

Work Plan No. A.15-01 BHT Fault Movement Mitigation - Return-to-Service 35% Design

Scope:

The scope of services required to complete this Work Plan follows.

Task 0: Administration and Project Management

HNTB+FMG JV (Consultant) will perform the following activities in support of this Work Plan:

Task 0.1 Bi-Weekly Project Update Meetings

- Attend bi-weekly (every-other-week) project update meetings with BART. Meetings will be 1-hour each and held virtually.
- Prepare meeting agenda
- Prepare meeting minutes

Task 0.2 Support SSWP, Badge Requests, Travel Approval, and Other Site Visit Related Efforts

- Prepare and submit site-specific work plan (SSWP) for site and tunnel visits and coordinate with BART for approval
- Prepare and submit temporary badge requests and coordinate with BART Police for badge approvals
- Submit travel approval forms for BART approval
- Provide support for site and tunnel visits

Task 0.3 Design Schedule

- Prepare a schedule (MS Project) for engineering activities for review and approval by BART. A revised schedule reflecting any updates to the engineering activities will be submitted, if necessary.

Task 0.4 Monthly Invoices and Monthly Progress Reports

- Prepare monthly invoices and monthly project reports

Task 0.5 Project-Specific Quality Management Plan (QMP)

- This Work Plan will follow the Quality Management Plan prepared for this Agreement and BART's Design Quality Management Plan.
- Consultant will perform QMP Training for all staff and subconsultants working on this Work Plan.

Task 0 Deliverables:

- Bi-Weekly Project Update Meeting Agendas and Minutes
- Invoices and Monthly Project Reports
- Design Schedule
- Quality Management Plan

Task 0 Assumptions:

- Project Management and Administration assumes a 15-month work plan duration.
- Up to 3 Consultant members will attend the Bi-Weekly Project Update Meetings.
- Up to 2 updates to the schedule for engineering activities will be performed, if necessary.

Task 1: Research, Interviews, and Site Visits

Task 1.1 Research and Summarize Documents

- Review the BHT documents provided by BART including:
 - Original BHT Record Documents
 - Technical Standards and other relevant literature
 - BART Berkeley Hills Tunnels Seismic Retrofit Feasibility Study (January 2014)
 - Caldecott BART Tunnel Creep Repair Report (January 2019)
- Review available fault hazard materials, seismic design criteria, geotechnical reports, and nonstructural component seismic performance qualification materials.
- Summarize the most relevant information from these documents and note where there are contradictions or superseding information.
- Discuss the merits of the sources and the engineering judgment that they reflect.

Task 1.2 Interviews with BART Divisions

- Conduct interviews with representatives from various relevant BART divisions including Engineering, Maintenance, Safety, and Operations. Interviews to include:
 - Gaining familiarity with the relevant BART divisions.

- Developing an understanding of current practice and capabilities.
- Identifying opportunities for future capabilities to supplement the return-to-service design.

Task 1.3 Site Visits to BHT and Surroundings

- Perform up to 2 site visits to document existing conditions of BART assets and their surroundings between the Rockridge (C10) and Orinda (C20) stations.

Task 1.4 Pre-Design Fact-Finding Memorandum (Technical Deliverable #1)

- Prepare a summary document (memorandum) including:
 - Summary of Documents reviewed
 - Interview notes and key lessons learned from BART divisions
 - Site visit notes, photographs, and measurements

Task 1 Deliverables:

- Technical Deliverable #1
- Consultant Certification of Submittal for BART Review
- All Task 1 Deliverables will be submitted in electronic (pdf) format only.

Task 1 Assumptions:

- Interviews include 4-hour interviews, conducted separately, with the following BART Divisions:
 - BART Engineering, Maintenance, Safety, and Operations
- Up to 8 Consultant team members (2 members per interview) will attend the Interviews.
- Consultant will perform up to 2 visits to the site and tunnel.
- Site visits will be performed during the blanket hours, roughly from 1:00 am to 4:00 am.
- Up to 8 Consultant team members will attend the site visits.
- Consultant team members who are not Roadway Worker Protection trained will be escorted by BART personnel. BART will provide escorts currently certified by the District's Roadway Worker Protection Certification Program as appropriate given the number of Consultant's personnel on site.
- BART will be responsible for preparing the System Access Request (SAR) and obtaining approvals for the Consultant to attend the site visits.
- BART will provide a hi-rail vehicle with operators and an Employee In Charge (EIC) for the site visits.
- Watchpersons, if needed, will be provided by BART.
- Site visits will be limited to visual observations, photographs, and measurements. No materials testing, sampling, or subsurface investigations will be performed.
- Technical Deliverable #1 will include up to 2 rounds of revisions based on BART reviews.

Task 2: Basis of Design and Design Scenarios

Task 2.1 Design Charrette Workshop

- Host a design charrette at BART's headquarters:

- Work with the project team to develop return-to-service concepts to serve as the genesis of the conceptual designs.
- Propose several damage/repair scenarios to serve as use cases for the design.

Task 2.2 Basis of Design and Design Scenarios Memorandum (Technical Deliverable #2)

- Prepare a technical memorandum that:
 - Describes the project's objectives, criteria, plan, and methodology for the design concepts.
 - Summarizes available fault displacement scenarios and corresponding ground motions.
 - Summarizes the damage/repair scenarios that are used to illustrate and bound the applicability of the conceptual design. These scenarios will be the basis for cost estimation exercises.
 - Summarizes existing equipment and component interdependencies and contributions to overall project risk.

Task 2 Deliverables:

- Technical Deliverable #2
- Consultant Certification of Submittal for BART Review
- All Task 2 Deliverables will be submitted in electronic (pdf) format only.

Task 2 Assumptions:

- Up to 8 Consultant Team members will attend the (8-hour) design charrette.
- Return-to-service concepts refer to post-disaster BART operability between Rockridge and Orinda. Concepts could include closure of both tunnels, limiting trains to a single tunnel, limiting trains to lower train speeds.
- Damage/Repair Scenarios will be based on assumptions made for magnitude of fault movements and assumed damages to facilities.
- Three damage/repair scenarios are assumed for this Work Plan.
- Book 346 – Emergency Operations Plan is Confidential; however, BART will provide relevant excerpts from Book 346 to the Consultant for this Work Plan.
- Technical Deliverable #2 will include up to 2 rounds of revisions based on BART reviews.

Task 3: Conceptual Engineering Report (CER)

Task 3.1 Conceptual Engineering Report (Technical Deliverable #3)

- Prepare a Conceptual Engineering Report, including:
 - Introduction and Purpose
 - Conceptual Engineering Scope
 - Damage/Repair Scenarios
 - Construction Activities Associated with the Scenarios
 - Discussion of and recommendations regarding additions to BART's Book 346 – Emergency Operations Plan. These edits would not be made at this time but would be developed in tandem with the future phases of the design and finalized along with the 100% design.

- Conceptual Cost Estimate
- Recommendations
- Prepare schematic design drawings for each damage/repair scenario.
- Prepare conceptual level design calculations for the 3 damage/repair scenarios.
- Prepare an engineer's estimate of construction costs for the 3 damage/repair scenarios.
- Prepare a procurement list that includes a list of construction materials and quantities needed for each damage/repair scenario.

Task 3 Deliverables:

- Technical Deliverable #3
- Design Review Checklist (DRC)
- Consultant Certification of Submittal for BART Review
- All Task 3 Deliverables will be submitted in electronic (pdf) format only.

Task 3 Assumptions:

- Up to 3 damage/repair scenarios will be evaluated.
- Schematic design drawings will be limited to the following disciplines: Structural/Tunnel, Track, Electrical (Power Distribution), Electrical (Traction Power), Communications (fiber, telephone, and radio), Emergency Walkway, Ventilation. Drawings may include details or images from the BART record drawings to depict existing conditions.
- Cost estimate includes up to 3 damage/repair scenarios. Value Engineering and Cost Studies are excluded.
- Technical Deliverable #3 will include up to 2 rounds of revisions based on BART review.

Task 4: Presentations

Task 4.1 Presentations

- Conduct three one-hour long presentations at BART headquarters

Task 4.1 Assumptions:

- Up to 8 Consultant Team members will attend the presentations.
- PowerPoint presentations will be developed from previously prepared material from Task 3.

Task 4 Deliverables:

- Agendas
- PowerPoint Presentation

Prime: HNTB-FMG JV

Subconsultant	Amount
Structural Integrity Associates, Inc.	\$ 74,699
Saylor Associates	\$ 66,982

Total Work Plan Value: \$ 805,000