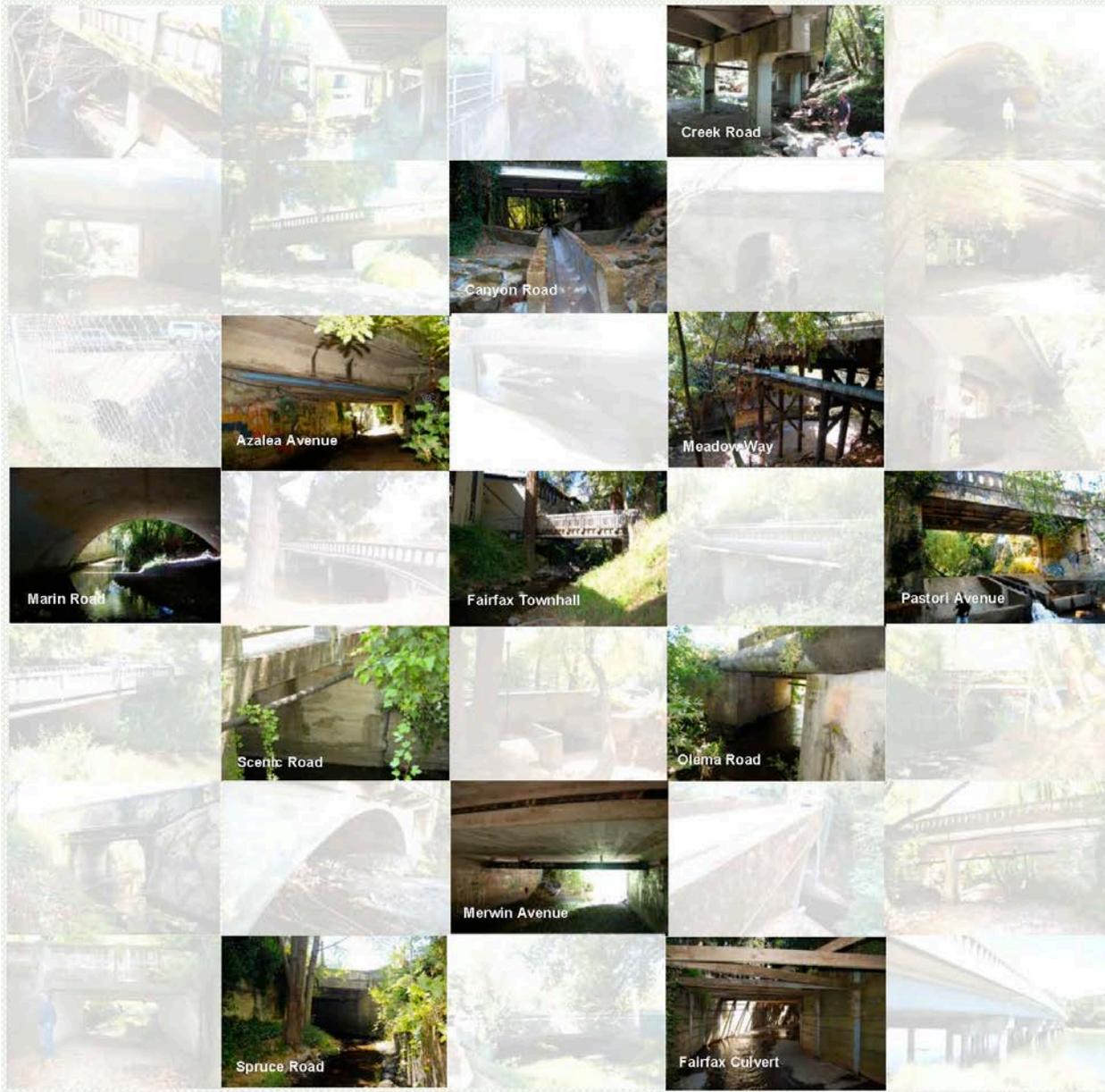


# ASSESSMENT REPORT – FAIRFAX BRIDGE PREVENTIVE MAINTENANCE PROGRAM



Submitted to the Town of Fairfax  
Department of Public Works  
January 14, 2014

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## Executive Summary

The Fairfax Bridge Preventive Maintenance Program (BPMP) is a federal Highway Bridge Program (HBP) project and 88.53% funded through federal funds, with the remaining 11.47% of the costs shared by the Town. The program is implemented to address certain preventive structural and safety issues concerning the Town's bridges that are in the National Bridge Inventory System (NBIS) and does not cover "routine" maintenance. By using this grant, however, the Town optimizes its use of federal and its own funds before bridge conditions deteriorate further. The Fairfax BPMP includes three of the Town's eleven bridges, none of which is eligible for listing in the National Register of Historic Places (NRHP). This is a preventive maintenance assessment phase, delineating a road map for the design and construction phases, as follows:

**Canyon Road Bridge** - The BPMP repairs at the superstructure level mainly include cleaning and preparing the bridge deck, sealing the deck surface with methacrylate and repairing and replacing the bridge expansion joint seals. At the substructure level, BPMP includes repairs to two bridge wingwalls at the bridge's north abutment by extending them and using soil nails, as well as repairs to the eroded abutment wall itself. Environmental permits will be required but the project may be a screened undertaking (exempt) as far as cultural and archeological resources are concerned. It is also recommended that the Town install two metal beam approach guard rails and two "Narrow Bridge" signs at the bridge approaches with its own funds since the program does cover them.

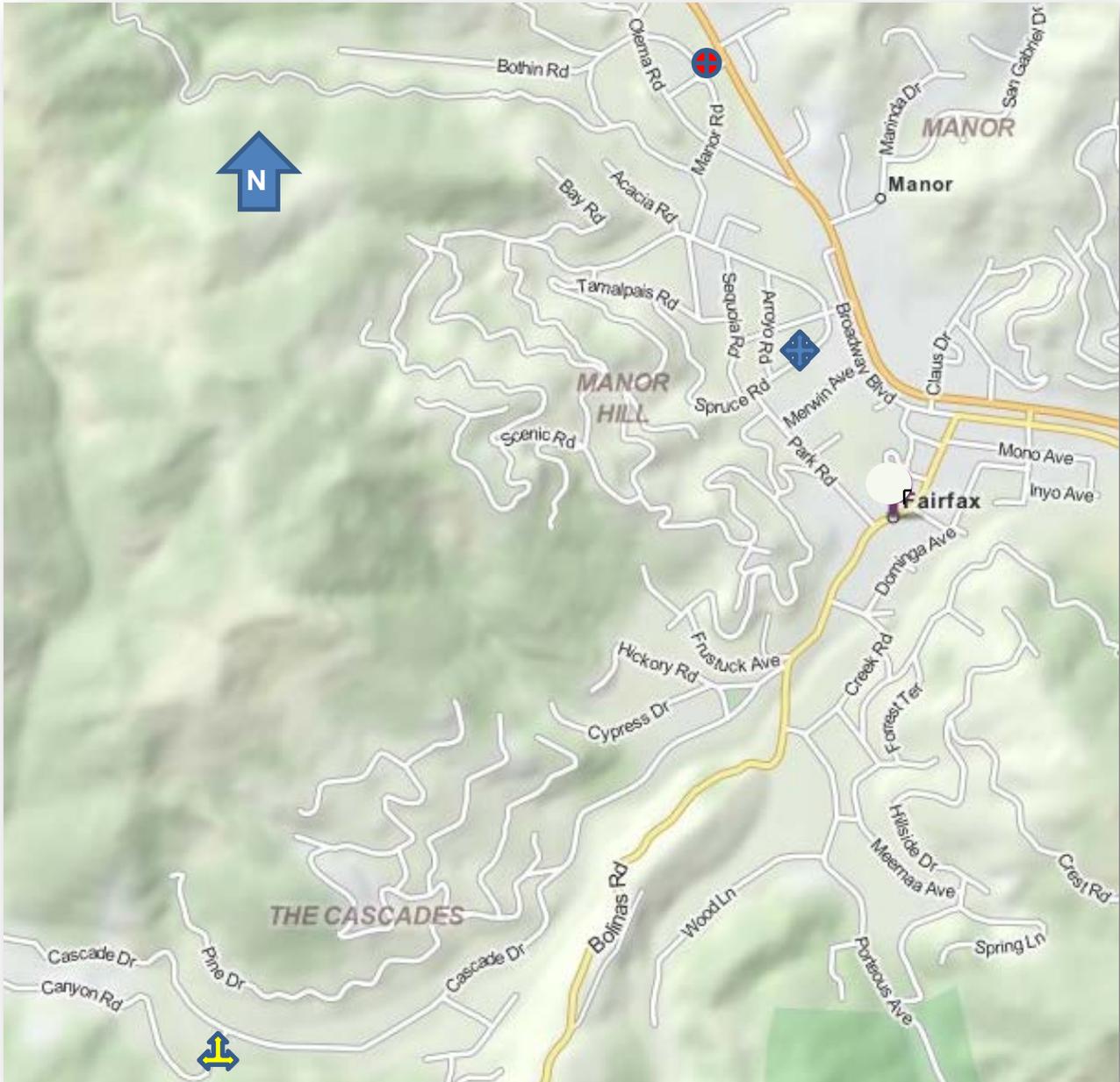
**Spruce Road Bridge** - BPMP repairs mainly include removing asphalt concrete (AC) from the bridge deck, sealing the deck with polyester concrete and placing joint seals at the two bridge ends. The bridge will not need environmental permits for BPMP and may be a screened undertaking for cultural and archeological resources. It is also recommended that the Town install one metal beam approach guard rail at the north approach to the bridge with its own funds. The county Flood Zone 9 recommended that the bridge be replaced in the next 10-15 years for proper flood conveyance. In the meantime, the relatively small expenditures will ensure the bridge, which has not had any maintenance attention for a long time, will function properly until replaced.

**Marin Road Bridge** - BPMP repairs chiefly include attaching the existing southeast concrete wingwall to the bridge headwall, adding a protective concrete layer on the face of the wing wall, augmenting the existing rock riprap at the wingwall, dry-packing the crack at the bottom of the northwest wingwall and adding small rock riprap to the dry-packed area to protect it from future scour. The work will require environmental permits but will likely be a screened undertaking as for cultural and archeological resources purposes. The bridge may be scour-critical based on the observations made by the team's geomorphologist and it is recommended that the Town pursue Caltrans funding for scour protection.

A construction schedule and estimates of costs for each bridge, including the Town's share, are also presented in this report. The construction cost, with a 25% contingency, is estimated to be \$371,500. Construction management will add approximately another 15%, making the total construction cost estimate \$427,225, of which the Town's share would be approximately \$49,000. Moreover, the Town may elect to install the signs and guard railings noted above at Canyon and Spruce for an additional \$6,325 with its own additional dollars. Full design, environmental and related costs are currently projected to be \$370,000. This is a dynamic cost at this stage and subject to adjustment after Field Review with Caltrans in early February 2014. The same cost sharing formula noted above also applies to design costs.

This Assessment Report concludes the initial engineering phase of the project. The Town will be seeking the approval of the design and construction funds from Caltrans to begin the final design and environmental studies.

## Project Locations Map



Legend:

Marin Road Bridge



Spruce Road Bridge



Canyon Road Bridge



## Introduction

The BPMP for the Town of Fairfax is comprised of three bridges crossings over two distinct creeks in town. The Fairfax bridge inventory is a small set of aged reinforced concrete structures in service. The quality of the original construction workmanship appears to be rather poor in places. The concrete used is inferior compared to today's and the site planning and overall bridge engineering are surpassed by modern standards. The bridges are mostly too narrow compared to today's standards and some lack basic amenities such as sidewalks and crashworthy railings. High flow levels and velocities, poor bridge location relative to the creek alignment, encroachment, erosion, sedimentation and drift accumulation have further exacerbated the problems in some cases.

### The Bridges in the Program



Canyon Road Bridge over  
San Anselmo Creek  
(Bridge No. 27C-0146)



Spruce Road Bridge over  
Fairfax Creek  
(Bridge No. 27C-0141)



Marin Road Bridge over  
Fairfax Creek  
(Bridge No. 27C-0143)

The BPMP is a narrowly defined program, the guidelines of which Caltrans insists on following closely. It has a limited scope of preventive repairs that are approved by Caltrans, separated from what the state considers "routine maintenance." It is implemented under the auspices of the federal Highway Bridge program (HBP), a vast program that provides for local government agency bridge needs such as replacement, seismic retrofit, bridge scour countermeasure, bridge rail and steel bridge paint, in addition to preventive maintenance. BPMP does not cover issues that are addressed by other federal programs noted. The program implementation requires that the local agencies pay 11.47% of the cost of design and construction while the remaining 88.53% is funded by HBP. Since it is a federally funded program, design and construction must adhere to the requirements of National Environmental Protection Act (NEPA) as well as California Environmental Quality Act (CEQA).

The Town owns 11 creek crossing vehicular bridges. The three bridges in the BPMP, as well as the four other Fairfax bridges are in NBIS, qualifying to be included for federal programs as local agency vehicular bridges with a span of 20 feet or longer. These bridges are inspected biennially by Caltrans, a program which provides an excellent opportunity to address the Town's bridge preventive and routine maintenance and other needs such as rehabilitation, seismic retrofit and replacement. The repairs needed include abutment wall repairs, reinforcement cleaning and spalls patching, wingwall stabilization, deck overlays and joint seal repairs. Bridge approach guard rail replacements at Canyon and Spruce and new Narrow Bridge signage at Canyon, none of which is covered by the program, are also needed.

The County Flood Control District has begun an extensive program of improvements to elevate flood protection in Ross Valley Watershed to the 100-year flow events. All of the bridges in the Town's inventory deal with the County's program in some form, although only one bridge in the current BPMP, Spruce Road

Bridge, will ultimately need to be replaced. Spruce Road Bridge will be up for replacement because of its inadequate opening to convey 100-year design flood waters. The bridge is not currently eligible for replacement through federal funds. In the meantime, while priorities are being sorted out, the current maintenance regiment will address the immediate issues and prevents them from getting worse until the bridge is replaced.

All three bridges in the Town's inventory were visited in November 2013 by staff members from CIC and the project geomorphologist, geotechnical engineer and two environmental scientists. Additional visits were conducted again to further inventory the needed preventive maintenance repairs. Because of the project funding structure implemented by Caltrans, this report takes the project through this Assessment Report, the first public outreach meeting for the project and a Field Review meeting with Caltrans District 4 staff, scheduled after the outreach meeting in early February 2014, setting the tone for the program's environmental studies. The next phase of the project, once approved by Caltrans, will include environmental studies, final design, bidding and construction.

This report defines the scope of the preventive repairs and estimates of construction costs at this conceptual phase and does not get into detailed design, which will be the scope of the next phase of the project. During the next phase, NEPA and CEQA studies, including cultural and archeological resources studies, and possibly hydraulic evaluations to support the final design will be necessary, especially if work in the creek is involved. The investigations have defined the preventive maintenance needs of the bridges and have set the stage for the environmental studies for, and the design of, the fixes. The fixes shown in this report are conceptual and have been developed to chart the environmental course of the project and to make it possible to estimate the cost of the repairs. Public outreach has been scheduled for both the current and design phases. This report will be posted on the web site created for this Fairfax bridge program.

With these efforts, the budgetary requirements of the project's design and construction phases have been determined for new funding applications to be submitted to Caltrans. After this report, future work on the project will be placed on hold until the request for the additional funds are approved by the State. This report will also show the design and environmental steps needed to be taken in the PE Phase 2 of the project. The Town's share of the construction cost for each bridge in this report had been identified.

Field observations and recommendations have been discussed in the following sections exclusively for each bridge. Repair concepts, costs of the preventive maintenance repairs for the Construction (CON) phase for all bridges have been presented. The Town's share of the budget for these remedial measures is also listed. A schedule of design and construction improvements has also been presented at the end of this report.

There are no plans available for the two older structures in the program, the bridges at Marin Road and Spruce. The superstructure for Canyon Road Bridge was replaced in 1998 and has a set of construction documents on file in the Town's Public Works Department. These plans, as well as the latest Caltrans Bridge Inspection Reports (BIRs) for the three bridges, are attached in the appendix to this report. New "as-built" Bridge General Plans for these bridges have been prepared and presented within the report section for each bridge, following bridge photos.

In the photos on the following page a set of bridge component names frequently used in this report have been shown and identified for the reader's benefit and familiarity.



Few Bridge Topside Components



Some of Bridge Substructure Components

# Canyon Road Bridge over San Anselmo Creek (Bridge No. 27C-0146)

### Photos of Canyon Road Bridge



Figure 1- North entrance to the bridge



Figure 2 – South entrance to the bridge



Figure 3 – Fish ladder running under the bridge



Figure 4 – Immediately downstream of fish ladder



Figure 5 – Utility pipe hung from bridge soffit



Figure 6 – North abutment face

Photos of Canyon Road Bridge



Figure 7 – Stacked concrete bags acting as wing wall



Figure 8 – South abutment looking downstream



Figure 9 - Close up of south abutment face



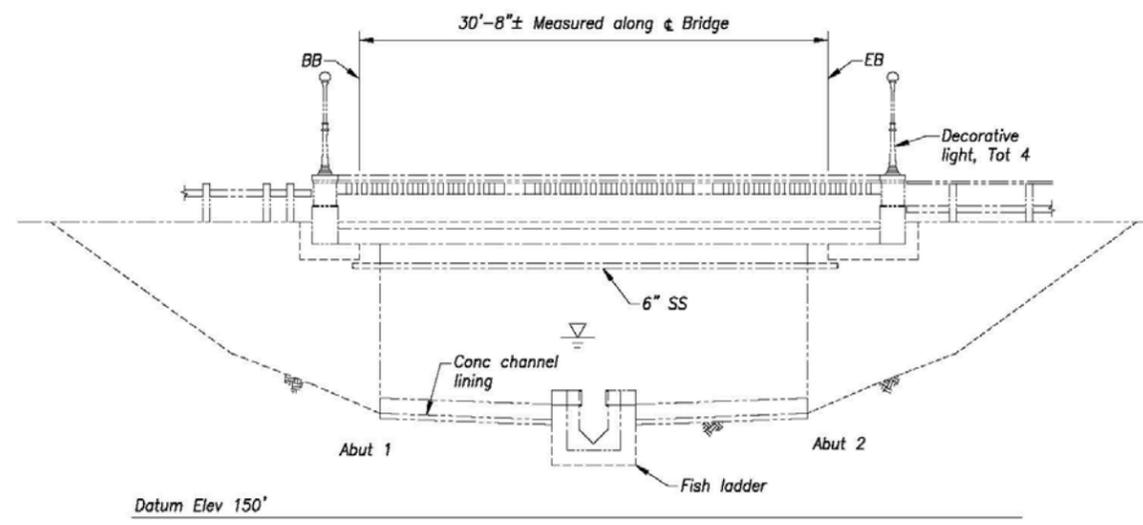
Figure 10 – Flow-induced concrete erosion at north abutment



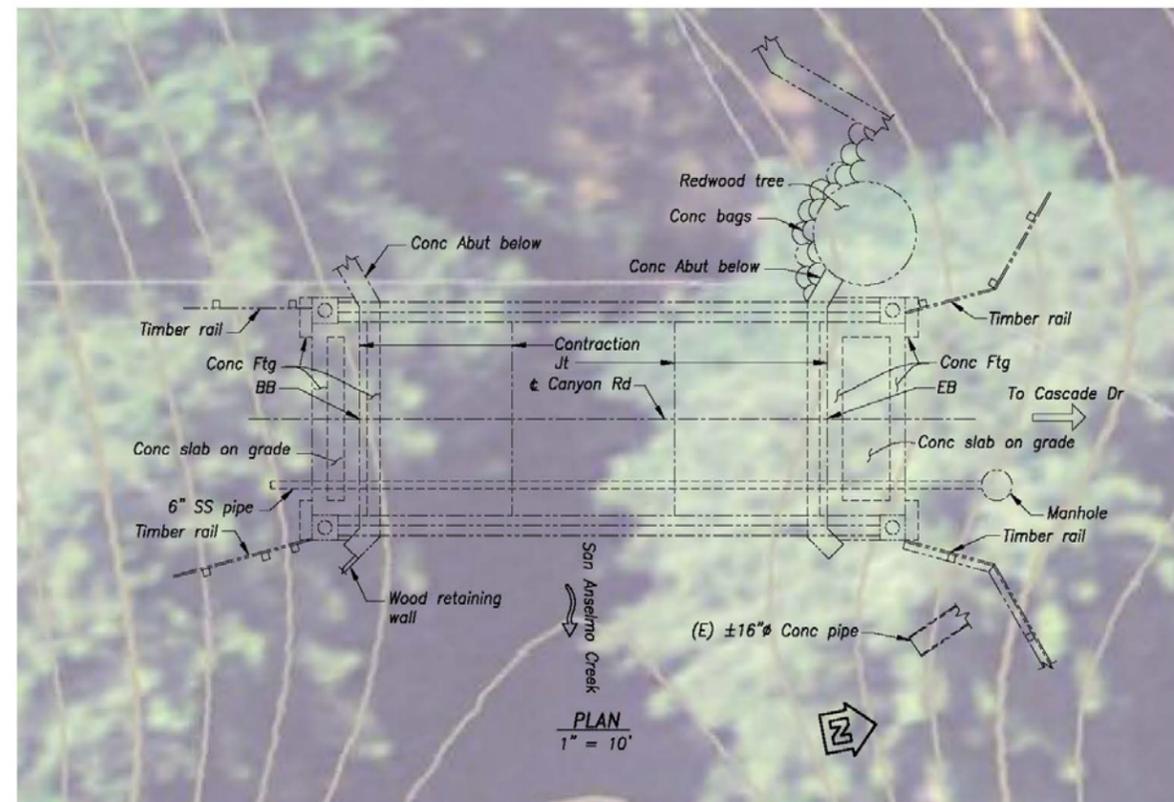
Figure 11- Substandard right approach guard rail at n. abutment



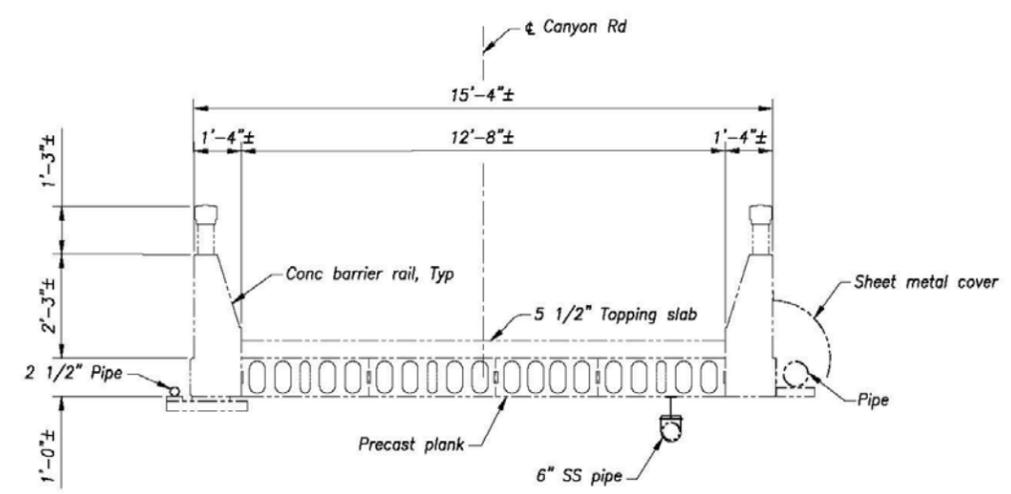
Figure 12 – Substandard right approach guard rail at n. abutment. Note the large redwood tree in the back.



**ELEVATION**  
1" = 10'



**PLAN**  
1" = 10'



**TYPICAL SECTION**  
1/4" = 1'-0"

**Note:** Bridge As-built drawings shown are approximate re-creations of existing configurations.

- LEGEND**
- Indicates Existing Structure
  - Indicates direction of travel
  - ↷ Indicates direction of flow

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CANYON ROAD BPMP  
 AS-BUILT GENERAL PLAN

## Canyon Road Bridge Description and BPMP

This single span concrete bridge was originally constructed during the first few decades of the 20<sup>th</sup> century. No as-built plans are available from this construction. In 1998 the superstructure was removed and replaced with precast, prestressed slabs topped with a 5.5" cast-in-place concrete course. As-built plans for this deck replacement are available and they are, in fact, the only two record drawings in existence for the forty or so original vehicular bridges in the watershed. The bridge is nearly 33 feet long and 15 feet wide, and carries one lane of traffic. The road surface is about 12 feet above the channel. Canyon Road is functionally classified as a Local Road. This bridge is not eligible for listing in the NRHP. An as-built Bridge General Plan has been prepared as part of this project and included on the previous page in this report.

The Creek bank slopes up- and downstream of the structure are variable and a low-flow channel and modest terracing is apparent. The bank slopes exhibit an average inclination of about 1:1 (horizontal to vertical) with locally steeper areas, and are vegetated with scattered mature trees, grasses and ivy. Bedrock is not exposed in the creek channel in the immediate vicinity of the bridge but it is apparent in a very steep eroded slope approximately 100 yards downstream. Grouted rip-rap and a few gabion baskets are located at the downstream end of the concreted channel bottom as noted above. A Denil-type fish ladder structure (originally developed by a Belgian scientist in 1909) was installed in the 1970s or 1980s by a fishery conservation organization. The ladder does not function optimally for fish passage according to current passage suitability criteria (Ross Taylor and Associates, 2006). The concrete invert under the bridge from the fish ladder extends a few feet upstream and approximately 50 feet downstream where it transitions to rock rip rap and other armoring. Since the creek bed is concrete lined for the fish ladder, scour at the bridge is not an issue and the bridge was not deemed necessary for inspection as part of the 2010 Caltrans/FHWA Scour Plan of Action Program. However, undermining of the apron downstream from the bridge does threaten the local stability of this invert apron (but not the bridge). Please see photos 3 and 4 on page 7.

The opening is generally larger for flood conveyance than bridges spanning San Anselmo creek downstream. The 1978 FEMA Flood Insurance Study estimated that the 500-year flood peak water surface elevation would not rise to within 4.5 feet from the ceiling of the bridge opening. BPMP measures may cause minor reductions in the culvert barrel flow capacity without requiring mitigation.

Canyon Road Bridge has a Sufficiency Rating of 72.8 (out of 100). This number represents a weighted evaluation of several bridge attributes through a formula devised by the Federal Highway Administration (FHWA). This algorithm is used by Caltrans after each of its biennial inspection of each bridge in the National Bridge Inventory (NBI). Every two years the results are published by Caltrans in a Bridge Inspection Report (BIR), which is shared by the local agency, in this case the Town of Fairfax Public Works Department. (The latest of these BIRs, from 2010, is included in the appendix.). The bridge is labeled as Functionally Obsolete (FO) in the BIR for having a one-lane deck and being not quite to the FHWA standards for width. The FO label is inconsequential since the deck was deliberately built narrow for a one-lane, 12 feet wide crossing. The bridge is hydraulically adequate and not on the County Flood Control list for any work. The bridge is not eligible to be in the National Register of Historic Places (NRHP).

On the upstream side of the northern abutment, growth of a very large redwood tree has bulged out a short section of a sacked concrete slope armoring that also serves as the bridge wingwall. Additional tree growth or water flow in the channel could potentially topple this armoring, which could then result in significant scour risks to the upstream side of the northern abutment. On the downstream side of the northern abutment, an 18-inch RCP storm drain discharges into the channel and a five foot long, eight foot high area of creek bank immediately adjacent to the bridge is eroding and threatening the bridge. The erosive flow forces have also abraded the concrete face of the north abutment.

In addition to the issues of the above substructure elements, the bridge deck concrete has developed extensive visible transverse cracks. These cracks, if not repaired and properly sealed, could lead to further deterioration and damage.



Looking at north abutment of the bridge – Sacked concrete wingwall is on the left and partial wingwall and 18” RCP on the right. Note the erosion of the abutment concrete facing due to abrasive creek flow.

Because of the necessity of working in the creek, NEPA/CEQA environmental studies and permits will be needed. From a cultural and archeological resources point of view, the repairs are hoped to be a screened undertaking (an exempt project). CIC’s cultural historian subconsulting firm, JRP Historical, has discussed these types of projects with the Caltrans District 4 Cultural Resources staff recently, receiving recommendations that a Historic Property Survey Report (HPSR) with a detailed project description be prepared to determine whether or not the project will be a screened undertaking. This will take place during the design phase of the project (Phase 2). The preliminary BPMP work is summarized as:

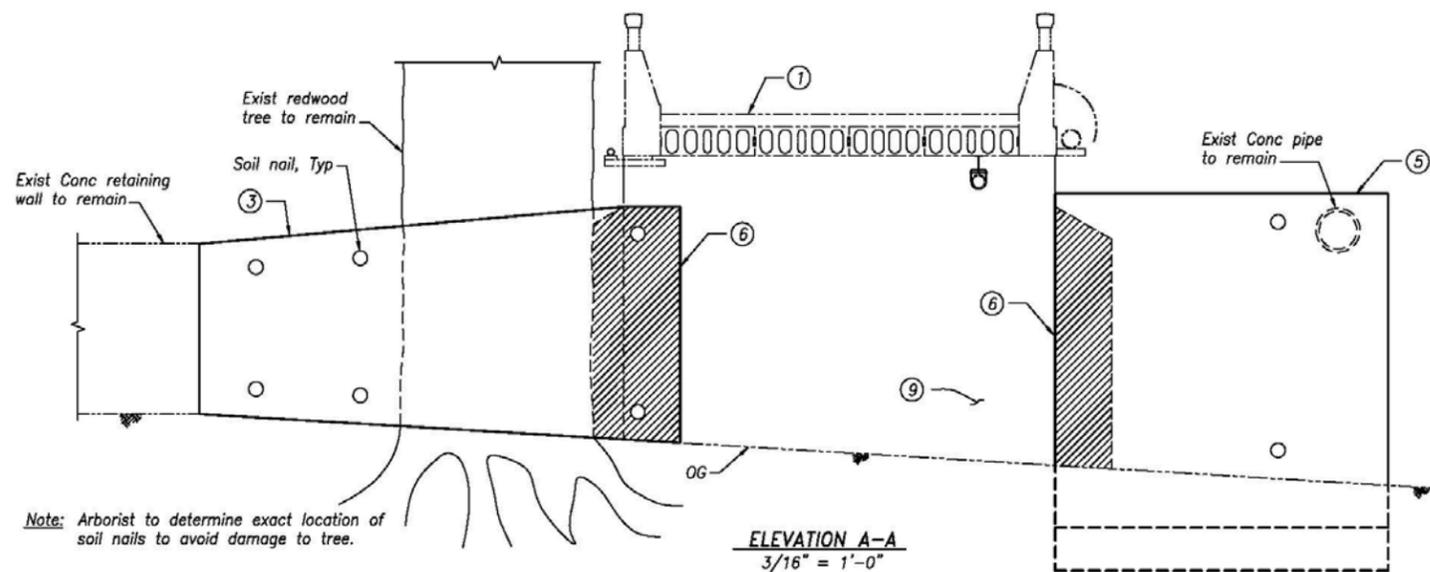
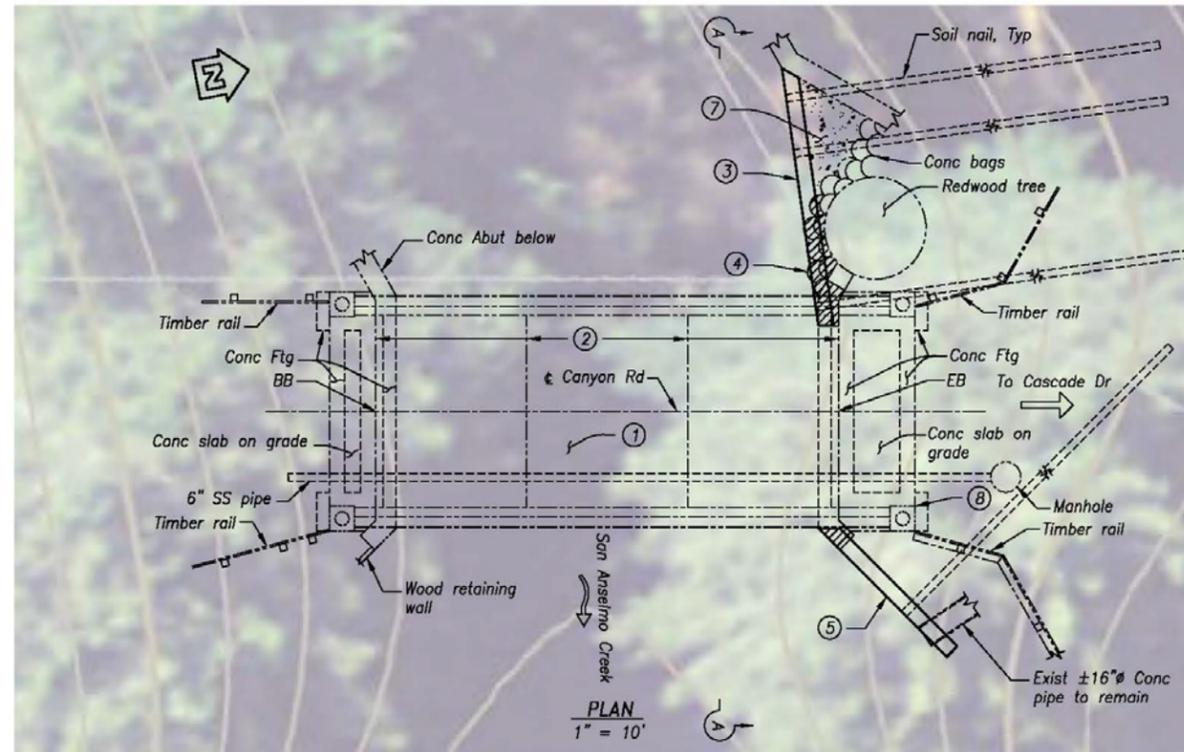
- Cleaning entire deck surface and applying methacrylate to seal the longitudinal and transverse deck cracks. Methacrylate is a colorless organic compound applied with a plastic broom uniformly over the bridge deck allowing the compound to penetrate and seal the cracks. The compound is toxic and a skin irritant, requiring the presence of an industrial hygienist at the project site during construction and the wearing of protective clothing by the workers.

- Removal of a portion of the north abutment wingwall, both downstream and upstream, to construct new concrete walls with soil nails. For the upstream concrete wall, removal of the existing concrete bags and backfilling with rock and soil is required to contain the redwood tree. A team arborist will be rendering professional opinions as to the proper approach to working around this tree.
- Repair the concrete surface at left abutment (looking downstream) by applying a 4"-thick layer of air-blown concrete (or shotcrete).
- Repair minor superstructure spall located at the northeast rail post.

The above improvements are shown on the Bridge Plan and Elevation attached and expected to take approximately three weeks to complete during construction. Two additional items concerning safety should be discussed here. The approach guard railings at each end of the bridge are made of light wooden beams. This is substandard and hazardous even considering the low auto speeds crossings the bridge. CIC recommends replacing the unsafe timber approach rails with standard crashworthy metal beam guard rails. The metal rails may be made of the Corten steel if the residents find the shiny galvanized look unsuitable for the natural bridge setting. This type of steel develops a controlled protective cover of rust on itself, which the residents may find to complement the natural surroundings better. Posting of two Narrow Bridge signs near the north and south approaches to the bridge will also be a good precautionary measure. The construction cost estimate for these items is \$4,500. This cost not covered by BPMP and Caltrans/FHWA considers it "non-participating," but it's a relatively small cost and will be a wise investment in bridge safety by the Town of Fairfax.

The project's construction costs estimate, including a 25% contingency but not including 15% for construction engineering (CE), is presented below:

	Total Construction Cost Estimate	Town's Share	State Share	Federal Share
HBP Participating	\$180,000	\$20,646	\$0	\$159,354
HBP Non-Participating	\$4,500	\$4,500	\$0	\$0
Total	\$184,500	\$25,146	\$0	\$159,354



**NOTES**

- ① Clean deck and seal entire surface with methacrylate
- ② Repair and replace joint seals
- ③ New Conc wall with soil nails
- ④ Remove Exist Conc bags as required to construct new wall
- ⑤ New "L" shaped Conc wall with soil nails
- ⑥ Remove partial Exist Conc wingwall/Abut for new wall
- ⑦ Rock and soil backfill
- ⑧ Repair spall at rail post
- ⑨ Repair concrete surface at abutment

**LEGEND**

- Indicates Existing Structure
- Indicates New Structure
- Indicates direction of travel
- ⇨ Indicates direction of flow
- ▨ Denotes limits of Conc removal

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<b>CANYON ROAD BPMP</b>	.
<b>REPAIR DETAILS</b>	SHEET
	.
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## **Spruce Road Bridge over Fairfax Creek (Bridge No. 27C-0141)**

Photos of Spruce Road Bridge



Figure 1 – North approach to the bridge



Figure 1 – Looking west at the bridge deck level



Figure 2 – Inspecting for bridge scour in 2010



Figure 3 – Storm drain daylighting through abutment



Figure 4 – Utility pipes tucked under the bridge



Figure 5 – Relatively small flow opening thru the bridge

Photos of Spruce Road Bridge



Figure 7 – Abutment concrete erosion due to flows



Figure 8 – Presence of bedrock under the bridge



Figure 6 – Environmental sign at the bridge



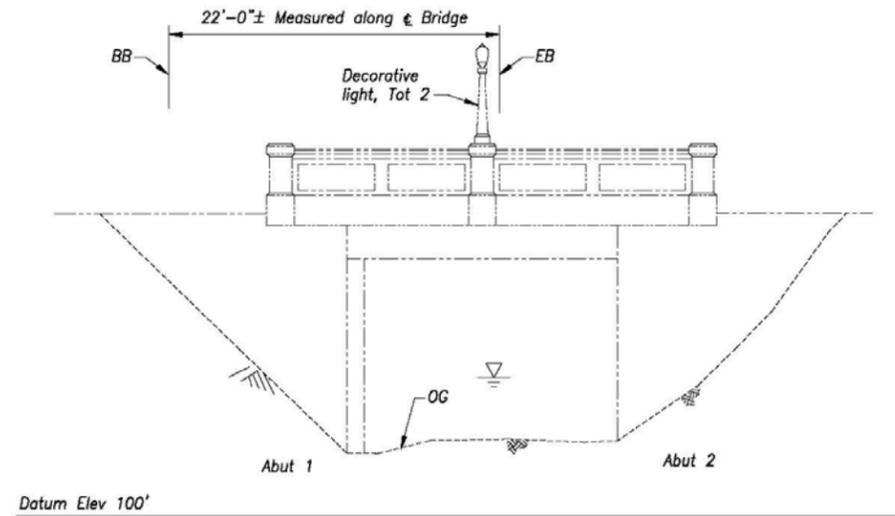
Figure 10 – Environmental exhibition at the bridge



Figure 11 – Pavement cracks at the south end of bridge



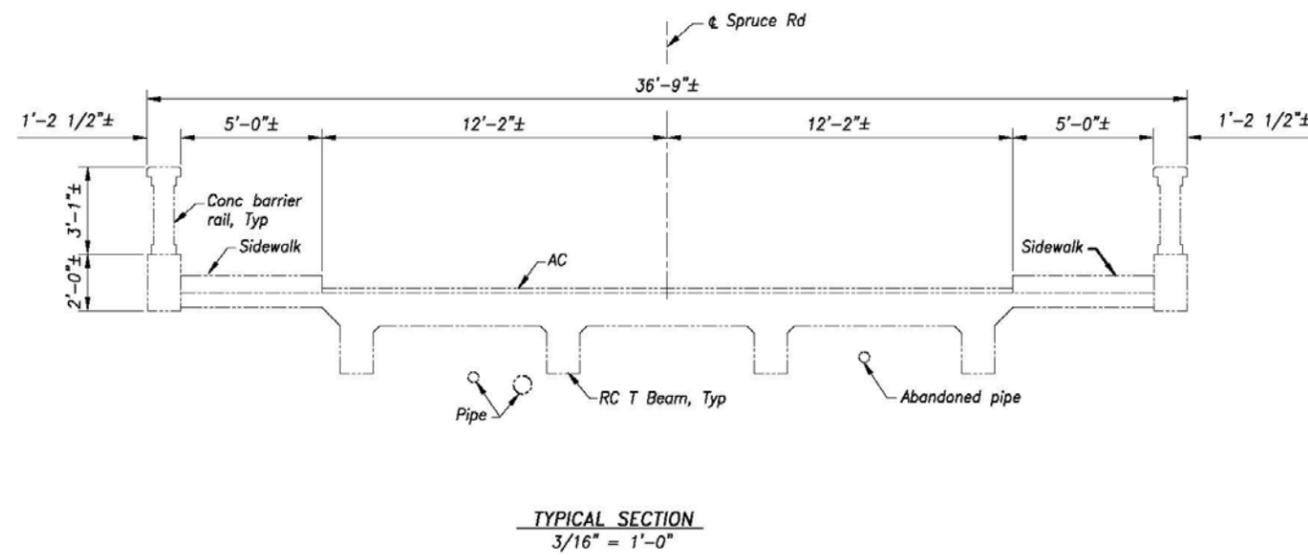
Figure 12 - Pavement cracks at the north end of bridge



**ELEVATION**  
1" = 10'



**PLAN**  
1" = 10'



**TYPICAL SECTION**  
3/16" = 1'-0"

**Note:** Bridge As-built drawings shown are approximate re-creations of existing configurations.

**LEGEND**

- Indicates Existing Structure
- Indicates direction of travel
- ↻ Indicates direction of flow

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SPRUCE ROAD BPMP  
**AS-BUILT GENERAL PLAN**

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## Spruce Road Bridge Description and BPMP

This single span, reinforced concrete T-beam bridge was reportedly constructed circa 1930. The structure is approximately 22 feet long and 37 feet wide. It carries two lanes of traffic and a sidewalk on each side of the bridge. The road surface is about 15 feet above the channel bottom. The only documentation available on the bridge is the collection of Biennial Caltrans Bridge Inspection Reports. Spruce Road is functionally classified as a Local Road. The Spruce Road Bridge has a Sufficiency Rating (SR) of 53.9 and is not classified as FO or SD (Structurally Deficient). This bridge is not eligible for listing in the NRHP. An as-built Bridge General Plan has been prepared as part of this project and included on the previous page in this report.

The site has been visited by the project staff several times since 2007, most notably in August 2010 for Bridge Scour Plan of Action (POA) program, and in the recent months to reassess the structure's needs. Up- and downstream of the structure, natural creek banks include slopes of 1:1 (horizontal to vertical) and somewhat steeper locally near the bridge. Bedrock exposures were observed in the project area in the channel bottom and creek banks upstream and downstream of the bridge and on the bed along the left abutment of the bridge. Sands and gravels cover other areas of the channel, but their depth is likely shallow. Small exposed footing areas, observed in 2010, appear to have been mostly covered up by traveling sediments. Scour Plan of Action of 2010 stated, with the relatively short span (lower loads), shallow rock and lack of current erosion, no mitigation measures were deemed necessary at this time. Additionally, the report stated the low risks at the site may be such that detailed monitoring could be performed on a less frequent basis (perhaps every three or five years) for more efficient use of available funding.

The right bank downstream from the bridge is straight and aligned parallel with the bridge abutment wall, appearing to be constructed from fill for residential property development. There are no bank stabilization structures – chronic surface erosion and periodic slump failures leave it in near vertical condition, incompletely fortified by riparian tree roots. The 84-ft-long section of the right bank beginning immediately downstream from the Spruce Road Bridge outlet was mapped as a severe, ongoing bank erosion site recommended for repair action by the 2006 geomorphic assessment (Smeltzer and Orum, 2006). This condition, not having a pre-existing retaining system to repair maybe hard to justify to Caltrans for BPMP participation, but the team will discuss this issue with Caltrans during the upcoming February 2014 Field Review visits with the State staff.

Hydraulically, the Spruce Road Bridge openings appear generally larger for flood conveyance than bridges spanning Fairfax Creek upstream and downstream. However, it is not large enough to convey the expected flood flows from the Fairfax Creek watershed. The 1978 FEMA Flood Insurance Study estimated that the bridge deck would be overtopped by the then estimated 500-year flood. The December 31, 2005 flood, believed to be a 100-year event, also produced water surface elevations which overtopped the sloping bridge opening by as much 0.5-1.0 foot at river right, but did not overtop the opening at river left. Based on the information from the Marin County Flood Control's web site, the bridge will ultimately need to be replaced, but it is not a priority bridge replacement candidate since it's far upstream in the watershed and can wait until downstream flood improvements have been completed. Bridge replacement will also eliminate the low-risk scour potential.

Structurally, the issue qualifying the bridge for preventive maintenance is deck cracks. The topside of the deck is covered by asphalt concrete (AC) covering the cracks. However, the underside of the deck, observable from the creek, shows efflorescence, or the concrete chemicals having leached out of the cracks in the concrete. This condition has been also noted in the Caltrans Bridge Inspection Reports. Since the creek will not be disturbed by the work on this bridge, environmental permits will not be needed. From a

cultural resources point of view, the project is anticipated to be a screened undertaking (an exempt project), to be determined during the design phase. The preventive maintenance will provided an extended life for the bridge until it is replaced for better flood conveyance.



An example of efflorescence in the soffit through cracks in Spruce Road Bridge deck



Cracked pavement at transition from concrete deck to asphalt-paved street

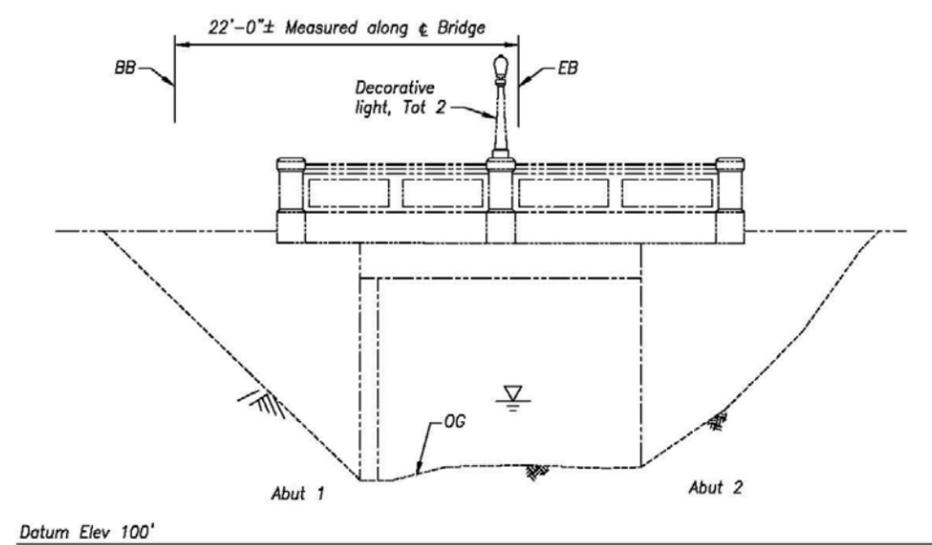
The preliminary BPMP work is summarized as:

- Removal of the 2"-thick AC and placement of 1"-thick polyester concrete to seal the deck and provide a riding surface that will butt up with AC outside the bridge. The AC at the approach to the deck will be partially removed and redone to match the new bridge deck grades since the polyester concrete is 1" thinner.
- The expansion joint between the deck and AC approach roadway will be repaired using Caltrans standard Type A seal.
- Removal of the abandoned exterior utility pipe under the bridge.

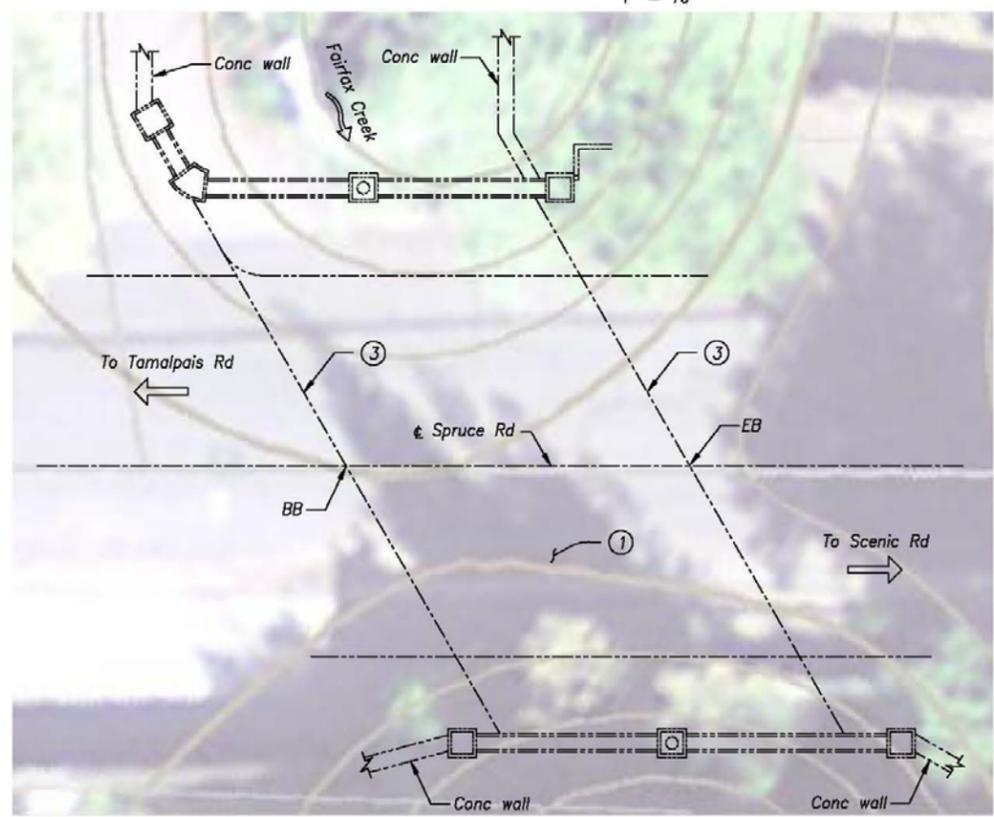
Installation of metal beam guard rail, similar to that described for Canyon Road Bridge, but only in one bridge quadrant will be prudent. The above improvements are shown on the Bridge Plan and Elevation attached and expected to take approximately two weeks to complete during construction. The project's construction

costs estimate, including a 25% contingency, but not including 15% for construction engineering (CE), is presented on the following page.

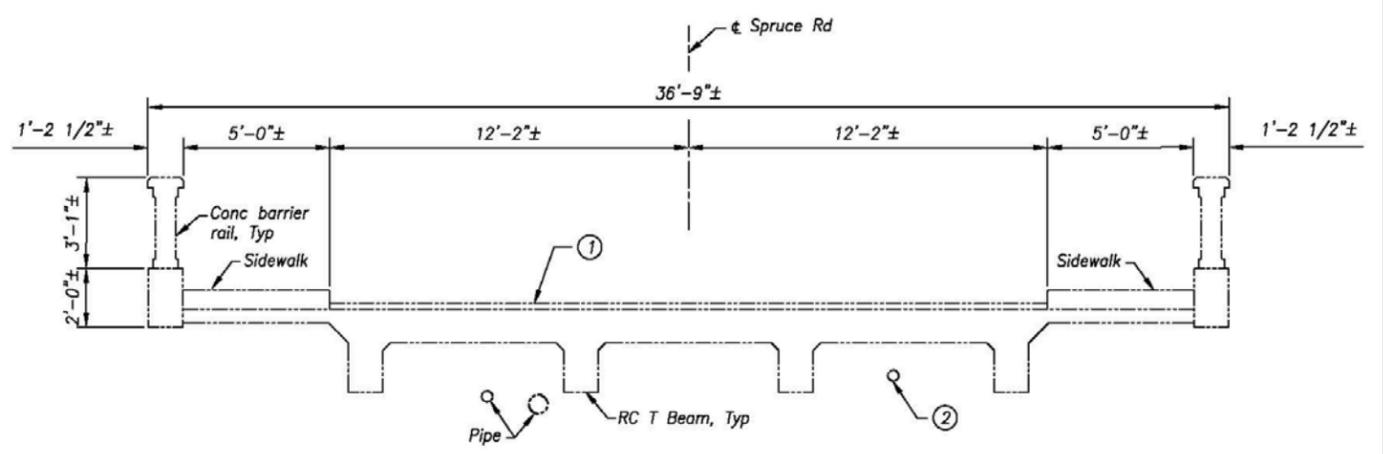
	Total Construction Cost Estimate	Town's Share	State Share	Federal Share
HBP Participating	\$90,000	\$10,323	\$0	\$79,677
HBP Non-Participating	\$1,000	\$1,000	\$0	\$0
Total	\$91,000	\$11,323	\$0	\$79,677



**ELEVATION**  
1" = 10'



**PLAN**  
1" = 10'



**TYPICAL SECTION**  
3/16" = 1'-0"

**NOTES**

- ① Remove AC and seal deck with polyester concrete
- ② Remove abandoned pipe
- ③ Place joint seal Type A

**LEGEND**

- Indicates Existing Structure
- Indicates direction of travel
- ↻ Indicates direction of flow

**Note:** Bridge As-built drawings shown are approximate re-creations of existing configurations.

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**TOWN OF FAIRFAX**  
142 BOLINAS ROAD,  
FAIRFAX, CA 94930

**SPRUCE ROAD BPMP**  
**REPAIR DETAILS**

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## Marin Road Bridge over Fairfax Creek (Bridge No. 27C-0143)

Photos of Marin Road Bridge



Figure 1 – Looking west at the street level



Figure 7 – Looking south at west side of bridge and the adjacent pedestrian bridge



Figure 3 – Looking south at street level



Figure 4 – Close up of specification of the adjacent pedestrian bridge



Figure 5 – Plaque on the bridge rail



Figure 6 – Looking north at the pedestrian bridge

**Photos of Marin Road Bridge**



Figure 7 - Looking north at toppled wing wall



Figure 8 – Spall at southeast arch base



Figure 9 - Looking northwest at toppled wing wall



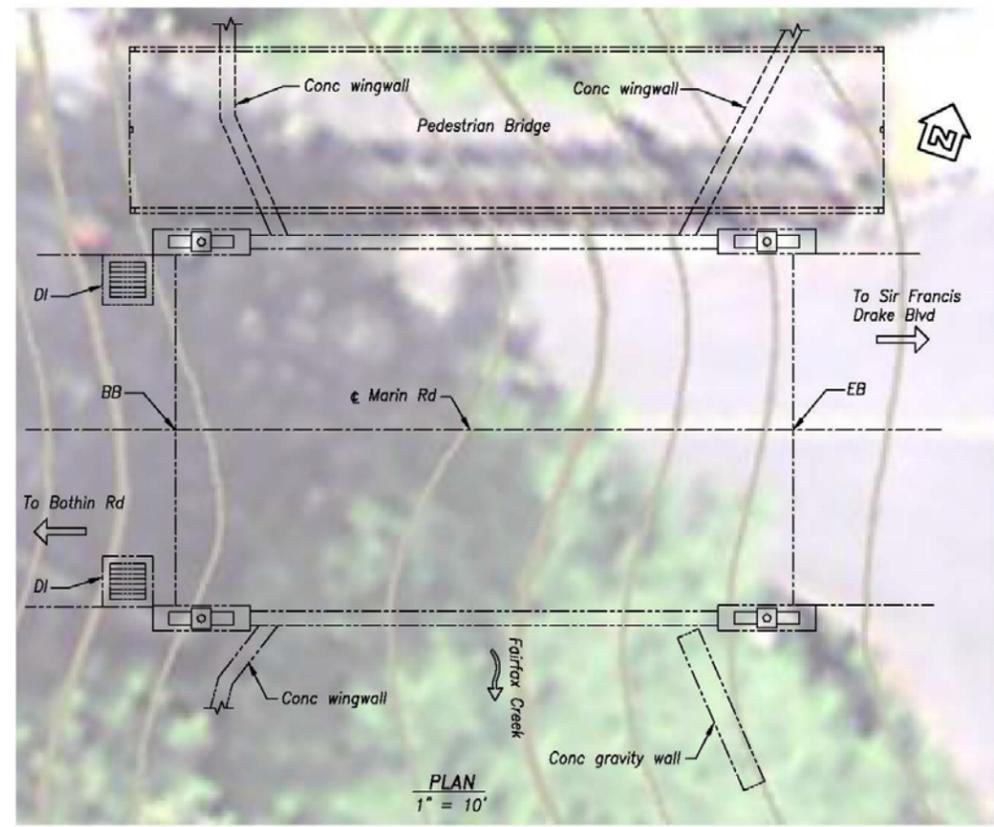
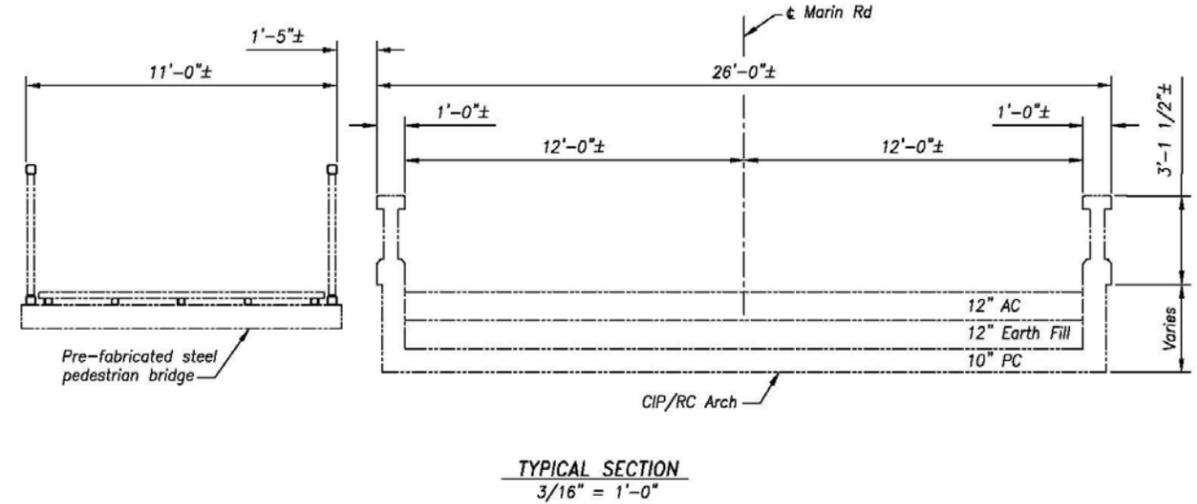
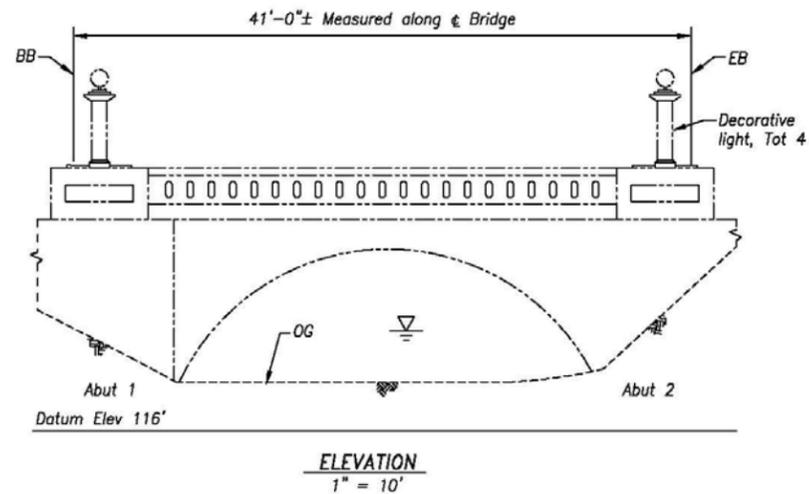
Figure 10– South base of the arch barrel



Figure 11 – Looking west at the bridge (upstream)



Figure 12 – Underside of the pedestrian bridge



**Note:** Bridge As-built drawings shown are approximate re-creations of existing configurations.

- LEGEND**
- Indicates Existing Structure
  - Indicates direction of travel
  - ↪ Indicates direction of flow

NO.	REVISIONS	BY	DATE	DESIGN BY :
△				DRAWN BY :
△				CHECKED BY :
△				SCALE : AS NOTED
△				DATE :
△				BRIDGE NO. :
△				PROJ NO. :



<b>MARIN ROAD BPMP</b>		.
<b>AS-BUILT GENERAL PLAN</b>		SHEET
		.
		OF
		.

## Marin Road Bridge Description and BPMP

This single span reinforced concrete arch bridge was reportedly constructed circa 1930 and carries two narrow traffic lanes with no sidewalks or shoulders. The structure is approximately 41 feet long by 26 feet wide. Height from the bridge deck to channel bottom is about 11 feet. Other than the Biennial Bridge Inspection Reports, there are no structural documents available for the bridge. Marin Road is functionally classified as a Local Road. The bridge has a sufficiency of 58.8 and is not classified as FO or SD. This bridge is not eligible for listing in the NRHP. An as-built Bridge General Plan has been prepared as part of this project and included on the previous page in this report.

This bridge was not part of the 2010 Scour Plan of Action Program by Caltrans and was therefore not



Headwall

Cracked northwest bridge wingwall, upstream

inspected for scour. However, some scour or undermining of the wall structures at the inlet and outlet of the bridge have been observed in the 2013 and previous visits. The bridge does not have formal integrated wingwalls, but concrete walls have been added at the right side of the inlet and the left side of the outlet. Both of the wingwalls appear to lack adequate foundations, drainage backfill, and structural connection to the bridge structure. Upstream from the inlet an angled concrete wall was added apparently to deflect flow from otherwise impinging directly on the bridge headwall. The angled concrete wall was apparently founded directly on the then existing creek bed and not structurally connected to either the bridge headwall or the right bank vertical concrete retaining wall it joins with. The wall is undermined several inches and cracked, as shown on the photo of the previous page.

Downstream from the bridge the left bank is aligned straight projecting out from the bridge outlet and erosion pressure is focused at the left toe of arch span at the outlet and the toe of the left bank immediately downstream. A near-vertical concrete wall was added to protect the bank from undermining and erosion pressure. However, the wall is presently severely undermined and rotated out of position.



Toppled Wingwall at southeast corner, downstream

The channel and creek banks downstream of the bridge include a 10 foot high by about 11 foot long concrete gravity wall at the east abutment and an 8 to 10 foot high concrete retaining wall that begins at the west

abutment and continues on downstream. The east and west creek banks, upstream of the structure, are also retained with an 8 to 10 foot high concrete retaining wall that ends at the structure. The creek bank downstream of the bridge slopes at approximately 2:1 (horizontal to vertical) and steeper in some areas and is vegetated with ivy and scattered trees.



Concrete spall at east abutment

The structure is over eighty years old and has a few major and minor deficiencies, the most significant of which is the undermined and rotated gravity wall. The BPMP work will include retrofitting the undermined and rotated gravity wall downstream and fixing the undermined and cracked wingwall upstream, as well as fixing the concrete spall at the east abutment corner exposing the reinforcement. Similar to Canyon Road Bridge, this bridge will need environmental permits and may be a screened undertaking (exempt) with regard to cultural resources. A Historic Property Survey Report (HPSR) with a comprehensive project description will be necessary for Caltrans to decide whether the project will be exempt.

In summary, the BPMP work will consist of:

1. Repair of the rotated and undermined concrete gravity wall by removing a portion near the structure, extending it flush with and doweling it to the structure, and reinforcing it with a 4 inch gunite wall. The wall will be further stabilized with soil nails. The existing rock riprap around the wall needs to be augmented.
2. Repair of the undermined retaining wall by dry-packing the cracked portion with new concrete and adding a small course of rock riprap to protect it from future scours

### 3. Repair and patch spall at corners of abutments

The above improvements are shown on the Bridge Plan and Elevations attached and expected to take approximately a month to complete in construction. Based on the current BPMP, estimate of the project construction costs, not including 15% for construction engineering (CE), are presented in the following table:

Total Construction Cost Estimate	Town's Share	State Share	Federal Share
\$96,000	\$11,011	\$0	\$84,989

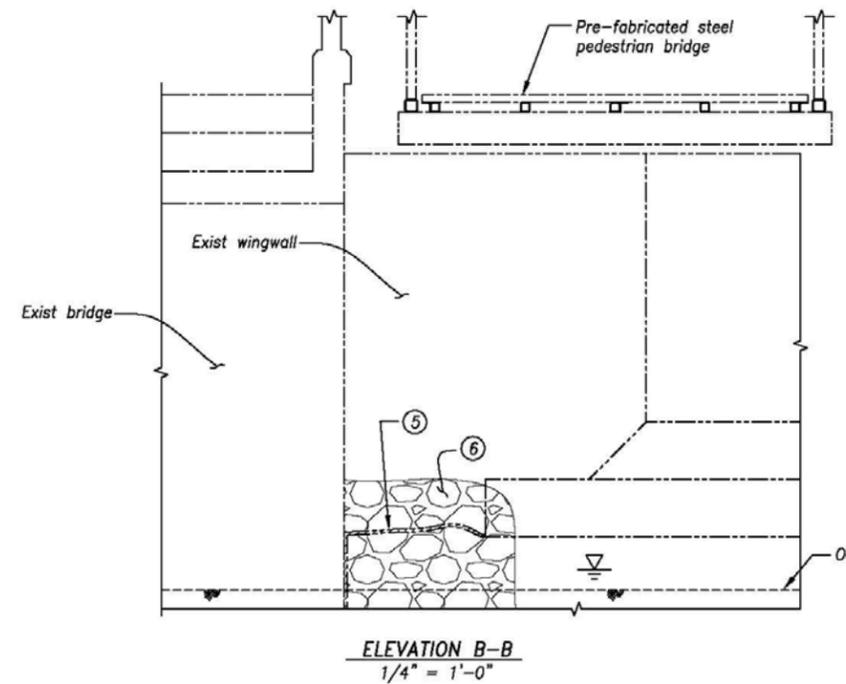
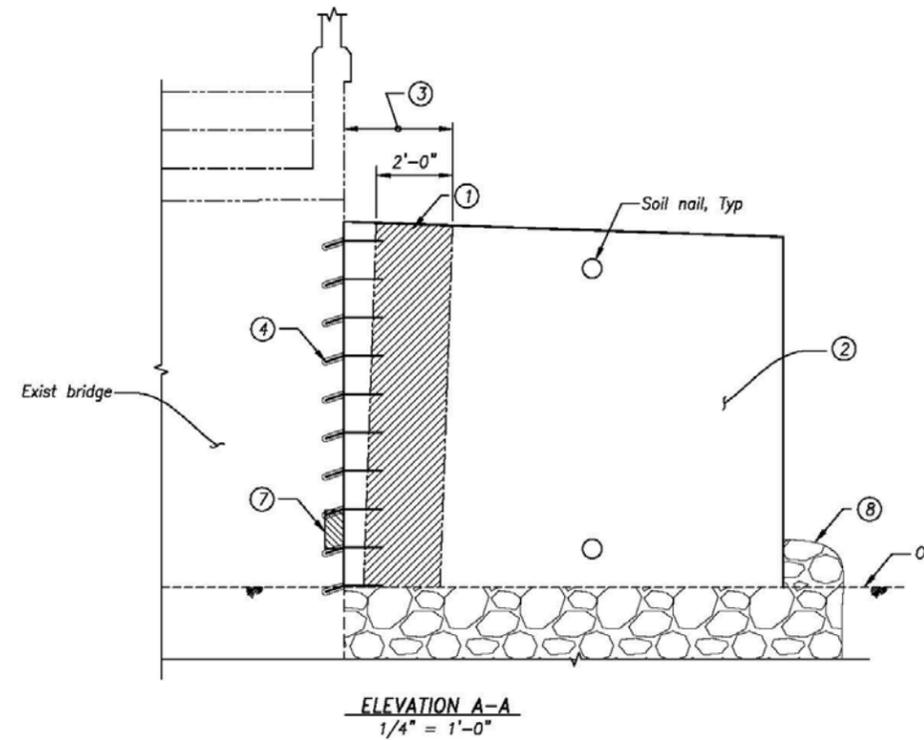
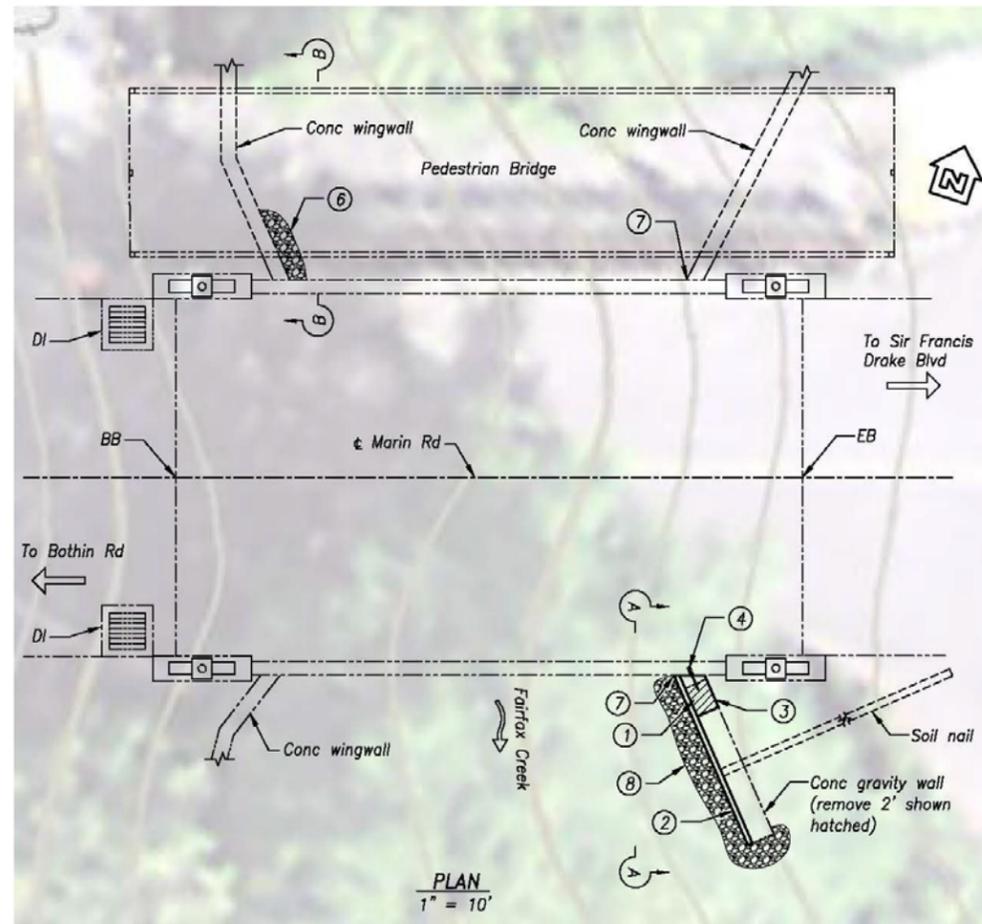
**Scour within the bridge section** –Since this bridge was not inspected for scour in 2010, a scour discussion is included here. Scour pressure within the bridge section is strongly focused at right arch toe at the inlet (photo on page 24) and left arch toe at the outlet (photo on previous page). Exposed bedrock does not occur near the site and shallow bedrock is not expected. Neither arch toe footing is exposed. Probing at depth is prevented by coarse gravel materials present. Short-term scour depth during floods appears may

be limited by the coarseness of materials. Instantaneous maximum depth of short term scour is focused at the two arch toe locations described above and probably does not exceed about 2.5 feet. Although the rate of Fairfax Creek channel bed incision has slowed in recent decades (Stetson Engineers 2000), there remains potential for additional long-term bed elevation degradation at the site. It is reasonable to expect as much as about 1 vertical foot of long-term channel bed elevation decline within the engineering lifespan of new structural components at the site. Therefore, a total of 3.5 feet of short and long-term scour is anticipated.

Scour remediation is not part of BPMP and has its own separate program, under HBP, for scour countermeasure programming and funding. CIC-MGE team recommends that the Town of Fairfax request a new look by Caltrans Division of Structures Maintenance at the scour situation at the bridge, change the scour rating of the bridge to “scour-critical” and authorize its fix after a funding application has been made possible by these changes in the Bridge Inspection Report (BIR).

**Flood conveyance capacity** - The single Marin Road Bridge opening is a natural-bottom arch span rising approximately 8 feet above the bed and spanning about 26 feet wide toe-to-toe. The opening is generally larger for flood conveyance than bridges spanning Fairfax Creek downstream. The 1978 FEMA Flood Insurance Study estimated that the 100-year flood peak water surface elevation would rise to the same elevation as the flow line of the culvert structure at the inlet and the bridge headwall would not be overtopped for the 500-year flood. The 2006 geomorphic assessment (Smeltzer and Orum, 2006) did not identify December 31, 2005 flood high water marks upstream from the bridge to determine if the flood waters rose above the culvert barrel ceiling at the inlet, but in general, the December 31, 2005 flood water surface elevations exceeded FEMA’s 1978 100-year flood elevation profile. Therefore, it is reasonable to expect that the 100-year flood, under existing conditions, would rise above the culvert soffit, and any reductions in the culvert barrel flow capacity caused by BPMP measures would yet cause a small rise in the water surface elevation upstream from the bridge.

The bridge is not on the County Flood Control list, but it appears to be of marginal flood capacity. It follows that any structural measures for bridge maintenance will be configured to avoid reducing the conveyance capacity of the bridge opening. If necessary, to offset potential flood flow capacity reduction of the wall improvement measures listed above, remove large rocks (exceeding 3 inches in diameter) from within the culvert barrel, and/or remove the alder tree approximately 10 feet downstream from the culvert outlet.



- NOTES**
- ① Remove portion of Exist Conc wall to construct new wall (shown hatched)
  - ② New 4" gunite wall
  - ③ New Conc wall
  - ④ Drill & bond dowels
  - ⑤ Crack in Exist wingwall, drypack with new Conc
  - ⑥ New small rock riprap, extend 2'-0" Min below OG or to top of Exist wingwall Ftg
  - ⑦ Repair and patch spall at abutment, Typ at bottom corners of north and south abutment
  - ⑧ Additional rock riprap, extend 2'-0" Min below OG

- LEGEND**
- Indicates existing structure
  - Indicates direction of travel
  - ↪ Indicates direction of flow
  - ▨ Denotes limits of Conc removal

NO.	REVISIONS	BY	DATE	DESIGN BY :
△				DRAWN BY :
△				CHECKED BY :
△				SCALE : AS NOTED
△				DATE :
△				BRIDGE NO. :
△				PROJ NO. :

<p>CALIFORNIA INFRASTRUCTURE CONSULTANCY 930 ALHAMBRA BLVD. SUITE 220 SACRAMENTO, CA 95818</p>	<p>TOWN OF FAIRFAX 142 BOLINAS ROAD. FAIRFAX, CA 94930</p>	MARIN ROAD BPMP	.
		REPAIR DETIALS	SHEET
			.
			OF
			.

## Design & Environmental (PE Phase 1b) and Construction Phases of the Project

## The Design and Construction Phases of the Project

The following table depicts a summary of the various remedial actions needed to be taken for each of the three bridges in the Town of Fairfax BPMP:

Bridge Name Creek Name Bridge No. Year Constructed	PREVENTIVE MAINTENANCE ITEMS FOR FAIRFAX BRIDGES						
	Treat Bridge Deck	Repair Cracks & Spalls	Repair Existing Wingwalls	Remove Unused Utility pipes	Optional Actions		
					Install Narrow Bridge Signs	Install Bridge Approach Rail	Replace Bridge in Next 10-15 Years
<b>Canyon Road</b> San Anselmo Creek 27C-0146 1998	Methacrylate	Yes	Two	No	Two	Two	No
<b>Spruce Road</b> Fairfax Creek 27C-0141 Circa 1930	Polyester Concrete	Yes	None	Yes	None	One	Yes
<b>Marin Road</b> Fairfax Creek 27C-0143 Circa 1908	No	Yes	Two	No	None	None	Maybe

Because of the nature of the repairs, Spruce Road Bridge will not need environmental permits, but Canyon and Marin will require them. The following table shows the various permits needed for Canyon and Marin.

Agency	Permit Needed	Comments
US Army Corps of Engineers (USACOE)	Clean Water Act, Section 404 Permit (most likely a Nationwide Permit)	The Corps will also consult with State Historic Preservation Office, SHPO, (Section 106 consultation) and US Fish and Wildlife Service (for federally protected species), as well as National Marine Fisheries Service (for federally protected fish species, such as salmon)
Regional Water Quality Control Board (RWQCB)	Clean Water Act, Section 401 Certification or Waiver	In conjunction with US Army Corps of Engineers 404 certification.
CA Department of Fish and Game (DF&G)	Lake and Streambed Alteration Agreement	Required if the installation impacts the bed/bank of a stream or creek channel and, in some cases, if riparian vegetation is removed. They also look at state protected special status species impact.

Because of these environmental and cultural resources studies and the design tasks, the bridges will need the following professional fields of expertise during the full PE Phase (1b):

Technical Work Needed	Canyon Road	Spruce Road	Marin Road
Design Geotechnical Engineering	X		X
Right-of-Way (ROW) Research & Easements	X		X
Design Geomorphology, Hydraulics Evaluation	X	X	X
Archeological Resources Studies	X		X
Cultural Resources	X	X	X
Biological Studies	X		X
Engineering Design, Utilities Coordination, Specifications, Estimates, CAD Drafting, Project Management	X	X	X

Costs related to the above technical work to prepare a complete bid package for the Town is currently projected to be \$372,000. This cost is also shared between the Town and HBP based on the same split of 11.47% and 88.53%. This cost will be reviewed and adjusted after the Field Review meeting with Caltrans staff on February 4, 2014.

The construction cost and schedule of the improvements for each bridge are presented on the following pages. The longest work will be at Canyon, estimated to take approximately 3 calendar weeks. The bridge work can take place concurrently at all three sites, but it is safer to say that the overall schedule of work will be approximately 1 calendar month. To construct the improvements the following road closure/opening conditions will be necessary:

Bridge	Temporary Bridge Closure Requirements
Canyon Road	Keep the bridge open at all times, except close it for 4-5 hours for applying methacrylate and allowing it to dry. Park an emergency vehicle with fire departments crews on the south side of the bridge. Emergency vehicles will be able to cross the bridge even during this closure period. Do this work after 12 p.m. and publicize the dates and hours well ahead of the closure.
Spruce Road	Close the bridge for 3 days to place polyester concrete on the deck. Detour the traffic away and post signs at the project area for the detour route and publicize the dates and hours well ahead of the closure.
Marin Road	No bridge closure will be necessary.

## Construction Cost Summary

The following table summarizes the total project construction (CON) costs, as well as construction management, or Construction Engineering (CE) as Caltrans calls it. The latter is computed as 15% of the cost of construction. For HBP-participating cost elements the cost sharing formula is 88.53% federal and 11.47% Fairfax. Caltrans does not participate in BPMP cost sharing. The costs of non-participating items (metal beam guard rails and signs), if elected to install, will be entirely borne by Fairfax.

Cost Sharing Entity	Canyon Road Bridge CON + CE Costs		Spruce Road Bridge CON + CE Costs		Marin Road Bridge CON + CE Costs	Total Cost
	HBP Participating	HBP Non-Participating	HBP Participating	HBP Non-Participating	HBP Participating	
Fairfax	\$23,742	\$5,175	\$11,871	\$1,150	\$12,663	\$54,601
Federal	\$183,257	\$0	\$91,629	\$0	\$97,737	\$372,623
Subtotal	\$206,999	\$5,175	\$103,500	\$1,150	\$110,400	\$427,224
Grand Total	\$212,174		\$104,650		\$110,400	\$427,224

The total non-participating cost is \$6,325. Detailed items cost breakdowns are presented on the subsequent pages, in Appendix A, along with Critical Path Management (CPM) schedules for each bridge.

## Appendix A – Summary and Detailed Construction Cost Estimates & Schedules

**Spruce Road Bridge - 24.33' x 22.0' single-span reinforced concrete T-beam**

Item	Quantity	Unit	Unit Price	Item Cost
Remove Asphalt Concrete Surfacing	536	SF	\$15.00	\$8,040.00
Prepare Concrete Bridge Deck Surface	536	SF	\$10.00	\$5,360.00
Furnish Polyester Concrete	45	CF	\$250.00	\$11,250.00
Place Polyester Concrete	536	SF	\$20.00	\$10,720.00
Remove Pipe	18	LF	\$100.00	\$1,800.00
Traffic Control	1	LS	\$15,000.00	\$15,000.00
Grind AC Surfacing	55	SQYD	\$40.00	\$2,200.00
Hot-Mixed Asphalt	15	Ton	\$100.00	\$1,500.00
Joint Seal Type A	74	LF	\$50.00	\$3,700.00
Repair Concrete Spalls	50	SF	\$100.00	\$5,000.00
Subtotal 1				\$64,570.00
Mobilization				\$7,174.44
Subtotal 2				\$71,744.44
Contingency 25%				\$17,936.11
Grand Total Cost, not including Construction Engineering (CE)				\$89,680.55

**For HBP Participating Use: \$90,000**  
**Additional, HBP Non-Participating (Guard Rail): \$1,000**

**Spruce Road Construction Schedule**

Activity	Item	Working Days								
		1	2	3	4	5	6	7	8	9
1	Clear & Grubbing, remove abandoned pipe, Install CAS									
2	Remove AC Surfacing									
3	Repair Concrete spalls									
4	Clean / Prepare Bridge Deck									
5	Place Polyester Concrete									
6	Grind AC									
7	Place Hot-Mixed Asphalt									
8	Clean existing expansion joints and install new joint seal (Type A)									
9	Prepare punch list, conduct final walk through Conduct CT 342									

Red boxes indicate critical path

**Marin Road Bridge - 41.0' x 26.0' single-span cast-in-place/reinforced concrete arch**

Item	Quantity	Unit	Unit Price	Item Cost
Structure Excavation (Retaining Wall)	2	CY	\$ 450.00	\$ 900
Structure Backfill (Retaining Wall)	5	CY	\$ 250.00	\$ 1,250
Structural Concrete (Retaining Wall)	2	CY	\$ 500.00	\$ 1,000
Bar Reinforcing Steel (Retaining Wall)	456	LB	\$ 10.00	\$ 4,559
Shotcrete (gunite)	2	CY	\$ 1,500.00	\$ 3,000
Soil Nail	70	LF	\$ 200.00	\$ 14,000
Bridge Removal (Portion)	1	LS	\$ 2,500.00	\$ 2,500
Dry-pack Existing Wingwall Crack and Place Riprap	1	LS	\$ 3,500.00	\$ 3,500
Drill & bond dowel	6	LF	\$ 100.00	\$ 600
Additional Rock Riprap	10	CY	\$ 800.00	\$ 8,000
Repair Spalled Surface area	20	SF	\$ 250.00	\$ 5,000
Water Diversion	1	LS	\$ 10,000.00	\$ 10,000
Vegetation Restoration	1	LS	\$ 5,000.00	\$ 5,000
Biological Monitoring	1	LS	\$ 10,000.00	\$ 10,000
Subtotal 1				\$ 69,309
Mobilization				\$ 7,701
Subtotal 2				\$ 77,010
Contingency 25%				\$ 19,253
Grand Total Cost, , not including Construction Engineering (CE)				\$ 96,263

**For HBP Participating use: \$96,000**

**Marin Road Construction Schedule**

(Red boxes indicate Critical Path)

Activity	Item	Working Days									
		1	2	3	4	5	6	7	8	9	10
1	Clear & Grubbing, Install CAS	Red									
2	Submit Review & approve Submittals	Yellow	Red	Yellow							
3	Water Diversion		Red	Red							
4	Bridge Removal (Portion)				Red						
5	Structure Excavation (Retaining Wall)				Yellow						
6	Drill & Bond Dowels				Yellow						
7	Form, Install Rebar & pour Concrete (Retaining)					Red					
6	Structure Backfill (Retaining Wall)					Yellow	Red				
8	Construct Soil Nail Wall							Red	Red		
9	Dry-pack Existing Wingwall Crack and Place Riprap								Red		
10	Repair Spalled Surfaces Area								Yellow		
11	Vegetation Restoration									Red	Red
12	Prepare punch list, conduct final walk through Conduct CT 342										Red

**Canyon Road Bridge - 15.33' x 30.67' single-span Topping Slab over Precast Planks**

Item	Quantity	Unit	Unit Price	Item Cost
Structure Excavation (Retaining Wall)	15	CY	\$ 300.00	\$ 4,500
Structure Backfill (Retaining Wall)	34	CY	\$ 200.00	\$ 6,800
Soil Nail Assembly	210	LF	\$ 200.00	\$ 42,000
Structural Concrete (Retaining Wall)	15	CY	\$ 300.00	\$ 4,500
Bar Reinforcing Steel (Retaining Wall)	1,570	LB	\$ 5.00	\$ 7,850
Shotcrete	2	CY	\$ 1,500.00	\$ 3,000
Prepare Concrete Bridge Deck Surface	494	SF	\$ 10.00	\$ 4,940
Furnish Bridge Deck Treatment Material	5	Gal	\$ 100.00	\$ 500
Treat Bridge Deck (Methacrylate)	494	SF	\$ 5.00	\$ 2,470
Rock & Soil Backfill	10	CY	\$ 300.00	\$ 3,000
Concrete Removal (Portion)	1	LS	\$ 10,000.00	\$ 10,000
Repair Spalled Surface area	20	SF	\$ 250.00	\$ 5,000
Water Diversion	1	LS	\$ 10,000.00	\$ 10,000
Traffic Control	1	LS	\$ 10,000.00	\$ 10,000
Vegetation Restoration	1	LS	\$ 5,000.00	\$ 5,000
Biological Monitoring	1	LS	\$ 10,000.00	\$ 10,000
Subtotal 1				\$ 129,560
Mobilization				\$ 14,396
subtotal 2				\$ 143,956
Contingency 25%				\$ 35,989
Grand Total Cost, , not including Construction Engineering (CE)				\$ 179,944

**For HBP Participating use: \$180,000**

**Additional, HBP Non-Participating (Guard Rails & Signs): \$4,500**

**Canyon Road Bridge Construction Schedule** (Red boxes indicate Critical Path)

Activity	Item	Working Days													
		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Clear & Grubbing, Install CAS	Red													
2	Submit Review & approve Submittals	Yellow	Red	Yellow											
3	Water Diversion		Yellow	Red											
4	Bridge Removal (Portion)				Red										
5	Structure Excavation (Retaining Wall)					Red	Red								
6	Form, Install Rebar & pour Concrete (Retaining)						Yellow	Red							
7	Structure Backfill (Retaining Wall) / Rock & Grout							Yellow	Red	Red					
6	Construct Soil Nail Wall									Yellow	Red	Red	Red		
8	Repair Spalled Surfaces Area										Yellow	Red			
9	Clean Bridge Deck													Red	
10	Treat Bridge Deck													Yellow	
11	Vegetation Restoration												Yellow	Yellow	
12	Prepare punch list, conduct final walk through Conduct CT 342														Red

## Appendix B – Year 2010 Partial Caltrans Bridge Inspection Reports

*California Department of Transportation  
Division of Maintenance*

*Structure Maintenance and Investigations*

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**B**<sub>RIDGE</sub>

**I**<sub>NSPECTION</sub>

**R**<sub>ECORDS</sub>

**I**<sub>NFORMATION</sub>

**S**<sub>YSTEM</sub>

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The requested documents have been generated by BIRIS.

These documents are the property of the California Department of Transportation and should be handled in accordance with Deputy Directive 55 and the State Administrative Manual.

Records for “Confidential” bridges may only be released outside the Department of Transportation upon execution of a confidentiality agreement.

SPRUCE  
ROAD  
BRIDGE



**INSPECTION COMMENTARY**

Abutment 1 footing is exposed entire length, about 12 inches deep, and undermined about 6 inches. This condition was first noted in the 1993 report and has not significantly changed at this time. See photo 3.

**SAFE LOAD CAPACITY**

No as-built plans are available for this structure/culvert. Load ratings are assigned based on the guidelines provided in the Section 5.8.3.2 of the Assigned Load Rating Procedures for Bridges and Culverts:

The estimate design live load is H10  
 The Inventory rating is 16.8 metric tonne (RF = 0.52)  
 The Operating rating is 28.1 metric tonne (RF = 0.87)  
 Permit rating is 00000

Since this bridge has been carrying legal trucks without showing distress, it is assumed that the bridge has adequate capacity to carry the largest demand from the legal trucks and bridge capacity is assigned to be equal to the largest demand from the legal truck.

**MISCELLANEOUS**

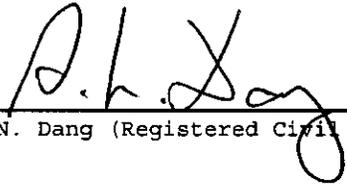
Kathleen Wilkie, Director of Public Works for the Town of Fairfax, was contacted on 09/15/2008, and requested for as-built plans. The current assigned load capacity is applicable until the as-built plans are available for new load rating calculations.

<b><u>ELEMENT INSPECTION RATINGS</u></b>										
Elem No.	Element Description	Env	Total		Qty in each Condition State					
			Qty	Units	St. 1	St. 2	St. 3	St. 4	St. 5	
13	Concrete Deck - Unprotected w/ AC Overlay	2	70	sq.m.	70	0	0	0	0	0
110	Reinforced Conc Open Girder/Beam	2	33	m.	0	33	0	0	0	0
215	Reinforced Conc Abutment	2	26	m.	0	26	0	0	0	0
331	Reinforced Conc Bridge Railing	2	38	m.	38	0	0	0	0	0
361	Scour	2	1	ea.	0	1	0			

**WORK RECOMMENDATIONS**

RecDate: 07/28/1993	EstCost:	Underpin Abutment 1 to prevent
Action : Undefined Work	StrTarget:	undermining of the footing.
Work By: LOCAL AGENCY	DistTarget:	
Status : PROPOSED	EA:	

Inspected By : AN.Dang/AR.Nojoumi

  
 Andy N. Dang (Registered Civil Engineer)



**STRUCTURE INVENTORY AND APPRAISAL REPORT**

\*\*\*\*\* IDENTIFICATION \*\*\*\*\*

(1) STATE NAME- CALIFORNIA 069  
 (8) STRUCTURE NUMBER 27C0141  
 (5) INVENTORY ROUTE (ON/UNDER)- ON 150000000  
 (2) HIGHWAY AGENCY DISTRICT 04  
 (3) COUNTY CODE 041 (4) PLACE CODE 23168  
 (6) FEATURE INTERSECTED- FAIRFAX CREEK  
 (7) FACILITY CARRIED- SPRUCE RD  
 (9) LOCATION- IN FAIRFAX  
 (11) MILEPOINT/KILOMETERPOINT 0  
 (12) BASE HIGHWAY NETWORK- NOT ON NET 0  
 (13) LRS INVENTORY ROUTE & SUBROUTE  
 (16) LATITUDE 37 DEG 59 MIN 16.12 SEC  
 (17) LONGITUDE 122 DEG 35 MIN 35.04 SEC  
 (98) BORDER BRIDGE STATE CODE % SHARE %  
 (99) BORDER BRIDGE STRUCTURE NUMBER

\*\*\*\*\* STRUCTURE TYPE AND MATERIAL \*\*\*\*\*

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE  
 TYPE- TEE BEAM CODE 104  
 (44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA  
 TYPE- OTHER/NA CODE 000  
 (45) NUMBER OF SPANS IN MAIN UNIT 1  
 (46) NUMBER OF APPROACH SPANS 0  
 (107) DECK STRUCTURE TYPE- CIP CONCRETE CODE 1  
 (108) WEARING SURFACE / PROTECTIVE SYSTEM:  
 A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6  
 B) TYPE OF MEMBRANE- NONE CODE 0  
 C) TYPE OF DECK PROTECTION- NONE CODE 0

\*\*\*\*\* AGE AND SERVICE \*\*\*\*\*

(27) YEAR BUILT 1930  
 (106) YEAR RECONSTRUCTED 0000  
 (42) TYPE OF SERVICE: ON- HIGHWAY-PEDESTRIAN 5  
 UNDER- WATERWAY 5  
 (28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00  
 (29) AVERAGE DAILY TRAFFIC 255  
 (30) YEAR OF ADT 1981 (109) TRUCK ADT 3 %  
 (19) BYPASS, DETOUR LENGTH 2 KM

\*\*\*\*\* GEOMETRIC DATA \*\*\*\*\*

(48) LENGTH OF MAXIMUM SPAN 6.4 M  
 (49) STRUCTURE LENGTH 6.7 M  
 (50) CURB OR SIDEWALK: LEFT 1.5 M RIGHT 1.5 M  
 (51) BRIDGE ROADWAY WIDTH CURB TO CURB 7.4 M  
 (52) DECK WIDTH OUT TO OUT 11.2 M  
 (32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 4.9 M  
 (33) BRIDGE MEDIAN- NO MEDIAN 0  
 (34) SKEW 30 DEG (35) STRUCTURE FLARED NO  
 (10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M  
 (47) INVENTORY ROUTE TOTAL HORIZ CLEAR 7.4 M  
 (53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M  
 (54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M  
 (55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M  
 (56) MIN LAT UNDERCLEAR LT 0.0 M

\*\*\*\*\* NAVIGATION DATA \*\*\*\*\*

(38) NAVIGATION CONTROL- NO CONTROL CODE 0  
 (111) PIER PROTECTION- CODE  
 (39) NAVIGATION VERTICAL CLEARANCE 0.0 M  
 (116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M  
 (40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

\*\*\*\*\* SUFFICIENCY RATING \*\*\*\*\*

SUFFICIENCY RATING = 53.9  
 STATUS  
 HEALTH INDEX 72.1  
 PAINT CONDITION INDEX = N/A

\*\*\*\*\* CLASSIFICATION \*\*\*\*\*

(112) NBIS BRIDGE LENGTH- YES Y  
 (104) HIGHWAY SYSTEM- NOT ON NHS 0  
 (26) FUNCTIONAL CLASS- LOCAL URBAN 19  
 (100) DEFENSE HIGHWAY- NOT STRAHNET 0  
 (101) PARALLEL STRUCTURE- NONE EXISTS N  
 (102) DIRECTION OF TRAFFIC- 2 WAY 2  
 (103) TEMPORARY STRUCTURE-  
 (105) FED.LANDS HWY- NOT APPLICABLE 0  
 (110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0  
 (20) TOLL- ON FREE ROAD 3  
 (21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04  
 (22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04  
 (37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

\*\*\*\*\* CONDITION \*\*\*\*\*

(58) DECK 7  
 (59) SUPERSTRUCTURE 5  
 (60) SUBSTRUCTURE 5  
 (61) CHANNEL & CHANNEL PROTECTION 6  
 (62) CULVERTS N

\*\*\*\*\* LOAD RATING AND POSTING \*\*\*\*\*

(31) DESIGN LOAD- UNKNOWN 0  
 (63) OPERATING RATING METHOD- FIELD EVAL/ENG JUDG 0  
 (64) OPERATING RATING- 28.2  
 (65) INVENTORY RATING METHOD- FIELD EVAL/ENG JUL 0  
 (66) INVENTORY RATING- 16.8  
 (70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5  
 (41) STRUCTURE OPEN, POSTED OR CLOSED- A  
 DESCRIPTION- OPEN, NO RESTRICTION

\*\*\*\*\* APPRAISAL \*\*\*\*\*

(67) STRUCTURAL EVALUATION 5  
 (68) DECK GEOMETRY 5  
 (69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N  
 (71) WATER ADEQUACY 7  
 (72) APPROACH ROADWAY ALIGNMENT 4  
 (36) TRAFFIC SAFETY FEATURES 0000  
 (113) SCOUR CRITICAL BRIDGES U

\*\*\*\*\* PROPOSED IMPROVEMENTS \*\*\*\*\*

(75) TYPE OF WORK- CODE  
 (76) LENGTH OF STRUCTURE IMPROVEMENT M  
 (94) BRIDGE IMPROVEMENT COST  
 (95) ROADWAY IMPROVEMENT COST  
 (96) TOTAL PROJECT COST  
 (97) YEAR OF IMPROVEMENT COST ESTIMATE  
 (114) FUTURE ADT 313  
 (115) YEAR OF FUTURE ADT 2028

\*\*\*\*\* INSPECTIONS \*\*\*\*\*

(90) INSPECTION DATE 09/10 (91) FREQUENCY 24 MO  
 (92) CRITICAL FEATURE INSPECTION: (93) CFI DATE  
 A) FRACTURE CRIT DETAIL- NO MO A)  
 B) UNDERWATER INSP- NO MO B)  
 C) OTHER SPECIAL INSP- NO MO C)

MARIN  
ROAD  
BRIDGE



DEPARTMENT OF TRANSPORTATION  
Structure Maintenance & Investigations

Bridge Number : 27C0143  
Facility Carried: MARIN DR  
Location : AT BOTHIN RD  
City : FAIRFAX  
Inspection Date : 09/22/2010

## Bridge Inspection Report

Inspection Type

Routine  FC Underwater Special Other

**STRUCTURE NAME:** FAIRFAX CREEK

### CONSTRUCTION INFORMATION

Year Built : 1930 Skew (degrees): 0  
Year Widened: N/A No. of Joints : 0  
Length (m) : 12.5 No. of Hinges : 0

Structure Description: Reinforced concrete spandrel arch bridge. One (1) foot earth filled.

Span Configuration : 1 @ 8.2 m

### LOAD CAPACITY AND RATINGS

Design Live Load: UNKNOWN  
Inventory Rating: 16.2 metric tonnes Calculation Method: FIELD EVAL/ENG JUDGMENT  
Operating Rating: 26.9 metric tonnes Calculation Method: FIELD EVAL/ENG JUDGMENT  
Permit Rating : 00000  
Posting Load : Type 3: Legal Type 3S2: Legal Type 3-3: Legal

### DESCRIPTION ON STRUCTURE

Deck X-Section: 0.30 m br, 7.50 m, 0.30 m br  
Total Width: 8.1 m Net Width: 7.5 m No. of Lanes: 2  
Rail Description: Concrete Rail Code : 0000  
Min. Vertical Clearance: Unimpaired

### DESCRIPTION UNDER STRUCTURE

Channel Description: Cobbles

### INSPECTION COMMENTARY

#### INSPECTION ACCESS

The water depth on this date was approximately 18 inches at the deepest part of the channel. An Underwater Type A (wade/probe) investigation was performed at both abutments.

#### CONDITION OF STRUCTURE

##### DECK AND RAIL:

The deck AC overlay and rails were inspected and there are no cracks, spalls or signs of distress.

##### SUPERSTRUCTURE/SUBSTRUCTURE:

There are arch soffit spalls about 1.5 feet by 4 inches along both the left and right bottom edges of the arch at Abutment 2 with exposed rebar. This condition was first noted in the 8/19/1987 report. See photos 3 and 4.

#### SAFE LOAD CAPACITY

No as-built plans are available for this structure. Load ratings are assigned based on the guidelines provided in the Section 5.8.3.2 of the Assigned Load Rating Procedures for Bridges and Culverts:

The estimate design live load is H10  
The Inventory rating is 16.1 metric tonne (RF = 0.50)  
The Operating rating is 26.9 metric tonne (RF = 0.83)  
Permit rating is 00000

**INSPECTION COMMENTARY****MISCELLANEOUS**

Kathleen Wilkie, Director of Public Works for the Town of Fairfax, was contacted on 09/15/2008, and requested for as-built plans. The current assigned load capacity is applicable until the as-built plans are available for new load rating calculations.

**ELEMENT INSPECTION RATINGS**

Elem No.	Element Description	Env	Total		Qty in each Condition State				
			Qty	Units	St. 1	St. 2	St. 3	St. 4	St. 5
144	Reinforced Conc Arch	2	12	m.	0	12	0	0	0
215	Reinforced Conc Abutment	2	15	m.	15	0	0	0	0
331	Reinforced Conc Bridge Railing	2	49	m.	49	0	0	0	0

**WORK RECOMMENDATIONS**

RecDate: 06/04/1996

Action : Sub-Patch spalls

Work By: LOCAL AGENCY

Status : PROPOSED

EstCost:

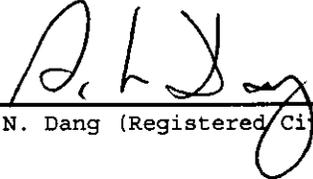
StrTarget: 2 YEARS

DistTarget:

EA:

Clean rusted bar reinforcing steel and patch spalls at both the right and left sides near Abutment 2.

Inspected By : AN.Dang/AR.Nojoumi

  
 Andy N. Dang (Registered Civil Engineer)



**STRUCTURE INVENTORY AND APPRAISAL REPORT**

\*\*\*\*\* IDENTIFICATION \*\*\*\*\*

(1) STATE NAME- CALIFORNIA 069  
 (8) STRUCTURE NUMBER 27C0143  
 (5) INVENTORY ROUTE (ON/UNDER) - ON 150000000  
 (2) HIGHWAY AGENCY DISTRICT 04  
 (3) COUNTY CODE 041 (4) PLACE CODE 23168  
 (6) FEATURE INTERSECTED- FAIRFAX CREEK  
 (7) FACILITY CARRIED- MARIN DR  
 (9) LOCATION- AT BOTHIN RD  
 (11) MILEPOINT/KILOMETERPOINT 0  
 (12) BASE HIGHWAY NETWORK- NOT ON NET 0  
 (13) LRS INVENTORY ROUTE & SUBROUTE  
 (16) LATITUDE 37 DEG 59 MIN 36.19 SEC  
 (17) LONGITUDE 122 DEG 35 MIN 40.66 SEC  
 (98) BORDER BRIDGE STATE CODE % SHARE %  
 (99) BORDER BRIDGE STRUCTURE NUMBER

\*\*\*\*\* STRUCTURE TYPE AND MATERIAL \*\*\*\*\*

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE  
 TYPE- ARCH - DECK CODE 111  
 (44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA  
 TYPE- OTHER/NA CODE 000  
 (45) NUMBER OF SPANS IN MAIN UNIT 1  
 (46) NUMBER OF APPROACH SPANS 0  
 (107) DECK STRUCTURE TYPE- NOT APPLICABLE CODE N  
 (108) WEARING SURFACE / PROTECTIVE SYSTEM:  
 A) TYPE OF WEARING SURFACE- BITUMINOUS CODE 6  
 B) TYPE OF MEMBRANE- NONE CODE 0  
 C) TYPE OF DECK PROTECTION- NONE CODE 0

\*\*\*\*\* AGE AND SERVICE \*\*\*\*\*

(27) YEAR BUILT 1930  
 (106) YEAR RECONSTRUCTED 0000  
 (42) TYPE OF SERVICE: ON- HIGHWAY 1  
 UNDER- WATERWAY 5  
 (28) LANES:ON STRUCTURE 02 UNDER STRUCTURE 00  
 (29) AVERAGE DAILY TRAFFIC 110  
 (30) YEAR OF ADT 2004 (109) TRUCK ADT 2 %  
 (19) BYPASS, DETOUR LENGTH 2 KM

\*\*\*\*\* GEOMETRIC DATA \*\*\*\*\*

(48) LENGTH OF MAXIMUM SPAN 8.2 M  
 (49) STRUCTURE LENGTH 12.5 M  
 (50) CURB OR SIDEWALK: LEFT 0.0 M RIGHT 0.0 M  
 (51) BRIDGE ROADWAY WIDTH CURB TO CURB 7.5 M  
 (52) DECK WIDTH OUT TO OUT 8.1 M  
 (32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 7.3 M  
 (33) BRIDGE MEDIAN- NO MEDIAN 0  
 (34) SKEW 0 DEG (35) STRUCTURE FLARED NO  
 (10) INVENTORY ROUTE MIN VERT CLEAR 99.99 M  
 (47) INVENTORY ROUTE TOTAL HORIZ CLEAR 7.5 M  
 (53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M  
 (54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M  
 (55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M  
 (56) MIN LAT UNDERCLEAR LT 0.0 M

\*\*\*\*\* NAVIGATION DATA \*\*\*\*\*

(38) NAVIGATION CONTROL- NO CONTROL CODE 0  
 (111) PIER PROTECTION- CODE  
 (39) NAVIGATION VERTICAL CLEARANCE 0.0 M  
 (116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M  
 (40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

\*\*\*\*\* SUFFICIENCY RATING \*\*\*\*\*

SUFFICIENCY RATING = 58.8  
 STATUS  
 HEALTH INDEX 88.6  
 PAINT CONDITION INDEX = N/A

\*\*\*\*\* CLASSIFICATION \*\*\*\*\*

(112) NBIS BRIDGE LENGTH- YES Y  
 (104) HIGHWAY SYSTEM- NOT ON NHS 0  
 (26) FUNCTIONAL CLASS- LOCAL URBAN 19  
 (100) DEFENSE HIGHWAY- NOT STRAHNET 0  
 (101) PARALLEL STRUCTURE- NONE EXISTS N  
 (102) DIRECTION OF TRAFFIC- 2 WAY 2  
 (103) TEMPORARY STRUCTURE-  
 (105) FED.LANDS HWY- NOT APPLICABLE 0  
 (110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0  
 (20) TOLL- ON FREE ROAD 3  
 (21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04  
 (22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04  
 (37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

\*\*\*\*\* CONDITION \*\*\*\*\*

(58) DECK N  
 (59) SUPERSTRUCTURE 5  
 (60) SUBSTRUCTURE 7  
 (61) CHANNEL & CHANNEL PROTECTION 6  
 (62) CULVERTS N

\*\*\*\*\* LOAD RATING AND POSTING \*\*\*\*\*

(31) DESIGN LOAD- UNKNOWN 0  
 (63) OPERATING RATING METHOD- FIELD EVAL/ENG JUDG 0  
 (64) OPERATING RATING- 26.9  
 (65) INVENTORY RATING METHOD- FIELD EVAL/ENG JUDG 0  
 (66) INVENTORY RATING- 16.2  
 (70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5  
 (41) STRUCTURE OPEN, POSTED OR CLOSED- A  
 DESCRIPTION- OPEN, NO RESTRICTION

\*\*\*\*\* APPRAISAL \*\*\*\*\*

(67) STRUCTURAL EVALUATION 5  
 (68) DECK GEOMETRY 5  
 (69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N  
 (71) WATER ADEQUACY 7  
 (72) APPROACH ROADWAY ALIGNMENT 4  
 (36) TRAFFIC SAFETY FEATURES 0000  
 (113) SCOUR CRITICAL BRIDGES 5

\*\*\*\*\* PROPOSED IMPROVEMENTS \*\*\*\*\*

(75) TYPE OF WORK- CODE  
 (76) LENGTH OF STRUCTURE IMPROVEMENT M  
 (94) BRIDGE IMPROVEMENT COST  
 (95) ROADWAY IMPROVEMENT COST  
 (96) TOTAL PROJECT COST  
 (97) YEAR OF IMPROVEMENT COST ESTIMATE  
 (114) FUTURE ADT 126  
 (115) YEAR OF FUTURE ADT 2028

\*\*\*\*\* INSPECTIONS \*\*\*\*\*

(90) INSPECTION DATE 09/10 (91) FREQUENCY 24 MO  
 (92) CRITICAL FEATURE INSPECTION: (93) CFI DATE  
 A) FRACTURE CRIT DETAIL- NO MO A)  
 B) UNDERWATER INSP- NO MO B)  
 C) OTHER SPECIAL INSP- NO MO C)

CANYON  
ROAD  
BRIDGE



**INSPECTION COMMENTARY**

Both abutments were inspected and there are no cracks, efflorescence, spalls or signs of distress.

**SAFE LOAD CAPACITY**

Load ratings are assigned based on the guidelines provided in the Section 5.8.3.2 of the Assigned Load Rating Procedures for Bridges and Culverts:

The estimate design live load is HS20-44

The Inventory rating is 32.4 metric tonne (RF = 1.00)

The Operating rating is 54.1 metric tonne (RF = 1.67)

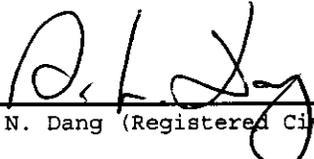
Permit rating is P P P P P

**ELEMENT INSPECTION RATINGS**

Elem No.	Element Description	Env	Total		Qty in each Condition State				
			Qty	Units	St. 1	St. 2	St. 3	St. 4	St. 5
48	Concrete Slab - Protected w/ Rigid Overlay	2	135	sq.m.	135	0	0	0	0
215	Reinforced Conc Abutment	2	9	m.	9	0	0	0	0
331	Reinforced Conc Bridge Railing	2	32	m.	32	0	0	0	0
358	Deck Cracking	2	1	ea.	0	1	0	0	0

**WORK RECOMMENDATIONS** - NONE

Inspected By : AN.Dang/AR.Nojoumi

  
Andy N. Dang (Registered Civil Engineer)



**STRUCTURE INVENTORY AND APPRAISAL REPORT**

## \*\*\*\*\* IDENTIFICATION \*\*\*\*\*

(1) STATE NAME- CALIFORNIA 069  
 (8) STRUCTURE NUMBER 27C0146  
 (5) INVENTORY ROUTE (ON/UNDER)- ON 151000000  
 (2) HIGHWAY AGENCY DISTRICT 04  
 (3) COUNTY CODE 041 (4) PLACE CODE 23168  
 (6) FEATURE INTERSECTED- SAN ANSELMO CREEK  
 (7) FACILITY CARRIED- CANYON ROAD  
 (9) LOCATION- IN FAIRFAX  
 (11) MILEPOINT/KILOMETERPOINT 0  
 (12) BASE HIGHWAY NETWORK- NOT ON NET 0  
 (13) LRS INVENTORY ROUTE & SUBROUTE  
 (16) LATITUDE 37 DEG 58 MIN 30.96 SEC  
 (17) LONGITUDE 122 DEG 36 MIN 23.22 SEC  
 (98) BORDER BRIDGE STATE CODE % SHARE %  
 (99) BORDER BRIDGE STRUCTURE NUMBER

## \*\*\*\*\* STRUCTURE TYPE AND MATERIAL \*\*\*\*\*

(43) STRUCTURE TYPE MAIN:MATERIAL- CONCRETE  
 TYPE- SLAB CODE 101  
 (44) STRUCTURE TYPE APPR:MATERIAL- OTHER/NA  
 TYPE- OTHER/NA CODE 000  
 (45) NUMBER OF SPANS IN MAIN UNIT 1  
 (46) NUMBER OF APPROACH SPANS 0  
 (107) DECK STRUCTURE TYPE- PRECAST CONC. PA CODE 2  
 (108) WEARING SURFACE / PROTECTIVE SYSTEM:  
 A) TYPE OF WEARING SURFACE- NONE CODE 0  
 B) TYPE OF MEMBRANE- NONE CODE 0  
 C) TYPE OF DECK PROTECTION- NONE CODE 0

## \*\*\*\*\* AGE AND SERVICE \*\*\*\*\*

(27) YEAR BUILT 1998  
 (106) YEAR RECONSTRUCTED 0000  
 (42) TYPE OF SERVICE: ON- HIGHWAY 1  
 UNDER- WATERWAY 5  
 (28) LANES:ON STRUCTURE 01 UNDER STRUCTURE 00  
 (29) AVERAGE DAILY TRAFFIC 100  
 (30) YEAR OF ADT 1992 (109) TRUCK ADT 1 %  
 (19) BYPASS, DETOUR LENGTH 199 KM

## \*\*\*\*\* GEOMETRIC DATA \*\*\*\*\*

(48) LENGTH OF MAXIMUM SPAN 10.0 M  
 (49) STRUCTURE LENGTH 10.0 M  
 (50) CURB OR SIDEWALK: LEFT 0.0 M RIGHT 0.0 M  
 (51) BRIDGE ROADWAY WIDTH CURB TO CURB 3.5 M  
 (52) DECK WIDTH OUT TO OUT 3.6 M  
 (32) APPROACH ROADWAY WIDTH (W/SHOULDERS) 3.6 M  
 (33) BRIDGE MEDIAN- NO MEDIAN 0  
 (34) SKEW 0 DEG (35) STRUCTURE FLARED NO  
 (10) INVENTORY ROUTE MIN VERT CLEAR 99.00 M  
 (47) INVENTORY ROUTE TOTAL HORIZ CLEAR 3.5 M  
 (53) MIN VERT CLEAR OVER BRIDGE RDWY 99.99 M  
 (54) MIN VERT UNDERCLEAR REF- NOT H/RR 0.00 M  
 (55) MIN LAT UNDERCLEAR RT REF- NOT H/RR 0.0 M  
 (56) MIN LAT UNDERCLEAR LT 0.0 M

## \*\*\*\*\* NAVIGATION DATA \*\*\*\*\*

(38) NAVIGATION CONTROL- NO CONTROL CODE 0  
 (111) PIER PROTECTION- CODE  
 (39) NAVIGATION VERTICAL CLEARANCE 0.0 M  
 (116) VERT-LIFT BRIDGE NAV MIN VERT CLEAR M  
 (40) NAVIGATION HORIZONTAL CLEARANCE 0.0 M

## \*\*\*\*\* SUFFICIENCY RATING = 72.8 \*\*\*\*\*

STATUS FUNCTIONALLY OBSOLETE  
 HEALTH INDEX 100.0  
 PAINT CONDITION INDEX = N/A

## \*\*\*\*\* CLASSIFICATION \*\*\*\*\* CODE

(112) NBIS BRIDGE LENGTH- YES Y  
 (104) HIGHWAY SYSTEM- NOT ON NHS 0  
 (26) FUNCTIONAL CLASS- LOCAL URBAN 19  
 (100) DEFENSE HIGHWAY- NOT STRAHNET 0  
 (101) PARALLEL STRUCTURE- NONE EXISTS N  
 (102) DIRECTION OF TRAFFIC- 1 WAY 1  
 (103) TEMPORARY STRUCTURE-  
 (105) FED.LANDS HWY- NOT APPLICABLE 0  
 (110) DESIGNATED NATIONAL NETWORK - NOT ON NET 0  
 (20) TOLL- ON FREE ROAD 3  
 (21) MAINTAIN- CITY OR MUNICIPAL HIGHWAY AGENCY 04  
 (22) OWNER- CITY OR MUNICIPAL HIGHWAY AGENCY 04  
 (37) HISTORICAL SIGNIFICANCE- NOT ELIGIBLE 5

## \*\*\*\*\* CONDITION \*\*\*\*\* CODE

(58) DECK 6  
 (59) SUPERSTRUCTURE 7  
 (60) SUBSTRUCTURE 7  
 (61) CHANNEL & CHANNEL PROTECTION 9  
 (62) CULVERTS N

## \*\*\*\*\* LOAD RATING AND POSTING \*\*\*\*\* CODE

(31) DESIGN LOAD- MS-18+MOD OR HS-20+MOD 6  
 (63) OPERATING RATING METHOD- FIELD EVAL/ENG JUDG 0  
 (64) OPERATING RATING- 54.1  
 (65) INVENTORY RATING METHOD- FIELD EVAL/ENG JUL 0  
 (66) INVENTORY RATING- 32.4  
 (70) BRIDGE POSTING- EQUAL TO OR ABOVE LEGAL LOADS 5  
 (41) STRUCTURE OPEN, POSTED OR CLOSED- A  
 DESCRIPTION- OPEN, NO RESTRICTION

## \*\*\*\*\* APPRAISAL \*\*\*\*\* CODE

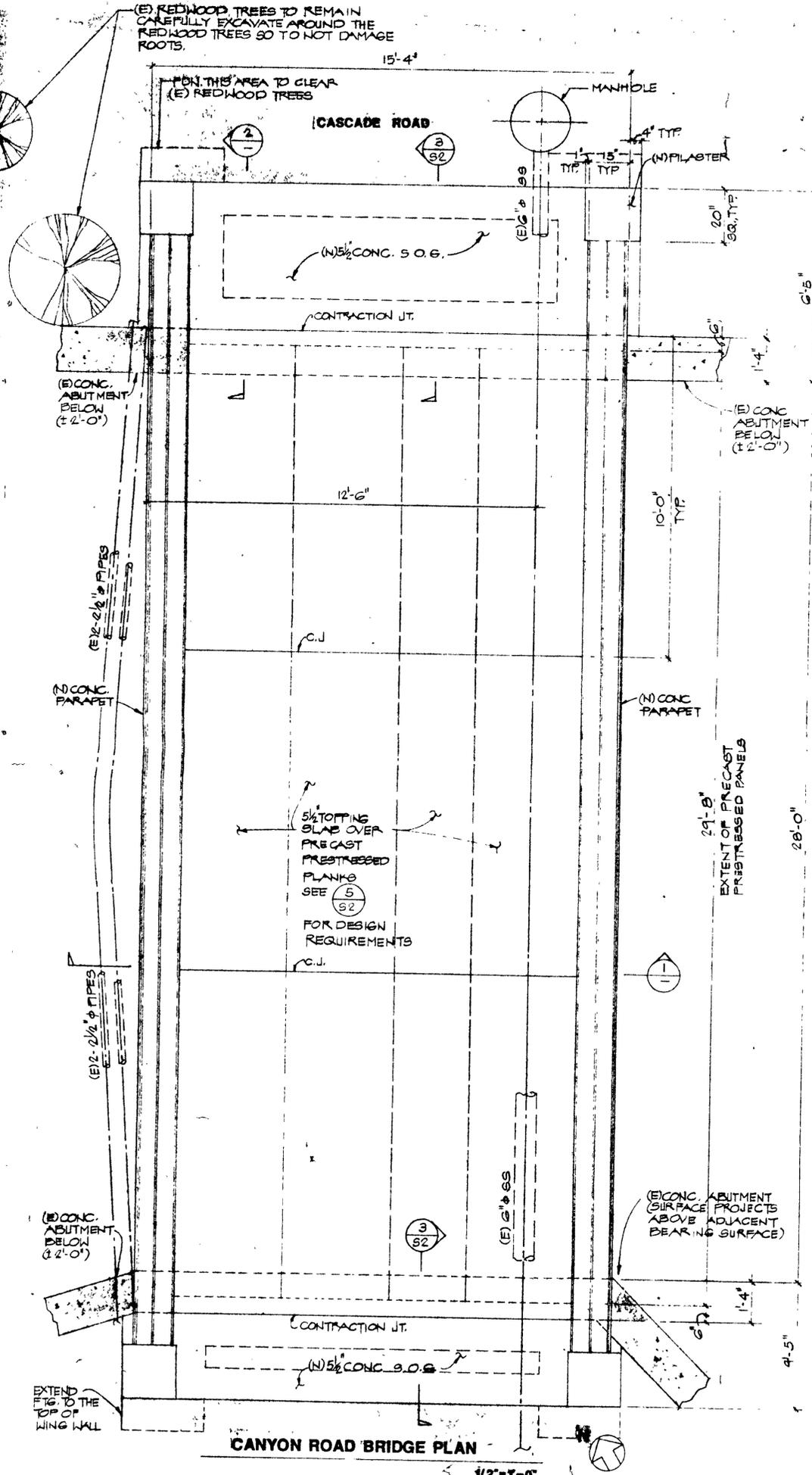
(67) STRUCTURAL EVALUATION 7  
 (68) DECK GEOMETRY 3  
 (69) UNDERCLEARANCES, VERTICAL & HORIZONTAL N  
 (71) WATER ADEQUACY 9  
 (72) APPROACH ROADWAY ALIGNMENT 4  
 (36) TRAFFIC SAFETY FEATURES 1NNN  
 (113) SCOUR CRITICAL BRIDGES 8

## \*\*\*\*\* PROPOSED IMPROVEMENTS \*\*\*\*\*

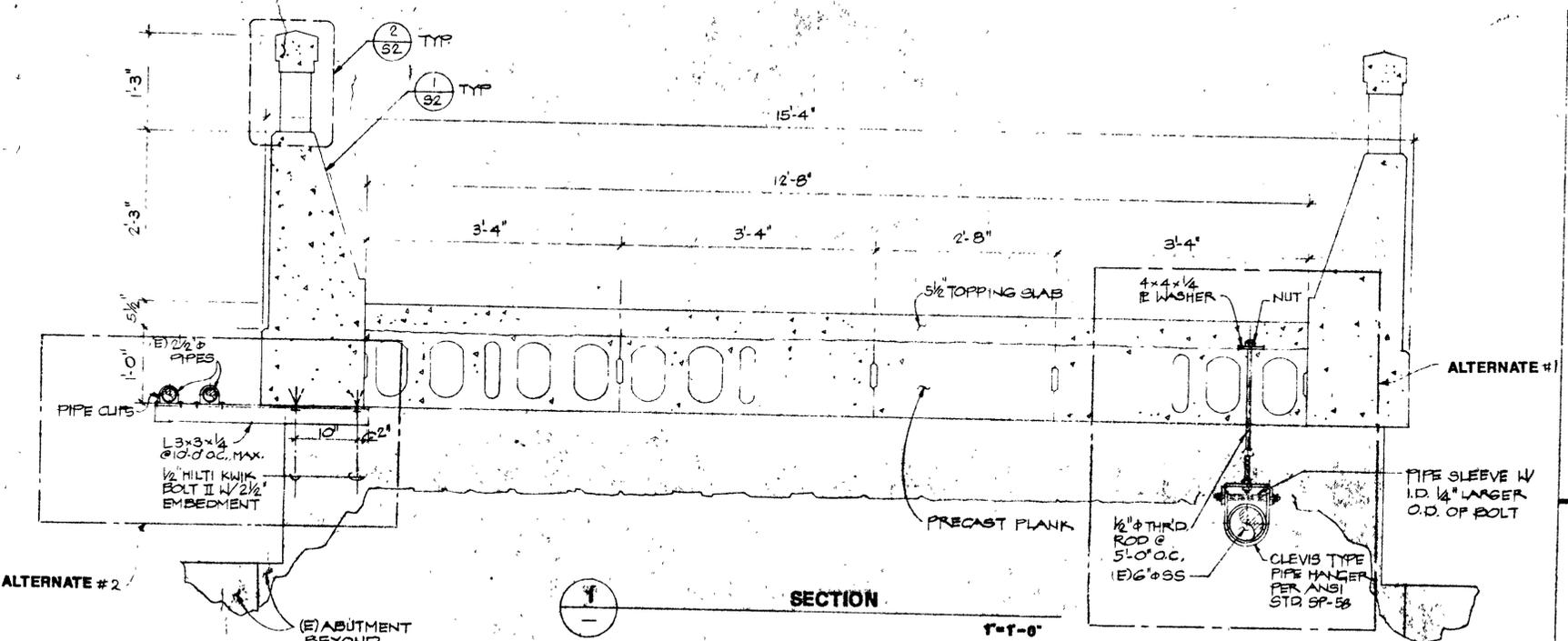
(75) TYPE OF WORK- SUP/SUB REHAB CODE 35  
 (76) LENGTH OF STRUCTURE IMPROVEMENT 10 M  
 (94) BRIDGE IMPROVEMENT COST \$35,000  
 (95) ROADWAY IMPROVEMENT COST \$7,000  
 (96) TOTAL PROJECT COST \$58,800  
 (97) YEAR OF IMPROVEMENT COST ESTIMATE 2010  
 (114) FUTURE ADT 530  
 (115) YEAR OF FUTURE ADT 2028

## \*\*\*\*\* INSPECTIONS \*\*\*\*\*

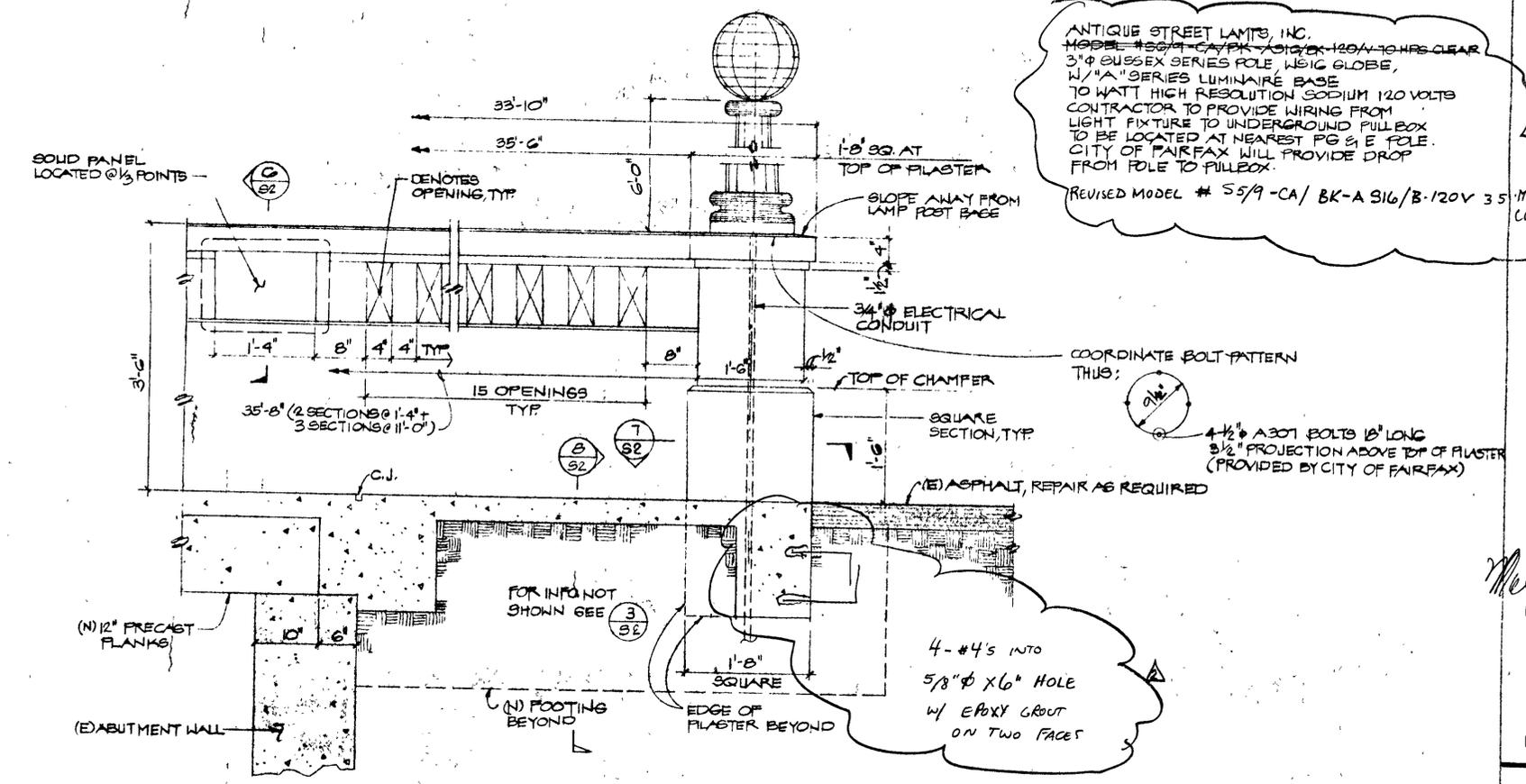
(90) INSPECTION DATE 09/10 (91) FREQUENCY 48 MO  
 (92) CRITICAL FEATURE INSPECTION: (93) CFI DATE  
 A) FRACTURE CRIT DETAIL- NO MO A)  
 B) UNDERWATER INSP- NO MO B)  
 C) OTHER SPECIAL INSP- NO MO C)



CANYON ROAD BRIDGE PLAN



SECTION 1-1



TYPICAL PARTIAL ELEVATION

ANTIQUE STREET LAMPS, INC.  
 MODEL # 559-CA/BK-A 316/B-120V 3.5\"/>

4-#4'S INTO  
 5/8\"/>



BID SET 7/15/96

PLAN, SECTION & ELEVATION

CHANGE ORDER # 1  
 CHANGE ORDER # 5

AS-BUILT 27C-146

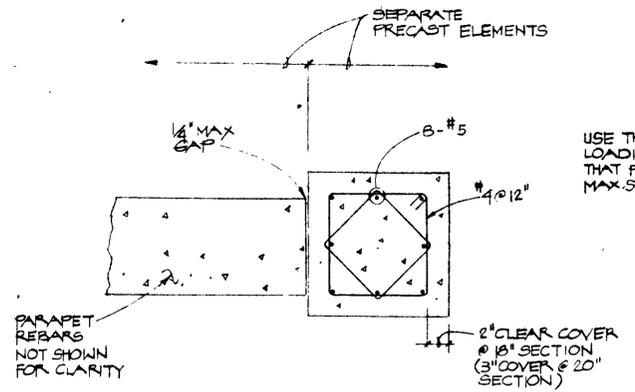
S1

**GENERAL STRUCTURAL NOTES**

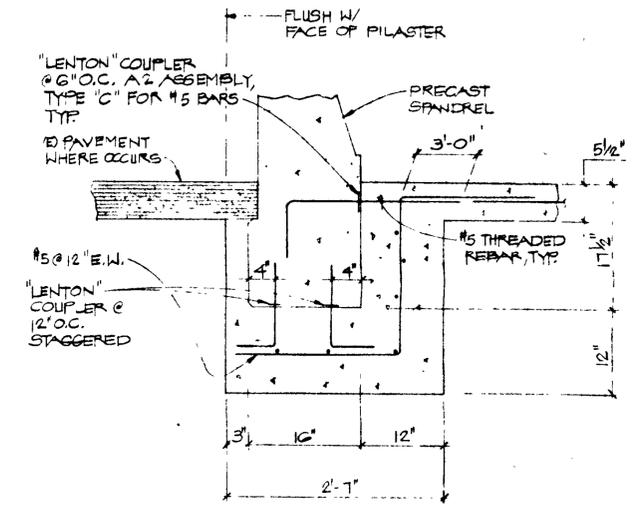
- I. GENERAL**  
 A DRAWINGS AND SPECIFICATIONS REPRESENT FINISHED STRUCTURE CONTRACTOR SHALL BE RESPONSIBLE FOR MEANS AND METHODS OF CONSTRUCTION INCLUDING BUT NOT LIMITED TO SHORING AND TEMPORARY BRACING THE CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO INSURE SAFETY OF ALL PERSONS AND STRUCTURES AT THE SITE AND ADJACENT TO THE SITE OBSERVATION VISITS TO THE SITE BY THE ENGINEER OR CONSTRUCTION MANAGER SHALL NOT RELIEVE THE CONTRACTOR OF SUCH RESPONSIBILITY  
 B CONTRACTOR SHALL VERIFY ALL DIMENSIONS AT JOB SITE BEFORE COMMENCING WORK AND SHALL REPORT ANY DISCREPANCIES TO THE ENGINEER  
 C OMISSIONS OR CONFLICTS BETWEEN VARIOUS ELEMENTS OF THE DRAWINGS, NOTES, AND DETAILS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND RESOLVED BEFORE PROCEEDING WITH THE WORK  
 D DO NOT USE SCALED DIMENSIONS, USE WRITTEN DIMENSIONS WHERE NO DIMENSION IS PROVIDED, CONSULT THE ENGINEER FOR CLARIFICATION BEFORE PROCEEDING WITH THE WORK  
 E IF CERTAIN FEATURES ARE NOT FULLY SHOWN OR CALLED FOR ON THE DRAWINGS OR SPECIFICATIONS, THEIR CONSTRUCTION SHALL BE OF THE SAME CHARACTER AS FOR SIMILAR CONDITIONS THAT ARE CALLED FOR OR SHOWN
- II. DESIGN BASIS**  
 A APPLICABLE CODES  
 1 AASHTO  
 2 CALTRANS - STANDARD PLAN AND BRIDGE DESIGN MANUAL  
 B VERTICAL LIVE LOADS  
 1 AASHTO LOADING HS 20-44 W/ NO IMPACT  
 (FIRE ENGINE GROSS VEHICLE WEIGHT = 37,500 LBS  
 W/ NO IMPACT AXLE LENGTH = 98"  
 WHEEL BASE = 158")  
 C LATERAL LOADS  
 1 DESIGN WIND PRESSURE = 16 PSF,  $C_e = 1.06$ ,  
 $C_s = 1.3$ ,  $C_d = 1.2$ ,  $I = 1.0$   
 2 SEISMIC  $Z = 0.4$ ,  $I = 1.0$ ,  
 $R_w = 8$ ,  $C = 2.75$ ,  $S = 1.0$
- III. MATERIALS (NEW CONSTRUCTION)**  
 A CONCRETE  
 1 REINFORCING STEEL  
 a BARS ASTM A615, GRADE 60  
 b ALL CONCRETE SHALL BE REINFORCED UNLESS SPECIFICALLY MARKED 'NOT REINFORCED'  
 2 CONCRETE CLASSES  

CLASS	USE	WT	STRENGTH
A	FOUNDATIONS, PARAPETS, TOPPING SLAB ON SPANCRETE PLANKS	145 PCF	3,000 PSI
B	PRECAST PLANK	145 PCF	5,000 PSI

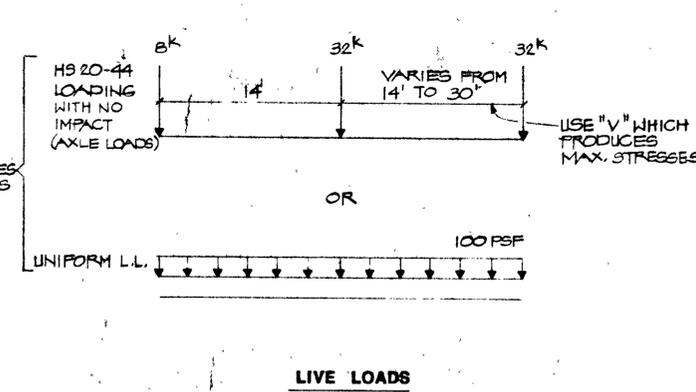
 3 MINIMUM CONCRETE COVER FOR REINFORCING STEEL  
 a SURFACES PLACED AGAINST EARTH 3"  
 b FORMED SURFACES BELOW GRADE 2"  
 c SURFACES EXPOSED TO WEATHER 2"  
 d BEAM AND COLUMN BARS (INCLUDING STIRRUPS OR TIES) 1-1/2"  
 e EXTERIOR WALL AT EXTERIOR FACE 1-1/2"  
 f SLABS AND WALLS NOT EXPOSED TO WEATHER 1"  
 g EXPOSED TO WEATHER 1"  
 IV QUALITY CONTROL  
 A THE FOLLOWING WORK REQUIRES TESTS AND/OR INSPECTIONS FOR SPECIFIC REQUIREMENTS SEE SPECIFICATION INSPECTIONS SHALL BE MADE IN ACCORDANCE WITH UBC 1701 BY A CERTIFIED SPECIAL INSPECTOR RETAINED BY THE OWNER  
 1 FOOTING & PIER EXCAVATION  
 2 SOIL COMPACTION  
 3 REINFORCING STEEL, PRESTRESSING STEEL TENDONS & ANCHOR BOLTS  
 4 CONCRETE  
 5 EXPANSION BOLTS  
 6 GROUTED DOWELS  
 B A PARTIAL LISTING OF REQUIRED STRUCTURAL SUBMITTALS FOLLOWS CONSULT THE SPECIFICATION FOR A COMPLETE LISTING OF SUBMITTAL REQUIREMENTS  
 1 CONCRETE MIX DESIGNS  
 2 GROUT MIX DESIGNS  
 3 CONSTRUCTION JOINT LAYOUT & CONTROL JOINT LAYOUT  
 4 REINFORCING STEEL SHOP DRAWINGS  
 5 MANUFACTURER'S DATA FOR INSERTS, GROUTS & EPOXIES



**7** DETAIL 1"=1'-0"

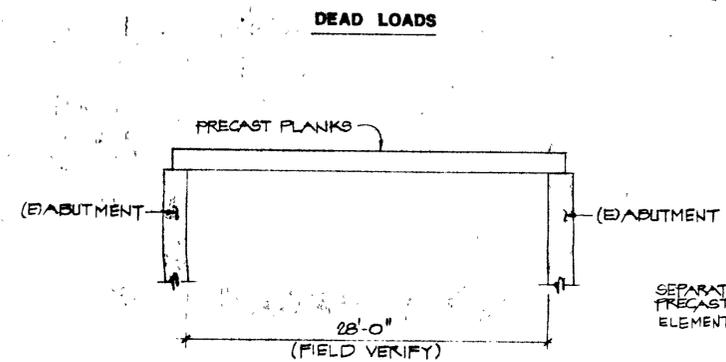


**8** DETAIL 1"=1'-0"



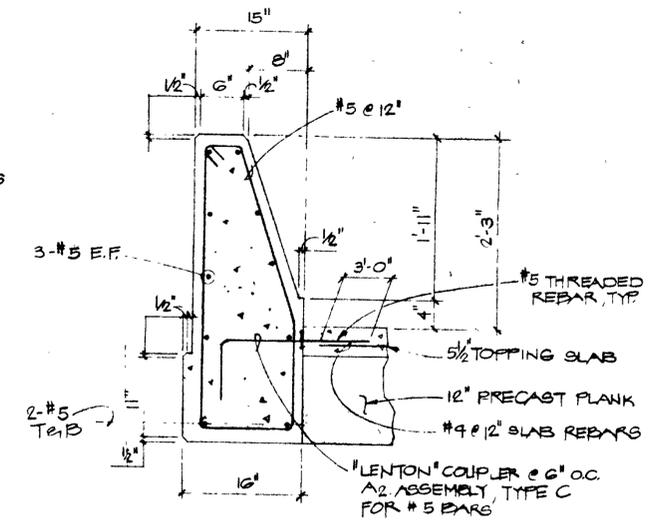
LIVE LOADS

PRECAST PLANKS: 12 PSF; TOPPING SLAB: 61 PSF

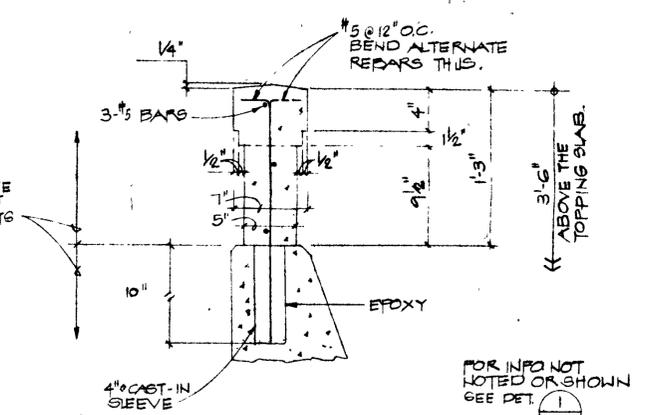


DEAD LOADS

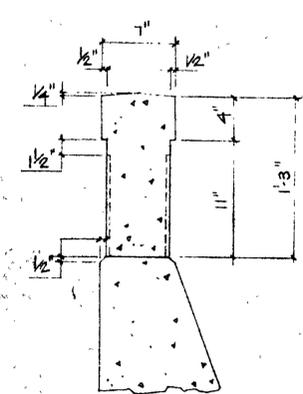
**5** LOADING DIAGRAM FOR PRECAST PLANKS N.T.S.



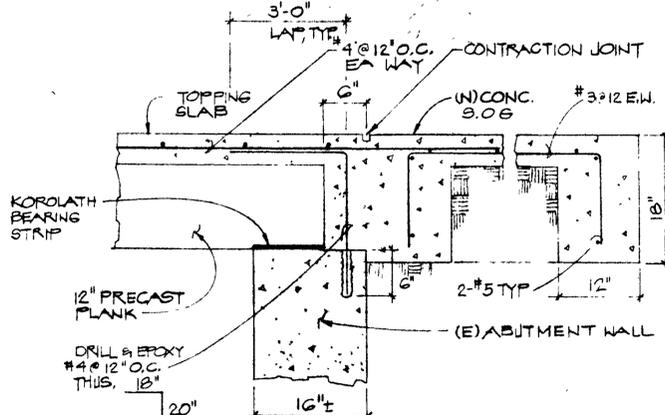
**1** DETAIL 1"=1'-0"



**2** DETAIL 1 1/2"=1'-0"



**6** SECTION 1 1/2"=1'-0"



**3** DETAIL 27C-146 1 1/2"=1'-0"

AS-BUILT



BID SET 7/15/96

GENERAL NOTES & STRUCTURAL DETAILS

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