

October 21, 2005

Miller, Owen & Trost  
428 J Street, Suite 400  
Sacramento, California 95814

Attention: Madeline E. Miller

Subject: Santa Cruz RTC  
Structural Engineering Proposal

Dear Ms. Miller:

Biggs Cardosa Associates, Inc. is pleased to submit the following proposal to provide additional structural engineering services on for the Santa Cruz Branch Line Acquisition. The proposed scope of services includes:

- Preliminary structural assessments of three retaining wall structures that were excluded from the previous preliminary structural assessment scope of services. The structures include:
  - o Steel soldier pile and lagging retaining wall located between Watsonville Slough (MP 4.45) and Harkins Slough (MP 4.87)
  - o Steel rail pile and lagging wall located between San Andreas Road (MP 8.64) and Leonard Gulch (La Selva Trestle) (MP 9.09). This structure is of particular concern due to the potential risk to trackway and continuation of freight service should localized failure occur.
  - o Timber crib wall located north of Leonard Gulch (La Selva Trestle) (MP 9.09)
- Detailed structural assessments of five railway bridge structures as recommended in the Santa Cruz Branch Line Structural Assessment report. The structures were group into two priority classifications and include:
  - Priority 1 Structures: (due to Poor Condition Rating)
    - o MP10.45 Seascape Trestle: Condition Rating of 4: Poor Condition; Major crossing (~ 240 ft long), approximately 80 years old, with moderate to severe decay of timber bracing elements
    - o MP19.43 San Lorenzo River Crossing: Condition Rating of 4: Poor Condition; Important river crossing (~300 ft long), over 100 years old with potentially high rehabilitation costs
    - o MP23.54 Meder Creek Crossing: Condition Rating of 4: Poor Condition; over 90 years old
  - Priority 2 Structures: (due to importance and/or potentially high rehabilitation costs)
    - o MP1.06 Pajaro River Crossing: Condition Rating of 6: Satisfactory Condition; Important river crossing (~300 ft long), approximately 100 years old with potentially high rehabilitation cost
    - o MP15.89 Capitola Crossing: Condition Rating varies with low of 5: Fair Condition; Important highway and river crossing (~580 ft long thru Downtown

Capitola), over 100 years old, located in historic district with potentially high rehabilitation cost

- Seismic vulnerability study of MP 19.43 San Lorenzo River Crossing as recommended in the Santa Cruz Branch line structural Assessment report.

***Scope of Work:***

**Task 1: Preliminary Structural Assessment:**

1. Conduct visual field inspection of structures and review available as-built data
2. Structural assessment of the structures will be provided by "senior" engineering staff based on the field review information recorded by BCA, any available as-built data (plans, maintenance reports, previous assessments, etc), field review data, and any other pertinent record data that is readily available. Structural assessment recommendations/discussions will be two-fold:
  - Address impacts/remediation required for continuance of freight rail service.
  - Address impacts/remediation required for future passenger rail service.
3. Prepare capitol and maintenance cost estimation including:
  - Conceptual level construction costs associated with anticipated remediation required for continuance of freight rail service.
  - Conceptual level construction costs associated with anticipated remediation required for future passenger rail service, including seismic retrofits where necessary.
  - Prepare annual maintenance list and range of anticipated maintenance costs, and compare to the current Business Plan maintenance estimates.
4. Prepare an executive summary report of our findings (as listed above). Report will be a supplement document to the already-completed Santa Cruz Branch Line Structural Assessment report.

**Task 2: Detailed Structural Assessment:**

1. Thorough review of available as-built data, including as-built structure plans (original, retrofit, rehabilitation), complete maintenance reports and previous assessment reports
2. Conducting structural element field surveys, including review of current structure condition and estimated section loss in primary support and secondary bracing members. Section loss shall be estimated for these elements based on representative field measurements and comparison to as-built structure data provided.
3. Structural vertical service load analysis of primary structure support members and secondary bracing members to determine safe operating service load rating. Analysis shall account for current member conditions and estimated section loss.
4. Prepare executive summary report including:
  - Summary of items 1 through 3 above

- Recommendations pertaining to whether to 1) continue the current freight service operations at current levels; 2) limiting the freight service operations to load levels below the load rating determined by the detailed structural assessment; and/or 3) rehabilitate, reconstruct or replace the existing structure elements to increase the structure service load rating above anticipated freight operation requirements.
  - Anticipated planning level construction costs and/or potential maintenance cost impacts associated with above recommendations
5. Submittal of structural calculations, assumptions and supporting documentation for analysis outlined in item 3, for independent structural peer review by the SCCRTC

**Task 3: Seismic Vulnerability Study:**

1. Thorough review of available as-built data, including as-built structure plans (original, retrofit, rehabilitation), complete maintenance reports and previous assessment reports
2. Conducting structural element field surveys, including review of current structure condition and estimated section loss in primary support and secondary bracing members. Section loss shall be estimated for these elements based on representative field measurements and comparison to as-built structure data provided.
3. Geotechnical investigation including preliminary structure foundation assessments and seismic design criteria recommendations.
4. Structural vertical service load analysis of primary structure support members and secondary bracing members to determine safe operating service load rating. Analysis shall account for current member conditions and estimated section loss.
5. Prepare executive summary report including:
  - Summary of items 1 through 4 above
  - Recommendations pertaining to whether to 1) continue the current freight service operations at current levels; 2) limiting the freight service operations to load levels below the load rating determined by the detailed structural assessment; and/or 3) rehabilitate, reconstruct or replace the existing structure elements to increase the structure service load rating above anticipated freight operation requirements.
  - Anticipated planning level construction costs and/or potential maintenance cost impacts associated with above recommendations
6. Submittal of structural calculations, assumptions and supporting documentation for analysis outlined in item 3, for independent structural peer review by the SCCRTC

***Fee Basis:***

Biggs Cardosa Associates, Inc proposes to provide the supplemental structural assessment scope of services outlined in this proposal, including expenses on a per diem basis not to exceed \$129,975 per the attached work plan.

***Assumptions:***

The following assumptions were made in preparing this scope of work:

- A. Available as-built data (structure plans, maintenance reports, previous assessment reports, etc) will be provided to Consultant at the start of the project. As-built data is assumed to contain pertinent member sizes, length, geometry and material properties required for the analysis.
- B. Readily available access to key components of the structure to be inspected is assumed, including access from the UP right-of-way and to the existing structure catwalks.
- C. All fieldwork is anticipated to occur outside of the limits of the active river/ creek channel. Underwater investigation is outside of the project scope of work.
- D. Field review shall be limited to non-destructive measurement of representative structure elements. Field measurements will be performed on a representative sample of accessible structural elements and used to assess estimated levels of corrosion and section loss for analysis purposes. Field measurements may require selected non-destructive removal of corrosion build-up on representative members to assess corrosion trends and remaining structural section. Special hazardous material handling measures are assumed to NOT be required.
- E. Fieldwork for all priority 1 detailed structural assessments will be performed concurrently. Fieldwork for all priority 2 detailed structural assessments will be performed concurrently.
- F. Structural analysis for the Pajaro River Crossing (MP 1.06b), Seascape Trestle (MP 10.45), Capitola Crossing (MP 15.89a-e) and Meder Creek Crossing (MP 23.54) shall be limited to vertical service load analysis to determine safe operating service load rating for existing structure condition. Horizontal load analysis (seismic, wind, stream flow, etc) is outside the scope of work.
- G. Structural analysis for the San Lorenzo River Crossing (MP 19.43a&b) shall be limited to vertical service load analysis to determine safe operating service load rating for existing structure condition and seismic vulnerability study. Other horizontal load analysis (wind, stream flow, etc) is outside the scope of work. The seismic vulnerability study shall be performed concurrently with the detailed structural assessment.
- H. Geotechnical investigations shall be limited to the San Lorenzo River Crossing (MP 19.43a&b).
- I. Costs due to meeting UP safety or insurance requirements, or any costs to gain permission to enter onto the UP right of way are not included. Fieldwork with the potential to foul the tracks will be limited to occur on days without scheduled UP rail traffic. Fieldwork without the potential to foul the tracks is anticipated to occur on days with and/or without scheduled UP rail traffic.
- J. Existing UP freight service consists of 4000 carloads per year with car tonnage restricted to 286 kips.
- K. All construction cost estimates will be for planning level purposes and will be developed on an approximate cost per square foot or linear foot of bridge deck basis.
- L. All maintenance cost estimates will be for planning level purposes and will be developed on an approximate cost per square foot or linear foot of bridge deck basis.
- M. Executive summary report will be prepared using MSWord.
- N. The Capitola Crossing (MP 15.89a-e) structures are assumed to be of historical significance. All other structures are assumed to NOT be of historical significance.

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Please sign below and return to our office to authorize work to begin on this project. Should you have any questions, please do not hesitate to call

Sincerely,

For Biggs Cardosa Associates

Anthony P. Notaro  
Engineering Manager

AGREED TO BY: \_\_\_\_\_  
Miller Owen & Trost

