anything but a way to get over the creek. Besides the obvious aesthetic contrast to a bland bridge, the trestle will evoke memories of the past agricultural life in the Santa Clara Valley for me and an excitement for my grandson to be able to walk where trains used to go. When he is older, my grandson will be able to imagine the history of our valley.

On a more cynical note, from what I have heard, it is less expensive to retrofit the trestle than to build a new bridge. I wonder if some company has already been promised the contract to build a new bridge, and the insistence on knocking down history for mediocrity is part of politics as usual.

Please retain the trestle as a very special part of the Three Creeks project.

Janet Burdick
645 Hadley Avenue
San Jose 95126-1921

408-292-5375
millerburdick@att.net

VIA EMAIL:
john.davidson@sanjoseca.gov

November 7, 2014

John Davidson, Senior Planner
City of San Jose, Planning Division
Department of Planning, Building, and Code Enforcement
City Hall, 200 East Santa Clara Street, 3rd
San Jose, CA 95113

RE: DEIR Three Creeks Pedestrian Bridge
also known as Willow Glen Trestle
Project No: PP13-085

Dear Mr. Davidson,

It was a pleasure to meet you at the city's Public Scoping Meeting on October 21st. I also appreciate the opportunity to respond to the City's Draft Environmental Impact Report for the above project.

As a long time resident of Willow Glen, and an enthusiast of family history, genealogy, and preservation, I strongly support the restoration and preservation of the Three Creeks Pedestrian Bridge, also known as the Willow Glen Trestle.

The Willow Glen Trestle is not only an important part of our local history in San Jose and Willow Glen, but also it is a connecting link to the many family histories of those who had ancestors here a century ago. It was not that long ago that Santa Clara County was known as the "Valley of Heart's Delight" because it was the largest fruit production and packing region in the world! This hub was linked to the world by the railroads that transported our canned products to distant markets. It was this particular 93 year old Willow Glen Trestle that the trains used to cross over the Los Gatos Creek to reach the canneries on Auzerais Avenue. This particular trestle connects to many families in this valley -- those who farmed and had orchards here, those who picked the crops, those who worked in the canneries, and those who were connected to the railroads. Destroying this trestle will not only take away yet another important structure of our local history, but also a visual portion of those family histories will vanish.

Unfortunately, there is very little left here in this valley that is a reminder of our rich agricultural past and what we once were. The orchards have disappeared along with the canneries. However, this 93 year old railroad trestle in Willow Glen is still standing strong and remains a remarkable and impressive representation of our local history during that relevant and important time period. In fact, the Ward Hill "Feasibility Report" dated October 8, 2012, at Section 3.1 states: **"The Los Gatos Creek trestle is in generally good condition and can be modified to perform as a bicycle pedestrian crossing of Los Gatos Creek."** This report even details exactly what nuts, bolts, pieces of wood, etc. would need to be replaced in the existing trestle and the report further states: **"The repairs to the trestle would be minimal and would cost less than replacing it with a prefabricated steel bridge."**

Through historic preservation our resources are recognized, appreciated and protected so that future generations may benefit from them. It is only when we tell the stories of our ancestors as they relate to the historical event and the preserved historical site that we can really see the true picture of what made us all what we are today. This trestle would add educational interest and charm to the trail, and would be a landmark that San Jose would be proud of as a reminder of our rich past as the Valley of Heart's Delight.

There are numerous written sources, including history books, newspapers and reference material with facts and stories of the Willow Glen Trestle and its role in supporting many decades of history not only with the local canneries and the railroads, but also with the development of the Town of Willow Glen. Many of these sources have already been supplied to your department and historian for use in your own research. You will discover, among other historical facts, that the Willow Glen Trestle is tall for a piled trestle and is considered to be undersized causing the trains to operate at a dead slow speed over the trestle. This fact is quite the opposite of the Ward Hill report of 2004 wherein it was stated that the Willow Glen Trestle is **"typical of the common type"**. Not so!

Not only could this trestle be accepted for State and/or Federal historic standing, but additionally the **95 pilings** of this 210 foot long trestle could also have historic recognition and status. (See *"Removal of Creosote-Treated Pilings and Structures From San Francisco Bay",* prepared for the California State Coastal Conservancy by the San Francisco Estuary Institute) www.sfei.org/sites/default/files/ReportNo605_Creosote_Dec2010_finalJan13.pdf This report reveals that pilings are **NOT** being removed in the Bay Area if deemed useful or historical, or both. Additionally, many of the creosote treated pilings and structures in the Bay Area are of interest because of their age and their cultural interest, and that historical analysis would have to be completed prior to removal. According to this report, for the 95 pilings of the Willow Glen Trestle to be considered eligible for inclusion in a historical register they must meet the following qualifications:

- Be over 50 years old. The pilings of the Willow Glen Trestle are over 93 years old.

- The pilings must be associated with potentially a significant event. This trestle and its pilings represent a significant part of history, not only to the founding of the Town of Willow Glen, but also with the canneries and the railroads.

- The pilings must retain integrity. These pilings of the Willow Glen Trestle have been maintained over the years first by the Western Pacific Railroad and then the Southern Pacific Railroad, and the repairs were done in a manner that preserved the structure's integrity. The trestle is still standing strong and, again, as stated in the Ward Hill "Feasibility Study" dated October 8, 2012, commissioned by the City of San Jose, **"the repairs to the trestle would be minimal and would cost less than replacing it with a prefabricated steel bridge."**

In demolishing the existing trestle, one can only imagine the environmental impact this will have on the waterways and the wildlife and natural habitat, including the known salmon and beavers that frequent the Los Gatos Creek. Demolishing the existing trestle would involve placing heavy equipment in the narrow creek bed to deconstruct the trestle and remove the timbers and pilings that span across the Los Gatos Creek, polluting not only the creek and everything in it and surrounding it, but further downstream where it flows into the Guadalupe River and then into the Bay. If left undisturbed, the creosote is causing minimal to no damage to the waterway and embankment, but if disturbed by the removal process the toxic environmental damage could be considerable. Most toxins in pilings are dispersed within the first two or three years so there is little risk of leaching toxins after 93 years. *(*See *"Removal of Creosote-Treated Pilings and Structures From San Francisco Bay")*

In addition, the pilings are considered hazardous waste and they cannot be remediated. The pilings will be placed permanently in landfill, with the likelihood of leaching the now disturbed creosote into the ground and potentially the ground water at the landfill site.

In the techniques outlined in the DEIR for the demolition of the existing trestle, the removal of the creosote treated pilings, and the routine transport and disposal of the creosote treated pilings, all would create considerable volumes of resuspension of sediments and introduce debris into the environment creating a significant hazard not only to the environment, to the Los Gatos Creek bed, the natural habitat, and to all residents and persons working in and around the site. Additionally, nearby businesses and residents and the natural habitat would be bothered by odors from the disposal process. The subsurface cutting resuspends considerable volumes of sediments and should not even be used in removing pilings. (See *"Removal of Creosote-Treated Pilings and Structures From San Francisco Bay"*)

Sources will reveal the historical status of the Willow Glen Trestle and that it is worthy of recognition and protection and should be preserved. Maintaining important links to our past will assist in building a better path to our future.

Thank you for your consideration.

Sincerely,

Martha Heinrichs
1407 Hamilton Way
San Jose, CA 95125
ichs@earthlink.net

From: Susan M. Landry <environmental.architect@yahoo.com>
Sent: Monday, November 17, 2014 2:03 PM
To: Davidson, John
Subject: Re: Three Creeks Trails Tresle Bridge - EIR update

Please notify me when the documents are available.

Thank you.

Susan M. Landry
Environmental Architect

Designing Spaces Between the Natural and Built Environment ™

Trees were not consumed in the transmission of this email. Try this on your end too.

From: "Davidson, John" <John.Davidson@sanjoseca.gov>
To: Susan M. Landry <environmental.architect@yahoo.com>
Sent: Thursday, November 13, 2014 2:15 PM
Subject: Re: Three Creeks Trails Tresle Bridge - EIR update

Hi Susan:

The comment period for the Notice of Preparation is winding down.

We expect to have a Draft EIR available for public review around the first of the year.

Let me know if you have any questions--thanks!

John Davidson
City of San Jose Planning Division
408/535-7895

From: Susan M. Landry <environmental.architect@yahoo.com>
Sent: Thursday, November 13, 2014 1:41 PM
To: Davidson, John
Subject: Three Creeks Trails Tresle Bridge - EIR update

Hi John,

What is the status of the EIR for this project?
Is the document out for Public Review.

Pleas make sure I am on you contact list for notifications about this project.

Thank You,.

Susan M. Landry
Environmental Architect

Designing Spaces Between the Natural and Built Environment ™

Trees were not consumed in the transmission of this email. Try this on your end too.

CITY OF
SAN JOSE
CAPITAL OF SILICON VALLEY

Department of Planning, Building, and Code Enforcement
HARRY FREITAS, DIRECTOR

THREE CREEKS PEDESTRIAN BRIDGE ENVIRONMENTAL IMPACT REPORT (FILE NO. PDC13-085)

Public Scoping Meeting
Tuesday, October 21, 2014

PUBLIC COMMENT SHEET

To be included in the public record for this project, all comments on the scope of the EIR must be made in writing and submitted by **5 p.m. on Wednesday, November 13, 2014**. Please send comments to: John Davidson, City of San Jose Senior Planner via one of the following:

By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: GAyle Frank **Email:** gaylefrankCA@gmail.com
Address: 1117 Norstad St **Phone:** 408-275-6889
SJ 95128

Comments:
Ridiculous that City of SJ says Trestle is not historic. Please research the railroad history & the impact to the economy of Willow Glen and SJ. The competition between the railroads & how the Trestle influenced SP business. Also the impact of the Trestle to the canneries & their successful transport of fruit/vegetables

CITY OF
SAN JOSE
CAPITAL OF SILICON VALLEY

Department of Planning, Building, and Code Enforcement
HARRY FREITAS, DIRECTOR

THREE CREEKS PEDESTRIAN BRIDGE
ENVIRONMENTAL IMPACT REPORT (FILE NO. PDC13-085)

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name:　　**Email:**

Address:　　**Phone:**

Comments: Keep the creek open so water flows. take out old Bridge and put new Structure in ASAP.

CITY OF SAN JOSE
CAPITAL OF SILICON VALLEY

Department of Planning, Building, and Code Enforcement
HARRY FREITAS, DIRECTOR

THREE CREEKS PEDESTRIAN BRIDGE ENVIRONMENTAL IMPACT REPORT (FILE NO. PDC13-085)

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: Larry Ames **Email:** LAmes@AOL.com
Address: **Phone:** 408/279.0266

Comments:

- Find the "as built" drawings of the trestle
- How many of the ~~Piers~~ Piles are original?
- Were the replacement pilings compatible w/ the design?
- How many canneries were served by this trestle
- What portion of their business went over the trestle?
- Are the pilings "old growth redwood"?

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THREE CREEKS PEDESTRIAN BRIDGE
ENVIRONMENTAL IMPACT REPORT (FILE NO. PDC13-085)

Public Scoping Meeting
Tuesday, October 21, 2014

PUBLIC COMMENT SHEET

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: LAmes@AOL.com **Email:**

Address: **Phone:**

Comments:
Study Hydrology:
- wide channel @ trestle, narrower downstream
- trestle catches debris from upstream
  - is it flood hazard?
  - if no trestle, where would debris catch?
  - would that be flood hazard?

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: Larry Ames **Email:**

Address: **Phone:**

Comments:

Creosote:
- how much leaches out now?
- what is allowable limit?
- what is contributions from other sources?
- what is impact from removal?
- what is cost to safely remove pilings w/o causing contam?
- could existing leaching be mitigated (eg, overcoat? cladding?)

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: Jack D. Nadeau **Email:** gingerjax@aol.com

Address: 990 Ramona Ct. **Phone:** (408) 280-0908
San Jose, CA 95125-2262

Comments: I am in favor of the Retrofit Alternative. This Very Historic structure should be saved for future generations To enjoy as part of their Trail experience.
The products of the large Del Monte cannery, for decades, crossed the Los Gatos Creek on that very trestle! To the world!
The "historic nostalgia" makes this place very special. Reminds us of an old Western movie - only this trestle is The Real Thing! What a wonderful "approach to Willow Glen" for trail-users coming from downtown San Jose.
San Jose needs more Special Places! This is one of them!

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: Chris Dresden **Email:** cdresden2@yahoo.com

Address: 1006 Broadway Ave **Phone:** 408-947-0936

Comments: Has the issue of impeding the flow of ~~G~~ C.G Creek been adressed if the exyting structure is kept versus a new bridge which would not impede the flow of the creek.

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: DAN CHAPMAN **Email:** dchapman59@gmail.com

Address: 1556 HESTER AVE **Phone:**

Comments: I WOULD LIKE TO SEE THE EXISTING BRIDGE PRESERVED AND RETROFITTED FOR PEDESTRIAN USE. AS A HISTORIC LINK TO OUR VALLEY'S AGRICULTURAL PAST IT IS IMPORTANT THAT FUTURE GENERATIONS CAN ENJOY A PART OF IT.

IN ADDITION RETROFITTING THE BRIDGE WOULD BE LESS EXPENSIVE SHOWING THE CITY IS FISCALY RESPONSIBLE.

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Or Email: john.davidson@sanjoseca.gov

Name: SILVA, DICK **Email:** DICKSILVA@GMAIL.COM

Address: 2815 KRING DR SJ **Phone:** 408-266-2193

Comments: History of the "RR" in 85 "WP" meaning of 21 mile marker, where is "0" 19 mile marker is behind left field of muni ballpark

21 mile marker still there need plack

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: Taisia McMahon **Email:** taisiat@comcast.net

Address: 1706 Cherry Grove Dr. **Phone:** 408-888-8005

Comments: The Friends of the Three Creeks Trail continue to support the City and Council in the decision to replace the Trestle with a new free span bridge and preserve the funding for the project. The opening of a creek crossing on the 3CT will provide connectivity and benefit the community and residents greatly. We hope to see this sooner than later.

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: Diane Solomon **Email:** diane_solomon@sbcglobal.net

Address: 917 Chabrant WY SJ CA 95125 **Phone:** 408.646.6193

Comments:

1) Find the "as built" drawings of the W.G. trestle ("trestle") & other documents that document its building (its history)
2) Research the status of the piers. 3) How many/what % are original?
4) are projected replacement piers compatable w/ the project's design? ~~The projected replacement piers?~~
5) Declare the trestle a city historical Landmark & preserve it.
6) In order to destroy or replace it, prove it is dangerous
7) If the trestle is removed How many types & numbers Forms of wildlife, bird migration, what its impacts on the Los gatos Creek if replaced? will be impacted
8) check the San Francisco Bay Study on creosote Hazards & quantify how much creosote (hazardous chemicals) the trestle is omitting, compare this to the San Francisco Study
9) Find out what the National Threshold for acceptable creosote emissions is. & Do the trestle's emissions exceed the National threshold ~~or the SF Bay~~ & Do the trestles emissions exceed that of those found in the SF Bay study

2/2 →

1/2

10) How many alternatives will be studied?
→ planned replacement ("The project"
→ Do nothing... NO project
→ restore the trestle for the 3. creeks trail
→ Piles/braces/cap/ stringers + new deck
or → Full trestle w/ ties and a new deck on top
→ Keep trestle unrestored but Stabilized w/a new bridge next to it for Bikes & Pedestrians

11) How long does contamination mitigation take?

12) Is it feasible to pull out the trestle within the "projects" planned timeline?

13) How many canneries and other local business were served by the trains that traveled across the trestle?

14) what were the names of these businesses? [Del Monte and Cantadina are two I know of]

15) I've been following this project for years. preserving and restoring the trestle was always part of the plan, then this year, without community input, the City decided to replace the trestle. please State the reason and the environmental and cultural justification for replacing this historic treasure.

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: EMILY CHEN **Email:** emily6chen@Hotmail.com

Address: 1067 Broadway **Phone:** 408 ~~E~~9962670

Comments:

Support the new bridge.

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: Peter Miron-Conk **Email:** Pete_Conk@yahoo.com
Address: 943 Riverside Dr **Phone:** 408-298-1387

Comments: Keep the old bridge

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: Bruce Tichinin **Email:** tichinin@garlic.com

Address: 17150 Wedgewood Ave. Los Gatos, CA 95032 **Phone:** (408) 429-8415

Comments: I favor the new clear-span bridge over the trestle.

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: Carolyn S. Rogozen **Email:** crogozen@gmail.com
Address: 1316 Dale Av. 95125 **Phone:**

Comments:

- explain the original purpose of the trestle and how it ties in with the agricultural/canning/marketing past of SJ ✗ Keep, restore trestle as part of SJ history
- highlight the way restoration/preservation will be done on the trestle & surrounding area
- include old photos, as well as artist's rendition of what it will look like in the future
- If people will have access to it (walking across it as part of creek trail), include illustrations of how that would look - i.e. children & families accessing the trestle on a family outing

include educational displays of the history

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: Liv Ames **Email:** LivAmes@AOL.com

Address: 1218 Willow St. San Jose, CA 95125 **Phone:** 408-279-0266

Comments:
I would like to see the Wood Trestle preserved as part of a W.G. Historic District. The trestle is a unique structure for our area. It is awesome when seen from below. Most people are fascinated when they see it and reach for their camera. The trestle will also be an important teaching tool for local history of trains and canning industry. It is a visual that can not be matched by photos.

⇒

I was biking on rails-to-trails paths in Wisconsin this summer. Many wooden trestles on the way, they were used for the railroad and still are holding up well.

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By Mail: 200 East Santa Clara Street, T-3, San José CA 95113-1905
Or Email: john.davidson@sanjoseca.gov

Name: Larry Ames **Email:** LAmes@AOL.com
Address: **Phone:** 408/279-0266

Comments: How many Alternatives will be studied?

- Planned replacement ("Project")
- Do nothing ("No Project")
- Restore Trestle for trail
  - piles/brace/cap/stringer + new deck
  - full trestle (w/ ties) w/ deck on top
- Keep trestle unrestored but "stabilized" w/ new bridge next to it.

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Or Email: john.davidson@sanjoseca.gov

P.S. 2 OF YOUR 7 EDUCATION COMPONENTS IN THE TRAILS MASTER PLAN SPECIFICALLY CALL OUT RAILROAD ALIGNMENT AND RAIL HISTORY.

Name: HEATHER LERNER **Email:** HEATHERLERNER@GMAIL.COM

Address: 1008 CAROLYN AVE SAN JOSE 95125 **Phone:** 408 993.9393

Comments: I FEEL THAT THERE IS AN ISSUE REGARDING THE TRESTLE THAT IS SO DIFFICULT TO MONETIZE IN THE SHORT TERM THAT IT IS BEING OVERLOOKED. IT IS THE ISSUE OF ICONIC AND PLACEMAKING. WE HAVE GORGEOUS ICONIC AND PLACEMAKING COMMISSIONED PUBLIC ART (ALSO NOT WELL UNDERSTOOD FOR ITS VALUE IN THE SHORT OR LONG TERM). HERE'S A PIECE OF ART, HAND-BUILT WITH THE UTMOST IN CRAFTSMANSHIP WITH NATIONS HISTORY BUILT RIGHT INTO IT ORGANICALLY. THE PROPOSED REPLACEMENT BRIDGE IS NOT EVEN CLOSE TO AN APPLES TO APPLES COMPARISON. THE INTRINSIC →

VALUE OF THE HISTORIC (STOP QUIBBLING OVER THIS POINT. IT IS HISTORIC AND DEBATING THIS IS SILLY AND A WASTE OF TIME) BRIDGE IS NOT PROPERLY BEING CAPTURED. IS IT ART? MAYBE. IS IT PLACEMAKING? IT CERTAINLY COULD BE. DOES IT MAKE PEOPLE FEEL A CONNECTION TO THEIR TIME AND PLACE HERE? ARGUABLY, YES.

DON'T TAKE MY WORD FOR IT. ASK WARREN BUFFET HOW HE FEELS ABOUT TRAINS. ASK LOCAL LEADER ROD DIRIDON. ASK ANY KID, "DO YOU LIKE TRAINS?"

SAN JOSE NEEDS TO HOLD ON TO THEIR DELIGHTS AND TREASURES. IT IS THE ~~SUBTLE~~ SUBTLETIES OF A PLACE, THAT MAKE CITIZENS FEEL A PART OF THE FABRIC.

I'LL SAY WHAT I SAID WHEN I ARGUED FOR THE DOMES, PREVENT UNITED STATES OF GENERICA. PLAY TO YOUR STRENGTHS, YOUR UNIQUE ATTRIBUTES, WHAT SETS YOU APART FROM THE OTHER CITIES OF THE REGION. SAN JOSE IS NOT, AND WONT EVER BE, THE TECH CAPITAL OF THE WORLD (COUNT YOUR HQ'S, THEN COUNT PALO ALTO'S, MTN. VIEW'S, S.F'S) - COMPANIES LOCATE WHERE ~~THEIR~~ WORKERS WANT TO BE. MAKE SAN JOSE THAT PLACE - GO AFTER THAT AND THE COMPANIES WILL FOLLOW. SAVE THIS TRESTLE.

Appendix B
California Emission Estimator Model (CalEEMod) Output Data

Three Creeks Construction

Santa Clara County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	1.25	Acre	1.25	54,450.00	0

1.2 Other Project Characteristics

Urbanization Urban

Wind Speed (m/s) 2.2

Precipitation Freq (Days) 58

Climate Zone 4

Operational Year 2015

Utility Company

CO2 Intensity (lb/MWhr) 0

CH4 Intensity (lb/MWhr) 0

N2O Intensity (lb/MWhr) 0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Phase durations based on original EIR schedule with a start date of July 1, 2015

Off-road Equipment - Default equipment and hours changed to match project-specific data. Horsepower and load factors set to CalEEMod default values.

Off-road Equipment - Default equipment and hours changed to match project-specific data. Horsepower and load factors set to CalEEMod default values.

Off-road Equipment - Default equipment and hours changed to match project-specific data. Horsepower and load factors set to CalEEMod default values.

Off-road Equipment - Default equipment and hours changed to match project-specific data. Horsepower and load factors set to CalEEMod default values.

Trips and VMT - Vehicle trips updated based on construction schedule. Vendor trips used in leiu of onsite pickup trucks

Grading - Default grading area changed to meet project-specific data.

Construction Off-road Equipment Mitigation - Based on IS Best Management Practices

Demolition - Square footage based on footprint of the bridge (285 ft long x 20 ft wide)

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Interior	81675	0
tblConstructionPhase	NumDays	200.00	100.00
tblConstructionPhase	NumDays	20.00	30.00
tblConstructionPhase	NumDays	2.00	10.00
tblConstructionPhase	NumDays	2.00	10.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00

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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Construction
tblOffRoadEquipment	PhaseName		Cleanup
tblOffRoadEquipment	PhaseName		Construction
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Construction
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Cleanup
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Construction
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Demolition
tblOffRoadEquipment	PhaseName		Construction
tblOffRoadEquipment	PhaseName		Construction
tblOffRoadEquipment	PhaseName		Cleanup
tblOffRoadEquipment	PhaseName		Construction

tblOffRoadEquipment	UsageHours	6.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	6.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblProjectCharacteristics	OperationalYear	2014	2015
tblTripsAndVMT	HaulingTripLength	20.00	0.00
tblTripsAndVMT	HaulingTripLength	20.00	0.00
tblTripsAndVMT	HaulingTripNumber	0.00	8.00
tblTripsAndVMT	HaulingTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripLength	7.30	2.00
tblTripsAndVMT	VendorTripLength	7.30	2.00
tblTripsAndVMT	VendorTripLength	7.30	2.00
tblTripsAndVMT	VendorTripLength	7.30	2.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorTripNumber	9.00	4.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	VendorVehicleClass	HDT_Mix	EMFAC_Mix
tblTripsAndVMT	VendorVehicleClass	HDT_Mix	EMFAC_Mix
tblTripsAndVMT	VendorVehicleClass	HDT_Mix	EMFAC_Mix
tblTripsAndVMT	VendorVehicleClass	HDT_Mix	EMFAC_Mix
tblTripsAndVMT	WorkerTripLength	12.40	50.00
tblTripsAndVMT	WorkerTripLength	12.40	50.00
tblTripsAndVMT	WorkerTripLength	12.40	50.00
tblTripsAndVMT	WorkerTripLength	12.40	50.00
tblTripsAndVMT	WorkerTripNumber	8.00	9.00
tblTripsAndVMT	WorkerTripNumber	28.00	9.00
tblTripsAndVMT	WorkerTripNumber	23.00	9.00

tblTripsAndVMT	WorkerTripNumber	8.00	9.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	4.4760	47.0555	25.0604	0.0478	0.5398	2.3057	2.8455	0.1219	2.1482	2.2701	0.0000	4,891.2944	4,891.2944	1.2812	0.0000	4,918.1986
2016	3.7948	40.5136	22.0824	0.0466	0.3549	1.9028	2.2578	0.0940	1.7750	1.8690	0.0000	4,712.8048	4,712.8048	1.2377	0.0000	4,738.7968
Total	**8.2708**	**87.5691**	**47.1428**	**0.0944**	**0.8948**	**4.2085**	**5.1033**	**0.2159**	**3.9232**	**4.1391**	**0.0000**	**9,604.0992**	**9,604.0992**	**2.5189**	**0.0000**	**9,656.9954**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	4.4760	47.0555	25.0604	0.0478	0.5398	2.3057	2.8455	0.1219	2.1482	2.2701	0.0000	4,891.2944	4,891.2944	1.2812	0.0000	4,918.1986
2016	3.7948	40.5136	22.0824	0.0466	0.3549	1.9028	2.2578	0.0940	1.7750	1.8690	0.0000	4,712.8048	4,712.8048	1.2377	0.0000	4,738.7968
Total	**8.2708**	**87.5691**	**47.1428**	**0.0944**	**0.8948**	**4.2085**	**5.1033**	**0.2159**	**3.9232**	**4.1391**	**0.0000**	**9,604.0992**	**9,604.0992**	**2.5189**	**0.0000**	**9,656.9954**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.2171	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.7000e-004	2.7000e-004	0.0000		2.9000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	7.8100e-003	0.0158	0.0759	1.2000e-004	8.9600e-003	2.0000e-004	9.1600e-003	2.3900e-003	1.8000e-004	2.5700e-003		10.6458	10.6458	5.0000e-004		10.6563
Total	**1.2249**	**0.0158**	**0.0760**	**1.2000e-004**	**8.9600e-003**	**2.0000e-004**	**9.1600e-003**	**2.3900e-003**	**1.8000e-004**	**2.5700e-003**		**10.6461**	**10.6461**	**5.0000e-004**	**0.0000**	**10.6566**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.2171	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.7000e-004	2.7000e-004	0.0000		2.9000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	7.8100e-003	0.0158	0.0759	1.2000e-004	8.9600e-003	2.0000e-004	9.1600e-003	2.3900e-003	1.8000e-004	2.5700e-003		10.6458	10.6458	5.0000e-004		10.6563
Total	**1.2249**	**0.0158**	**0.0760**	**1.2000e-004**	**8.9600e-003**	**2.0000e-004**	**9.1600e-003**	**2.3900e-003**	**1.8000e-004**	**2.5700e-003**		**10.6461**	**10.6461**	**5.0000e-004**	**0.0000**	**10.6566**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Mobilization	Site Preparation	7/1/2015	7/14/2015	5	10	
2	Demolition	Grading	7/15/2015	8/25/2015	5	30	
3	Construction	Building Construction	8/26/2015	1/12/2016	5	100	
4	Cleanup	Site Preparation	1/13/2016	1/26/2016	5	10	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 1.25

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Mobilization	Air Compressors	1	4.00	78	0.48
Mobilization	Generator Sets	1	4.00	84	0.74
Mobilization	Off-Highway Trucks	1	6.00	400	0.38
Demolition	Air Compressors	1	4.00	78	0.48
Demolition	Cranes	2	4.00	226	0.29
Demolition	Excavators	1	6.00	162	0.38
Demolition	Forklifts	1	6.00	89	0.20
Demolition	Generator Sets	1	4.00	84	0.74
Demolition	Graders	1	4.00	174	0.41
Demolition	Off-Highway Trucks	1	6.00	400	0.38
Demolition	Off-Highway Trucks	2	4.00	400	0.38
Demolition	Tractors/Loaders/Backhoes	1	4.00	97	0.37
Construction	Air Compressors	1	4.00	78	0.48
Construction	Bore/Drill Rigs	1	6.00	205	0.50
Construction	Cranes	2	4.00	226	0.29
Construction	Excavators	1	6.00	162	0.38
Construction	Generator Sets	1	4.00	84	0.74
Construction	Graders	1	4.00	174	0.41
Construction	Off-Highway Trucks	1	4.00	400	0.38
Construction	Off-Highway Trucks	1	6.00	400	0.38
Construction	Plate Compactors	1	4.00	8	0.43
Construction	Tractors/Loaders/Backhoes	1	4.00	97	0.37
Cleanup	Air Compressors	1	4.00	78	0.48
Cleanup	Generator Sets	1	4.00	84	0.74
Cleanup	Off-Highway Trucks	1	6.00	400	0.38

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Mobilization	3	9.00	4.00	0.00	50.00	2.00	0.00	LD_Mix	EMFAC_Mix	HHDT
Demolition	11	9.00	4.00	8.00	50.00	2.00	20.00	LD_Mix	EMFAC_Mix	HHDT
Construction	15	9.00	4.00	4.00	50.00	2.00	20.00	LD_Mix	EMFAC_Mix	HHDT
Cleanup	3	9.00	4.00	0.00	50.00	2.00	0.00	LD_Mix	EMFAC_Mix	HHDT

3.1 Mitigation Measures Construction

3.2 Mobilization - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4009	13.4317	7.2809	0.0152		0.6852	0.6852		0.6574	0.6574		1,536.3093	1,536.3093	0.3659		1,543.9924
Total	**1.4009**	**13.4317**	**7.2809**	**0.0152**		**0.6852**	**0.6852**		**0.6574**	**0.6574**		**1,536.3093**	**1,536.3093**	**0.3659**		**1,543.9924**

3.2 Mobilization - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0133	0.0152	0.0943	9.0000e-005	6.1900e-003	1.7000e-004	6.3600e-003	1.6600e-003	1.5000e-004	1.8100e-003		8.2110	8.2110	4.6000e-004		8.2206
Worker	0.0772	0.2135	1.8429	3.7100e-003	0.3420	2.5700e-003	0.3445	0.0907	2.3500e-003	0.0930		321.9754	321.9754	0.0177		322.3473
Total	**0.0905**	**0.2287**	**1.9372**	**3.8000e-003**	**0.3482**	**2.7400e-003**	**0.3509**	**0.0923**	**2.5000e-003**	**0.0948**		**330.1865**	**330.1865**	**0.0182**		**330.5680**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.4009	13.4317	7.2809	0.0152		0.6852	0.6852		0.6574	0.6574	0.0000	1,536.3093	1,536.3093	0.3659		1,543.9924
Total	**1.4009**	**13.4317**	**7.2809**	**0.0152**		**0.6852**	**0.6852**		**0.6574**	**0.6574**	**0.0000**	**1,536.3093**	**1,536.3093**	**0.3659**		**1,543.9924**

3.2 Mobilization - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0133	0.0152	0.0943	9.0000e-005	6.1900e-003	1.7000e-004	6.3600e-003	1.6600e-003	1.5000e-004	1.8100e-003		8.2110	8.2110	4.6000e-004		8.2206
Worker	0.0772	0.2135	1.8429	3.7100e-003	0.3420	2.5700e-003	0.3445	0.0907	2.3500e-003	0.0930		321.9754	321.9754	0.0177		322.3473
Total	**0.0905**	**0.2287**	**1.9372**	**3.8000e-003**	**0.3482**	**2.7400e-003**	**0.3509**	**0.0923**	**2.5000e-003**	**0.0948**		**330.1865**	**330.1865**	**0.0182**		**330.5680**

3.3 Demolition - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1870	0.0000	0.1870	0.0283	0.0000	0.0283			0.0000			0.0000
Off-Road	4.3784	46.7331	23.0473	0.0438		2.3016	2.3016		2.1444	2.1444		4,540.7610	4,540.7610	1.2628		4,567.2801
Total	**4.3784**	**46.7331**	**23.0473**	**0.0438**	**0.1870**	**2.3016**	**2.4886**	**0.0283**	**2.1444**	**2.1728**		**4,540.7610**	**4,540.7610**	**1.2628**		**4,567.2801**

3.3 Demolition - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.0700e-003	0.0937	0.0760	2.0000e-004	4.6400e-003	1.3800e-003	6.0200e-003	1.2700e-003	1.2700e-003	2.5400e-003		20.3469	20.3469	1.7000e-004		20.3505
Vendor	0.0133	0.0152	0.0943	9.0000e-005	6.1900e-003	1.7000e-004	6.3600e-003	1.6600e-003	1.5000e-004	1.8100e-003		8.2110	8.2110	4.6000e-004		8.2206
Worker	0.0772	0.2135	1.8429	3.7100e-003	0.3420	2.5700e-003	0.3445	0.0907	2.3500e-003	0.0930		321.9754	321.9754	0.0177		322.3473
Total	**0.0976**	**0.3224**	**2.0132**	**4.0000e-003**	**0.3528**	**4.1200e-003**	**0.3569**	**0.0936**	**3.7700e-003**	**0.0974**		**350.5334**	**350.5334**	**0.0183**		**350.9185**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1870	0.0000	0.1870	0.0283	0.0000	0.0283			0.0000			0.0000
Off-Road	4.3784	46.7331	23.0473	0.0438		2.3016	2.3016		2.1444	2.1444	0.0000	4,540.7610	4,540.7610	1.2628		4,567.2801
Total	**4.3784**	**46.7331**	**23.0473**	**0.0438**	**0.1870**	**2.3016**	**2.4886**	**0.0283**	**2.1444**	**2.1728**	**0.0000**	**4,540.7610**	**4,540.7610**	**1.2628**		**4,567.2801**

3.3 Demolition - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	7.0700e-003	0.0937	0.0760	2.0000e-004	4.6400e-003	1.3800e-003	6.0200e-003	1.2700e-003	1.2700e-003	2.5400e-003		20.3469	20.3469	1.7000e-004		20.3505
Vendor	0.0133	0.0152	0.0943	9.0000e-005	6.1900e-003	1.7000e-004	6.3600e-003	1.6600e-003	1.5000e-004	1.8100e-003		8.2110	8.2110	4.6000e-004		8.2206
Worker	0.0772	0.2135	1.8429	3.7100e-003	0.3420	2.5700e-003	0.3445	0.0907	2.3500e-003	0.0930		321.9754	321.9754	0.0177		322.3473
Total	**0.0976**	**0.3224**	**2.0132**	**4.0000e-003**	**0.3528**	**4.1200e-003**	**0.3569**	**0.0936**	**3.7700e-003**	**0.0974**		**350.5334**	**350.5334**	**0.0183**		**350.9185**

3.4 Construction - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.9913	43.7427	21.0634	0.0428		2.0790	2.0790		1.9401	1.9401		4,433.0265	4,433.0265	1.2273		4,458.7997
Total	**3.9913**	**43.7427**	**21.0634**	**0.0428**		**2.0790**	**2.0790**		**1.9401**	**1.9401**		**4,433.0265**	**4,433.0265**	**1.2273**		**4,458.7997**

3.4 Construction - 2015

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.0600e-003	0.0141	0.0114	3.0000e-005	7.4000e-004	2.1000e-004	9.5000e-004	2.0000e-004	1.9000e-004	3.9000e-004		3.0520	3.0520	3.0000e-005		3.0526
Vendor	0.0133	0.0152	0.0943	9.0000e-005	6.1900e-003	1.7000e-004	6.3600e-003	1.6600e-003	1.5000e-004	1.8100e-003		8.2110	8.2110	4.6000e-004		8.2206
Worker	0.0772	0.2135	1.8429	3.7100e-003	0.3420	2.5700e-003	0.3445	0.0907	2.3500e-003	0.0930		321.9754	321.9754	0.0177		322.3473
Total	**0.0916**	**0.2428**	**1.9486**	**3.8300e-003**	**0.3489**	**2.9500e-003**	**0.3518**	**0.0925**	**2.6900e-003**	**0.0952**		**333.2385**	**333.2385**	**0.0182**		**333.6205**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.9913	43.7427	21.0634	0.0428		2.0790	2.0790		1.9401	1.9401	0.0000	4,433.0265	4,433.0265	1.2273		4,458.7997
Total	**3.9913**	**43.7427**	**21.0634**	**0.0428**		**2.0790**	**2.0790**		**1.9401**	**1.9401**	**0.0000**	**4,433.0265**	**4,433.0265**	**1.2273**		**4,458.7997**

3.4 Construction - 2015

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.0600e-003	0.0141	0.0114	3.0000e-005	7.4000e-004	2.1000e-004	9.5000e-004	2.0000e-004	1.9000e-004	3.9000e-004		3.0520	3.0520	3.0000e-005		3.0526
Vendor	0.0133	0.0152	0.0943	9.0000e-005	6.1900e-003	1.7000e-004	6.3600e-003	1.6600e-003	1.5000e-004	1.8100e-003		8.2110	8.2110	4.6000e-004		8.2206
Worker	0.0772	0.2135	1.8429	3.7100e-003	0.3420	2.5700e-003	0.3445	0.0907	2.3500e-003	0.0930		321.9754	321.9754	0.0177		322.3473
Total	**0.0916**	**0.2428**	**1.9486**	**3.8300e-003**	**0.3489**	**2.9500e-003**	**0.3518**	**0.0925**	**2.6900e-003**	**0.0952**		**333.2385**	**333.2385**	**0.0182**		**333.6205**

3.4 Construction - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.7146	40.2964	20.3426	0.0428		1.9001	1.9001		1.7725	1.7725		4,390.9667	4,390.9667	1.2211		4,416.6103
Total	**3.7146**	**40.2964**	**20.3426**	**0.0428**		**1.9001**	**1.9001**		**1.7725**	**1.7725**		**4,390.9667**	**4,390.9667**	**1.2211**		**4,416.6103**

3.4 Construction - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	9.4000e-004	0.0121	0.0108	3.0000e-005	6.7800e-003	1.6000e-004	6.9300e-003	1.6800e-003	1.4000e-004	1.8300e-003		3.0173	3.0173	2.0000e-005		3.0177
Vendor	0.0123	0.0139	0.0872	9.0000e-005	6.1900e-003	1.5000e-004	6.3400e-003	1.6600e-003	1.4000e-004	1.7900e-003		7.9974	7.9974	4.2000e-004		8.0061
Worker	0.0670	0.1913	1.6417	3.7000e-003	0.3420	2.4100e-003	0.3444	0.0907	2.2200e-003	0.0929		310.8234	310.8234	0.0162		311.1627
Total	**0.0802**	**0.2173**	**1.7398**	**3.8200e-003**	**0.3549**	**2.7200e-003**	**0.3576**	**0.0940**	**2.5000e-003**	**0.0965**		**321.8381**	**321.8381**	**0.0166**		**322.1865**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	3.7146	40.2964	20.3426	0.0428		1.9001	1.9001		1.7725	1.7725	0.0000	4,390.9667	4,390.9667	1.2211		4,416.6103
Total	**3.7146**	**40.2964**	**20.3426**	**0.0428**		**1.9001**	**1.9001**		**1.7725**	**1.7725**	**0.0000**	**4,390.9667**	**4,390.9667**	**1.2211**		**4,416.6103**

3.4 Construction - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	9.4000e-004	0.0121	0.0108	3.0000e-005	6.7800e-003	1.6000e-004	6.9300e-003	1.6800e-003	1.4000e-004	1.8300e-003		3.0173	3.0173	2.0000e-005		3.0177
Vendor	0.0123	0.0139	0.0872	9.0000e-005	6.1900e-003	1.5000e-004	6.3400e-003	1.6600e-003	1.4000e-004	1.7900e-003		7.9974	7.9974	4.2000e-004		8.0061
Worker	0.0670	0.1913	1.6417	3.7000e-003	0.3420	2.4100e-003	0.3444	0.0907	2.2200e-003	0.0929		310.8234	310.8234	0.0162		311.1627
Total	**0.0802**	**0.2173**	**1.7398**	**3.8200e-003**	**0.3549**	**2.7200e-003**	**0.3576**	**0.0940**	**2.5000e-003**	**0.0965**		**321.8381**	**321.8381**	**0.0166**		**322.1865**

3.5 Cleanup - 2016

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2717	12.1378	6.9480	0.0151		0.6075	0.6075		0.5830	0.5830		1,524.2827	1,524.2827	0.3598		1,531.8394
Total	**1.2717**	**12.1378**	**6.9480**	**0.0151**		**0.6075**	**0.6075**		**0.5830**	**0.5830**		**1,524.2827**	**1,524.2827**	**0.3598**		**1,531.8394**

3.5 Cleanup - 2016

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0123	0.0139	0.0872	9.0000e-005	6.1900e-003	1.5000e-004	6.3400e-003	1.6600e-003	1.4000e-004	1.7900e-003		7.9974	7.9974	4.2000e-004		8.0061
Worker	0.0670	0.1913	1.6417	3.7000e-003	0.3420	2.4100e-003	0.3444	0.0907	2.2200e-003	0.0929		310.8234	310.8234	0.0162		311.1627
Total	**0.0793**	**0.2051**	**1.7290**	**3.7900e-003**	**0.3482**	**2.5600e-003**	**0.3507**	**0.0923**	**2.3600e-003**	**0.0947**		**318.8208**	**318.8208**	**0.0166**		**319.1688**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.2717	12.1378	6.9480	0.0151		0.6075	0.6075		0.5830	0.5830	0.0000	1,524.2827	1,524.2827	0.3598		1,531.8394
Total	**1.2717**	**12.1378**	**6.9480**	**0.0151**		**0.6075**	**0.6075**		**0.5830**	**0.5830**	**0.0000**	**1,524.2827**	**1,524.2827**	**0.3598**		**1,531.8394**

3.5 Cleanup - 2016

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0123	0.0139	0.0872	9.0000e-005	6.1900e-003	1.5000e-004	6.3400e-003	1.6600e-003	1.4000e-004	1.7900e-003		7.9974	7.9974	4.2000e-004		8.0061
Worker	0.0670	0.1913	1.6417	3.7000e-003	0.3420	2.4100e-003	0.3444	0.0907	2.2200e-003	0.0929		310.8234	310.8234	0.0162		311.1627
Total	**0.0793**	**0.2051**	**1.7290**	**3.7900e-003**	**0.3482**	**2.5600e-003**	**0.3507**	**0.0923**	**2.3600e-003**	**0.0947**		**318.8208**	**318.8208**	**0.0166**		**319.1688**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	7.8100e-003	0.0158	0.0759	1.2000e-004	8.9600e-003	2.0000e-004	9.1600e-003	2.3900e-003	1.8000e-004	2.5700e-003		10.6458	10.6458	5.0000e-004		10.6563
Unmitigated	7.8100e-003	0.0158	0.0759	1.2000e-004	8.9600e-003	2.0000e-004	9.1600e-003	2.3900e-003	1.8000e-004	2.5700e-003		10.6458	10.6458	5.0000e-004		10.6563

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	1.99	1.99	1.99	4,243	4,243
Total	1.99	1.99	1.99	4,243	4,243

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	9.50	7.30	7.30	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.552608	0.057937	0.185322	0.124470	0.029726	0.004465	0.012479	0.021685	0.001768	0.001276	0.005971	0.000530	0.001762

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.2171	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.7000e-004	2.7000e-004	0.0000		2.9000e-004
Unmitigated	1.2171	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.7000e-004	2.7000e-004	0.0000		2.9000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0519					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.1652					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.7000e-004	2.7000e-004	0.0000		2.9000e-004
Total	**1.2171**	**0.0000**	**1.3000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.7000e-004**	**2.7000e-004**	**0.0000**		**2.9000e-004**

6.2 Area by SubCategory

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0519					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.1652					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.7000e-004	2.7000e-004	0.0000		2.9000e-004
Total	**1.2171**	**0.0000**	**1.3000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.7000e-004**	**2.7000e-004**	**0.0000**		**2.9000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Three Creeks Retrofit Construction

Santa Clara County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
City Park	1.25	Acre	1.25	54,450.00	0

1.2 Other Project Characteristics

Urbanization Urban **Wind Speed (m/s)** 2.2 **Precipitation Freq (Days)** 58

Climate Zone 4 **Operational Year** 2015

Utility Company

CO2 Intensity (lb/MWhr) 0 **CH4 Intensity (lb/MWhr)** 0 **N2O Intensity (lb/MWhr)** 0

1.3 User Entered Comments & Non-Default Data

Project Characteristics -

Land Use -

Construction Phase - Phase durations based on original EIR schedule with a start date of July 1, 2015

Off-road Equipment - Default equipment and hours changed to match project-specific data. Horsepower and load factors set to CalEEMod default values.

Trips and VMT - Vehicle trips updated based on construction schedule. Vendor trips used in leiu of onsite pickup trucks

Grading - Default grading area changed to meet project-specific data.

Construction Off-road Equipment Mitigation - Based on IS Best Management Practices

Off-road Equipment - Equipment counts altered to match retrofit construction equipment list

Off-road Equipment - Equipment counts altered to match retrofit construction equipment list

Off-road Equipment - Combination of timber cap replacement, brace replacement and pile repair, and abutment timber replacement phases. Equipment counts altered to match retrofit construction equipment list.

Off-road Equipment - Equipment counts altered to match retrofit construction equipment list

Off-road Equipment - Equipment counts altered to match retrofit construction equipment list

Off-road Equipment - Equipment counts altered to match retrofit construction equipment list

Off-road Equipment - Equipment counts altered to match retrofit construction equipment list

Off-road Equipment - Equipment counts altered to match retrofit construction equipment list

On-road Fugitive Dust -

Vehicle Trips - No operational emissions quantified

Road Dust - no operational emissions quantified

Water And Wastewater - no operational emissions quantified

Solid Waste - No operational emissions quantified

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Nonresidential_Interior	81675	0
tblConstructionPhase	NumDays	200.00	31.00
tblConstructionPhase	NumDays	2.00	10.00
tblConstructionPhase	NumDays	20.00	10.00
tblConstructionPhase	NumDays	200.00	5.00
tblConstructionPhase	NumDays	200.00	20.00

tblConstructionPhase	NumDays	10.00	2.00
tblConstructionPhase	NumDays	200.00	20.00
tblConstructionPhase	NumDays	200.00	15.00
tblDemolition	PhaseName	Demolition	Streambed Debris Removal
tblOffRoadEquipment	HorsePower	81.00	5.00
tblOffRoadEquipment	OffRoadEquipmentType		Pressure Washers
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Plate Compactors
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
tblOffRoadEquipment	OffRoadEquipmentType		Graders
tblOffRoadEquipment	OffRoadEquipmentType		Tractors/Loaders/Backhoes
tblOffRoadEquipment	OffRoadEquipmentType		Cranes
tblOffRoadEquipment	OffRoadEquipmentType		Concrete/Industrial Saws
tblOffRoadEquipment	OffRoadEquipmentType		Excavators
tblOffRoadEquipment	OffRoadEquipmentType		Forklifts
tblOffRoadEquipment	OffRoadEquipmentType		Crushing/Proc. Equipment
tblOffRoadEquipment	OffRoadEquipmentType		Air Compressors
tblOffRoadEquipment	OffRoadEquipmentType		Off-Highway Trucks
tblOffRoadEquipment	OffRoadEquipmentType		Cranes

tblOffRoadEquipment	OffRoadEquipmentType		Generator Sets
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tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	5.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	0.00	1.00
tblOffRoadEquipment	PhaseName	Construction	Structure Replacement
tblOffRoadEquipment	PhaseName	Construction	Structure Replacement
tblOffRoadEquipment	PhaseName		Pressure Wash/Treatment

tblOffRoadEquipment	PhaseName	Demolition	Streambed Debris Removal
tblOffRoadEquipment	PhaseName		Timber Deck Removal
tblOffRoadEquipment	PhaseName		Structure Replacement
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tblOffRoadEquipment	PhaseName		Pressure Wash/Treatment
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tblOffRoadEquipment	PhaseName		Streambed Debris Removal
tblOffRoadEquipment	PhaseName		Viewing Platform Installation

tblOffRoadEquipment	PhaseName		Viewing Platform Installation
tblOffRoadEquipment	PhaseName		Viewing Platform Installation
tblOffRoadEquipment	PhaseName		Viewing Platform Installation
tblOffRoadEquipment	UsageHours	6.00	4.00
tblOffRoadEquipment	UsageHours	8.00	4.00
tblOffRoadEquipment	UsageHours	8.00	7.00
tblProjectCharacteristics	OperationalYear	2014	2015
tblRoadDust	MeanVehicleSpeed	40	0
tblSolidWaste	LandfillCaptureGasFlare	94.00	0.00
tblSolidWaste	LandfillNoGasCapture	6.00	0.00
tblSolidWaste	SolidWasteGenerationRate	0.11	0.00
tblVehicleTrips	CC_TL	7.30	0.00
tblVehicleTrips	CNW_TL	7.30	0.00
tblVehicleTrips	CW_TL	9.50	0.00
tblVehicleTrips	ST_TR	1.59	0.00
tblVehicleTrips	SU_TR	1.59	0.00
tblVehicleTrips	WD_TR	1.59	0.00
tblWater	OutdoorWaterUseRate	1,489,351.69	0.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	5.2915	57.7581	29.6207	0.0649	0.1164	2.5191	2.5720	0.0270	2.3445	2.3654	0.0000	6,685.4874	6,685.4874	1.7988	0.0000	6,723.2612
Total	**5.2915**	**57.7581**	**29.6207**	**0.0649**	**0.1164**	**2.5191**	**2.5720**	**0.0270**	**2.3445**	**2.3654**	**0.0000**	**6,685.4874**	**6,685.4874**	**1.7988**	**0.0000**	**6,723.2612**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2015	5.2915	57.7581	29.6207	0.0649	0.1164	2.5191	2.5720	0.0270	2.3445	2.3654	0.0000	6,685.4874	6,685.4874	1.7988	0.0000	6,723.2612
Total	**5.2915**	**57.7581**	**29.6207**	**0.0649**	**0.1164**	**2.5191**	**2.5720**	**0.0270**	**2.3445**	**2.3654**	**0.0000**	**6,685.4874**	**6,685.4874**	**1.7988**	**0.0000**	**6,723.2612**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.2171	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.7000e-004	2.7000e-004	0.0000		2.9000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.2171**	**0.0000**	**1.3000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.7000e-004**	**2.7000e-004**	**0.0000**	**0.0000**	**2.9000e-004**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	1.2171	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.7000e-004	2.7000e-004	0.0000		2.9000e-004
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**1.2171**	**0.0000**	**1.3000e-004**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**2.7000e-004**	**2.7000e-004**	**0.0000**	**0.0000**	**2.9000e-004**

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N20	CO2e
Percent Reduction	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Timber Deck Removal	Demolition	7/1/2015	7/14/2015	5	10	
2	Streambed Debris Removal	Site Preparation	7/15/2015	7/28/2015	5	10	
3	Structure Replacement	Building Construction	7/29/2015	9/9/2015	5	31	
4	Pressure Wash/Treatment	Building Construction	9/10/2015	9/16/2015	5	5	
5	Form Deck	Building Construction	9/17/2015	10/14/2015	5	20	
6	Pour Deck	Paving	10/15/2015	10/16/2015	5	2	
7	Railing Installation	Building Construction	10/17/2015	11/13/2015	5	20	
8	Viewing Platform Installation	Building Construction	11/14/2015	12/4/2015	5	15	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 0

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0 (Architectural Coating – sqft)

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Timber Deck Removal	Air Compressors	1	6.00	78	0.48
Timber Deck Removal	Generator Sets	1	4.00	84	0.74
Streambed Debris Removal	Concrete/Industrial Saws	2	4.00	5	0.73

Structure Replacement	Concrete/Industrial Saws	2	4.00	81	0.73
Streambed Debris Removal	Cranes	1	4.00	226	0.29
Pressure Wash/Treatment	Pressure Washers	2	6.00	13	0.30
Form Deck	Air Compressors	1	4.00	78	0.48
Streambed Debris Removal	Generator Sets	1	4.00	84	0.74
Form Deck	Cranes	1	4.00	226	0.29
Form Deck	Generator Sets	1	4.00	84	0.74
Pour Deck	Air Compressors	1	4.00	78	0.48
Streambed Debris Removal	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Structure Replacement	Air Compressors	1	4.00	78	0.48
Pour Deck	Off-Highway Trucks	5	6.00	400	0.38
Structure Replacement	Cranes	1	4.00	226	0.29
Pour Deck	Generator Sets	1	4.00	84	0.74
Structure Replacement	Generator Sets	1	4.00	84	0.74
Railing Installation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Railing Installation	Plate Compactors	1	4.00	8	0.43
Railing Installation	Air Compressors	1	4.00	78	0.48
Railing Installation	Generator Sets	1	4.00	84	0.74
Railing Installation	Graders	1	7.00	174	0.41
Pressure Wash/Treatment	Air Compressors	1	4.00	78	0.48
Pressure Wash/Treatment	Generator Sets	1	4.00	84	0.74
Viewing Platform Installation	Tractors/Loaders/Backhoes	1	7.00	97	0.37
Timber Deck Removal	Cranes	1	4.00	226	0.29
Timber Deck Removal	Concrete/Industrial Saws	2	4.00	81	0.73
Timber Deck Removal	Excavators	1	4.00	162	0.38
Timber Deck Removal	Forklifts	1	4.00	89	0.20
Streambed Debris Removal	Crushing/Proc. Equipment	1	5.00	85	0.78
Viewing Platform Installation	Air Compressors	1	4.00	78	0.48

Viewing Platform Installation	Off-Highway Trucks	5	6.00	400	0.38
Viewing Platform Installation	Cranes	1	4.00	226	0.29
Viewing Platform Installation	Generator Sets	1	4.00	84	0.74

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Timber Deck Removal	0	10.00	2.00	2.00	50.00	2.00	20.00	LD_Mix	EMFAC_Mix	HHDT
Streambed Debris Removal	0	10.00	0.00	2.00	50.00	2.00	20.00	LD_Mix	EMFAC_Mix	HHDT
Structure Replacement	0	10.00	2.00	2.00	50.00	2.00	20.00	LD_Mix	EMFAC_Mix	HHDT
Pressure Wash/Treatment	0	10.00	2.00	0.00	50.00	2.00	0.00	LD_Mix	EMFAC_Mix	HHDT
Form Deck	0	10.00	2.00	1.00	50.00	2.00	20.00	LD_Mix	EMFAC_Mix	HHDT
Pour Deck	0	10.00	0.00	9.00	50.00	2.00	20.00	LD_Mix	EMFAC_Mix	HHDT
Railing Installation	0	10.00	2.00	1.00	50.00	2.00	20.00	LD_Mix	EMFAC_Mix	HHDT
Viewing Platform Installation	0	10.00	2.00	11.00	50.00	2.00	20.00	LD_Mix	EMFAC_Mix	HHDT

3.1 Mitigation Measures Construction

Clean Paved Roads

3.2 Timber Deck Removal - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1758	18.0524	11.5141	0.0187		1.2072	1.2072		1.1746	1.1746		1,839.7686	1,839.7686	0.3273		1,846.6428
Total	**2.1758**	**18.0524**	**11.5141**	**0.0187**		**1.2072**	**1.2072**		**1.1746**	**1.1746**		**1,839.7686**	**1,839.7686**	**0.3273**		**1,846.6428**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.3000e-003	0.0703	0.0570	1.5000e-004	8.4000e-004	1.0300e-003	1.8700e-003	3.0000e-004	9.5000e-004	1.2600e-003		15.2602	15.2602	1.3000e-004		15.2629
Vendor	6.6300e-003	7.6000e-003	0.0471	5.0000e-005	4.5000e-004	8.0000e-005	5.4000e-004	1.8000e-004	8.0000e-005	2.6000e-004		4.1055	4.1055	2.3000e-004		4.1103
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.0978**	**0.3151**	**2.1518**	**4.3200e-003**	**0.0507**	**3.9600e-003**	**0.0547**	**0.0201**	**3.6400e-003**	**0.0237**		**377.1162**	**377.1162**	**0.0200**		**377.5369**

3.2 Timber Deck Removal - 2015

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	2.1758	13.0580	11.5141	0.0187		1.2072	1.2072		1.1746	1.1746	0.0000	1,839.7686	1,839.7686	0.3273		1,846.6428
Total	**2.1758**	**13.0580**	**11.5141**	**0.0187**		**1.2072**	**1.2072**		**1.1746**	**1.1746**	**0.0000**	**1,839.7686**	**1,839.7686**	**0.3273**		**1,846.6428**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.3000e-003	0.0703	0.0570	1.5000e-004	8.4000e-004	1.0300e-003	1.8700e-003	3.0000e-004	9.5000e-004	1.2600e-003		15.2602	15.2602	1.3000e-004		15.2629
Vendor	6.6300e-003	7.6000e-003	0.0471	5.0000e-005	4.5000e-004	8.0000e-005	5.4000e-004	1.8000e-004	8.0000e-005	2.6000e-004		4.1055	4.1055	2.3000e-004		4.1103
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.0978**	**0.3151**	**2.1518**	**4.3200e-003**	**0.0507**	**3.9600e-003**	**0.0547**	**0.0201**	**3.6400e-003**	**0.0237**		**377.1162**	**377.1162**	**0.0200**		**377.5369**

3.3 Streambed Debris Removal - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6258	13.7057	8.3942	0.0132		0.9406	0.9406		0.9057	0.9057		1,309.5770	1,309.5770	0.2577		1,314.9877
Total	**1.6258**	**13.7057**	**8.3942**	**0.0132**		**0.9406**	**0.9406**		**0.9057**	**0.9057**		**1,309.5770**	**1,309.5770**	**0.2577**		**1,314.9877**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.3000e-003	0.0703	0.0570	1.5000e-004	8.4000e-004	1.0300e-003	1.8700e-003	3.0000e-004	9.5000e-004	1.2600e-003		15.2602	15.2602	1.3000e-004		15.2629
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.0911**	**0.3075**	**2.1047**	**4.2700e-003**	**0.0503**	**3.8800e-003**	**0.0542**	**0.0199**	**3.5600e-003**	**0.0235**		**373.0107**	**373.0107**	**0.0198**		**373.4266**

3.3 Streambed Debris Removal - 2015

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.6258	10.0223	8.3942	0.0132		0.9406	0.9406		0.9057	0.9057	0.0000	1,309.5770	1,309.5770	0.2577		1,314.9877
Total	**1.6258**	**10.0223**	**8.3942**	**0.0132**		**0.9406**	**0.9406**		**0.9057**	**0.9057**	**0.0000**	**1,309.5770**	**1,309.5770**	**0.2577**		**1,314.9877**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	5.3000e-003	0.0703	0.0570	1.5000e-004	8.4000e-004	1.0300e-003	1.8700e-003	3.0000e-004	9.5000e-004	1.2600e-003		15.2602	15.2602	1.3000e-004		15.2629
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.0911**	**0.3075**	**2.1047**	**4.2700e-003**	**0.0503**	**3.8800e-003**	**0.0542**	**0.0199**	**3.5600e-003**	**0.0235**		**373.0107**	**373.0107**	**0.0198**		**373.4266**

3.4 Structure Replacement - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7114	13.7270	8.5227	0.0144		0.9265	0.9265		0.9104	0.9104		1,387.9917	1,387.9917	0.2083		1,392.3652
Total	**1.7114**	**13.7270**	**8.5227**	**0.0144**		**0.9265**	**0.9265**		**0.9104**	**0.9104**		**1,387.9917**	**1,387.9917**	**0.2083**		**1,392.3652**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.7100e-003	0.0227	0.0184	5.0000e-005	2.7000e-004	3.3000e-004	6.0000e-004	1.0000e-004	3.1000e-004	4.1000e-004		4.9226	4.9226	4.0000e-005		4.9235
Vendor	6.6300e-003	7.6000e-003	0.0471	5.0000e-005	4.5000e-004	8.0000e-005	5.4000e-004	1.8000e-004	8.0000e-005	2.6000e-004		4.1055	4.1055	2.3000e-004		4.1103
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.0942**	**0.2675**	**2.1132**	**4.2200e-003**	**0.0502**	**3.2600e-003**	**0.0534**	**0.0199**	**3.0000e-003**	**0.0229**		**366.7787**	**366.7787**	**0.0200**		**367.1975**

3.4 Structure Replacement - 2015

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	1.7114	8.7327	8.5227	0.0144		0.9265	0.9265		0.9104	0.9104	0.0000	1,387.9917	1,387.9917	0.2083		1,392.3652
Total	**1.7114**	**8.7327**	**8.5227**	**0.0144**		**0.9265**	**0.9265**		**0.9104**	**0.9104**	**0.0000**	**1,387.9917**	**1,387.9917**	**0.2083**		**1,392.3652**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.7100e-003	0.0227	0.0184	5.0000e-005	2.7000e-004	3.3000e-004	6.0000e-004	1.0000e-004	3.1000e-004	4.1000e-004		4.9226	4.9226	4.0000e-005		4.9235
Vendor	6.6300e-003	7.6000e-003	0.0471	5.0000e-005	4.5000e-004	8.0000e-005	5.4000e-004	1.8000e-004	8.0000e-005	2.6000e-004		4.1055	4.1055	2.3000e-004		4.1103
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.0942**	**0.2675**	**2.1132**	**4.2200e-003**	**0.0502**	**3.2600e-003**	**0.0534**	**0.0199**	**3.0000e-003**	**0.0229**		**366.7787**	**366.7787**	**0.0200**		**367.1975**

3.5 Pressure Wash/Treatment - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7050	4.8581	3.5632	6.1000e-003		0.3664	0.3664		0.3664	0.3664		557.7843	557.7843	0.0631		559.1102
Total	**0.7050**	**4.8581**	**3.5632**	**6.1000e-003**		**0.3664**	**0.3664**		**0.3664**	**0.3664**		**557.7843**	**557.7843**	**0.0631**		**559.1102**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.6300e-003	7.6000e-003	0.0471	5.0000e-005	4.5000e-004	8.0000e-005	5.4000e-004	1.8000e-004	8.0000e-005	2.6000e-004		4.1055	4.1055	2.3000e-004		4.1103
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.0925**	**0.2448**	**2.0948**	**4.1700e-003**	**0.0499**	**2.9300e-003**	**0.0528**	**0.0198**	**2.6900e-003**	**0.0225**		**361.8560**	**361.8560**	**0.0199**		**362.2740**

3.5 Pressure Wash/Treatment - 2015

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.7050	4.3277	3.5632	6.1000e-003		0.3664	0.3664		0.3664	0.3664	0.0000	557.7843	557.7843	0.0631		559.1102
Total	**0.7050**	**4.3277**	**3.5632**	**6.1000e-003**		**0.3664**	**0.3664**		**0.3664**	**0.3664**	**0.0000**	**557.7843**	**557.7843**	**0.0631**		**559.1102**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.6300e-003	7.6000e-003	0.0471	5.0000e-005	4.5000e-004	8.0000e-005	5.4000e-004	1.8000e-004	8.0000e-005	2.6000e-004		4.1055	4.1055	2.3000e-004		4.1103
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.0925**	**0.2448**	**2.0948**	**4.1700e-003**	**0.0499**	**2.9300e-003**	**0.0528**	**0.0198**	**2.6900e-003**	**0.0225**		**361.8560**	**361.8560**	**0.0199**		**362.2740**

3.6 Form Deck - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9966	8.7038	4.7093	8.0700e-003		0.5372	0.5372		0.5213	0.5213		793.3855	793.3855	0.1441		796.4109
Total	**0.9966**	**8.7038**	**4.7093**	**8.0700e-003**		**0.5372**	**0.5372**		**0.5213**	**0.5213**		**793.3855**	**793.3855**	**0.1441**		**796.4109**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3300e-003	0.0176	0.0143	4.0000e-005	2.1000e-004	2.6000e-004	4.7000e-004	8.0000e-005	2.4000e-004	3.1000e-004		3.8150	3.8150	3.0000e-005		3.8157
Vendor	6.6300e-003	7.6000e-003	0.0471	5.0000e-005	4.5000e-004	8.0000e-005	5.4000e-004	1.8000e-004	8.0000e-005	2.6000e-004		4.1055	4.1055	2.3000e-004		4.1103
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.0938**	**0.2624**	**2.1091**	**4.2100e-003**	**0.0501**	**3.1900e-003**	**0.0533**	**0.0199**	**2.9300e-003**	**0.0228**		**365.6711**	**365.6711**	**0.0199**		**366.0897**

3.6 Form Deck - 2015

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.9966	8.7038	4.7093	8.0700e-003		0.5372	0.5372		0.5213	0.5213	0.0000	793.3855	793.3855	0.1441		796.4109
Total	**0.9966**	**8.7038**	**4.7093**	**8.0700e-003**		**0.5372**	**0.5372**		**0.5213**	**0.5213**	**0.0000**	**793.3855**	**793.3855**	**0.1441**		**796.4109**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3300e-003	0.0176	0.0143	4.0000e-005	2.1000e-004	2.6000e-004	4.7000e-004	8.0000e-005	2.4000e-004	3.1000e-004		3.8150	3.8150	3.0000e-005		3.8157
Vendor	6.6300e-003	7.6000e-003	0.0471	5.0000e-005	4.5000e-004	8.0000e-005	5.4000e-004	1.8000e-004	8.0000e-005	2.6000e-004		4.1055	4.1055	2.3000e-004		4.1103
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.0938**	**0.2624**	**2.1091**	**4.2100e-003**	**0.0501**	**3.1900e-003**	**0.0533**	**0.0199**	**2.9300e-003**	**0.0228**		**365.6711**	**365.6711**	**0.0199**		**366.0897**

3.7 Pour Deck - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.5124	50.0751	23.7634	0.0549		2.0849	2.0849		1.9451	1.9451		5,710.878 1	5,710.878 1	1.6121		5,744.733 1
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**4.5124**	**50.0751**	**23.7634**	**0.0549**		**2.0849**	**2.0849**		**1.9451**	**1.9451**		**5,710.878 1**	**5,710.878 1**	**1.6121**		**5,744.733 1**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1194	1.5815	1.2821	3.3800e-003	0.0189	0.0233	0.0422	6.8600e-003	0.0214	0.0283		343.3539	343.3539	2.9100e-003		343.4151
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.2052**	**1.8187**	**3.3298**	**7.5000e-003**	**0.0683**	**0.0261**	**0.0945**	**0.0265**	**0.0240**	**0.0505**		**701.1044**	**701.1044**	**0.0226**		**701.5787**

3.7 Pour Deck - 2015

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	4.5124	50.0751	23.7634	0.0549		2.0849	2.0849		1.9451	1.9451	0.0000	5,710.8781	5,710.8781	1.6121		5,744.7331
Paving	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Total	**4.5124**	**50.0751**	**23.7634**	**0.0549**		**2.0849**	**2.0849**		**1.9451**	**1.9451**	**0.0000**	**5,710.8781**	**5,710.8781**	**1.6121**		**5,744.7331**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1194	1.5815	1.2821	3.3800e-003	0.0189	0.0233	0.0422	6.8600e-003	0.0214	0.0283		343.3539	343.3539	2.9100e-003		343.4151
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.2052**	**1.8187**	**3.3298**	**7.5000e-003**	**0.0683**	**0.0261**	**0.0945**	**0.0265**	**0.0240**	**0.0505**		**701.1044**	**701.1044**	**0.0226**		**701.5787**

3.8 Railing Installation - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0663	0.0000	0.0663	7.1600e-003	0.0000	7.1600e-003			0.0000			0.0000
Off-Road	1.8924	16.9658	9.7716	0.0137		1.1121	1.1121		1.0505	1.0505		1,377.8739	1,377.8739	0.3152		1,384.4932
Total	**1.8924**	**16.9658**	**9.7716**	**0.0137**	**0.0663**	**1.1121**	**1.1784**	**7.1600e-003**	**1.0505**	**1.0577**		**1,377.8739**	**1,377.8739**	**0.3152**		**1,384.4932**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3300e-003	0.0176	0.0143	4.0000e-005	2.1000e-004	2.6000e-004	4.7000e-004	8.0000e-005	2.4000e-004	3.1000e-004		3.8150	3.8150	3.0000e-005		3.8157
Vendor	6.6300e-003	7.6000e-003	0.0471	5.0000e-005	4.5000e-004	8.0000e-005	5.4000e-004	1.8000e-004	8.0000e-005	2.6000e-004		4.1055	4.1055	2.3000e-004		4.1103
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.0938**	**0.2624**	**2.1091**	**4.2100e-003**	**0.0501**	**3.1900e-003**	**0.0533**	**0.0199**	**2.9300e-003**	**0.0228**		**365.6711**	**365.6711**	**0.0199**		**366.0897**

3.8 Railing Installation - 2015

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0663	0.0000	0.0663	7.1600e-003	0.0000	7.1600e-003			0.0000			0.0000
Off-Road	1.8924	16.9658	9.7716	0.0137		1.1121	1.1121		1.0505	1.0505	0.0000	1,377.8739	1,377.8739	0.3152		1,384.4932
Total	**1.8924**	**16.9658**	**9.7716**	**0.0137**	**0.0663**	**1.1121**	**1.1784**	**7.1600e-003**	**1.0505**	**1.0577**	**0.0000**	**1,377.8739**	**1,377.8739**	**0.3152**		**1,384.4932**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.3300e-003	0.0176	0.0143	4.0000e-005	2.1000e-004	2.6000e-004	4.7000e-004	8.0000e-005	2.4000e-004	3.1000e-004		3.8150	3.8150	3.0000e-005		3.8157
Vendor	6.6300e-003	7.6000e-003	0.0471	5.0000e-005	4.5000e-004	8.0000e-005	5.4000e-004	1.8000e-004	8.0000e-005	2.6000e-004		4.1055	4.1055	2.3000e-004		4.1103
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.0938**	**0.2624**	**2.1091**	**4.2100e-003**	**0.0501**	**3.1900e-003**	**0.0533**	**0.0199**	**2.9300e-003**	**0.0228**		**365.6711**	**365.6711**	**0.0199**		**366.0897**

3.9 Viewing Platform Installation - 2015

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.1795	57.2556	27.3169	0.0602		2.5123	2.5123		2.3383	2.3383		6,267.6775	6,267.6775	1.7784		6,305.0233
Total	**5.1795**	**57.2556**	**27.3169**	**0.0602**		**2.5123**	**2.5123**		**2.3383**	**2.3383**		**6,267.6775**	**6,267.6775**	**1.7784**		**6,305.0233**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0195	0.2577	0.2089	5.5000e-004	3.0800e-003	3.7900e-003	6.8700e-003	1.1200e-003	3.4900e-003	4.6100e-003		55.9540	55.9540	4.7000e-004		55.9639
Vendor	6.6300e-003	7.6000e-003	0.0471	5.0000e-005	4.5000e-004	8.0000e-005	5.4000e-004	1.8000e-004	8.0000e-005	2.6000e-004		4.1055	4.1055	2.3000e-004		4.1103
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.1119**	**0.5025**	**2.3037**	**4.7200e-003**	**0.0530**	**6.7200e-003**	**0.0597**	**0.0209**	**6.1800e-003**	**0.0271**		**417.8100**	**417.8100**	**0.0204**		**418.2379**

3.9 Viewing Platform Installation - 2015

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	5.1795	57.2556	27.3169	0.0602		2.5123	2.5123		2.3383	2.3383	0.0000	6,267.6774	6,267.6774	1.7784		6,305.0233
Total	**5.1795**	**57.2556**	**27.3169**	**0.0602**		**2.5123**	**2.5123**		**2.3383**	**2.3383**	**0.0000**	**6,267.6774**	**6,267.6774**	**1.7784**		**6,305.0233**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0195	0.2577	0.2089	5.5000e-004	3.0800e-003	3.7900e-003	6.8700e-003	1.1200e-003	3.4900e-003	4.6100e-003		55.9540	55.9540	4.7000e-004		55.9639
Vendor	6.6300e-003	7.6000e-003	0.0471	5.0000e-005	4.5000e-004	8.0000e-005	5.4000e-004	1.8000e-004	8.0000e-005	2.6000e-004		4.1055	4.1055	2.3000e-004		4.1103
Worker	0.0858	0.2372	2.0477	4.1200e-003	0.0494	2.8500e-003	0.0523	0.0196	2.6100e-003	0.0222		357.7505	357.7505	0.0197		358.1637
Total	**0.1119**	**0.5025**	**2.3037**	**4.7200e-003**	**0.0530**	**6.7200e-003**	**0.0597**	**0.0209**	**6.1800e-003**	**0.0271**		**417.8100**	**417.8100**	**0.0204**		**418.2379**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
City Park	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
City Park	0.00	0.00	0.00	33.00	48.00	19.00	66	28	6

4.4 Fleet Mix

LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
0.552608	0.057937	0.185322	0.124470	0.029726	0.004465	0.012479	0.021685	0.001768	0.001276	0.005971	0.000530	0.001762

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.2 Energy by Land Use - NaturalGas

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
City Park	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	1.2171	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.7000e-004	2.7000e-004	0.0000		2.9000e-004
Unmitigated	1.2171	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.7000e-004	2.7000e-004	0.0000		2.9000e-004

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0519					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.1652					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.7000e-004	2.7000e-004	0.0000		2.9000e-004
Total	**1.2171**	**0.0000**	**1.3000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.7000e-004**	**2.7000e-004**	**0.0000**		**2.9000e-004**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0519					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	1.1652					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	1.0000e-005	0.0000	1.3000e-004	0.0000		0.0000	0.0000		0.0000	0.0000		2.7000e-004	2.7000e-004	0.0000		2.9000e-004
Total	**1.2171**	**0.0000**	**1.3000e-004**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**2.7000e-004**	**2.7000e-004**	**0.0000**		**2.9000e-004**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Vegetation

Appendix C
Inspection Site Visit Report

D.W. ALLEY & Associates aquatic biology

Technical Memorandum−Fishery Evaluation for the Three Creeks Trail Pedestrian Bridge Project, San Jose, California, Along Los Gatos Creek in the Vicinity of the Railroad Trestle Near Lincoln Avenue−November 2014

Existing Fishery Conditions

Methods

Los Gatos Creek was surveyed in the vicinity of the railroad trestle spanning the Creek (N37.31484; W121.70378) along the route of the Three Creeks Trail in San Jose. The stream survey and inspection of the existing trestle were completed in early November after a recent rainfall event. Evidence of flashy stormflow was present. During the survey, the stream was intermittent, with isolated pools remaining. Nearly all potentially fastwater habitat was dry. No fish were observed, and Los Gatos Creek was likely dry in the vicinity of the trestle previously in summer during severe drought conditions. The streambed at the trestle was observed to be dry earlier in the summer (Matthew Franck, CH2MHILL staff, pers. comm.). Streamflow in Los Gatos Creek in summer and fall is typically reliant upon flow releases upstream. In recent years, Los Gatos Creek was maintained perennially down to its confluence with Guadalupe River, providing fish habitat (J. Smith, pers. comm.).

Approximately 1,650 feet upstream and 1,600 feet beneath and downstream of the railroad trestle were habitat typed on 3 November 2014. The segment surveyed downstream of the trestle extended 200 feet downstream (N37.31926; W121.90200) of the Sinclair Highway overpass. The segment surveyed upstream of the trestle extended approximately 650 feet upstream (N37.311187; W121.906656) beyond Lincoln Avenue. Habitats were divided between pool and fastwater (riffles and runs) habitat. When habitat was dry, it was categorized based on streambed contours, hydraulic controls and gradient.

Results-Fish Habitat

The segment habitat typed up- and downstream of the railroad trestle would have consisted of an estimated 65% pool and 35% riffle and run habitat, had surface flow been continuous. On 3 November, 63% of the pool habitat and 95% of the riffle and run habitat were dry. However, over the long term, Los Gatos Creek may be expected to provide perennial habitat in most years. This being the case, this reach of Los Gatos Creek in the vicinity of the railroad trestle would likely provide somewhat less than a third of its length as fastwater habitat for juvenile steelhead during the dry season in riffles, fast runs and heads of some pools that provide fastwater. Under perennial conditions, the deepest and largest existing pools under perennial conditions would provide adequate depth and sufficient escape cover to for small numbers of adult migrating steelhead and fall-run Chinook salmon, though large instream wood was limited for adult salmonids and overwintering juveniles. Hydraulics would likely be conducive to salmonid spawning at the tails of the longer pools during spawning season, of which there were at least 8 such pools in the half-mile segment that was habitat typed. However, spawning gravel was in short supply and compacted in these spawning glides, this making spawning conditions poor. With fall and winter flows being dependent on dam and percolation pond releases lacking permit requirements, instream flow for adult spawning passage and spawning may be inadequate for highly successful spawning and egg incubation.

According to the National Marine Fisheries Service (NMFS) Biological Opinion (2014), "Upper Los Gatos Creek historically supported an anadromous run of steel head and collections were made as early as 1895 by Snyder (Leidy, Becker, & Harvey 2005). Today, steelhead have access to the lower 5.3 miles of creek due to an impassable barrier just north of Camden Avenue. The lower 5.3 miles of Los Gatos Creek accessible to steelhead, in which the action area is located, were habitat surveyed in 2000 for the Santa Clara Valley Water District's (SCVWD) Fisheries Aquatic Habitat Collaborative Effort (Entrix 2001). The survey results indicated that Los Gatos Creek is dominated by pool habitat (57%) and runs (32%). Only 10% of the habitat was characterized as rimes. This low amount of riffle habitat combined with a lack of in-stream cover and poor substrate resulted in an overall rating of poor habitat conditions for steelhead in this part of Los Gatos Creek. The channel is entrenched and stream banks are steep with little floodplain. Summer streamflow is typically low. Overall, habitat conditions in the action area are generally poor for steelhead spawning and rearing."

Relocation of fish during a streambank repair project adjacent 101 Glen Eyrie Avenue in summer 2011, less than 1 mile upstream from the railroad trestle on Los Gatos Creek, indicated fish species likely to inhabit the vicinity of the trestle during perennial flow years (Table 1) (Alley 2012). Other potential native species that may inhabit Los Gatos Creek include the riffle sculpin (*Cottus gulosus*) that was identified in the upper Guadalupe watershed and is likely present above Lexington Reservoir on Los Gatos Creek (J. Smith pers. comm.), and hitch (*Lavinia exilicauda*), which was detected in lower Guadalupe River. Threespine stickleback (*Gasterosteus aculeatus*) is another native species. Other non-native introduced fish species that are likely in Vasona Reservoir may include mosquito fish (*Gambusia affinis),* goldfish (*Carassius auratus*), brown bullhead (*Ictalurus nebulosus*), and pumpkinseed (*Lepomis gibbosus*). Fall-run Chinook salmon (*Oncorhynchus tshawytscha*), a species of federal concern without federal protection in Los Gatos Creek, has been detected in the Guadalupe River watershed and has been reported in Los Gatos Creek (J. Smith pers. comm.). The recent perennial flows maintained in lower Los Gatos Creek (until the drought in 2014) provided spawning access to fall-run Chinook salmon. Although Los Gatos Creek is not designated as critical habitat for CCC steelhead, essential fish habitat (EFH) for juvenile steelhead at the construction site and likely adjacent to the railroad trestle included fastwater habitat only (riffles, runs and swift heads of pools. A likely holdover, adult steelhead used a deep pool in the project area, which would have been EFH for spawning adult steelhead and fall-run Chinook salmon as refugia from predators and as rearing habitat for primarily pool-dwelling juvenile Chinook salmon.

Table 1. Fish species captured in Los Gatos Creek in summer 2011, less than a mile upstream from the railroad trestle.

Common Name	Scientific Name	Native or Introduced
California Roach	*Hesperoleucus symmetricus*	Native
Pacific Lamprey	*Lampetra tridentata*	Native
Prickly Sculpin	*Cottus asper*	Native
Sacramento Sucker	*Catostomus occidentalis*	Native
Steelhead Salmon	*Oncorhynchus mykiss*	Native
Bluegill	*Lepomis macrochirus*	Introduced
Carp	*Cyprinus carpio*	Introduced
Green Sunfish	*Lepomis cyanellus*	Introduced
Largemouth Bass	*Micropterus salmoides*	Introduced
Red Shiner	*Notropis lutrensis*	Introduced

<u>Results- Riparian Corridor</u>

Overstory trees in the riparian corridor in the vicinity of the railroad trestle included willow, black cottonwood, box elder, white alder, black walnut blue gum (*Eucalyptus*). A few palm trees were also present near the bankfull elevation, as well as small fig. Oak had been planted at the edge of the riparian corridor along the trail above the steep slope on the north side of the Creek. Understory vegetation was dominated by invasive exotics, including giant reed (*Arundo donax*), Himalayan blackberry and English Ivy. Poison oak was present in limited distribution. Measured canopy closure varied between 38 and 78% on 3 November, after partial leaf fall.

There was a high potential for downstream transport and collection of uprooted riparian trees and instream wood upon the railroad trestle from future flood flows. Trees had encroached into the bankfull channel after below average rainfall years, and trees 3-6 inches DBH were common within the bankfull channel (**Appendix A; Photos #1−2**). Many larger trees were perched at the edge of the bankfull channel, likely to fall into the channel during flood flows causing streambank erosion (**Appendix A; Photo #3**). In one location, a grove of cottonwood had developed on a narrow floodplain at near the bankfull elevation (**Appendix A; Photo #4**). During flood flows at greater than bankfull, the steeply sloped banks and sometimes concrete walls on either side of the incised stream channel created confined conditions that would increase the likelihood of uprooting of trees perched at the bankfull elevation and slightly higher between the steep banks. Five clusters of woody debris were observed in the 1,650 feet upstream of the railroad trestle, which would likely mobilize downstream during bankfull events and greater (**Appendix A; Photos #5−7**).

Existing Conditions at the Railroad Trestle and Effects on Fishery Habitat, Long Term

The trestle was in a state of disrepair. Many of the timbers making up the piling piers were badly weathered and splintered at their ends (**Appendix A; Photo #8−9**). Evidence of fire damage was observed on one of the northern piling piers (**Appendix A; Photo #10**). Soil erosion was observed on the barren steep slope adjacent to and under the trestle on the north side. An estimated 7 piling support piers of the railroad trestle were most likely to be subject to flow inundation over the range most stormflows. These piling piers were approximately 14-15 feet apart over a measured 88 feet of width between the 7 piers. Bankfull flows likely inundated 4 or 5 of these piling piers.

According to the NMFS Biological Opinion (2014), "Within the action area, the existing derelict trestle is supported by approximately 81 creosote treated timber piles that are located within the bed and bank of Los Gatos Creek. These support piles impair streamflow, and the creosote contained within the piles impairs water quality for CCC steelhead. Creosote, a distillate of coal tar, is a complex chemical mixture, up to 80% of which is comprised of polycyclic aromatic hydrocarbons (PAHs). PAHs can alter salmonid egg hatching rates and reduce egg survival as well as harm the benthic organisms that are a salmonid food source (Eisler 2000). Thus, habitat conditions along the bank and in the channel are likely degraded by toxic chemicals for steelhead in this portion of the action area. Removal of all or most of these creosote-treated timber piles would likely improve water quality and substrate conditions in the action area."

According to the assessment of creosote treated wood pilings completed by CH2MHILL environmental toxicologist, Bruce Hope, "Studies in both terrestrial (e.g., railroad ties) and aquatic (e.g., pier pilings) environments have shown significant decreases in creosote and PAH releases from treated wooden structures within 5 years or less of placement. The pilings comprising the Three Creeks Bridge are, for the most part, not new (the bridge itself was built in 1921) and are likely well past the point where meaningful quantities of creosote constituents (particularly the more soluble and toxic LPAHs) are leaching into the environment – either to the creek or to its terrestrial, riparian margins. Vines-Vines et al (2000) did find that creosote-treated wood extracts from 50-year-old San Francisco Bay pilings were the source of PAHs to the surrounding water, but PAH availability from these older pilings may have been due to splintering of the piling which facilitated the release of otherwise sequestered creosote. And a study in Australia found that significant amounts of PAHs were released during a pile-removal project, and that significantly elevated concentrations of PAHs remained in the sediments up to six months after removal was completed (Smith, 2008). Our current knowledge of the behavior of creosote and its constituents in older creosote-treated wooden structures suggests that leaving the pilings of the Three Creeks Bridge in place will not pose a risk to terrestrial or aquatic receptors. Conversely, if removal is contemplated, this same knowledge clearly indicates that pile removal projects must deploy best management practices (BMPs) to avoid or mitigate the possibility of temporarily increasing PAH levels in soils or sediment as a consequence of the physical disturbance of pilings."

A cluster of small woody debris (pieces mostly less than 1 foot diameter at breast height (DBH)) had collected on one pier within the low flow channel, offering limited escape cover for fish in a shallow pool (**Appendix A; Photos #11−12**). A piece of large woody debris (greater than 1 foot DBH), approximately 1.75 feet DBH and 20 feet long had collected on another pier outside the low flow channel and within the bankfull channel (**Appendix A; Photo #13**). Riprap was observed under the trestle, above the low flow channel on the south side, preventing scour and undermining of the piling piers (**Appendix A; Photo #14**). Potentially fastwater habitat existed just upstream of the trestle, if streamflow had been present.

During future erosive flood flows in the incised stream channel, the potential for large debris jams collecting on the railroad trestle pilings is predictably high. These debris jams would develop from the mobilization of instream wood and from uprooting of both small trees encroaching within the bankfull channel and perched trees at the edge of the bankfull channel. These trestle pilings will likely reduce the natural downstream dispersal and clustering of large woody debris at multiple locations and reduce the frequency of EFH for juvenile steelhead at fastwater heads of pools that would have been naturally scoured out by deposition of large wood downstream in Los Gatos Creek and the Guadalupe River. Quality of EFH downstream of the trestle will also be reduced for spawning adult steelhead and fall-run Chinook salmon and juvenile, rearing of mostly pool-dwelling juvenile Chinook salmon with less scouring of pools and provision of refugia from predation provided by naturally dispersing wood that will instead collect on the trestle pilings. The reduction in dispersal of large instream wood by accumulations on the trestle will also reduce the overwintering habitat for juvenile steelhead. Hindrance of large woody debris dispersal will reduce the sorting of gravel by woody debris clusters, thus reducing quality of salmonid spawning gravel.

In the aftermath of flood events that result in large debris accumulation on the trestle, flood control activities typically will include cutting of large woody debris into small pieces that will be less likely to anchor along stream banks downstream of the trestle, thus greatly reducing the functionality of this instream wood to create fish habitat. Evidence of such flood control activity was observed with some large instream wood having been cut into smaller pieces in the survey segment in November 2014. Flood control activities typically include cutting of large woody debris as a preventative measure to prevent accumulation on structures such as bridges and the railroad trestle. Thus, this destruction of large woody debris as preventative of future flooding problems also reduces the functionality of instream wood to create fish habitat because it will be transported away more easily during flood flows. With the railroad trestle being replaced with a freespan bridge, the need for cutting large instream wood would be reduced, thus allowing the potential for intact, longer pieces of wood to pass under and provide increased fish habitat as they form clusters downstream.

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Appendix A. Photographs.

**Photo #1. Small trees encroaching into the low flow channel, upstream of the railroad trestle.
3 November 2014**

Photo #2. Small trees encroaching into the low flow channel, upstream of the railroad trestle. 3 November 2014

Photo #3. Riparian trees perched at the bankfull margin, upstream of the railroad trestle.
3 November 2014

Photo #4. Cottonwood grove on narrow floodplain beside streamside residence, upstream of the railroad trestle. 3 November 2014

Photo #5. Large woody debris in dry low-flow channel (evidence of cutting) upstream of the railroad trestle. 3 November 2014

Photo 6. Large woody debris in dry low-flow channel (evidence of cutting cottonwood) upstream of railroad trestle. 3 November 2014

**Photo 7. Large woody debris in dry low-flow channel upstream of the railroad trestle.
3 November 2014**

Photo #8. Weathered and splintering pilings on railroad trestle in disrepair. 3 November 2014

Photo #9. Weathered and splintering pilings on railroad trestle in disrepair. 3 November 2014

Photo #10. Charred pilings on railroad trestle, north side. 3 November 2014

Photo #11. Woody debris collected on railroad trestle pier. 3 November 2014

Photo #12. Shallow pool under railroad trestle. 3 November 2014

Photo #13. Large wood collected on railroad trestle pier within bankfull channel. 3 November 2014

Photo #14. Riprap under railroad trestle (weathered pilings), south side. 3 November 2014

Appendix D
Ecological Toxicology Report

BACKGROUND

Coal tar creosote (creosote) is a wood preservative that has been used in the United States for almost 150 years to preserve wooden structures from attack by fungi, marine borers, and insects (ATSDR, 2002; Brooks, 2004; Hutton and Samis, 2000). It is currently a registered pesticide under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) (USEPA, 2008). Wood preservation accounts for over 97% of current creosote production (ATSDR, 2002). It is used as a wood preservative and water-proofing agent for log homes, railroad ties, telephone poles, marine pilings, and fence posts. In addition, creosote prevents animal and vegetable growth on concrete marine pilings and is a component of roofing pitch, fuel oil, and lamp black, and a lubricant for die molds (ATSDR, 2002). Other uses include animal and bird repellent, insecticide, animal dip, fungicide, and a pharmaceutical agent for the treatment of psoriasis (ATSDR, 2002).

TRANSPORT & FATE IN THE ENVIRONMENT

Chemically, creosote it is a brownish-black/yellowish-dark green oily product distilled from crude coal tars, and is made up of hundreds or thousands of chemical compounds (WHO, 2004). Fewer than 20% of the compounds that make up a creosote mixture are present in percentages greater than 1%. Chemical formulations of creosote have varied over the production years, but it is generally reported that polycyclic aromatic hydrocarbons (PAHs) and alkylated PAHs account for up to 90% of creosote mixtures and most of the literature on creosote pertains to PAHs. There are two broad categories of PAHs: low molecular weight PAHs (LPAHs, compounds with 3 or fewer aromatic rings) and high molecular weight PAHs (HPAHs, compounds with 4 or more aromatic rings) (Meador et al., 1995).

Creosote and its chemical constituents have various physical and chemical properties, such as solubility, partitioning, and persistence, that drive their transport and fate behavior in terrestrial and aquatic environments. Individual PAH solubility in water is generally inversely correlated with molecular weight. LPAH compounds have solubilities varying from 32 mg/L for naphthalene to 0.044 mg/L for anthracene, while the solubility HPAH compounds varies from 0.26 mg/L for fluoranthene to 0.00026 mg/L for benzo[ghi]perylene (ATSDR, 2002). PAHs that are more soluble in water (LPAHs, phenolics, and heterocyclics) tend to partition to water while less water soluble PAHs (HPAHs) tend to partition to sediment and particulate organic matter (Bestari et al., 1998; Hylland, 2006; Padma et al., 1999; WHO, 2004). This means that LPAHs are more likely to move out of treated wood and remain free in the water than are HPAHs, while HPAHs, if they move out of the treated wood at all, are more likely to be bound up in sediment or organic matter.

The greater solubility of LPAHs also means that they tend to be more biologically available than HPAHs and also more toxic to plants and animals (Hylland, 2006; Padma et al., 1999). HPAHs are less bioavailable, and less toxic, but may still be accumulated by aquatic biota.
LPAHs are typically less persistent in water and sediment due to volatilization, photolysis, and biological (microbial) decomposition (Bestari et al., 1998; Eisler, 1987; Goyette and Brooks, 1998; Hylland, 2006; WHO, 2004). HPAHs can persist in sediment for long periods of time because they are less volatile and more chemically resistant to physical (photolysis) and biological degradation (Padma et al., 1999; WHO, 2004). Photochemical transformation of creosote seems to be the most important abiotic mechanism for transforming its components in the atmosphere, water, and soil (Poston, 2001; WHO, 2004). LPAHs are degraded more quickly by microbes in the presence of oxygen and HPAHs degrade more slowly, particularly in anaerobic environments; thus, as creosote in sediment ages, the low and intermediate weight compounds are metabolized by microbes, leaving a deposit rich in the high molecular weight compounds (Brooks, 1997).

MIGRATION

Terrestrial Environments

Studies of creosote migration in terrestrial environments have focused on railroad cross ties, as treatment of these is one of the largest uses of creosote preservative in the U.S. and there are huge numbers of ties deployed in terrestrial environments (Bolin and Smith, 2013).

Brooks (2004) studied the extent and pattern of creosote, or more specifically PAH, migration from railroad ties and what effects this would have on a simulated wetland environment. Untreated (control), newly treated, and weathered creosote-treated railroad ties were placed in a simulated wetland and samples were taken of the ballast, wetland sediment, groundwater, stormwater, and soil cores at intervals for 18 months. There was an initial pulse of PAHs from the treated railway ties into the ballast during the first summer of the study; during this time PAH movement from weathered ties was less than that from newly treated ties. During the second summer, small, statistically insignificant amounts of PAHs may have moved vertically down into the ballast or may have migrated from the ballast into the adjacent wetland. These results suggest that it is reasonable to expect a detectable migration of creosote-derived LPAHs from newly treated railway ties into supporting ballast during their first exposure to hot summer weather.

The rapid disappearance of these PAHs from the ballast during the fall and winter suggests that they either volatilized (evaporated) or were degraded in the ballast.

In an earlier study, Brooks (2001) had concluded that, in upland environments, (a) the majority of PAHs remain within 15 to 30 cm of the pressure treated wood structure, (b) PAHs lost from new and weathered railroad ties do migrate from the wood into ballast, (c) railroad tie-derived PAHs do not migrate out of the ballast into adjacent landscapes, (d) creosote-derived PAHs do not migrate from railroad rights-of-way in stormwater, and (e) PAH loss rates from creosote treated wood decline exponentially with time and were less than 10% of the initial loss rates by the middle of the expected life of a typical project.

Chakraborty (2001) measured the loss characteristics of some creosote components (PAHs and phenolic components) in new and aged creosote-impregnated railroad ties under simulated environmental conditions of UV radiation, infrared radiation, water spray, and freezing temperatures. Leaching was found to be the major loss process (accounting for 50% to 96% of the losses) and, unlike vaporization and bleeding, was found to be an important mechanism in both new and old ties. While vaporization and bleeding declined in old ties, there was substantial leaching from all the ties tested, even those that had been in service for 26 years. This leaching at age may have been facilitated by cracks that formed in these weathered ties. The PAH components lost by leaching and bleeding were found to be directly related with the amount initially present in the ties.

Aquatic Environments

There have been many field and laboratory experiments designed to quantify release of creosote-related contaminants from creosote-treated structures in aquatic environments. LPAHs are the most soluble chemical constituents in creosote, which makes them more likely to leach from creosote-treated wood into aquatic environments (Bestari et al., 1998; Padma et al., 1999; WHO, 2004). The degree of leaching is affected by salinity (greater in freshwater than in saltwater), temperature (increases with increasing temperatures) , flow, density of the wood, length of time since treatment of the wood (decreases with increasing age), whether leaching occurs from the end grain or the face, and the surface area-to-volume ratio. Estimates in the literature of creosote loss rates from treated wooden pilings (discussed as PAH loss) range from 273 mg/piling/day to 403 mg/piling/day and are most likely good estimates of initial loss of PAHs immediately following installation of pilings in the aquatic environment (Bestari et al., 1998; Ingram et al., 1982). Studies have suggested that most leaching occurs during the first two to three years after a pile is installed, but may continue to some extent for many years (Brooks, 1997; Goyette and Brooks 1998). PAH migration from creosote-treated wood into a flowing freshwater water column decreased sharply from initial high values and reached a steady state within one week, which suggests that PAH concentrations from creosote-treated wood appear to decline rapidly (to parts per trillion (ng/L) levels) after an initial exposure to flowing water (Kang et al., 2005). Maximum PAH concentrations in the sediments from creosote-treated structures are predicted to occur two to three years following piling installation (Brooks 1997; Goyette and Brooks, 1998). Various studies of weathered creosote-treated pilings have shown continued loss of chemicals from pilings but the loss rate from older pilings is generally lower and quite variable (Goyette and Brooks, 1998; Ingram et al., 1982). Over time, creosote near the surface of the piling undergoes a "weathering" process, in which individual chemical constituents are adsorbed, evaporated, photo-oxidized, or dissolved (Sved et al., 1997). The decreased level of creosote migration or leaching from older pilings is largely thought to be due to decreased surface availability resulting from such weathering. Laboratory studies also showed that creosote and PAH concentrations in sediment decrease with increasing distance from a piling (Gagnéa et al., 1995; Goyette and Brooks, 1998; Hutton and Samis, 2000; Ingram et al., 1982).

IMPACTS

Terrestrial Biota

The toxicity of creosote and PAHs to terrestrial wildlife (birds, mammals, etc.) and humans has been studied extensively in the laboratory and in the field (ATSDR, 2002; WHO, 2004). Sixteen of the seventeen PAHs most commonly found in creosote are listed under the U.S. Clean Water Act as priority pollutants and can be mutagenic or teratogenic to mammals, including humans. Some PAHs found in creosote have been identified as probable human (B2) carcinogens by the U.S. EPA and all of the B2 PAHs are within the high molecular weight category (ATSDR, 2002; Stratus Consulting 2006). Over time, creosote near the surface of the piling undergoes a "weathering" process, in which individual chemical constituents are adsorbed, evaporated, photo-oxidized, or dissolved (Sved et al., 1997). As noted previously, weathering of creosote-treated wood structures results in decreased surface availability of creosote and creosote constituents. Thus, absent damage that could facilitate a release, terrestrial receptors, including humans, are unlikely to be exposed to, or impacted by, those PAHs (specifically the HPAHs) bound-up in older treated wood. Thus studies of creosote in terrestrial environments have focused on those PAHs that can escape from railroad cross ties and on the effect those releases may have on adjacent wetland or aquatic environments. As noted above, Brooks (2004) examined creosote leaching from railroad ties in wetland areas, with an examination of both PAHs migrating to the railroad bed ballast and into the wetland. After 18 months, PAH concentrations in the wetland had increased by only an average of 0.3 mg/kg, which was not a statistically significant increase. Brooks (2004) concluded that PAH concentrations observed in the highest wetland sediment samples associated with either newly treated or weathered ties were not stressful to benthic aquatic life (per the consensus sediment benchmark methodology of Swartz (1999)). Similarly, Chakraborty (2001) used a fugacity-based mass balance model to predict that two PAHs (phenanthrene and fluoranthene) were released from ties at levels well below those toxic to fish.

Aquatic Biota

Aquatic biota that live in or on sediment or in the water column can be exposed to PAHs (primarily LAPHs) and other creosote constituents that leach out of treated structures. Invertebrates in the water column take up PAHs by diffusion across their integument and through their diet (Meador et al., 1999). Benthic organisms take up PAHs by diffusion from the water column or sediment porewater, through their diet, or by diffusion from the sediment across their integument. Benthic and pelagic fish share similar PAH uptake routes with invertebrates but fish can also take up contaminants via exchange across their gills (Meador et al., 1999). Various studies in the literature have shown that fish can metabolize PAHs to more soluble forms that can subsequently be excreted. Research has also shown that invertebrate metabolic mechanisms are more variable and that invertebrates are, generally, less able to metabolize, and thus more likely to accumulate, the more fat soluble HPAHs (Eisler, 1987; Meador et al., 1995). For example, benzo[a]pyrene, a HPAH and probable human carcinogen, has concentrations in creosote ranging from < 0.05-0.2 % by weight (WHO, 2004) but has been found to bioaccumulate (3.4% of total PAHs) in bivalves transplanted in San Francisco Bay (Greenfield and Davis, 2005).

There is a considerable literature on the potential effects – including toxicity and bioaccumulation - of creosote constituents on organisms at various levels of aquatic food webs, primarily benthic invertebrates and fish (Stratus Consulting, 2006; Werme et al., 2010). Overall, these laboratory and field studies indicate that treated wood structures can leach PAHs and other toxic compounds into the aquatic environment. However, in well circulated water bodies, concentrations of the more soluble and toxic LPAHs have not been shown to reach levels capable of causing adverse effects in pelagic aquatic biota. In addition, the degree of PAH accumulation to sediment associated with these structures appears to be relatively minor in many settings, particularly in well-circulated waters and over time. PAH accumulation in sediment also appears to be relatively limited spatially (within approximately 10 m of the structure) and has not generally been associated with measured, significant, biological effects except in close proximity to the structures. The duration of any biological effects also appears to become attenuated within several months of construction (the time period when leaching rates are likely to be highest) (Stratus Consulting, 2006). An important caveat are field studies that have indicated that PAHs can accumulate in aquatic invertebrates to potentially deleterious concentrations in poorly circulated water bodies or when the density of treated wood structures is high relative to the overall surface area of the water body (Stratus Consulting, 2006).

Project-Specific Considerations

Studies in both terrestrial (e.g., railroad ties) and aquatic (e.g., pier pilings) environments have shown significant decreases in creosote and PAH releases from treated wooden structures within 5 years or less of placement. The pilings comprising the Three Creeks Bridge are, for the most part, not new (the bridge itself was built in 1921) and are likely well past the point where meaningful quantities of creosote constituents (particularly the more soluble and toxic LPAHs) are leaching into the environment – either to the creek or to its terrestrial, riparian margins. Vines-Vines et al (2000) did find that creosote-treated wood extracts from 50-year-old San Francisco Bay pilings were the source of PAHs to the surrounding water, but PAH availability from these older pilings may have been due to splintering of the piling which facilitated the release of otherwise sequestered creosote. And a study in Australia found that significant amounts of PAHs were released during a pile-removal project, and that significantly elevated concentrations of PAHs remained in the sediments up to six months after removal was completed (Smith, 2008). Our current knowledge of the behavior of creosote and its constituents in older creosote-treated wooden structures suggests that leaving the pilings of the Three Creeks Bridge in place will not pose a risk to terrestrial or aquatic receptors. Conversely, if removal is contemplated, this same knowledge clearly indicates that pile removal projects must deploy best management practices (BMPs) to avoid or mitigate the possibility of temporarily increasing PAH levels in soils or sediment as a consequence of the physical disturbance of pilings.

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Appendix E
Archaeological Assessment Report

BASIN
RESEARCH
ASSOCIATES

1933 DAVIS STREET
SUITE 210
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

January 14, 2015

Mr. Matt Franck
CH2M HILL, Inc.
2485 Natomas Park Drive, Suite 600
Sacramento, CA 95833

RE: *Archaeological Assessment Report* – Los Gatos Creek Trail Reach 4, Coe Avenue North to Lonus Street, City of San Jose, Santa Clara County

Dear Mr. Franck,

Please let this letter serve as Basin Research Associates' *Archaeological Assessment Report* (AAR) for the Los Gatos Creek Trail Reach 4, Coe Avenue north to Lonus Street segment, City of San Jose, Santa Clara County. This *Archaeological Assessment Report* was requested in order to determine if significant cultural resources under the California Environmental Quality Act (CEQA) and/or City of San Jose planning requirements might be affected by the proposed action.

This report provides the results of an updated records search conducted by the California Historical Resources Information System, Northwest Information Center (CHRIS/NWIC), Sonoma State University; a limited literature review and archival review of materials on file with BASIN; consultation with the Native American Heritage Commission (NAHC), the results of a pedestrian field inspection of the proposed trail alignment; and, a short management summary and recommendations.

PROJECT LOCATION AND DESCRIPTION

The project proposes to construct the segment of thee Los Gatos Creek Trail Reach 4 from Coe Avenue north to Lonus Street (hereafter COE/LONUS), City of San Jose, Santa Clara County. The approximately 0.66 mile long (1.06 km) segment is a vital link of the continuous 19 mile (30.6 km) streamside trail extending from the upper watershed, through the proposed Lexington Reservoir County Park, Vasona Lake County Park, Los Gatos Creek County Park, and Campbell Park to downtown San Jose (USGS San Jose West, Calif. 1980, Township 7 South, Range 1 East [T7S R1E], Unsectioned) [Figs. 1-3].

The COE/LONUS Trail segment was previously reviewed for the proposed *Three Creeks Trail Master Plan Environmental Assessment*, an approximately 3,930-foot long trail alignment located in the former railroad right of way of the Willow Glen Spur that stretches between Lonus Street and Minnesota Avenue – crossing Los Gatos Creek and terminating approximately 0.25

miles west of the Guadalupe River (Busby 2013). The majority of the *Three Creeks Trail* Class I trail will be 19 feet wide (12 feet of paved asphaltic concrete with 2-foot wide decomposed granite shoulder on one side and a 5-foot wide decomposed granite shoulder on the other). Gateway plazas will set back from the trail at three crossing points - Coe Avenue, Broadway; Willow Street/Bird Avenue; and, Delmas Avenue. Anticipated subsurface impacts will be limited and affect only six to 12 inches below the current surface - 6 inches for trail shoulders and planting areas and 12 inches along the trail and gateway plazas.

REGULATORY OVERVIEW

Cultural resources include prehistoric and historic archaeological sites, districts and objects; standing historic structures, buildings, districts and objects; and locations of important historic events or sites of traditional/cultural importance to various groups.[1] The analysis of cultural resources can provide valuable information on the cultural heritage of both local and regional populations. CEQA requires review to determine if a project will have a significant effect on archaeological sites or a property of historic or cultural significance to a community or ethnic group eligible for inclusion in the California Register of Historical Resources (CRHR) (CEQA *Guidelines*).

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

CEQA requires that a project proponent determine potential impacts on both historical and archaeological cultural resources and mitigate impacts on historically or culturally significant resources.

Historical Resources

CEQA equates a substantial adverse change in the significance of a historical resource with a significant effect on the environment (Section 21084.1 of the Public Resources Code) and defines substantial adverse change as demolition, destruction, relocation, or alteration that would impair historical significance (Section 5020.1). Section 21084.1 stipulates that any resource

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1. The "federal" definitions of *cultural resource*, *historic property* or *historic resource*, *traditional use area*, *sacred resources* are reviewed below and are usually applied to non-federal projects.

   A *cultural resource* may be defined as a phenomenon associated with prehistory, historical events or individuals or extant cultural systems. These include archaeological sites, districts and objects; standing historic structures, districts and objects; locations of important historic events; and, places, objects and living or non-living things that are important to the practice and continuity of traditional cultures. Cultural resources may involve *historic propert*ies, *traditional use area*s and *sacred resource areas*.

   Historic property or *historic resource* means any prehistoric district, site building, structure or object included in, or eligible for, inclusion in the National Register of Historic Places. The definition also includes artifacts, records and remains which are related to such a district, site, building, structure or object.

   Traditional use area refers to an area or landscape identified by a cultural group to be necessary for the perpetuation of the traditional culture. The concept can include areas for the collection of food and non-food resources, occupation sites and ceremonial and/or sacred areas.

   Sacred resources applies to traditional sites, places or objects that Native American tribes or groups, or their members, perceive as having religious significance.

listed in, or eligible for listing in, the California Register of Historical Resources[2] is presumed to be historically or culturally significant.[3]

Resources listed in a local historic register or deemed significant in a historical resource survey (as provided under Section 5024.1g) are presumed historically or culturally significant unless the preponderance of evidence demonstrates they are not. A resource that is not listed in, or determined to be eligible for listing in, the CRHR, is not included in a local register of historic resources, or not deemed significant in a historical resource survey may nonetheless be historically significant (Section 21084.1 of CEQA).

Archaeological Resources

CEQA requires a Lead Agency to identify and examine environmental effects that may result in significant adverse effects. Where a project may adversely affect a unique archaeological resource, Public Resources Code (PRC) Section 21083.2 requires the Lead Agency to treat that effect as a significant environmental effect and prepare an EIR. When an archaeological resource is listed in or is eligible to be listed in the CRHR, Section 21084.1 requires that any substantial adverse effect to that resource be considered a significant environmental effect. Sections 21083.2 and 21084.1 operate independently to ensure that potential effects on archaeological resources are considered as part of a project's environmental analysis. Either of these benchmarks may indicate that a project may have a potential adverse effect on archaeological resources.

PRC 21083.2 (g) defines a unique archaeological resource to be: an archaeological artifact, object, or site, about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria: (1) contains information needed to answer important scientific research questions and there is a demonstrable public interest in that information; (2) has a special and particular quality such as being the oldest of its type or the best available example of its type; or, (3) is directly associated with a scientifically recognized important prehistoric or historic event or person.

PRC Section 21084.1 requires treatment of any substantial adverse change in the significance of a historical resource listed in, or eligible to be listed in, the CRHR as a significant effect on the environment. The definition of "historical resource" includes archaeological resources listed in

2. The California Register of Historical Resources is a listing of " those properties which are to be protected from substantial adverse change." Any resource eligible for listing in the California Register is also to be considered under CEQA. Consensus determinations for the California Register for the purposes of CEQA are solely the responsibility of the lead agency (CAL/OHP ca. 1999).

3. A historical resource may be listed in the California Register of Historical Resources if it meets one or more of the following criteria: "(1) it is associated with events that have made a significant contribution to the broad patterns of local or regional history, or the cultural heritage of California or the United States; (2) it is associated with the lives of persons important to local, California or national history; (3) it embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values; or, (4) it has yielded or has the potential to yield information important in the prehistory or history of the local area, California or the nation." Automatic CRHR listings include National Register of Historic Places (NRHP) listed and determined eligible historic properties (either by the Keeper of the NRHP or through a consensus determination on a project review); State Historical Landmarks from number 770 onward; Points of Interest nominated from January 1998 onward. Landmarks prior to 770 and Points of Historical Interest may be listed through an action of the State Historical Resources Commission (CAL/OHP ca. 1999, 2001a-b).

or formally determined eligible for listing in the CRHR and by reference, the NRHP, California Historical Landmarks, Points of Historical Interest, and local registers.

OTHER CALIFORNIA LAWS AND REGULATIONS

Other state level requirements for cultural resources management appear in the California Public Resources Code Chapter 1.7, Section 5097.5 (Archaeological, Paleontological, and Historical Sites), and Chapter 1.75, beginning at Section 5097.9 (Native American Historical, Cultural, and Sacred Sites) for lands owned by the state or a state agency.

The disposition of Native American burials is governed by Section 7050.5 of the California Health and Safety Code and Sections 5097.94 and 5097.98 of the Public Resources Code, and falls within the jurisdiction of the Native American Heritage Commission (NAHC).

CITY OF SAN JOSE

Various policies in the City's *Envision San Jose 2040 General Plan* (City of San Jose 2011) have been adopted for the purpose of avoiding or mitigating cultural resource impacts resulting from planned development within the City. Goals pertinent to archaeological resources include:

Goal ER-10 – Archaeology and Paleontology

Preserve and conserve archaeologically significant structures, sites, districts and artifacts in order to promote a greater sense of historic awareness and community identity.

Policies – Archaeology and Paleontology

ER-10.1 For proposed development sites that have been identified as archaeologically or paleontologically sensitive, require investigation during the planning process in order to determine whether potentially significant archeological or paleontological information may be affected by the project and then require, if needed, that appropriate mitigation measures be incorporated into the project design.

ER-10.2 Recognizing that Native American human remains may be encountered at unexpected locations, impose a requirement on all development permits and tentative subdivision maps that upon their discovery during construction, development activity will cease until professional archaeological examination confirms whether the burial is human. If the remains are determined to be Native American, applicable state laws shall be enforced.

ER-10.3 Ensure that City, State, and Federal historic preservation laws, regulations, and codes are enforced, including laws related to archaeological and paleontological resources, to ensure the adequate protection of historic and pre-historic resources.

METHODOLOGY

RESEARCH SOURCES

Two site record and literature searches have been conducted by the CHRIS/NWIC for the project alignment. One was completed at the request of the Santa Clara County Planning Office

(CHRIS/NWIC File No. 13- 0327 dated 9/11/2013 by Mikulik) for the *Three Creeks Trail Master Plan Environmental Assessment;* and, the second by BASIN (File No. 14-0384 10/22/2014 by Hagel) for the *COE/LONUS* Trail Segment.

Both literature reviews included a review of lists of various state and/or federal historically or architecturally significant structures, landmarks, or points of interest in/adjacent (see References Cited and Consulted). Specialized listings for cultural resources consulted include:

- *Historic Properties Directory for Santa Clara County* (CAL/OHP 2012a) with the most recent updates of the National Register of Historic Places (NRHP), California Register of Historical Resources (CRHR), California Historical Landmarks, and California Points of Historical Interest as well as other evaluations of properties reviewed by the State of California Office of Historic Preservation;
- *Archeological Determinations of Eligibility for Santa Clara County* (CAL/OHP 2012b);
- *California History Plan* (CAL/OHP 1973);
- *California Inventory of Historic Resources* (CAL/OHP 1976);
- *Five Views: An Ethnic Sites Survey for California* (CAL/OHP 1988);
- *California Historical Resources – Santa Clara County* [including National Register, State Landmark, California Register, and Point of Interest] **(**CAL/OHP 2014).
- Various resources for Santa Clara County (Pace 1975; SClCoHHC 1979, 1999) and City of San Jose lists (SJHLC/PBCE 2014a-b);
- Historic topographic and plan view maps (Lewis 1857; Healy 1860; Healey 1866; Whitney 1873; Pieper 1872; Thompson and West 1876; Clayton 1886; Nelson ca. 1912; Hendry and Bowman 1940; Thompson and Sowers 2005; USGS v.d.; US War Dept 1943).

FIELD INVENTORY

An archaeological field inventory of the COE/LONUS Trail segment was completed by Mr. Christopher Canzonieri (M.A.) on October 31, 2014. A field inventory of the entire trail had been completed previously by Mr. Canzonieri on September 26, 2013.

INDIVIDUALS, AGENCIES AND GROUPS

The Native American Heritage Commission (NAHC) was contacted for a search of the *Sacred Lands Inventory* on file with the Commission (Busby 2014) to supplement the search completed by the NAHC in 2013 (Busby 2013).

No other agencies, departments or local historical societies were contacted for this report.

SUMMARY BACKGROUND CONTEXT

SETTING

The COE/LONUS Trail alignment is located in an urban area within a former railroad right-of-way approximately 11.5 miles inland from the shoreline of San Francisco Bay. Los Gatos Creek and the nearby Guadalupe River are approximately 0.8 miles east of the trail. The general area is within a valley oak savanna (Kuchler 1977:Map #33) with riparian vegetation present along the banks of the flowing water resources. Soils are mapped as Yolo fine sandy loam (USGS 1980 San Jose West; USDA/SCS 1958).

PREHISTORIC

Native American occupation and use of the general area appears to extend over 5000-10,000 years and may be longer. Archaeological information suggests an increase in the prehistoric population over time with an increasing focus on permanent settlements with large populations in later periods. This change from hunter-collectors to an increased sedentary lifestyle is due to more efficient resource procurement but with a focus on staple food exploitation, the increased ability to store food at village locations, and the development of increasing complex social and political systems including long-distance trade networks.

Most of the prehistoric archaeological sites recorded in the study area have been discovered as the result of EuroAmerican settlement and development. These sites were undoubtedly selected for relative accessibility, protection from seasonal flooding, and proximity to a diversified resource base. Rising sea levels between 10,000 — 8000 years B.P. may have inundated early occupation of the Bay Area. Concomitantly falling levels between ca. 8000-6000 years B.P. lead to changes in the hydrological gradient resulting in increasing sedimentation and the formation of wetlands within the expanding alluvial plains around the drainages flowing into San Francisco Bay. The fresh water marshes around the bay expanded during the middle and late Holocene due to the changing regime associated with declining sea levels and it is probable that the human populations moved further inland away from the bay periphery due to the expanding wetlands (see Atwater 1977; Atwater et al. 1979; Moratto 1984; Bickel 1978a-b).

Prehistoric site types recorded in the region consist of shell mounds, lithic scatters, quarries, habitation sites (including burials), bedrock mortars or other milling feature sites, petroglyph sites, and isolated burial sites. A number of shell mounds are present around the bay margin and the majority were recorded by Nelson (1909, ca. 1912) during the first most comprehensive archaeological survey of the Bay region between 1906 and 1908. None of the Nelson mound sites or other known mounds were located in or adjacent to the project (e.g., Whitney 1873; Nelson 1909, ca. 1912; Moratto 1984:227, 252-261).

Archaeological research in the San Francisco Bay Region has been interpreted using several chronological schemes based on stratigraphic differences and cultural traits. A three-part sequence of cultural development over time proposed by Lillard et al. (1939) was first used to document local and regional cultural change in prehistoric central California including the study area. This classification scheme, using Early, Middle and Late "horizons" to designate both chronological periods and social change, was based on stratigraphic patterns and an analysis of grave goods to explain local and regional cultural change from about 4,500 years ago to the time of European contact (see Lillard et al. 1939; Beardsley 1948, 1954).

The scheme was modified by Beardsley (1948, 1954) who renamed the sequence the Central California Taxonomic System (CCTS). This sequence proved inadequate and has since been revised and supplemented by new taxonomic systems recognizing cultural distinctions and associations resulting in the development and refinement of local sequences with specific cultural traits and chronologies (e.g., Fredrickson 1974, 1994a-b; Bennyhoff and Fredrickson 1994).

General overviews and perspectives on the regional prehistory including chronological sequences can be found in C. King (1978a), Wallace (1978), Moratto (1984), Elsasser (1978, 1986), Hylkema (2002) and Jones and Klar (2007).

ETHNOGRAPHIC

The project is within the ethnographic and historic boundaries of the Native American group known as the *Tamyen* (*Tamien*), a subgroup of the Ohlone/Costanoan. Milliken (2006) places the project within the *Santa Clara Tamien* territory with an estimated population density of 5.94 (persons per square mile; op cit.:27, Fig. 5).

The closest known tribelet settlements were *Santa Clara* (or *Our Mother Santa Clara* at the second Mission Santa Clara site) and *Tamie-n* (or Our Patron San Francisco located at the junction of Los Gatos Creek and the Guadalupe River). No ethnographic settlements are known to have been located in study area (Kroeber 1925:465, Fig. 42; Levy 1978:485-487; C. King 1978b; Hylkema 1995:35-36, Map 6; Milliken 1995:229, 256).

A major prehistoric trail was located along the west side of Los Gatos Creek continuing north crossing the Guadalupe River just north of its confluence with Los Gatos Creek (Elsasser 1986:Fig. 10).

In 1770 the Ohlone tribelets were politically autonomous groups of 50-500 individuals, with an average population of 200. Tribelet territories, defined by physiographic features, usually had one or more permanent villages surrounded by a number of temporary camps. The camps were used to exploit seasonally available floral and faunal resources. Unfortunately, extensive ethnographic data on the Ohlone are lacking and the aboriginal lifeway apparently disappeared by approximately 1810 due to introduced diseases, a declining birthrate, the cataclysmic impact of the mission system and the later secularization of the missions by the Mexican government (Levy 1978). An estimated 200+ persons of partial Ohlone Costanoan descent currently reside in the greater San Francisco Bay area.

For a more extensive review of the Native Americans in the general study area see Kroeber (1925), Harrington (1942), King (1978b), Levy (1978), Bean (1994) and Milliken (1995, 2006).

HISPANIC PERIOD

The Spanish philosophy of government in northwestern New Spain was directed at the founding of presidios, missions, and secular towns with the land held by the Crown (1769-1821) while the later Mexican policy stressed individual ownership of the land. During the Mexican Period (1822-1848) vast tracts of land were granted to individuals (Hart 1987).

Early Spanish expeditions likely followed aboriginal trails. The period of initial historic exploration of this portion of the Bay Area began in 1769. Between 1769 and 1776 a number of Spanish expeditions passed through Costanoan territory, including those led by Portola, Fages, Fages and Crespi, Anza, Rivera, and Moraga. Even though the routes of the early explorers cannot be determined with total accuracy, none the expeditions appear to have explored the vicinity east of the project (Beck and Haase 1974:#17, 20-22; Brown 1994:2, Fig. 1.1; Milliken 1995:33, Map 3; USNPS 1995).

The favorable reports of Anza and Font led to the establishment of both Mission Santa Clara (the 8th of the 21 missions founded in California) in January 1777 and later the Pueblo San Jose de Guadalupe in the same year along the banks of the Guadalupe River (Hall 1871:48; Hart 1987).

The trail alignment is within in the boundaries of two former ranchos: the *Rancho de Los Coches* west of Los Gatos Creek and the *Rancho San Juan Bautista* between Los Gatos Creek and the Guadalupe River. The *Rancho de Los Coches* was granted to Roberto, a Native American, by Governor Micheltorena on March 12, 1844. Roberto sold the grant to Antonio Sunol, and on December 31 1857, it was patented to Antonio Sunol, Paula Sunol de Sainsevain and Henry M. Naglee. The 1830s Roberto Adobe Dwelling and the 1840s Roberto-Sunol-Spilvalo Adobe Dwelling are located in the southeastern portion of the rancho within 0.25 miles of the project (CA-SCl-385H; P-43-000391; Cooper 1979/form).[4] The *Rancho San Juan Bautista* was granted to Augustin Narvaez by Governor Miguel Micheltorena on March 30, 1844. The rancho was finally patented to Jose Augustin Narvaez on December 1, 1865. No known Hispanic Period adobe dwellings or other features (e.g., mills, corrals, ovens, roads, etc.) were within or adjacent to the project (Lewis 1857; Healy 1860; Hendry and Bowman 1940:909-911, 932-935 and Map of Santa Clara County).

AMERICAN PERIOD

In the mid-19th century, the majority of the rancho and pueblo lands and some of the ungranted land in California were subdivided as the result of population growth, the American takeover, and the confirmation of property titles. Not until the United States occupation of California in 1846 was land coveted and valued. The initial population boom in the study area was associated with the Gold Rush (1848), followed later by the construction of the transcontinental railroad (1869) with Oakland as its western terminus, and various local railroads. Still later, the development of the refrigerator railroad car (ca. 1880s), used for the transport of agricultural produce to distant markets, had a major impact on population growth in the area (Hart 1987).

The COE/LONUS Trail alignment was southwest of the San Jose city limits and characterized by semi-urban farmsteads into the 1920s (Bunse et al. 2013:18). Roads and railroads, development, especially rail, proceed through the study area (e.g., USGS 1899 [surveyed 1895], 1980).

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4 Located at 770 Lincoln Avenue (e.g., Hendry and Bowman 1940:911, H&B 60(2); Cooper 1979/form). Associated with property owned by "Spivale" (Lewis 1857) and "Capt S. Splivalo" (Thompson and West 1876).

The project is within the Midtown and Willow Glen areas of the contemporary City of San Jose. Willow Glen was adversely incorporated as the City of Willow Glen on September 8, 1927. The City comprised the area bounded by Los Gatos Creek on the west, Guadalupe Creek on the east, and a 'series of jogs' on the south composed of Hicks Avenue, Pine, Cottle, and Malone Road. It was annexed in 1936 to the City of San Jose (James and McMurry 1933:157, 165; Giarratana 1977:110, 112; A&A 1992:15).

The trail alignment follows part of the former Western Pacific Railway Company (WP), also known as the Western Pacific Railroad Company (WPRR) right-of-way. The WP incorporated March 6, 1903 to connect Oakland and Salt Lake City and compete with the Southern Pacific. The railroad opened for freight traffic in December 1909 and passengers in August 1911 but the franchise for the branch from Niles to San Jose was not secured until 1917. The main freight depot at The Alameda and Bush Street opened May 1, 1922. The Union Pacific Railroad acquired the WPRR in 1982 (Holmes 1985; Fickewirth 1992). The COE/LONUS right-of-way is no longer used; all rails have been removed.

Limited Historic Map Review

The *Creek & Watershed Map of Central San Jose & Vicinity* shows the alignment of Los Gatos Creek through the project and vicinity as unmodified (e.g., “original” alignment). Notable willow groves, ca. 1850 within the Willow Glen area were present along the Guadalupe River and ca. 0.75 miles north of the project along Los Gatos Creek (see Thompson and Sowers 2005).

Hendry and Bowman (1940) shows no known adobe dwellings and/or other features (e.g., roads corrals, *embarcadero*, *acequias*, mills) in or adjacent to the project alignment.

The 1857 Lewis Map of the final survey of *Rancho de los Coches* finally confirmed to Don Antonio Sunol and others, shows two roads in the project vicinity crossing the “Arroyo de los Gatos” that appear to conform to the approximate alignment of portions present-day Lincoln Avenue and Coe Avenue and Bird Avenue. In addition, “Spivale” owned the property between the two roads on the west side of the creek.

Healy’s 1860 plat of the *Rancho de San Juan Bautista* finally confirmed to Jose Augustine Narvaez shows no features other than the “Arroyo de los Gatos” in the vicinity of the COE/LONUS Trail segment.

Healey’s 1866 *Official Map of the County of Santa Clara* shows rancho boundaries, major roads, and the alignment of the “Arroyo de los Gatos.” One road, probably present-day Lincoln Avenue is shown crossing the creek.

Pieper’s 1872 *Map of the City of San Jose* does not show the project vicinity.

Whitney's 1873 *Map of the Region Adjacent to the Bay of Bay Francisco* shows alignment of the “Arroyo de los Gatos” along with rancho boundaries. No "Indian Mound(s)" or "Shell Mound(s)" and/or cultural features (e.g., houses, roads, railroad tracks) are shown in or adjacent to the COE/LONUS Trail segment. This map also shows considerable braiding of Los Gatos Creek just north of Coe Avenue.

Thompson and West's 1876 *Historical Atlas of Santa Clara County, California*, shows roads crossing “Los Gatos Creek that appear to conform to the approximate alignment of portions present-day Lincoln Avenue and Coe Avenue (labeled Lincoln Avenue). At the time the west side of the creek portion of the COE/LONUS Trail was owned by "Capt S. Splivalo", likely the same individual noted on the 1857 Lewis plat of *Rancho de los Coches*, while the east side of the creek was owned by E.D. Daly. No homesteads or the like are shown in or possibly adjacent to the COE/LOUS Trail segment (Thompson and West 1876:37, 42).

The 1887 Brainard map of *"The Willows"* shows Lincoln Avenue as the thoroughfare between Los Gatos Creek and the Guadalupe River. At the time, as in 1876, the project alignment was bounded on the south by Coe Avenue (not labeled).

The USGS topographic map series provides minimal information regarding potential cultural features in and/or adjacent to the COE/LONUS Trail segment. The earliest map shows the approximate alignments of present-day Lincoln Avenue and Coe Avenue along with structures along various roads including Lonus Street. The next available map, the 1943 United States War Department topographic quadrangle, relying on 1939 photography, shows the railroad alignment through urban San Jose (USGS 1899 [surveyed 1895], 1953, 1961, 1973, 1980; US War Dept 1943 [photography 1939]).

In summary, the approximate alignment of present-day Coe Avenue appears to have been in existence prior to 1857 followed by Lonus Street by at least 1899. The railroad alignment dates to 1922.

RECORDS SEARCH (CHRIS/NWIC File No. 14-0384)

- No prehistoric and/or historic era archaeological sites have been recorded in or adjacent to the COE/LONUS Trail segment.
- One historic site has been recorded within 0.25 miles of the project: P-43-000391 (CA-SCl-385H), the Roberto-Sunol Adobe located at 770 Lincoln Avenue (Cooper 1979/form).

Compliance Reports on File

Three (3) cultural resources compliance reports on file with the CHRIS/NWIC include the project or area adjacent.

Historic Property Survey Report (HPSR) (Busby 2004a/S-33288) with attached *Archaeological Survey Report* (ASR) *Los Gatos Creek Trail - Reach 4* [from Coe Avenue north to Auzerais Avenue] ,*City of San Jose* (Busby 2004b/S-332889).

Cultural Resources Survey for the Level (3) Communications Long Haul Fiber Optics Project. Segment WS05: San Jose to San Luis Obispo (Nelson, and Carpenter 2000/S-22819)

Note: The 2004 HPSR for the *Los Gatos Creek Trail - Reach 4* includes most of the COE/LONUS Trail segment with the exception of a portion from the creek north to Lonus Street. The HPSR includes a Bridge Evaluation Short Form for the Los Gatos Creek Railroad Bridge Over Los Gatos Creek within the COE/LONUS Trail (Hill 5/19/2004 form in Busby 2004). This trail segment will connect with the west end of the *Three Creeks Trail* (see Busby 2013).

Other Known Reports

> *Archaeological Review for an Initial Study - Three Creeks Trail Master Plan Environmental Assessment, City of San Jose, Santa Clara County* (Busby 2013). The COE/LONUS Trail segment is the northernmost portion of the Three Creeks Trail alignment.

LISTED HISTORIC PROPERTIES

No listed local, state or federal historically or architecturally significant structures, landmarks or points of interest have been identified in or adjacent to the proposed project.

ARCHAEOLOGICAL SENSITIVITY

The proposed trail along Los Gatos Creek is within an Area of Archaeological Sensitivity (*Cultural Resources Existing Setting Envision San Jose 2040 General Plan* (Basin Research Associates 2009:Fig. 12A).

AGENCIES, GROUPS AND/OR INDIVIDUALS CONTACTED

The Native American Heritage Commission (NAHC) was contacted for a search of the Sacred Lands Inventory (Busby 2014). The NAHC record search ". . . failed to indicate the presence of Native American resources in the immediate project area" (Pilas-Treadway 2014) a similar finding to that reached during previous consultation for the Initial Study (Busby 2013).

The NAHC provided a list of 11 Native American individuals/organizations who might have knowledge of cultural resources in the area. The Native Americans were contacted by letter dated November 12, 2014 with follow up telephone calls made to the 11 parties on January 9, 2015. Four Native Americans responded; five voice mails were left; a message was not able to be left with one party; and, one party was contacted by email.

One Native American had no immediate concerns but recommended that proper measures should be followed in the event of an unexpected discovery; two Native Americans recommended sensitivity training for the construction crew; and, one Native American had a number of recommendations including: a larger search area due to the proximity of the Roberto-Sunol Adobe; information on historic creek flows; and, to be notified of any response from the State Historic Preservation Officer as well as continuing notification of project progress. In addition, she requested a cop of the draft report and a response from the client on the draft report (see Attachments for details).

ARCHAEOLOGICAL FIELD INVENTORIES

Two archaeological field inventories have been completed for the Three Creeks Trail alignment on September 26, 2013 and October 31, 2014 by a professional archaeologist meeting the Standards of the Secretary of the Interior. The 2013 field inventory noted:

> Field transects were oriented southeast to northeast and spaced approximately 3-5 meters apart. Visibility within the project area was excellent with 100% of the surface observable along the existing gravel pathway (ca. 15-20 feet wide) and approximately 50-90% of the surface observable along the easement on both sides of

> the existing trail. Observed sediments consist of yellowish brown clayey silt. Several palm, redwood and oak trees were observed within the project area. A wood trestle, an apparent standard pattern trestle associated with the former Western Pacific Railroad is located approximately 64 meters southeast of Lonus Street. The trestle is approximately 210 feet long x approximately 20 feet wide. The tracks have been removed. The trestle is gated on both sides and is posted No Entry. It appears to be a standard pattern trestle. No evidence of prehistoric or historically significant archaeological or architectural resources was observed during the field inventory conducted for the project.

Another archaeological inventory was completed October 31, 2014 by Mr. Christopher Canzonieri (M.A.) who noted:

> The survey focused on the existing trail and easements. Field transects were oriented southeast to northeast and spaced approximately 3-5 meters apart. Visibility within the project area was excellent with 100% of the surface observable along the existing gravel pathway and 0-5% of the surface observable along the easement on both sides of the existing trail (wood chips covered the majority of the surface). Observed sediments consist of yellowish brown clayey silt.
>
> A wood train trestle is located approximately 200 feet southeast of Lonus Street. The trestle measures approximately 210 feet long x approximately 20 feet wide. The tracks have been removed. There is a new steel gate at both ends of the trestle. Visibility beneath the trestle varied from 50-100% due to dense vegetation and granite rip-rap. The sediments varied from yellowish brown clay silt along the banks to sand along the creek.

No evidence of prehistoric or historically significant archaeological resources was observed during the field inventory.

RESULTS

This AAR was undertaken with the objective of identifying and evaluating both prehistoric and historic resources to meet the legal requirements of CEQA and planning requirements of the City of San Jose.

The records search, archival research and field inventory conducted for the COE/LONUS Trail project did not identify any prehistoric, Hispanic or significant American Period resources within the project.

- No prehistoric and/or historic era archaeological sites have been recorded or identified in or adjacent to the project (CHRIS/NWIC File No. 14-0384).
- No known Native American villages, trails, traditional use areas or contemporary use areas have been identified in, adjacent or near the project.
- No known Hispanic Period adobe dwellings or other structures and features, etc. dating to about ca. 1850 have been reported in or adjacent to the project.

- No known American Period buildings or features have been identified in or adjacent to the project.
- A field inventory of the COE/LONUS project alignment did not note any indications of prehistoric and/or historic archaeological resources. One built environment feature, a railroad trestle of a standard pattern, is present.
- No known National Register of Historic Places or California Register of Historic Resources listed, determined eligible, or pending properties were identified in or adjacent to the proposed COE/LONUS trail segment as a result of the records search, literature review, and/or field survey.

IMPACTS AND MITIGATION MEASURES
DEFINITION AND USE OF SIGNIFICANCE CRITERIA

This section analyzes the impacts related to cultural resources that could result from project development and provides recommended mitigation measures.

The following criteria have been established for determining the significance of potential impacts on cultural resources, based on the CEQA Guidelines environmental checklist. Development of the proposed trail would have a significant impact on cultural resources if it would:

> Cause a substantial adverse change in the significance of a historical resource as defined in CEQA Guidelines §15064.5. Specifically, substantial adverse changes include physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of the historical resource would be materially impaired;
>
> Cause damage to, disrupt, or adversely affect an important prehistoric or historic archaeological resource such that its integrity could be compromised or eligibility for future listing on the California Register of Historical resources diminished (CEQA Guidelines § 15064 .5); and,
>
> Disturb any human remains, including those interred outside of formal cemeteries.

GENERAL PROJECT IMPACTS

Ground-disturbing construction activities have the highest potential to directly impact cultural resources within the project site by disturbing both surface and subsurface soils. Subsurface and surface disturbance could result in the loss of integrity of cultural deposits and loss of information. There is also a potential for inadvertent discoveries of buried archaeological materials during construction.

POTENTIAL IMPACTS

No unique archaeological resources have been identified within the project alignment based on archival research and a field inventory.

The majority of the project area has been disturbed by previous railroad and other activities which may have disturbed or displaced artifacts at or near the ground surface. It is possible that construction associated with the trail project could result in disturbance of as yet unknown archaeological sites. It is also possible that excavation associated with trail development could expose as-yet undetected (i.e., buried) resources. Such finds may meet the definition of a "unique archaeological resource" as specified in Section 21083.2 of the Public Resources Code. Furthermore, it is possible that human remains could be encountered as human remains have been associated with several of the prehistoric archaeological resources along the Guadalupe River and other water courses in the general area of the project site.

However, the project has a minor potential to affect as yet unknown prehistoric or historic cultural resources associated either with the unique archaeological resources recorded outside of the project parcel or previously unknown cultural deposits.[5] Potential impacts include:

Potential Impact CR-1: The potential to cause a substantial adverse change in the significance of historical resources as defined in §15064.5 of CEQA.

Previously unknown historical resources could be exposed during ground disturbing construction operations associated with grading, roadway, utility, and/or drainage improvements and/or other development. Construction operations could result in the inadvertent exposure of historical resources that could be eligible for inclusion on the CRHR (PRC Section 5024.1).

This impact would be reduced to a less-than-significant impact with implementation of Mitigation Measure CM-1 which requires the review, identification, evaluation and treatment of any significant finds by a Professional Archaeologist at the time of discovery.

Potential Impact CR-2: The potential to cause a substantial adverse change in the significance of archeological resources pursuant to §15064.5 of CEQA

Previously unknown archaeological resources could be exposed during ground disturbing construction operations associated with utility, and/or drainage improvements and/or other

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5. Significant prehistoric cultural resources may include:

a. Human bone - either isolated or intact Native American burials.
b. Habitation (occupation or ceremonial structures as interpreted from rock rings/features, distinct ground depressions, differences in compaction (e.g., house floors).
c. Artifacts including chipped stone objects such as projectile points and bifaces; groundstone artifacts such as manos, metates, mortars, pestles, grinding stones, pitted hammerstones; and, shell and bone artifacts including ornaments and beads.
d. Various features and samples including hearths (fire-cracked rock; baked and vitrified clay), artifact caches, faunal and shellfish remains (which permit dietary reconstruction), distinctive changes in soil stratigraphy indicative of prehistoric activities.
e. Isolated artifacts

Historic cultural materials may include finds from the late 19th through early 20th centuries. Objects and features associated with the Historic Period can include.

a. Structural remains or portions of foundations (bricks, cobbles/boulders, stacked field stone, postholes, etc.).
b. Trash pits, privies, wells and associated artifacts.
c. Isolated artifacts or isolated clusters of manufactured artifacts (e.g., glass bottles, metal cans, manufactured wood items, etc.).
d. Historic human remains.

In addition, cultural materials including both artifacts and structures that can be attributed to Hispanic, Asian and other ethnic or racial groups are potentially significant. Such features or clusters of artifacts and samples include remains of structures, trash pits, and privies.

development. Construction operations in areas of native soil could result in the inadvertent exposure of buried prehistoric or historic archaeological materials that could be eligible for inclusion on the CRHR (PRC Section 5024.1) and/or meet the definition of a unique archeological resource as defined in Section 21083.2 of the Public Resources Code (PRC).

This impact would be reduced to a less-than-significant impact with implementation of Mitigation Measure CM-1 which requires the review, identification, evaluation and treatment of any significant archaeological finds by a Professional Archaeologist at the time of discovery.

Potential Impact CR-3: The potential to disturb any human remains, including those interred outside of formal cemeteries.

Previously unknown Native American human remains could be exposed during ground disturbing construction operations associated with grading, roadway, utility, and/or drainage improvements and/or other development. Construction operations could result in the inadvertent exposure of buried prehistoric or protohistoric (ethnographic) Native American human remains. Although considered unlikely, future project activities have a small possibility of disturbing human remains.

This significant impact would be reduced to a less-than-significant impact with implementation of Mitigation Measure CM-2 which requires that the treatment of human remains and or associated or unassociated funerary objects exposed during construction must comply with applicable state law.

MITIGATION MEASURES

Mitigation measures for potential project impacts are provided below.

CM-1

(a) The project proponent shall note on any plans that require ground disturbing excavation that there is a potential for exposing buried cultural resources.

(b) The project proponent shall retain a Professional Archaeologist to provide a pre-construction briefing to supervisory personnel of any excavation contractor to alert them to the possibility of exposing significant prehistoric archaeological resources within the project area. The briefing shall discuss any archaeological objects that could be exposed, the need to stop excavation at the discovery, and the procedures to follow regarding discovery protection and notification of the project proponent and archaeological team.

(c) The project proponent shall retain a Professional Archaeologist on an “on-call” basis during ground disturbing construction for the project to review, identify and evaluate cultural resources that may be inadvertently exposed during construction. Should previously unidentified cultural resources be discovered during construction of the project, the project proponent shall cease work within 50 feet of the resources notify the City of San Jose immediately. The archaeologist shall review and evaluate any discoveries to determine if they are historical resource(s) and/or unique archaeological resources under CEQA.

(d) If the Professional Archaeologist determines that any cultural resources exposed during construction constitute a historical resource and/or unique archaeological resource, he/she shall notify the project proponent and other appropriate parties of the evaluation and recommended mitigation measures to mitigate to a less-than-significant impact. Mitigation measures may include avoidance, preservation in-place, recordation, additional archaeological testing and data recovery among other options. Treatment of any significant cultural resources shall be undertaken with the approval of the City of San Jose. The archaeologist shall document the resources using DPR 523 forms and file said forms with the California Historical Resources Information System, Northwest Information Center. The archaeologist shall be required to submit to the City of San Jose for review and approval a report of the findings and method of curation or protection of the resources. Further grading or site work within the area of discovery shall not be allowed until the preceding steps have been taken.

CM-2

(a) Pursuant to State Health and Safety Code Section7050.5(e) and Public Resources Code Section 5097.98, if human bone or bone of unknown origin is found at any time during on- or off-site construction, all work shall stop in the vicinity of the find and the County of Santa Clara Medical Examiner-Coroner notified immediately. If the remains are determined to be Native American, the Medical Examiner-Coroner shall notify the California State Native American Heritage Commission (NAHC), who shall identify the person believed to be the Most Likely Descendant (MLD). The archaeologist, project proponent, and MLD shall make all reasonable efforts to develop an agreement for the treatment of human remains and associated or unassociated funerary objects with appropriate dignity (CEQA Guidelines Sec. 15064.5(d)). The agreed upon Treatment Plan shall address the appropriate excavation, removal, recordation, analysis, custodianship, curation, and final disposition of the human remains and associated or unassociated funerary objects. California Public Resources Code allows 48 hours to reach agreement on a Treatment Plan. If the MLD and the other parties do not agree on the reburial method, the project will follow PRC Section 5097.98(b) which states that ". . . the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American burials with appropriate dignity on the property in a location not subject to further subsurface disturbance."

(b) The Treatment Plan shall be implemented and any findings shall be submitted by the archaeologist in a professional report submitted to the project applicant, the County of Santa Clara Medical Examiner-Coroner, the City of San Jose, and the California Historical Resources Information System, Northwest Information Center.

CONCLUSIONS AND MANAGEMENT RECOMMENDATIONS

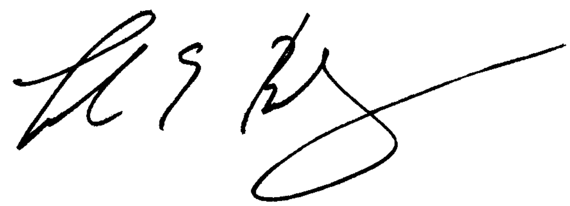
The research and field inventory completed for the project suggests a very low potential for the presence of intact subsurface prehistoric and historic archaeological deposits within the proposed trail alignment at the depths to be impacted by the future trail. In addition, the former WPR right-of-way has been impacted previously to unknown depths during its construction and has been subject to current soil remediation due to past contamination.

It is recommended, based on the review of pertinent records, maps and other documents that the proposed project can proceed as planned with the recommended mitigation measures to protect known or potential prehistoric and historic archaeological resources.

CLOSING REMARKS

If I can provide any additional information or be of further service please don't hesitate to contact me.

Sincerely,
BASIN RESEARCH ASSOCIATES, INC.



Colin I. Busby, Ph.D., RPA
Principal

CIB/dm

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<u>Abbreviations</u>

n.d.	no date	v.d.	various dates	N.P.	no publisher noted
n.p.	no place of publisher noted				

Note: "CHRIS/NWIC, Sonoma State University, Rohnert Park" is used for material assigned S-# on file at the California Historical Resources Information System, Northwest Information Center, California State University Sonoma, Rohnert Park.

ATTACHMENTS

FIGURES

FIGURE 1	General Project Location
FIGURE 2	Project Location (USGS San Jose West, Calif. 1980)
FIGURE 3	Project Area with Photo View Locations
FIGURE 4	Project Alignment from Lonus Street, view to the southeast
FIGURE 5	View southeast along trestle
FIGURE 6	Trestle understructure, view to the north
FIGURE 7	View northwest along trestle towards Lonus Street
FIGURE 8	Project Alignment, view to the northwest
FIGURE 9	Project Alignment from Coe Avenue, view to the northwest

CORRESPONDENCE

LETTER 1	Letter to Ms. Cynthia Gomez, Executive Secretary, West Sacramento, CA. Regarding: Request for Review of Sacred Lands Inventory – Los Gatos Creek Trail Reach 4, Coe Avenue North to Lonus Avenue [Street], City of San Jose, Santa Clara County. Dated October 17, 2014.
LETTER 2	Letter to Colin Busby, Basin Research Associates, San Leandro from Debbie Pilas-Treadway, Native American Heritage Commission. Regarding: [Request for Review of Sacred Lands Inventory] *Proposed* Los Gatos Creek Trail Reach 4, Coe Avenue North to Lonus Avenue [Street], City of San Jose, Santa Clara County. Dated November 3, 2014.
LETTER 3	Letters from Colin I. Busby, Basin Research Associates to various Native Americans listed by the Native American Heritage Commission requesting further information on Los Gatos Creek Trail Reach 4, Coe Avenue North to Lonus Avenue [Street], City of San Jose, Santa Clara County. Dated November 12, 2014.
MEMO	Record of Native American Contacts, Proposed Los Gatos Creek Trail Reach 4, Santa Clara County. Dated January 9, 2015.

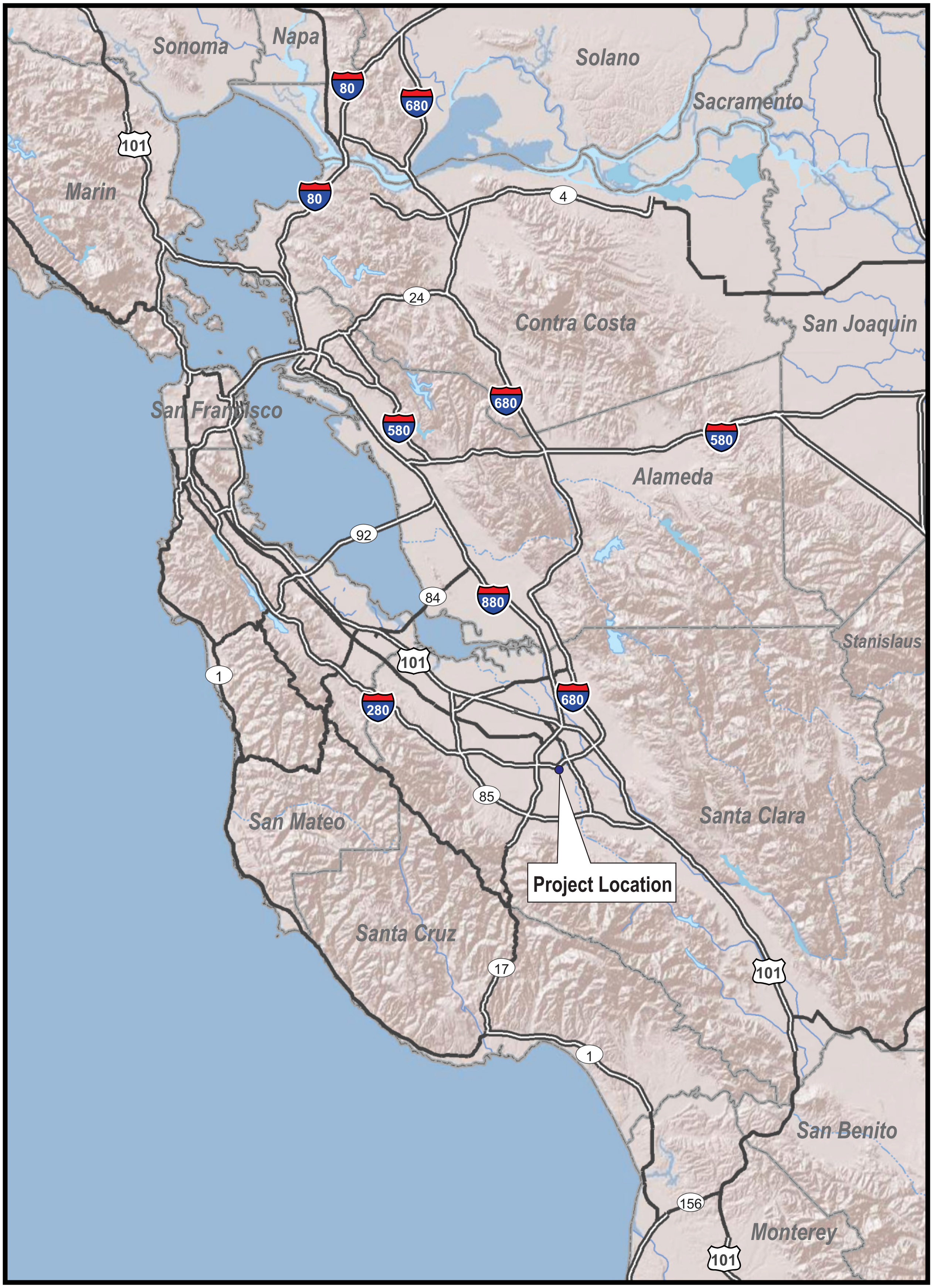

Figure 1: General Project Location

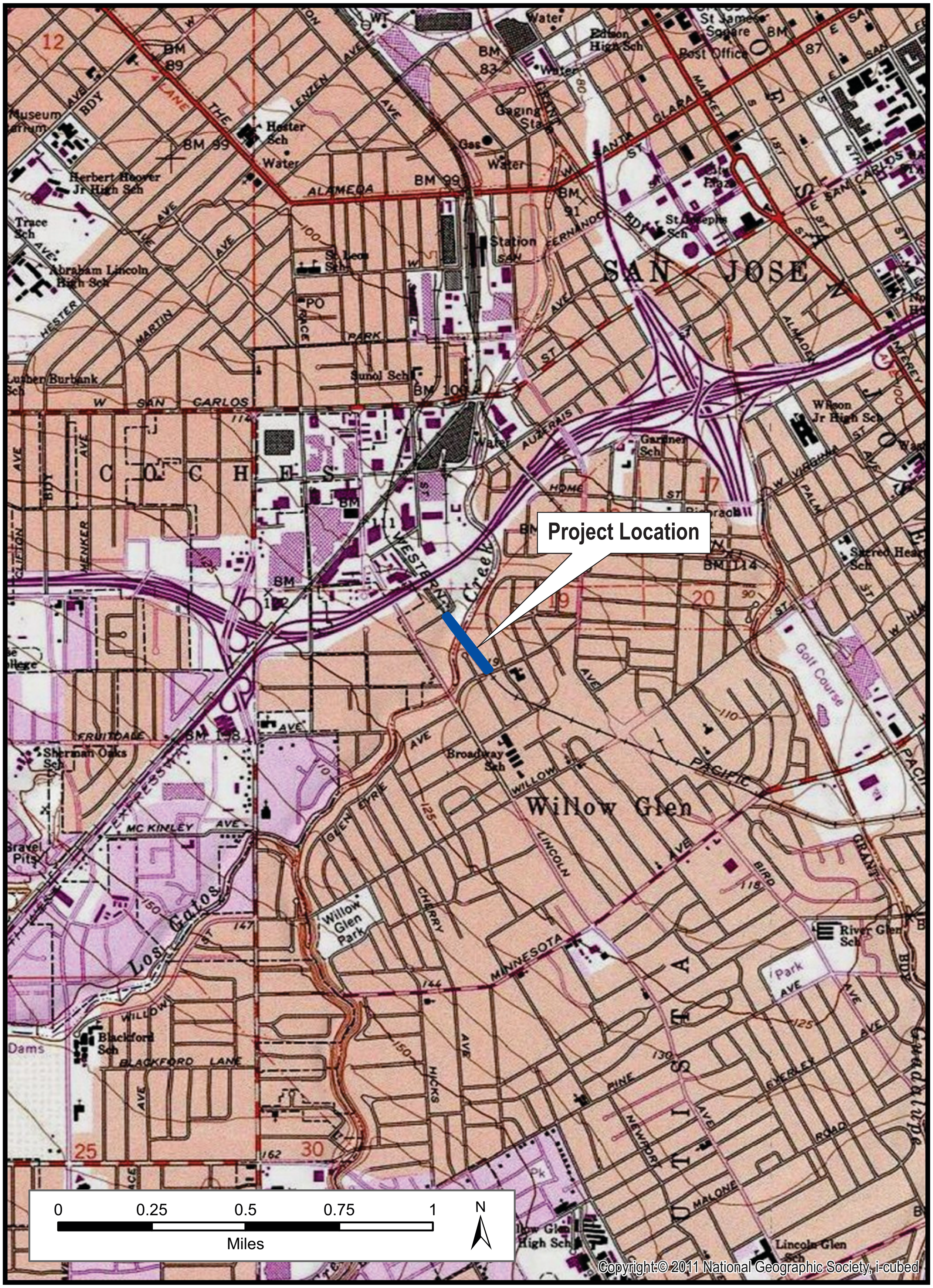

Figure 2: Project Location (USGS San Jose West, Calif. 1980)

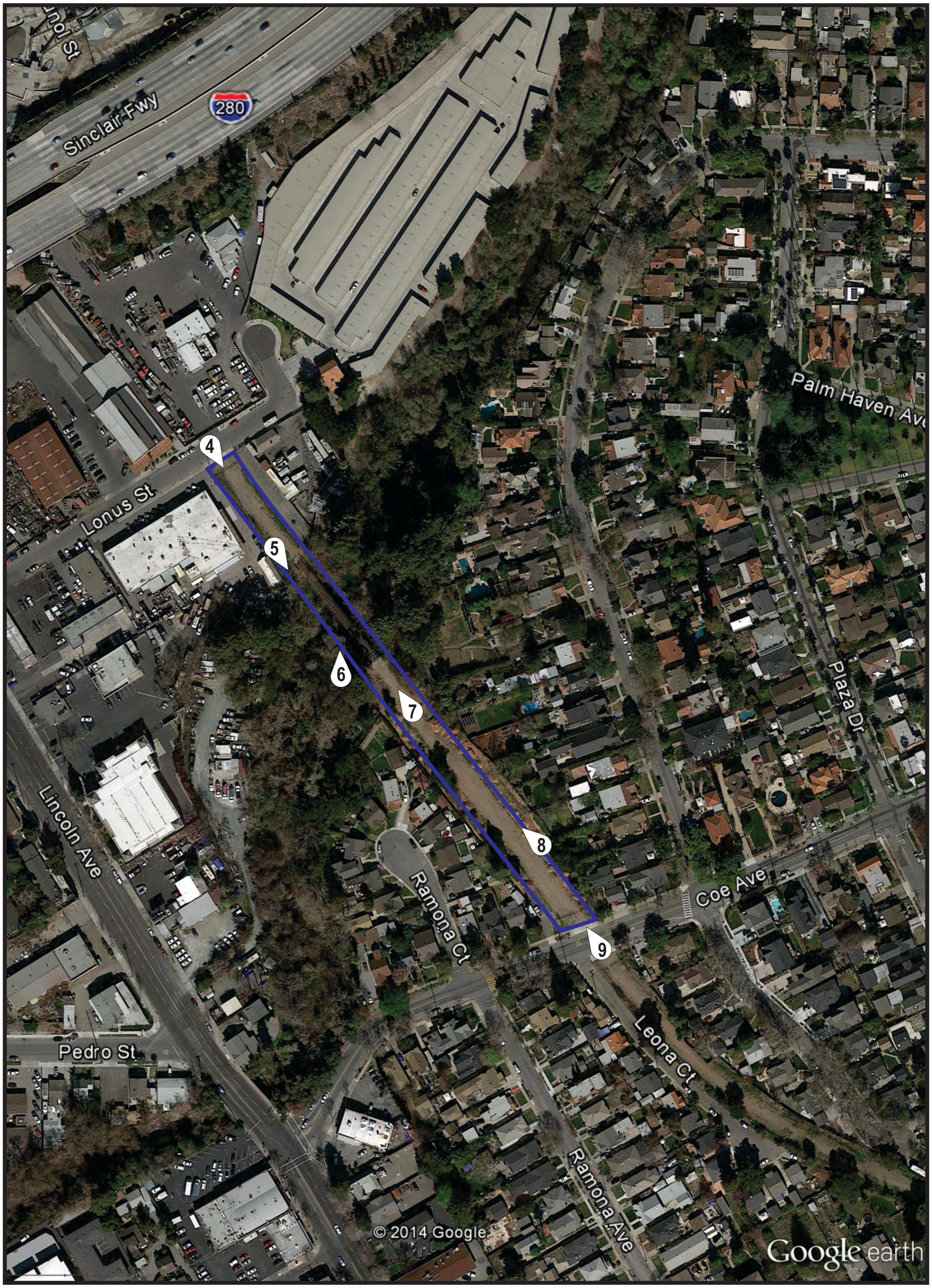

Figure 3: Project Area with Photo View Locations

Figure 4: Project Alignment from Lonus Street, view to the southeast

Figure 5: View southeast along trestle

Figure 6: Trestle understructure, view to the north

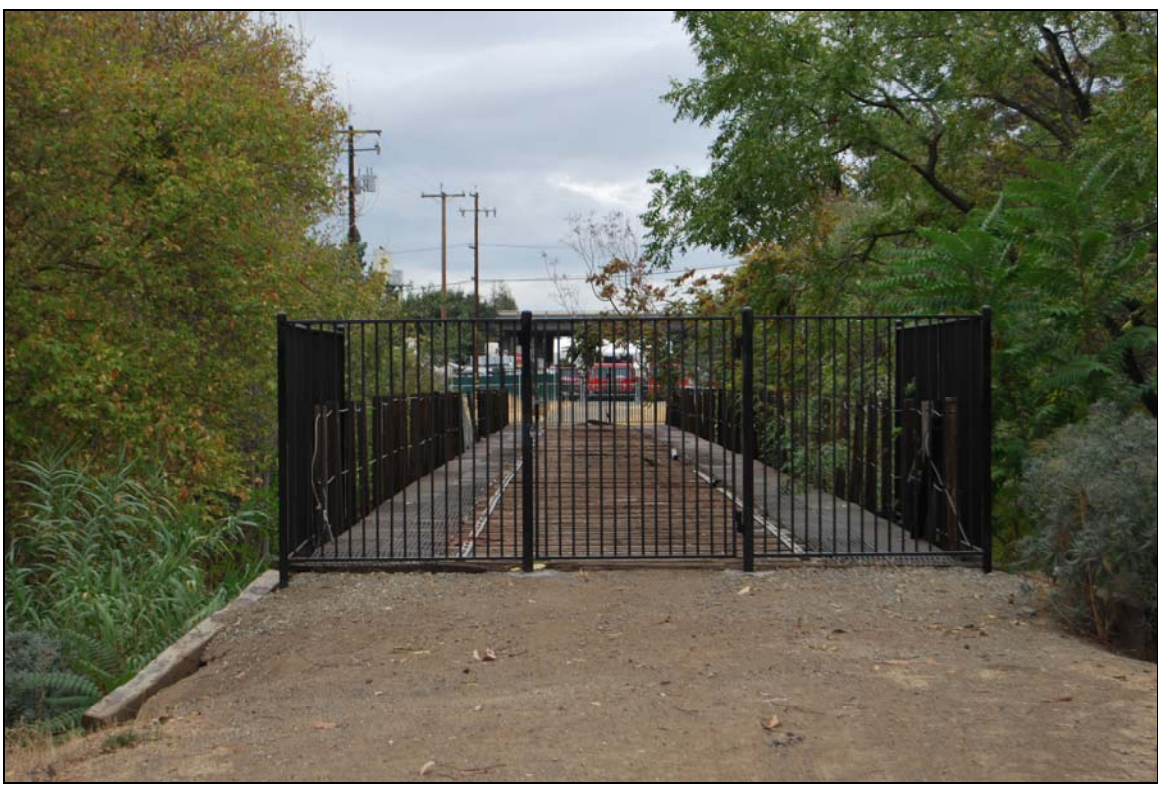

Figure 7: View northwest along trestle towards Lonus Street

Figure 8: Project Alignment, view to the northwest

Figure 9: Project Alignment from Coe Avenue, view to the northwest

BASIN
RESEARCH
ASSOCIATES

1933 DAVIS STREET
SUITE 210
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

October 17, 2014

Ms. Cynthia Gomez
Executive Secretary
Native American Heritage Commission
1550 Harbor Boulevard
West Sacramento, CA 95691

RE: Request for Review of Sacred Lands Inventory – *Los Gatos Creek Trail Reach 4, Coe Avenue North to Lonus Avenue, City of San Jose, Santa Clara County*

Dear Ms. Gomez,

Please let this letter stand as our request for the Native American Heritage Commission (NAHC) to conduct a review of the NAHC *Sacred Lands Inventory* to determine if any listed properties are present within or adjacent to the above proposed project area (see enclosed USGS map).

The proposed project consist of the construction of a segment of a public multi-use trail over Los Gatos Creek in the Willow Glen area of the City of San Jose.

Information from the NAHC *Sacred Lands Inventory* will be used to in an updated *Archaeological Assessment Report* (AAR) to determine if significant archaeological resources may be affected by the proposed project.

If I can provide any further information, please don't hesitate to contact me (510 430-8441 or Basinres1@gmail.com). Thank you for your timely review of our request.

BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA
Principal

CIB/dg

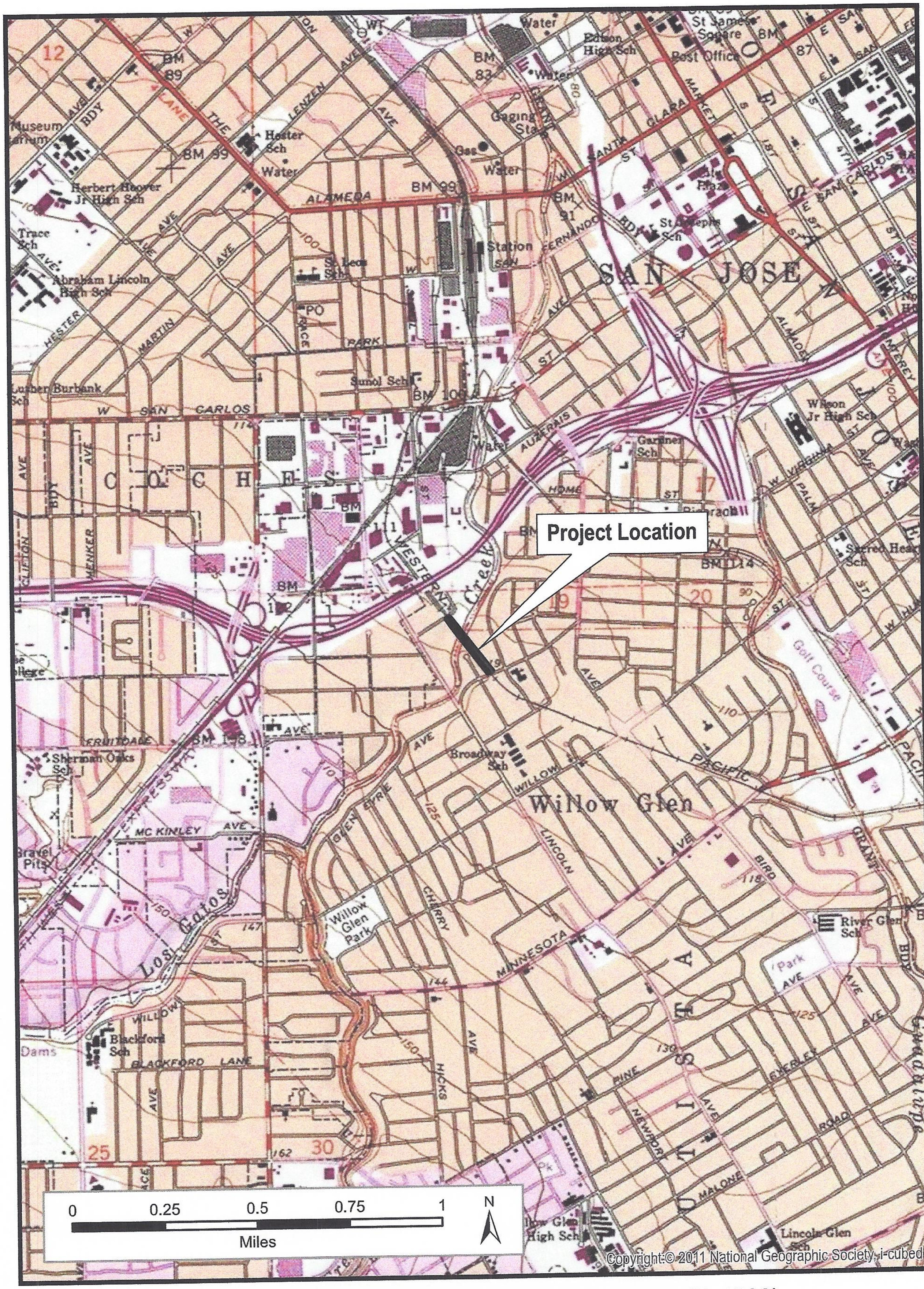

Figure 1: Project Location T7S R1E (USGS San Jose West, Calif. 1980)

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION

1550 Harbor Blvd.
West Sacramento, CA 95691
(916) 373-3710
Fax (916) 373-5471

November 3, 2014

Colin I. Busby, Ph.D
BASIN
1933 Davis Street, #210
San Leandro, CA 94577

By: FAX: 510-430-8443

3 Pages

Re: Los Gatos Creek Trail Reach 4, Santa Clara

Dr. Busby,

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 373-3713.

Sincerely,

Leyte Winston for

Debbie Pilas-Treadway
Environmental Specialist III

Native American Contacts
Santa Clara County
October 31, 2014

Jakki Kehl
720 North 2nd Street
Patterson, CA 95363
jakkikehl@gmail.com
510-701-3975
Ohlone/Costanoan

Amah MutsunTribal Band of Mission San Juan Bautista
Irene Zwierlein, Chairperson
789 Canada Road
Woodside, CA 94062
amahmutsuntribal@gmail.com
(650) 400-4806 Cell
(650) 332-1526 Fax
Ohlone/Costanoan

Katherine Erolinda Perez
P.O. Box 717
Linden, CA 95236
canutes@verizon.net
(209) 887-3415
Ohlone/Costanoan
Northern Valley Yokuts
Bay Miwok

Amah MutsunTribal Band of Mission San Juan Bautista
Michelle Zimmer
789 Canada Road
Woodside, CA 94062
amahmutsuntribal@gmail.com
(650) 851-7747 Home
(650) 332-1526 Fax
Ohlone/Costanoan

Linda G. Yamane
1585 Mira Mar Ave
Seaside, CA 93955
rumsien123@yahoo.com
(831) 394-5915
Ohlone/Costanaon

Indian Canyon Mutsun Band of Costanoan
Ann Marie Sayers, Chairperson
P.O. Box 28
Hollister, CA 95024
ams@indiancanyon.org
(831) 637-4238
Ohlone/Costanoan

Amah MutsunTribal Band
Valentin Lopez, Chairperson
P.O. Box 5272
Galt, CA 95632
vlopez@amahmutsun.org
(916) 743-5833
Ohlone/Costanoan
Northern Valley Yokuts

Muwekma Ohlone Indian Tribe of the SF Bay Area
Rosemary Cambra, Chairperson
P.O. Box 360791
Milpitas, CA 95036
muwekma@muwekma.org
(408) 205-9714
(510) 581-5194
Ohlone / Costanoan

Amah MutsunTribal Band
Edward Ketchum
35867 Yosemite Ave
Davis, CA 95616
aerieways@aol.com
Ohlone/Costanoan
Northern Valley Yokuts

The Ohlone Indian Tribe
Andrew Galvan
P.O. Box 3152
Fremont, CA 94539
chochenyo@AOL.com
(510) 882-0527 Cell
(510) 687-9393 Fax
Ohlone/Costanoan
Bay Miwok
Plains Miwok
Patwin

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Los Gatos Creek Trail Reach 4, Santa Clara County

Native American Contacts
Santa Clara County
October 31, 2014

Trina Marine Ruano Family	
Ramona Garibay, Representative	
30940 Watkins Street	Ohlone/Costanoan
Union City , CA 94587	Bay Miwok
soaprootmo@comcast.net	Plains Miwok
(510) 972-0645	Patwin

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Los Gatos Creek Trail Reach 4, Santa Clara County

BASIN
RESEARCH
ASSOCIATES

1933 DAVIS STREET
SUITE 210
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

November 12, 2014

Ms. Jakki Kehl
720 North Second Street
Patterson, CA 95363

RE: Request for Information – *Los Gatos Creek Trail Reach 4, Coe Avenue North to Lonus Avenue, City of San Jose, Santa Clara County*

Dear Jakki,

The Native American Heritage Commission has provided your name as an individual who may have information regarding Native American sites within or adjacent to the above proposed project (see enclosed USGS map).

The proposed project consist of the construction of a segment of a public multi-use trail over Los Gatos Creek in the Willow Glen area of the City of San Jose.

Any information provided will be used in an updated *Archaeological Assessment Report* (AAR) to determine if significant archaeological resources may be affected by the proposed project.

If I can provide any further information, please don't hesitate to contact me (510 430-8441 or Basinres1@gmail.com). Thank you for your timely review of our request.

BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA
Principal

CIB/dg

BASIN
RESEARCH
ASSOCIATES

1933 DAVIS STREET
SUITE 210
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

November 12, 2014

Ms. Katherine Erolinda Perez
P.0. Box 717
Linden, CA 95236

RE: Request for Information – *Los Gatos Creek Trail Reach 4, Coe Avenue North to Lonus Avenue, City of San Jose, Santa Clara County*

Dear Kathy,

The Native American Heritage Commission has provided your name as an individual who may have information regarding Native American sites within or adjacent to the above proposed project (see enclosed USGS map).

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BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA
Principal

CIB/dg

BASIN
RESEARCH
ASSOCIATES

1933 DAVIS STREET
SUITE 210
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

November 12, 2014

Ms. Linda G. Yamane
1585 Mira Mar Avenue
Seaside, CA 93955

RE: Request for Information – *Los Gatos Creek Trail Reach 4,*
Coe Avenue North to Lonus Avenue, City of San Jose, Santa Clara County

Dear Linda,

The Native American Heritage Commission has provided your name as an individual who may have information regarding Native American sites within or adjacent to the above proposed project (see enclosed USGS map).

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BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA
Principal

CIB/dg

BASIN
RESEARCH
ASSOCIATES

1933 DAVIS STREET
SUITE 210
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

November 12, 2014

Mr. Valentin Lopez
Chairperson
Amah Mutsun Tribal Band
P.O. Box 5272
Galt, CA 95632

RE: Request for Information – *Los Gatos Creek Trail Reach 4, Coe Avenue North to Lonus Avenue, City of San Jose, Santa Clara County*

Dear Valentin,

The Native American Heritage Commission has provided your name as an individual who may have information regarding Native American sites within or adjacent to the above proposed project (see enclosed USGS map).

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If I can provide any further information, please don't hesitate to contact me (510 430-8441 or Basinres1@gmail.com). Thank you for your timely review of our request.

BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA
Principal

CIB/dg

BASIN
RESEARCH
ASSOCIATES

1933 DAVIS STREET
SUITE 210
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

November 12, 2014

Mr. Edward Ketchum
Amah Mutsun Tribal Band
35867 Yosemite Avenue
Davis, CA 95616

RE: Request for Information – *Los Gatos Creek Trail Reach 4,*
Coe Avenue North to Lonus Avenue, City of San Jose, Santa Clara County

Dear Edward,

The Native American Heritage Commission has provided your name as an individual who may have information regarding Native American sites within or adjacent to the above proposed project (see enclosed USGS map).

The proposed project consist of the construction of a segment of a public multi-use trail over Los Gatos Creek in the Willow Glen area of the City of San Jose.

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If I can provide any further information, please don't hesitate to contact me (510 430-8441 or Basinres1@gmail.com). Thank you for your timely review of our request.

BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA
Principal

CIB/dg

BASIN
RESEARCH
ASSOCIATES

1933 DAVIS STREET
SUITE 210
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

November 12, 2014

Ms. Irenne Zwierlein, Chairperson
Amah/Mutsun Tribal Band
789 Canada Road
Woodside, CA 94062

RE: Request for Information – *Los Gatos Creek Trail Reach 4,*
Coe Avenue North to Lonus Avenue, City of San Jose, Santa Clara County

Dear Irenne,

The Native American Heritage Commission has provided your name as an individual who may have information regarding Native American sites within or adjacent to the above proposed project (see enclosed USGS map).

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BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA
Principal

CIB/dg

BASIN
RESEARCH
ASSOCIATES

1933 DAVIS STREET
SUITE 210
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

November 12, 2014

Ms. Michelle Zimmer
Amah/Mutsun Tribal Band of Mission San Juan Bautista
789 Canada Road
Woodside, CA 94062

RE: Request for Information – *Los Gatos Creek Trail Reach 4, Coe Avenue North to Lonus Avenue, City of San Jose, Santa Clara County*

Dear Michelle

The Native American Heritage Commission has provided your name as an individual who may have information regarding Native American sites within or adjacent to the above proposed project (see enclosed USGS map).

The proposed project consist of the construction of a segment of a public multi-use trail over Los Gatos Creek in the Willow Glen area of the City of San Jose.

Any information provided will be used in an updated *Archaeological Assessment Report* (AAR) to determine if significant archaeological resources may be affected by the proposed project.

If I can provide any further information, please don't hesitate to contact me (510 430-8441 or Basinres1@gmail.com). Thank you for your timely review of our request.

BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA
Principal

CIB/dg

BASIN
RESEARCH
ASSOCIATES

1933 DAVIS STREET
SUITE 210
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

November 12, 2014

Ms. Ann Marie Sayers, Chairperson
Indian Canyon Mutsun Band of Costanoan
P.O. Box 28
Hollister, CA 95024

RE: Request for Information – *Los Gatos Creek Trail Reach 4, Coe Avenue North to Lonus Avenue, City of San Jose, Santa Clara County*

Dear Ann Marie,

The Native American Heritage Commission has provided your name as an individual who may have information regarding Native American sites within or adjacent to the above proposed project (see enclosed USGS map).

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If I can provide any further information, please don't hesitate to contact me (510 430-8441 or Basinres1@gmail.com). Thank you for your timely review of our request.

BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA
Principal

CIB/dg

BASIN
RESEARCH
ASSOCIATES

1933 DAVIS STREET
SUITE 210
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

November 12, 2014

Ms. Rosemary Cambra
Chairperson
Muwekma Ohlone Tribe of the SF Bay Area
P.O. Box 360791
Milpitas, CA 95036

RE: Request for Information – *Los Gatos Creek Trail Reach 4, Coe Avenue North to Lonus Avenue, City of San Jose, Santa Clara County*

Dear Rosemary,

The Native American Heritage Commission has provided your name as an individual who may have information regarding Native American sites within or adjacent to the above proposed project (see enclosed USGS map).

The proposed project consist of the construction of a segment of a public multi-use trail over Los Gatos Creek in the Willow Glen area of the City of San Jose.

Any information provided will be used in an updated *Archaeological Assessment Report* (AAR) to determine if significant archaeological resources may be affected by the proposed project.

If I can provide any further information, please don't hesitate to contact me (510 430-8441 or Basinres1@gmail.com). Thank you for your timely review of our request.

BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA
Principal

CIB/dg

BASIN
RESEARCH
ASSOCIATES

1933 DAVIS STREET
SUITE 210
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

November 12, 2014

Mr. Andrew Galvan
The Ohlone Indian Tribe
P.O. Box 3152
Fremont, CA 94539

RE: Request for Information – *Los Gatos Creek Trail Reach 4, Coe Avenue North to Lonus Avenue, City of San Jose, Santa Clara County*

Dear Andrew,

The Native American Heritage Commission has provided your name as an individual who may have information regarding Native American sites within or adjacent to the above proposed project (see enclosed USGS map).

The proposed project consist of the construction of a segment of a public multi-use trail over Los Gatos Creek in the Willow Glen area of the City of San Jose.

Any information provided will be used in an updated *Archaeological Assessment Report* (AAR) to determine if significant archaeological resources may be affected by the proposed project.

If I can provide any further information, please don't hesitate to contact me (510 430-8441 or Basinres1@gmail.com). Thank you for your timely review of our request.

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BASIN
RESEARCH
ASSOCIATES

1933 DAVIS STREET
SUITE 210
SAN LEANDRO, CA 94577
VOICE (510) 430-8441
FAX (510) 430-8443

November 12, 2014

Ms. Ramona Garibay, Representative
Trina Marine Ruano Family
30940 Watkins Street
Union City, CA 94587

RE: Request for Information – *Los Gatos Creek Trail Reach 4, Coe Avenue North to Lonus Avenue, City of San Jose, Santa Clara County*

Dear Ramona,

The Native American Heritage Commission has provided your name as an individual who may have information regarding Native American sites within or adjacent to the above proposed project (see enclosed USGS map).

The proposed project consist of the construction of a segment of a public multi-use trail over Los Gatos Creek in the Willow Glen area of the City of San Jose.

Any information provided will be used in an updated *Archaeological Assessment Report* (AAR) to determine if significant archaeological resources may be affected by the proposed project.

If I can provide any further information, please don't hesitate to contact me (510 430-8441 or Basinres1@gmail.com). Thank you for your timely review of our request.

BASIN RESEARCH ASSOCIATES, INC.

Colin I. Busby, Ph.D., RPA
Principal

CIB/dg

Record of Native American Contacts
Proposed Los Gatos Creek Trail Reach 4, Santa Clara County.

10/17/14 Letter to Ms. Cynthia Gomez, Executive Secretary, Native American Heritage Commission (NAHC), Sacramento. Regarding: Request for Review of Sacred Lands Inventory for project.

11/3/14 Letter response by Debbie Pilas-Treadway, NAHC.

11/12/14 Letters sent to all parties recommended by NAHC.

Letters to Jakki Kehl, Patterson; Katherine E. Perez, Linden; Linda G. Yamane, Seaside; Valentin Lopez, Chairperson, Amah Mutsun Tribal Band, Galt; Edward Ketchum, Amah Mutsun Tribal Band, Davis; Irenne Zwierlein, Amah Mutsun Tribal Band of Mission San Juan Bautista, Woodside; Michelle Zimmer Amah/Mutsun Tribal Band, Amah Mutsun Tribal Band of Mission San Juan Bautista, Woodside; Ann Marie Sayers, Chairperson, Indian Canyon Mutsun Band of Costanoan, Hollister; Rosemary Cambra, Chairperson, Muwekma Ohlone Indian Tribe of the SF Bay Area, Milpitas; Andrew Galvan, The Ohlone Indian Tribe, Mission San Jose; and Ramona Garibay, Representative, Trina Marine Ruano Family, Lathrop.

1/9/15 Telephone calls and/or emails made by Basin Research Associates (Christopher Canzonieri) in the morning to non-responding parties.

Jakki Kehl – called at 10:17 AM; recommends that the client does a larger search area (1/2-mile) because of the proximity to the Roberto-Sunol Adobe. Additionally, Ms. Kehl would like to know historic creek flows. She wants her comments to be sent to SHPO. Ms. Kehl is very familiar with the area. Ms. Kehl wants to be notified of any response. Ms. Kehl would like a copy of the draft report and a response from the client on the draft report. Ms. Kehl would continue notification of progress. jakkikehl@gmail.com.

Katherine Perez – called at 10:48 AM; left a detailed message.

Linda G. Yamane – called at 10:49 AM; left a detailed message.

Valentin Lopez – called at 10:53 AM; left a detailed message.

Edward Ketchum – emailed the document at 10:59 AM; no phone number for contact.

Irenne Zwierlein – Ms. Zimmer spoke on her mother's behalf. See recommendation below.

Michelle Zimmer – called at 11:01 AM; spoke with Ms. Zimmer. Ms. Zimmer recommends that all crew receive cultural sensitivity training. The archaeologists have experience with Northern and Central California archaeology and qualified and trained Native American monitors.

Ann Marie Sayers – called at 11:29 AM; left a detailed message

Rosemary Cambra – called at 11:31 AM; unable to leave a message.

Andrew Galvan – called at 11:39 AM; per previously discussed conversation, Andy has no immediate concerns, but recommends that if something is encountered the proper measures should be implemented (i.e., contact County Coroner and Native American Heritage Commission if Native American remains are exposed and follow recommendations).

Ramona Garibay – called at 11:32 AM; left a detailed message.

Appendix F
Historical Evaluation

HISTORICAL EVALUATION OF THE
LOS GATOS CREEK TRESTLE
SAN JOSE, CALIFORNIA

Prepared for:

City of San Jose

Prepared by:

Stephen Mikesell
Mikesell Historical Consulting
1532 Eligio Lane
Davis, CA 95618

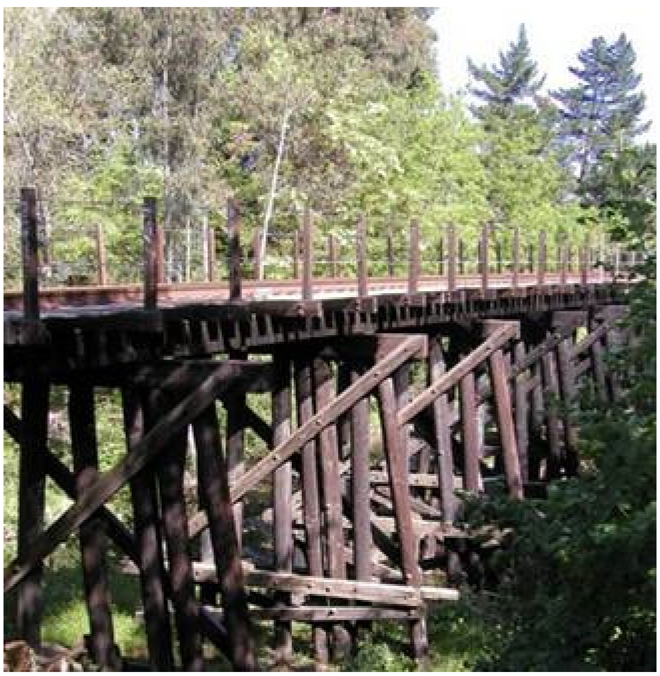
December 29, 2014

A. INTRODUCTION

This historic evaluation report was prepared by Mikesell Historical Consulting Services (MHC) for the City of San Jose. The purpose of this study is to evaluate the potential eligibility of the Los Gatos Creek Trestle as an "historical resource," as that term is used in the California Environmental Quality Act, or CEQA. This report concludes that the trestle does not constitute a historical resource, for reasons outlined below.

B. DESCRIPTION OF THE RESOURCE

The Los Gatos Creek Trestle exists along the former right of way for the Western Pacific Railroad in the San Jose community of Willow Glen. The right of way is now maintained as the Los Gatos Creek Trail by the City of San Jose. The Los Gatos Creek Trestle crosses Los Gatos Creek between Coe and Lonus streets, very near the I-280 crossing of Lincoln Boulevard in the Willow Glen neighborhood.



Elevation view from southern approach, Los Gatos Creek Trestle

Deck view from southern approach, Los Gatos Creek Trestle

The Los Gatos Creek Trestle is an open-deck pile-supported trestle that has an overall span length of 210.5 feet and is approximately 25 feet high at its tallest point. The trestle was constructed by the Western Pacific Railroad in 1922 but the tracks have been removed from the structure which is now owned by the City of San Jose. The structure is supported by two timber pile abutments and thirteen timber pile bents. The bents range in size and geometry at each location, but the longitudinal spacing of the bents is constant at approximately 15 feet. The bents have a skew angle of 9.5 degrees. The structure construction is generally in conformance with past and current editions of the AREMA (American Railway Engineering and Maintenance of Way Association) Manual for Railway Engineering for pile bent trestles.

The deck of the superstructure is composed of three components. The first component, 4-inch by 8-inch by 18-foot long ties that are spaced at 5 feet on center, have a metal grate and hand rails attached. [In recent months, the City of San Jose has installed safety metal fencing across the entrances to the deck.) Between these ties are 8-inch by 8-inch by 10-foot long ties that are generally spaced at approximately 13.5 inches on center. The 18 foot long 4-inch by 8-inch ties are typically nailed to an 8-inch by 8-inch tie. Also, there is one 8-inch by 8-inch by 18-foot member at each abutment

There are two longitudinal beams that are symmetric about the longitudinal centerline of the trestle. The beams are comprised of four 8-inch wide by 20-inch deep stringers that are bolted together. Each individual timber is about 30 feet in length and the splices are staggered 15 feet longitudinally. Typically, there are two stringers that are continuous at each bent cap location and two that are spliced over the cap. The bolt connection made at each pile cap is consistent with the AREMA Manual for Railway Engineering.

The various bents are made of timber piles in the substructure. A bent includes a series of piles, and is usually identified by the number of piles, e.g. a five-pile bent or a six-pile bent. This bridge is somewhat unusual in that there are different numbers of piles in different bents. In most of the bents, there are six piles. The number ranges, however, from five in two bents, seven in two bents, and eight in one bent.[1]

[1] The technical data on the trestle is derived in large part from CH2M HILL, “Field Inspection Report, Three Creeks Trail Railroad Trestle at Los Gatos Creek,” June 7, 2012

In general, one could characterize the substructure as comprising six-pile bents, noting that the number of piles sometimes varies.

The manner in which the number of bents varies suggests strongly that the bridge was modified with the use of paired piles, or soldier piles, to take the stress from deteriorated piles. In every case in which there are more than six piles, the additional piles are paired with heavily deteriorated piles. This doubling of piles is illustrated below.

Pile bents showing doubled piles, from Los Gatos Creek bed

The bents are vertical in the center and battered on the edges. In its bridge inspection manual, the AREMA describes the function of vertical and battered bents: “The center vertical posts used in each bent are known as ’plumb posts,’ and take the vertical loads. The outside inclined posts, are known as ’batter posts,; the tops being tilted toward the center of the bent and serving the purpose of giving increased stability, are installed adjacent to the plumb posts. The batter of these outside posts may vary between 1-1/2 and 3 inches per foot. Sway bracing provides additional lateral stability by the use of planks extending diagonally across the bent, through bolted to the ends of the cap and sill and also to the posts or piles. A similar brace, but placed with the opposite direction in slope, is installed on the opposite side of the bent such that the two braces cross in the middle.”[2]

C. REGULATORY CONTEXT

In general, this report is designed to establish whether the Los Gatos Creek Trestle constitutes a “historical resource” as that term is used in the guidelines to the CEQA. CEQA Guidelines define a historical resource at 15064.5:

> For purposes of this section, the term "historical resources" shall include the following:
>
> A resource listed in, or determined to be eligible by the State Historical Resources Commission, for listing in the California Register of Historical

[2] American Railway Engineering and Maintenance of Way Association, *Practical Guide to Railway Engineering,* 2003, 8-21.

Resources (Public Resource Code SS 5024.1, Title 14 CCR, Section 4850 et seq.).

A resource included in a local register of historical resources, as defined in section 5020.1(k) of the Public Resources Code or identified as significant in an historical resource survey meeting the requirements section 5024.1(g) of the Public Resources Code, shall be presumed to be historically or culturally significant. Public agencies must treat any such resource as significant unless the preponderance of evidence demonstrates that it is not historically or culturally significant.

Any object, building, structure, site, area, place, record, or manuscript which a lead agency determines to be historically significant or significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California may be considered to be an historical resource, provided the lead agency's determination is supported by substantial evidence in light of the whole record. Generally, a resource shall be considered by the lead agency to be "historically significant" if the resource meets the criteria for listing on the California Register of Historical Resources (Pub. Res. Code SS5024.1, Title 14 CCR, Section 4852) including the following:

Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

Is associated with the lives of persons important in our past;

Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or

Has yielded, or may be likely to yield, information important in prehistory or history.

The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources (pursuant to section 5020.1(k) of the Public Resources Code), or identified in an historical resources survey (meeting the criteria in section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in Public Resources Code sections 5020.1(j) or 5024.1.

The Los Gatos Creek Trestle does not meet the mandatory sections of this definition.[3] It is not listed in the California Register of Historical Resources (or the National Register of Historic Places, which

[3] Court decisions have drawn a distinction between those findings which are mandatory, such as formal listing in the California Register, and discretionary findings, which can include a finding developed specifically for a specific project.

automatically results in a California Register listing); nor is it listed as a San Jose Designated Historic City Landmark.[4] The CEQA guidelines clearly state, however, that: "The fact that a resource is not listed in, or determined to be eligible for listing in the California Register of Historical Resources, not included in a local register of historical resources (pursuant to section 5020.1(k) of the Public Resources Code), or identified in an historical resources survey (meeting the criteria in section 5024.1(g) of the Public Resources Code) does not preclude a lead agency from determining that the resource may be an historical resource as defined in Public Resources Code sections 5020.1(j) or 5024.1."

The purpose of this report is to determine whether the Los Gatos Creek Trestle is an "historical resource" as defined in the CEQA guidelines and PRC 5020.1 or 5024.5. Specifically, this report will determine whether the trestle meets the criteria for listing in the National Register of Historic Places or the California Register of Historical Resources.

National Register Eligibility Criteria

The eligibility criteria for the National Register are quoted in full below.

The quality of significance in American history, architecture, archeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:

A. That are associated with events that have made a significant contribution to the broad patterns of our history; or

B. That are associated with the lives of significant persons in or past; or

C. That embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

D. That have yielded or may be likely to yield, information important in history or prehistory.

Criteria Considerations

Ordinarily cemeteries, birthplaces, graves of historical figures, properties owned by religious institutions or used for religious purposes, structures that have been moved from their original locations, reconstructed historic buildings, properties primarily commemorative in nature, and properties that have achieved significance within the past 50 years shall not be considered eligible for the National Register. However, such properties *will qualify* if they are integral parts of districts that do meet the criteria or if they fall within the following categories:

A. A religious property deriving primary significance from architectural or artistic distinction or historical importance; or

[4] A record search was conducted at the Northwest Information Center in October 2014.

B. A building or structure removed from its original location but which is primarily significant for architectural value, or which is the surviving structure most importantly associated with a historic person or event; or

C. A birthplace or grave of a historical figure of outstanding importance if there is no appropriate site or building associated with his or her productive life; or

D. A cemetery that derives its primary importance from graves of persons of transcendent importance, from age, from distinctive design features, or from association with historic events; or

E. A reconstructed building when accurately executed in a suitable environment and presented in a dignified manner as part of a restoration master plan, and when no other building or structure with the same association has survived; or

F. A property primarily commemorative in intent if design, age, tradition, or symbolic value has invested it with its own exceptional significance; or

G. A property achieving significance within the past 50 years if it is of exceptional importance.

California Register of Historical Resources Eligibility Criteria

The criteria for the California Register of Historical Resources are quoted in full below:

- Associated with events that have made a significant contribution to the broad patterns of local or regional history or the cultural heritage of California or the United States (Criterion 1).
- Associated with the lives of persons important to local, California or national history (Criterion 2).
- Embodies the distinctive characteristics of a type, period, or method of construction or represents the work of a master or possesses high artistic values (Criterion 3).
- Has yielded, or has the potential to yield, information important to the prehistory or history of the local area, California or the nation (Criterion 4).

D. RESEARCH STRATEGY

The research strategy in evaluating this trestle is enriched by the fact that community members have made very useful suggestions, either through a court case that tested the adequacy of a previous evaluation or through the CEQA Scoping Process for the current Environmental Impact Report (EIR).[5] The comments made before the court proceeding as well as the comments from the Scoping Meeting raised a wide array of issues. These may be summarized in five categories, summarized below and discussed and analyzed separately.

Rarity of the trestle

One issue raised during the court hearing was the rarity of the trestle. At various points during the legal proceedings leading to preparation of an EIR for this project, different parties have raised the possibility

[5] Los Gatos Creek Trestle was the subject of a court case, Friends of the Willow Glen Trestle vs. City of San Jose, City Council of San Jose, decided in Superior Court, County of Santa Clara, on July 28, 2014. As a result of this decision, the City of San Jose initiated preparation of an Environmental Impact Report. A Scoping Meeting was held in the Willow Glen neighborhood on October 21, 2014.

that the Los Gatos Creek Trestle is a rare example of a bridge type. In a July 16, 2013 letter, the California Trolley and Railroad Corporation stated that "the trestle is a classic 90 year-old structure, which once were common and are now almost non-existent."[6] In a letter of December 18, 2013, one commentator does not specifically state that the bridge is rare or unusual, but challenges the conclusion of the Ward Hill "Short Form" that it is a "typical" trestle. Among other questions, she asks: "How does his [Hill's] evaluation of 'typical' compare to accounts in railroad histories and Western Pacific Railroad documents?"[7] Elsewhere, Susan Landry makes a more limited case for rarity for this bridge, contending it is the only timber trestle still in place on the Western Pacific Railway in Willow Glen.[8] The question of rarity is best analyzed under National Register Criterion C or California Register Criterion 3.

Relationship to Canning Industry in San Jose

A second issue mentioned repeatedly was the relationship between the trestle and the canning industry in San Jose. This issue was raised in several comments from the Scoping Meeting. One comment read: "Please research the railroad history & the impact to the economy of Willow Glen and SJ. Also the impact of the Trestle to the canneries & their successful transport of fruit and vegetables." Another comment asked "How many canneries were served by this trestle? What portion of their business went over the trestle?" Another comment noted: "The products of the large Del Monte cannery, for decades, crossed the Los Gatos Creek on that very Trestle!" Still another commented on how the trestle "ties in with the agricultural/canning/marketing past of SJ." This type of analysis is most consistent with National Register Criterion A or California Register Criterion 1.

Grade Separation Movement

Still another issue that arose in the court case and in Scoping Comments is that of the grade separation movement. In the court proceeding but not in the Scoping Meeting, comments were made about the close association with a political movement to provide for safer interaction between automobiles and trucks, on the one hand, and railroad traffic on the other. The grade separation issue is best considered under National Register Criterion A and California Register Criterion 1.

History of the Community of Willow Glen

A fourth issue, raised in many comments, was the importance of the trestle to the history of the community of Willow Glen, with specific reference to the relationship between the Western Pacific Railroad line and the brief incorporation of Willow Glen as an independent city in the late 1920s and the 1930s. This issue is appropriately considered under National Register Criterion A and California Register Criterion 1.

History of the Western Pacific Railroad

A final research topic raised in some comments had to do with the importance of this trestle to the Western Pacific Railroad. This issue is appropriately considered under National Register Criterion A and California Register Criterion 1.

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[6] Writ, Friends of Willow Glen Trestle, 10.
[7] Jean Dresden to City of San Jose, July 16, 2013.
[8] Writ, Friends of Willow Glen Trestle, 12.

E. HISTORIC CONTEXT

The Los Gatos Creek Trestle was built by the Western Pacific Railway in 1922 as part of the San Jose Branch, which connected the City of San Jose and vicinity with the Western Pacific Railroad main line at Niles Canyon in Alameda County.

General History of Western Pacific Railroad

The Western Pacific Railroad[9] has sometimes been called the railroad that was built too late.[10] The chief backer of the line was George Gould, son of the legendary railroader Jay Gould, who felt his access to the California market was stymied by the Southern Pacific Railroad. Under the brief ownership of Edward Harriman in the early 20th century, the Southern Pacific Railroad had taken a much more aggressive stance toward Gould's holdings.[11] Gould was particularly concerned about ensuring access to the Port of Oakland, which the Harriman-owned Southern Pacific threatened to deny.

The Western Pacific Railroad was incorporated in 1903 and surveys of the line began almost immediately. The general alignment was to go from Salt Lake City to Oakland. The exact alignment, however, was fraught with difficulties, chiefly because the Southern Pacific already controlled the obvious railroad routes through Utah, Nevada, and California. The eastern end of the route – from Salt Lake City to Reno – was relatively easy to construct, although it was complicated by the need to cross the line of the Southern Pacific at various spots through the Humboldt River valley. The western end of the line, however, required heroic engineering and construction accomplishments. The line entered the Central Valley of California via the Feather River Canyon, a line that extended from Oroville in Butte County to a connection with an old Nevada- California-Oregon Railway (NCO) line, through what is commonly called the Beckwourth Pass. The Western Pacific line through the Feather River Canyon creates one of the most scenic railroad alignments in the United States and is the subject of many books.[12] The Feather River route also includes some of the most dramatic and significant railroad tunnels and bridges in the United States, which are commonly called out in national studies on railroad structures.[13]

In the San Francisco Bay Area, the Western Pacific Railroad found itself forced to wiggle around the lines of the Southern Pacific, which controlled all of the obvious passes and bridge sites. One key site was Niles Canyon, which connects the flatlands around the Bay in modern Fremont with the San Ramon

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[9] The line was called the Western Pacific Railway when it was incorporated. The line went into receivership in 1915 and emerged as the Western Pacific Railroad. The latter name will be used except in quotations from historic sources.

[10] Spencer Crump, *Western Pacific: The Railroad that was Built Too Late,* Railway History Quarterly, Jan. 1963. It will be noted that there was an early San Francisco Bay Area railroad called the Western Pacific, which was absorbed into the Central Pacific in the 1870s. The early 20th century line of the same name has no corporate or operational relationship to that pioneer line.

[11] Richard Orsi, *Sunset Limited: The Southern Pacific Railroad and the Development of the American West, 1850-1930,* University of California Press, 2005; David F. Myrick, *Railroads of Nevada and Eastern California: The Northern Roads*; Donald L. Hofsommer, *The Southern Pacific, 1901-1985,* Texas A&M Press, 1986.

[12] See, for example, Ken Rattenne, *The Feather River Route: A Geographical Tour, Son Francisco to Keddie,* Two Volumes, 1980.

[13] There are relatively few books on railroad bridges, relative to those on highway bridges. Two good examples that feature the Feather River bridges are: Brian Solomon, *North American Railroad Bridges,* Voyageur Press, 2008, and Robert J. Cook, *The Beauty of Railroad Bridges,* Golden West Books, 1987.

Valley. The Niles Canyon alignment was first used in the 1860s by a pioneer line, also called the Western Pacific, but which has no corporate relationship with the early 20th century line. The old Western Pacific built through the canyon in 1865 but went bankrupt and was purchased by the Central Pacific.[14] The other difficult crossing the Western Pacific had to endure was the Altamont Pass, separating the Port of Stockton and the Central Valley from the San Ramon Valley and the Niles Canyon connector.

The old Niles Canyon route proved to be less useful than a more direct route between Oakland and Sacramento pioneered by the California Pacific Railroad, which extended from Oakland to Sacramento via a ferry crossing at Vallejo. The California Pacific alignment would prove to be the principal route for the Southern Pacific, relegating the Niles Canyon route to a secondary service. Nonetheless, the Southern Pacific still controlled and was using and upgrading the Niles Canyon alignment when the Western Pacific Railroad began to build its way through the Bay Area in 1909. The Western Pacific 1909 alignment proved to be superior to that of the older Western Pacific. The 1909 line of the Western Pacific is now used by Union Pacific freight trains as well as the busy Altamont Commuter Express passenger service.

The Western Pacific Railroad was never successful financially and the company went bankrupt in 1935. It was reorganized and continued in independent operation until it was purchased by the Union Pacific Railroad in the 1960s. When the Union Pacific purchased the Southern Pacific in the 1990s, Class 1 railroad service in Northern California was consolidated into a single carrier.

Western Pacific San Jose Branch Line

In the early 20th century, the Western Pacific Railroad purchased or built short lines or branches to increase its freight revenue. This issue was broached in a 1915 report of the California Railroad Commission, Rate Department, "Report on Western Pacific Railway," April 1, 1915. [15] The author of the report notes that the newly-built line, if it were to succeed, would need to move into additional markets through the purchase of existing short lines or through construction of branches. The report analyzed various commodities that might add to the profitability of the line and discussed various planned or contemplated extensions from the main line from Oakland to the Feather River Canyon.

The Western Pacific did build many such lines. One extension was made using the old NCO tracks to connect with Reno, Nevada.[16] Another acquisition was the Boca and Loyalton in the Sierra Valley.[17] Another line, built in 1917, connected with the Toole Valley in Utah.[18] Still another line extended from Stockton south to Turlock. In 1918, when the railroad was under federal control, it reported that it was operating 87 miles of branch lines in California, Nevada, and Utah.[19]

The 1915 Railroad Commission report discussed the possibility of a relatively short branch line from Niles Canyon to the San Jose area. "It goes without saying that the Western Pacific Railway should be

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[14] Henry Luna, *Niles Canyon Railways,* Arcadia Press, 2005.
[15] California Railroad Commission, Rate Department, "Report on Western Pacific Railway," April 1, 1915
[16] Myrick, 338.
[17] Western Pacific Railroad, First Annual Report, 1916, 6.
[18] Western Pacific Railroad, Second Annual Report, 1917, 6.
[19] Western Pacific railroad, Third Annual Report, 1918, 6. The importance of "feeder" lines is discussed in detail by Crump, who argues that the absence of such feeder lines was ultimately the undoing of the late-arriving transcontinental line.

constructed south of Niles to San Jose at which point very large terminal facilities should be purchased so as to encourage construction of packing houses and industries on the rails of the new line."[20]

In 1917, the Western Pacific Railroad was reorganized from receivership and its funding was more dependable. It began to contemplate some expansion, including the branch line to San Jose. American entry into World War I, however, put the line into federal control and delayed any such construction. The work began on the San Jose Branch in 1921 and was completed in 1922. The 1921 Annual Report for the railroad expressed optimism that the San Jose Branch would help increase freight traffic. "The outlook is for better freight traffic in 1922 than in 1921. The extension of the Western Pacific line into San Jose and the Santa Clara Valley and a number of minor extensions which together are of substantial importance have recently been completed and should contribute to 1922 revenue."[21]

As discussed later, many commentators, including the staff of the California Railroad Commission, felt that it was most logical for the Western Pacific to use existing Southern Pacific tracks to get from Niles Canyon to downtown San Jose. At this point, however, the Southern Pacific and Western Pacific were unwilling to engage in any discussions about shared trackage or any other type of cooperation. Instead, the Western Pacific chose a great looping approach to San Jose in what many have called a huge fishhook, with a north-south shaft and a hook that turned to the west. It entered the city at the northeast, roughly paralleling Coyote Creek in a north-south direction. It passed near the modern San Jose Municipal Golf Course, crossing Santa Clara Street near where U.S. 101 now crosses Santa Clara. The line turned west near the corner of Senter and Phelan. It looped west into the community of Willow Glen, crossing the Guadalupe River and Los Gatos Creek, before heading due north into old San Jose. It terminated at stops at The Alameda and Sunol Street.

The Western Pacific acquired the Sacramento Northern electric line in an attempt to broaden its market. In 1982, the Western Pacific was acquired by the Union Pacific Railroad. The Union Pacific continues to use most of the Western Pacific "fishhook" though San Jose. The hook through Willow Glen was abandoned in recent years and the track removed in about 2010.[22] The Los Gatos Creek Trestle was left in place but all track removed on either side of it. [23]

Packing Industry in San Jose

One of the main reasons the Western Pacific Railroad decided to build a line from Niles Canyon to San Jose was to take advantage of the fast growing fruit packing business there. Although fruit had been dried for decades before the coming of the Western Pacific Railroad, the Western Pacific did enter the city at a time in which the business was growing rapidly.

There was a bumper crop of fruit in the Santa Clara County region during the 1870s, leading local farmers and businessmen to search for ways to preserve the crop long enough to be shipped outside the

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[20] California Railroad Commission, Rate Department, "Report on Western Pacific Railway," April 1, 1915, 16.
[21] Western Pacific Railroad, Sixth Annual Report, 1921, 6.
[22] Holmes, 162 shows a map of the lines still in use and the parts through Willow Glen that were abandoned.
[23]Camp Dresser & McKee, "Removal Action Plan Workshop Willow Glen Right of Way Minnesota Avenue to Lonus Street, San Jose California, November 8, 2010.

local market. Fruit drying and canning would emerge as the preferred method. Santa Clara County entrepreneurs would make great innovations in the business of fruit packing.[24]

These experiments led to the organization of the San Jose Fruit Packing Company in 1875, which would become a major part of the California Packing Company, or Calpak, which would in turn become the modern Del Monte Corporation. Experimentation included both fruit drying (especially useful for the huge apricot and plum crops) and fruit canning, favored for peaches. The innovations concerned the horticulture as well as industrial methods, especially as they pertained to automation in the drying and canning operations.

This industry was successful but still growing by the time the Western Pacific Railroad completed its branch to San Jose. The Calpak company was organized in 1916 and it first marketed its Del Monte brand in 1917. Calpak had small and large factories throughout the region by 1922. The Muirson Label company, which was responsible for many colorful fruit can and box labels, was also in operation prior to 1922.[25]

This industry had grown around the railroad network of the Southern Pacific Railroad long before the Western Pacific Railroad built to San Jose in 1922.[26] The Southern Pacific controlled a tangle of freight lines through San Jose from lines it developed and especially the line it acquired when it took control of the South Pacific Coast Railroad. The Southern Pacific got control of the South Pacific Coast in 1887 and converted it to standard gauge through dual-tracking in 1904.[27]

The 1932 Sanborn Fire Insurance Maps offer a glimpse of how canners and railroads interacted at the height of the canning industry.[28] Three facts are clear. First, packers are everywhere in the city. Second, there was a critical mass of packing and railroad resources at the huge Calpak Plant No. 3 at San Carlos and Los Gatos Creek, and at Plant No. 51 at Bush and San Fernando. Plant No. 3 was served directly only by the Southern Pacific but the Western Pacific tracks were nearby. Plant No. 51 was served only by the Southern Pacific Railroad. Third, while the Southern Pacific tracks appear to have offered more direct access, a packer could get a car to the Western Pacific through track linkages.

The Annual Reports of the Western Pacific Railroad suggest that the Western Pacific was an active but not dominant shipper of produce from the Santa Clara Valley. The report does not isolate tonnage by point of origin. It does, however, differentiate as to the type of tonnage. One category, particularly apropos for the San Jose area, was "dried fruit." In 1921, before the San Jose Branch was built, the

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[24] The history of fruit packing in the region, oriented toward extant resources, is told in two very interesting places. One is a website, "Cannery Life: Del Monte in the Santa Clara Valley." http://www.historysanjose.org/cannerylife/canned-topics/del-monte-brand.html A second is a text for a tour of cannery sites in San Jose, prepared for the Society for Industrial Archaeology, May-June, 2008. See also: Robert James Claus, "Fruit and Vegetable Canning Industry in the Santa Clara Valley," MA Thesis, San Jose State, August 1966.

[25] SIA walking tour guide. See also another website history, "Label Legacy," dealing with the Muirson label, at http://www.historysanjose.org/labellegacy/places/rancho_el_potrero.html

[26] The most useful general history of railroad development in San Jose is: Norman W. Holmes, *Prune Country Railroading: Steel Trails to San Jose,* Huntington Beach, CA, 1985.

[27] Bruce A. MacGregor and Richard Truesdale, *South Pacific Coast*, Pruett Publishing Company, 1982.

[28] The California Room at the Martin Luther King, Jr. Library in downtown San Jose has a wonderfully intact paper copy of the 1932 Sanborn maps for San Jose.

Western Pacific shipped 7,626 tons of dried fruit. In 1922, when the San Jose branch was active, that figure jumped to 24,360, nearly a four-fold increase, almost certainly attributable to tapping the San Jose market. Between 1922 and 1930, that figure remained consistent: 20,560 in 1923, 23,602 in 1924, 34,321 in 1925, 37,220 in 1926, 44,781 in 1927, 36,157 in 1928, 28,875 in 1929, and 29,605 in 1930.[29] Again, these figures are not specific to Santa Clara County and may have been influenced by shipping elsewhere, such as Butte County, where dried fruit was also important.

Was the Western Pacific dominant in shipping dried fruit? One way to measure this is to compare the Western Pacific tonnage figure with the amount shipped by the Southern Pacific. In 1921, the Southern Pacific shipped 515,584 tons of dried fruit, compared with 7,626 tons for Western Pacific.[30] In 1922, the Southern Pacific figure was 568,501, compared with 24,360 for the Western Pacific. Similar figures were maintained throughout the 1920s: 517,431 in 1923 (20,560 for the Western Pacific); 634,261 in 1924 (23,602 for the Western Pacific); 649,339 in 1925 (34,321 for the Western Pacific); 651,729 in 1926 (37,220 for the Western Pacific); 699,002 in 1927 (44,781 for the Western Pacific); 629,711 in 1928 (36,157 for the Western Pacific); 387,107 in 1929 (28,875 for the Western Pacific); and 399,610 in 1930 (29,605 for the Western Pacific). Neither the Western Pacific nor the Southern Pacific Annual Reports break down shipping by point of origin. Dried fruit was selected as a good indicator of activity in San Jose because of the dominance of Santa Clara County in the production of dried apricots and prunes. In this key measure, the Southern Pacific between 1921 and 1930 shipped between 10 and 20 times as much dried fruit as the Western Pacific.

The Timber Trestle in Bridge Engineering

The timber trestle has been a mainstay of railroad bridge design since the earliest years of American railroad construction and operation, and remains so today. Simply stated, the timber trestle is by far the most common railroad bridge type, particularly in reference to smaller branch lines, such as the San Jose Branch of the Western Pacific Railroad.

A sense of the place of the timber trestle in standard railroad operation is gained from a 1917 publication by Wilcott C. Foster, entitled *A Treatise on Wooden Trestle Bridges According to the Present Practice on American Railroads.*[31] This was written a few years before the Los Gatos Creek Trestle was constructed and is useful in assessing how and why this bridge type was selected for this crossing.

Foster begins his discussion by estimating how many timber trestles may have been in place at that time. He writes:

> The amount of Timber Trestling in this country is very large, but few probably realizing its extent unless they have thoroughly studied the subject. At the present time there are about 2400 miles of single-track railway-trestle in the United States, of which we can

[29] Annual Reports, Western Pacific railroad 1921-1930. Available online from the Western Pacific Railroad Museum.
[30] Southern Pacific Company, Annual Reports, 1921-1930. On file at the California Railroad Museum Library.
[31] Wilcott C. Foster, *A Treatise on Wooden Trestle Bridges According to the Present Practice on American Railroads*, 1917 Edition.

> consider about one quarter as only temporary, to be replaced by embankment. Of the remaining 1800 miles, at least 800 miles will be maintained in wood.[32]

Foster approximates the number of timber trestles, calculated on the basis of an average distribution across the country, to be more than 700,000 nationwide. Foster goes on to express his opinion as to why the timber trestle was such a common part of the American railroad landscape. "The great extent to which timber trestling has been adopted in this country is one of the principal factors in the economy of construction and rapidity of completion which have been characteristic of American railroad construction."[33] The timber trestle, in short, allowed a line to be built quickly and inexpensively with the hope that, as revenue increased for the new line, the wooden bridges could be replaced by steel bridges or embankments.

To a surprising degree, timber trestles appear to be nearly as common today as they were in 1917. The AREMA publishes a *Practical Guide to Railway Engineering,* an encyclopedic guide to all aspects of railroad engineering, which includes a chapter on timber structures. The author of this chapter comments on the common nature of timber trestles: "While the advent of economical steel construction has more or less eliminated timber from new mainline structures of any size, the lower initial cost and ease of construction still makes timber construction attractive for many light density lines. Additionally, because of the relative ease of repair, many significant older timber structures remain in service today. In all of North America, timber trestles are the preponderant type of structure still found on branch lines, short lines and at temporary crossings."[34] This analysis suggests two things. First, railroads keep older timber trestles in service "because of the relative ease of repair." Second, it suggests that for branch lines or short lines, the timber trestle is preferred, even for new construction.

The common presence of timber trestles was also noted in a recent study of railroad bridge safety prepared by the General Accounting Office, or GAO. In this 2007 report on railroad bridge safety, the GAO cited a 1999 survey by the Federal Railroad Administration that found there are 61,000 bridges on Class I railroad lines.[35] Of these, 36 percent are made of timber, making wood the most common bridge material for railroad bridges; the other materials are steel (32 percent), masonry (20 percent) and unidentified materials for the remainder. If these figures are accurate, there are 19,520 timber bridges in use by Class I railroads in the United States. There are also 15,000 bridges owned by Class II and III lines, of which more than 5,000 are timber. Relying upon this large-scale data, it is reasonable to expect that there are more than 24,000 timber bridges in use by railroads today. That number would not include the Los Gatos Creek Bridge, which is not in current railroad use.

One of the key conclusions of the GAO report is that neither the federal government nor the states have systems in place for inspecting railroad bridges or even for knowing how many railroad bridges are in place. This is in stark contrast to the situation with highway bridges, where both the states and the federal government maintain very accurate lists of such bridges as well as the results of regular safety maintenance inspections. As a result, it is far more difficult to draw conclusions about the actual percentages associated with any one bridge type, including the timber trestle. The conclusions of the

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[32] Foster, 1.

[33] Foster, 4.

[34] American Railway Engineering and Maintenance of Way Association, or AREMA, *Practical Guide to Railway Engineering*, 2007. Chapter 8-11.

[35] General Accounting Office, "Railroad Bridges and Tunnels: Federal Role in Providing Safety Oversight and Freight Infrastructure Investment Could Be Better Targeted," GAO 07-770, 2007, 6.

GAO and the AREMA, however, are that the trestle is the most common type of bridge, especially on branch lines or on Class II or III lines.

It is nearly impossible to test the conclusions of the GAO and AREMA commentators because there is no current public data on railroad bridge types. It is possible, however, to see how different bridge types were distributed in California as recently as 1970 by inspecting the records of the Southern Pacific Railroad in the library and archives of the California Railroad Museum. The Railroad Museum has a wonderful collection of bridge logs from the Southern Pacific, going back to the early years of the 20th century. For present purposes, however, the more recent data is most useful, as the more recent the data, the more likely it is to approximate circumstances today. The 1970 bridge log covers only the Southern Pacific Sacramento Division, which included Central California outside the Bay Area, as well as portions of Nevada. The table below shows the distribution of five bridge types on 753 miles of Southern Pacific Railroad. The ODT refers to open deck timber trestle, similar to the Los Gatos Creek Trestle. BDT refers to a ballasted deck trestle, similar to the Los Gatos Creek structure but with a closed box deck that held ballast. Concrete and steel bridges are self-explanatory. Culverts can be concrete or stone, although most appear to have been concrete. These figures indicate that as recently as 1970, timber trestles represented a huge part of the Southern Pacific bridge population. If one discounts the culverts, there were 755 true bridges on these 753 miles of track. Of these, 619 were timber trestles, either open or ballasted decks, or roughly 82 percent of all bridges in that part of the Southern Pacific system.

BRIDGES IN SOUTHERN PACIFIC SACRAMENTO BRANCH, 1970 INSPECTION REPORT

Name of Line	**Miles**	**ODT**	**BDT**	**Concrete**	**Steel**	**Culvert**
Woodland to Tehama	108	1	121	0	4	208
Roseville to Castle Rock	192	9	229	6	45	788
Sacramento to Rocklin	23	2	13	4	13	85
Rocklin to Colfax	31	2	14	1	13	99
Colfax to Norden	51	0	4	1	13	422
Norden to Eder	5	0	4	0	0	57
Eder to Reno	45	1	64	1	11	298
Polk to Elvas	4	0	0	0	0	15
Citrus Heights	2	2	0	0	0	3
Woodland to Knights Landing	17	4	2	1	1	3
Mattheson Branch	10	0	1	1	1	97
Oroville	25	2	0	0	2	15
Placerville line	60	21	2	3	4	295
Stirling Branch	30	10	1	0	2	147
Walnut Grove Branch	33	15	2	0	4	55
Yuba City	44	4	0	1	0	26
Colusa Branch	73	80	9	0	4	127
TOTALS	753	153	466	19	117	2740

Another interesting point from the 1970 bridge inspection report is that timber trestles were not a product only of the early years of railroad construction. To get a sense of when these bridges were located, records were inspected for 79 timber trestles on about 80 miles of track on the Woodland to Tehama line. Of these, 18 (23 percent) were built between 1900 and 1909, 2 (3 percent) between 1911 and 1920; 24 (30 percent) between 1921 and 1930; 28 (35 percent) between 1931 and 1940; and 7 (9 percent) after 1940. These figures are consistent with the observations of the AREMA guidelines that timber trestles are still commonly used in branch lines; by 1970 the Woodland to Tehama Branch had diminished in utility and has since been largely taken over by a short line operator.

The Development of the Community of Willow Glen

Willow Glen has arguably a more complicated relationship with San Jose City Hall than any other neighborhood within San Jose. Willow Glen began life as a named but unincorporated community at the southern edge of San Jose. It became a separate incorporated city in 1927, in large part because of disagreement with the City of San Jose about where the Southern Pacific Railroad should built its north-south alignment. Nine years later, it allowed itself to be annexed to the City of San Jose but has held on to a spirit of independence, born of its brief life as a separate city.

The Willow Glen community is south and a little west of downtown San Jose. It was first settled in the 1860s as an agricultural community but was increasingly converted to suburban and urban uses in the early 20th century.[36] Community leaders attempted to incorporate in 1917 but that effort failed. They tried again in 1927 and the effort was successful. In 1936, the people of the City of Willow Glen voted to be annexed into the City of San Jose and the community has been part of San Jose since that time.

The actions of the Southern Pacific and Western Pacific played a part in the decision to incorporate in 1927 and, in the view of some, to unincorporate in 1936. The problem with the Southern Pacific was also a source of disagreement between the people of Willow Glen and the city government of San Jose. The Southern Pacific had an active line that ran down 4th Street in downtown San Jose, which caused traffic congestion in the downtown area. The city council of San Jose sought to force the Southern Pacific to move the line west, which would have resulted in a bifurcation of the Willow Glen community.[37] The Southern Pacific had actually acquired a right of way through the area but construction was delayed by American entry into World War I and governmental takeover of the railroad system.

At the same time, the Western Pacific Railroad sought approval from the Railroad Commission to build into San Jose via a circuitous “fishhook” alignment discussed earlier. The people of Willow Glen complained mightily to the Commission. As discussed below under “Grade Separations,” the engineer for the Railroad Commission observed that Willow Glen people were opposed to any entry of the Western Pacific Railroad into San Jose, especially into the Willow Glen neighborhood.

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[36] There are numerous histories of this community. Darrell Alvin Hoff, “A Study of the Community of Willow Glen, San Jose, California,” M.A. San Jose State University, 1995; John Rivizza, “Splendid Isolation: A Brief History of the City of Willow Glen, 1927-1936,” 1994; Bob Garratana, *Old Willow Glen,* 1977;

[37] Hoff, 88.

Likely in response to both railroad alignments (Southern Pacific and Western Pacific), local leaders petitioned the County Board of Supervisors to schedule an incorporation vote. The vote was taken in November 1917 but failed 273-155.[38]

The ire of the community was tested again in 1927. As one historian notes: "On July 22, 1927, the Southern Pacific, in conjunction with the San Jose City Council and City Manager, announced a plan for the removal of the 4th Street Railway station and tracks and the re-routing of a new railway. The new route would run from downtown San Jose along the Alameda, across Los Gatos Creek, around the Palm Haven district and across Willow Street through the Willow Glen district."[39] Another election was held in November 1927 and this time the vote passed.

Willow Glen would remain an independent city for only nine years, annexing itself to San Jose in 1936. During those years, the Southern Pacific and City of San Jose managed to figure out how to get the trains off 4th Street without going through Willow Glen. The Southern Pacific moved its main depot to Cahill Street (the modern Diridon Station) and the north-south track that once went down 4th Street was moved to an alignment that just missed going through Willow Glen. That station and track realignment were completed in 1935. The next year, Willow Glen voted to annex itself to the city, giving it access to better sewers and other civic amenities.

Grade Separation as a Safety Issue in California and San Jose

Throughout the 20th century and into the 21st century, the State of California has wrestled with the question of how best to eliminate conflicts between automobile and truck traffic on the one hand and railroad traffic on the other. The origin of this conflict was clear: most train corridors were built before automobiles and trucks came into widespread use and, even among later-developed train lines such as the Western Pacific Railroad, railroad traffic had priority when railroad and vehicular traffic met at grade.

The conflict over vehicular-railroad traffic was especially heated during the early decades of the 20th century, as car and truck usage accelerated in California, faster than in any other state of the union. In 1916, the California Railroad Commission produced a report, "General Program on Investigation of the Grade Crossing Problem in California to be Undertaken by the Commission." [40] The report analyzed the extent of the problem. "The grade crossing conditions in California are worse than in any other state in the Union." California at that time had two percent of the trackage in the country but five percent of accidents involving vehicles and railroads. And the problem was huge: in 1914, 4,900 Californians were killed or injured through a vehicle-train collision.[41] The Commission estimated the cost of providing grade separations and concluded it was so expensive that, "Plainly any movement to separate all grade crossings in the State is entirely out of the question." The Commission recommended a course of installing better signals, cutting down visual obstructions, and so forth, but pursuing grade separations "in extreme cases and only as a last resort."

[38] Rivizza, 5.
[39] Rivizza, 5.
[40] California Railroad Commission, "General Program on Investigation of the Grade Crossing Problem in California to be Undertaken by the Commission," January 1916.
[41] 1916 report, page 2.

The interface between vehicles and trains was both dangerous and annoying. Even where signals were installed, for example, vehicles might have to wait for long periods of time while a train or trains cleared the roadway. The grade separation movement reflected an attempt by the various communities within the state to convince the Railroad Commission that the situation in that community constituted an "extreme case" and deserved a "last resort" solution.

In some cases, the communities were successful. The problem in the City of Los Angeles, for example, was so dire that all parties, including the railroads, agreed that something needed to be done. The Railroad Commission was able to convince the railroads and the city to jointly sponsor a series of large bridges across the tracks, which ran along both sides of the Los Angeles River. This effort, financed equally by the city and the railroads, was one of the most ambitious grade separation programs anywhere in the United States. The joint railroad-city cooperative program also resulted in construction of Union Station in downtown Los Angeles.[42]

Not surprisingly, the people of San Jose and the emerging community of Willow Glen tried to make a case for being an "extreme case" deserving grade separations when the Western Pacific Railroad proposed to build through the area.

In late 1917, the Engineering Department of the California Railroad Commission prepared a lengthy report on grade crossing issues raised by the proposal of the Western Pacific Railroad to build an extension from Niles Canyon to San Jose.[43] The author, H.G. Butler, was the Assistant Chief Engineer for the California Railroad Commission. He made it clear that the Commission was put in a difficult position by the attitudes of the leaders of the Western Pacific and the Southern Pacific Railroad. The City of San Jose had asked the Commission to compel the Western Pacific to use existing Southern Pacific tracks between Niles Canyon and San Jose, and to compel the Western Pacific and Southern Pacific to build a Union Station to serve passengers from both lines. At one point, he notes: "if joint trackage is possible and desirable, and there is no question that it is desirable, the logical place to make connection between the two roads would be at Niles."[44] But he lamented that it was virtually impossible to achieve joint usage because the Southern Pacific had refused to allow use of its tracks by a competitor and because Western Pacific leadership had insisted that it simply would not go into San Jose except on its own tracks. He concluded: "On the whole, the practical difficulties in the way of bringing about a joint use of tracks seem to be insurmountable, as far as orders of the Commission are concerned."

In the rest of the long report, Butler explores steps that can be taken to increase safety for the various places the Western Pacific would need to cross highways or other railroad lines, with a crossing-by-crossing analysis of the types of signals and sightlines improvements that would be required.

In his transmittal letter, Butler comments on objections raised by the residents of what was then the unincorporated community of Willow Glen, or Willow Glenn, as he spelled it. His conclusion was that there was nothing the Railroad Commission could do to mollify the residents of Willow Glen. "I have not commented on the protest of the people in the Willow Glenn district, as it appears that it is directed

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[42] The Los Angeles situation is detailed in: Stephen D. Mikesell, "The Los Angeles River Bridges: A Study of the Bridge as a Civic Monument," *Southern California Quarterly,* Winter 1986, pp. 365-386.
[43] California Railroad Commission, Engineering Department, "Application 3139. Subject: Report on Proposed Crossings of Western Pacific Railroad, Niles to San Jose." H.G. Butler, Assistant Chief Engineer, September 26. 1917.
[44] Page 4.

against the construction of any line rather than the manner in which this particular line is to be built. I do not believe that a separation of grades at all crossings in this district would remove the objections of these protestants, and a discussion of the matters seems to be outside the purpose of this report."[45] It seems clear that the residents were asking for construction of grade separation but Butler concluded that not even that would appease them.

The disagreement about the railroad traffic of the Western Pacific paled in comparison to a much more heated debate in 1925 over the proposal by the City of San Jose to move Southern Pacific Railroad tracks from 4th Street in San Jose to Lincoln Avenue, generally acknowledged as the "Main Street" of Willow Glen. It was the debate over the relocation of the Southern Pacific tracks that convinced residents of the unincorporated community of Willow Glen to incorporate as a separate city.[46]

F. APPLICATION OF THE CRITERIA FOR THE NATIONAL REGISTER AND CALIFORNIA REGISTER

The Criteria for the National Register and California Register are presented in Section C above. It will be observed that the criteria are nearly identical, with the four National Register criteria identified by letters A, B, C and D and the California Register criteria by numbers 1, 2, 3, and 4. In the analysis below, the National Register Criteria and California Register Criteria will be applied in groups of similar criteria (A and 1, B and 2, C and 3, D and 4).

National Register Criterion A, California Register Criterion 1

The majority of the topics identified during the Scoping Meeting for this project and during legal proceedings leading to the current EIR are best considered under the "association with events" criteria A and 1. These include association with the Western Pacific Railroad, association with the Santa Clara County fruit packing industry, association with the development of the community of Willow Glen, and association with the grade separation movement. These will be discussed separately below.

- *Association with the Western Pacific Railroad*

This trestle does not appear to be significantly associated with the history of the Western Pacific Railroad. As discussed in the Historic Context, the Western Pacific Railroad represented an ill-fated attempt by the Gould family to break the Harriman family's stranglehold on the West Coast, particularly the Bay Area of California. It was a daring investment that defied the most consolidated railroad line in the world at the time. The Western Pacific extended throughout the Western United States and in specific communities played an extremely important role. In San Jose, however, the Western Pacific was a latecomer and its contribution never matched that of the long-established Southern Pacific.

The National Register of Historic Places has excellent guidance on how to apply National Register Criterion A. The Office of Historic Preservation, which has jurisdiction over the California Register, announces on its website that its California Register guidance is under review and not currently

[45] Transmittal letter, 1917 report.
[46] Cecily Barnes, "Willow Glen residents think of their community, rather than their history, on Founders Day, 1998," reprinted on http://www.willowglen.com/history/founders.shtml

available. [47] Because the eligibility criterion 1 for the California Register is almost identical to that of National Register Criterion A, we can safely apply the National Register guidance as a guide to California Register eligibility as well.

National Register guidance in Bulletin 15 offers a three-step process for assessing significance under Criterion A:

- Determine the nature and origin of the property;
- Identify the historic context with which it is associated;
- Evaluate the property's history to determine whether it is associated with the historic context in any important way.[48]

As we have seen, the history of the Western Pacific was characterized by daring economic and engineering achievements because existing railroads, especially the Southern Pacific, had long before captured the easiest routes to various California markets. If one wished to point to the physical remains that best characterize the history of the Western Pacific, it would be the great pass through the Feather River Canyon, which still retains many aspects of its original 1906 design.

The Branch Line to San Jose reflects the history of the Western Pacific in that it followed a convoluted alignment to avoid or reduce interaction with existing Southern Pacific operations. The Western Pacific had just emerged from bankruptcy before it began construction into San Jose. While it had enough funds to expand, the Western Pacific was famous for economizing in construction. Norman Holmes in his study of railroading in *Prune Country Railroading*, argues that the Western Pacific was unusually penurious in building the San Jose line, noting that "because of WP's financial condition, trackage was constructed as inexpensively as possible, using 75 lb. rail, untreated pine ties, no tie plates and little or no ballast."[49] The San Jose Branch was one of the last "feeder" lines built by the Western Pacific; later expansion was achieved chiefly through acquisition of short lines.

The historic context for the Western Pacific, even the Western Pacific San Jose Branch, does not suggest that this timber trestle is associated with this development "in any important way." The trestle, like other trestles and bridges along the San Jose Branch, helped the branch to operate but only as part of a coordinated transportation network. There is little reason to conclude that this structure's contribution to the Western Pacific Railroad is significant, as significance is measured under National Register Criterion A.

- *Association with the Santa Clara County Fruit Industry*

This trestle does not appear to be significantly associated with the Santa Clara County fruit packing industry. It is beyond dispute that the fruit packing industry was important to the economy and social network of Santa Clara County for more than half a century, between the late 1870s and American

[47] www.ohp.parks.ca.gov states that: "Because Technical Assistance Bulletin 7, California Register, is now under review for updates and revisions, there are no manuals for nominating California Register properties."
[48] National Register Bulletin 15, 12.
[49] Norman W. Holmes, *Prune Country Railroading: Steel Trails to San Jose,* Huntington Beach, CA, 1985, 141. 75 lb. rails are not used today.

involvement in World War II. This trestle, however, is only tangentially related to that industry and does not meet the guidelines for how Criterion A of the National Register should be applied.

It will be recalled that the National Park Service calls for a three-step process in applying Criterion A to a specific property: to identify the nature of the property, to identify the historic context with which it is associated, and to evaluate whether that property "is associated with the historic context in any important way." Some who commented during the Scoping Session for the EIR concerning this trestle argued that the trestle is important for its association with the canning industry in San Jose and elsewhere in Santa Clara County, drawing attention to the indisputable importance of the packing industry to the region.

The National Register guidelines differentiate, however, between the importance of the historical development and the importance of the association between a historic property and that historical development. Few would dispute the notion that the packing industry was a key economic force in Santa Clara County from the 1870s through the 1950s. It is legitimate to ask, however, whether this trestle is associated with that development "in any important way."

Drying and canning fruit was an industry that required the involvement of a long chain of participants, from the growers who provided the produce to the wagons, trains, and trucks that carried the finished product to market. At the heart of the industry, however, were the physical plants where the canning and drying took place. Those plants were importantly associated with this industry.

The historical record indicates that there were dozens of such plants in the county, with the biggest collection being in San Jose. These sprawling industrial plants did not fare well once the industry failed in the 1960s. However, there are some physical remnants that were directly and importantly associated with this resource. In 2008, the Society for Industrial Archaeology (SIA) held its annual meeting in San Jose and presented several "walking tours," one of which was entitled "Cannery Life." The tour included several cannery sites for which almost nothing is left and several others where there are some physical remains. There is also a list of properties that have been designated Historic City Landmarks by the City of San Jose, some of which are mentioned in the SIA walking tour. These two sources do not offer a complete listing of properties that were directly related to this industry but they do suggest that at least a few such resources still exist. These include the CalPak District Manager's Office at 734 The Alameda (HL05-154); Pickle Factory Plant No. 39 at 621 N. Eighth Street (HL92-79); Bayside Canning Company at 1290 Hope Street (HL92-69); American Can Company Factory at 190 Martha Street (HL-92-94); and the Stevens Ranch Fruit Barn, moved to History Park in 1979. The SIA tour suggests that remnant pieces can still be found from Calpak No. 3, the biggest cannery in the area, and of Calpak No. 51, also a very substantial operation.[50]

On balance, it is difficult to conclude that the Los Gatos Creek Trestle is related to the Santa Clara County canning industry in any important way. It is one piece of dozens of transportation networks that served that industry. The association of the trestle with that industry is so secondary that it does not appear to meet the National Register Criterion A guidelines.

- *Association with the early history of the Willow Glen community*

[5050] This discussion does not ensure that all of the resources mentioned in the SIA tour or designated as a San Jose Landmark still exist and retain integrity.

As discussed in the Historic Context, the community of Willow Glen was briefly an independent and incorporated city. The impetus for incorporation is generally interpreted as being a three-way struggle among the citizens of the Willow Glen neighborhood, the City Council of San Jose, and the Southern Pacific Railroad over the alignment of the Southern Pacific's major north-south track. The track passed down 4th Street in downtown San Jose, causing great traffic congestion among San Jose motorists. Under state law, the Southern Pacific had a franchise from San Jose to operate within city limits. That franchise expired in the early years of the 20th century and San Jose leaders sought to use the need for a new franchise as leverage to force the Southern Pacific to move its tracks to the west, and to consolidate its passenger service in the area now served by Diridon Station. In 1927, the Southern Pacific and city leaders in San Jose announced agreement on a western alignment that would have included a diagonal passage through Willow Glen. This agreement caused Willow Glen activists to ask for an incorporation vote. Historian Bob Garratana summarizes this situation: "But in 1927 residents rallied themselves for a common cause. The Southern Pacific Railroad, whose contract had expired years earlier, was planning to bisect this quiet community by rerouting its tracks from 4th Street down Willow through a portion of Willow Glen. The battle cry was 'Let's keep the railroad out of our bedrooms.'"[51]

It is also true that there was an earlier unsuccessful attempt at incorporation that was spurred by Willow Glen residents' concern about the Southern Pacific realignment as well as the entry of the Western Pacific into the neighborhood. A previously cited report by an engineer for the California Railroad Commission makes clear that Willow Glen residents had objected to any form of the alignment passing through their neighborhood. He wrote: "I have not commented on the protest of the people in the Willow Glenn district, as it appears that it is directed against the construction of any line rather than the manner in which this particular line is to be built. I do not believe that a separation of grades at all crossings in this district would remove the objections of these protestants, and a discussion of the matter seems to be outside the purpose of this report."[52]

In analyzing the relationship between the Los Gatos Creek Trestle and this chapter of Willow Glen history, there are two good reasons to conclude the two are not associated "in any important way." First, the historical record is clear that was it the proposed realignment of the Southern Pacific's 4th Street track, not the building of the Western Pacific line, which precipitated the incorporation of Willow Glen. To commemorate that relationship, one would better look to the 1935 alignment of the Southern Pacific Railroad, the physical manifestation of the long debate over where and how to realign that track. Diridon Station, for example, is a stately and important example of a resource that was built specifically for that purpose. There are also numerous grade separations around Diridon Station which grew out of the same agreement for realigning the track, reflecting the concern by the leaders of San Jose not simply to move gridlock from 4th Street to the new alignment near Cahill Street.

Second, the incorporation movement was not only about stopping the railroad; it resulted in the creation of a small city that was self-governing for nine years. A resource that is importantly associated with this early history of Willow Glen should take into account that the city actually

[51] Bob Garratana, *Old Willow Glen,* 1977. 110.

[52] California Railroad Commission, Engineering Department, "Application 3139. Subject: Report on Proposed Crossings of Western Pacific Railroad, Niles to San Jose." H.G. Butler, Assistant Chief Engineer, September 26. 1917. Transmittal letter.

governed the neighborhood for nine years: maintaining streets, arranging for police services, handling garbage, and so forth. It is likely there exists within the neighborhood a building that more closely reflects how the city functioned: a city hall, a fire department building, a police station, or something of the sort.

It is beyond the scope of the present study to inventory any and all buildings directly associated with the brief period of self-government. The point to be made is that a building directly associated with self-government would reflect that period of neighborhood history in a direct manner. The association of this 1922 timber trestle with the 1927-1936 period of self-government is distant at best.

- *Association with the grade separation movement*

As discussed in the Historic Context, there has been a persistent movement in California and throughout the United States to provide better separation of automobile and train traffic. This movement involves both safety and traffic flow issues. As noted in the Historic Context, a 1916 study by the California Railroad Commission found that there were 4,900 deaths or injuries in 1914 in California associated with railroad-auto interface.[53] Cities throughout the state scrambled to find a way to provide some type of relief, with grade separation being the most effective but also the most expensive option.

The long dispute between the residents of Willow Glen and the City of San Jose was precipitated by an effort in San Jose to eliminate its greatest auto-railroad choke point on 4th Street downtown. The preferred solution in 1927 involved moving the congestion point from downtown San Jose to streets in Willow Glen, something that was not well-received in Willow Glen. Ultimately, the railroad and the City of San Jose found an alignment that moved the trains off 4th Street but also bypassed Willow Glen, no doubt moving the point of congestion to points north and west of Willow Glen. The solution did, however, result in various grade separations near Diridon Station, at Julian, Alameda, Park, San Carlos, Bird, Delmas, Provost, and Willow. Many of those grade separations are still in use.[54]

The Los Gatos Creek Trestle is particularly unrepresentative of this problem in that it carried a railroad over a waterway and is not directly associated with either the problem or the solution. There are bridges that have been listed in the National Register of Historic Places on the basis of solving the grade crossing problem; the aforementioned Los Angeles River bridges, built in the 1920s and early 1930s, were listed for that reason as well as the architecture of the bridges. Another Northern California example is the Sierra Boulevard Overhead structure in Roseville over the Union Pacific tracks. It is worth noting that the solution to a grade crossing problem ordinarily involves a highway bridge or a highway underpass rather than a railroad bridge because it is usually more cost effective to raise or sink a highway than to raise or sink a railroad. The aforementioned railroad underpasses around the 1935 realigned Southern Pacific tracks are directly associated with the grade separation movement in San Jose and Santa Clara County. The Los Gatos Creek Trestle is not, and it does not qualify for listing in the National Register or California Register for a potential association with this historic theme.

---

[53] California Railroad Commission, "General Program on Investigation of the Grade Crossing Problem in California to be Undertaken by the Commission," January 1916.

[54] California Department of Transportation, Bridge Inventory indicates that the San Carlos Grade separation 037c-195) was built in 1932 and is still in use, as it the facility at Julian (37c-207, 1935); at Taylor (37c-278, 1935}; Delmas (37C-704, 1935) and Almaden (37c-264, 1936).

National Register Criterion B, California Register Criterion 2

There is no indication that the Los Gatos Creek Trestle is associated with a person important to our history. Neither was there a suggestion made during the Scoping for the current EIR that such an association exists. It is concluded the trestle does not meet either National Register Criterion B or California Register Criterion 2.

National Register Criterion C, California Register Criterion 3

- Rarity or importance as an example of a timber trestle bridge

National Register Criterion C includes four possible ways in which a property may qualify: embodies distinctive characteristics of a type, period, or method of construction; represents the work of a master; possesses high artistic value; or represents a significant and distinguishable entity whose components may lack individual distinction. Of these, only the first has been mentioned as a potential area of significance for the Los Gatos Creek Trestle. There has been no suggestion that the trestle was designed by a master bridge engineer.[55] No one has suggested that the trestle is of "high artistic value." And the fourth category applies to historic districts and no one has suggested that this isolated trestle is part of a potential historic district. In applying National Register Criterion C to this trestle, the appropriate guidance from the National Register bulletin is that applying to "distinctive characteristics of a type, period, or method of construction."

In discussing the distinctive characteristics and the type, period or method of construction, Bulletin 15 offers the following guidance: "A structure is eligible as a specimen of its type or period of construction if it is an important example (within its context) of building practices of a particular time in history. For properties that represent the variation, evolution, or transition of construction types, it must be demonstrated that the variation, etc., was an important phase of the architectural development of the area or community in that it had an impact as evidenced by later buildings."[56] It will be observed that the language of this guidance is clearly directed toward architectural values and properties; the National Register guidance often must be interpreted to apply to engineering features.

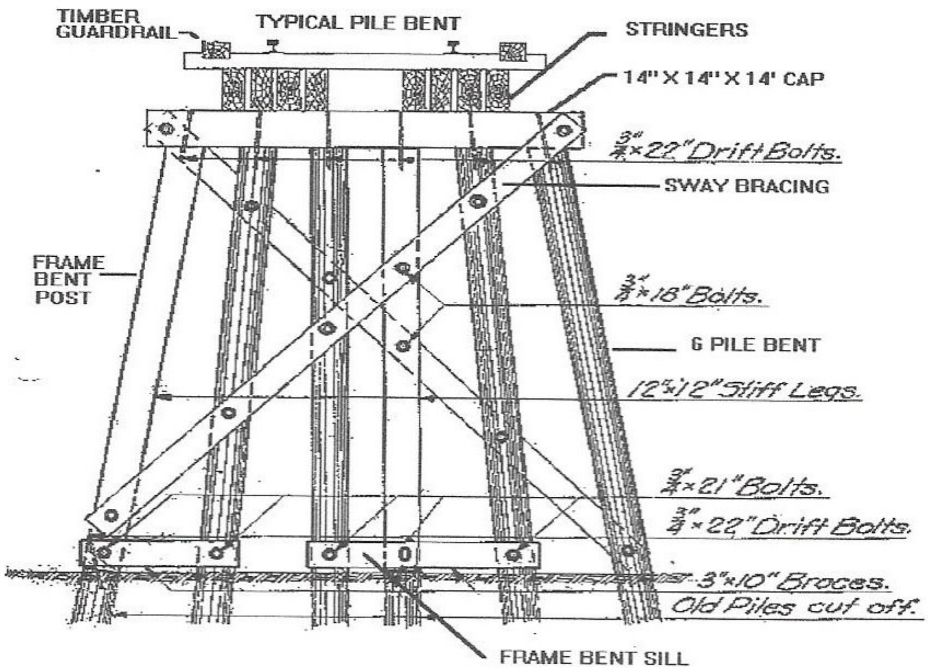
Using this guidance, the type and period of construction are easily identified. The bridge type is an open deck, pile-supported timber trestle. The "open deck" part of the type description refers to a deck in which there is no ballast; the opposite is a "ballast deck." The "pile-supported" part of the type description refers to the use of bents made of timber piles in the substructure. As noted earlier, this bridge is somewhat unusual in that there are different numbers of piles in different bents, but in general, one could characterize the substructure as comprising six-pile bents, noting that the number of piles sometimes varies.

The AREMA inspection manual includes an illustration of a typical 6-pile bent, braced in the manner of the Los Gatos Creek Trestle described earlier. This illustration fits the bents of the Los Gatos Creek Trestle very closely, except that in some instances there are more or fewer than six piles.

---

[55] Unfortunately, despite repeated efforts, the author of this report was not able to locate original plans for this bridge. The City of San Jose was not given any such plans when it assumed ownership from the Union Pacific Railroad. The author inspected all citations to "Technical Drawings" in the vast Western Pacific Railroad holdings of the California State Railroad Museum library. While there are some bridge plans in that collection, there is no bridge plan for this trestle.

[56] Bulletin 15, 18.



From American Railway Engineering and Maintenance of Way Association, *Practical Guide to Railway Engineering,* 2003.

In assessing whether the Los Gatos Creek Trestle represents "an important example (within its context) of building practices of a particular time in history," the structure must be seen as both a typical and an atypical example of its type. It is typical in that it was originally constructed in a manner called forth in all historic as well as contemporary analyses of the timber trestle structural type. It is atypical in that it has been repaired and maintained in ways that have detracted from its ability to convey the typical appearance of such a structure.

One point that must be recalled is that a timber trestle is a very common resource type. The historic context documents that timber trestles are found in the thousands in California. Historic preservationists have long recognized the difficulty involved in evaluating resource types for which there are many examples.

Fortunately, the National Register program at the National Park Service does offer some guidance for dealing with common resource types, in "Evaluating Common Resources for National Register of Historic Places Eligibility: A National Register White Paper."[57] This "White Paper" recognizes that certain resource types are "ubiquitous, and, therefore, difficult to evaluate." In dealing with ubiquitous resources, this White Paper places special emphasis on recognizing types and sub-types of the common resources as a way of differentiating significant from insignificant examples. By identifying sub-types, it

[57] Barbara Wyatt, "Evaluating Common Resources for National Register of Historic Places Eligibility: A National Register White Paper," 4-9-09.

may be possible to "reduce the number of properties or groups of properties that constitute a basis for comparison."

As discussed in an earlier section of this report, the only distinction made by bridge inspectors for the Southern Pacific Sacramento Department was between open deck and ballast deck timber trestles. This distinction concerns only the deck supports; the timber trestle types are otherwise nearly identical. In his thoughtful analysis of railroad bridge types, *The Beauty of Railroad Bridges,* Richard J. Cook suggests another sub-type in timber trestles: the framed trestle, which was built around four-legged frames, usually of squared timbers. The framed trestle form was used for very tall bridges and provided the most dramatic and daring crossings.

Cook includes photographs of only a few of the most dramatic examples of different bridge types (stone bridges, steel trusses, concrete arches, timber trestles, and so forth). Every timber trestle illustrated in his book is a framed trestle, most of them being very tall and dramatic. Well-known timber trestles in California are also dominated by framed trestles. Two very notable examples, both owned by California State Parks, are framed timber trestles. One is the Pudding Creek Trestle, near Ft. Bragg on the Mendocino Coast. Another is the Carrizo Gorge, or Goat Canyon, Trestle in Anza-Borrega State Park in the desert of San Diego County.

Pudding Creek Trestle

Goat Canyon Trestle

Following the logic of the White Paper on Common Resources, one may conclude that there are, in fact, specific sub-types of the timber trestle bridge type that can be seen as significant. The tall framed trestles, for example, achieved great engineering significance and incredible beauty. The far more common pile-bent trestles are so common as to make it unlikely that any one would be significant under National Register Criterion C on the basis of its design alone. A trestle might also be significant for historical associations, as with the Southern Pacific trestle on the coast in Orange County, California that gained great celebrity as the gateway to The Trestles, a surfing spot listed in the National Register for its role in the development of the California surf culture.[58] That type of significance, however, would better be judged under National Register Criterion A.

On balance, there is no evidence to suggest that the Los Gatos Creek Trestle achieved the kind of distinction needed to represent a significant example of a common property type. It does not appear to be significant under National Register Criterion C or California Register Criterion 3.

G. OVERALL CONCLUSIONS REGARDING POTENTIAL HISTORICAL SIGNIFICANCE OF THE LOS GATOS CREEK TRESTLE

This report applies the eligibility criteria for the National Register of Historic Places and the California Register of Historical Resources to the Los Gatos Creek Trestle, to determine whether it meets the definition of a :historical resource," as that term is used in CEQA guidelines. This report concludes that the trestle does not meet the National Register or California Register eligibility criteria and is not a historical resource.

[58] Lamentably, the trestle for which the site was named was recently replaced with a metal bridge.

H. SIGNIFICANCE UNDER CITY OF SAN JOSE LANDMARKS PROGRAM

The City of San Jose, like most medium- to large-sized California cities, has adopted a landmark ordinance that enables the City to designate properties as historic landmarks. The legal basis for this program is found at San Jose Municipal Code, Chapter 13.48, Historic Preservation.

As with most municipal historic preservation programs, the City of San Jose assigns primary responsibility for designating landmarks to a Historic Landmarks Commission. An applicant for landmark designation is asked to complete a landmarks nomination form, which applies the basis for landmark designation to a specific property. The landmark commission is responsible for making a finding that the property in question meets the city criteria for landmark designation. This process, including the criteria, are quoted below.

> *13.48.110 Designation*
>
> H. Prior to recommending approval or modified approval, the historic landmarks commission shall find that said proposed landmark has special historical, architectural, cultural, aesthetic, or engineering interest or value of an historical nature, and that its designation as a landmark conforms with the goals and policies of the general plan. In making such findings, the commission may consider the following factors, among other relevant factors, with respect to the proposed landmark:
>
> 1. Its character, interest or value as part of the local, regional, state or national history, heritage or culture;
> 2. Its location as a site of a significant historic event;
> 3. Its identification with a person or persons who significantly contributed to the local, regional, state or national culture and history;
> 4. Its exemplification of the cultural, economic, social or historic heritage of the city of San José;
> 5. Its portrayal of the environment of a group of people in an era of history characterized by a distinctive architectural style;
> 6. Its embodiment of distinguishing characteristics of an architectural type or specimen;
> 7. Its identification as the work of an architect or master builder whose individual work has influenced the development of the city of San José;
> 8. Its embodiment of elements of architectural or engineering design, detail, materials or craftsmanship which represents a significant architectural innovation or which is unique.

It will be noted that the San Jose ordinance uses the term factors to describe the criteria for designation, rather than the term, “criteria,” which is used in state and federal designation processes. These factors are repeated nearly verbatim in the City of San Jose application form for historic landmark designation, as follows:

BRIEF STATEMENT EXPLAINING WHY THE PROPOSED LANDMARK HAS SPECIAL HISTORICAL, ARCHITECTURAL, CULTURAL, AESTHETIC, OR ENGINEERING INTEREST OR VALUE OF AN HISTORICAL NATURE, AND HOW THE CHARACTERISTICS OF THE PROPOSED LANDMARK MEET WHICHEVER OF THE FOLLOWING THAT APPLY:

1. Its character, interest or value as part of the local, regional, state or national history, heritage or culture;
2. Its location as a site of a significant historic event;
3. Its identification with a person or persons who significantly contributed to local, regional, state or national culture and history;
4. Its exemplification of the cultural, economic, social or historic heritage of the City of San Jose;
5. Its portrayal of the environment of a group of people in an era of history characterized by a distinctive architectural style;
6. Its embodiment of distinguishing characteristics of an architectural type or specimen;
7. Its identification as the work of an architect or master builder whose individual work has influenced the development of the City of San Jose;
8. Its embodiment of elements of architectural or engineering design, detail, materials or craftsmanship which is either unique or represents a significant architectural innovation.

The landmark designation process in San Jose requires a positive recommendation and finding by the Historic Landmarks Commission and approval by the City Council. There is a slightly different process for designating historic districts but it too requires a finding by the Commission and approval by the City Council.

Two general conclusions may be drawn about the landmark designation process and the factors used to establish significance. First, the eight factors take into account many of the same values embodied in the National Register criteria. Second, the ordinance assigns responsibility for applying these factors to the Historic Landmarks Commission and the City Council. On balance, it must be observed that there is no legal basis for any party other than the Historic Landmarks Commission and the City Council to apply these "factors." The best that an outside party can propose is an opinion about how these factors appear to apply to any given property, such as the Los Gatos Creek Trestle.

Relationship between the San Jose Landmarks factors and National Register Eligibility Criteria

While there are obvious differences between the San Jose factors and National Register eligibility criteria, it is also clear that there are important similarities. It will be recalled that there are four National Register criteria, labeled A, B, C, and D. Criterion A pertains to association with important events. Criterion B pertains to association with important persons. Criterion C pertains to significance in design, generally architecture or engineering. And Criterion D relates to "information important to our history," and is most commonly applied to archaeological sites.

The City of San Jose factors 1 and 2 are closely related to National Register Criterion A, association with important events.

1. Its character, interest or value as part of the local, regional, state or national history, heritage or culture;

2. Its location as a site of a significant historic event;

San Jose factor 4 also seems to relate to National Register Criterion A, which is often used to apply to the cultural history of groups, such as ethnic groups or religious groups.

4. Its exemplification of the cultural, economic, social or historic heritage of the city of San José;

San Jose factor 3 is very similar to National Register Criterion B, association with important people.

3. Its identification with a person or persons who significantly contributed to the local, regional, state or national culture and history;

San Jose factors 5, 6, 7, and 8 are similar to, although more expansive, than National Register Criterion C, which is geared toward significance in architecture or engineering.

5. Its portrayal of the environment of a group of people in an era of history characterized by a distinctive architectural style;

6. Its embodiment of distinguishing characteristics of an architectural type or specimen;

7. Its identification as the work of an architect or master builder whose individual work has influenced the development of the city of San José;

8. Its embodiment of elements of architectural or engineering design, detail, materials or craftsmanship which represents a significant architectural innovation or which is unique.

Does the Los Gatos Creek Trestle meet the factors in San Jose Landmarks ordinance?

As discussed earlier, the scoping session for the EIR for this project brought forth numerous questions that relate to National Register Criterion A. These included: association with the Western Pacific Railroad; association with the Western Pacific San Jose Branch; association with the canning industry of San Jose; and association with the history of the Willow Glen neighborhood.

These historical associations also align with San Jose landmark factors 1, 2, and 4. The history of the Western Pacific Railroad is best assessed under factor 1 and 2 as is the history of the canning industry. The development of the Willow Glen neighborhood might best be assessed under factor 4.

Across the board, the logic in applying National Register Criterion A applies to factors 1, 2, and 4. The importance of the trestle to the canning industry of San Jose is the same, whether analyzed under Criterion A or factors 1 or 2. The facts regarding the role of this trestle in servicing the canning industry do not change and the basis for ineligibility under National Register Criterion A is the same as that for San Jose factors 1 and 2. The same may be said of the relationship between this trestle and the development of the Western Pacific Railroad. This trestle was a minor element of the Western Pacific whether evaluated under National Register criteria or San Jose factors.

Similarly, the role of this trestle in the history of Willow Glen does not change, whether it is considered under National Register Criterion A or San Jose factor 4. The brief incorporation of Willow Glen as a city was sparked in part by disagreements between and among the Southern Pacific Railroad, the Western Pacific Railroad, the City of San Jose, and community leaders in the Willow Glen neighborhood. The Los Gatos Creek Trestle is not significantly associated with this aspect or other aspects of the history of this neighborhood.

The four design-related factors, San Jose factors 5 through 8, are far more explicit than National Register Criterion C and deserve detailed analysis. Factor 5 relates to a property portraying the ”environment of a group of people in an era of history characterized by a distinctive architectural style.” The Los Gatos Creek Trestle does not portray the environment of a group of San Jose people in that the trestle was designed by a corporation headquartered in San Francisco.

Factor 6 is closest in language to National Register Criterion C, and speaks to the “embodiment of distinguishing characteristics of an architectural type or specimen.” The foregoing analysis of the potential significance of the trestle under National Register Criterion C applies directly to potential significance under Factor 6. The trestle is not important under Factor 6 for the reasons given in the foregoing discussion of National Register Criterion C.

Factor 7 relates to a property being the work of a noted architect or master builder. The trestle is not the work of a noted architect or master builder.

Factor 8 relates to a property being an example of innovative design: “Its embodiment of elements of architectural or engineering design, detail, materials or craftsmanship which represents a significant architectural innovation or which is unique.” As discussed in the foregoing analysis under National Register Criterion C, the Los Gatos Creek Trestle is a typical timber bent trestle, of a type built in the thousands throughout California. By the time it was built in the 1902s, trestles of this sort had already been built for at least half a century. Under this factor, the Los Gatos Creek Trestle is neither innovative nor unique.

General Conclusion Regarding Significance of the Los Gatos Creek Trestle under the Landmarks Program of the City of San Jose

As noted earlier, the Landmark designation process for the City of San Jose belongs to the City of San Jose and responsibility for its implementation is assigned to the Historic Landmarks Commission and the City Council.

It can be observed, however, that the factors to be considered for Landmark designation are fundamentally similar to the criteria for the National Register of Historic Places and California Register of Historical Resources. The logic that finds the Los Gatos Creek Trestle not eligible for the National Register or California Register strongly suggests that the trestle is also not eligible for designation under the Landmarks program of the City of San Jose.

Appendix G
Bridge Retrofit Report

Feasibility Study

Three Creeks Trail Railroad Trestle at Los Gatos Creek

Prepared for

City of San Jose

REGISTERED PROFESSIONAL ENGINEER
HANS C. STRANDGAARD
No. 46248
Exp. 12/31/12
CIVIL
STATE OF CALIFORNIA

Sealed on
10/8/12

October 08, 2012

CH2MHILL.

1737 N. First Street, Suite 300

San Jose, California 95112

(408) 436-4936

(408) 436-4829 FAX

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Acronyms and Definitions

Acronyms

AASHTO: American Association of State Highway and Transportation Officials

AASHTO Pedestrian: AASHTO LRFD Guide Specifications for the Design of Pedestrian Bridges

AASHTO Sign: AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals

AISC- American Institute of Steel Construction

AREA- American Railway Engineering Association

AREMA- American Railway Engineering and Maintenance-of-Way Association

ARS- Acceleration Response Spectrum (Definition below).

Caltrans SDC: California Department of Transportation's Seismic Design Criteria

Caltrans LRFD: AASHTO LRFD, 4^{th} Editions with California Amendments

LRFD- Load Resistance Factor Design

Definitions

ARS- Acceleration Response Spectrum. This is a plot of the acceleration vs. period for a structural system. Curves are based on a series of oscillators (of varying natural frequency), which are forced into motion by the same ground motion at the base.

Pile Bent- Part of the bridge substructure. Uses a row of driven piles with a pile cap to transfer loads to the soil.

Pile Cap- Horizontal member between the stringers and piles. This member carries the load of the superstructure and distributes it amongst the piles.

Sash Brace- Horizontal brace spanning between and bolted to all piles.

Skew Angle- The acute angle between a line perpendicular to the alignment of the superstructure and the alignment of the substructure.

Stringer- A beam aligned with the length of a span which supports the deck.

Sway Brace- Cross braces above and/or below the sash brace bolted to the piles.

1.0 Executive Summary

This report summarizes the findings of a retrofit study by CH2M HILL of the existing railroad trestle at Los Gatos Creek (near Lonus Street) in San Jose, CA. The study determines whether or not the existing timber trestle should be considered for re-use as a pedestrian and bicycle structure in a network of local trails. Inspection of the existing structure's condition served as the basis of the feasibility study. From this information, the overall current condition of the structure was assessed and a retrofit approach selected. Two options for retrofit, a concrete decked option and an IPE wood decked option, were considered in the analysis. A pre-fabricated replacement bridge was also analyzed as an option.

The current condition of the structure requires extensive repairs to the bracing and complete replacement of the decking. In addition, the bridge has been the victim of several fires over the years which will require quite a bit of work to clean up. If returned to a useable state, this structure would require on-going maintenance and inspection above and beyond typical City practice. Additional equipment would also need to be purchased or rented in order to annually clear debris away from the base of the bridge. The bridge should also be provided with a fire protection system to minimize the risk of further fire damage. While retrofit of the existing structure was found to be feasible, due to its age, the bridge will continue to deteriorate and will need additional repairs at regular intervals.

To address the concerns over repairing the existing bridge, the study also looked into using a single-span prefabricated replacement bridge as a design option. CH2M HILL worked with Contech® Engineering Services to find a single-span steel truss that could span over the creek and floodplain. It was found that a 210 foot long steel truss with a concrete deck could work. In order to compare all the pros and cons of each option, a comparison matrix was developed and a scoring system applied. It was found that the replacement option had a slightly higher upfront cost, but was the best value for the City over a 40 year time frame. CH2MHILL recommends that the bridge be replaced with a new prefabricated bridge to minimize the long term cost to the City.

2.0 Introduction

CH2MHILL was contracted by the City of San Jose to analyze and eventually design either a retrofit or replacement of the former UPRR Railroad Trestle over Los Gatos Creek in San Jose, California. Our agreement with the City, dated January 27, 2009, is a Master Services Agreement (MSA) with individually authorized task orders. Service Order No. #6 authorized the Three Creeks Trail Trestle Enhancement Feasibility Study, which is an investigation of the possible reuse and repair of the existing timber trestle that crosses Los Gatos Creek near Lonus Street. A repair and retrofit evaluation of the existing structure was performed as part of Task 2 of this service order.

The Los Gatos Creek Railroad Trestle is an open-deck pile supported trestle that has an overall span length of 210.5 ft and is approximately 25 ft high at its tallest point. The trestle was a former rail road structure constructed by the rail road but the tracks have been removed from the structure, which is now owned by the City of San Jose. The structure is supported by two timber pile abutments and thirteen timber pile bents. The bents range in size and geometry at each location, but the longitudinal spacing of the bents is approximately constant at 15 feet. The bents have a skew angle of approximately 9.5 degrees. The structure construction is generally in conformance with past editions of the AREA (American Railway Engineering Association) Manual for Railway Engineering.

The following contains the findings of our preliminary engineering task which utilized our previous field inspection work along with engineering analysis to evaluate seismic vulnerabilities, scour potential and repair needs. Utilizing the proposed design criteria we developed earlier (see Appendix A), we evaluated the structure for conversion to a bike path bridge. The open-deck of the existing trestle, consisting of stringers and ties, is inappropriate for use as a pedestrian or bicycle path. Two re-decking alternatives for reuse of the existing trestle were considered in our analysis: 1.) Replacement of the open deck with a concrete slab (pre-cast post-tensioned or cast-in-place) and 2.) Replacement of the existing ties with IPE wood decking and also new longitudinal stringers at each edge of the 12 foot wide deck. In both options a new 54-inch high galvanized metal bicycle safe railing system would be provided. This railing could be powder coated for aesthetics and would still be very low maintenance.

Recommendations for retrofit or replacement of the trestle, including cost estimates, will be discussed in this report. When referencing different members and locations, the numbering and names used in this report follow designations as follows: The southernmost abutment is designated “Abutment 1”. Moving northward, and starting with Bent 2, the bents are numbered consecutively up to “Abutment 15”. Looking ahead on line refers to a view looking from the south to the north. The west edge of the structure is referred to as the left edge, and the east is referred to as the right edge. The span numbering corresponds to the abutment and bent numbering, so, Span 1 goes from Abutment 1 to Bent 2, and so on.

2.1 Concrete Deck and Railing System

The concrete deck system will consist of either a precast slab system with longitudinal post tensioning or a cast-in-place on steel stay-in-place forms reinforced concrete system. Both options will have concrete approximately 8 inches thick and will contain two layers of bar reinforcement in both directions. A slight cross slope will be built into the slab to drain it to one side. A 54-inch high galvanized metal railing system will be supported by posts mounted to the side of the slab. The advantages of a precast slab compared to a cast-in-place deck include lower cost and speedier construction. The advantages of the cast-in-place deck include a more uniform and aesthetically pleasing walking/biking surface and less chance of leaks through the deck. The proposed concrete decked trestle cross section is shown in **Figure 2**.

If visual appearance is a concern, the concrete deck can be scored and stained to resemble the old railroad tracks for an aesthetically pleasing nod to the past life of the structure. This treatment has been used in other locations where a pedestrian facility has replaced a railroad track. The concrete stain could be something similar to what is shown in **Figure 1**.

Figure 1: Concrete Stain Example

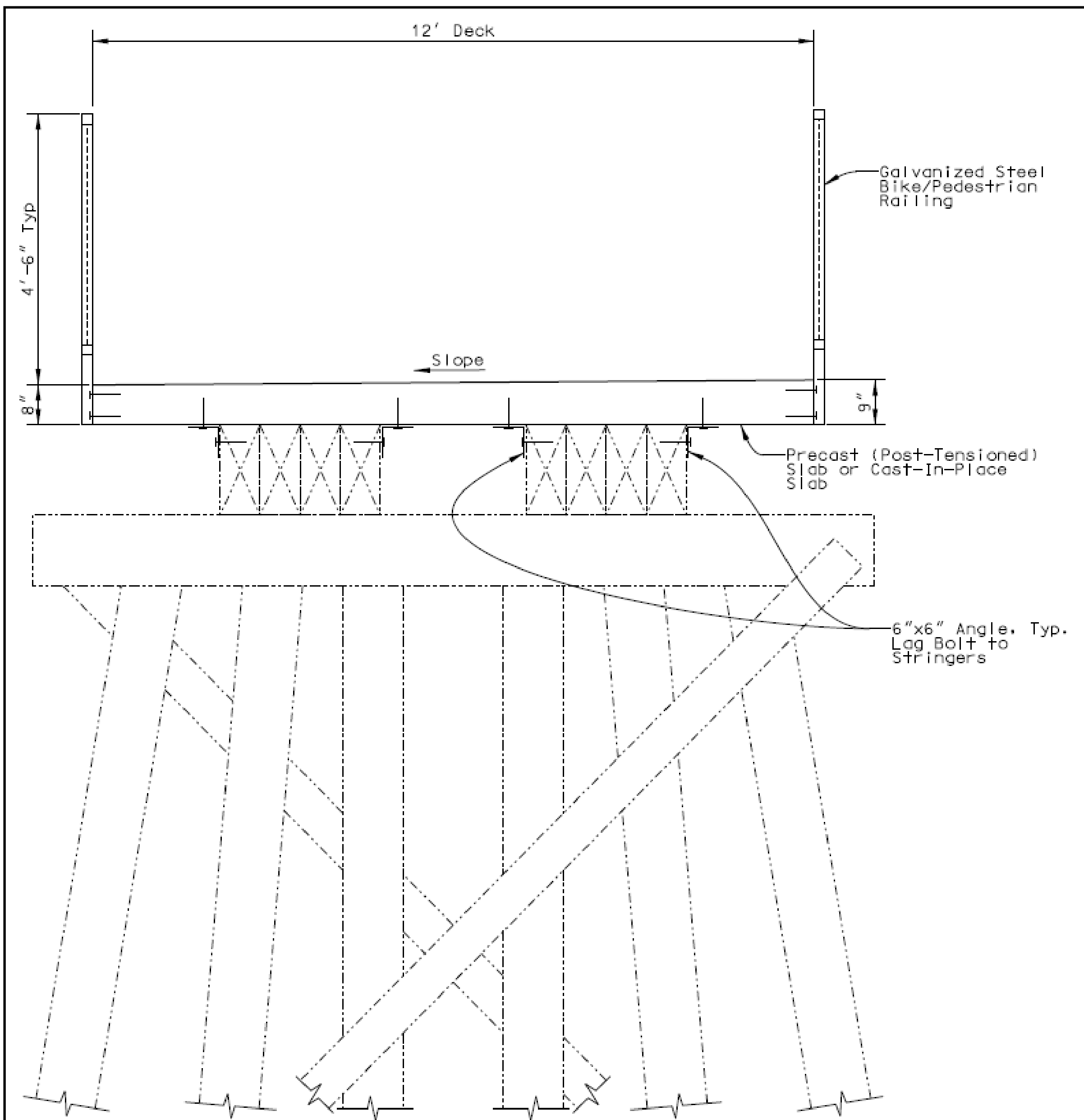

Figure 2: Concrete Deck Option

2.2 Timber Deck and Railing System

For the timber decked system, per City request, the walking surface planking will be IPE timber. Planks will be oriented transverse to the alignment to avoid longitudinal gaps that could trap or steer bicycle tires. The planks would sit on the existing stringers and an additional stringer (8-inch x 20-inch x 30-ft Doug Fir beam or equivalent Doug Fir Glulam) would be added to each edge of the 12 foot wide deck. Decking would be predrilled and screwed into the stringers, because nailing is not practical with the use of IPE. PVC drip guards (or flashing) would be provided to help prevent moisture collection on the tops of all timber stringers and on the tops of any bent caps that are replaced.

The proposed timber decked trestle cross section is shown in **Figure 3**.

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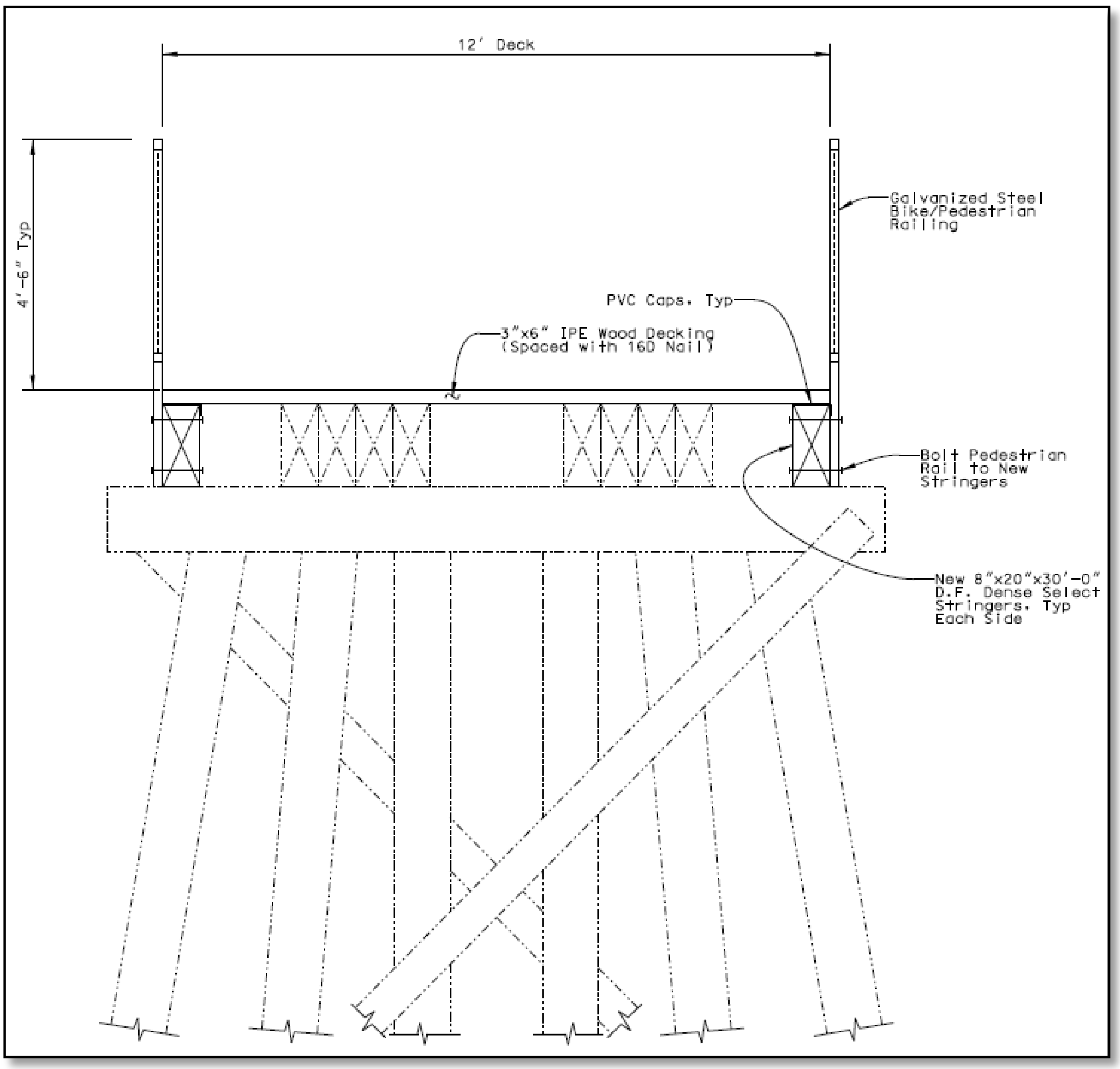

Figure 3: Timber Deck Option

2.3 Analysis Methods

For this preliminary analysis, the bridge was analyzed in parts using tributary areas for loading. Transverse bent models were built in a structural analysis program (SAP 2000) for selected bents. Bents that were analyzed were selected to limit the number of required models and to capture the worst case response. One bent with only a partial cross brace was analyzed (Type 1 Bent), one bent with upper cross braces was analyzed (Type 2 Bent), one with upper cross braces and sash braces was analyzed (Type 3 Bent), and two with upper cross braces, sash braces, and lower cross braces were analyzed (Type 4 Bent).

Type 4 bents included Bent 6 and Bent 7, which were both selected as they both have ineffective piles that are deteriorated near the ground line. Bent 6 has 5 piles that are good and one that is deteriorated near the ground line and Bent 7 has 4 piles that are good and 2 that are deteriorated near the ground line. Both bents were analyzed with all piles effective for one model and then again with only the effective piles. This was done in order to determine the minimum number of piles required to carry the design loads. Demand to capacity ratios were calculated for each component of the structure from each of the model types.

Typically the code requires that 100% of the forces from an earthquake in one orthogonal direction be combined with 30% of the forces in the other direction. For the simplified analysis performed, an equivalent static method in transverse direction was chosen. Typically combining the two directions of forces would be done using Square Root Sum of Squares (SRSS) methodology. If the stiffness in the two directions is similar and the bent has 100 kips of shear in a pile transversely, the longitudinal shear would be 30 kips. Using SRSS to combine forces the overall force would be 104.4 kips. This is a small increase from the 100 kips transverse. In the case of this timber trestle the stiffness of the structure transversely is larger than it is longitudinally. As such, analyzing the bents for transverse motion only is a good way to approximate the overall demand. For final design of either retrofit option, a full 3-D seismic model of the structure should be analyzed to confirm the findings of this report.

For this report the concrete deck option was analyzed first. The concrete alternative has an overhang beyond the existing stringers and an initial calculation was done to confirm that an 8 to 9-inch reinforced slab would work for a truck wheel load placed 1 ft from the railing. This same section was analyzed for 95 pounds per square foot of pedestrian loading and it was found that the demands were lower than with the truck loading. The stringers, cap, and substructure were then checked using a concrete deck.

The wood design option uses IPE decking. The decking was designed to run transversely on top of the existing stringers. Our calculations showed that a 3-inch by 6-inch IPE board would be capable of taking the demand of self-weight and the live load. To avoid driving a truck on a timber cantilever, the outside edges of the new 12 foot wide deck were supported by new 8-inch by 20-inch stringers. Dead load for this alternative was found to be less than that of the concrete deck option; therefore the overall seismic mass and forces would be less. Substructure checks were not completed for the timber decking system as the concrete decking worked.

Structure loading consisted of the following approaches:

Dead Load Approximation:

Dead load approximations for the two design options were done using known densities for the types of materials used. Nominal dimensions of timbers were used in all dead load calculations. Creosoted Douglas Fir was taken at 60 pounds per cubic foot per the AREA Manual Recommendation. This is heavier than pressure treated Doulas Fir and is intended to account for the added mass of the creosote in the timber. Any new timbers that were added to the structure, or any that replace existing components, were also taken at 60 pounds per cubic foot. This is to account for the possible use of creosoted Douglas Fir if the City selects to use that instead of pressure treated. Pressure treated material is lighter and therefore, the demands on the structure would only decrease.

All IPE planking was taken at 69 pounds per cubic foot (values for this vary and the USDA Forest Products Laboratory lists it at 64 pounds per cubic foot for 12% moisture). The overall weight of the timber deck option is less than that of the concrete deck option and is a factor in the seismic modeling choices that will be discussed. Concrete was assumed to have a unit weight of 150 pounds per cubic foot and the steel pedestrian/cyclist safety railing was estimated at 40 pounds per linear foot.

Live Load Approximation:

Pedestrian loading of 95 pounds per square foot and truck loading of 20 kips (H10 Design Truck) were both used in accordance with the AASHTO LRFD Pedestrian Bridge Guide Specifications. During work on the superstructure it was found that the H10 truck governed the live load forces and that the total reaction in the stringers was higher than those seen from pedestrian loading. Thus, all LL checks were performed using the H10 Truck. Per AASHTO Pedestrian Guide Specification no impact factors were applied. Also, braking, collision, and centrifugal forces were assumed to be insignificant since only maintenance vehicles traveling 5 miles per hour or less will be on the structure. For the purpose of the analysis the H10 Truck is considered to be the maximum allowable vehicle load allowed on the bridge.

Seismic Load Approximation:

Seismic loading was done using the Caltrans Probabilistic ARS curve that was provided by Parikh Consultants. In order to characterize overall performance of the bridge, specific bents were chosen for transverse analysis in the structural analysis program SAP 2000. An iterative approach was used to determine the bent's performance. Force displacement curves for each pile group were characterized and modeling of the selected bents started by assuming an initial depth of fixity. An assumed lateral load was applied to the cap level of the bent and the ground line displacements were averaged and checked against the average requirement from L-pile for the same loading. Depth of fixity was adjusted until the two displacements matched (the model results vs. the L-Pile results). The period of the bent was then calculated based on its stiffness and tributary mass and a new lateral force was calculated using the ARS curves.

The new lateral force displacement was applied to the top of the cap and the deflections were again checked against L-pile. Depth of fixity was again adjusted until L-pile deflections at the ground line were achieved and a new period and seismic force was calculated. This process was repeated until the period of the bent converged. This ensured that the L-pile properties were applied correctly to the model and that the forces in the substructure were correct based off of the applied seismic forces.

The following AASHSTO LRFD load cases were considered in the analysis:

Strength 1:

This load takes into account 125% of dead load combined with 175% of live load and 100% of water load. Stream loading found to be less than 1 kip transversely and was therefore neglected. The final load case analyzed was 125% of dead load combined with 175% of live load. All elements of the bridge were checked at this force level.

Strength 3:

This load case takes into account 125% of dead load combined with 100% of water load and 140% of wind on the structure. Stream loading found to be less than 1 kip transversely and was therefore neglected.

Extreme Event 1:

This load case takes into account 125% of dead load combined with 100% of water load and 100% of earthquake load. Stream loading found to be less than 1 kip transversely and was therefore neglected.

Extreme Event 2:

This load case takes into account 125% of dead load combined with 50% of live load and 100% of water load. Stream loading found to be less than 1 kip transversely and was therefore neglected. Since the Strength 1 case would result in larger forces the Extreme Event 2 load case was ignored.

Service 1:

This load takes into account 100% of dead load combined with 100% of live load, 100% of water load, 30% of wind on the structure, 100% of wind on live load, and 100% of thermal load. Stream loading found to be less than 1 kip transversely and was therefore neglected. Wind on live load is not considered since a long row of vehicles is never expected to be present on the bridge. Longitudinal thermal effects are not accounted for as timber is a high insulator for temperature changes. Thus, the overall load combination was reduced to 100% dead combined with 100% live and 30% wind.

Fatigue 1:

Fatigue was not considered per the AASHTO Pedestrian Guide Specification.

3.0 Vulnerabilities

3.1 General

The Los Gatos Creek Trestle is in generally good condition and can be modified to perform as a bicycle pedestrian crossing of Los Gatos Creek. Originally designed to carry heavy freight train loads, the structure has significant capacity to accept both pedestrian and light maintenance vehicle loading. Typically, for bridges in use, the railroad would periodically inspect the bridge and replace individual structural elements as they decay. There is some evidence that previous inspections and replacements were done. However, because the trestle was removed from service for freight a number of years ago, the decay in structural members has likely accelerated because the regular cycle of bridge inspection and repair has not occurred.

For the structural analysis performed for this report, it has been assumed that the deck will be replaced with either of the alternatives listed above in Section 1. It is also assumed that all of the sway bracing and sash bracing that is damaged or unusable will be repaired. The analysis also considered the need for piling replacement or repair since some of the existing piles are damaged and unusable in their current condition.

3.2 Dead and Live Load Analysis and Repairs

The existing structure was investigated for the two deck replacement options described above. The weight of the new deck and the live loads resulting from the new 12-foot wide width were imposed on the structure to check the various elements. The design criteria in **Appendix A** was used for the analysis.

3.2.1 Timber Ties

None of the existing ties will be reused in either of the retrofit cases. The 8-inch by 8-inch ties are not required for the concrete deck option and were found to be inadequate for the timber deck option. This was due to the fact that longitudinal runners would be needed as a buffer between the transverse IPE and the transverse ties. The size of the longitudinal runners that would be needed (assuming the use of Douglas Fir) became larger than expected due to shear reactions from the H10 trucks. This design was considered to be uneconomical and a new alternative in which two new stringers would be added was selected.

3.2.2 Longitudinal Stringers

Our analysis indicated that the existing timber stringers are adequate to support either the concrete slab or timber decked bridge without modification.

The areas with voids or soft spots on Spans 7, Span 9, and Span 13 should be repaired by filling them with a penetrating epoxy. When the existing ties are removed, the bolt holes should also be sealed.

The char areas on the stringers between Bent 6 and Bent 10 should be pressure washed to remove the char then coated with a penetrating waterproofing sealer.

The tops of all of the stringers should be cleaned of all debris and pressure washed. For the timber deck option, the tops of the stringers should be sealed and PVC drip caps or flashing should be installed.

Table 1: Stringer Maximum Demand to Capacity Ratio (Due to Dead and Live Loads)

Bridge Element	Axial D/C	Moment D/C	Shear D/C
Stringers	0.00	0.37	0.32

3.2.3 Pile Caps

Pile caps consist of 14-inch by 14-inch by approximately 18 foot long timber sections that are set atop driven timber piles. Our analysis indicates that the existing pile caps are adequate to accept the load of either of the new deck alternatives. The caps at Bents 3, 5, and 13 need to be replaced due to significant deterioration and loss of section. This will require removing the through bolts to the stringers then jacking the stringers up to allow removal and replacement of the caps. Prior to the replacement of any cap, the tops of the existing piles should be treated with preservative and covered with flashing in accordance with AREMA specifications (see **Figure 4**). Once the new cap is in place, new drift pins should be installed into the piles. Where the stringers sit over the existing piles and drift pins cannot be installed a pair of side bolted clips should be used (see **Figure 5**). Connection between the stringers and caps is through bolts that also pass through the existing ties. When the ties are removed, the through bolt connecting the stringers to the caps should be replaced. Connection between the piles and caps is through drift bolts and toe nails. Our analysis indicates that these connections are adequate for dead and live loads.

Table 2: Pile Cap Maximum Demand to Capacity Ratio (Due to Dead and Live Loads)

Bridge Element	Axial D/C	Moment D/C	Shear D/C
Pile Caps	0.00	0.17	0.68

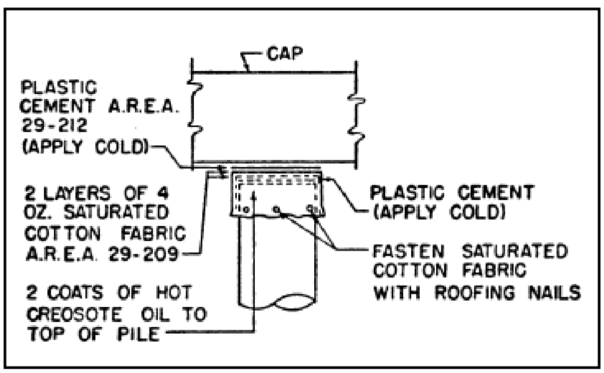

Figure 4: Pile Flashing at Bents with Replacement Caps

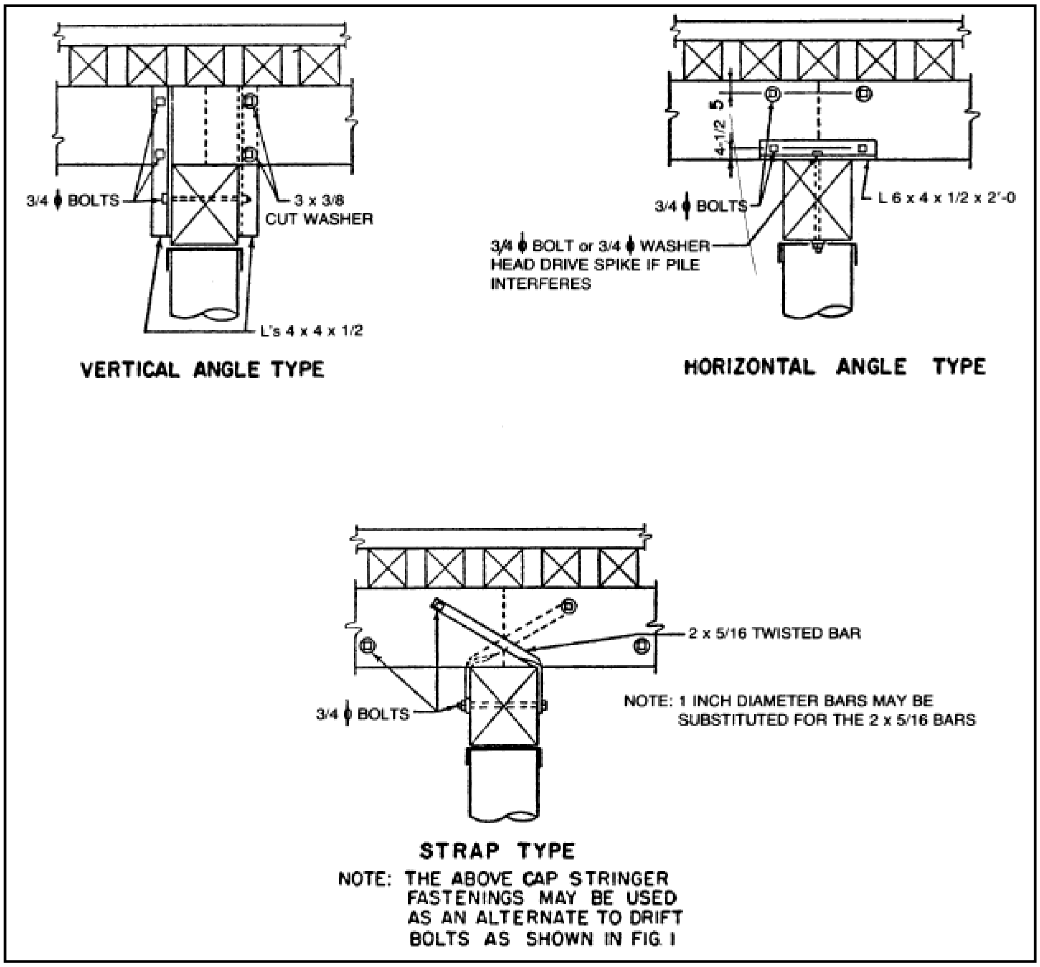

Figure 5: Cap/Stringer Alternate Fastening

3.2.4 Abutments

At Abutment 1 and 15 the existing bulkhead timbers should be excavated and removed as they are deteriorated. If they are replaced in kind with pressure treated lumber, a drainage mat, granular backfill and a drainage pipe should be used against the new timber. Wingwalls at Abutment 1 could be re-constructed with a stackable concrete block wall system to reduce cost. If a concrete deck is used, consideration should be given to using a concrete backwall and wingwalls. A paving notch might also be provided, if the trail approaches are to be paved with asphalt concrete in the future.

3.2.5 Piles

Analysis of the piles compares the available strength of the piles themselves (due to bending and axial forces as well as due to shear) and the assumed available soil bearing strength. Initial research using the AREA Manual showed that 14-inch butt diameter piles typically have 9-inch tips and that for 25 feet of exposed length a 45 to 50 foot pile was used. We therefore asked Parikh Consultants to analyze both 20 and 25 foot cases and they found a log of test borings for a bridge that is located about 3,000 feet away. Our analysis indicated that the piles are adequate for both dead and live load as long as the recommended repairs on select Bents are made. Modeling of the critical bents was performed to evaluate the need for strengthening or repairs. Bent 7 has two piles (of six) that are deteriorated at the base. SAP Modeling of Bent 7 was broken into two models: one in which it was assumed the piles were repaired and another in which the piles were not repaired and were ineffective for vertical and lateral capacity. It was found that pile repair or replacement is required at Bent 7 as the axial loads exceed the capacities that were developed by Parikh Consultants.

Bent 6 has one pile (of six) that is deteriorated at the base. SAP Modeling of Bent 6 was broken into two models: one in which it was assumed the pile was repaired and another in which the pile was not repaired and was ineffective for vertical and lateral capacity. In this case, an extreme event demand of 42 kips in compression was found when only 5 piles were considered effective. With capacities given at 35 to 50 kips per pile (for the 20 and 25 foot deep piles assumption, respectively) it was decided that the damaged pile at Bent 6 should be repaired.

Based on the field investigation and the modeling of the selected bents it is determined that Bents 4, 6, 7, 11, and 12 should have piles repaired for either retrofit strategy. Bent 4 has a pile (see repair diagrams in **Appendix B**) that is spliced and is considered to be ineffective for lateral capacity and should be repaired in accordance with AREMA Volume 2, Section 3.3.3.3 (see **Figure 6**) in order to ensure proper lateral capacity. Bents 6, 7, and 12 have 6 piles each and exhibit some piles that are deteriorated at the base (see repair diagrams in **Appendix B**). Bent 11 has 8 piles total; however, the pile directly under the left stringers is deteriorated at the base and should be repaired in order to properly distribute loads evenly along the cap. These five bents should be repaired using epoxy in accordance with AREMA Volume 2, Section 3.3.3.3 (see **Figure 7**).

Table 3: Pile Maximum Demand to Capacity Ratio (Due to Dead and Live Loads)

Bridge Element	Axial D/C	Moment D/C	Shear D/C
Piles	0.81	0.04	0.07

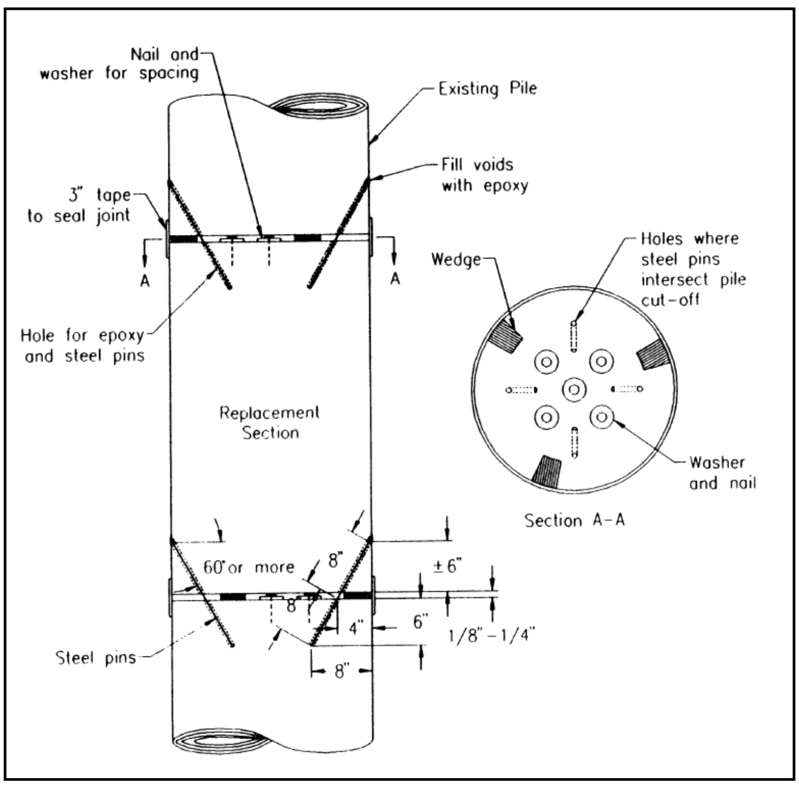

Figure 6: Column Splice Detail

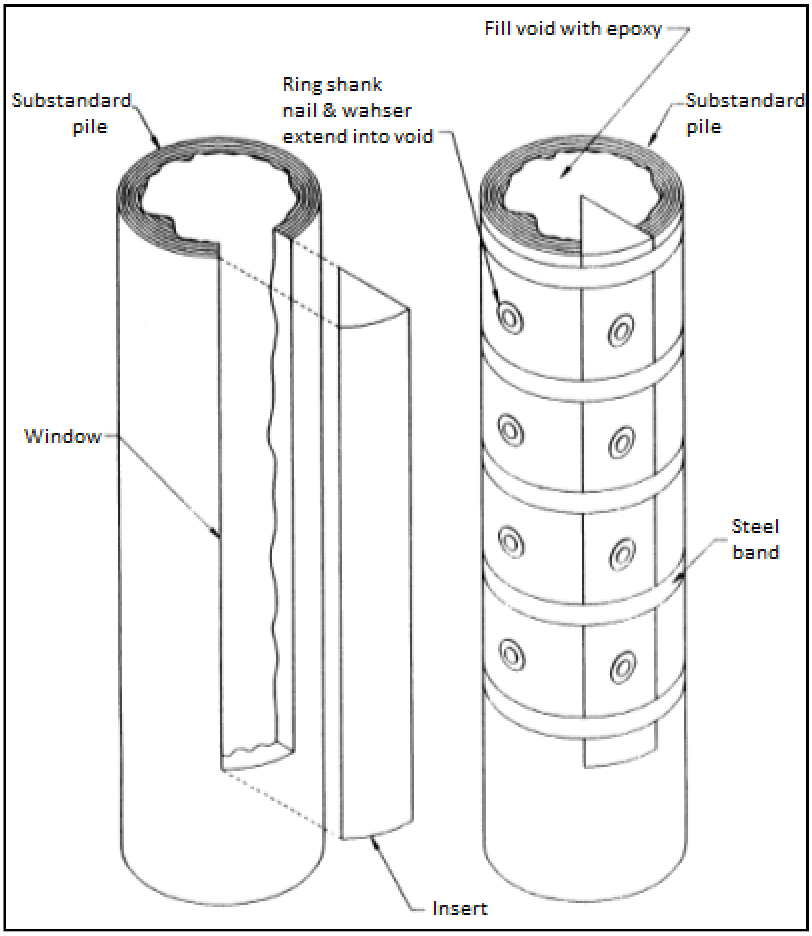

Figure 7: Epoxy Filled Piling Repair Detail

3.2.6 Sway and Sash Bracing

Sway and sash bracing on the piers is used to resist wind forces and to restrain lateral movement and vibration under live loads. The sway and sash bracing will also be important to help distribute seismic loads to the piles. As noted above, the railroad did not typically design for seismic loading. All lateral loads were originally considered to be from wind only and longitudinal forces came from train nosing. Our analysis indicated that the demand on bracing components due to Strength 1 and Strength 3 loading is much smaller than the demand that seismic loading induces. No demand to capacity ratios are reported here as seismic demand is reported below.

3.3 Weather and Decay

The timber of the existing trestle is subject to continued wetting and drying due to the current open deck configuration. In addition, due to the many horizontal surfaces, standing water and debris accumulates. Wetting and drying promotes decay and fungal growth that will weaken and degrade the structure over time. Reducing the amount of moisture that the stringers, cap beams and piles are subject to will lengthen the remaining life of the trestle. The concrete slab deck option would provide greater protection to the existing timber elements than would the timber deck option since rain will be drained away from these elements. Under the timber deck option, on the other hand, the timber elements will continue to be exposed. If the timber deck option is selected, protective measures such as flashing and capping should be implemented to promote moving moisture away from the timber as much as is practical.

3.4 Scour

3.4.1 Background

Los Gatos Creek originates in the Santa Cruz Mountains and flows most of the year, passing through the cities of Los Gatos, Campbell, and San Jose. There are two dams located on the creek. Lexington Reservoir and Lenihan Dam are located upstream of the Town of Los Gatos and Vasona Dam and Reservoir are located in the Town of Los Gatos. Los Gatos Creek joins the Guadalupe River in downtown San Jose at Confluence Point in the Guadalupe River Park.

The trestle is part of the Three Creeks Trail alignment. The trestle crosses Los Gatos Creek downstream of Lincoln Avenue and south of Interstate 280. The creek flows in a northeast direction.

The City of San Jose Flood Insurance Study (FIS) Revised August 17, 1998 currently represents the best available information for this reach of Los Gatos Creek. An existing conditions hydraulic model for Los Gatos Creek was provided by the Santa Clara Valley Water District (SCVWD). This model was developed in 1978 by George S. Nolte & Associates using the U.S. Army Corps of Engineers (USACE) Hydraulic Engineering Center (HEC) model HEC-2 (river hydraulics). The HEC-2 model was imported into the USACE HEC-RAS (River Analysis System) model as a starting point for establishing existing conditions for the Los Gatos Creek Trail Reach 5 study – Auzerais to the confluence with Guadalupe River. HEC-RAS is a newer, more computationally rigorous model than HEC-2 and has a better graphics interface.

This section of the HEC-RAS model, upstream from Auzerais Avenue, has not been reviewed or approved by the project owner, the SCVWD. However, the model is not now being used to analyze the present condition of the water surface profile (WSP), but rather to analyze scour conditions relative to the supports of the existing railroad trestle bridge. Abutment scour was not considered, as the channel through this section of Los Gatos Creek is wide, relative to the width of the creek upstream and downstream of this bridge location, and the banks in the channel are lower than at the location of the railroad bridge. It is likely that water would exceed the banks of the creek long before the water surface elevation would rise to the elevation of the abutments.

Two bulk soil samples were collected on the creek bed for the purpose of analyzing the potential for scour (Parikh, 2012).

The bridge is approximately 210 feet long, 2’-4” deep, eighteen feet wide, and is supported by 13 bents with 5 to 8 piles each (depending on the location along the longitudinal profile of the bridge), and two abutments. Bents are spaced 15 feet on center and are oriented at an angle of approximately 9.5 degrees. It is assumed that this angle was intended to offset the creek’s angle of approach to its intersection with the railroad crossing. However, this assumption is strictly being used for the purpose of this preliminary analysis. All assumptions used in this analysis should be reviewed and confirmed if and when a design level scour analysis is performed.

3.4.2 Hydraulic Features

The Santa Clara Valley Water District (District) manages Los Gatos Creek as a raw water recharge and flood control channel. In the lower watershed, Los Gatos Creek passes through urban areas (Cities of Los Gatos, Campbell, and San Jose), and much of the riparian corridor has been fragmented by bank stabilization for flood control purposes.

The centerline of the low flow channel appears to be located approximately 90 feet from the north bank of the channel. Based on the angle of the approach from the southeast, the location of the channel relative to the cross-section under the bridge is as expected. Field observations include debris buildup between bents 7 and 8, and no local scour. A significant amount of rip rap was observed on the south side or inside bend of the creek through the location of the bridge. The location of the riprap may be contributing to the lateral migration of the low flow channel to the north bank. The Manning’s roughness for the upstream approach to the bridge, for a distance of approximately 132 feet, as described in the San Jose, CA FIS is 0.045, which is relatively conservative. According to field observations of the vegetation conditions within this reach of creek, this assumption seems to be appropriate. The majority of area underneath the bridge, with the exception of the two bents previously mentioned, was debris free and therefore the assumed roughness value of 0.035 at this location, as described in the San Jose, CA FIS, was left unchanged from the existing conditions model.

3.4.3 Scour Analysis Results

A scour analysis was conducted for the existing abandoned railroad trestle bridge. These results are presented below in **Table 5**. Assumptions include:

Bridge modeling methods used for this analysis: Yarnell and Standard Step. (Yarnell is the most conservative of these two methods. The results presented below are based on the Yarnell method).

Table 4: Assumptions and Coefficients Used for Scour Analysis

Assumptions	Value	Notes
D_{50}	9.52 mm	From Geotechnical Results
D_{90}	38.10 mm	From Geotechnical Results
Contraction Coefficient	0.2	Value between gradual and typical
Expansion Coefficient	0.3	Gradual
Drag Coefficient (CD)	1.2	Round nose pier
Yarnell's pier coefficient (K)	2.5	10 pile trestle bent (conservative assumption; maximum number of piles per bent is eight (8))
Pier debris loading	5-ft wide 3-feet deep	All piers assumed to catch debris (conservative assumption)
Flood events 10-year	1770 cfs	City of San Jose FIS (Revised August 17, 1998)
100-year	7550 cfs	

Table 5: Existing Railroad Bridge Scour Analysis Results

Feature	10-year flood Scour Depth (ft)	100-year flood Scour Depth (ft)
Pier	2.6	3.9
Contraction	0	0
Total	2.6	3.9

*Contraction scour was not detected or minimal and therefore no value was produced by the model

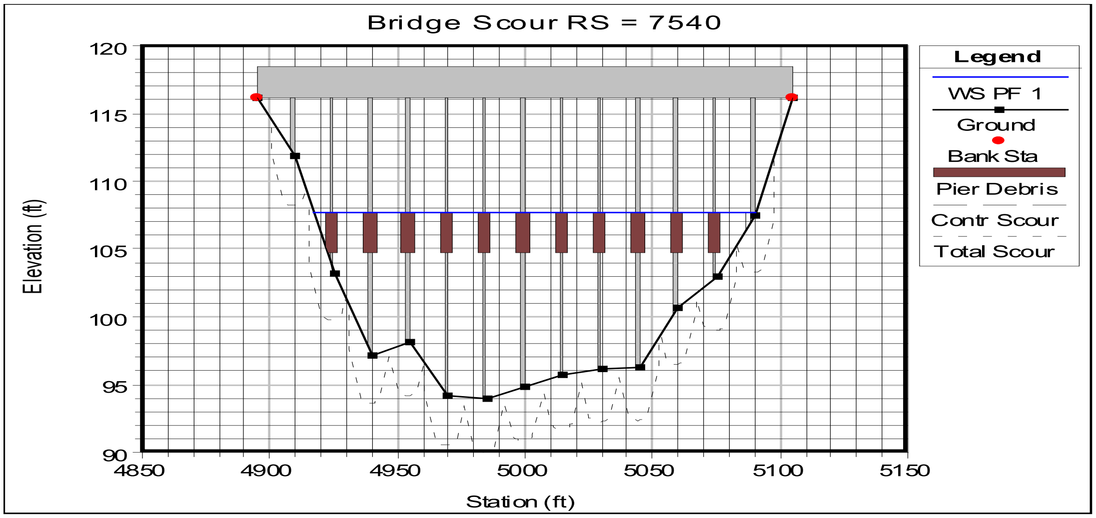

Figure 8: Cross-Section from HEC-RAS Model Illustrating Pier Scour Conditions for 100-year Flood Event

Based on initial analysis, it appears that the existing bridge does not impede flow under flood conditions. This change is slightly measureable (approximately 0.5 feet) for the conservative assumptions used in this analysis for debris loading of the piers. This means that were the bridge supports to be removed for aesthetic or other reasons, the hydraulic conditions downstream may change slightly. The SCVWD may require further analysis during the design phase, to determine the extent of this impact and overall channel performance in the absence of the bridge. This future analysis may also require some research on the geomorphologic characteristics of the channel to determine if degradation or aggradation is present. It is unclear if the creek at this location is being 'sediment starved' as a result of the sediment being captured upstream at Lexington Dam or in the creek at the Town of Los Gatos. If the retrofit alternative is chosen, the SCVWD may require additional surveyed cross-sections added to the HEC-RAS model, to better understand the impacts of the assumed migration of the low flow channel as well as to confirm the results from the preliminary scour analysis.

3.5 Seismic Analysis and Repairs

According to the AREMA manuals, Rail Road companies typically exempt timber trestles from seismic evaluation. This is likely due to their low mass, flexibility and redundancy. For this project, given that the City is the owner of the bridge, a seismic analysis was performed. Lateral earthquake forces on the trestle are primarily resisted by battered piles, sway bracing, and the connections made by steel drift pins and bolts. Analysis of the structure showed that some timber elements need replacement or retrofit due to decay. Also, the A36 steel bolts that connect bracing to the piles were insufficient for lateral seismic loading. Steel through bolts that connect the stringers to the caps should be replaced after ties are removed since they may not be usable after the ties are removed.

It is known that this structure survived the Loma Prieta earthquake (7.1 magnitude on the Richter scale). However, it is not known if any retrofits were needed (or done) following the earthquake. Our analysis showed that only the sway brace bolts would need to be replaced if the timbers were in excellent shape. Our field investigation, however, showed that several elements have become subject to fungus and decay. It is primarily the loss of timber section due to deterioration that forces the replacement of many of the timber elements as described below.

3.5.1 Upper Sway Braces

The upper sway braces are typically constructed using 4-inch wide by 10-inch deep timbers. It is typical to see a carriage bolt at each pile; however this is not consistent throughout the structure. Also, some of the timbers have been notched and have a less effective section. Some of the bracing was retrofit at some point by adding additional timbers above or below the existing braces. Overall, 38% of the upper sway braces are damaged and are likely in need of repair or replacement. Replacement of damaged braces with similar 4-inch wide by 10-inch deep timbers is adequate. It should be noted that the moment demand to capacity ratios shown in **Table 6** show that the braces are inadequate. This ratio is from Bent 14 and is due to the fact that the braces are incomplete. Both braces on this bent should be replaced and should be longer so that all of the piles are engaged by bracing. Detailed demand to capacity ratios for each bent modeled can be found in **Appendix C**. For full details of which braces need to be replaced see the drawings attached in **Appendix B**.

Table 6: Upper Sway Brace Maximum Demand to Capacity Ratios (Due to Lateral Seismic Loading)

Bridge Element	Axial D/C	Moment D/C	Shear D/C
Upper Sway Braces (Compression)	0.28	1.07	0.28
Upper Sway Braces (Tension)	0.32	1.10	0.22

3.5.2 Sash Braces

The sash braces are typically constructed using 8-inch wide by 10-inch deep timbers. They seem to have been installed on bents that have more than 13 feet of exposed pile as they are located 13 feet down (measured from the top of pile to centerline of brace). This height is inconsistent with newer versions of the AREA Manual where the typical distance to the sash on a 6 pile bent is 11 feet 6 inches. It is also typical to see a carriage bolt at each pile; however this is not consistent throughout the structure. Bents 7, 8, and 9 have some char damage, but it is not significant. Overall, 90% of the sash braces are damaged and are in need of repair or replacement. Replacement of damaged braces with similar 8-inch wide by 10-inch deep timbers is adequate. For details of which sash braces need to be replaced see the drawings attached in **Appendix B**.

Table 7: Sash Brace Maximum Demand to Capacity Ratios (Due to Lateral Seismic Loading)

Bridge Element	Axial D/C	Moment D/C	Shear D/C
Sash Brace (Compression)	0.04	0.04	0.02
Sash Brace (Tension)	0.05	0.04	0.03

3.5.3 Lower Sway Braces

Only some of the bents have both upper and lower sway braces. Lower sway braces are included at Bents 5, 6, 7, 8, 9, 10, 11, and 12. Overall, 50% of the lower sway braces are damaged and in need of repair or replacement. Replacement of damaged braces with similar 8-inch wide by 10-inch deep timbers is adequate. For details of which braces need to be replaced see the drawings attached in **Appendix B**.

Table 8: Lower Sway Brace Maximum Demand to Capacity Ratios (Due to Lateral Seismic Loading)

Bridge Element	Axial D/C	Moment D/C	Shear D/C
Lower Sway Braces (Compression)	0.24	0.18	0.05
Lower Sway Braces (Tension)	0.27	0.14	0.05

3.5.4 Piles

Seismic analysis of the piles assumed that the piles are repaired as discussed in Section 2.2.5 of this report. Also, connections and braces were all assumed to be in good condition as insufficient sections would be replaced as part of the retrofit. Analysis found that the piles were sufficient for the demands that the design earthquake produced. Combined bending and axial demands were not checked due to the fact that the demand to capacity ratios appear to be low enough to show that the system is adequately braced against buckling failures.

Table 9: Pile Maximum Demand to Capacity Ratios (Due to Lateral Seismic Loading)

Bridge Element	Axial D/C	Moment D/C	Shear D/C
Piles (Compression)	0.81	0.34	0.32
Piles (Tension)	0.79	0.25	0.32

3.5.5 Connections

Bolts from stringers to caps should be replaced after ties are removed since they may not be usable after the ties are removed. The use of ASTM A325 1 inch diameter bolts or threaded rod is desired in order to avoid addition drilling and desired strength increase. Drift pins from cap to piles are of sufficient strength; however, in locations where pile caps are replaced and new drift pins cannot be installed the connection should be achieved using the details shown in **Figure 5**. Sway brace bolts require replacement at all locations as the A36 steel that was used is inadequate for seismic demands. Sash brace bolts do not require replacement, however as 90% of the sash braces are damaged it is recommended to upgrade the bolts to current ASTM A325 1-inch bolts at all locations.

Table 10: Bolt and Drift Pin Maximum Demand to Capacity Ratios (Due to Lateral Seismic Loading)

Connection Element	Shear D/C
Drift Pins (Cap to Pile)	0.85
Sway Brace Bolts	1.40
Sash Brace Bolts	0.57
Stringer to Cap Bolts	0.55

Connection capacity was checked based on assumed bolt replacement. It was determined that the bolts will likely tear out of the timber cross braces at the ends of the braces during an earthquake equivalent to the maximum design earthquake. It was also found that other bolt locations could experience localized crushing of the timber and plastic hinging of the bolts. The maximum design earthquake is based off of 5% damping and a return period of 975 years (5% probability of exceedance in 50 years). This structure is timber and is likely to have a higher damping ratio than 5% and would therefore be likely to have less force in the elements than what has been calculated.

The failures found are not deemed to be detrimental because localized failure could alert the owner to a potential problem. The AREMA Manual says "***Providing for "yielding type response" at non-critical points of the structure to relieve seismic stresses***" is allowed (2010 AREA Volume 2, Chapter 9, Section 1.5.4.5). In order to allow localized failure, the structure needed to be checked assuming failure has occurred. In order to conserve budget Bent 7 was the only bent analyzed for the assumed failure.

Bent 7 was selected since it has the largest axial forces of the prior bents modeled. It should be noted that a failure of the ends would soften the structure which in turn, would increase the period. As a result, the overall force applied to the bent decreases. This decrease in force is not accounted for in the new SAP models for efficiency. D/C ratios for the individual elements were checked again and no critical failures are found. Net section tension was found to be okay and tear-out capacity was not exceeded at any other bolt locations.

Localized timber crushing and bolt hinging is probable due to a design level earthquake, but there will be no collapse.

It would become very expensive to retrofit the structure to a point where there is no longer any localized damage due to an earthquake. Since the structure is known to have survived the nearby Loma Prieta Earthquake, it is likely that the bridge once repaired can withstand similar sized future earthquakes. It is expected that the bridge will be inspected on a bi-annual basis and that if any components show signs of distress they are replaced or repaired. It is expected that this structure can withstand a design level event, but that there will be damage. If the structure is subjected to a seismic event in excess of 5.0 magnitude the City should close the bridge until an inspection can be performed.

3.6 Other Required Repairs

3.6.1 Replacement Timber

All replacement structural lumber (does not include IPE) shall be stress-grade Douglas Fir (Larch) and shall conform to AREMA specifications see, Part 1, Material Specifications for Lumber, Timber, Engineered Wood Products, Timber Piles, Fasteners, Timber Bridge Ties and Recommendations for Fire-Retardant Coating for Creosoted Wood. All lumber and piles, except IPE timber, should be pressure treated in accordance with AREMA Chapter 30.

3.6.2 Shimming and Fillers

Shimming of stringers and piles to provide proper bearing surface should be performed using a single hardwood shim under stringer. Shimming with stacked or multiple shims is not allowed. Replacement of the stringer shims is required at Bents 3, 4, 6, 8, and 9. Piles need shims at Bents 3, 4, 6, 8, and 9. For a detailed view of the shims that need replacing, see **Appendix B**.

Sash and sway bracing should bear firmly against the piles to which secured. When necessary, filler shall be placed to avoid bending the bracing more than 1 inch out of line when the bracing bolts or other fastenings are drawn up tight. Built-up fillers will not be permitted and each filler shall be a single piece of pressure treated lumber of like kind to that in the brace with a width of not less than 6 inches and a length of not less than 12 inches. Piling shall not be trimmed or cut to facilitate the framing of sway bracing.

3.6.3 PVC Deck Joist Drip Shields and Flashing

Flashing should be applied to top surfaces that are exposed during retrofit. This includes the top of the existing stringers, the new stringers, and the top of the new bent caps. Flashing may consist of PVC Drip Caps, Grace Vycor Self-Adhesive flashing, or similar.

3.6.4 Fire Protection and Maintenance

This trestle has been subject to multiple arson attempts. Several methods are available reduce the risk of fire. Fusible-link detector systems can be connected to alarm systems that notify the fire department of a fire allowing them to get there and extinguish it sooner. Housekeeping is another effective method of preventing fires. Housekeeping performed by the City should include:

- Decayed spots in exposed timbers should be trimmed.
- Brush and weeds are kept down for a distance of at least 25 feet from the bridge, both underneath and on the embankment at the ends of the bridge or trestle.
- Creek flow debris is removed from the piers after storms. Due to difficult access from the banks for equipment, this may require the use of equipment that can reach over the edge of the bridge deck to remove debris from the stream bed. Large pieces, such as logs and trees, can be cut by workers below to make the pieces more manageable. This maintenance should be completed at least once annually.

Fireproofing coatings are also available that can be sprayed on to the timber to make it less combustible from the outside. This should be considered cautiously as some fire protective coatings will change the appearance of the structure. Fire damage may continue to be a maintenance issue due to the fact that that there are homeless camps downstream of the bridge that may be the source of the fires (someone tried to light our timber inspection scaffolding on fire when it was left unattended overnight).

4.0 Replacement Bridge Considerations

As part of the scope of work and as an alternate to the retrofit options, a replacement bridge was also considered. A pre-fabricated Contech® "Capstone" steel truss bridge (details in **Appendix D**) was selected for the comparison. This bridge would utilize a poured concrete deck that can also be scored and stained to resemble the old railroad tracks for an aesthetically pleasing nod to the past life of the crossing. The bridge alignment would remain the same and the abutments would be replaced with new concrete abutments on cast-in-drilled-hole concrete piles. If the replacement option is selected, the existing timber piles could potentially be used as falsework supports to erect the prefabricated bridge on site, since it will come in pieces that need to be assembled.

The prefabricated truss option provides the City with many benefits. While the initial upfront cost to the City is slightly higher than the other two retrofit options, the cost of ownership and overall return on investment is greater with the replacement option. Benefits of replacing the structure include the following:

- Reduction in probability of damage due to either arson or wildfires.
- Less time and money spent on maintenance of both the creek and the structure itself.
- Less time and money spent on bi-annual inspections of the bridge.
- Less time and money spent on post-seismic event inspections.
- 25-35 year longer expected life span compared to the retrofitted trestle

Replacement of the trestle with a single span steel and concrete truss bridge would also remove all of the piers from the creek, which in turn keeps debris from collecting at the piers. Lack of debris collecting means the City's maintenance crews would no longer have to annually clear the piers. The lack of debris also lowers the risk of arson, because there is less fuel to ignite below the bridge. In addition, the bridge is not combustible and would not require alarms or fireproof coating for protection, (see **Table 11**).

Table 11: Fire Resistance and Protection Comparison

Design Option	Resistance to Fire Damage	Source of Fuel	Fire Protection Recommended	Type of Protection
New Pre-Fabricated Steel & Concrete Truss	High	Reduced	No	N/A
Trestle Rehab with Concrete Decking	Low to Moderate	Substructure and debris at bents in the streambed	Yes*	Fire proof coating, fire sprinklers, and/or alarms may be utilized
Trestle Rehab with IPE Decking	Low to Moderate	Superstructure and substructure and debris at bents in the streambed	Yes*	Fire proof coating, fire sprinklers, and/or alarms may be utilized

*While large timbers can resist significant section loss caused by some amount of burning, any damage by fire is not desired by the City. Fire protection is therefore recommended.

Another benefit of replacement is that structure maintenance costs decrease. This is because elements will not have to be replaced as they would in the timber option. A single span prefabricated bridge would also decrease inspection costs to the City since a two man crew can easily inspect the bridge in one working day. This inspection cost savings applies to both the bi-annual inspections as well as any post-earthquake inspections. The best cost benefit, however, can be seen in the lifespan difference between the structures. With a 25-35 year increase in lifespan, the City can expect to avoid having to pay for both the retro fit now and a new bridge 25 to 50 years from now. This is where the largest return on investment can be seen.

It should be noted that one of the concerns when considering the replacement option seemed to be the overall environmental impact. However, a study of all three options showed disturbance within the Los Gatos Creek, including the active channel, to be unavoidable. A new Initial Study, a new CEQA document (and possibly NEPA clearance if federal funding is used), and regulatory permits would likely be required for all three options. The replacement option, would have slightly larger environmental impacts during construction, but would have less impact over the lifetime of the trail. For full details regarding the environmental assessment see the Environmental Consistency Memo (**Appendix F**).

5.0 Conclusions

5.1 Proposed Rehabilitation Sequence

- The existing ties, walkway and the longitudinal steel strap should be removed.
- Remove damaged caps as indicated.
- Flash top of piles where caps are removed.
- Flash and install new caps.
- Replace all stringer to cap bolts.
- Clean and seal charred caps.
- Flash all existing caps in situ.
- Clean and seal charred portions of stringers.
- Install flashing on stringers.
- Repair piles as noted.
- Replace sway and sash bracing as noted.
- Repair abutment bulkheads and wingwalls.
- Install new decking system and pedestrian railing.

5.2 Additional Recommended Inspections

5.2.1 Stringers

With either the concrete slab or the timber deck alternatives, all of the existing ties will be removed. Once the ties are out of the way, the top portions of the stringers not previously inspected should be sounded for areas of decay. Any voids found during the inspection should be repaired with a two-part penetrating epoxy. **Table 12** and **Table 13** show the estimated quantities for both retrofit options. Repair of stringer voids does not have a quantity listed since more may be found once the existing ties are removed. However, since there were so few voids found during our inspection, even if a few more are found, this is not expected to be a significant repair cost item.

5.2.2 Geotechnical Investigations

If the City decides that bridge replacement is the desired alternative, a geotechnical investigation which includes borings at each support should be completed. Although not required for the retrofit options, additional geotechnical work could be useful even if trestle is to remain. Our analysis work was based on an assumed pile embedment of 20 to 25 feet and a boring log from 3,000 feet away. While it would be difficult to obtain test borings in the stream bed itself due to access, borings at the abutments could provide useful information that could also be used for the approach pavement and or retaining wall designs.

5.3 Concrete Decked Alternative Quantity Estimate

Table 12: Estimated Quantities for Concrete Deck Alternative

Item	Units	Quantity
Structure Excavation, Bridge	CUYD	25
Structure Backfill, Bridge	CUYD	25
Existing Deck Demolition and Disposal	LINFT	210
14”x14”x18’ PT DF Timber Cap	EA	3
Piling Repair	EA	5
4”x10” Upper Sway Brace Replacement	EA	11
4”x10” Lower Sway Brace Replacement	EA	7
8”x10” Sash Brace Replacement	EA	16
Structural Concrete, Bridge	CUYD	67
Bar Reinforcing, Bridge	LBS	13538
Miscellaneous Metal, Bridge	LBS	825
Metal Railing	LINFT	420
Repair Stringer Void	EA	TBD in Field
Pressure Wash and Treat	SQFT	2563
Replace Stringer to Cap Bolt, 1” ASTM A325	EA	30
Replace Bracing Bolts, 1” ASTM A325	EA	342
Flashing (Top of Stringers)	SQFT	1190
Flashing (Top of Pile Cap)	SQFT	300
Flashing (Top of Pile)	SQFT	30
Abutment Wingwall Replacement (Abutment 1)	SQFT	108
Abutment Backwall 8" x 20" x 25' DF Timber Beams (Abutment 1)	EA	5
Abutment Backwall 8" x 20" x 18' DF Timber Beams (Abutment 15)	EA	3
Fire Alarm	LS	LUMP SUM
2" Steel Pipe for Fire Sprinklers	LINFT	210
Fire Sprinkler Heads	EA	21
Connection to Water Supply	LS	LUMP SUM
Fire Proof Coating	SQFT	9480
Stream Bed Debris Removal	LS	LUMP SUM
Concrete Stain	SQFT	2520

5.4 Timber Decked Alternative Quantity Estimate

Table 13: Estimated Quantities for Timber Deck Alternative

Item	Units	Quantity
Structure Excavation, Bridge	CUYD	25
Structure Backfill, Bridge	CUYD	25
Existing Deck Demolition and Disposal	LINFT	210
14”x14”x18’ PT DF Timber Cap	EA	3
8”x20”x30’ PT DF Timber Beams	EA	14
Piling Repair	EA	5
4”x10” Upper Sway Brace Replacement	EA	11
4”x10” Lower Sway Brace Replacement	EA	7
8”x10” Sash Brace Replacement	EA	16
IPE Decking (3”x6”x12’)	EA	458
Metal Railing	LINFT	420
Repair Stringer Void	EA	TBD in Field
Pressure Wash and Treat	SQFT	2563
Replace Stringer to Cap Bolt, 1” ASTM A325	EA	30
Replace Bracing Bolts, 1” ASTM A325	EA	342
Flashing (Top of Stringers)	SQFT	1190
Flashing (Top of Pile Cap)	SQFT	300
Flashing (Top of Pile)	SQFT	30
Abutment Wingwall Replacement (Abutment 1)	SQFT	108
Abutment Backwall 8" x 20" x 25' DF Timber Beams (Abutment 1)	EA	5
Abutment Backwall 8" x 20" x 18' DF Timber Beams (Abutment 15)	EA	3
Fire Alarm	LS	LUMP SUM
2" Steel Pipe for Fire Sprinklers	LINFT	210
Fire Sprinkler Heads	EA	21
Connection to Water Supply	LS	LUMP SUM
Fire Proof Coating	SQFT	11075
Stream Bed Debris Removal	LS	LUMP SUM

5.5 Replacement Bridge Quantity Estimate

Table 14: Estimated Quantities for Replacement Option

Item	Units	Quantity
Structure Excavation, Bridge	CUYD	25
Structure Backfill, Bridge	CUYD	25
Trestle Removal	LS	LUMP SUM
Prefabricated Bridge	LS	LUMP SUM
24" Cast-in-drilled-hole concrete piles	LINFT	720
Structural Concrete, Bridge	CUYD	103
Bar Reinforcing, Bridge	LBS	15615
Installation of Bridge	LS	LUMP SUM

5.6 Repair Cost Estimates and Replacement Bridge Cost

Estimates for total costs were developed for each retrofit alternative. These costs include the prices of the materials, labor costs, equipment costs, design, and permitting costs for the duration of the work. These costs are only for the bridge work and do not include any trail connection work (ie trail retaining walls, approaches at either end of bridge, and trail paving). In addition to costs for the rehabilitation options, a cost estimate was developed for a replacement bridge (**Appendix E**).

Design costs are higher for the replacement option because a geotechnical investigation at the abutments would need to be performed. It should be noted that modeling of the trestle, if retrofit is selected, should consist of a full three dimensional structural model to better capture the overall force effect. The costs for each of the three options, as determined by the analysis methods discussed, are presented in **Table 15**. It should be noted that the costs presented include a 30% contingency. Also, market variance can occur before construction begins and therefore a market variance of 20% less in cost to 40% more in cost is presented in the table to show the possible cost range that can be expected.

Table 15: Cost Estimate for Alternatives

Design Option	Design Cost	Total Cost*	-20% Market Variance*	+40% Market Variance*
Trestle Rehab with IPE Decking	$ 161,111	$ 1,090,000	$872,000	$1,526,000
Trestle Rehab with Concrete Decking	$ 161,111	$ 959,000	$767,200	$1,342,600
Replacement with Pre-fabricated Truss	$ 194,444	$ 1,637,323	$1,309,858	$2,292,252

**These estimates include 30% contingency, 5% storm water/erosion control, 10% mobilization, and 10% construction engineering. For details on all assumptions see Appendix G.*

5.7 Recommended Alternative

It is the recommendation of CH2MHILL that the bridge be replaced with the pre-fabricated truss option. However, if the City decides to retain the existing trestle and rehabilitate it, then it is the recommendation of CH2M HILL that the concrete decked retrofit be selected. This alternative is less costly than the IPE decking and will decrease the cost of ownership over the remaining lifespan of the trestle. It should be noted that the concrete decked trestle is expected to outlast the IPE decked option by approximately 10+ years as the deck will partially protect the substructure from water exposure. A full comparison matrix (with a 1-3 point scoring system) for all three options can be found on the next page of this document (**Table 16**).

The trestle is already showing some signs of age and will only continue to require maintenance over the remainder of its useful life as the original timbers continue to decompose. While the retrofit plan would repair existing problems, the older portions of the structure will continue to deteriorate and at a faster rate than the repairs. This leads to components needing to be replaced on somewhat of a regular interval. While some in the community around the existing trestle may want the existing trestle to remain, it is in the City's best interest to remove the structure. Although a replacement bridge has a slightly higher initial cost, it is the best overall option to own and maintain in the long run if the cost of future inspections, future maintenance, and future bridge replacement are added in.

To compare the overall value, **Table 16** includes present value costs and overall ratings for all three options. The listed cost includes future inspections for all three options, future structure maintenance for all three options, and future replacement of the trestle for either of the rehab options once the bridge's useful life has been exceeded. Streambed maintenance cost has not been included in this table as it is a cost that the City would need to determine. The values shown in the table are calculated assuming a 3% rate of return on investment, no inflation, and a 40 year lifespan for the retrofits. This is done to show the City's total cost for each option (minus streambed maintenance), if the City were to invest a lump sum now to pay for the next 40 years. All values reported are in 2012 dollars and calculations do not include future streambed maintenance costs.

Table 16: Alternative Comparison Matrix

Three Creeks Trail Railroad Trestle

PEDESTRIAN BRIDGE DESIGN ALTERNATIVE

Bridge Design Alternatives	Streambed Maintenance		Structure Maintenance				Inspection				Construction/Design Cost		Time to Completion		Expected Lifespan		Neighborhood Aesthetics		Environmental Permitting		Rating Total	Overall Present Value**
	Streambed Maintenance	Rating	Superstructure Maintenance	Substructure Maintenance	Estimated Cost	Rating	Bi-Annual	Post-Seismic (Magnitude ≥ 5.0)	Bi-Annual Inspection Cost	Rating	Cost	Rating	Description	Rating	Description	Rating	Description	Rating	Description	Rating		
Alternative 1 Trestle Rehab with IPE Decking	Debris from streambed should be removed annually. This would likely require one day, a truck with a crane arm and dump bed, and a crew of 3 or 4.	1	IPE decking is almost maintenance free. Screws may occasionally need replacement. Non-IPE timber beams may need repair if decay is found.	Repair of piling and braces when decay or insect damage is found. Repair costs can be significant if a large seismic event occurs.	$25,000.00 **Every Five Years** **Note:** Total present value over 40 years is $108,848**	1	Inspection would rely on two people with a couple 25 ft ladders, safety gear, hammers, a drill, and oak dowels (to plug drill holes). Expect one full day of work. Decking and substructure need to both be checked for signs of rot, insects, fungus, and failed connections.	This inspection effort can vary depending upon the magnitude of the earthquake. Likely to take 3-4 days with a crew of two people to cover all elements of the bridge. Ladders and safety gear are needed.	$5,000.00 **Every Other Year** **Note:** Total present value over 40 years is $57,788**	1	$1,090,000.00 **Note:** Market prices can make this vary from -20% to +40%. Design effort for this option is considered medium.	2	This is the fastest option as the work could be started as soon as the design was finished and a bid accepted. All timber construction work could be completed in 4 months.	3	25-40 years with regular maintenance. **Note:** Total present value of a replacement bridge (similar to alternative 3) is $500,165**.	1	Some in the community desire to have the structure remain a trestle. As such, this alternative receives 3 points.	3	Disturbance of the Los Gatos Creek corridor, including the active channel, is unavoidable. A new Initial Study, a new CEQA document, and new permits would likely be required. For full details, see the Environmental Consistency Memo (Appendix F).	3	15	$ 1,756,798.00
Alternative 2 Trestle Rehab with Concrete Decking	Debris from streambed should be removed on an annual basis. This would likely be an all day activity involving a pickup with a crane arm and dump bed. A crew of 3 or 4 is likely needed to complete the work.	2	Minimal due to use of concrete	Concrete decking will help protect the substructure from water and rot. Repair of elements is less frequent than with the IPE option. However, seismic damage is still a factor.	$20,000.00 **Every Five Years** **Note:** Total present value over 40 years is $87,078**	2	Inspection would rely on two people with a couple 25 ft ladders, safety gear, hammers, a drill, and oak dowels (to plug drill holes). Expect one full day of work. Substructure checks similar to alternative one. Deck needs to be inspected primarily for signs of cracking or water infiltration.	This inspection effort can vary depending upon the magnitude of the earthquake. Likely to take 3-4 days with a crew of two people to cover all elements of the bridge. Ladders, safety gear, hammers, drills, and oak dowels (to plug drill holes) are needed.	$4,000.00 **Every Other Year** **Note:** Total present value over 40 years is $46,230**	2	$959,000.00 **Note:** Market prices can make this vary from -20% to +40%. Design effort for this option is considered medium.	2	This option would likely be slower than the wood deck option. Construction with concrete cast-in-place would take approximately 4.5 months. Precast could take about a month longer (dependant on how quickly they can get the segments cast).	2	30-50 years with regular maintenance. **Note:** Total present value of a replacement bridge (similar to alternative 3) is $500,165**.	1	Some in the community desire to have the structure remain a trestle. As such, this alternative receives 3 points.	3	Disturbance of the Los Gatos Creek corridor, including the active channel, is unavoidable. A new Initial Study, a new CEQA document, and new permits would likely be required. For full details, see the Environmental Consistency Memo (Appendix F).	3	17	$ 1,592,478.00
Alternative 3 Replacement with Pre-fabricated Truss	None	3	Minimal due to use of weathering steel truss and concrete deck	None	$0.00 **Every Five Years** **Note:** Total present value over 40 years is $0.00**	3	Most of the structural elements can be inspected without any special equipment. As weathering steel is used there is no paint to inspect and with a concrete deck, the underside of the truss is mostly protected. Two people could complete this inspection in a couple of hours.	This inspection could likely be completed in a day or less by two people. Ladders can be used to access the underside to determine if there has been any steel yielding. All other components can be inspected without the use of any special equipment.	$1,000.00 **Every Other Year** **Note:** Total present value over 40 years is $11,558**	3	$1,637,323.00 **Note:** Market prices can make this vary from -20% to +40%. Design cost is highest for this due to need for geotechnical investigations.	1	Fastest in field construction time. The trestle removal could be done in 2 weeks and the new bridge could be open within 2 months of construction start. However, due to prefabricating lead times and submittal reviews this option can take about 4.5 months total.	2	75 years. **Note:** No replacement at 40 years needed.	3	While this does not salvage the trestle, aesthetics could be made pleasing. Staining the concrete deck to resemble the old track could be done. Also, railroad themed signs could be incorporated at the approaches.	2	Similar to the retrofit options, a new Initial Study, a new CEQA document, and new permits would likely be required. The replacement option, however, would have slightly larger environmental impacts. For full details, see the Environmental Consistency Memo (Appendix F).	2	19*	$ 1,648,884.00

Note: **Ratings used above are based on a scale of 1 to 3, with 1 being the worst overall value and 3 being the best overall value. The total rating is the sum of the individual scores and the highest score is selected as the alternative of choice.**

***Recommended Option:** **Based on analysis of the table above, we recommend Alternative 3 (Replacement with pre-fabricated truss). While there appears to be some community sentiment to keep the existing trestle, it is the most difficult to maintain and inspect. The trestle would require more maintenance of the structure as well as the stream bed than the prefabricated replacement would. In addition, the trestle would have an inspection process that would require more effort and therefore an increased bi-annual cost. The pre-fabricated truss bridge would be the best option for the city based off of overall return on investment (if some sort of streambed maintnence costs were to be included). If it is decided that the trestle should remain then it is our recommendation that the second alternative (trestle rehab with concrete decking) be selected as this option helps to protect the substructure from accelerated water damage.**

****These estimates were calculated assuming a 3% rate of return on investment over 40 years (the approximate retrofit useful life). Inflation was not taken into account and the values reported are in terms of 2012 US Dollar value. These estimates are intended to be used as guidance when comparing the overall cost for each alternative that could be expected if the City were to pay all costs everything for the next 40 years by investing a sum of money today.**

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Appendix A

Proposed Design Criteria

Analysis and design of the Los Gatos Creek railroad trestle will conform to Caltrans LRFD (4^{th} Edition) and Caltrans SDC 1.6 requirements. Section 3.6.1.6 of the Caltrans LRFD states that "*Bridges intended for only pedestrian, equestrian, light maintenance vehicle, and/or bicycle traffic shall be designed in accordance with AASHTO's LRFD Guide Specifications for the Design of Pedestrian Bridges*". Therefore, AASHTO Pedestrian shall be used in design of any retrofit or replacement strategy.

Loads that will be considered include: self weight, pedestrian load, maintenance vehicle load, wind loading, seismic loading, and fatigue loading. The City had noted that the superstructure should consist of either a concrete deck or an IPE wood deck. Therefore, the analysis will be performed using two different dead loads based off of the material choice. Also, the City mentioned that their pedestrian bridges are typically 12 feet between barriers. For either the rehabilitation or the replacement, 12 feet will be assumed to be the design width between barriers.

Dead Load (DC):

- Substructure self weight (includes stringers, pile caps, piles, and braces).
- Plus either a Concrete Deck or an IPE Deck

Pedestrian Live Load (PL):

- 90 psf per AASHTO Pedestrian (Section 3.1)
- Consideration of dynamic load allowance is not required for this load
- Equestrian Load will not be considered

Vehicle Load (LL):

- H10 truck per AASHTO Pedestrian (Section 3.2)
    - 4kip front axle and 16 kip rear axle spaced at 14 feet
    - Transverse spacing between wheels is 6 ft
- Consideration of dynamic load allowance is not required for this load

Wind Loads (WS):

- AASHTO Pedestrian states that wind design shall be in accordance with AASHTO Signs.
- A wind pressure will be applied in the transverse direction on the exposed edges of the bridge. This pressure will be calculated as per sections 3.8 and 3.9 in AASHTO Signs. The wind importance factor, I_r, in the wind equation will be taken as 1.15 (per AASHTO Pedestrian Section 3.4).
- A vertical uplift line load, caused by a 0.020 kips/ft^2 pressure applied over the full width of the deck will be applied at the windward quarter point of the superstructure. This load will be applied concurrently with the transverse wind loading in order to determine the effects of uplift caused by wind.

Seismic Loading:

- Seismic analysis will conform to Caltrans SDC. The bridge will be subjected to horizontal ground motions (in SAP 2000) using a site specific ARS Curve

Fatigue Loading (only applicable for a replacement bridge):

- Natural Wind Gust specified in AASHTO Signs 11.7.3 will be used (per AASHTO Pedestrian Section 3.5)
- Truck-Induced wind gust need not be considered as the bridge spans a creek and does not see traffic below.

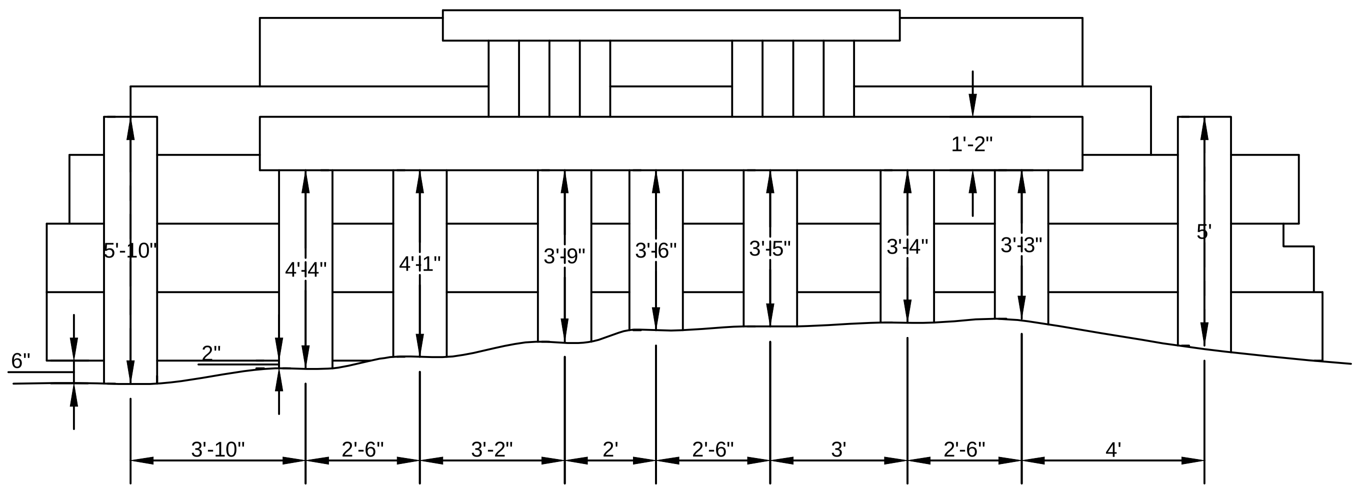
Vibrations and Deflections:

- Vibration and deflection will not be investigated for a rehabilitated trestle

Load Combinations:

- Will conform to Caltrans LRFD Table 3.4.1-1 in general.
- Load combinations Strength II, Strength IV, and Strength V need are not to be considered (per AASHTO Pedestrian Section 3.7).
- The load factor for Fatigue I load combination will be taken as 1.0 (per AASHTO Pedestrian Section 3.7) and Fatigue II will not be considered.

Appendix B



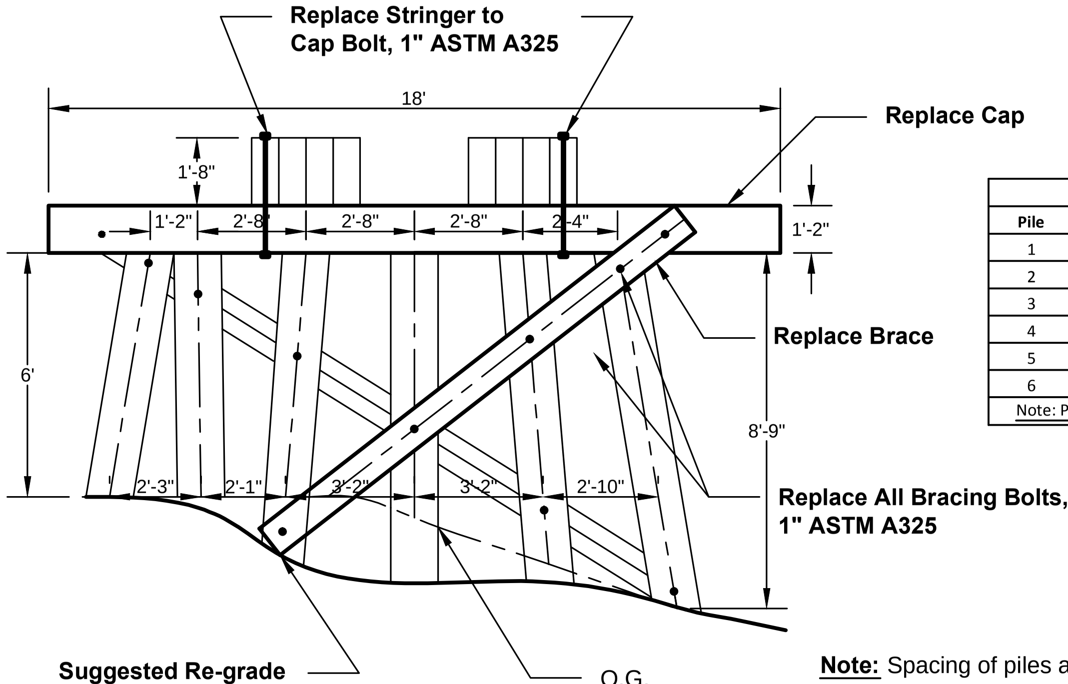
Abutment 1 (Looking Back on Line)

Notes:

-Piles are 14" diameter (average)
-Soil is restrained by transverse planks. These planks are rotten.
-Location of transverse planks is approximate.

Retrofit:

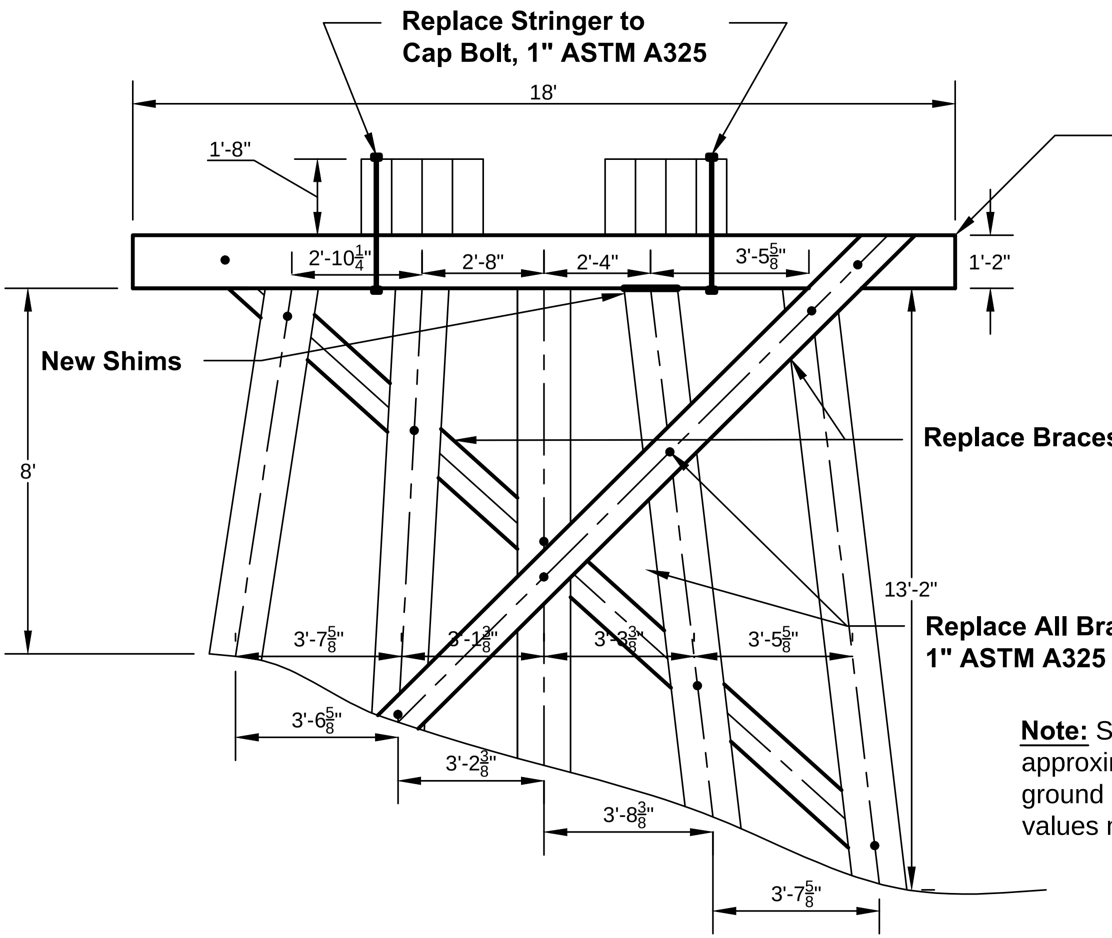
Piles, Cap, and Stringers are all in good condition. New timber for backwall is needed. New concrete block wingwalls to be provided. Concrete replacement could be used as well.



Bent 2 Pile Diameters				
Pile	Circ. Top (in)	Circ. Bott. (in)	Dia. Top (in)	Dia. Bott. (in)
1	45	43	14	14
2	36.5	34	12	11
3	44.5	43	14	14
4	42.5	41.5	14	13
5	41.5	40	13	13
6	47	46	15	15
Note: Pile 1 is on the left (west edge) when looking ahead on line				

Note: Spacing of piles at top and bottom are approximations obtained by using the spacing at the ground (left edge) and the slope of the pile. These values may vary slightly.

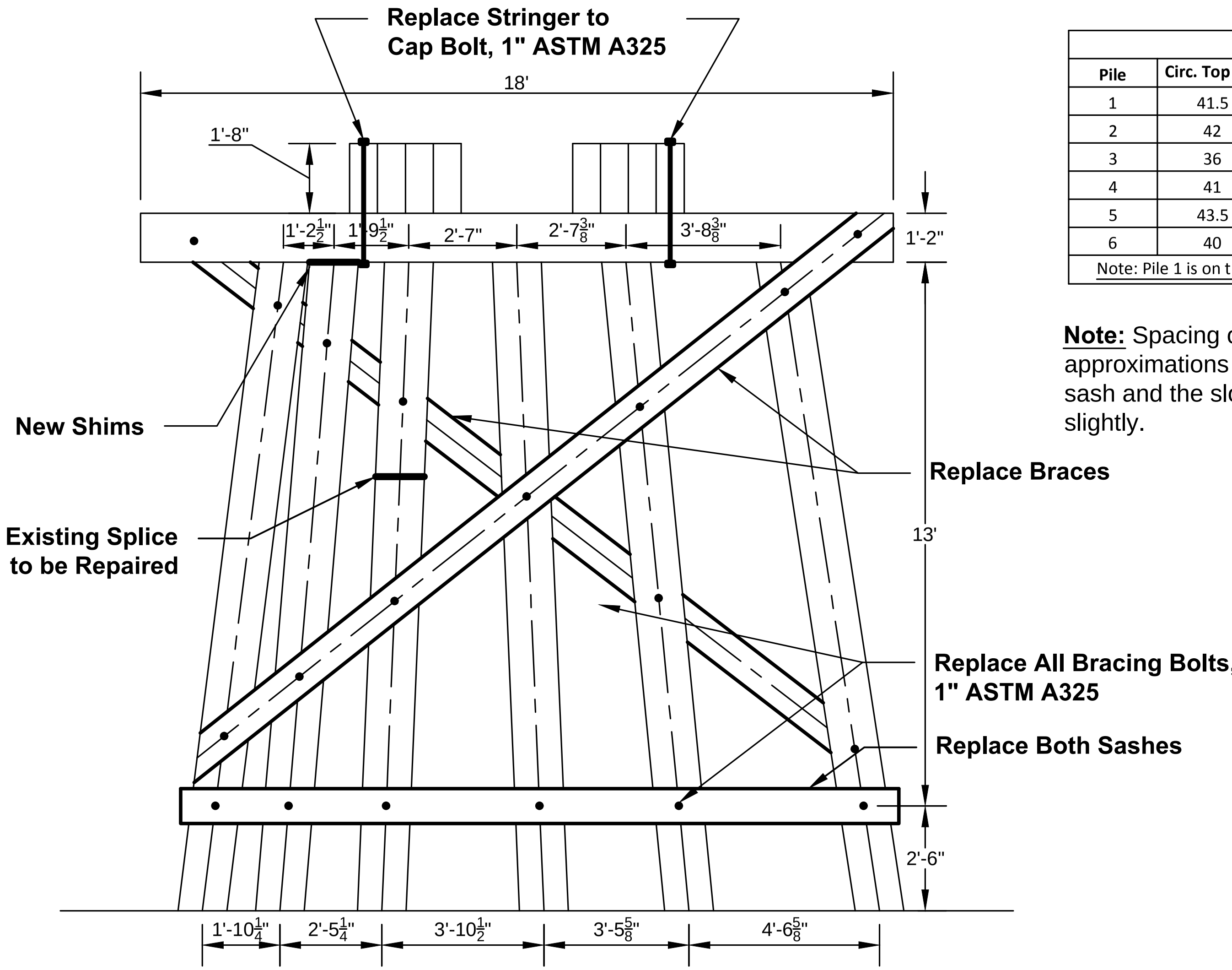
Bent 2 (Looking Ahead on Line)



Bent 3 Pile Diameters				
Pile	Circ. Top (in)	Circ. Bott. (in)	Dia. Top (in)	Dia. Bott. (in)
1	45	42	14	13
2	43	41	14	13
3	42.5	39.5	14	13
4	43	40	14	13
5	46.5	42.5	15	14
Note: Pile 1 is on the left (west edge) when looking ahead on line				

Note: Spacing of piles at top and bottom are approximations obtained by using the spacing at the ground (left edge) and the slope of the pile. These values may vary slightly.

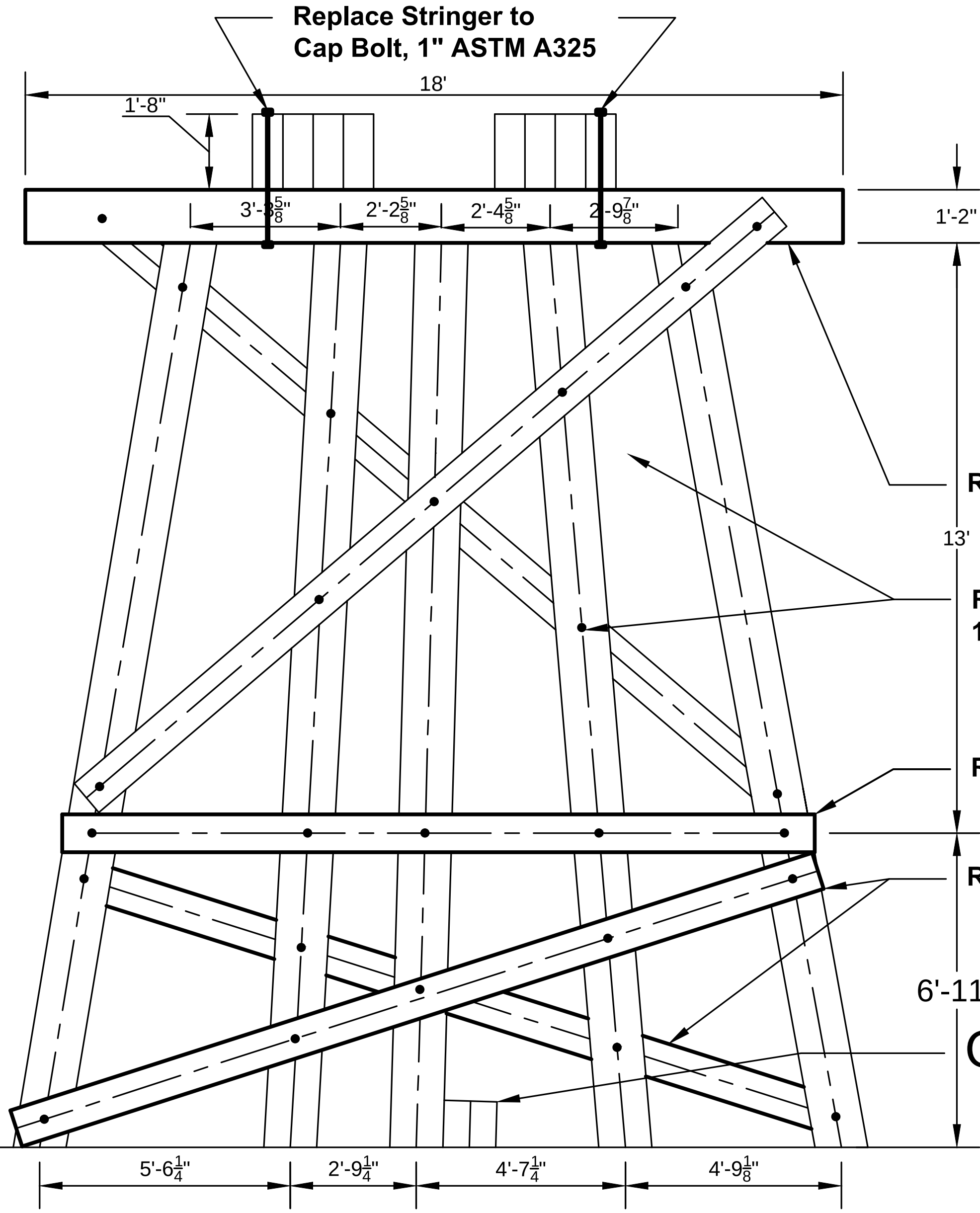
Bent 3 (Looking Ahead on Line)



Bent 4 (Looking Ahead on Line)

Bent 4 Pile Diameters				
Pile	Circ. Top (in)	Circ. Bott. (in)	Dia. Top (in)	Dia. Bott. (in)
1	41.5	44	13	14
2	42	45.5	13	14
3	36	40	11	13
4	41	43.5	13	14
5	43.5	45.5	14	14
6	40	43	13	14
Note: Pile 1 is on the left (west edge) when looking ahead on line				

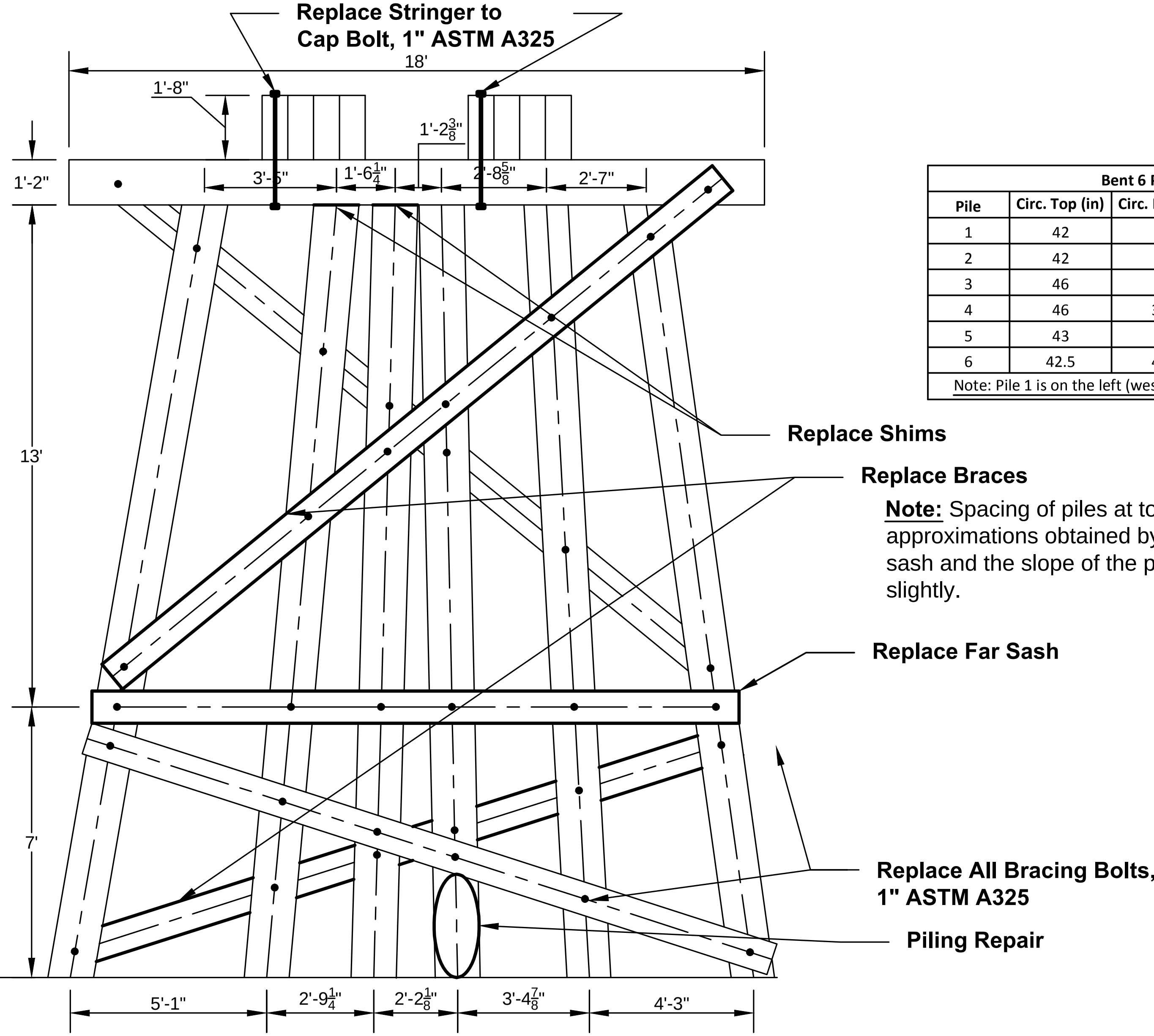
Note: Spacing of piles at top and bottom are approximations obtained by using the spacing at the sash and the slope of the pile. These values may vary slightly.



Bent 5 Pile Diameters				
Pile	Circ. Top (in)	Circ. Bott. (in)	Dia. Top (in)	Dia. Bott. (in)
1	41	37.5	13	12
2	42	38	13	12
3	48.5	43	15	14
4	44	39.5	14	13
5	41	37	13	12
Note: Pile 1 is on the left (west edge) when looking ahead on line				

Note: Spacing of piles at top and bottom are approximations obtained by using the spacing at the sash and the slope of the pile. These values may vary slightly.

Bent 5 (Looking Ahead on Line)



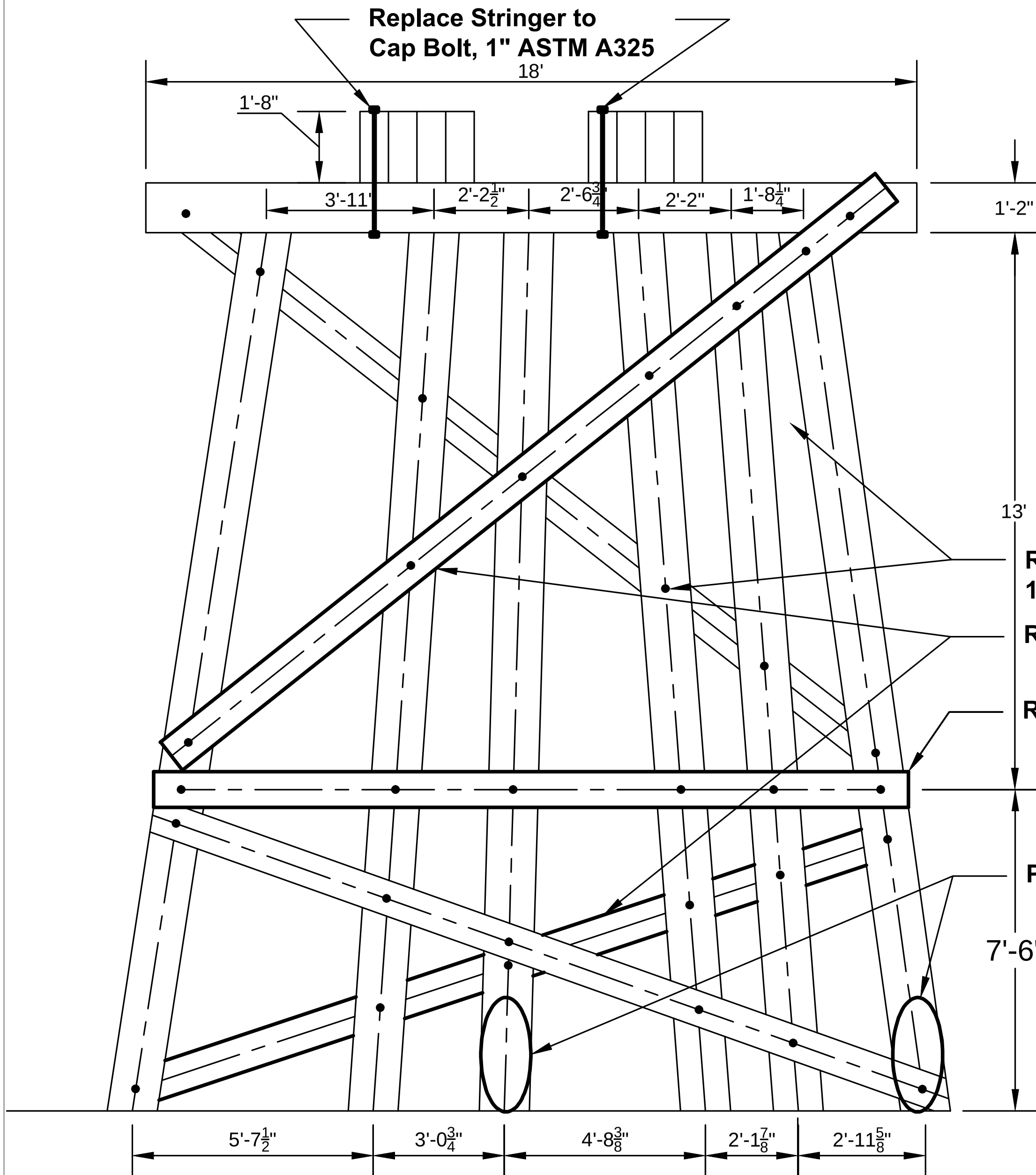
Note: Spacing of piles at top and bottom are approximations obtained by using the spacing at the sash and the slope of the pile. These values may vary slightly.

Bent 6 Pile Diameters

Pile	Circ. Top (in)	Circ. Bott. (in)	Dia. Top (in)	Dia. Bott. (in)
1	42	37	13	12
2	42	38	13	12
3	46	42	15	13
4	46	39.5	15	13
5	43	39	14	12
6	42.5	41.5	14	13

Note: Pile 1 is on the left (west edge) when looking ahead on line

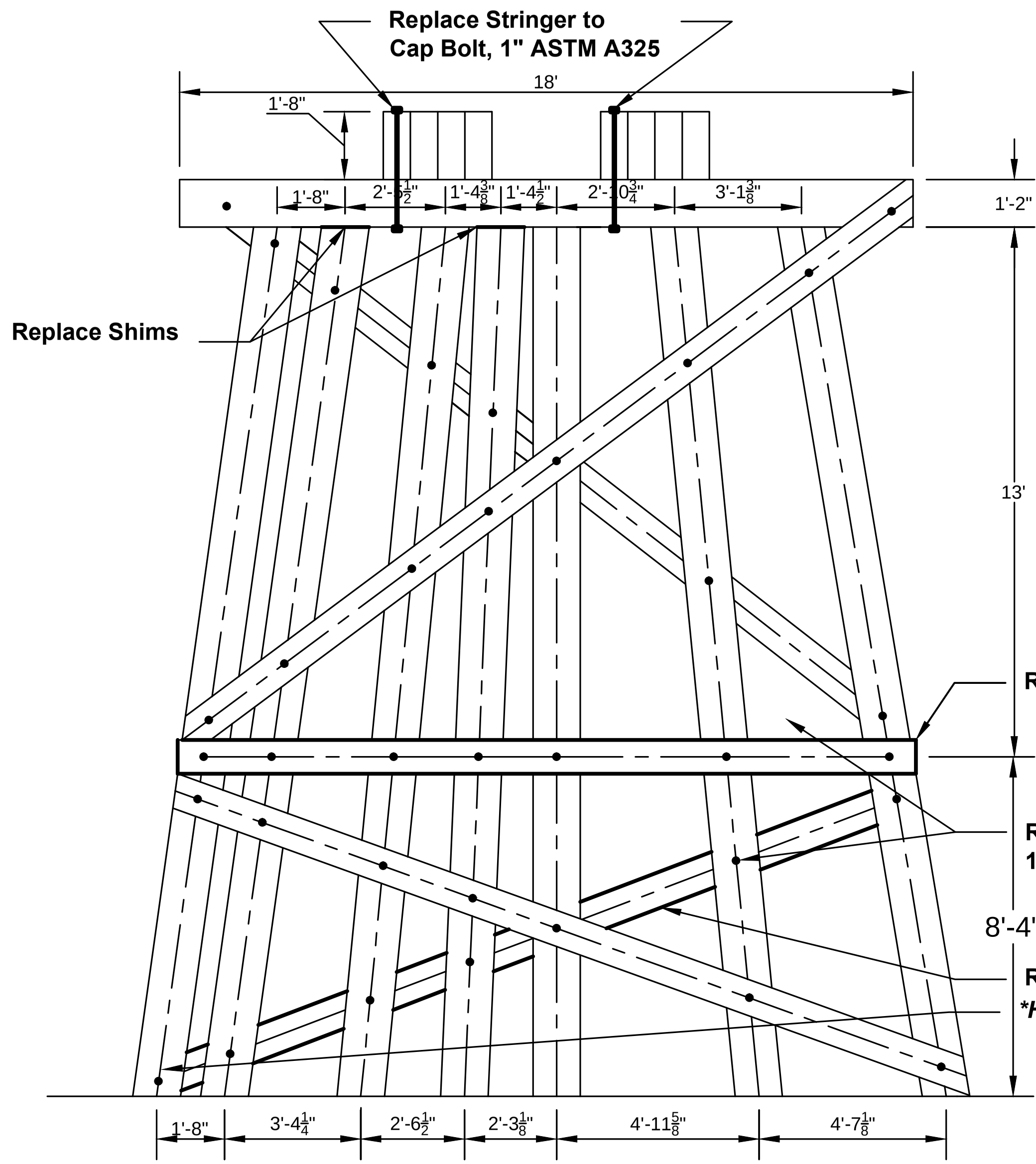
Bent 6 (Looking Ahead on Line)



Bent 7 (Looking Ahead on Line)

Bent 7 Pile Diameters				
Pile	Circ. Top (in)	Circ. Bott. (in)	Dia. Top (in)	Dia. Bott. (in)
1	43	39.5	14	13
2	41.5	37.5	13	12
3	47	41	15	13
4	40	40	13	13
5	42.5	38	14	12
6	43	40	14	13
Note: Pile 1 is on the left (west edge) when looking ahead on line				

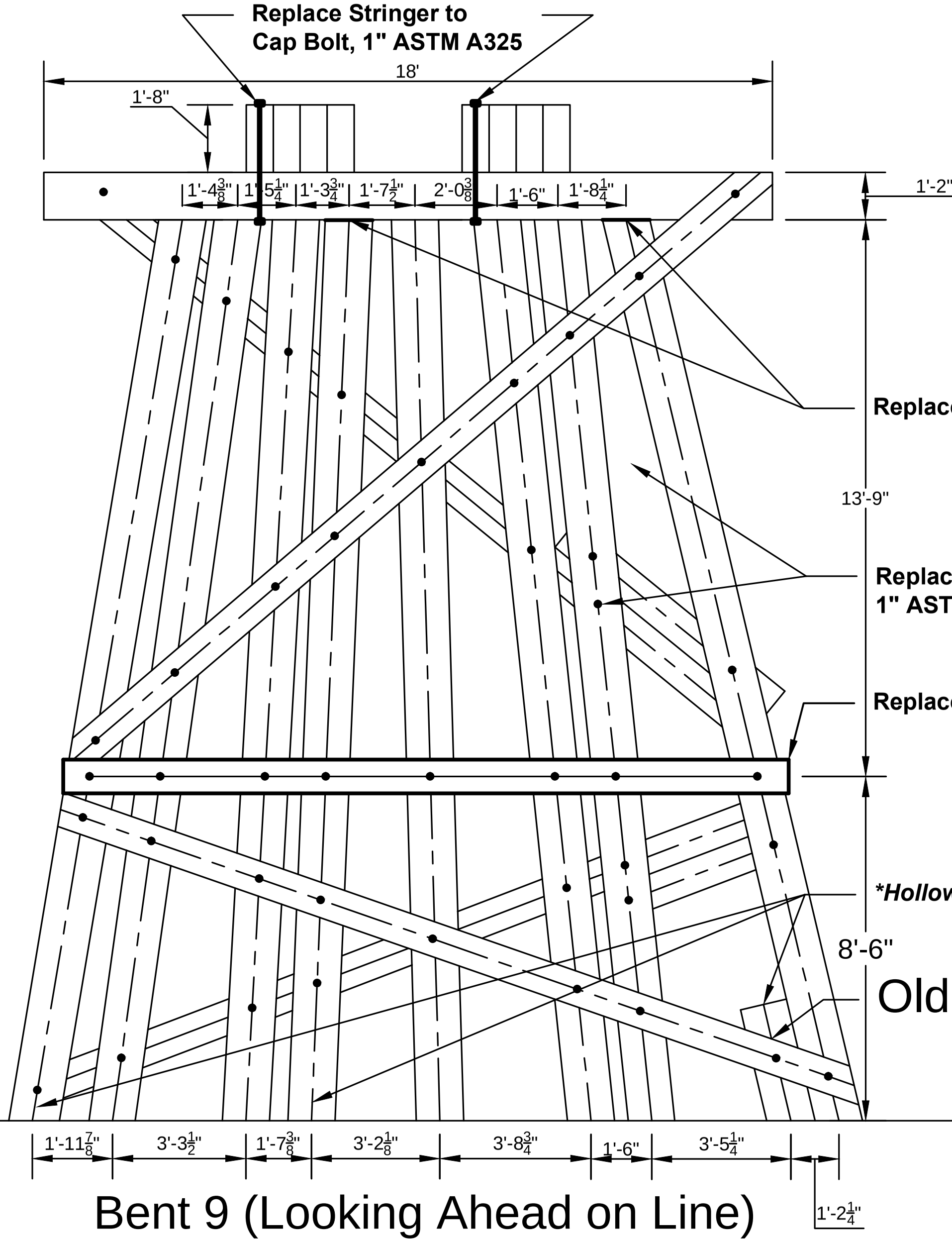
Note: Spacing of piles at top and bottom are approximations obtained by using the spacing at the sash and the slope of the pile. These values may vary slightly.



Bent 8 (Looking Ahead on Line)

Bent 8 Pile Diameters				
Pile	Circ. Top (in)	Circ. Bott. (in)	Dia. Top (in)	Dia. Bott. (in)
1	43	40.5	14	13
2	45	41.5	14	13
3	43	39	14	12
4	45	42.5	14	14
5	48	46	15	15
6	41	38.5	13	12
7	43	40	14	13
Note: Pile 1 is on the left (west edge) when looking ahead on line				

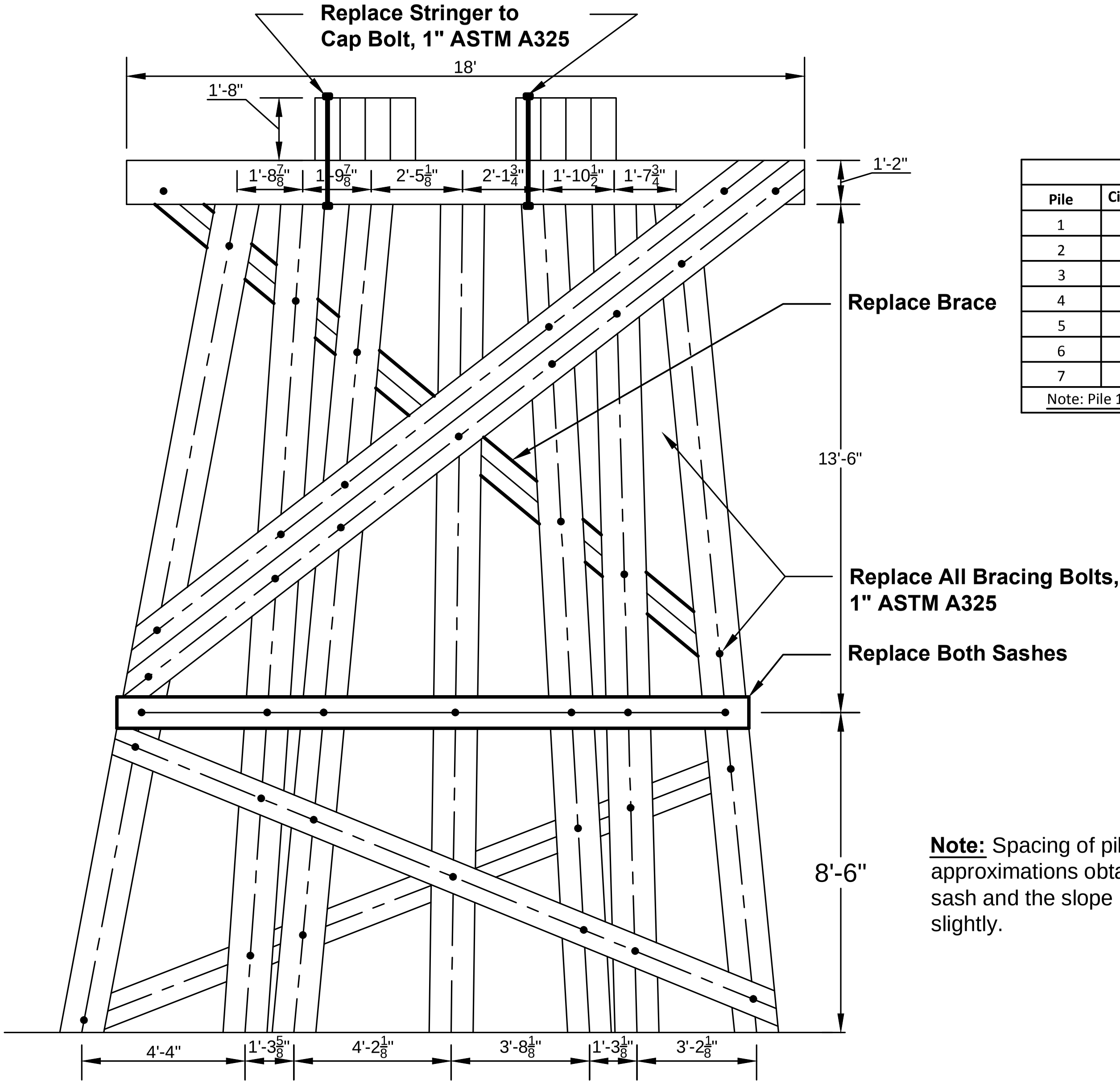
Note: Spacing of piles at top and bottom are approximations obtained by using the spacing at the sash and the slope of the pile. These values may vary slightly.



Bent 9 (Looking Ahead on Line)

Bent 9 Pile Diameters				
Pile	Circ. Top (in)	Circ. Bott. (in)	Dia. Top (in)	Dia. Bott. (in)
1	42	38	13	12
2	40	37	13	12
3	41	38	13	12
4	42	41	13	13
5	43	41	14	13
6	43	41	14	13
7	41	37	13	12
8	36.5	34	12	11
Note: Pile 1 is on the left (west edge) when looking ahead on line				

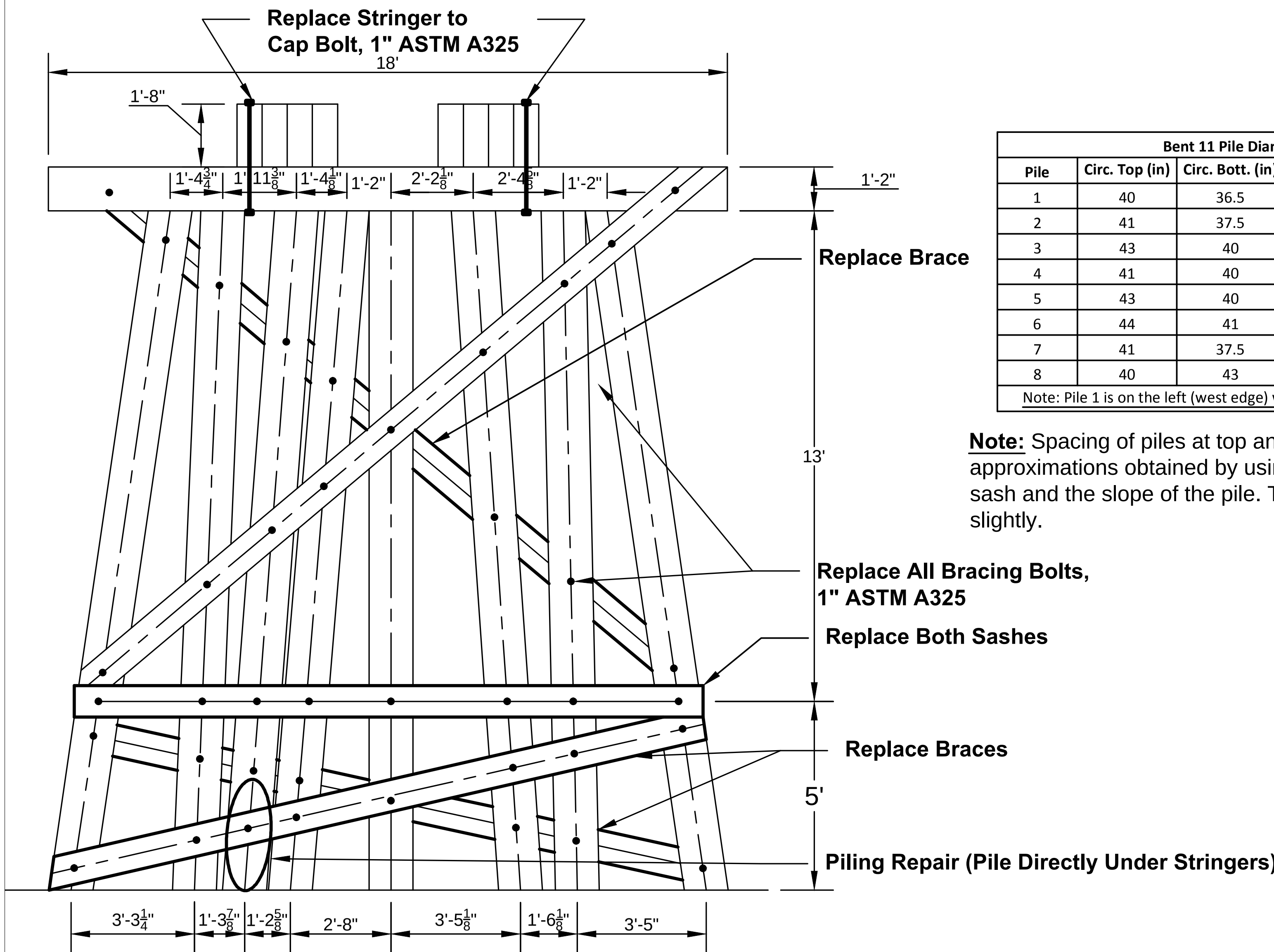
Note: Spacing of piles at top and bottom are approximations obtained by using the spacing at the sash and the slope of the pile. These values may vary slightly.



Bent 10 Pile Diameters				
Pile	**Circ. Top (in)**	**Circ. Bott. (in)**	**Dia. Top (in)**	**Dia. Bott. (in)**
1	42	39	13	12
2	42	39	13	12
3	44	41	14	13
4	48	42	15	13
5	46	43.5	15	14
6	38	34.5	12	11
7	47	44	15	14
Note: Pile 1 is on the left (west edge) when looking ahead on line				

Note: Spacing of piles at top and bottom are approximations obtained by using the spacing at the sash and the slope of the pile. These values may vary slightly.

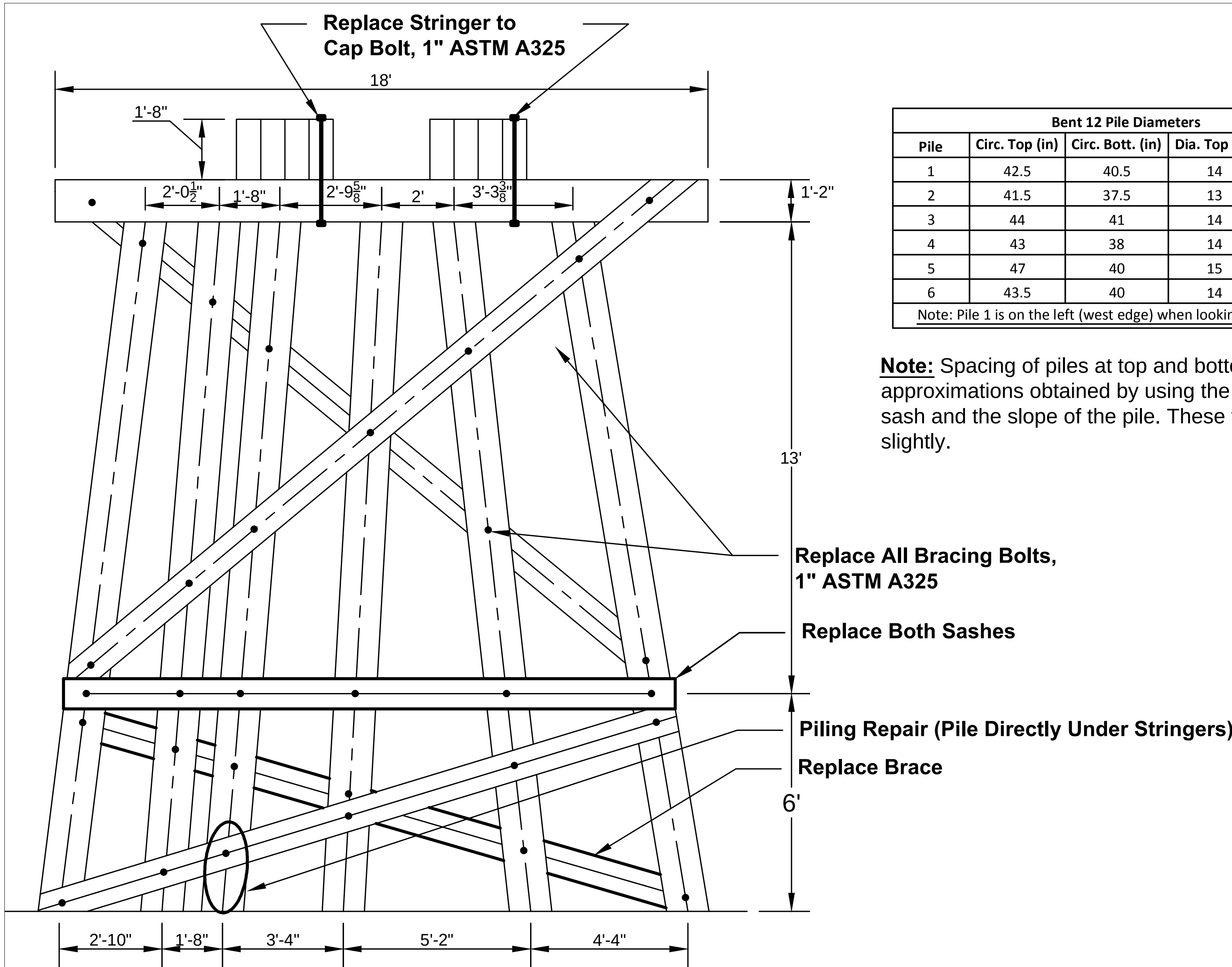
Bent 10 (Looking Ahead on Line)



Bent 11 Pile Diameters				
Pile	Circ. Top (in)	Circ. Bott. (in)	Dia. Top (in)	Dia. Bott. (in)
1	40	36.5	13	12
2	41	37.5	13	12
3	43	40	14	13
4	41	40	13	13
5	43	40	14	13
6	44	41	14	13
7	41	37.5	13	12
8	40	43	13	14
Note: Pile 1 is on the left (west edge) when looking ahead on line				

Note: Spacing of piles at top and bottom are approximations obtained by using the spacing at the sash and the slope of the pile. These values may vary slightly.

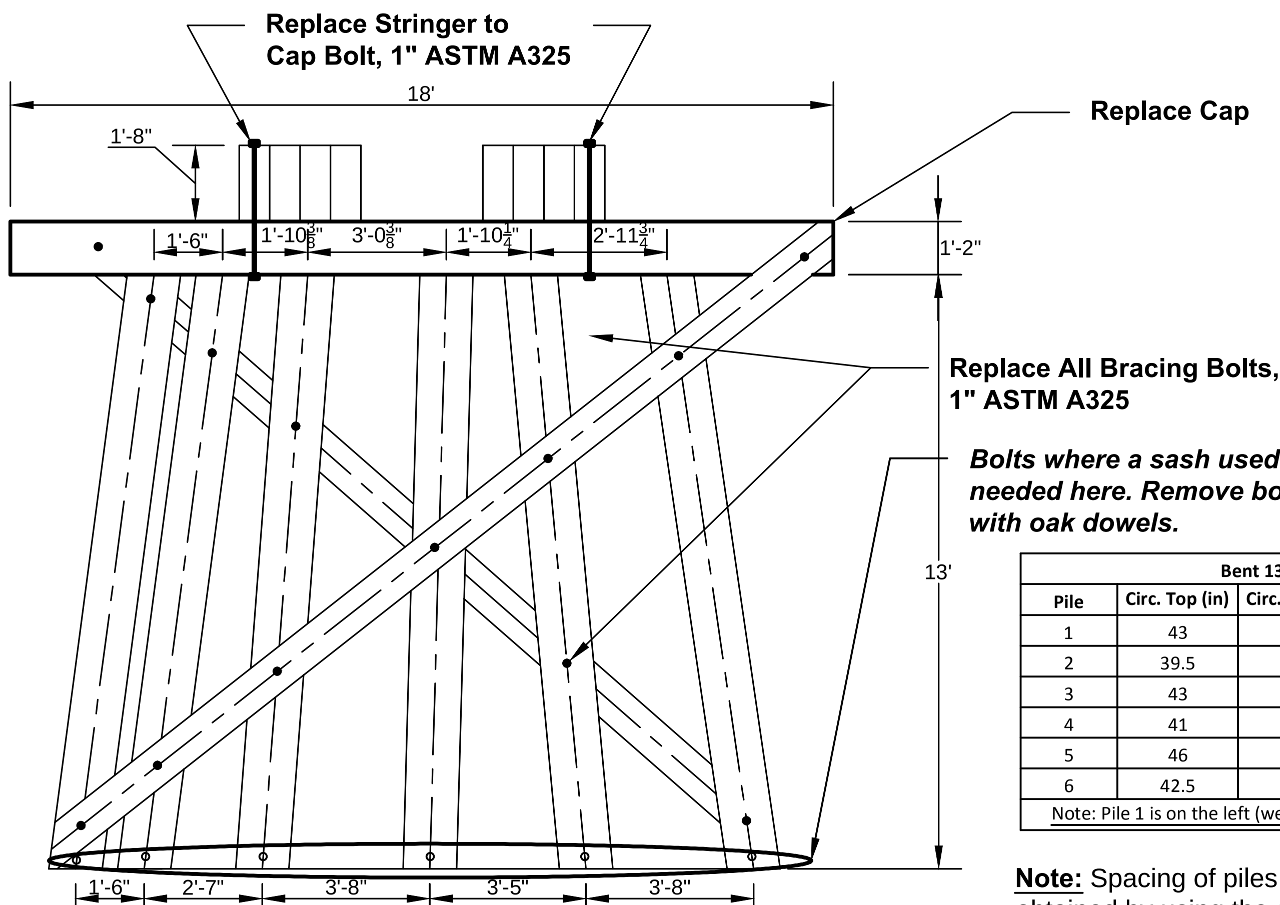
Bent 11 (Looking Ahead on Line)



Bent 12 (Looking Ahead on Line)

Bent 12 Pile Diameters				
Pile	Circ. Top (in)	Circ. Bott. (in)	Dia. Top (in)	Dia. Bott. (in)
1	42.5	40.5	14	13
2	41.5	37.5	13	12
3	44	41	14	13
4	43	38	14	12
5	47	40	15	13
6	43.5	40	14	13
Note: Pile 1 is on the left (west edge) when looking ahead on line				

Note: Spacing of piles at top and bottom are approximations obtained by using the spacing at the sash and the slope of the pile. These values may vary slightly.



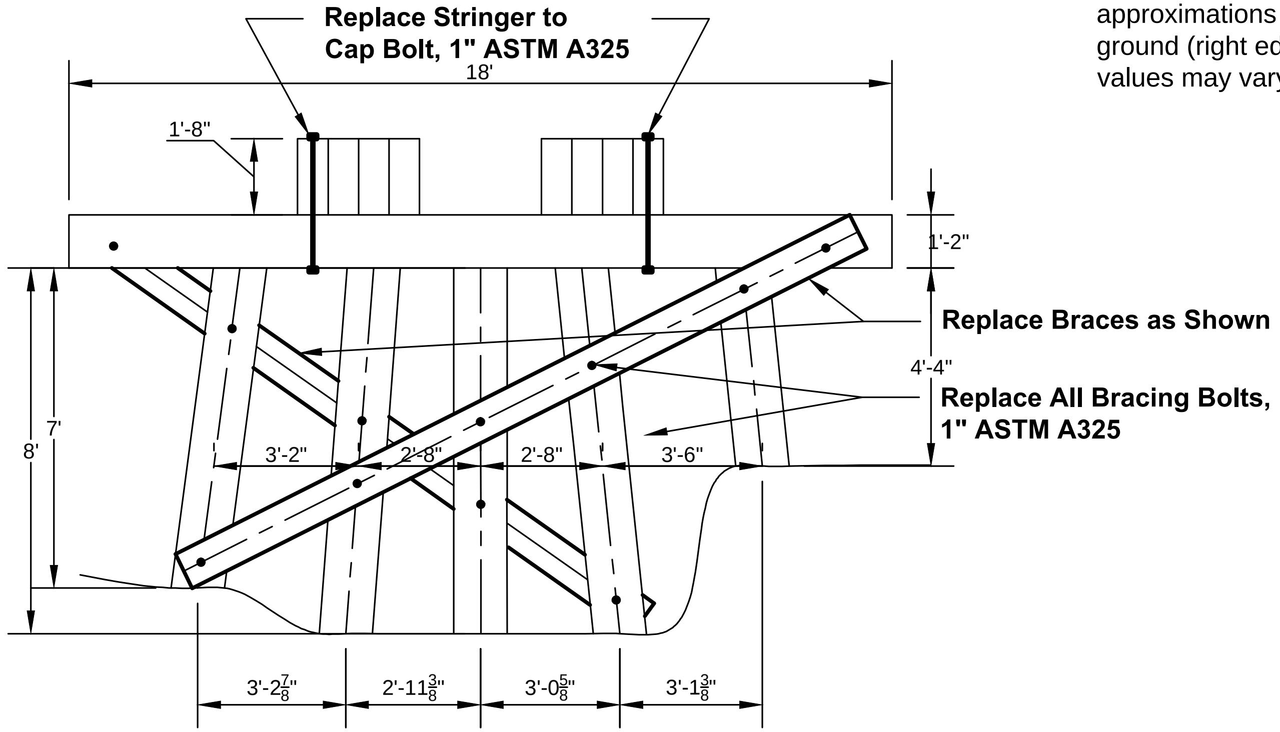
Bent 13 (Looking Ahead on Line)

Bent 13 Pile Diameters				
Pile	Circ. Top (in)	Circ. Bott. (in)	Dia. Top (in)	Dia. Bott. (in)
1	43	41.5	14	13
2	39.5	37	13	12
3	43	38	14	12
4	41	39	13	12
5	46	40	15	13
6	42.5	39	14	12
Note: Pile 1 is on the left (west edge) when looking ahead on line				

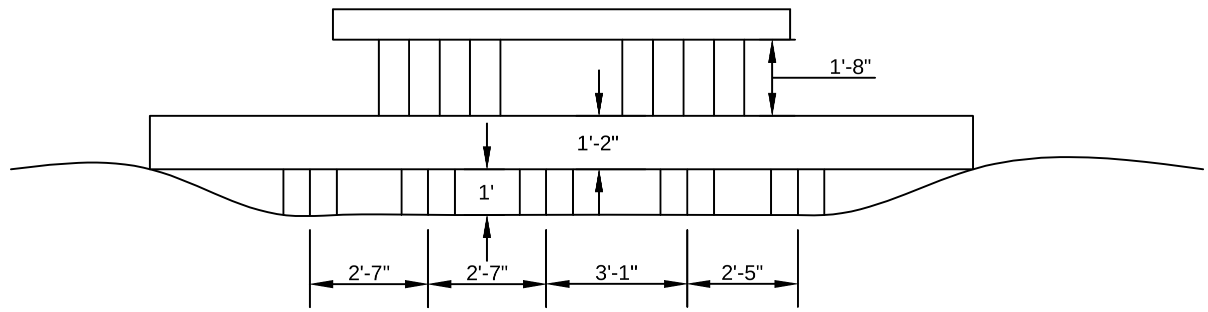
Note: Spacing of piles at the top is an approximation obtained by using the spacing at the ground and the slope of the pile. These values may vary slightly.

Bent 14 Pile Diameters				
Pile	Circ. Top (in)	Circ. Bott. (in)	Dia. Top (in)	Dia. Bott. (in)
1	41	39.5	13	13
2	44.5	41.5	14	13
3	47	43	15	14
4	44	43	14	14
5	43	43	14	14
Note: Pile 1 is on the left (west edge) when looking ahead on line				

Note: Spacing of piles at top and bottom are approximations obtained by using the spacing at the ground (right edge) and the slope of the pile. These values may vary slightly.



Bent 14 (Looking Ahead on Line)



Abutment 15 (Looking Ahead on Line)

Notes:

-Piles are 14" diameter (average)
-Soil is restrained by transverse planks.
-Transverse plans are all rotten and falling apart.
-Location of transverse planks not shown as they are not clear in the field

Retrofit:

Piles, Cap, and Stringers are all in good condition. New timber for backwall is needed. A concrete replacement could be used as well.

Appendix C

Bent 4 D/C Ratios

CH2MHILL

Sacramento Office
2485 Natomas Park Dr., Suite 600
Sacramento, California, 95833

Project Name: Three Creeks Trail
Job Number: 393685
Structure Name: Los Gatos Creek RR Trestle
Date: 8/8/2012
By: R. Coomes

Bent 4 Strength Demands

Bridge Element	Axial Force - Strength Limit State			Moment - Strength Limit State			Shear - Strength Limit State		
	Demand (kips)	Capacity (kips)	D/C	Demand (k-ft)	Capacity (k-ft)	D/C	Demand (kips)	Capacity (kips)	D/C
Stringers	N/A	N/A	N/A	90.04	241.06	0.37	34.05	106.08	0.32
Pile Caps	N/A	N/A	N/A	13.04	95.56	0.14	16.28	33.08	0.49
Piles	28.25	35	0.81	1.9	50.4	0.04	1.36	27.71	0.05

***Note* : Demands come from Bent 4 modeling that assumes the piles are repaired.**

Bent 4 Extreme Event Demands

Bridge Element	Axial Force - Extreme Limit State			Moment - Extreme Limit State			Shear - Extreme Limit State		
	Demand (kips)	Capacity (kips)	D/C	Demand (k-ft)	Capacity (k-ft)	D/C	Demand (kips)	Capacity (kips)	D/C
Piles (Compression)	29.21	50	0.58	16.60	62.91	0.26	11.03	34.89	0.32
Piles (Tension)	20.49	35	0.59	15.76	62.91	0.25	8.35	34.89	0.24
Upper Sway Braces (Compression)	24.81	89.78	0.28	2.80	5.66	0.49	1.73	11.3	0.15
Upper Sway Braces (Tension)	24.19	76.48	0.32	3.05	5.66	0.54	2.47	11.3	0.22
Lower Sway Braces (Compression)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lower Sway Braces (Tension)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sash Brace (Compression)	6.86	185.93	0.04	1.56	35.7	0.04	0.39	16.15	0.02
Sash Brace (Tension)	7.85	156.75	0.05	1.56	35.7	0.04	0.39	16.15	0.02

***Note* : Demands come from Bent 4 modeling that assumes the piles are repaired.**

Connection Element	Shear - Extreme Limit State		
	Demand (kips)	Capacity (kips)	D/C
Drift Pins (Cap to Pile)	6.06	7.69	0.79
Sway Brace Bolts	19.14	13.66	1.40
Sash Brace Bolts	7.85	13.66	0.57
Stringer to Cap Bolts	15.11	28.3	0.53

****Capacity assumes exisiting bolts replaced by ASTM A325 1" threaded rod***

***Note* : Values listed are for the worst bolt in the bent. Directional Shears have been combined using SRSS Method.**

Bent 6 D/C Ratios

CH2MHILL
Sacramento Office
2485 Natomas Park Dr., Suite 600
Sacramento, California, 95833

Project Name: Three Creeks Trail
Job Number: 393685
Structure Name: Los Gatos Creek RR Trestle
Date: 8/8/2012
By: R. Coomes

Bent 6 Strength Demands

Bridge Element	Axial Force - Strength Limit State			Moment - Strength Limit State			Shear - Strength Limit State		
	Demand (kips)	Capacity (kips)	D/C	Demand (k-ft)	Capacity (k-ft)	D/C	Demand (kips)	Capacity (kips)	D/C
Stringers	N/A	N/A	N/A	90.04	241.06	0.37	34.05	106.08	0.32
Pile Caps	N/A	N/A	N/A	15.97	95.56	0.17	22.65	33.08	0.68
Piles	20.56	35	0.59	1.95	50.4	0.04	1.92	27.71	0.07

***Note** : Demands come from Bent 6 modeling that assumes the piles are repaired.*

Bent 6 Extreme Event Demands

Bridge Element	Axial Force - Extreme Limit State			Moment - Extreme Limit State			Shear - Extreme Limit State		
	Demand (kips)	Capacity (kips)	D/C	Demand (k-ft)	Capacity (k-ft)	D/C	Demand (kips)	Capacity (kips)	D/C
Piles (Compression)	40.35	50	0.81	12.28	62.91	0.20	11.16	34.89	0.32
Piles (Tension)	27.61	35	0.79	12.4	62.91	0.20	10.36	34.89	0.30
Upper Sway Braces (Compression)	24.05	89.78	0.27	6.04	5.66	1.07	2.05	11.3	0.18
Upper Sway Braces (Tension)	23.53	76.48	0.31	6.01	5.66	1.06	2.21	11.3	0.20
Lower Sway Braces (Compression)	20.61	89.78	0.23	0.92	5.66	0.16	0.38	11.3	0.03
Lower Sway Braces (Tension)	20.51	76.48	0.27	0.80	5.66	0.14	0.34	11.3	0.03
Sash Brace (Compression)	1.96	193.08	0.01	0.50	32.9	0.02	0.30	16.15	0.02
Sash Brace (Tension)	2.57	163.88	0.02	0.98	32.9	0.03	0.49	16.15	0.03

***Note** : Demands come from Bent 6 modeling that assumes the piles are repaired.*

Connection Element	Shear - Extreme Limit State		
	Demand (kips)	Capacity (kips)	D/C
Drift Pins (Cap to Pile)	4.06	7.69	0.53
Sway Brace Bolts	18.38	13.66	1.35
Sash Brace Bolts	1.47	13.66	0.11
Stringer to Cap Bolts	15.61	28.3	0.55

Capacity assumes exisiting bolts replaced by ASTM A325 1" threaded rod

***Note** : Values listed are for the worst bolt in the bent. Directional Shears have been combined using SRSS Method.*

Bent 7 D/C Ratios

CH2MHILL
Sacramento Office
2485 Natomas Park Dr., Suite 600
Sacramento, California, 95833

Project Name: Three Creeks Trail
Job Number: 393685
Structure Name: Los Gatos Creek RR Trestle
Date: 8/8/2012
By: R. Coomes

Bent 7 Strength Demands

Bridge Element	Axial Force - Strength Limit State			Moment - Strength Limit State			Shear - Strength Limit State		
	Demand (kips)	Capacity (kips)	D/C	Demand (k-ft)	Capacity (k-ft)	D/C	Demand (kips)	Capacity (kips)	D/C
Stringers	N/A	N/A	N/A	90.04	241.06	0.37	34.05	106.08	0.32
Pile Caps	N/A	N/A	N/A	16.02	95.56	0.17	14.47	33.08	0.44
Piles	25.91	35	0.74	1.67	50.4	0.03	1.76	27.71	0.06

***Note* : Demands come from Bent 7 modeling that assumes the piles are repaired.**

Bent 7 Extreme Event Demands

Bridge Element	Axial Force - Extreme Limit State			Moment - Extreme Limit State			Shear - Extreme Limit State		
	Demand (kips)	Capacity (kips)	D/C	Demand (k-ft)	Capacity (k-ft)	D/C	Demand (kips)	Capacity (kips)	D/C
Piles (Compression)	31.99	50	0.64	11.15	62.91	0.18	10.27	34.89	0.29
Piles (Tension)	26.51	35	0.76	12.45	62.91	0.20	11.30	34.89	0.32
Upper Sway Braces (Compression)	24.44	89.78	0.27	2.61	5.66	0.46	1.73	11.3	0.15
Upper Sway Braces (Tension)	23.65	76.48	0.31	2.86	5.66	0.51	2.54	11.3	0.22
Lower Sway Braces (Compression)	21.71	89.78	0.24	1.04	5.66	0.18	0.60	11.3	0.05
Lower Sway Braces (Tension)	20.32	76.48	0.27	0.73	5.66	0.13	0.53	11.3	0.05
Sash Brace (Compression)	0.62	193.08	0.00	0.58	32.9	0.02	0.31	16.15	0.02
Sash Brace (Tension)	2.45	163.88	0.01	0.94	32.9	0.03	0.38	16.15	0.02

***Note* : Demands come from Bent 7 modeling that assumes the piles are repaired.**

Connection Element	Shear - Extreme Limit State		
	Demand (kips)	Capacity (kips)	D/C
Drift Pins (Cap to Pile)	6.26	7.69	0.81
Sway Brace Bolts	17.23	13.66	1.26
Sash Brace Bolts	1.99	13.66	0.15
Stringer to Cap Bolts	15.60	28.3	0.55

***Capacity assumes exisiting bolts replaced by ASTM A325 1" threaded rod**

***Note* : Values listed are for the worst bolt in the bent. Directional Shears have been combined using SRSS Method.**

Bent 7 D/C Ratios (End Bolt Failure)

Sacramento Office
2485 Natomas Park Dr., Suite 600
Sacramento, California, 95833

Project Name: Three Creeks Trail
Job Number: 393685
Structure Name: Los Gatos Creek RR Trestle
Date: 8/8/2012
By: R. Coomes

Bent 7 Strength Demands (Assuming failure of end bolts in bracing)

Bridge Element	Axial Force - Strength Limit State			Moment - Strength Limit State			Shear - Strength Limit State		
	Demand (kips)	Capacity (kips)	D/C	Demand (k-ft)	Capacity (k-ft)	D/C	Demand (kips)	Capacity (kips)	D/C
Stringers	N/A	N/A	N/A	90.04	241.06	0.37	34.05	106.08	0.32
Pile Caps	N/A	N/A	N/A	17.14	95.56	0.18	15.01	33.08	0.45
Piles	27.08	35	0.77	4.56	50.4	0.09	2.16	27.71	0.08

***Note*: Demands come from Bent 7 modeling that assumes the piles are repaired.**

Bent 7 Extreme Event Demands (Assuming failure of end bolts in bracing)

Bridge Element	Axial Force - Extreme Limit State			Moment - Extreme Limit State			Shear - Extreme Limit State		
	Demand (kips)	Capacity (kips)	D/C	Demand (k-ft)	Capacity (k-ft)	D/C	Demand (kips)	Capacity (kips)	D/C
Piles (Compression)	47.63	50	0.95	29.27	62.91	0.47	14.82	34.89	0.42
Piles (Tension)	16.26	35	0.46	31.73	62.91	0.50	13.50	34.89	0.39
Upper Sway Braces (Compression)	38.49	89.78	0.43	3.15	5.66	0.56	1.35	11.3	0.12
Upper Sway Braces (Tension)	31.74	76.48	0.42	3.66	5.66	0.65	3.32	11.3	0.29
Lower Sway Braces (Compression)	27.7	89.78	0.31	1.54	5.66	0.27	1.11	11.3	0.10
Lower Sway Braces (Tension)	27.78	76.48	0.36	1.65	5.66	0.29	1.07	11.3	0.09
Sash Brace (Compression)	4.43	193.08	0.02	1.21	32.9	0.04	0.4	16.15	0.02
Sash Brace (Tension)	5.8	163.88	0.04	1.21	32.9	0.04	0.44	16.15	0.03

***Note*: Demands come from Bent 7 modeling that assumes the piles are repaired.**

Bent 13 D/C Ratios

Sacramento Office
2485 Natomas Park Dr., Suite 600
Sacramento, California, 95833

Project Name: Three Creeks Trail
Job Number: 393685
Structure Name: Los Gatos Creek RR Trestle
Date: 8/8/2012
By: R. Coomes

Bent 13 Strength Demands

Bridge Element	Axial Force - Strength Limit State			Moment - Strength Limit State			Shear - Strength Limit State		
	Demand (kips)	Capacity (kips)	D/C	Demand (k-ft)	Capacity (k-ft)	D/C	Demand (kips)	Capacity (kips)	D/C
Stringers	N/A	N/A	N/A	90.04	241.06	0.37	34.05	106.08	0.32
Pile Caps	N/A	N/A	N/A	11.56	95.56	0.12	13.45	33.08	0.41
Piles	23.82	35	0.68	2.18	50.4	0.04	0.93	27.71	0.03

Bent 13 Extreme Event Demands

Bridge Element	Axial Force - Extreme Limit State			Moment - Extreme Limit State			Shear - Extreme Limit State		
	Demand (kips)	Capacity (kips)	D/C	Demand (k-ft)	Capacity (k-ft)	D/C	Demand (kips)	Capacity (kips)	D/C
Piles (Compression)	28.93	50	0.58	14.23	62.91	0.23	5.91	34.89	0.17
Piles (Tension)	11.78	35	0.34	10.2	62.91	0.16	5.19	34.89	0.15
Upper Sway Braces (Compression)	23.32	89.78	0.26	3.40	5.66	0.60	3.14	11.3	0.28
Upper Sway Braces (Tension)	22.05	76.48	0.29	2.72	5.66	0.48	1.12	11.3	0.10
Lower Sway Braces (Compression)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lower Sway Braces (Tension)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sash Brace (Compression)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sash Brace (Tension)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Connection Element	Shear - Extreme Limit State		
	Demand (kips)	Capacity (kips)	D/C
Drift Pins (Cap to Pile)	5.71	7.69	0.74
Sway Brace Bolts	10.29	13.66	0.75
Sash Brace Bolts	N/A	N/A	N/A
Stringer to Cap Bolts	14.30	28.3	0.51

Capacity assumes exisiting bolts replaced by ASTM A325 1" threaded rod

Note : Values listed are for the worst bolt in the bent. Directional Shears have been combined using SRSS Method.

Bent 14 D/C Ratios

Sacramento Office
2485 Natomas Park Dr., Suite 600
Sacramento, California, 95833

Project Name: Three Creeks Trail
Job Number: 393685
Structure Name: Los Gatos Creek RR Trestle
Date: 8/8/2012
By: R. Coomes

Bent 14 Strength Demands

Bridge Element	Axial Force - Strength Limit State			Moment - Strength Limit State			Shear - Strength Limit State		
	Demand (kips)	Capacity (kips)	D/C	Demand (k-ft)	Capacity (k-ft)	D/C	Demand (kips)	Capacity (kips)	D/C
Stringers	N/A	N/A	N/A	90.04	241.06	0.37	34.05	106.08	0.32
Pile Caps	N/A	N/A	N/A	15.09	95.56	0.16	13.64	33.08	0.41
Piles	27.29	35	0.78	2	50.4	0.04	1.24	27.71	0.04

Bent 14 Extreme Event Demands

Bridge Element	Axial Force - Extreme Limit State			Moment - Extreme Limit State			Shear - Extreme Limit State		
	Demand (kips)	Capacity (kips)	D/C	Demand (k-ft)	Capacity (k-ft)	D/C	Demand (kips)	Capacity (kips)	D/C
Piles (Compression)	16.7	50	0.33	21.29	62.91	0.34	9.75	34.89	0.28
Piles (Tension)	4.35	35	0.12	14.70	62.91	0.23	6.04	34.89	0.17
Upper Sway Braces (Compression)	12.39	89.78	0.14	6.08	5.66	1.07	2.10	11.3	0.19
Upper Sway Braces (Tension)	21.63	76.48	0.28	6.75	5.66	1.19	2.20	11.3	0.19
Lower Sway Braces (Compression)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Lower Sway Braces (Tension)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sash Brace (Compression)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sash Brace (Tension)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Connection Element	Shear - Extreme Limit State		
	Demand (kips)	Capacity (kips)	D/C
Drift Pins (Cap to Pile)	6.57	7.69	0.85
Sway Brace Bolts	15.47	13.66	1.13
Sash Brace Bolts	N/A	N/A	N/A
Stringer to Cap Bolts*	14.10	28.3	0.50

Capacity assumes exisiting bolts replaced by ASTM A325 1" threaded rod

***Note** : Values listed are for the worst bolt in the bent. Directional Shears have been combined using SRSS Method.*

Appendix D

CONTECH ENGINEERED SOLUTIONS

9025 Centre Pointe Drive
Suite 400
West Chester, Ohio 45069
(513) 645-7000
(800) 344-2102
Fax: (513) 645-7689
www.contech-cpi.com

8/3/2012

Mr. Neil Erickson
Contech Engineered Solutions

Subject: Three Creeks Trail, San Jose, CA , (CONTECH Project #)

The following is a Continental Pedestrian Bridge System ENGINEER'S COST ESTIMATE for the subject project. This ESTIMATE is intended for preliminary estimating purposes only and should **not** be interpreted as a final QUOTATION. The information presented is based on the most current data made available to CONTECH.

CONTECH will fabricate and deliver the following described Continental Pedestrian Bridge components and appurtenances:

DESCRIPTION OF SUPPLIED MATERIALS:

1 - 210 x 12 Capstone Model
Weathering steel finish utilizing plated top and bottom chords
6" Concrete Deck (Galv. Form Deck)
Design and seismic stresses in accordance CALTRANS
Vertical picket safety rail system to 54" above the deck

Uniform Live Load of 90 psf (LRFD) psf
Vehicular Live Load of 20000 lbs
Bridge delivered with each side truss in 4 sections and all stringer, floor beams and wind bracing field bolted in place

ESTIMATE: $498,600 Delivered (F.O.B.)

Lifting weight of assembled bridge 186,300 lbs

These costs do not include the foundation, or installation costs. As part of the construction process, the contractor is to perform the items listed below in accordance with the installation drawings:

- Excavate and/or construction for the structure & foundations
- Provide and install anchor bolts
- Unload and set structure utilizing crane
- Touch-Up paint work
- Third-party testing
- Materials and work for reinforced concrete deck slab

Please contact me should you have any questions or need additional information. Thank you for your interest in the Continental Pedestrian Bridge System.

Respectfully,

Courtney Smith
320-852-5339

Note: 5'-0" top of deck to low steel dimension, 5'-6" at the abutments due to bearings. Total dead load per bearing is 90,600 lbs at each corner of the bridge, live load reaction is 56,700 lbs at each corner of the bridge.

CONTECH® ENGINEERED SOLUTIONS

Pedestrian & Vehicular Steel Truss Bridges

CONTINENTAL® BRIDGE

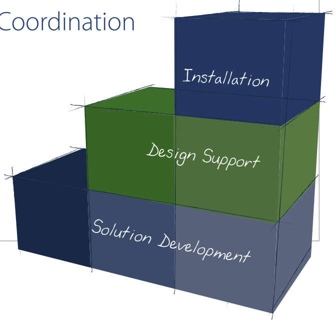
EXPRESS™

U.S. BRIDGE®
BRIDGING AMERICA SINCE 1936

Building Blocks to a Successful Project.

Contech® prefabricated truss bridges are durable and aesthetic solutions. Prefabricated manufacturing means fast installation and substantial cost-savings. Contech truss bridges are typically erected and installed in one to three days, without the need for field welding. Contech truss bridges feature efficient bridge design and construction that is customized and manufactured to your specifications.

SOLUTION DEVELOPMENT	DESIGN SUPPORT	INSTALLATION
• Product Design Worksheet	• Specifications	• Preconstruction Meeting
• Structure Selection	• Contract Drawings	• On-Site Installation Assistance
• Siting & Layout	• Permitting Assistance	• Logistics Coordination
• Design Your Own Bridge (DYOB®)	• Structural/Fabrication Drawings	
• Engineer Estimates	• Approval Assistance	
• Site Simulation	• Custom Solutions	
• Proposal Preparation	• Horizontal/Vertical Alignment	
• Design Build Support	• Hydraulics & Scour Support	
	• Foundation Support	



Rockingham County, VA

Wolverton Road, NJ

Vehicular Steel Truss Bridges

U.S. Bridge® is known for its safe, durable, affordable and aesthetic solutions. U.S. Bridge truss structures are suitable for residential and commercial developments, Department of Transportation, municipal roads, parks and trails, as well as industrial and mining facilities.

U.S. Bridge Offers:

- Clear spans to 300 feet
- Aesthetic solutions
- Quick and straightforward installation with onsite support
- Improved hydraulics
- A variety of rail, deck, and finish options
- Extensive technical support
- Manufacturing with AISC major bridge certification
- Fracture critical and sophisticated paint coating endorsements

U.S. BRIDGE®
BRIDGING AMERICA SINCE 1936

Pedestrian Steel Truss Bridges

Since 1972, Continental® has been North America's premier brand for pedestrian steel truss bridges. With more than 14,000 installations worldwide, Continental truss bridges are ideal for parks and trails, golf courses, skywalks, environmentally sensitive areas and developments.

Continental Bridge Offers:

- Clear spans to 250 feet and more
- Pedestrian crossings over highways, railroad tracks, rivers and wetlands
- Rapid installation
- Aesthetic solutions
- A variety of rail, deck, and finish options
- Extensive technical support
- Manufacturing with AISC major bridge certification
- Fracture critical and sophisticated paint coating endorsements

CONTINENTAL® BRIDGE

Greenway, TN


Cincinnati, OH


Ridgeway, CO

EXPRESS™

Pre-Engineered Pedestrian Bridges

The Steadfast EXPRESS™ bridge is a pre-engineered pedestrian steel truss bridge designed for owners, engineers and contractors who know "time is money." This standardized truss system provides stamped drawings within three business days after receipt of order and a bridge ready for shipment in less than six weeks, significantly reducing construction time. The speed, quality and value of Steadfast EXPRESS™ bridges will ensure you receive the industry's best customer experience.

EXPRESS Bridges Offer:

- Stamped drawings within 3 business days after receipt of order
- Bridge ready for shipment within 6 weeks of approved drawings
- Quick and straightforward installation
- Designed in accordance with IBC and AISC

MUNICIPALITIES & COUNTIES

Rebuilding Our Infrastructure

Time-sensitive projects and emergency bridge replacements often lead municipalities to a U.S. Bridge vehicular or Steadfast EXPRESS pedestrian structure. The clear span structures can improve hydraulics and minimize road and trail closure time with a quick installation, while fitting within a budget. Structures are typically installed in 1-3 days and require minimal maintenance.

Cambridge **Union, ME**

Keystone® **Raleigh, NC**

Gateway® **Apopka, FL**

Connector® **Eagle, ID**

ENERGY, MINING & INDUSTRIAL

Helping to keep America Working

Continental steel truss structures have been utilized for pipe support, conveyor support and other elevated crossings. U.S. Bridge vehicular structures, which meet AASHTO loading criteria, will accommodate large construction vehicles and equipment for the transport of heavy materials. The strength and durability of these systems allow for a wide range of unique solutions.

Connector® **Morris,IL**

Cambridge **Calera, AL**

Connector® **Stephens Point, WI**

Cambridge` **Gillette, WY**

Custom **Pella, IA**

PARK, RESORTS, GOLF COURSES & MORE

Enjoying Life & Leisure

Resorts, tourist attractions and signature golf courses all over the country have turned to Contech pedestrian and U.S. Bridge vehicular truss structures with a wide variety of styles, rail, deck and finishing options available. Truss structures combine aesthetic designs with solid construction to handle golfers, their carts, and maintenance vehicle traffic.

Connector® **Lancaster, PA**

Connector® **Moab, UT**

Custom Gateway® **Atlanta, GA**

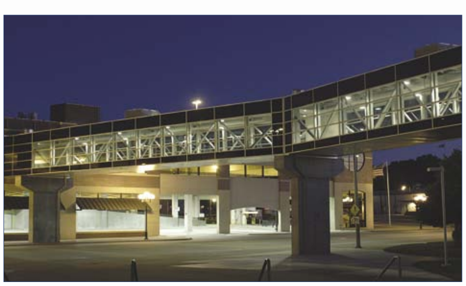
Gateway® **Dedham, MS**

RESIDENTIAL & COMMERCIAL

Providing **Community Solutions**

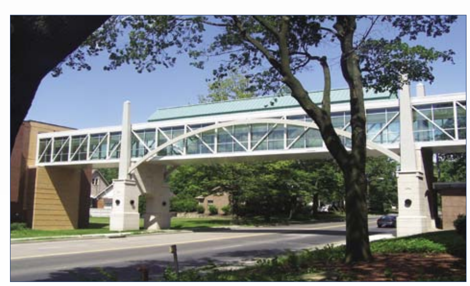
Continental pedestrian and U.S. Bridge vehicular truss structures have been selected by developers throughout the U.S. to provide practical, yet aesthetic structures in residential developments, hospitals, schools and communities. These structures are available in an array of style and finish options to provide a signature look as well as guarantee safe, reliable bridges for every day use.

Developers also look to Continental pedestrian and U.S. Bridge vehicular truss solutions for busy commercial sites. Often times, these bridges are main entrances or centerpieces for business parks, shopping centers and local communities.



Gateway® **Moline, IL**

Cambridge **Shelbyville, IN**



Custom **Warren, OH**

Cable-Stayed **Mishawaka, IN**

CUSTOM DESIGNS & SIGNATURE LOOKS

Looking Ahead We Can Help

Speciality truss bridges by Contech can be custom designed to specifically fit your project's needs. Our bridges have been successfully designed to replicate a particular bridge style or create a brand new signature look.

These custom options have included:

- Gangways onto floating docks, wildlife crossings, material handling and pipe support systems within buildings
- Bridges enclosed with stone, stucco, wood or other materials
- Multi-color paint systems and decorative lighting
- Cable-stayed bridges and skywalks
- Specialized railing, decking and finish options
- ADA accessible ramps

Gateway® **Sturtevant, WI**

Gateway™ **Daytona Beach, FL**

Connector® **Dulles, VA**

Rail Options

Thrie-Beam*

W-Beam*

Safety Rail/Wood Rub Rail

Vertical Picket/Pipe Handrail

Deck Options

Wood

Steel Grate

Concrete

Asphalt*

Finish Options

Weathering Steel

Painted Steel

Galvanized Steel

*Our truss structures offer a wide range of rail, deck and finish options that guarantee a distinctive look for any bridge. * Applies to Vehicular Truss Only.*

Pedestrian Truss Styles*

Connector®

Archway®

Capstone®

Keystone®

Link®

Gateway®

****Custom styling is available to make your project a reality (e.g. skywalks, cable-stayed bridges).***

Vehicular Truss Styles

The Cambridge Flat

The Cambridge

The Viking

The Seneca

The Cortez

Thru Truss

Contech® Engineered Solutions offers a full range of pedestrian and vehicular truss styles for your project's needs. As highly skilled solution providers, we are ready to support you in every phase of your project, from concept to installation.

Tech **Support:** Options & Support

All of our truss structures are accompanied by extensive technical support. Our experienced sales team and national Project Consultant network are available to provide technical assistance for every aspect of your project, from concept to installation.

Visit our website www.ContechES.com to find your local Project Consultant. You may also want to take advantage of the **Design Your Own (DYO) Tool** for truss - our newest online design tool will help to help create the truss bridge you need.

For Vehicular & Pedestrian Truss Bridges

DESIGN SPECIFICATIONS:

- AISC
- AASHTO Standard Specs for Highway Bridges
- AASHTO Guide Specs for Pedestrian Bridges
- AWS D1.1, D1.5
- Registered Professional Engineers

MATERIAL & FINISHES

Steel Types Used (50 ksi material):

- ASTM A588 Weathering Steel
- ASTM A572 Painted (2 Coat and 3 Coat (Zinc Rich Primer) – Any Color)
- ASTM A572 Galvanized (35-year Limited Warranty)

MANUFACTURING/INSTALLATION SPECIFICATIONS:

- AISC Shop Certification
- Simple Bridge Certification
- Major Bridge Certification
- Sophisticated Paint Endorsement
- Fracture Critical Endorsement
- AWS Certified Welders

Contech Engineered Solutions LLC provides site solutions for the civil engineering industry. Contech's portfolio includes bridges, drainage, retaining walls, sanitary sewer, stormwater, erosion control and soil stabilization products.

For more information, call one of Contech's Regional Offices located in the following cities:

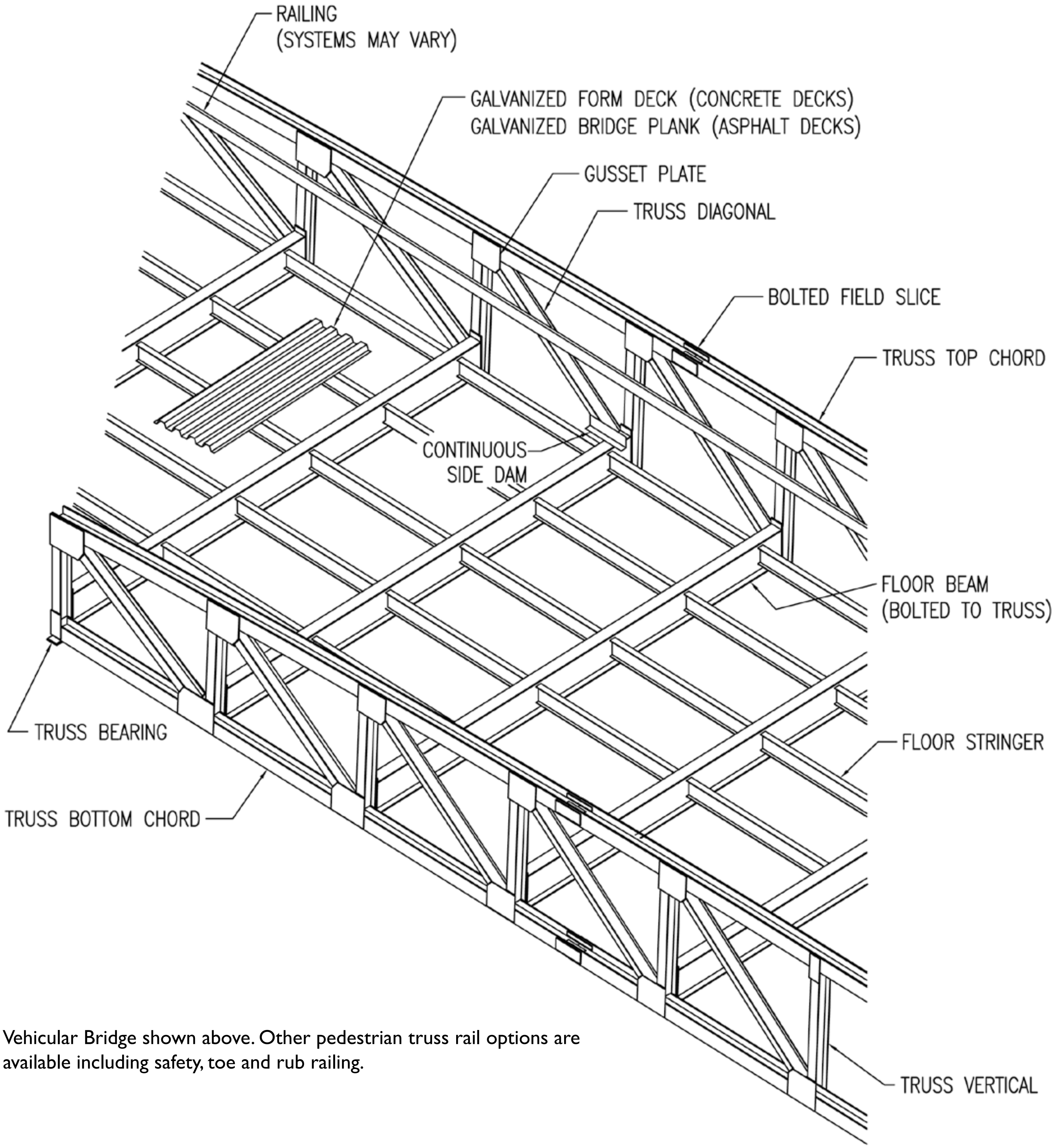
Ohio (Corporate Office)	**513-645-7000**
California (Long Beach)	562-733-0733
Colorado (Denver)	720-587-2700
Florida (Tampa)	727-544-8811
Georgia (Atlanta)	770-409-0814
Maine (Scarborough)	207-885-9830
Maryland (Baltimore)	410-740-8490
Oregon (Portland)	503-258-3180
Texas (Dallas)	972-590-2000

Visit our web site: www.ContechES.com
800-338-1122

Get Social With Us!

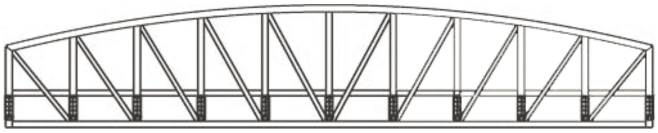
CONTECH ENGINEERED SOLUTIONS

Truss Bridge Details

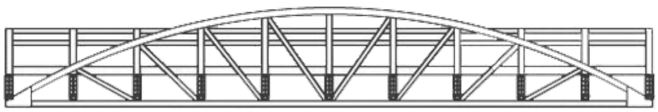


*Vehicular Bridge shown above. Other pedestrian truss rail options are available including safety, toe and rub railing.

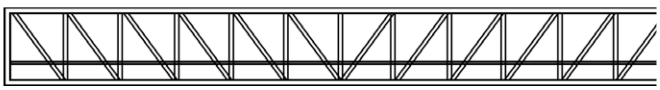
Typical Truss Styles (Pedestrian and Vehicular)



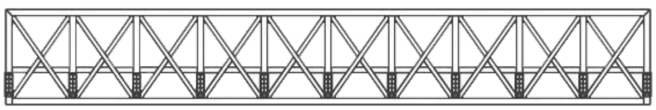
Capstone® Modified Bow Truss



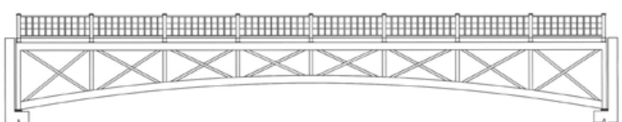
Keystone® Bow Truss



Connector® Standard Truss



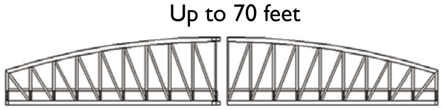
Link® X-Brace Truss



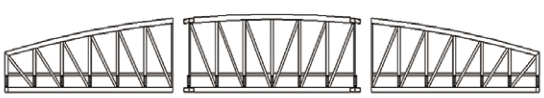
Archway® Underhung Truss

Typical Shipping Splices

Up to 70 feet

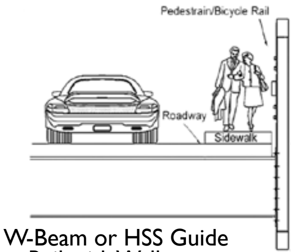


70 feet to 135 feet

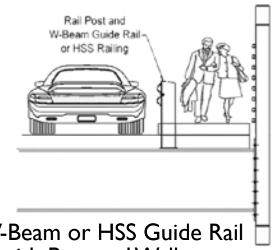


135 feet to 160 feet

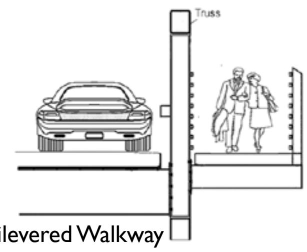
Typical Sidewalk and Railing Arrangements



W-Beam or HSS Guide Rail with Walkway

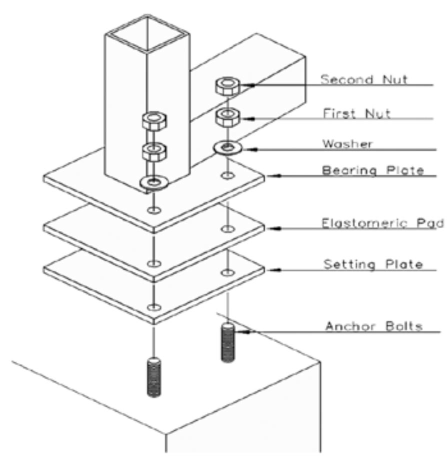


W-Beam or HSS Guide Rail with Post and Walkway

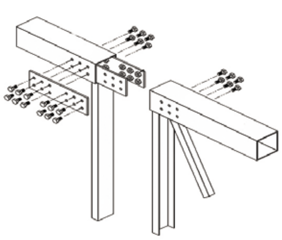


Cantilevered Walkway

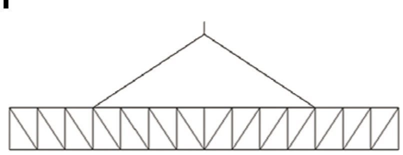
Bearing Details



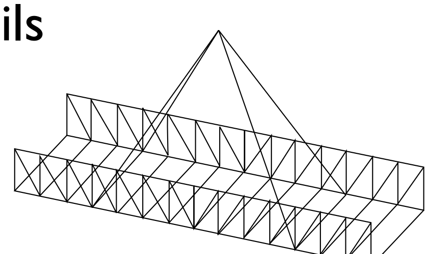
Typical Installation Details



Bolted Splice/Connection Detail

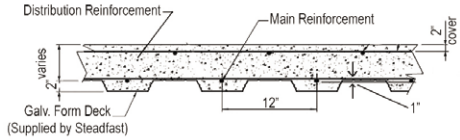


Fully Assembled Truss Only
(top chord lift)

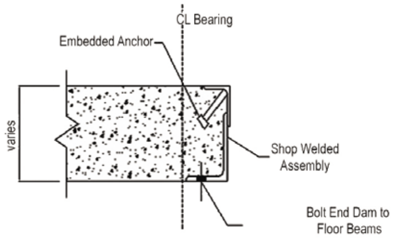


Fully Assembled Bridge
(bottom panel point)

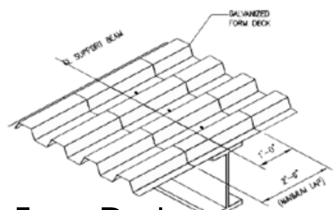
Concrete Floor Connections



Concrete Deck Reinforcing



End Dam Detail



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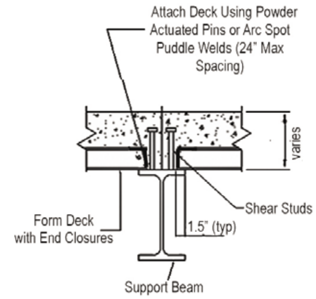
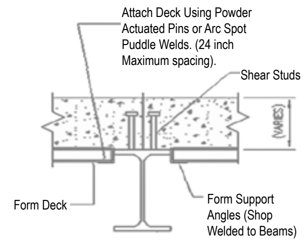
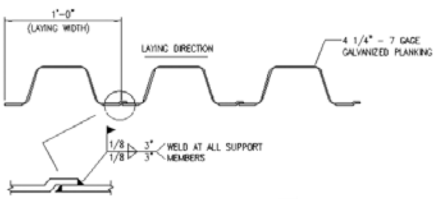


Section View Option #1



Section View Option #2

Asphalt Floor Connections



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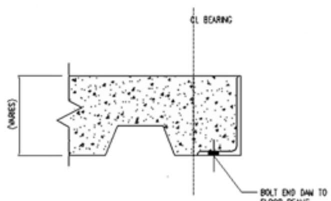
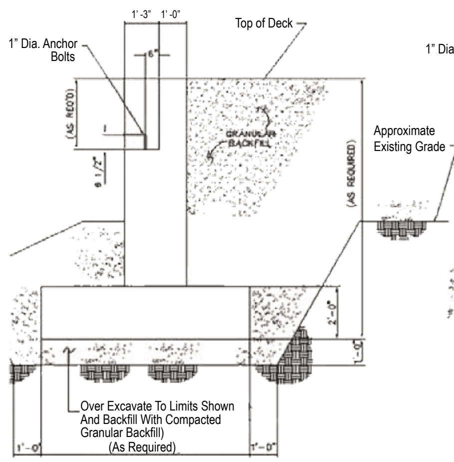
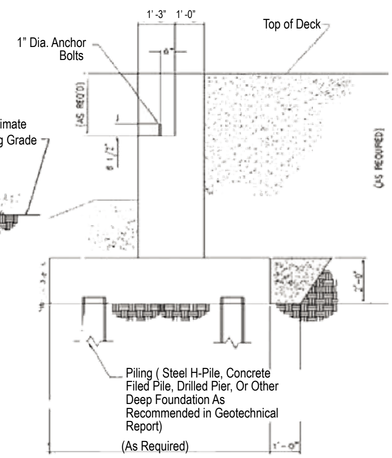


End Dam Detail

Foundations



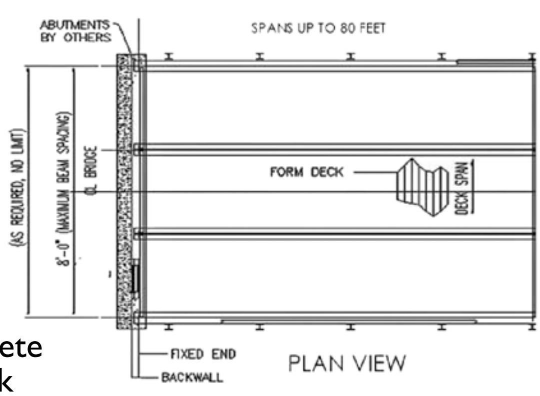
Soil Supported

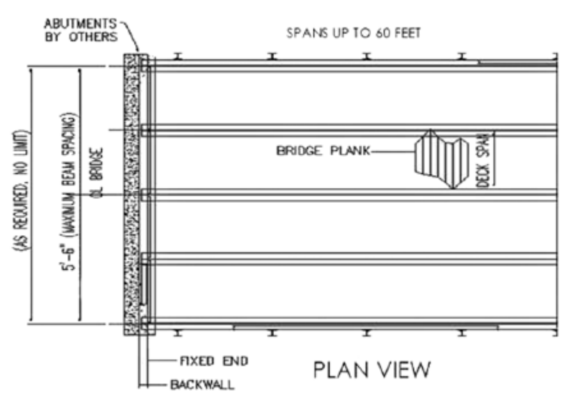


Pile Supported

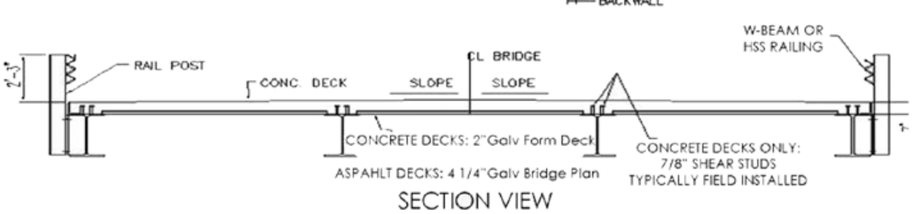
Steel Stringer

Concrete Deck

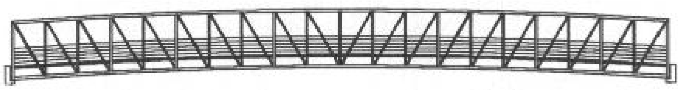




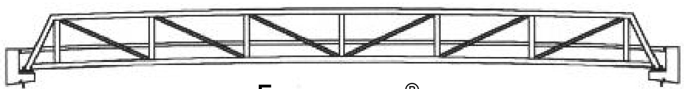
Asphalt Deck



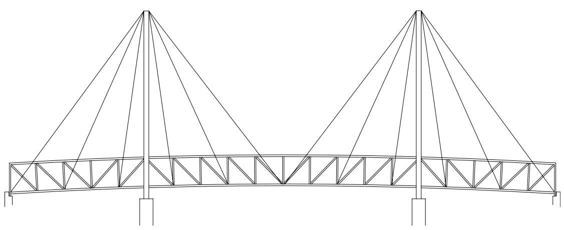
Pedestrian Only Truss Styles



Gateway®

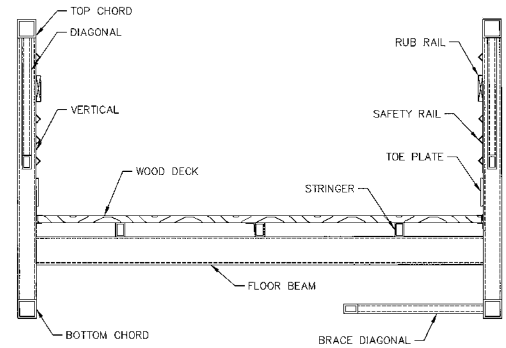


Expressway®

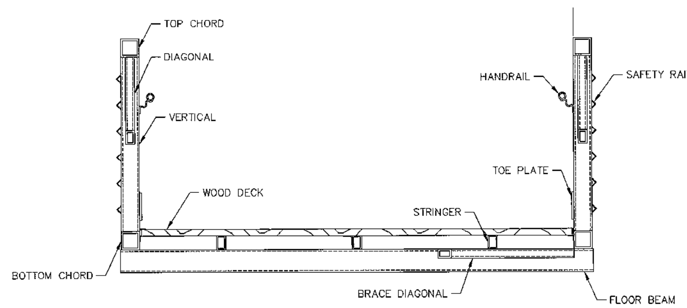


Cable Stayed

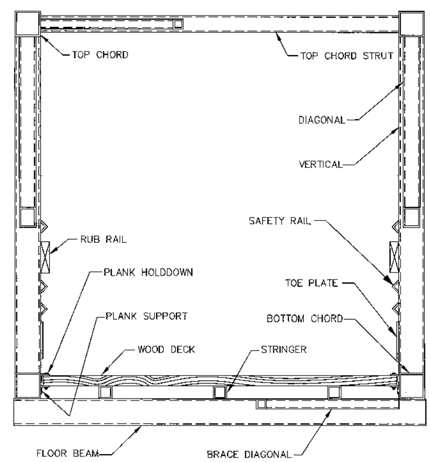
Section Views



Connector® - H-Section

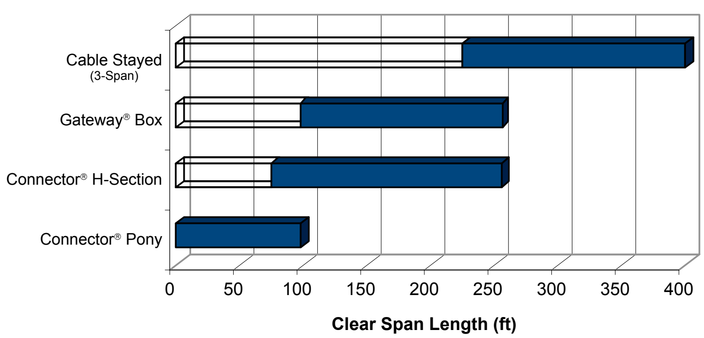


Connector® - Underhung Floor



Gateway® - Through Box

Optimum Pedestrian Bridge System Types



For Vehicular & Pedestrian Truss Bridges

Material & Finishes:

Steel Types Used (50 ksi material):

- A588 Weathering or A847 (Pedestrian Only)
- A500 Painted (Pedestrian Only)
- A572 Painted (2 Coat and 3 Coat (Zinc Rich Primer) – Any Color)
- A572 Galvanized (35-year Limited Warranty)
- A325 Galvanized or Type 3 Weathering (Bolts Provided)
- A307 Galvanized Anchor Bolts are Specified (By Contractor)

Design Specifications:

- AISC
- AASHTO Standard Specifications for Highway Bridges
- AASHTO Guide Specifications for Pedestrian Bridges
- AWS D1.1, D1.5

Manufacturing/Installation Specifications:

- AISC Shop Certification
  - Fracture Critical Endorsement
  - Sophisticated Paint Endorsement
- AWS

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Appendix E

Contech 210 ft Prefabricated Capstone Truss Cost Estimate

CH2MHILL
Sacramento Office
2485 Natomas Park Dr., Suite 600
Sacramento, California, 95833

Project Name: Three Creeks Trail
Job Number: 393685
Structure Name: Los Gatos Creek Trestle
Date: 9/28/2012
By: R. Coomes

Work item	Cost	Cost Source
Trestle Removal	$58,800	Estimate from Rick Hultz (CH2M HILL). Includes labor and equipment cost.
Prefabricated Bridge	$498,600	Estimate from Contech ES. This is delivered cost and doesn't include installation, abutments, or equip (note the installation cost below).
Abutment Piles	$144,000	Need 6 piles at 60 ft each per abutment. $200/ft estimate based off of 2011 Caltrans Contact Cost Data. Includes labor and equipment costs.
Abutment Concrete	$33,600	Estimated at $600/yd^3
Abut. Reinforcing Steel	$6,804	Estimated at $1.35/lb by Rick Hults (CH2M Hill)
Deck Concrete	$28,200	Estimated at $600/yd^3
Deck Reinforcing	$14,276	Estimated at $1.35/lb by Rick Hults (CH2M Hill)
Installation of Bridge	$54,000	From a recent CH2M HILL construction cost estimate for a similar structure.

Subtotal (A)	$838,280		
Stormwater/Erosion	$ 41,914	5%	of Subtotal A
Mobilization	$ 88,019	10%	of Subtotal A + Stormwater/Erosion
Subtotal (B)	$968,214		
Design Engineering	$194,444		
Construction Engineering	$96,821	10%	of Subtotal B
Subtotal (C)	$1,259,479		
Construction Contingency	$ 377,843.72	30%	of Subtotal C
Total	**$1,637,323**		

Low Range	$1,309,858	-20%
High Range	$2,292,252	40%

Appendix F

Three Creeks Trail - Trestle Repair Environmental Consistency

PREPARED FOR: Humin Mu/City of San José
Jan Palajac/City of San José
Yves Zsutty/City of San José

COPY TO: Hans Strandgaard/CH2M HILL
Robert Coomes/CH2M HILL
Dave Von Rueden/CH2M HILL
René Langis/CH2M HILL

PREPARED BY: Matthew Franck/CH2M HILL

DATE: August 16, 2012

PROJECT NUMBER: 393685

Summary

This memorandum evaluates the design alternatives for the Three Creeks Trail Trestle at Los Gatos Creek for consistency with the previously approved environmental impact assessment. Based on the extent of the proposed activities, it appears that all three alternatives would require a new environmental document. All three alternatives would require similar permits from environmental resource agencies for work within Los Gatos Creek. Once conceptual design is completed for the preferred alternative, the City of San José should allow time for completion of a new environmental document – estimated at approximately 6 months. During that time, it is recommended that resource agency consultation occur with participation by the Santa Clara Valley Water District.

Background

The City of San José is in the process of developing the Three Creeks Trail as part of a citywide effort to improve the pedestrian and bicycle trail system. As part of this effort, the City is considering improvements to (or replacement of) an existing railroad trestle, which crosses Los Gatos Creek near Coe Avenue and Lonus Street. Bridge repair and replacement options are being considered in a Retrofit Feasibility Report, which describes recommended actions to ensure safe use. Based on a range of decision criteria (including environmental review and permit processes), the City of San José anticipates selecting one of the repair or replacement options to carry forward for final design and construction. Because of schedule and budget considerations, environmental review processes and permit requirements are among the decision criteria.

In 2004, the City of San José completed an environmental impact assessment for the Los Gatos Creek Trail, Reach 4 project, including the existing railroad trestle that is the subject of the current analysis.[1] The assessment was completed pursuant to the California Environmental Quality Act (CEQA), and consisted of an Initial Study and Mitigated Negative Declaration (City Project No. PP04-014). The documents were approved and issued on June 28, 2004 and a CEQA Notice of Determination was filed on December 2, 2004. The railroad trestle repairs were described in the 2004 CEQA document based on what was known at the time, and did not include work within Los Gatos Creek. At this time, no permit actions have been initiated with the environmental resource agencies.

Project Description Consistency

Los Gatos Creek Trail, Reach 4 Initial Study

The 2004 CEQA document describes the trestle portion of the Reach 4 project as follows:

> The trail would travel to the north from Coe Avenue within the [railroad] right-of-way to the trestle bridge and to the northern side of the creek. Six to eight-foot high security fencing would be installed on both

[1] The entire Reach 4 project, as described in the Initial Study, includes trail improvements from Coe Avenue in Willow Glen to Auzerais Avenue in Midtown San José, and is part of the larger 19-mile Los Gatos Trail system from Lexington Reservoir to the Guadalupe River confluence in Downtown San José. The trail would be a Class I (off-street, paved) pedestrian and bicycle facility with two 6-foot lanes and unpaved shoulders.

sides of the trail on top of the trestle bridge, which will be covered with either wood or synthetic decking material. A stormwater outfall and associated riprap or sacrete apron would be constructed on the north bank of the creek, immediately adjacent to the eastern side of the railroad trestle bridge.

The description references a site plan (Figure 4B in the Initial Study) and a cross section drawing (Figure 5 in the Initial Study). The site plan is part of conceptual design drawings prepared by AN-West Consulting Engineers, and both it and the cross section show the improvements consistent with the project description text. The project description does not discuss safety retrofits to the existing trestle and, other than the stormwater outfall, does not mention work within Los Gatos Creek. Overall, however, the Reach 4 project included disturbance within the Los Gatos Creek corridor (e.g., between Interstate 280 and West Home Street), and included two riparian mitigation sites (Seacrist and Del Monte properties) where habitat would be restored to mitigate for project impacts.[2]

Current Alternatives

Three alternatives are evaluated in the Retrofit Feasibility Report: trestle rehabilitation using a water-resistant decking material such as ipe wood (Alternative 1), trestle rehabilitation using a concrete deck (Alternative 2), and a complete trestle replacement with a pre-fabricated steel truss bridge and concrete deck (Alternative 3).

Both bridge rehabilitation options (Alternatives 1 and 2) include structural repairs to improve bridge safety and long-term reliability. All proposed repairs are described in detail in the Retrofit Feasibility Report, and include the following:

- Removing the existing railroad ties and disposing the wood in a Class 1 landfill.
- Injecting epoxy into some of the longitudinal (stringer) boards to improve their structural integrity, and installing metal flashing. This would occur from the bridge deck following removal of the existing railroad ties. In addition, several stringer boards with charred wood would be pressure washed and sealed with a standard wood sealer, and a fireproof coating also may be applied using either roll-on or spray-on methods. These activities would occur from the bridge deck.
- Replacing pile caps at three of the bents with new pile caps made of pressure-treated or creosoted wood. Creosoted wood from the old pile caps would be disposed in a Class 1 landfill. This work would occur from within the Los Gatos Creek channel.
- Injecting epoxy into several pilings at Bents 4, 6, 7, 11, and 12, where there is evidence of rotting. Some of these piles are located within the active channel, and would require small cofferdams (e.g., using sand bags) to allow the repairs to occur “in the dry.” The repairs could occur without the use of heavy equipment.
- Repairing or replacing many of the sway and sash braces on all of the bents. Replacing these large, heavy timbers may require work within Los Gatos Creek.
- Rebuilding the bulkhead and wingwall timbers at both the north and south abutments. This would be accomplished by excavating the abutments (from the top of the north and south banks), replacing the decayed timbers, and backfilling the area. New bulkhead and wingwall timbers would be pressure-treated or creosoted wood, or possibly concrete would be used instead if a concrete bridge deck option is selected.

These structural repair options under Alternatives 1 and 2 are not discussed in the 2004 CEQA document.

Following the completion of structural repairs, both Alternatives 1 and 2 involve the installation of new decking and safety fencing. Under Alternative 1, new deck planks would be installed using a specialty hardwood that resists rot and decay. A 54-inch high galvanized metal railing system also would be installed. These project features are fully consistent with the 2004 CEQA document. Similarly, new decking would be installed under Alternative 2, but a concrete deck would be used. The concrete deck would either be poured onsite (cast in place)

[2] The Initial Study describes habitat impacts as follows: permanent impacts to 0.15 acres of dense, mixed riparian forest habitat and 34 linear feet of shaded riverine aquatic habitat. An additional 50 square feet of non-native herbaceous cover would be affected by construction of the stormwater outfall on the north side of Los Gatos Creek at the railroad trestle.

or pre-cast and delivered to the site. The concrete deck options also include a 54-inch high railing system consisting of galvanized metal. Installation of the concrete deck would require the use of heavy equipment, and there is some potential for encroachment into Los Gatos Creek under the pre-cast option – cranes would be needed to lift the pre-cast panels into place. Concrete is not described as a possible deck material in the 2004 CEQA document, and no installation from within the creek channel is discussed.

None of the structural repairs discussed above would be necessary under Alternative 3, which was not discussed in the 2004 CEQA document. Alternative 3 involves entirely removing the existing railroad trestle and replacing it with a new, prefabricated steel bridge with concrete abutments. Extensive work would be required in the Los Gatos Creek channel to remove the existing piles, which would occur either by pulling the piles with an excavator or cutting each of them 2 feet below the ground surface. Although extensive work would be required to install new concrete abutments, no piers would be necessary for this freestanding steel bridge. This alternative may have long-term benefits in terms of improved hydrologic conditions and reduced maintenance needs, as well as the removal of creosoted timbers within the creek channel.

For all three alternatives, disturbance of the Los Gatos Creek corridor, including the active channel, is unavoidable. The disturbance area has not been delineated for any of the alternatives, but likely would include vegetation removal and access improvements within the footprint of the existing trestle and some clear distance upstream and downstream – perhaps 16 to 20 feet for all alternatives. Specifications for the bridge repair or replacement contract would likely include extensive erosion control and revegetation requirements within the disturbed area.

Resource Analysis Consistency

This section briefly describes the potential impacts of the new project alternatives in comparison to the 15 environmental resources analyzed in the 2004 CEQA document.

- **Aesthetic** impacts were evaluated in the 2004 CEQA document, and it was determined that impacts would be less than significant because most of the trail area (including the railroad trestle) would not be visible from surrounding areas. This is still the case, and aesthetic impacts are not likely to be more severe than previously evaluated (even under the bridge replacement alternative).
- There would be no **agricultural** impacts as described in the 2004 CEQA document.
- **Air quality** impacts during construction would be greater than described in the 2004 CEQA document. The 2004 CEQA document stated that quantitative analysis of construction impacts was not necessary – the Bay Area Air Quality Management District prescribes standard mitigation measures to be applied during all construction activities, and does not require a detailed analysis. However, the Bay Area Air Quality Management District now requires a detailed analysis of construction emissions. Otherwise, the current project remains consistent with the prior analysis.
- The overall Reach 4 project would have impacts to **biological resources** as identified in the 2004 CEQA document; however, those impacts were not due to the trestle deck repair. The additional work associated with either the repair or replacement alternatives would result in greater impacts to riparian habitat than previously evaluated.[3] In addition, the tree inventory (for purposes of San José Tree Ordinance compliance) is likely out of date. No new species listings relevant to the project area have occurred, and mitigation is likely to be the same as prescribed in the 2004 CEQA document (e.g., work windows to protect steelhead spawning).
- No **cultural resources** were determined to be present in the project area, and the project as currently proposed would be consistent with the 2004 CEQA document including standard mitigation requirements.
- There would be no change to **geology, soils, and seismicity** compared to the 2004 CEQA document.

[3] The evaluation in the 2004 CEQA document references a Natural Environment Study (H.T. Harvey Associates, 2003) that was incorporated as Appendix A, but was not available for review.

- The 2004 CEQA document concluded that impacts from **hazardous materials** would be less than significant, but deferred to later studies associated with acquiring the railroad right of way. These studies have occurred and some remediation activities (e.g., removal of contaminated soils) have been implemented. The exact nature of potential contamination in the trestle area, however, is unknown. The current project would properly handle known hazardous materials (e.g., creosote logs), but additional documentation may be necessary to confirm how potentially hazardous materials disrupted during construction (e.g., from pressure washing charred timbers) would be contained in order to prevent water pollution.
- For the retrofit alternatives, **hydrologic and hydraulic impacts** would be the same as the 2004 CEQA document, but hydrologic and hydraulic conditions would improve under the bridge replacement alternative because the existing wood pilings would be removed. **Water quality** impacts would be potentially greater; however, a detailed water quality control plan would be developed as described in the 2004 CEQA document. Under all alternatives, rain falling onto the bridge deck would continue to run off into the creek.
- There would continue to be no **land use** impacts as described in the 2004 CEQA document.
- Construction **noise** would occur as described in the 2004 CEQA document, but greater noise impacts would occur because of increased construction activity at the trestle (especially under the bridge replacement alternative). Mitigation (primarily limits on nighttime construction) would occur consistent with the City of San José Municipal Code. Noise levels from trail use would be as described in the 2004 CEQA document.
- There would be no **population and housing** impacts as described in the 2004 CEQA document.
- Less-than-significant (and somewhat beneficial) impacts to **public services** (e.g., access for police and fire) would occur as described in the 2004 CEQA document.
- **Recreation** benefits would occur as described in the 2004 CEQA document.
- Construction **traffic** would be similar to what is described in the 2004 CEQA document, but construction activity in the trestle area would be more equipment intensive and last longer than previously described. Long-term traffic impacts would be as described in the 2004 CEQA document.
- There would be no impacts to **utilities and service systems** as described in the 2004 CEQA document.

Recommendations

Environmental Impact Assessment

The 2004 CEQA document evaluated the environmental impacts of the Reach 4 project, including placing new decking and safety railings on the existing railroad trestle. No work was anticipated to occur in the stream channel at the railroad trestle sites, but some disturbance in the channel was anticipated to occur elsewhere in the Reach 4 project area and mitigation sites were identified. As described above, all alternatives require work within the stream channel. Because of its environmental sensitivity, the stream channel is the key resource for evaluating the need for subsequent CEQA documentation.

Actions previously evaluated under CEQA may proceed as long as the CEQA tests for subsequent documentation are not met (State CEQA Guidelines Section 15162). When a Negative Declaration has been adopted, a subsequent CEQA document would be required if any of the following conditions were true:

(1) Substantial changes are proposed in the project that will require major revisions of the previous CEQA document due to the involvement of new significant environmental effects or the substantial increase in the severity of previously identified significant effects.

(2) Substantial changes occur with respect to the circumstances under which the project is undertaken that will require major revisions of the previous CEQA document due to the involvement of new significant environmental effects or the substantial increase in the severity of previously identified significant effects.

(3) New information of substantial importance that was not known at the time the previous document was approved shows any of the following:

(A) The project would have one or more significant effects not discussed in the previous document.

(B) Significant effects previously examined would be substantially more severe than shown in the previous document.

(C) Mitigation measures or alternatives previously found not to be feasible would in fact be feasible and would substantially reduce one or more significant effect of the project, but the project proponents decline to adopt the mitigation measure or alternative.

(D) Mitigation measures or alternatives that are considerably different from those analyzed in the previous document would substantially reduce one or more significant effect on the environment, but the project proponents decline to adopt the mitigation measure or alternative.

For both the trestle repair options and the replacement alternative, the additional work within the stream channel triggers the requirement to prepare a subsequent CEQA document pursuant to criteria 1 and 3B above. This work was not envisioned at the time of the 2004 CEQA document, and impacts to riparian and stream habitat would be substantially greater than previously analyzed.[4] For this reason, a new Initial Study (likely leading to a new Mitigated Negative Declaration) should be prepared. A new CEQA document will help current stakeholders (e.g., creek and trail interests, neighbors, permitting agencies) understand the current project description and provide comments on the environmental impacts and mitigation. However, the typical CEQA process for a project of this type may require 6 months to develop the Initial Study, solicit stakeholder and neighbor comments, and obtain final approvals.

Because of the similar expected footprint for all three alternatives, all alternatives would require similar effort. However, the replacement alternative would have greater overall environmental impacts. Demolition of the existing bridge along with construction of a new steel bridge would take longer and require more equipment-intensive construction activity; this would increase the duration of temporary impacts to a riparian area and cause greater disturbance to nearby residences. The relative increase in effects under the replacement alternative would require a greater level of analysis and greater effort to address neighborhood and stakeholder concerns.

Federal participation in the Three Creeks Trail trestle repair project (e.g., funding) may trigger a requirement to comply with the National Environmental Policy Act (NEPA). A new CEQA document would satisfy basic NEPA requirements for environmental impact assessment. Adding an equivalent level of NEPA documentation (e.g., Environmental Assessment) may increase overall documentation costs by 10 to 20 percent. However, added costs and schedule delays could be much greater depending on how the funding sources are administered. For example, federal trail funds administered by Caltrans trigger that agency's environmental review process and may require additional technical evaluations (e.g., Natural Environment Study).

Permits

The 2004 CEQA document identifies the following environmental permits that would be required for the Reach 4 project: federal Clean Water Act nationwide permit and water quality certification, state Streambed Alteration Agreement, and local permits for construction activities. Specific elements of the Reach 4 project that required these permits are not identified, but the new decking and safety fencing described in the 2004 CEQA document would not normally trigger these permit requirements. The three alternatives from the Retrofit Feasibility Report, however, would trigger the permits discussed for the overall Reach 4 project.

Because of the time delays typically associated with resource agency permits, the application should be submitted as soon as project details are finalized – for example, following conceptual design after the site plan has been confirmed and quantities can be estimated. Permit timeframes can be variable, but the permits themselves do not need to be issued until just prior to the construction period (although earlier permit issuance may provide greater certainty for the construction contractor). The required permits are described in greater detail as follows.

[4] One important consideration is the use of the mitigation sites identified in the 2004 CEQA document (Seacrist and Del Monte properties) if riparian habitat restoration is necessary. A detailed assessment of existing habitat conditions at the trestle will help determine if riparian habitat mitigation is likely to be required, and how much would be necessary. If space is not available at these two sites, then other mitigation sites should be considered.

- Clean Water Act, Section 404. The federal Clean Water Act requires that a permit be issued prior to discharging dredge or fill material into waters of the United States. Generally, construction activity falls under the Clean Water Act permitting requirements, and a standard permit has been issued for these activities throughout the United States (Nationwide Permit 33). Applicants who plan to undertake activities pursuant to Nationwide Permit 33 must file a pre-construction notification with the U.S. Army Corps of Engineers, including a discussion of wetland impacts and mitigation. Construction of any of the repair or retrofit alternatives would require filing a pre-construction notification and coordination with the U.S. Army Corps of Engineers to confirm impact calculations and mitigation.

  The U.S. Army Corps of Engineers typically consults with the U.S. Fish and Wildlife Service and National Marine Fisheries Service to determine any potential impacts to species listed as endangered or threatened by the Endangered Species Act. Because the project occurs within a creek, the National Marine Fisheries Service may require that strict in-channel work windows be followed in order to protect anadromous fish (e.g., steelhead) that may be using Los Gatos Creek for upstream migration. Work windows are not expected to be a significant challenge for this relatively simple bridge repair or replacement project. However, the consultation requirement adds time to the Nationwide Permit 33 process. In addition, the project lies within the anticipated permit area for the Santa Clara Valley Habitat Plan, which is expected to be adopted in late 2012. Preconstruction survey requirements and payment of mitigation fees would be required consistent with the final Habitat Plan. The U.S. Army Corps of Engineers also typically consults with the State Historic Preservation Officer for properties listed on or eligible for listing on the National Register of Historic Places. This consultation process is expected to be abbreviated (or not necessary at all) given the prior determination that the railroad trestle is not eligible for listing on the National Register.

- Clean Water Act, Section 401. The federal Clean Water Act also requires that the state water pollution control agency (in this case, the San Francisco Bay Regional Water Quality Control Board [RWQCB]) certify that that water pollution control standards are met. Consultation with the San Francisco Bay RWQCB will be required, and the certification would be issued pending their acceptance of the water pollution control plan. The San Francisco Bay RWQCB also may issue waste discharge requirements (or waive issuance) pursuant to state law. As an agency of the State of California, the San Francisco Bay RWQCB is subject to CEQA and the requirement to consider the environmental impacts of its actions, including its action to issue a water quality certification. The San Francisco Bay RWQCB may not accept the 2004 CEQA document as adequate for the current project, and for this reason an updated CEQA document may help streamline the water quality certification process.

- Rivers and Harbors Act, Section 10. Construction activities within a waterway considered "navigable" by the U.S. Army Corps of Engineers requires a permit under Section 10 of the Rivers and Harbors Act. This would be addressed in conjunction with the Nationwide Permit 33 process described above.

- California Fish and Game Code, Section 1600. The California Department of Fish and Game issues Streambed Alteration Agreements for activities with a stream zone. This is usually defined as the area with the tops of the banks, including the active stream channel and adjacent riparian areas. The permit would be issued following acceptance of the impact and mitigation calculations, requirements for water pollution control, and commitments to only conduct work in the creek corridor outside of the rainy season. Like the San Francisco Bay RWQCB, the Department of Fish and Game is a state agency subject to CEQA. An updated CEQA document also may help streamline the Department of Fish and Game action to issue a Streambed Alteration Agreement.

In addition to these federal and state processes, local consultation and permits would be required. Both the City of San José and Santa Clara Valley Water District have permit authority for the purposes of ensuring that water pollution control measures are properly implemented consistent with the San Francisco Bay RWQCB municipal discharge permit for the Santa Clara Valley. Early coordination with these agencies will help ensure that comprehensive water pollution control plan is developed for the project, which also would help ensure a successful permit application process through the U.S. Army Corps of Engineers, San Francisco Bay RWQCB, and the Department of Fish and Game.

Appendix G

Three Creeks Trail Railroad Trestle at Los Gatos Creek

City of San Jose, Santa Clara County, California

BASIS OF ESTIMATE

CH2MHILL

Project No:	393685
Estimate ID:	12-030
Project Name:	Three Creeks Railroad Trestle
Class Estimate:	Class 4
Requested By:	Hans Strandgaard/SAC, Robert Coomes/SAC
Estimated By:	Rick Hults/BAO
Estimator Phone:	510.587.7736
Estimated QC By:	Ben Kamph/SEA
Estimator Phone:	425.233.3033
Estimate Date:	September 23, 2012

Rick Hults /BAO
ESTIMATOR

Purpose of Estimate

The purpose of this estimate is to establish a feasibility level opinion of probable cost at less than 5% design to evaluate two design options. Option 1 is replace the timber decking with a new timber deck. Option 2 is to replace the timber decking with a concrete deck. Both options include repair/rehabilitation of the substructure.

General Project Description

The city is investigating the possible reuse and repair of the existing timber railroad trestle that crosses Los Gatos Creek near Lonus Street. The 14-span bridge is an open-deck pile supported timber trestle that has an overall span length of 210.5 ft.

Project Purpose and Need

The purpose of the project is to develop a trail system to connect Los Gatos Creek, Guadalupe River, Highway 87 Bikeway and Coyote Creek Trails. This project is trail segment WGS01 and is in the western alignment (Lonus Street to Guadalupe River).

Overall Costs

The following is a summary breakdown of the costs including contingency with an accuracy range per the AACE standard guidelines for a class 4 estimate of -30% and +50%. Since the level of design is low but a cost based estimate was prepared, a range of -20% to +40% is appropriate. See Appendix "C" for additional details.

See Appendix "A" for bid item breakdown and Appendix "B" for detailed estimate. At this level of design a 30% contingency is recommended per CH2M Hill. Two cost estimates options, as well bridge demo cost for a complete replacement, are provided.

Timber Deck Option:

Low Range	ESTIMATE RANGE	High Range
-20%	**Total $ 1,090,000**	+40%
$ 872,000		$ 1,526,000

Concrete Deck Option:

Low Range	ESTIMATE RANGE	High Range
-20%	**Total $ 959,000**	+40%
$ 767,000		$ 1,343,000

Replacement Option:

Low Range	ESTIMATE RANGE	High Range
-20%	**Total $ 253,000**	+40%
$ 202,000		$ 354,000

Markups/Allowances

The following typical contractor markups & engineering costs were applied to the Cost Estimate:

Contractor Indirects	12% (Included in bid unit prices)
Contractor Profit & Overhead	8% (Included in bid unit prices)
Storm Water/Erosion Control	5%
Mobilization	10%
Environmental	$50,000 (Including CEQA & Permits)
Engineering, Structure	$50,000
Engineering, Civil	$50,000
Geotechnical	$30,000
Construction Engineering	10%

Escalation Rate

Escalation was not considered for this estimate, however using 5% per year calculated compounded to the midpoint of construction would be appropriate.

Market Conditions

The current market conditions are drastically affecting the construction market, across the country. This is based upon recent bids and comparisons with Engineer's Estimates. Bids can be very erratic. Despite the estimator's best practices and adjustments, bids are being driven by current market conditions.

Estimate Classification

This cost estimate prepared is considered a Study or Feasibility Level or Class 4 estimate as defined by the American Association of Cost Engineering (AACE). It is considered accurate to +50% to –30%, based upon a 5% design deliverable. See Appendix "C" for additional details.

The cost estimates shown have been prepared for guidance in project evaluation and implementation from the information available at the time of the estimate. The final cost of the project will depend upon the actual labor and material costs, competitive market conditions, final project costs, implementation schedule and other variable factors. As a result, the final project costs will vary from the estimates presented herein. Because of this, project feasibility and funding needs must be carefully reviewed prior to making specific financial decisions to help ensure proper project evaluation and adequate funding. The estimate is based on material, equipment, and labor pricing as of July 2012.

Estimate Methodology

This cost estimate is considered a **Cost-based estimate** at 5% design.

Cost-based estimate methods do not rely on historical bid data, but rather are based on determining, for an item or set of items, the contractor's cost for labor, equipment, materials and specialty subcontractor effort (if appropriate) needed to complete the work. A reasonable amount for contractor overhead and profit is then added. This method is preferable on unique projects or where geographical influences, market factors and volatility of material prices can cause the use of historical bid-based methods to be unreliable. Also, since contractors generally utilize a cost-based estimating approach to prepare bids, this method can provide more accurate and defensible costs to support the decision for contract award/rejection and to support any future price negotiations with the contractor after contract award.

Quantities were provided by the engineer.

Cost Resources

The following is a list of the various cost resources used in the development of the cost estimate.

- Estimator Judgment
- CH2M Hill Historical Data
- R.S. Means

Allowance Costs

The cost estimate includes the following allowances within the cost estimate:

- Estimate Contingency 30% @ 5% Design Complete

Labor Costs

Labor unit prices reflect a burdened rate, including: workers compensation, FICA, unemployment taxes, Fringe Benefits, small tools & supplies.

Major Assumptions

The estimate is based on the assumption the work will be done on a competitive bid basis and the contractor will have a reasonable amount of time to complete the work working 5-eight hour days.

This estimate should be evaluated for market changes after 90 days of the issue date. It is assumed that most of the fabricated materials will be shipped from the continental USA.

- Contractor will have access and control of construction site during construction.
- Owner will coordinate with contractor and provide adequate notification when needing to perform operations within the construction area.
- Contractor will accommodate owner access in the construction area in event of emergency.
- Utility Companies (power & telephone) will perform own relocation and improvements.
- Dewatering when necessary can be accomplished using portable pumps. No well-point systems were assumed necessary.
- Costs do not include purchase of easements or right-of-way or owner costs beyond the capital construction costs.
- Site access for the contractor and contractor staging areas are adequate for the contractors needs.
- The only hazardous material is the creosote coated timber.
- Timber is Douglas Fir No. 1, rough-full sawn, pressure treated ACZA with retention level 0.60.
- Estimate is based on bid-build delivery.
- Sales Tax is included at 8.75% for materials and equipment.
- See Appendix "B" for detail estimate backup and assumptions.

Excluded Costs

The cost estimate excludes the following costs:

- Non-construction or soft costs for land and legal costs.
- Material Adjustment allowances above and beyond what is included at the time of the cost estimate.

Reference Documents

DeckAlternative_Concrete, 6/21/12
DeckAlternative_Timber, 7/16/12
Retrofit Quantities, by R. Coomes, 7/16/12
Quantity Calcs, by R. Coomes, 7/16/12
Field Inspection Report, 6/7/12
Draft Retrofit Feasibility Report, 6/25/12

Disclaimer
The opinions of cost (estimates) shown, and any resulting conclusions on project financial or economic feasibility or funding requirements, have been prepared for guidance in project evaluation and implementation from the information available at the time the opinion was prepared. The final costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personnel and engineering, and other variable factors. The recent increases or decreases in material pricing may have a significant impact which is not predictable and careful review or consideration must be used in evaluation of material prices. As a result, the final project costs will vary from the opinions of cost presented herein. Because of these factors, project feasibility, benefit/cost ratios, risks, and funding needs must be carefully reviewed prior to making specific financial decisions or establishing project budgets to help ensure proper project evaluation and adequate funding.

APPENDIX A – Bid Item Breakdown

TIMBER DECK OPTION

Construction Costs (A) (Includes indirect, profit and overhead costs)

Bid Item	Item Description	Quantity	Unit	Bid Price		Bid Total
1	Structural Excavation	25	CY	70.00		1,800
2	Structural Backfill	25	CY	143.50		3,600
3	Existing Deck Demolition & Disposal	210	LF	122.00		25,600
4	Stream Bed Debris Removal	1	LS	10,800.00		10,800
5	Piling Repair	5	EA	4,180.00		20,900
6	Repair Stringer Void	9	EA	1,560.00		14,000
7	Timber Replacement	1	LS	81,000.00		81,000
8	Abutment Wingwall Replacement	108	SF	43.00		4,600
9	Fire Alarm	1	LS	1,600.00		1,600
10	Fire Sprinklers	210	LF	95.00		20,000
11	Water Supply Connection	1	LS	19,250.00		19,300
12	Pressure Wash & Treat	2,563	SF	2.50		6,400
13	Timber Beams	14	EA	2,775.00		38,900
14	Timber Deck	1	LS	192,690.00		192,700
15	Fire Proof Coating	11,075	SF	2.00		22,200
16	Metal Railing	420	LF	166.00		69,700
	Subtotal (A)					**533,100**
17	Stormwater Pollution Prevention & Erosion Control (5% of A)			5%		26,700
18	Mobilization (10% of A+ Item 17)			10%		56,000
	Subtotal (B)					**82,700**
	Construction Total (A + B)					**615,800**
	Engineering & CM (C)					
19	Environmental, Including CEQA & Permits			LS		50,000
20	Engineering, Structure			LS		50,000
21	Engineering, Civil			LS		50,000
22	Project Management			LS		11,111
23	Construction Engineering (10% of A + B)			10%		61,600
	Subtotal (C)					**222,711**
	Total Design, CM & Construction Cost (A+B+C)		==============>		**$**	**838,511**
24	**Construction Contingency (D)**			30%		**251,600**
	Total Timber Deck Cost (A+B+C+D)		==============>		**$**	**1,090,000**

CONCRETE DECK OPTION

Construction Costs (A) (Includes indirect, profit and overhead costs)

Bid Item	Item Description	Quantity	Unit	Bid Price		Bid Total
1	Structural Excavation	25	CY	70.00		1,800
2	Structural Backfill	25	CY	143.50		3,600
3	Existing Deck Demolition & Disposal	210	LF	122.00		25,600
4	Stream Bed Debris Removal	1	LS	10,800.00		10,800
5	Piling Repair	5	EA	4,180.00		20,900
6	Repair Stringer Void	9	EA	1,560.00		14,000
7	Timber Replacement	1	LS	81,000.00		81,000
8	Abutment Wingwall Replacement	108	SF	43.00		4,600
9	Fire Alarm	1	LS	1,600.00		1,600
10	Fire Sprinklers	210	LF	95.00		20,000
11	Water Supply Connection	1	LS	19,250.00		19,300
12	Pressure Wash & Treat	2,563	SF	2.50		6,400
13	Structural Concrete Bridge	67	CY	1,467.00		98,300
14	Bar Reinforcing, Bridge	32,000	LB	1.35		43,200
15	Miscellaneous Metal, Bridge	825	LB	14.00		11,600
16	Concrete Stain	2,520	SF	3.50		8,800
17	Metal Railing	420	LF	151.00		63,400
18	Fire Proof Coating	9,480	SF	2.00		19,000
	Subtotal (A)					**453,900**
19	Stormwater Pollution Prevention & Erosion Control (5% of A)			5%		22,700
20	Mobilization (10% of A+ Item 19)			10%		47,700
	Subtotal (B)					**70,400**
	Construction Total (A + B)					**524,300**
	Engineering & CM (C)					
21	Environmental, Including CEQA & Permits			LS		50,000
22	Engineering, Structure			LS		50,000
23	Engineering, Civil			LS		50,000
24	Project Management			LS		11,111
25	Construction Engineering (10% of A + B)			10%		52,400
	Subtotal (C)					**213,511**
	Total Design, CM & Construction Cost (A+B+C)		==============>		**$**	**737,811**
26	**Construction Contingency (D)**			30%		**221,300**
	Total Concrete Deck Cost (A+B+C+D)		==============>		**$**	**959,000**

REPLACEMENT OPTION

Construction Costs (A) (Includes indirect, profit and overhead costs)

Bid Item	Item Description	Quantity	Unit	Bid Price		Bid Total
1	Complete Bridge Removal	210	LF	280.00		58,800
	Construction Total (A)					**58,800**
	Engineering & CM (C)					
4	Environmental, Including CEQA & Permits			LS		50,000
5	Geotechnical			LS		30,000
6	Engineering, Structure			LS		50,000
7	Engineering, Civil			LS		50,000
8	Project Management			LS		14,444
	Subtotal (B)					**194,444**
	Total Design, CM & Construction Cost (A+B)		==============>		**$**	**253,000**

APPENDIX B – Detailed Estimate

DETAILED ESTIMATE

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 100 Land Item SCHEDULE: 1 100
Description = Structural Excavation Unit = CY Takeoff Quan: 25.000 Engr Quan: 25.000

202000 Structure Excavation Quan: 25.00 CY Hrs/Shft: 8.00 Cal 508 WCCCISP

```
Figure lots of handwork and limited equipment access. Use Dump truck to offhaul
spoils
Crew costs include mobilization from one abut to other
```

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
EXC3	Excavate 426 BH Loader		4.00	CH	Eff: 100.00	**Prod: 0.6400 MU**	Lab Pcs: 4.00		Eqp Pcs: 4.00		
31DFEXCCY	Excavation Dump Fee		25.00	CY	10.000			250			250
8BHLD426	BHL Cat 426C 1.25C	1.00	4.00	HR	34.500				138		138
8TRKHW10	Tandem Truck 12 CY	1.00	4.00	HR	59.896				240		240
8TRKHW30	Lowbed Trailer 60 T	1.00	4.00	HR	19.154				77		77
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	4.00	HR	11.828				47		47
GF	Grade Foreman	1.00	4.00	MH	31.950	189					189
LGEN	Laborer-General	2.00	8.00	MH	27.520	311					311
OPEXC3	Op Eng 3- Backhoe to	1.00	4.00	MH	32.390	191					191
$1,442.81	0.6400 MH/CY		16.00	MH	[19.101]	691		250	501		1,443
1.5625 Unit/M	0.5000 Shifts		6.2500	Units/H		27.65		10.00	20.06		57.71

=====> Item Totals: 100 - Structural Excavation

$1,442.81	0.6400 MH/CY	16.00	MH	[19.101]	691		250	501		**1,443**
57.712	25 CY				27.65		10.00	20.06		57.71

BID ITEM = 200 Land Item SCHEDULE: 1 100
Description = Structural Backfill Unit = CY Takeoff Quan: 25.000 Engr Quan: 25.000

203000 Backfill - Granular Quan: 25.00 CY Hrs/Shft: 8.00 Cal 508 WCCCISP

```
Figure lots of handwork and limited equipment access. Figure 2 tons/cy
Crew costs include mobilization from one abut to other
```

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
BACKF4	Backfill 426 BH Loader		4.00	CH	Eff: 100.00	**Prod: 0.6400 MU**	Lab Pcs: 4.00		Eqp Pcs: 6.00		
2EG01	Geotextile Fab@108.		1.00	ROLL	500.000		544				544
2SBF	Buy Str Backfi@108.		50.00	TON	12.000		653				653
5SBF	Haul Str Backfill@11		50.00	TON	10.000			550			550
8BHLD426	BHL Cat 426C 1.25C	1.00	4.00	HR	34.500				138		138
8COMPACA5	Compaction Wheel 46	1.00	4.00	HR	6.704				27		27
8COMPACW	Compactor Hand Ram	1.00	4.00	HR	3.634				15		15
8TRKHW10	Tandem Truck 12 CY	1.00	4.00	HR	59.896				240		240
8TRKHW30	Lowbed Trailer 60 T	1.00	4.00	HR	19.154				77		77
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	4.00	HR	11.828				47		47
GF	Grade Foreman	1.00	4.00	MH	31.950	189					189
LGEN	Laborer-General	2.00	8.00	MH	27.520	311					311
OPEXC3	Op Eng 3- Backhoe to	1.00	4.00	MH	32.390	191					191

DETAILED ESTIMATE

Activity / Resource	Desc	Quantity Pcs	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 200 Land Item SCHEDULE: 1 100
Description = Structural Backfill Unit = CY Takeoff Quan: 25.000 Engr Quan: 25.000

$2,980.38	0.6400 MH/CY	16.00 MH	[19.101]	691	1,196	550	543		2,980
1.5625 Unit/M	0.5000 Shifts	6.2500 Units/H		27.65	47.85	22.00	21.71		119.22

=====> Item Totals: 200 - Structural Backfill

$2,980.38	0.6400 MH/CY	16.00 MH	[19.101]	691	1,196	550	543		**2,980**
119.215	25 CY			27.65	47.85	22.00	21.71		119.22

BID ITEM = 300 Land Item SCHEDULE: 1 100
Description = Existing Deck Demolition & Disposal Unit = LF Takeoff Quan: 210.000 Engr Quan: 210.000

```
210 LF x 12' = 2,520 SF
```

133014 Remove Timber Deck Quan: 2,520.00 SF Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Remove Grating & Flat Bar  - 210 LF x 2 = 420 LF = 1 Shift
Remove Timbers = 214 Each @ 0.75 MH/Ea = 5.4 Shifts = 4 Shifts
Remove Posts/Cable/Fence Panels                  = 1 Shift
```

DEMO22 Timber Deck Demo 48.00 CH Eff: 100.00 **Prod: 6.0000 S** Lab Pcs: 5.00 Eqp Pcs: 6.00

Resource	Desc	Pcs	Quantity	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
31MATMISC	Misc Material@108.7		210.00 LF	5.000			1,142			1,142
8COMPR04	Compressor 185 CFM	1.00	48.00 HR	13.278				637		637
8DEMO02	Jackhammer 35#	2.00	96.00 HR	2.600				250		250
8EXC315	Excavator Cat 315D L	1.00	48.00 HR	53.312				2,559		2,559
8FORK04	Forklift Cat TL1055 1	1.00	48.00 HR	42.914				2,060		2,060
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	48.00 HR	11.828				568		568
LFORMN	Laborer-Foreman	1.00	48.00 MH	29.250	1,962					1,962
LPWR	Laborer-Power Tools	2.00	96.00 MH	28.020	3,791					3,791
OPEXC3	Op Eng 3- Backhoe to	1.00	48.00 MH	32.390	2,291					2,291
OPLDR6	Op Eng 2- Loader <6	1.00	48.00 MH	32.910	2,319					2,319
$17,578.57	0.0952 MH/SF		240.00 MH	[2.868]	10,363		1,142	6,073		17,579
10.5000 Unit/M	6.0000 Shifts	*	52.5000 Units/H		4.11		0.45	2.41		6.98

133500 Dispose of Timber (Haz) Quan: 1.00 LS Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Main Ties are   10' x 8" x 8" = 53 BF x 171 each = 9,063 BF x 4.5#/BF = 40,784#
Handrail Ties are 18' x 4" x 8" = 48 BF x 43 each = 2,064 BF x 4.5#/BF = 9,288#
Disposal At $60/ton                                          Total...50,072#
(25.0 tons)
Two loads x 2 hours to load, 2 hours travel each way, 2 hour unload = 16 hours
trucking a 4 hours to offhaul steel
```

Resource	Desc	Pcs	Quantity	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
31DFTIMTN	Timber Dump Fee-To		25.00 TN	60.000			1,500			1,500
5TRKFB	Trucking - Flat Bed		20.00 HR	100.000			2,000			2,000
$3,500.00				[ ]			3,500			3,500
							3,500.00			3,500.00

DETAILED ESTIMATE

Activity / Resource	Desc		Quantity Pcs	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 300 Land Item SCHEDULE: 1 100
Description = Existing Deck Demolition & Disposal Unit = LF Takeoff Quan: 210.000 Engr Quan: 210.000

=====> Item Totals: 300 - Existing Deck Demolition & Disposal

$21,078.57	1.1428	MH/LF	240.00	MH	[34.421]	10,363		4,642	6,073	**21,079**
100.374	210	LF				49.35		22.10	28.92	100.37

BID ITEM = 400 Land Item SCHEDULE: 1 100
Description = Stream Bed Debris Removal Unit = LS Takeoff Quan: 1.000 Engr Quan: 1.000

110050 Stream Bed Debris Removal Quan: 60.00 CY Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Price for removal of debris in four 15 ft spans (assume 12 ft width). 4ea x 15'L x
12'W x 2'thick (Ave) = 53.3 CY, say 60 CY
Use same equip as excavation, so no equip mob
Use Highside trailer for debris
```

EXC3 Excavate 426 BH Loader 8.00 CH Eff: 100.00 **Prod: 0.6667 MU** Lab Pcs: 5.00 Eqp Pcs: 4.00

Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
31DFBLDCY	Bldg Debris Dump Fe		60.00	CY	10.000			600			600
5TRKED	Trucking - End Dump		8.00	HR	100.000			800			800
8BDZR03G	Bulldozer Cat D3G X	1.00	8.00	HR	33.305				266		266
8BHLD426	BHL Cat 426C 1.25C	1.00	8.00	HR	34.500				276		276
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	8.00	HR	11.828				95		95
8WOOD2	Wood Chipper Verme	1.00	8.00	HR	33.354				267		267
GF	Grade Foreman	1.00	8.00	MH	31.950	378					378
LGEN	Laborer-General	2.00	16.00	MH	27.520	623					623
OPDZ9	Op Eng 3- Dozer to D	1.00	8.00	MH	31.950	378					378
OPEXC3	Op Eng 3- Backhoe to	1.00	8.00	MH	32.390	382					382
$4,064.49	0.6666 MH/CY		40.00	MH	[20.177]	1,761		1,400	904		4,064
1.5000 Unit/M	1.0000 Shifts		7.5000	Units/H		29.34		23.33	15.06		67.74

202045 Access Quan: 1.00 LS Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Install/Remove Creek Access. Grade slope and restore as required.
1 shift in/1 shift out
```

EXC3 Excavate 426 BH Loader 16.00 CH Eff: 100.00 **Prod: 2.0000 S** Lab Pcs: 4.00 Eqp Pcs: 3.00

Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
31MATMISC	Misc Material@108.7		1.00	LS	500.000			544			544
8BDZR03G	Bulldozer Cat D3G X	1.00	16.00	HR	33.305				533		533
8BHLD426	BHL Cat 426C 1.25C	1.00	16.00	HR	34.500				552		552
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	16.00	HR	11.828				189		189
GC	Grade Checker	1.00	16.00	MH	29.470	711					711
GF	Grade Foreman	1.00	16.00	MH	31.950	756					756
OPDZ9	Op Eng 3- Dozer to D	1.00	16.00	MH	31.950	756					756
OPEXC3	Op Eng 3- Backhoe to	1.00	16.00	MH	32.390	764					764
$4,804.65	64.0000 MH/LS		64.00	MH	[2012.16]	2,987		544	1,274		4,805
0.0156 Unit/M	2.0000 Shifts		* 0.0625	Units/H		2,986.79		543.75	1,274.11		4,804.65

=====> Item Totals: 400 - Stream Bed Debris Removal

DETAILED ESTIMATE

Activity / Resource	Desc	Quantity Pcs	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 400 Land Item SCHEDULE: 1 100
Description = Stream Bed Debris Removal Unit = LS Takeoff Quan: 1.000 Engr Quan: 1.000

$8,869.14	104.0000 MH/LS	104.00	MH	[3222.8]	4,747		1,944	2,178		**8,869**
8,869.140		1	LS		4,747.42		1,943.75	2,177.97		8,869.14

BID ITEM = 500 Land Item SCHEDULE: 1 100
Description = Piling Repair Unit = EA Takeoff Quan: 5.000 Engr Quan: 5.000

```
Actual epoxy injection volume unknown. Assume 5 ft high for section of each pile.
Pile diam=14", assume 50% void.
```

372020 Epoxy Crack Repairs Quan: 13.40 CF Hrs/Shft: 8.00 Cal 508 WC CCISP

```
14" dia = 1.069CF/Ft x 5' x 5 piles x 50% void = 13.4 CF
Surface Area = 3.67SF/FT x 5' x 5 piles = 92 SF
Repair per AREMA Volume 2, Section 3.3.3.3
Clean out, Install Wedge, Install Nails/Washers, Install Banding, Coat/Seal Pile
with Sikadur 33, Inject Sikadur 35 Hi-Mod LV Epoxy into the void.
4 crew hours per pile
Sikadur 35 yields 231 cubic inches per gallon (0.1337 CF/GAL) = 100 gallons, buy
34-3 gallon kits
Sikadur 33 yields 231 CI/GA (0.1337 CF/GAL) Allow 1/4" Thick = 2CF = 15 gallons,
buy 8-2 gallon kits
```

FORM3 Form Crew 3 Man 20.00 CH Eff: 100.00 **Prod: 4.4776 MU** Lab Pcs: 3.00 Eqp Pcs: 3.00

Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
2GRT21	Sealant Epoxy @108.		8.00	EA	184.000		1,601				1,601
2GRT22	Epoxy Injectio@108.		34.00	EA	257.000		9,503				9,503
31MATMISC	Misc Material@108.7		5.00	EA	500.000			2,719			2,719
8COMPR04	Compressor 185 CFM	1.00	20.00	HR	13.278				266		266
8GEN010	Generator 10 KW	1.00	20.00	HR	7.010				140		140
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	20.00	HR	11.828				237		237
CARPFRM	Carpenter Foreman	1.00	20.00	MH	34.720	995					995
CARPJ	Carpenter Journeyma	1.00	20.00	MH	31.920	933					933
LGEN	Laborer-General	1.00	20.00	MH	27.520	779					779
$17,171.18	4.4776 MH/CF		60.00	MH	[140.537]	2,707	11,103	2,719	642		17,171
0.2233 Unit/M	2.5000 Shifts		0.6700	Units/H		201.99	828.61	202.89	47.93		1,281.43

=====> Item Totals: 500 - Piling Repair

$17,171.18	12.0000 MH/EA	60.00	MH	[376.64]	2,707	11,103	2,719	642		**17,171**
3,434.236		5	EA		541.35	2,220.68	543.75	128.46		3,434.24

BID ITEM = 600 Land Item SCHEDULE: 1 100
Description = Repair Stringer Void Unit = EA Takeoff Quan: 9.000 Engr Quan: 9.000

```
Actual epoxy injection volume unknown. Assume 1 CF in each spot for 9 locations
```

DETAILED ESTIMATE

Activity	Desc	Quantity		Unit			Perm	Constr	Equip	Sub-	
Resource		Pcs	Unit		Cost	Labor	Materi	Matl/Ex	Ment	Contrac	Total

BID ITEM = 600 Land Item SCHEDULE: 1 100
Description = Repair Stringer Void Unit = EA Takeoff Quan: 9.000 Engr Quan: 9.000

found in field inspection.

372020 Epoxy Crack Repairs Quan: 9.00 CF Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Use the pile repair and change proportional from 13.4 CF  to 9 CF
Pile Repair Notes:
14" dia = 1.069CF/Ft x 5' x 5 piles x 50% void = 13.4 CF
Surface Area = 3.67SF/FT x 5' x 5 piles = 92 SF
Repair per AREMA Volume 2, Section 3.3.3.3
Clean out, Install Wedge, Install Nails/Washers, Install Banding, Coat/Seal Pile
with Sikadur 33, Inject Sikadur 35 Hi-Mod LV Epoxy into the void.
4 crew hours per pile
Sikadur 35 yields 231 cubic inches per gallon (0.1337 CF/GAL) = 100 gallons, buy
34-3 gallon kits
Sikadur 33 yields 231 CI/GA (0.1337 CF/GAL) Allow 1/4" Thick = 2CF = 15 gallons,
buy 8-2 gallon kits
```

Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
FORM3	Form Crew 3 Man		13.50	CH	Eff: 100.00	**Prod: 4.5000 MU**		Lab Pcs: 3.00		Eqp Pcs: 3.00	
2GRT21	Sealant Epoxy @108.		5.37	EA	184.000		1,075				1,075
2GRT22	Epoxy Injectio@108.		22.84	EA	257.000		6,383				6,383
31MATMISC	Misc Material@108.7		3.36	EA	500.000			1,827			1,827
8COMPR04	Compressor 185 CFM	1.00	13.50	HR	13.278				179		179
8GEN010	Generator 10 KW	1.00	13.50	HR	7.010				95		95
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	13.50	HR	11.828				160		160
CARPFRM	Carpenter Foreman	1.00	13.50	MH	34.720	672					672
CARPJ	Carpenter Journeyma	1.00	13.50	MH	31.920	630					630
LGEN	Laborer-General	1.00	13.50	MH	27.520	526					526
$11,545.61	4.5000 MH/CF		40.50	MH	[141.24]	1,827	7,458	1,827	434		11,546
0.2222 Unit/M	1.6875 Shifts		0.6667	Units/H		203.01	828.67	203.00	48.17		1,282.85

=====> Item Totals: 600 - Repair Stringer Void

$11,545.61	4.5000 MH/EA	40.50 MH	[141.24]	1,827	7,458	1,827	434		**11,546**
1,282.846	9 EA			203.01	828.67	203.00	48.17		1,282.85

BID ITEM = 700 Land Item SCHEDULE: 1 100
Description = Timber Replacement Unit = LS Takeoff Quan: 1.000 Engr Quan: 1.000

All replacement structural lumber (does not include IPE) shall be stress-grade Douglas Fir (Larch) and shall conform to AREMA specifications see, Part 1, Material Specifications for Lumber, Timber, Engineered Wood Products, Timber Piles, Fasteners, Timber Bridge Ties and Recommendations for Fire-Retardant Coating for Creosoted Wood. All lumber and piles, except IPE timber, should be pressure treated in accordance with AREMA Chapter 30.

Trucking included in Demolition/Removals item #300

DETAILED ESTIMATE

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 700 Land Item SCHEDULE: 1 100
Description = Timber Replacement Unit = LS Takeoff Quan: 1.000 Engr Quan: 1.000

389000 Timber Cap (14 x 14 x 18') Quan: 3.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Jack existing bridge, remove existing cap, install new 14" x 14" x 18' cap.
882 BF x 4.5#/BF = 3,969#
Disposal At $60/ton
```

Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
FORM4F	Form Crew 4 Men Forklift		24.00	CH	Eff: 100.00	**Prod: 32.0000 MU**	Lab Pcs: 4.00		Eqp Pcs: 4.00		
2WDLCAP	14 x 14 x 18' @108.7		882.00	BF	1.650		1,583				1,583
31DFTIMTN	Timber Dump Fe@10		2.00	TN	60.000			131			131
31MATMISC	Misc Material@108.7		3.00	EA	500.000			1,631			1,631
3FA10	Form Access Sc@108		1.00	EA	500.000			544			544
8COMPR04	Compressor 185 CFM	1.00	24.00	HR	13.278				319		319
8FORK04	Forklift Cat TL1055 1	1.00	24.00	HR	42.914				1,030		1,030
8GEN010	Generator 10 KW	1.00	24.00	HR	7.010				168		168
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	24.00	HR	11.828				284		284
CARPFRM	Carpenter Foreman	1.00	24.00	MH	34.720	1,194					1,194
CARPJ	Carpenter Journeyma	1.00	24.00	MH	31.920	1,119					1,119
LGEN	Laborer-General	1.00	24.00	MH	27.520	934					934
OPLDR6	Op Eng 2- Loader <6	1.00	24.00	MH	32.910	1,160					1,160
$10,096.42	32.0000 MH/EA		96.00	MH	[1016.56]	4,408	1,583	2,306	1,801		10,096
0.0313 Unit/M	3.0000 Shifts		0.1250	Units/H		1,469.20	527.55	768.50	600.22		3,365.47

389005 Lower Sway Brace (4 x 10 x 20') Quan: 7.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Remove existing brace, install new 4" x 10" x 20' lower sway brace.
470 BFx 4.5#/BF = 2,115#
Disposal At $60/ton
```

Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
FORM4F	Form Crew 4 Men Forklift		14.00	CH	Eff: 100.00	**Prod: 8.0000 MU**	Lab Pcs: 4.00		Eqp Pcs: 4.00		
2WDLSB	4 x 10 x 20' D@108.7		470.00	BF	1.500		767				767
31DFTIMTN	Timber Dump Fe@10		1.00	TN	60.000			65			65
31MATMISC	Misc Material@108.7		7.00	EA	50.000			381			381
8COMPR04	Compressor 185 CFM	1.00	14.00	HR	13.278				186		186
8FORK04	Forklift Cat TL1055 1	1.00	14.00	HR	42.914				601		601
8GEN010	Generator 10 KW	1.00	14.00	HR	7.010				98		98
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	14.00	HR	11.828				166		166
CARPFRM	Carpenter Foreman	1.00	14.00	MH	34.720	697					697
CARPJ	Carpenter Journeyma	1.00	14.00	MH	31.920	653					653
LGEN	Laborer-General	1.00	14.00	MH	27.520	545					545
OPLDR6	Op Eng 2- Loader <6	1.00	14.00	MH	32.910	676					676
$4,834.05	8.0000 MH/EA		56.00	MH	[254.14]	2,571	767	446	1,050		4,834
0.1250 Unit/M	1.7500 Shifts		0.5000	Units/H		367.30	109.53	63.70	150.05		690.58

389010 Upper Sway Brace (4 x 10 x 20') Quan: 11.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Remove existing brace, install new 4" x 10" x 20' Upper sway brace.
740 BFx 4.5#/BF = 3,330#
```

DETAILED ESTIMATE

BID ITEM = 700 Land Item SCHEDULE: 1 100
Description = Timber Replacement Unit = LS Takeoff Quan: 1.000 Engr Quan: 1.000

```
Disposal At $60/ton
```

FORM4F Form Crew 4 Men Forklift 28.00 CH Eff: 100.00 **Prod: 10.1818 MU** Lab Pcs: 4.00 Eqp Pcs: 4.00

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
2WDLSB	4 x 10 x 20' D@108.7		740.00	BF	1.500		1,207				1,207
31DFTIMTN	Timber Dump Fe@10		1.70	TN	60.000			111			111
31MATMISC	Misc Material@108.7		11.00	EA	50.000			598			598
3FA10	Form Access Sc@108		1.00	EA	500.000			544			544
8COMPR04	Compressor 185 CFM	1.00	28.00	HR	13.278				372		372
8FORK04	Forklift Cat TL1055 1	1.00	28.00	HR	42.914				1,202		1,202
8GEN010	Generator 10 KW	1.00	28.00	HR	7.010				196		196
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	28.00	HR	11.828				331		331
CARPFRM	Carpenter Foreman	1.00	28.00	MH	34.720	1,394					1,394
CARPJ	Carpenter Journeyma	1.00	28.00	MH	31.920	1,306					1,306
LGEN	Laborer-General	1.00	28.00	MH	27.520	1,090					1,090
OPLDR6	Op Eng 2- Loader <6	1.00	28.00	MH	32.910	1,353					1,353
$9,702.95	10.1818 MH/EA		112.00	MH	[323.451]	5,142	1,207	1,253	2,101		9,703
0.0982 Unit/M	3.5000 Shifts		0.3929	Units/H		467.47	109.74	113.89	190.98		882.09

389015 Sash Brace (8 x 10 x 18') Quan: 16.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Remove existing brace, install new 8" x 10" x 18' sash brace.
1,920 BFx 4.5#/BF = 8,640#
Disposal At $60/ton
```

FORM4F Form Crew 4 Men Forklift 32.00 CH Eff: 100.00 **Prod: 8.0000 MU** Lab Pcs: 4.00 Eqp Pcs: 4.00

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
2WDLSAB	8 x 10 x 18' S@108.7		1,920.00	BF	1.600		3,341				3,341
31DFTIMTN	Timber Dump Fe@10		4.30	TN	60.000			281			281
31MATMISC	Misc Material@108.7		16.00	EA	50.000			870			870
8COMPR04	Compressor 185 CFM	1.00	32.00	HR	13.278				425		425
8FORK04	Forklift Cat TL1055 1	1.00	32.00	HR	42.914				1,373		1,373
8GEN010	Generator 10 KW	1.00	32.00	HR	7.010				224		224
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	32.00	HR	11.828				378		378
CARPFRM	Carpenter Foreman	1.00	32.00	MH	34.720	1,593					1,593
CARPJ	Carpenter Journeyma	1.00	32.00	MH	31.920	1,492					1,492
LGEN	Laborer-General	1.00	32.00	MH	27.520	1,246					1,246
OPLDR6	Op Eng 2- Loader <6	1.00	32.00	MH	32.910	1,546					1,546
$12,769.11	8.0000 MH/EA		128.00	MH	[254.14]	5,877	3,341	1,151	2,401		12,769
0.1250 Unit/M	4.0000 Shifts		0.5000	Units/H		367.30	208.80	71.91	150.06		798.07

389020 Abut 1 Backwall 8 x 20 x 25' Quan: 5.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Remove existing timbers, install new 8" x 20" x 25' Timber Beams.
1,667 BF x 4.5#/BF = 7,500#
Disposal At $60/ton
```

FORM4F Form Crew 4 Men Forklift 10.00 CH Eff: 100.00 **Prod: 8.0000 MU** Lab Pcs: 4.00 Eqp Pcs: 4.00

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
2WDLBW1	8 x 20 x 25' B@108.7		1,667.00	BF	1.750		3,173				3,173
31DFTIMTN	Timber Dump Fe@10		3.75	TN	60.000			245			245
31MATMISC	Misc Material@108.7		5.00	EA	50.000			272			272

DETAILED ESTIMATE

BID ITEM = 700 Land Item SCHEDULE: 1 100
Description = Timber Replacement Unit = LS Takeoff Quan: 1.000 Engr Quan: 1.000

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
8COMPR04	Compressor 185 CFM	1.00	10.00	HR	13.278				133		133
8FORK04	Forklift Cat TL1055 1	1.00	10.00	HR	42.914				429		429
8GEN010	Generator 10 KW	1.00	10.00	HR	7.010				70		70
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	10.00	HR	11.828				118		118
CARPFRM	Carpenter Foreman	1.00	10.00	MH	34.720	498					498
CARPJ	Carpenter Journeyma	1.00	10.00	MH	31.920	466					466
LGEN	Laborer-General	1.00	10.00	MH	27.520	389					389
OPLDR6	Op Eng 2- Loader <6	1.00	10.00	MH	32.910	483					483
$6,275.89		8.0000 MH/EA	40.00	MH	[254.14]	1,837	3,173	517	750		6,276
0.1250 Unit/M		1.2500 Shifts	0.5000	Units/H		367.30	634.50	103.31	150.06		1,255.18

389025 Abut 15 Backwall 8 x 20 x 18' Quan: 3.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Remove existing timbers, install new 8" x 20" x 18' Timber Beams.
720 BF x 4.5#/BF = 3,240#
Disposal At $60/ton
```

FORM4F Form Crew 4 Men Forklift 6.00 CH Eff: 100.00 **Prod: 8.0000 MU** Lab Pcs: 4.00 Eqp Pcs: 4.00

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
2WDLBW15	8 x 20 x 18' B@108.7		720.00	BF	1.750		1,370				1,370
31DFTIMTN	Timber Dump Fe@10		1.60	TN	60.000			104			104
31MATMISC	Misc Material@108.7		3.00	EA	50.000			163			163
8COMPR04	Compressor 185 CFM	1.00	6.00	HR	13.278				80		80
8FORK04	Forklift Cat TL1055 1	1.00	6.00	HR	42.914				257		257
8GEN010	Generator 10 KW	1.00	6.00	HR	7.010				42		42
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	6.00	HR	11.828				71		71
CARPFRM	Carpenter Foreman	1.00	6.00	MH	34.720	299					299
CARPJ	Carpenter Journeyma	1.00	6.00	MH	31.920	280					280
LGEN	Laborer-General	1.00	6.00	MH	27.520	234					234
OPLDR6	Op Eng 2- Loader <6	1.00	6.00	MH	32.910	290					290
$3,189.84		8.0000 MH/EA	24.00	MH	[254.14]	1,102	1,370	268	450		3,190
0.1250 Unit/M		0.7500 Shifts	0.5000	Units/H		367.30	456.75	89.18	150.05		1,063.28

389100 Purchase Bolts Quan: 1.00 LS Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Replace Stringer to Cap Bolt, 1" ASTM A325 EA 30 Use 36" all thread for the bolt.
Includes nuts and washers.
Replace Bracing Bolts, 1" ASTM A325 EA 342 2 lengths. Use 32" long all-thread for
now. Includes nuts and washers.
Buy all 36" all thread 30 + 342 = 372 each, say 380 each
Nuts & Washers 380 + 380 = 760 each
```

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
2SA020	1" x 36" All-T@108.7		380.00	EA	29.000		11,984				11,984
2SA030	1" Heavy Hex N@10		760.00	EA	1.600		1,322				1,322
2SA040	1" Wood Washer@10		760.00	EA	5.750		4,752				4,752
$18,059.03					[ ]		18,059				18,059
							18,059.03				18,059.03

DETAILED ESTIMATE

Activity / Resource	Desc	Quantity Pcs	Quantity Unit		Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 700 Land Item SCHEDULE: 1 100
Description = Timber Replacement Unit = LS Takeoff Quan: 1.000 Engr Quan: 1.000

389150 Buy Flashing Quan: 1,520.00 SF Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Flashing (Top of Stringers) SQFT 1,190 Tops of existing stringers plus 2" over
sides.
Flashing (Top of  Pile Cap) SQFT   300 Top of 3 new caps and tops of existing 12
(less stringer area)
Flashing (Top of Pile)      SQFT    30 Top of pile at cap replacement locations.
                          TOTAL...1,520 SF 5% waste
```

2SA050	Vycor Flashing	1.00	1,600.00	SF	1.000		1,600				1,600

=====> Item Totals: 700 - Timber Replacement

$66,527.29	456.0000 MH/LS	456.00 MH	[14485.98]	20,936	31,099	5,939	8,553		**66,527**
66,527.290	1 LS			20,936.16	31,099.05	5,938.87	8,553.21		66,527.29

BID ITEM = 800 Land Item SCHEDULE: 1 100
Description = Abutment Wingwall Replacement Unit = SF Takeoff Quan: 108.000 Engr Quan: 108.000

313100 Abutment Wingwall Replacement Quan: 108.00 SF Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Includes removal, gravity block wall, backfill
Throw the old blocks in the the structure excavation offhaul
```

LAB4 Foreman + 3 Laborers 8.00 CH Eff: 100.00 **Prod: 0.3704 MU** Lab Pcs: 5.00 Eqp Pcs: 2.00

Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
2PM08	Retaining Wall@108.		108.00	SF	15.000		1,762				1,762
8BHLD426	BHL Cat 426C 1.25C	1.00	8.00	HR	34.500				276		276
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	8.00	HR	11.828				95		95
LFORMN	Laborer-Foreman	1.00	8.00	MH	29.250	327					327
LPWR	Laborer-Power Tools	3.00	24.00	MH	28.020	948					948
OPEXC3	Op Eng 3- Backhoe to	1.00	8.00	MH	32.390	382					382
$3,788.98	0.3703 MH/SF		40.00	MH	[10.793]	1,657	1,762		371		3,789
2.7000 Unit/M	1.0000 Shifts		13.5000	Units/H		15.34	16.31		3.43		35.08

=====> Item Totals: 800 - Abutment Wingwall Replacement

$3,788.98	0.3703 MH/SF	40.00 MH	[10.793]	1,657	1,762		371		**3,789**
35.083	108 SF			15.34	16.31		3.43		35.08

BID ITEM = 900 Land Item SCHEDULE: 1 100
Description = Fire Alarm Unit = LS Takeoff Quan: 1.000 Engr Quan: 1.000

411000 Fire Alarm Quan: 1.00 LS Hrs/Shft: 8.00 Cal 508 WC CCISP

DETAILED ESTIMATE

Activity / Resource	Desc	Quantity Pcs	Quantity Unit		Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 900 Land Item SCHEDULE: 1 100
Description = Fire Alarm Unit = LS Takeoff Quan: 1.000 Engr Quan: 1.000

```
From Means Alarm, Electric pressure switch (circuit closer), explosion proof, max
20 PSI, Contacts close or open, water motor complete with gong (21 13 13.50 0010)
.308 +.308 + 2 = 2.62 MH, say 4 hours
Materials 73+510+325 = $908, say $1,000
```

CARP2 Foreman+1 Carpenter 2.00 CH Eff: 100.00 **Prod: 4.0000 MU** Lab Pcs: 2.00 Eqp Pcs: 2.00

Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
2UWE004	Fire Alarm@108.75%		1.00	EA	1,000.000		1,088				1,088
8GEN010	Generator 10 KW	1.00	2.00	HR	7.010				14		14
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	2.00	HR	11.828				24		24
CARPFRM	Carpenter Foreman	1.00	2.00	MH	34.720	100					100
CARPJ	Carpenter Journeyma	1.00	2.00	MH	31.920	93					93
$1,317.96	4.0000 MH/LS		4.00	MH	[133.28]	193	1,088		38		1,318
0.2500 Unit/M	0.2500 Shifts		0.5000	Units/H		192.81	1,087.50		37.65		1,317.96

=====> Item Totals: 900 - Fire Alarm

$1,317.96	4.0000 MH/LS	4.00 MH	[133.28]	193	1,088		38		**1,318**
1,317.960	1 LS			192.81	1,087.50		37.65		1,317.96

BID ITEM = 1000 Land Item SCHEDULE: 1 100
Description = Fire Sprinklers Unit = LF Takeoff Quan: 210.000 Engr Quan: 210.000

411100 2" Fire Sprinkler Pipe/Heads Quan: 210.00 LF Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Use Galvanized Steel Pipe 2" dia From Means Data: Schedule 40, threaded with
couplings and clevis hanger assemblies sized for covering at 10' OC
Pipe 0.286 mh/ft x 210' = 60 manhours (22 11 13.44 5580)
Tees 1.455 mh/ea x 21ea = 31 manhours (22 11 13.45 5540)
Heads 0.50 mh/ea x 21ea = 11 manhours (22 11 13.50 3760)
                   TOTAL 102 MH
```

CARP2 Foreman+1 Carpenter 52.00 CH Eff: 100.00 **Prod: 0.4952 MU** Lab Pcs: 2.00 Eqp Pcs: 3.00

Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
2UWE001	2" Dia Galv St@108.		210.00	LF	25.000		5,709				5,709
2UWE002	2" Galv Steel @108.7		21.00	EA	35.000		799				799
2UWE003	Sprinkler Head@108.		21.00	EA	15.000		343				343
31MATMISC	Misc Material@108.7		210.00	LF	5.000			1,142			1,142
8GEN010	Generator 10 KW	1.00	52.00	HR	7.010				365		365
8MLIFT060	Manlift Grove T60 60	1.00	52.00	HR	28.412				1,477		1,477
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	52.00	HR	11.828				615		615
CARPFRM	Carpenter Foreman	1.00	52.00	MH	34.720	2,588					2,588
CARPJ	Carpenter Journeyma	1.00	52.00	MH	31.920	2,425					2,425
$15,463.06	0.4952 MH/LF		104.00	MH	[16.501]	5,013	6,851	1,142	2,457		15,463
2.0192 Unit/M	6.5000 Shifts		4.0385	Units/H		23.87	32.63	5.44	11.70		73.63

411088 Test Water Pipe Quan: 210.00 LF Hrs/Shft: 8.00 Cal 508 WC CCISP

CARP2 Foreman+1 Carpenter 4.00 CH Eff: 100.00 **Prod: 0.0000** Lab Pcs: 3.00 Eqp Pcs: 3.00

DETAILED ESTIMATE

BID ITEM = 1000 Land Item SCHEDULE: 1 100
Description = Fire Sprinklers Unit = LF Takeoff Quan: 210.000 Engr Quan: 210.000

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
8GEN010	Generator 10 KW	1.00	4.00	HR	7.010				28		28
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	4.00	HR	11.828				47		47
8TRKWTR04	Water Truck 4,000 ga	1.00	4.00	HR	45.330				181		181
CARPFRM	Carpenter Foreman	1.00	4.00	MH	34.720	199					199
CARPJ	Carpenter Journeyma	1.00	4.00	MH	31.920	187					187
TDWT	Water Truck Driver	1.00	4.00	MH	27.020	176					176
$818.70		0.0571 MH/LF	12.00	MH	[1.784]	562			257		819
17.5000 Unit/M		0.5000 Shifts	52.5000	Units/H		2.68			1.22		3.90

=====> Item Totals: 1000 - Fire Sprinklers

$16,281.76		0.5523 MH/LF	116.00	MH	[18.285]	5,575	6,851	1,142	2,714		**16,282**
77.532		210 LF				26.55	32.63	5.44	12.92		77.53

BID ITEM = 1100 Land Item SCHEDULE: 1 100
Description = Water Supply Connection Unit = LS Takeoff Quan: 1.000 Engr Quan: 1.000

411200 Backflow Preventer Quan: 1.00 LS Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Means 22 11 19.42 1160)
```

<u>CARP2</u> Foreman+1 Carpenter 2.00 CH Eff: 100.00 **Prod: 4.0000 MU** Lab Pcs: 2.00 Eqp Pcs: 2.00

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
2UWC14	Gate Valve Box@108		1.00	EA	75.000		82				82
2UWE005	Backfilow Prev@108.		1.00	EA	1,500.000		1,631				1,631
31MATMISC	Misc Material@108.7		1.00	LS	500.000			544			544
8GEN010	Generator 10 KW	1.00	2.00	HR	7.010				14		14
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	2.00	HR	11.828				24		24
CARPFRM	Carpenter Foreman	1.00	2.00	MH	34.720	100					100
CARPJ	Carpenter Journeyma	1.00	2.00	MH	31.920	93					93
$2,487.02		4.0000 MH/LS	4.00	MH	[133.28]	193	1,713	544	38		2,487
0.2500 Unit/M		0.2500 Shifts	0.5000	Units/H		192.81	1,712.81	543.75	37.65		2,487.02

411300 Connection & Piping to Bridge Quan: 220.00 LF Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Connection from Lonus Street to bridge supply piping is in the $60/lf range
```

<u>BACKF4</u> Backfill 426 BH Loader 20.00 CH Eff: 100.00 **Prod: 0.3636 MU** Lab Pcs: 4.00 Eqp Pcs: 6.00

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
31MATMISC	Misc Material@108.7		220.00	LF	30.000			7,178			7,178
8BHLD426	BHL Cat 426C 1.25C	1.00	20.00	HR	34.500				690		690
8COMPACA5	Compaction Wheel 46	1.00	20.00	HR	6.704				134		134
8COMPACW	Compactor Hand Ram	1.00	20.00	HR	3.634				73		73
8TRKHW10	Tandem Truck 12 CY	1.00	20.00	HR	59.896				1,198		1,198
8TRKHW30	Lowbed Trailer 60 T	1.00	20.00	HR	19.154				383		383
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	20.00	HR	11.828				237		237
GF	Grade Foreman	1.00	20.00	MH	31.950	945					945
LGEN	Laborer-General	2.00	40.00	MH	27.520	1,557					1,557

DETAILED ESTIMATE

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
BID ITEM = 1100					Land Item	SCHEDULE: 1		100			
Description = Water Supply Connection					Unit = LS	Takeoff Quan:		1.000		Engr Quan:	1.000
OPEXC3	Op Eng 3- Backhoe to	1.00	20.00	MH	32.390	955					955
$13,348.59	0.3636 MH/LF		80.00	MH	[10.853]	3,457		7,178	2,714		13,349
2.7500 Unit/M	2.5000 Shifts		11.0000	Units/H		15.71		32.63	12.34		60.68
=====> Item Totals: 1100	**- Water Supply Connection**										
$15,835.61	84.0000 MH/LS		84.00	MH	[2520.88]	3,650	1,713	7,721	2,752		**15,836**
15,835.610	1 LS					3,649.58	1,712.81	7,721.25	2,751.97		15,835.61

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
BID ITEM = 1200					Land Item	SCHEDULE: 1		100			
Description = Pressure Wash & Treat					Unit = SF	Takeoff Quan:		2,563.000		Engr Quan:	2,563.000
389200	**Pressure Wash Timber**				**Quan: 2,563.00 SF**	**Hrs/Shft: 8.00**		**Cal 508 WC**	**CCISP**		
FIN2	Pressure Washing		8.00	CH	Eff: 100.00	**Prod: 0.0094 MU**		Lab Pcs: 3.00		Eqp Pcs: 4.00	
31MATMISC	Misc Material@108.7		1.00	LS	250.000			272			272
8CONCEQ42	Pressure Washer 3,00	1.00	8.00	HR	4.251				34		34
8MLIFT060	Manlift Grove T60 60	1.00	8.00	HR	28.412				227		227
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	8.00	HR	11.828				95		95
8TRKWTR04	Water Truck 4,000 ga	1.00	8.00	HR	45.330				363		363
LFORMN	Laborer-Foreman	1.00	8.00	MH	29.250	327					327
LPWR	Laborer-Power Tools	1.00	8.00	MH	28.020	316					316
TDWT	Water Truck Driver	1.00	8.00	MH	27.020	353					353
$1,986.20	0.0093 MH/SF		24.00	MH	[0.263]	996		272	719		1,986
106.7917 Unit/M	1.0000 Shifts		320.3750	Units/H		0.39		0.11	0.28		0.77
389210	**Treat Timber**				**Quan: 2,563.00 SF**	**Hrs/Shft: 8.00**		**Cal 508 WC**	**CCISP**		
Treat after Pressure Wash 09 91 03.14 2900											
LAB2	Foreman + 1 Laborer		16.00	CH	Eff: 100.00	**Prod: 0.0125 MU**		Lab Pcs: 2.00		Eqp Pcs: 2.00	
31MATMISC	Misc Material@108.7		2,563.00	SF	0.500			1,394			1,394
8MLIFT060	Manlift Grove T60 60	1.00	16.00	HR	28.412				455		455
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	16.00	HR	11.828				189		189
LFORMN	Laborer-Foreman	1.00	16.00	MH	29.250	654					654
LPWR	Laborer-Power Tools	1.00	16.00	MH	28.020	632					632
$3,323.24	0.0124 MH/SF		32.00	MH	[0.358]	1,286		1,394	644		3,323
80.0938 Unit/M	2.0000 Shifts		160.1875	Units/H		0.50		0.54	0.25		1.30
=====> Item Totals: 1200	**- Pressure Wash & Treat**										
$5,309.44	0.0218 MH/SF		56.00	MH	[0.621]	2,282		1,666	1,362		**5,309**
2.072	2563 SF					0.89		0.65	0.53		2.07

DETAILED ESTIMATE

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 2000 Land Item SCHEDULE: 1 100
Description = Timber Beams Unit = EA Takeoff Quan: 14.000 Engr Quan: 14.000

389030 Timber Beams (8 x 20 x 30') Quan: 14.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Install new 8" x 20" x 30' Beams.
6,600 BF
```

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
FORM4F	Form Crew 4 Men Forklift		56.00	CH	Eff: 100.00	**Prod: 16.0000 MU**	Lab Pcs: 4.00		Eqp Pcs: 5.00		
2WDLTB	8 x 20 x 30' D@108.7		6,600.00	BF	2.000		14,355				14,355
31MATMISC	Misc Material@108.7		14.00	EA	100.000			1,523			1,523
8COMPR04	Compressor 185 CFM	1.00	56.00	HR	13.278				744		744
8FORK04	Forklift Cat TL1055 1	1.00	56.00	HR	42.914				2,403		2,403
8GEN010	Generator 10 KW	1.00	56.00	HR	7.010				393		393
8MLIFT060	Manlift Grove T60 60	1.00	56.00	HR	28.412				1,591		1,591
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	56.00	HR	11.828				662		662
CARPFRM	Carpenter Foreman	1.00	56.00	MH	34.720	2,787					2,787
CARPJ	Carpenter Journeyma	1.00	56.00	MH	31.920	2,612					2,612
LGEN	Laborer-General	1.00	56.00	MH	27.520	2,180					2,180
OPLDR6	Op Eng 2- Loader <6	1.00	56.00	MH	32.910	2,706					2,706
$31,954.64	16.0000 MH/EA		224.00	MH	[508.28]	10,284	14,355	1,523	5,793		31,955
0.0625 Unit/M	7.0000 Shifts		0.2500	Units/H		734.60	1,025.36	108.75	413.76		2,282.47

=====> Item Totals: 2000 - Timber Beams

$31,954.64	16.0000 MH/EA		224.00	MH	[508.28]	10,284	14,355	1,523	5,793		**31,955**
2,282.474	14 EA					734.60	1,025.36	108.75	413.76		2,282.47

BID ITEM = 2100 Land Item SCHEDULE: 1 100
Description = Timber Deck Unit = LS Takeoff Quan: 1.000 Engr Quan: 1.000

389100 Timber Deck Quan: 458.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Per the IPE Depot 3 x 6 (2-1/2" x 5-1/2" finish dim.) is $22/lf x 12' boards =
$264/ea
Pre-drill 12 holes per board x 458 boards = 5,500 each / 22/mh...250 MH
8 X 3-1/8" Stainless Steel Screws (Torx Drive) - 1,000 piece contractor packs
$235.00 buy 6 each
Tapered Ipe Plugs 3/8" 1,000 pack @ $130.00, buy 6 each
Install screws & plugs at 20/hour...............................275 MH = 525 MH =
16.4 shifts, say 17 shifts
```

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
FORM4F	Form Crew 4 Men Forklift		136.00	CH	Eff: 100.00	**Prod: 1.1878 MU**	Lab Pcs: 4.00		Eqp Pcs: 4.00		
2WDLIPE	IPE Decking 3 x 6 x 1		458.00	EA	264.000		120,912				120,912
31MATMISC	Misc Material@108.7		458.00	EA	5.000			2,490			2,490
8COMPR04	Compressor 185 CFM	1.00	136.00	HR	13.278				1,806		1,806
8FORK04	Forklift Cat TL1055 1	1.00	136.00	HR	42.914				5,836		5,836
8GEN010	Generator 10 KW	1.00	136.00	HR	7.010				953		953

DETAILED ESTIMATE

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 2100 Land Item SCHEDULE: 1 100
Description = Timber Deck Unit = LS Takeoff Quan: 1.000 Engr Quan: 1.000

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	136.00	HR	11.828				1,609		1,609
CARPFRM	Carpenter Foreman	1.00	136.00	MH	34.720	6,768					6,768
CARPJ	Carpenter Journeyma	1.00	136.00	MH	31.920	6,342					6,342
LGEN	Laborer-General	1.00	136.00	MH	27.520	5,295					5,295
OPLDR6	Op Eng 2- Loader <6	1.00	136.00	MH	32.910	6,571					6,571
$158,582.90	1.1877 MH/EA		544.00	MH	[37.733]	24,976	120,912	2,490	10,204		158,583
0.8419 Unit/M	17.0000 Shifts		3.3676	Units/H		54.53	264.00	5.44	22.28		346.25

=====> Item Totals: 2100 - Timber Deck

$158,582.90	544.0000 MH/LS		544.00	MH	[17281.52]	24,976	120,912	2,490	10,204		**158,583**
158,582.900	1 LS					24,976.47	120,912.00	2,490.38	10,204.05		158,582.90

BID ITEM = 2200 Land Item SCHEDULE: 1 100
Description = Fire Proof Coating Unit = SF Takeoff Quan: 11,075.000 Engr Quan: 11,075.000

845000 Fire Proof Coating **Quan: 11,075.00 SF Hrs/Shft: 8.00 Cal 508 WC CCISP**

```
Material-Contego Intumescent Latex 130sf per gallon per coat, 2 coats required
11,075sf / 130sf/gal x 2 coats = 170 gallons, say 180 gallons (097 97 10.10 7000)
(Labor 097 97 13.23 6830) 0.005mh/sf x 11,075sf x 2 coats = 111 mh
```

LAB2 Foreman + 1 Laborer 56.00 CH Eff: 100.00 **Prod: 0.0101 MU** Lab Pcs: 2.00 Eqp Pcs: 3.00

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
2COAT5	Intumescent La@108.		180.00	GAL	50.000		9,788				9,788
31MATMISC	Misc Material@108.7		11,075.00	SF	0.100			1,204			1,204
8GEN010	Generator 10 KW	1.00	56.00	HR	7.010				393		393
8MLIFT060	Manlift Grove T60 60	1.00	56.00	HR	28.412				1,591		1,591
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	56.00	HR	11.828				662		662
LFORMN	Laborer-Foreman	1.00	56.00	MH	29.250	2,289					2,289
LPWR	Laborer-Power Tools	1.00	56.00	MH	28.020	2,212					2,212
$18,138.16	0.0101 MH/SF		112.00	MH	[0.29]	4,500	9,788	1,204	2,646		18,138
98.8840 Unit/M	7.0000 Shifts		197.7679	Units/H		0.41	0.88	0.11	0.24		1.64

=====> Item Totals: 2200 - Fire Proof Coating

$18,138.16	0.0101 MH/SF		112.00	MH	[0.29]	4,500	9,788	1,204	2,646		**18,138**
1.638	11075 SF					0.41	0.88	0.11	0.24		1.64

BID ITEM = 2300 Land Item SCHEDULE: 1 100
Description = Metal Railing Unit = LF Takeoff Quan: 420.000 Engr Quan: 420.000

387000 Install Steel Railing **Quan: 420.00 LF Hrs/Shft: 8.00 Cal 508 WC CCISP**

DETAILED ESTIMATE

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 2300 Land Item SCHEDULE: 1 100
Description = Metal Railing Unit = LF Takeoff Quan: 420.000 Engr Quan: 420.000

```
1 shift each side
```

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
FORM3	Form Crew 3 Man		16.00	CH	Eff: 100.00	**Prod: 0.1143 MU**	Lab Pcs: 3.00		Eqp Pcs: 4.00		
2SR05	Steel Bridge R@108.		420.00	LF	100.000		45,675				45,675
8COMPR04	Compressor 185 CFM	1.00	16.00	HR	13.278				212		212
8GEN010	Generator 10 KW	1.00	16.00	HR	7.010				112		112
8MLIFT060	Manlift Grove T60 60	1.00	16.00	HR	28.412				455		455
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	16.00	HR	11.828				189		189
CARPFRM	Carpenter Foreman	1.00	16.00	MH	34.720	796					796
CARPJ	Carpenter Journeyma	1.00	16.00	MH	31.920	746					746
LGEN	Laborer-General	1.00	16.00	MH	27.520	623					623
$48,808.79		0.1142 MH/LF	48.00	MH	[3.587]	2,165	45,675		968		48,809
8.7500 Unit/M		2.0000 Shifts	26.2500	Units/H		5.16	108.75		2.31		116.21

387100 Install Railing Anchor Bolts **Quan: 144.00 EA Hrs/Shft: 8.00 Cal 508 WCCCISP**

```
Figure bolts at 6' oc, 210' = 36 x 2 bolts x 2 sides = 144 ea @ 1 mh each
Drill & Install
```

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
CARP4	Foreman + 3 Carpenters		36.00	CH	Eff: 100.00	**Prod: 1.0000 MU**	Lab Pcs: 4.00		Eqp Pcs: 3.00		
8GEN010	Generator 10 KW	1.00	36.00	HR	7.010				252		252
8MLIFT060	Manlift Grove T60 60	1.00	36.00	HR	28.412				1,023		1,023
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	36.00	HR	11.828				426		426
CARPFRM	Carpenter Foreman	1.00	36.00	MH	34.720	1,792					1,792
CARPJ	Carpenter Journeyma	3.00	108.00	MH	31.920	5,037					5,037
$8,529.25		1.0000 MH/EA	144.00	MH	[32.62]	6,828			1,701		8,529
1.0000 Unit/M		4.5000 Shifts	4.0000	Units/H		47.42			11.81		59.23

=====> Item Totals: 2300 - Metal Railing

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
$57,338.04		0.4571 MH/LF	192.00	MH	[14.771]	8,994	45,675		2,669		**57,338**
136.519		420 LF				21.41	108.75		6.36		136.52

BID ITEM = 3000 Land Item SCHEDULE: 1 100
Description = Structural Concrete Bridge Unit = CY Takeoff Quan: 67.000 Engr Quan: 67.000

```
210.5'L x 12' W
```

325035 Falsework Beams **Quan: 56.00 EA Hrs/Shft: 8.00 Cal 508 WCCCISP**

```
Use 14 x 120 or 12's x 16' on exterior two beams per span per side
2 beams x 2 sides x 14 spans x 16' x 120# = 107,520#
Trucking: Three loads in, three out. Figure 4 hours / load = 24 hours
```

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
CARP4C	Foreman+3 Carpenters w/Crane		56.00	CH	Eff: 100.00	**Prod: 5.0000 MU**	Lab Pcs: 5.00		Eqp Pcs: 3.00		
2SS02	Steel Beams (?size)		107,520.00	LB	0.100		10,752				10,752
5EQML	Equipment Move, Lar		2.00	EA	750.000			1,500			1,500
5TRKFB	Trucking - Flat Bed		24.00	HR	100.000			2,400			2,400

DETAILED ESTIMATE

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 3000 Land Item SCHEDULE: 1 100
Description = Structural Concrete Bridge Unit = CY Takeoff Quan: 67.000 Engr Quan: 67.000

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
8CRANERT7	Crane Grove RT700E	1.00	56.00	HR	106.929				5,988		5,988
8GEN010	Generator 10 KW	1.00	56.00	HR	7.010				393		393
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	56.00	HR	11.828				662		662
CARPFRM	Carpenter Foreman	1.00	56.00	MH	34.720	2,787					2,787
CARPJ	Carpenter Journeyma	3.00	168.00	MH	31.920	7,835					7,835
OPCR70	Op Eng 1- Crane 45-9	1.00	56.00	MH	32.910	2,706					2,706
$35,022.25	5.0000 MH/EA		280.00	MH	[163.39]	13,327	10,752	3,900	7,043		35,022
0.2000 Unit/M	7.0000 Shifts		1.0000	Units/H		237.99	192.00	69.64	125.77		625.40

325040 Soffit F&S **Quan: 2,170.00 SF Hrs/Shft: 8.00 Cal 508 WC CCISP**

```
Width is 12' - the existing timber beams center section is 2'-4" and is formed like
a closure pour, ledger attached to existing timber beams, horses at 4' OC and 2 x 4
joists at 12" OC max.
The outside section 2'-2" wide and is supported on 2 x 4's @ 12" OC with a 2' for
walkway for a width of about 4'.
Therefore the soffit area is 210 x 10.333 = 2,170 SF
```

<u>FORM4F</u> Form Crew 4 Men Forklift 32.00 CH Eff: 100.00 **Prod: 0.0590 MU** Lab Pcs: 4.00 Eqp Pcs: 5.00

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
31FMAALL	Oil/Nails/Ties@108.7		2,170.00	SF	0.350			826			826
3FBF1	Form - Bottom @108.		2,170.00	SF	2.000			4,720			4,720
8COMPR04	Compressor 185 CFM	1.00	32.00	HR	13.278				425		425
8FORK04	Forklift Cat TL1055 1	1.00	32.00	HR	42.914				1,373		1,373
8GEN010	Generator 10 KW	1.00	32.00	HR	7.010				224		224
8MLIFT060	Manlift Grove T60 60	1.00	32.00	HR	28.412				909		909
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	32.00	HR	11.828				378		378
CARPFRM	Carpenter Foreman	1.00	32.00	MH	34.720	1,593					1,593
CARPJ	Carpenter Journeyma	1.00	32.00	MH	31.920	1,492					1,492
LGEN	Laborer-General	1.00	32.00	MH	27.520	1,246					1,246
OPLDR6	Op Eng 2- Loader <6	1.00	32.00	MH	32.910	1,546					1,546
$14,732.61	0.0589 MH/SF		128.00	MH	[1.874]	5,877		5,546	3,310		14,733
16.9531 Unit/M	4.0000 Shifts		67.8125	Units/H		2.71		2.56	1.53		6.79

323025 Edge & End of Deck F&S **Quan: 334.00 SF Hrs/Shft: 8.00 Cal 508 WC CCISP**

<u>CARP3</u> Foreman+2 Carpenters 20.00 CH Eff: 100.00 **Prod: 0.1796 MU** Lab Pcs: 3.00 Eqp Pcs: 2.00

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
31FMAALL	Oil/Nails/Ties@108.7		334.00	SF	0.350			127			127
3EOD	EOD Deck Forms@1		334.00	SF	2.000			726			726
8GEN010	Generator 10 KW	1.00	20.00	HR	7.010				140		140
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	20.00	HR	11.828				237		237
CARPFRM	Carpenter Foreman	1.00	20.00	MH	34.720	995					995
CARPJ	Carpenter Journeyma	2.00	40.00	MH	31.920	1,865					1,865
$4,091.12	0.1796 MH/SF		60.00	MH	[5.902]	2,861		854	377		4,091
5.5667 Unit/M	2.5000 Shifts		16.7000	Units/H		8.57		2.56	1.13		12.25

323020 Overhang Safety Rail **Quan: 424.00 LF Hrs/Shft: 8.00 Cal 508 WC CCISP**

DETAILED ESTIMATE

BID ITEM = 3000 Land Item SCHEDULE: 1 100
Description = Structural Concrete Bridge Unit = CY Takeoff Quan: 67.000 Engr Quan: 67.000

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
CARP2	Foreman+1 Carpenter		16.00	CH	Eff: 100.00	**Prod: 0.0755 MU**		Lab Pcs: 2.00		Eqp Pcs: 2.00	
3SR	Safety Rail@108.75%		424.00	LF	1.500			692			692
8GEN010	Generator 10 KW	1.00	16.00	HR	7.010				112		112
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	16.00	HR	11.828				189		189
CARPFRM	Carpenter Foreman	1.00	16.00	MH	34.720	796					796
CARPJ	Carpenter Journeyma	1.00	16.00	MH	31.920	746					746
$2,535.49	0.0754 MH/LF		32.00	MH	[2.515]	1,542		692	301		2,535
13.2500 Unit/M	2.0000 Shifts		26.5000	Units/H		3.64		1.63	0.71		5.98

322000 Screed&Rail Setup/Grd/Rmv Quan: 240.00 LF Hrs/Shft: 8.00 Cal 508 WC CCISP

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
CARP2C	Foreman+1 Carpenter w/Crane		8.00	CH	Eff: 100.00	**Prod: 0.1000 MU**		Lab Pcs: 3.00		Eqp Pcs: 3.00	
31MATFMR	Finish Machine@108.		240.00	LF	5.000			1,305			1,305
8CRANERT7	Crane Grove RT700E	1.00	8.00	HR	106.929				855		855
8GEN010	Generator 10 KW	1.00	8.00	HR	7.010				56		56
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	8.00	HR	11.828				95		95
CARPFRM	Carpenter Foreman	1.00	8.00	MH	34.720	398					398
CARPJ	Carpenter Journeyma	1.00	8.00	MH	31.920	373					373
OPCR70	Op Eng 1- Crane 45-9	1.00	8.00	MH	32.910	387					387
$3,468.84	0.1000 MH/LF		24.00	MH	[3.318]	1,158		1,305	1,006		3,469
10.0000 Unit/M	1.0000 Shifts		30.0000	Units/H		4.82		5.44	4.19		14.45

322005 Fin Mach Setup/Grd/Rmv Quan: 1.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
POUR1	Bidwell Set-up		8.00	CH	Eff: 100.00	**Prod: 48.0000 MU**		Lab Pcs: 6.00		Eqp Pcs: 3.00	
8CONCEQ48	Bid-well 4800 Deck F	1.00	8.00	HR	27.786				222		222
8CRANERT7	Crane Grove RT700E	1.00	8.00	HR	106.929				855		855
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	8.00	HR	11.828				95		95
CARPFRM	Carpenter Foreman	1.00	8.00	MH	34.720	398					398
CARPJ	Carpenter Journeyma	1.00	8.00	MH	31.920	373					373
GF	Grade Foreman	1.00	8.00	MH	31.950	378					378
LGEN	Laborer-General	1.00	8.00	MH	27.520	311					311
OPBIDW	Op Eng 2- Bidwell	1.00	8.00	MH	32.390	382					382
OPCR70	Op Eng 1- Crane 45-9	1.00	8.00	MH	32.910	387					387
$3,401.28	48.0000 MH/EA		48.00	MH	[1531.28]	2,229			1,172		3,401
0.0208 Unit/M	1.0000 Shifts		0.1250	Units/H		2,228.99			1,172.29		3,401.28

322025 Slab Deck - Plc Conc Quan: 67.00 CY Hrs/Shft: 8.00 Cal 508 WC CCISP

10% Waste

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
POUR7	Pour Conc 7 man		8.00	CH	Eff: 100.00	**Prod: 0.8358 MU**		Lab Pcs: 7.00		Eqp Pcs: 5.00	
2CONC01	4,000 psi Read@108.	1.10	73.70	CY	100.000		8,015				8,015
5CONCP52M	Concrete Pump 52m		8.00	HR	250.000			2,000			2,000
5CONCPCY	Cubic Yard Charge		67.00	CY	2.250			151			151
8COMPR04	Compressor 185 CFM	1.00	8.00	HR	13.278				106		106
8CONCEQ28	Conc Vib 2.0" Elec.	2.00	16.00	HR	0.777				12		12

DETAILED ESTIMATE

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
BID ITEM = 3000					Land Item	SCHEDULE: 1		100			
Description = Structural Concrete Bridge					Unit = CY	Takeoff Quan:		67.000	Engr Quan:		67.000
8GEN010	Generator 10 KW	1.00	8.00	HR	7.010				56		56
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	8.00	HR	11.828				95		95
CARPJ	Carpenter Journeyma	1.00	8.00	MH	31.920	373					373
FINISHJ	Cement Mason Journe	2.00	16.00	MH	32.280	762					762
LFORMN	Laborer-Foreman	1.00	8.00	MH	29.250	327					327
LPWR	Laborer-Power Tools	3.00	24.00	MH	28.020	948					948
$12,844.87	0.8358 MH/CY		56.00	MH	[25.05]	2,410	8,015	2,151	269		12,845
1.1964 Unit/M	1.0000 Shifts		8.3750	Units/H		35.97	119.63	32.10	4.02		191.71
322072	**Wet Cure Deck**				**Quan: 2,860.00 SF**	**Hrs/Shft: 8.00**		**Cal 508 WC**	**CCISP**		
LAB3	Foreman + 2 Laborers		8.00	CH	Eff: 100.00	**Prod: 0.0112 MU**		Lab Pcs: 4.00		Eqp Pcs: 2.00	
31FCUREBL	Curing Blankets		2,860.00	SF	0.500			1,430			1,430
3CRC	Concrete Resin@108.		2,860.00	SF	0.070			218			218
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	8.00	HR	11.828				95		95
8TRKWTR04	Water Truck 4,000 ga	1.00	8.00	HR	45.330				363		363
LFORMN	Laborer-Foreman	1.00	8.00	MH	29.250	327					327
LPWR	Laborer-Power Tools	2.00	16.00	MH	28.020	632					632
TDWT	Water Truck Driver	1.00	8.00	MH	27.020	353					353
$3,416.72	0.0111 MH/SF		32.00	MH	[0.314]	1,312		1,648	457		3,417
89.3750 Unit/M	1.0000 Shifts		357.5000	Units/H		0.46		0.58	0.16		1.19
315000	**Misc Form & Rental Hardware**				**Quan: 63.00 CY**	**Hrs/Shft: 8.00**		**Cal 508 WC**	**CCISP**		
3FH	Form Hardware@108.		63.00	CY	2.000			137			137
3MB	Misc Bridge It@108.7		63.00	CY	17.000			1,165			1,165
$1,301.74					[ ]			1,302			1,302
								20.66			20.66
=====> Item Totals: 3000	**- Structural Concrete Bridge**										
$80,814.92	9.8507 MH/CY		660.00	MH	[315.791]	30,716	18,767	17,396	13,936		**80,815**
1,206.193	67 CY					458.44	280.10	259.64	208.00		1,206.19
BID ITEM = 3100					Land Item	SCHEDULE: 1		100			
Description = Bar Reinforcing, Bridge					Unit = LB	Takeoff Quan:		32,000.000	Engr Quan:		32,000.000
380010	**Superstructure Rebar**				**Quan: 32,000.00 LB**	**Hrs/Shft: 8.00**		**Cal 508 WC**	**CCISP**		
IRON3C	Foreman+2 Ironworker+Crane		32.00	CH	Eff: 100.00	**Prod: 0.0040 MU**		Lab Pcs: 4.00		Eqp Pcs: 2.00	
2REBAR1	Rebar Accessor@108.		32,000.00	LB	0.025		870				870
2REBAR31	Rebar - Supers@108.		32,000.00	LB	0.700		24,360				24,360
8CRANERT7	Crane Grove RT700E	1.00	32.00	HR	106.929				3,422		3,422
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	32.00	HR	11.828				378		378

DETAILED ESTIMATE

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 3100 Land Item SCHEDULE: 1 100
Description = Bar Reinforcing, Bridge Unit = LB Takeoff Quan: 32,000.000 Engr Quan: 32,000.000

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
IW	Ironworker	2.00	64.00	MH	33.980	3,322					3,322
IWFR	Ironworker Foreman	1.00	32.00	MH	34.360	1,674					1,674
OPCR70	Op Eng 1- Crane 45-9	1.00	32.00	MH	32.910	1,546					1,546
$35,572.22		0.0040 MH/LB	128.00	MH	[0.135]	6,542	25,230		3,800		35,572
250.0000 Unit/M		4.0000 Shifts	1,000.0000	Units/H		0.20	0.79		0.12		1.11

=====> Item Totals: 3100 - Bar Reinforcing, Bridge

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
$35,572.22	0.0040 MH/LB		128.00	MH	[0.135]	6,542	25,230		3,800		**35,572**
1.112	32000 LB					0.20	0.79		0.12		1.11

BID ITEM = 3200 Land Item SCHEDULE: 1 100
Description = Miscellaneous Metal, Bridge Unit = LB Takeoff Quan: 825.000 Engr Quan: 825.000

385100 Miscellaneous Metal, Bridge Quan: 825.00 LB Hrs/Shft: 8.00 Cal 508 WC CCISP

L6 x 6 x 1/2" x 3" Angles Drilled and hot dipped galvanized
3/4" dia x 7" L Lag Bolts......336 each, buy 350 x $3.62
Washers 25 per pack at $7.82 ($0.31 each)
3/4" dia x 6" L Anchor Bolts...336 each, buy 350 x $4.23
Washers 25 per pack at $7.82 ($0.31 each)
Bolts 25 per pack at $11.86 ($0.47 each)
Prices from McMaster-Carr 115

FORM3 Form Crew 3 Man 24.00 CH Eff: 100.00 **Prod: 0.0873 MU** Lab Pcs: 3.00 Eqp Pcs: 4.00

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
2MM002	Angle@108.75%		825.00	LB	1.500		1,346				1,346
2SA01	Lag Bolt 3/4" @108.7		350.00	EA	4.000		1,523				1,523
2SA02	Anchor Bolt 3/@108.		350.00	EA	5.000		1,903				1,903
8COMPR04	Compressor 185 CFM	1.00	24.00	HR	13.278				319		319
8GEN010	Generator 10 KW	1.00	24.00	HR	7.010				168		168
8MLIFT060	Manlift Grove T60 60	1.00	24.00	HR	28.412				682		682
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	24.00	HR	11.828				284		284
CARPFRM	Carpenter Foreman	1.00	24.00	MH	34.720	1,194					1,194
CARPJ	Carpenter Journeyma	1.00	24.00	MH	31.920	1,119					1,119
LGEN	Laborer-General	1.00	24.00	MH	27.520	934					934
$9,472.13		0.0872 MH/LB	72.00	MH	[2.739]	3,248	4,771		1,453		9,472
11.4583 Unit/M		3.0000 Shifts	34.3750	Units/H		3.94	5.78		1.76		11.48

=====> Item Totals: 3200 - Miscellaneous Metal, Bridge

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
$9,472.13	0.0872 MH/LB		72.00	MH	[2.739]	3,248	4,771		1,453		**9,472**
11.481	825 LB					3.94	5.78		1.76		11.48

DETAILED ESTIMATE

Activity / Resource	Desc	Quantity Pcs	Quantity	Unit		Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 3300 Land Item SCHEDULE: 1 100
Description = Concrete Stain Unit = SF Takeoff Quan: 2,520.000 Engr Quan: 2,520.000

3400 Concrete Stain Quan: 2,520.00 SF Hrs/Shft: 8.00 Cal 508 WC CCISP

Resource	Desc	Pcs	Quantity	Unit		Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
4COAT	Coating Sub		2,520.00	SF		3.500					8,820	8,820

BID ITEM = 3400 Land Item SCHEDULE: 1 100
Description = Metal Railing Unit = LF Takeoff Quan: 420.000 Engr Quan: 420.000

387000 Install Steel Railing Quan: 420.00 LF Hrs/Shft: 8.00 Cal 508 WC CCISP

```
1 shift each side
```

Resource	Desc	Pcs	Quantity	Unit		Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
FORM3	Form Crew 3 Man		16.00	CH	Eff: 100.00	**Prod: 0.1143 MU**	Lab Pcs: 3.00			Eqp Pcs: 3.00		
2SR05	Steel Bridge R@108.		420.00	LF		100.000		45,675				45,675
8COMPR04	Compressor 185 CFM	1.00	16.00	HR		13.278				212		212
8GEN010	Generator 10 KW	1.00	16.00	HR		7.010				112		112
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	16.00	HR		11.828				189		189
CARPFRM	Carpenter Foreman	1.00	16.00	MH		34.720	796					796
CARPJ	Carpenter Journeyma	1.00	16.00	MH		31.920	746					746
LGEN	Laborer-General	1.00	16.00	MH		27.520	623					623
$48,354.22	0.1142 MH/LF		48.00	MH		[3.587]	2,165	45,675		514		48,354
8.7500 Unit/M	2.0000 Shifts		26.2500	Units/H			5.16	108.75		1.22		115.13

387100 Install Railing Anchor Bolts Quan: 144.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Figure bolts at 6' oc, 210' = 36 x 2 bolts x 2 sides = 144 ea @ 0.5 mh each
Layout, set, strip in concrete
```

Resource	Desc	Pcs	Quantity	Unit		Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
CARP4	Foreman + 3 Carpenters		18.00	CH	Eff: 100.00	**Prod: 0.5000 MU**	Lab Pcs: 4.00			Eqp Pcs: 2.00		
8GEN010	Generator 10 KW	1.00	18.00	HR		7.010				126		126
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	18.00	HR		11.828				213		213
CARPFRM	Carpenter Foreman	1.00	18.00	MH		34.720	896					896
CARPJ	Carpenter Journeyma	3.00	54.00	MH		31.920	2,518					2,518
$3,753.21	0.5000 MH/EA		72.00	MH		[16.31]	3,414			339		3,753
2.0000 Unit/M	2.2500 Shifts		8.0000	Units/H			23.71			2.35		26.06

=====> Item Totals: 3400 - Metal Railing

$52,107.43	0.2857 MH/LF		120.00	MH		[9.179]	5,580	45,675		853		**52,107**
124.065	420 LF						13.28	108.75		2.03		124.07

BID ITEM = 3500 Land Item SCHEDULE: 1 100
Description = Fire Proof Coating Unit = SF Takeoff Quan: 9,480.000 Engr Quan: 9,480.000

Activity / Resource	Desc	Quantity Pcs	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 3500 Land Item SCHEDULE: 1 100
Description = Fire Proof Coating Unit = SF Takeoff Quan: 9,480.000 Engr Quan: 9,480.000

845000 Fire Proof Coating Quan: 9,480.00 SF Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Material-Contego Intumescent Latex 130sf per gallon per coat, 2 coats required
9,480sf / 130sf/gal x 2 coats = 146 gallons, say 154 gallons (097 97 10.10 7000)
(Labor 097 97 13.23 6830) 0.005mh/sf x 9,480sf x 2 coats = 95 mh
```

LAB2 Foreman + 1 Laborer 48.00 CH Eff: 100.00 **Prod: 0.0101 MU** Lab Pcs: 2.00 Eqp Pcs: 3.00

Resource	Desc	Pcs	Quantity Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
2COAT5	Intumescent La@108.		154.00 GAL	50.000		8,374				8,374
31MATMISC	Misc Material@108.7		9,480.00 SF	0.100			1,031			1,031
8GEN010	Generator 10 KW	1.00	48.00 HR	7.010				336		336
8MLIFT060	Manlift Grove T60 60	1.00	48.00 HR	28.412				1,364		1,364
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	48.00 HR	11.828				568		568
LFORMN	Laborer-Foreman	1.00	48.00 MH	29.250	1,962					1,962
LPWR	Laborer-Power Tools	1.00	48.00 MH	28.020	1,896					1,896
$15,530.04	0.0101 MH/SF		96.00 MH	[0.29]	3,857	8,374	1,031	2,268		15,530
98.7500 Unit/M	6.0000 Shifts		197.5000 Units/H		0.41	0.88	0.11	0.24		1.64

=====> Item Totals: 3500 - Fire Proof Coating

$15,530.04	0.0101 MH/SF	96.00 MH	[0.29]	3,857	8,374	1,031	2,268		**15,530**
1.638	9480 SF			0.41	0.88	0.11	0.24		1.64

BID ITEM = 4000 Land Item SCHEDULE: 1 100
Description = Complete Bridge Removal Unit = LF Takeoff Quan: 210.000 Engr Quan: 210.000

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All replacement structural lumber (does not include IPE) shall be stress-grade
Douglas Fir (Larch) and shall conform to AREMA specifications see, Part 1, Material
Specifications for Lumber, Timber, Engineered Wood Products, Timber Piles,
Fasteners, Timber Bridge Ties and Recommendations for Fire-Retardant Coating for
Creosoted Wood. All lumber and piles, except IPE timber, should be pressure treated
in accordance with AREMA Chapter 30.

Trucking included in Demolition/Removals item #300
```

133014 Remove Timber Deck Quan: 2,520.00 SF Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Remove Grating & Flat Bar  - 210 LF x 2 = 420 LF = 1 Shift
Remove Timbers = 214 Each @ .75 MH/Ea           = 4 Shifts
Remove Posts/Cable/Fence Panels                 = 1 Shift
Main Ties are   10' x 8" x 8" = 53 BF x 171 each = 9,063 BF x 4.5#/BF = 40,784#
Handrail Ties are 18' x 4" x 8" = 48 BF x 43 each = 2,064 BF x 4.5#/BF = 9,288#
Disposal At $60/ton                                          Total...50,072#
(25.0 tons)
```

DEMO22 Timber Deck Demo 64.00 CH Eff: 100.00 **Prod: 8.0000 S** Lab Pcs: 5.00 Eqp Pcs: 6.00

Resource	Desc	Pcs	Quantity Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
31DFTIMTN	Timber Dump Fe@10		25.00 TN	60.000			1,631			1,631
8COMPR04	Compressor 185 CFM	1.00	64.00 HR	13.278				850		850

DETAILED ESTIMATE

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 4000 Land Item SCHEDULE: 1 100
Description = Complete Bridge Removal Unit = LF Takeoff Quan: 210.000 Engr Quan: 210.000

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
8DEMO02	Jackhammer 35#	2.00	128.00	HR	2.600				333		333
8EXC315	Excavator Cat 315D L	1.00	64.00	HR	53.312				3,412		3,412
8FORK04	Forklift Cat TL1055 1	1.00	64.00	HR	42.914				2,746		2,746
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	64.00	HR	11.828				757		757
LFORMN	Laborer-Foreman	1.00	64.00	MH	29.250	2,616					2,616
LPWR	Laborer-Power Tools	2.00	128.00	MH	28.020	5,055					5,055
OPEXC3	Op Eng 3- Backhoe to	1.00	64.00	MH	32.390	3,055					3,055
OPLDR6	Op Eng 2- Loader <6	1.00	64.00	MH	32.910	3,092					3,092
$23,546.83		0.1269 MH/SF	320.00	MH	[3.825]	13,818		1,631	8,098		23,547
7.8750 Unit/M		8.0000 Shifts	* 39.3750	Units/H		5.48		0.65	3.21		9.34

133020 Remove Timber Cap (14 x 14 x 18') Quan: 14.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Remove existing 14" x 14" x 18' cap, figure 0.5 mh/ea
294BF x 14ea x 4.5#/BF = 18,522# (9.3tons)
Disposal At $60/ton
```

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
DEMO22	Timber Deck Demo		2.00	CH	Eff: 100.00	**Prod: 0.5714 MU**		Lab Pcs: 4.00		Eqp Pcs: 6.00	
31DFTIMTN	Timber Dump Fe@10		9.30	TN	60.000			607			607
8COMPR04	Compressor 185 CFM	1.00	2.00	HR	13.278				27		27
8DEMO02	Jackhammer 35#	2.00	4.00	HR	2.600				10		10
8EXC315	Excavator Cat 315D L	1.00	2.00	HR	53.312				107		107
8FORK04	Forklift Cat TL1055 1	1.00	2.00	HR	42.914				86		86
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	2.00	HR	11.828				24		24
LFORMN	Laborer-Foreman	1.00	2.00	MH	29.250	82					82
LPWR	Laborer-Power Tools	1.00	2.00	MH	28.020	79					79
OPEXC3	Op Eng 3- Backhoe to	1.00	2.00	MH	32.390	95					95
OPLDR6	Op Eng 2- Loader <6	1.00	2.00	MH	32.910	97					97
$1,212.65		0.5714 MH/EA	8.00	MH	[17.51]	353		607	253		1,213
1.7500 Unit/M		0.2500 Shifts	7.0000	Units/H		25.20		43.35	18.07		86.62

133045 Remove Timber Piles (14" dia x 40') Quan: 81.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Remove existing 14" dia x 40' pile, figure 1.0 mh/ea
1.069 CF x 12BF/CF x 40' x 81ea x 4.5#/BF = 187,032 (93.5tons)
Disposal At $60/ton
```

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
DEMO22	Timber Deck Demo		20.00	CH	Eff: 100.00	**Prod: 0.9877 MU**		Lab Pcs: 4.00		Eqp Pcs: 6.00	
31DFTIMTN	Timber Dump Fe@10		93.50	TN	60.000			6,101			6,101
8COMPR04	Compressor 185 CFM	1.00	20.00	HR	13.278				266		266
8DEMO02	Jackhammer 35#	2.00	40.00	HR	2.600				104		104
8EXC315	Excavator Cat 315D L	1.00	20.00	HR	53.312				1,066		1,066
8FORK04	Forklift Cat TL1055 1	1.00	20.00	HR	42.914				858		858
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	20.00	HR	11.828				237		237
LFORMN	Laborer-Foreman	1.00	20.00	MH	29.250	817					817
LPWR	Laborer-Power Tools	1.00	20.00	MH	28.020	790					790
OPEXC3	Op Eng 3- Backhoe to	1.00	20.00	MH	32.390	955					955
OPLDR6	Op Eng 2- Loader <6	1.00	20.00	MH	32.910	966					966

DETAILED ESTIMATE

Activity / Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 4000 Land Item SCHEDULE: 1 100
Description = Complete Bridge Removal Unit = LF Takeoff Quan: 210.000 Engr Quan: 210.000

$12,159.66		0.9876	MH/EA	80.00 MH	[30.264]	3,528		6,101	2,531		12,160
1.0125 Unit/M		2.5000	Shifts	4.0500 Units/H		43.56		75.32	31.24		150.12

133025 Remove Sway Brace (4 x 10 x 20') Quan: 44.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Remove existing  4" x 10" x 20' sway brace at 0.5mh/ea
66.7BF x 44ea x 4.5#/BF = 13,200#(6.6 tons)
Disposal At $60/ton
```

DEMO22 Timber Deck Demo 6.00 CH Eff: 100.00 **Prod: 0.5455 MU** Lab Pcs: 4.00 Eqp Pcs: 6.00

Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
31DFTIMTN	Timber Dump Fe@10		6.60	TN	60.000			431			431
8COMPR04	Compressor 185 CFM	1.00	6.00	HR	13.278				80		80
8DEMO02	Jackhammer 35#	2.00	12.00	HR	2.600				31		31
8EXC315	Excavator Cat 315D L	1.00	6.00	HR	53.312				320		320
8FORK04	Forklift Cat TL1055 1	1.00	6.00	HR	42.914				257		257
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	6.00	HR	11.828				71		71
LFORMN	Laborer-Foreman	1.00	6.00	MH	29.250	245					245
LPWR	Laborer-Power Tools	1.00	6.00	MH	28.020	237					237
OPEXC3	Op Eng 3- Backhoe to	1.00	6.00	MH	32.390	286					286
OPLDR6	Op Eng 2- Loader <6	1.00	6.00	MH	32.910	290					290
$2,248.23		0.5454	MH/EA	24.00 MH	[16.714]	1,058		431	759		2,248
1.8333 Unit/M		0.7500	Shifts	7.3333 Units/H		24.06		9.79	17.25		51.10

133500 Dispose of Timber (Haz) Quan: 1.00 LS Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Timber Deck......25.0 tons
Timber Cap........9.3 Tons
Sway Brace........6.6 Tons
Sash Brace........5.4 Tons
Timber Abut 1.....3.8 Tons
Timber Abut 15....1.6 Tons
Timber Piles.....93.5 Tons
        TOTAL...145.2 Tons / 24 Tons/Load = 6 loads
2 hours to load, 2 hours travel each way, 2 hour unload = 8 x 6 loads = 48 hours
```

Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
5TRKFB	Trucking - Flat Bed		48.00	HR	100.000			4,800			4,800

133030 Remove Sash Brace (8 x 10 x 18') Quan: 20.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Remove existing 8" x 10" x 18' sash brace @ 0.5 MH/EA
120BF x 20EA x 4.5#/BF = 10,800# (5.4 tons)
Disposal At $60/ton
```

DEMO22 Timber Deck Demo 3.00 CH Eff: 100.00 **Prod: 0.6000 MU** Lab Pcs: 4.00 Eqp Pcs: 6.00

Resource	Desc	Pcs	Quantity	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total
31DFTIMTN	Timber Dump Fe@10		5.40	TN	60.000			352			352
8COMPR04	Compressor 185 CFM	1.00	3.00	HR	13.278				40		40
8DEMO02	Jackhammer 35#	2.00	6.00	HR	2.600				16		16
8EXC315	Excavator Cat 315D L	1.00	3.00	HR	53.312				160		160
8FORK04	Forklift Cat TL1055 1	1.00	3.00	HR	42.914				129		129
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	3.00	HR	11.828				35		35

DETAILED ESTIMATE

Activity / Resource	Desc	Pcs	Quantity Unit		Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 4000 Land Item SCHEDULE: 1 100
Description = Complete Bridge Removal Unit = LF Takeoff Quan: 210.000 Engr Quan: 210.000

LFORMN	Laborer-Foreman	1.00	3.00	MH	29.250	123					123
LPWR	Laborer-Power Tools	1.00	3.00	MH	28.020	118					118
OPEXC3	Op Eng 3- Backhoe to	1.00	3.00	MH	32.390	143					143
OPLDR6	Op Eng 2- Loader <6	1.00	3.00	MH	32.910	145					145
$1,261.10		0.6000 MH/EA	12.00	MH	[18.386]	529		352	380		1,261
1.6667 Unit/M		0.3750 Shifts	6.6667	Units/H		26.46		17.62	18.98		63.06

133035 Remove Abut 1 Backwall 8 x 20 x 25' Quan: 5.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Remove existing 8" x 20" x 25' Timber Beams @ 0.5mh/ea
333.3 BF x 5ea x 4.5#/BF = 7,500# (3.75tons)
Disposal At $60/ton
```

FORM4F Form Crew 4 Men Forklift 10.00 CH Eff: 100.00 **Prod: 8.0000 MU** Lab Pcs: 4.00 Eqp Pcs: 4.00

31DFTIMTN	Timber Dump Fe@10		3.75	TN	60.000			245			245
8COMPR04	Compressor 185 CFM	1.00	10.00	HR	13.278				133		133
8FORK04	Forklift Cat TL1055 1	1.00	10.00	HR	42.914				429		429
8GEN010	Generator 10 KW	1.00	10.00	HR	7.010				70		70
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	10.00	HR	11.828				118		118
CARPFRM	Carpenter Foreman	1.00	10.00	MH	34.720	498					498
CARPJ	Carpenter Journeyma	1.00	10.00	MH	31.920	466					466
LGEN	Laborer-General	1.00	10.00	MH	27.520	389					389
OPLDR6	Op Eng 2- Loader <6	1.00	10.00	MH	32.910	483					483
$2,831.50		8.0000 MH/EA	40.00	MH	[254.14]	1,837		245	750		2,832
0.1250 Unit/M		1.2500 Shifts	0.5000	Units/H		367.30		48.94	150.06		566.30

133040 Remove Abut 15 Backwall 8 x 20 x 18' Quan: 3.00 EA Hrs/Shft: 8.00 Cal 508 WC CCISP

```
Remove existing 8" x 20" x 18' Timber Beams @ 0.5mh/ea
240 BF x 3ea x 4.5#/BF = 3,240# (1.6tons)
Disposal At $60/ton
```

FORM4F Form Crew 4 Men Forklift 0.50 CH Eff: 100.00 **Prod: 0.6667 MU** Lab Pcs: 4.00 Eqp Pcs: 4.00

31DFTIMTN	Timber Dump Fe@10		1.60	TN	60.000			104			104
8COMPR04	Compressor 185 CFM	1.00	0.50	HR	13.278				7		7
8FORK04	Forklift Cat TL1055 1	1.00	0.50	HR	42.914				21		21
8GEN010	Generator 10 KW	1.00	0.50	HR	7.010				3		3
8TRKPU7	Leased 4x2, 3/4 T Pic	1.00	0.50	HR	11.828				6		6
CARPFRM	Carpenter Foreman	1.00	0.50	MH	34.720	25					25
CARPJ	Carpenter Journeyma	1.00	0.50	MH	31.920	23					23
LGEN	Laborer-General	1.00	0.50	MH	27.520	19					19
OPLDR6	Op Eng 2- Loader <6	1.00	0.50	MH	32.910	24					24
$233.68		0.6666 MH/EA	2.00	MH	[21.18]	92		104	37		234
1.5000 Unit/M		0.0625 Shifts	6.0000	Units/H		30.61		34.80	12.48		77.89

=====> Item Totals: 4000 - Complete Bridge Removal

$48,293.65		2.3142 MH/LF	486.00	MH	[70.341]	21,215		14,271	12,808		**48,294**
229.970		210 LF				101.02		67.96	60.99		229.97

DETAILED ESTIMATE

Activity / Resource	Desc	Quantity Pcs	Unit	Unit Cost	Labor	Perm Materi	Constr Matl/Ex	Equip Ment	Sub-Contrac	Total

BID ITEM = 4000 Land Item SCHEDULE: 1 100
Description = Complete Bridge Removal Unit = LF Takeoff Quan: 210.000 Engr Quan: 210.000

$**688,772.86**	*** **Report Totals** ***	3,866.50	MH		175,231	355,817	66,314	82,591	8,820	**688,773**

>>> indicates Non Additive Activity
------Report Notes:------
The estimate was prepared with TAKEOFF Quantities.
This report shows TAKEOFF Quantities with the resources.

Bid Date: 08/02/12 Owner: Engineering Firm:
Estimator-In-Charge: RHU

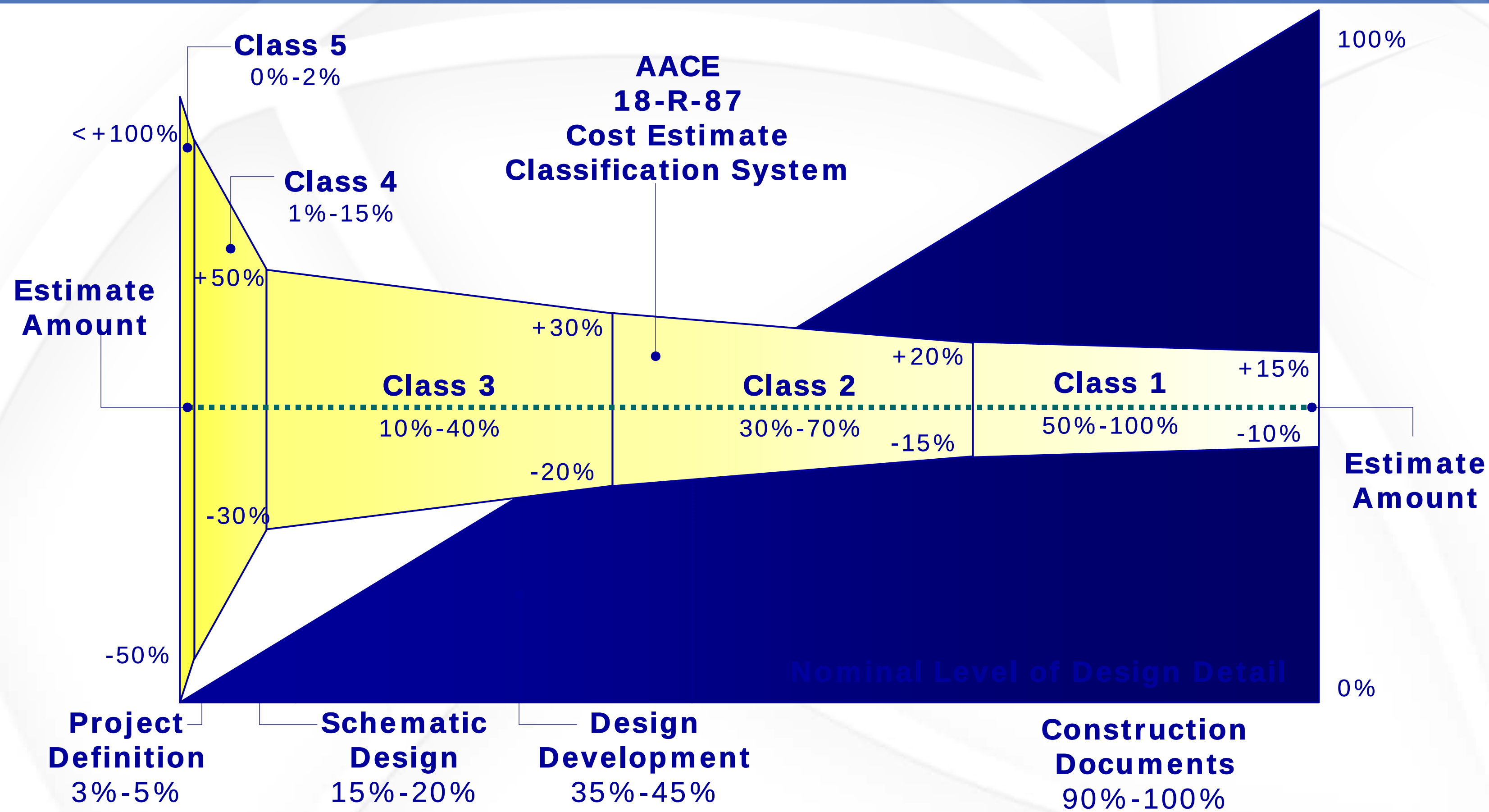
---

* on units of MH indicate average labor unit cost was used rather than base rate.
[ ] in the Unit Cost Column = Labor Unit Cost Without Labor Burdens
In equipment resources, rent % and EOE % not = 100% are represented as XXX%YYY where XXX=Rent% and YYY=EOE%
------Calendar Codes------

410	4 Nights @ 10 hrs/night
508	**5 days @ 8hrs/day (Default Calendar)**
509	5 days @ 9 hrs/day
510	5 days @ 10hrs/day
608	6 Days @ 8 hrs/day
610	6 Days @ 10 hrs/day

APPENDIX C– AACE Estimate Definitions

AACE – Classification System



Construction Cost Estimate Accuracy Ranges

CH2MHILL

Estimate Class	Class 5	Class 4	Class 3	Class 2	Class 1
LEVEL OF PROJECT DEFINITION Expressed as a % of complete definition	**0% to 2%**	**1% to 15%**	**10% to 40%**	**30% to 70%**	**50% to 100%**
END USAGE Typical Purpose of Estimate	**Concept Screening**	**Study or Feasibility**	**Budget Authorization, or Control**	**Control or Bid / Tender**	**Check Estimate or Bid / Tender**
METHODOLOGY Typical estimating method	**Capacity Factored, Parametric Models, Judgment, or Analogy**	**Equipment Factored or Parametric Models**	**Semi-Detailed Unit Costs with Assembly Level Line Items**	**Detailed Unit Cost with Forced Detailed Take-Off**	**Detailed Unit Cost with Detailed Take-Off**
EXPECTED ACCURACY RANGE Typical variation in low and high ranges [a]	**L: -20% to -50%** / **H: +30% to +100%**	**L: -15% to -30%** / **H: +20% to +50%**	**L: -10% to -20%** / **H: +10% to +30%**	**L: -5% to -15%** / **H: +5% to +20%**	**L: -3% to -10%** / **H: +3% to +15%**
PREPARATION EFFORT Typical degree of effort relative to least cost index of 1 [b]	**1**	**2 to 4**	**3 to 10**	**4 to 20**	**5 to 100**
REFINED CLASS DEFINITION	Class 5 estimates are generally prepared based on very limited information, and subsequently have very wide accuracy ranges. As such, some companies and organizations have elected to determine that due to the inherent inaccuracies, such estimates cannot be classified in a conventional and systematic manner. Class 5 estimates, due to the requirements of end use, may be prepared within a very limited amount of time and with very little effort expended - sometimes requiring less than 1 hour to prepare. Often, little more than proposed plant type, location, and capacity are known at the time of estimate preparation.	Class 4 estimates are generally prepared based on very limited information, and subsequently have very wide accuracy ranges. They are typically used for project screening, determination of feasibility, concept evaluation, and preliminary budget approval. Typically, engineering is from 1% to 5% complete, and would comprise at a minimum the following: plant capacity, block schematics, indicated layout, process flow diagrams (PFDs) for main process systems and preliminary engineered process and utility equipment lists. Level of Project Definition Required: 1% to 15% of full project definition.	Class 3 estimates are generally prepared to form the basis for budget authorization, appropriation, and/or funding. As such, they typically form the initial control estimate against which all actual costs and resources will be monitored. Typically, engineering is from 10% to 40% complete, and would comprise at a minimum the following: process flow diagrams, utility flow diagrams, preliminary piping and instrument diagrams, utility flow diagrams, preliminary piping and instrument diagrams, plot plan, developed layout drawings, and essentially complete engineering process and utility equipment lists. Level Of Project Definition Required: 10% to 40% of full project definition.	Class 2 estimates are generally prepared to form a detailed control baseline against which all project work is monitored in terms of cost and progress control. For contractors, this class of estimate is often used as the "bid" estimate to establish contract value. Typically, engineering is from 30% to 70% complete, and would comprise at a minimum the following: Process flow diagrams, utility flow diagrams, piping and instrument flow diagrams, heat and material balances, final plot plan, final layout drawings, complete engineered process and utility equipment lists, single line diagrams for electrical, electrical equipment and motor schedules, vendor quotations, detailed project execution plans, resourcing and work force plans, etc.	Class 1 estimates are generally prepared for discrete parts or sections of the total project rather than generating this level of detail for the entire project. The parts of the project estimated at this level of detail will typically be used by subcontractors for bids, or by owners for check estimates. The updated estimate is often referred to as the current control estimate and becomes the new baseline for cost/schedule control of the project. Class 1 estimates may be prepared for parts of the project to comprise a fair price estimate or bid check estimate to compare against a contractor's bid estimate, or to evaluate/dispute claims. Typically, engineering is from 50% to 100% complete, and would comprise virtually all engineering and design documentation of the project, and complete project execution and commissioning plans. Level for Project Definition Required: 50% to 100% of full project definition.
END USAGE DEFINED	Class 5 estimates are prepared for any number of strategic business planning purposes, such as but not limited to market studies, assessment of initial viability, evaluation of alternate schemes, project screening, project location studies, evaluation of resource needs and budgeting, long-range capital planning, etc.	Class 4 estimates are prepared for a number of purposes, such as but not limited to, detailed strategic planning, business development, project screening at more developed stages, alternative scheme analysis, confirmation of economic and/or technical feasibility, and preliminary budget approval or approval to proceed to next stage.	Class 3 estimates are typically prepared to support full project funding requests, and become the first of the project phase "control estimate" against which all actual costs and resources will be monitored for variations to the budget. They are used as the project budget until replaced by more detailed estimates. In many owner organizations, a Class 3 estimate may be the last estimate required and could well form the only basis for cost/schedule control.	Class 2 estimates are typically prepared as the detailed control baseline against which all actual costs an resources will now be monitored for variation to the budget, and form a part of the change/variation control program.	Class 1 estimates are typically prepared to form a current control estimate to be used as the final control baseline against which all actual costs and resources will now be monitored for variations to the budget, and form a part of the change/variation control program. They may be used to evaluate bid checking, to support vendor/contractor negotiations, or for claim evaluations and dispute resolution.
ESTIMATING METHODS USED	Class 5 estimates virtually always use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Handy-Whitman factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, and other parametric and modeling techniques.	Class 4 estimates virtually always use stochastic estimating methods such as cost/capacity curves and factors, scale of operations factors, Lang factors, Hand factors, Chilton factors, Peters-Timmerhaus factors, Guthrie factors, the Miller method, gross unit costs/ratios, and other parametric and modeling techniques.	Class 3 estimates usually involve more deterministic estimating methods that stochastic methods. They usually involve a high degree of unit cost line items, although these may be at an assembly level of detail rather than individual components. Factoring and other stochastic methods may be used to estimate less-significant areas of the project.	Class 2 estimates always involve a high degree of deterministic estimating methods. Class 2 estimates are prepared in great detail, and often involve tens of thousands of unit cost line items. For those areas of the project still undefined, an assumed level of detailed takeoff (forced detail) may be developed to use as line items in the estimate instead of relying on factoring methods.	Class 1 estimates involve the highest degree of deterministic estimating methods, and require a great amount of effort. Class 1 estimates are prepared in great detail, and thus are usually performed on only the most important or critical areas of the project. All items in the estimate are usually unit cost line items based on actual design quantities.
EXPECTED ACCURACY RANGE	Typical accuracy ranges for Class 5 estimates are -20% to 50% on the low side, and +30% to +100% on the high side, depending on the technological complexity of the project, appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.	Typical accuracy ranges for Class 4 estimates are -15% to -30% on the low side, and +20% to +50% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.	Typical accuracy ranges for Class 3 estimates are -10% to -20% on the low side, and +10% to +30% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.	Typical accuracy ranges for Class 2 estimates are -5% to -15% on the low side, and +5% to +20% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.	Typical accuracy ranges for Class 1 estimates are -3% to -10% on the low side, and +3% to +15% on the high side, depending on the technological complexity of the project, appropriate reference information, and the inclusion of an appropriate contingency determination. Ranges could exceed those shown in unusual circumstances.
EFFORT TO PREPARE (for US$20MM project):	As little as 1 hour or less to prepare to perhaps more than 200 hours, depending on the project and the estimating methodology used.	Typically, as little as 20 hours or less to perhaps more than 300 hours, depending on the project and the estimating methodology used.	Typically, as little as 150 hours or less to perhaps more than 1500 hours, depending on the project and the estimating methodology used.	Typically, as little as 300 hours or less to perhaps more than 3000 hours, depending on the project and the estimating methodology used. Bid Estimates typically require more effort than estimates used for funding or control purposes	Class 1 estimates require the most effort to create, and as such are generally developed for only selected areas of the project, or for bidding purposes. A complete Class 1 estimate may involve as little as 600 hours or less, to perhaps more than 6,000 hours, depending on the project and the estimating methodology used. Bid estimate typically require more effort than estimates used for funding or control purposes.
ANSI Standard Reference Z94.2-1989 name; Alternate Estimate Names, Terms, Expressions, Synonyms:	Order of Magnitude Estimate; Ratio, ballpark, blue sky, seat-of-pants, ROM, idea study, prospect estimate, concession license estimate, guesstimate, rule-of-thumb.	Budget Estimate; Screening, top-down, feasibility, authorization, factored, pre-design, pre-study.	Budget Estimate; Budget, scope, sanction, semi-detailed, authorization, preliminary control, concept study, development, basic engineering phase estimate, target estimate.	Definitive Estimate; Detailed Control, forced detail, execution phase, master control, engineering, bid, tender, change order estimate.	Definitive Estimate; Full detail, release, fall-out, tender, firm price, bottoms-up, final, detailed control, forced detail, execution phase, master control, fair price, definitive, change order estimate.

Estimate Class	Class 5	Class 4	Class 3	Class 2	Class 1
Estimate Input Checklist and Maturity Index	**Class 5**	**Class 4**	**Class 3**	**Class 2**	**Class 1**
GENERAL PROJECT DATA					
Project Scope Description	General	Preliminary	Defined	Defined	Defined
Plant Production / Facility Capacity	Assumed	Preliminary	Defined	Defined	Defined
Plant Location	General	Approximate	Specific	Specific	Specific
Soils & Hydrology	None	Preliminary	Defined	Defined	Defined
Integrated Project Plan	None	Preliminary	Defined	Defined	Defined
Project Master Schedule	None	Preliminary	Defined	Defined	Defined
Escalation Strategy	None	Preliminary	Defined	Defined	Defined
Work Breakdown Structure	None	Preliminary	Defined	Defined	Defined
Project Code of Accounts	None	Preliminary	Defined	Defined	Defined
Contracting Strategy	Assumed	Assumed	Preliminary	Defined	Defined
ENGINEERING DELIVERABLES:	**Class 5**	**Class 4**	**Class 3**	**Class 2**	**Class 1**
Block Flow Diagrams	Started / Preliminary	Preliminary / Complete	Complete	Complete	Complete
Plot Plans		Started	Preliminary / Complete	Complete	Complete
Process Flow Diagrams (PFDs)		Started / Preliminary	Preliminary / Complete	Complete	Complete
Utility Flow Diagrams (UFDs)		Started / Preliminary	Preliminary / Complete	Complete	Complete
Piping & Instrument Diagrams (P&IDS)		Started	Preliminary / Complete	Complete	Complete
Heat and Material Balances		Started	Preliminary / Complete	Complete	Complete
Process Equipment List		Started / Preliminary	Preliminary / Complete	Complete	Complete
Utility Equipment List		Started / Preliminary	Preliminary / Complete	Complete	Complete
Electrical One Line Drawings		Started / Preliminary	Preliminary / Complete	Complete	Complete
Specifications and Datasheets		Started	Preliminary / Complete	Complete	Complete
General Equipment Arrangement Drawings		Started	Preliminary / Complete	Complete	Complete
Spare Parts Lists			Started / Preliminary	Preliminary	Complete
Architectural Details / Schedules		Started	Preliminary / Complete	Complete	Complete
Structural Details		Started	Preliminary / Complete	Complete	Complete
Mechanical Discipline Drawings			Started	Preliminary	Preliminary / Complete
Electrical Discipline Drawings			Started	Preliminary	Preliminary / Complete
System Discipline Drawings			Started	Preliminary	Preliminary / Complete
Civil/Site Discipline Drawings			Started	Preliminary	Preliminary / Complete
Demolition Details		Started	Preliminary / Complete	Complete	Complete