California High-Speed Train Project

Request for Proposal for Design-Build Services

RFP No.: HSR 11-16

Book 3, Part B: Procedures

Attachments:

1. Verification, Validation and Self-Certification
2. Reliability, Availability, Maintainability Program Plan
3. Records Management Plan
4. Small Business Enterprise Plan
5. Design Variance Request Process
6. CHSTP Safety and Security Management Plan
7. Aesthetic Guidelines for Non-Station Structures

California High-Speed Train Project

Request for Proposal for Design-Build Services

RFP No.: HSR 11-16
Records Management Plan

Prepared by: _____ _____
Date

Checked by: _____ _____
Date

Approved by: _____ _____
Date

Released by: _____ _____
Date

Reviewed by: _____ _____
Date

Revision No.	Date	Description
		Initial Release

Note: Signatures apply for the latest technical memorandum revision as noted above.

Prepared for

CALIFORNIA High-Speed Rail Authority

Prepared by

PARSONS BRINCKERHOFF

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1 Introduction and Purpose

This document describes the Program Management Team (PMT) Document Control Procedures being utilized on the California High-Speed Train Project (CHSTP). These procedures govern the manner in which documents are managed throughout their lifecycle in the ProjectSolve2 (PS2) application. These practices for document control ensure that project documents are easily accessible, centrally located, most current, properly stored, and properly archived at the end of the project. Step-by-step instructions for document submittal to PS2 can be found in Section 4.

1.1 File Structure

The file structure allows for easy storage and retrieval of CHSTP documents. The file structure is also known as the project file index. This procedure establishes the requirements for all project staff that generates or receives project documents. The file structure for the PMT and Regional Consultants (RCs) are shown in Appendix A and B, respectively, of this document. This procedure applies to all CHSTP documents.

2 Project Correspondence

2.1 Outgoing Correspondence

All ***outgoing correspondence*** from the PMT members will be logged into PS2 and managed by the project administrator. ***(Please see Appendix C of this document for direction.)*** The PMT maintains logs of all outgoing[1] and incoming correspondence. These documents include but are not limited to letters, transmittals, memos, and emails.

2.2 Incoming Correspondence

All Incoming Correspondence must be routed through the PMT project administrator and date stamped with the date received. The PMT administrator will make a working copy to be logged

[1] Outgoing correspondence is automatically assigned an identifier by PS2 once they are entered into the PS2 letter log database. This unique identifier should be placed on the upper right-hand corner of the original correspondence document before it is processed for signature (i.e., PB-CHSRA-0001).

into the letter log in PS2, and route to the necessary project team members. The original is for file and is not a working copy.

2.3 E-Mail & Correspondence Archive

Mandatory for all Project-related outgoing and incoming email and correspondence. On the CHST PS2 site, an inbox labeled CHST E-MAIL/Correspondence ARCHIVE has been established to capture all sent emails. All Team Members are required to copy Project-related email to:

CHSTP@PS2mail.com

In the interest of maintaining generally open communications and enhancing the usefulness of the backup, the email folder will be generally accessible to all. PS2 initially makes all such emails readable by all who have access to the folder. If the material is sensitive, the sender must go to the PS2 site after sending and restrict its access.

The email content itself is automatically "Read Only"; however, the attachments may not be. Therefore, once each workday, the document control person will review attachments, and will convert those that are not "Read Only" to such a format.

2.4 Document Filing

Documents will be filed in accordance with the Parsons Brinckerhoff file category index (Appendix A for Project deliverables by RCs) and (Appendix B for PMT documents).

The original document for all incoming correspondence is placed in the subject file according to the Parsons Brinckerhoff file category index, i.e., From-To file, and copies placed in the other cross files as necessary. Cross filing of project correspondence is encouraged; generally, all attachments and enclosures are filed in the cross files.

3 Document Control Types

The document control software will report two types of documents: active and inactive. Active documents are those that require future action. Active documents can include:

- Correspondence
  - Letters
  - Transmittals
  - Memos

  - E-mail
- Technical Memos
- Design Specifications
  - General Provisions
  - Technical Specifications
- Technical Reports and Environmental Records
  - Technical Reports
  - Admin EIR/EIS
- Project Design and Drawings
  - Alignment and Typical Sections (In-Progress)
  - Structures, Viaducts, Tunnels (In-Progress)
  - Stations, Maintenance Facilities including Storage (In-Progress)
  - Traction Power (In-Progress)
  - Utility Relocations, Maintenance of Way Facilities and Trackside Access, Other (to be determined) (In-Progress)
  - Draft 15% Design (Final Draft)
- Meetings
  - Agendas
  - Sign-in Sheets
  - Meeting Minutes

Inactive documents are those documents that are in their final form and require no further updates. Inactive documents may include:

- Correspondence
  - Letters
  - Transmittal
  - Memos
  - E-mail
- Technical Memos
- Design Specifications
  - General Provisions
  - Technical Specifications

- Technical Reports and Environmental Records
  - Technical Reports
  - Admin EIR/EIS
- Project Design and Drawings
  - Alignment and Typical Sections (In-Progress)
  - Structures, Viaducts, Tunnels (In-Progress)
  - Stations, Maintenance Facilities including Storage (In-Progress)
  - Traction Power (In-Progress)
  - Utility Relocations, Maintenance of Way Facilities and Trackside Access, Other (to be determined) (In-Progress)
  - Draft 15% Design (Final Draft)
- Meetings
  - Agendas
  - Sign-in Sheets

4 Submittal of Project Documents

4.1 Parsons Brinckerhoff Receipt of Project Deliverables

Project deliverables from the RCs to the PMT will be received in electronic format to PS2 in accordance with procedures established at the start of this project and part of the RCs document control procedures. The hard copies of the project receivables received by the PMT staff will be date stamped upon receipt, scanned if electronic copies have not been posted to PS2, and posted to PS2 in the appropriate folder in accordance with Parsons Brinckerhoff established procedures, and in accordance with the project file index (Appendices A) of this document. Once these documents are received, date stamped, scanned, and placed in PS2, they must be logged into the PS2 deliverables log.

4.2 Processing Project Deliverables

4.2.1 Logging Environmental Submittal to the Submittal Log

1. Log into PS2
2. Open Folder 04. Environmental
3. Open Folder 00. PMT Environmental Reviews

4. Open Folder 00. Document Control Databases (Your Hidden Items)
5. Open your Projects Database
   a. Create "New Entry"
   b. Add WBS Activity, document title, date RC uploaded document to PS2, PMT/AUTH/FRA Review Complete (Expected).

      **At this point you will have to come back to complete this input when review is complete.*
   c. PMT/AUTH/FRA Complete Review (Actual), Current Status, RC Revisions Complete, RC Makes back-check Revisions, Final back-check PMT/AUTH/RFA upload approved Technical Report Complete Admin. DEIR/DEIS to PS2.

4.2.2 Environmental Document Submittal and Review Protocol

Regional Consultant to prepare the In-Progress Environmental Document Submittal and post on PS2 in the appropriate environmental folder.

Add the submittal file to the folder (upload into PS2) by selecting the "Add File" field or by dragging and dropping the file into the window.

4.2.2.1 Quality Control Tracking Sheet

An internal quality assurance/quality control (QA/QC) tracking sheet (see Figure 4) will appear as the first page of each separate document that is developed for the EIR/EIS, including chapters, sections, front matter, appendices, and reports. The QA/QC tracking sheet is a tool to ensure that each document receives at least the mandatory senior review, editing, and client review steps, and to track further review that might be necessary. The QA/QC tracking sheet will remain with each document until is final, as determined by the PMT Regional Manager (RM).

The RC will notify the PMT RM and the Environmental PMT (EPMT) Environmental Manager that the submittal is ready for review.

Use the PS2 "Send an Alert" email notification feature (click on the "Paper Airplane" icon). This feature transmits a hyperlink to the location of the document. The subject/header line in the email transmittal must include the title of the In-Progress Environmental Document Submittal.

If requested by the EPMT Environmental Manager, the RC shall provide hardcopies of the In-progress submittal to the PMT RM (one copy) and the EPMT Environmental Manager (two copies) via overnight mail service.

PMT RM to request EPMT review. PMT RM to notify the PMT Program Director and the Authority that the submittal has been posted.

The PMT (and other reviewers) to receive notification from the RC that a document that is ready for review has been uploaded to PS2. The PMT, Authority, FRA, and AG staff will then have **ten (10) working days** to review and provide comment.

4.2.2.2 Version Control

Each separate document that is developed for the EIR/EIS, including chapters, sections, front matter, appendices, and technical reports will be reviewed through the use of PS2. Each file will be posted into the appropriate "Draft" folder in PS2 with "Track Versions" enabled. This will ensure a collaborative review process and each series of edits will be tracked automatically by PS2.

Following the PMT's posting of comments, the RC will have 10 working days to respond and make the requested changes. At the end of this period, the RC will notify the PMT via PS2 that the changes have been made. Use the PS2 "Send an Alert" email notification feature.

To verify that the changes have been made, the PMT will then have 5 working days to "back check" the RC changes. Any additional PMT revisions or comments will be made and the document will be reposted on PS2. A notification will be sent to the RC alerting them to the changed document. Use the PS2 "Send an Alert" email notification feature.

Following the completion of Step 3 above, the RC will have 5 working days to make the text changes. Once the changes have been made, the PMT will be notified via PS2 that the document is ready for final review and approval. Use the PS2 "Send an Alert" email notification feature.

As a final step, the PMT will complete its review of the document and notify the RC that it has been accepted and is ready for final use and/or publication.

4.2.3 Logging Engineering Submittal to the PS2 Submittal Log

- Log into PS2
- Open CHSTP Program Mgmt. (13259) Project Folder
- Open Folder 03. Engineering
- Open Submittal Review Log (found under Hidden Items)
  - Create "New Entry'
  - Enter RC Agency, Section Identifier (FJ, JM, MB, Etc.), Submittal Number (Section, RC Initials, Revision No., and next submittal number FJ-HNTB-R0-0001), Submittal Name, date hard copies received, PS2 Alert Date, Review kick-off Meeting date, comment due date.
  - Once the submittal review is complete, go back to the submittal log and add the "Date Comments Posted to PS2 and Submittal Notes."

4.2.4 Processing Incoming Engineering Submittals (In-Progress Status Item 1-5)

Many of the project deliverables for the CHSTP are time sensitive. With that in mind, the specific procedures in place will include but are not limited to the following submittal s for

design review of the In-Progress, and the 15% Draft Design Submittals for the following elements are:

- Alignment and Typical Sections (In-Progress)
- Structures, Viaducts, Tunnels (In-Progress)
- Stations, maintenance Facilities including Storage (In-Progress)
- Traction Power (In-Progress)
- Utility Relocations, maintenance of Way Facilities & trackside Access, Other (to be determined) (In-Progress)
- Draft 15% Design (Final Draft)

4.2.5 Review Process for Draft In-Progress Design Submittal items 1 through 5 above

1. RC Notifies PMT/RM that a submittal has been posted to PS2.
   - *Use PS2 "Send Alert" email notification process.*
2. RC to deliver three (3) copies of submittal to the PMT RM for distribution.
3. PMT RM will perform a cursory review of the submittal to ensure it meets the requirements for review.
4. PMT RM will notify RC if the submittal meets the requirements for their review, or if the submittal will be returned to the RC for revisions.
   - *(If the submittal is accepted for review by the PMT RM goes to step 5)*
5. PMT RM will date stamp the submittal, logs submittal to submittal log in PS2, scans transmittal and add to submittal log, creates a link to the PS2 RC Submittal file. PMT RM to request EMT review (when required), and to schedule and hold a submittal review meeting for the PMT RM, EMT RM (if required) and RC if required for the submittal. Once the submittal review meeting is convened, the review period clock will start.
6. PMT RM to ensure delivery of the submittal(s) to reviewers identified by the PMT RM.
7. PMT RM to notify the Program Director and the Authority that the submittal has been posted to PS2 for review.
   - *Use the PS2 "Send Alert" email notification procedure*
8. PMT RM will create and send a Review Manager Link to the submittal reviewers.
9. Once the submittal review meeting is held, RC to provide meeting minutes to the PMT RM and the EMT RM (when required) within five (5) working days. These minutes will be posted on PS2 in the corresponding submittal and review folders.
10. PMT RM and assigned reviewers will put their comments in the selected MS Excel spreadsheet for import to review manager. If the PMT RM has requested EMT review the formal EMT comments on the submittal will be provided to the PMT RM team following a meeting. Comments are targeted to be provided to the PMT RM team by the EMT within

ten (10) working days following the meeting. (Please note that only the final draft of the MS Excel spreadsheet should imported to the Review Manager, by the person assigned to do so to eliminate duplications.)

11. PMT RM team to review comments in Review Manager and release comment to the RC for their review and response.
12. RC targeted to provide responses to comment posted on PS2 within ten (10) working days of release of comments in Review Manager by the PMT RM.
13. PMT RM targeted to resolve any "1" Mandatory comments with a response coded by the RC of "D" Disagree within ten (10) working days of response. PMT RM to document acceptance of response with initials and date in the "EMT Sign-off" field of Review Manager. Only "1" Mandatory comment with a "D" Disagree by RC will require sign off for QC.

Repeat Steps 1 to 13 for all In-Progress Design Submittal Reviews.

4.2.6 Review Process for Draft 15% Design Submittal

1. RC to prepare and post the Draft 15% Design Submittal on PS2 in the Draft 15% Design Submittal Review folder (see Figures 1 and 2).
2. RC to notify the PMT RM and the PMT Engineering Manager that the Draft 15% Design Submittal is ready for review.
   - *Use the PS2 "Send an Alert" email notification feature.*
3. RC to distribute hard copies of the Draft 15% Design Submittal to the PMT RM (two copies) and the EMT (one copy) via overnight mail service.
4. PMT RM to notify the PMT Program Director and the Authority that the Draft 15% Design Submittal has been posted.
   - *Use the PS2 "Send an Alert" email notification feature.*
5. PMT RM to request EMT review (when required), and schedule and hold a Draft 15% Design Submittal Review Meeting for the RC, PMT RM and the EMT (when requested). The purpose of the review meeting is to provide the PMT RM and ERM an overview and understanding of the RC intent and application of the Design Criteria.
6. RC to provide draft meeting notes to the PMT RM and the PMT Engineering Manager within five (5) working days. Meeting notes will be posted on PS2 in the corresponding submittal and review folder and serve as a record of the meeting, identifying attendees and main points of discussion.
7. PMT RM and team to review Draft 15% Design Submittal; all assigned reviewers will put their comments in the design review MS Excel spreadsheet for import to review manager; If the PMT RM has requested EMT review the formal EMT comments on the submittal will be provided to the PMT RM Team following a meeting. Comments are targeted to be provided to the PMT RM Team by the EMT within five (5) working days following the meeting. (Please note that only the final draft of the MS Excel spreadsheet should imported to the Review Manager by the person assigned to do so to eliminate duplications.)

8. PMT RM review of the Draft 15% Design Submittal to include a system integration review, confirming that the system elements to be included in the Draft 15% Design Submittal are consistent with system design requirements.
9. PMT RM to perform system-wide integration review on boundary interface conditions and confirm design integration with adjacent segments, post comments from his or her review.
10. When the ERM requested will notify the PMT RM that EMR review comments have been posted.
    - *Use the PS2 "Send Alert" email notification feature.*
11. PMT RM to review EMR comments and notify the RC and the PMT Program Director and the Authority that PMT review comments have been posted.
    - *Use the PS2 "Send Alert" email notification feature.*
    - *Complete Steps 14 through 24 for Draft 15% Submittal Review.*

    RC to provide responses to comments via PS2 within ten (10) working days of notification by PMT RM that comments are ready for response.

    Complete response field using the Review Manager Comments response process (as shown in Appendix B).

12. RC response in the "Action Taken" field should address how the comment is to be incorporated into the next submittal or justify why the comment does not apply.
13. RC to code each response "A" (agree, will revise) or "D" (disagree, see explanation/action taken) and dated.
14. RC to verify and document completion of action item with initials and date in the "Verified" field. Verification is subject to audit.
15. PMT RM and RC to resolve any comment/response issues coded "D" within ten (10) working days. EMT to document acceptance of each response issue with Subsystem Manager initials and date in the "EMT Sign-Off" field using the EMT comment/response process.
16. RC to prepare the Final 15% Design Submittal and post on PS2 in the Final 15% Design Submittal folder (see Figures 1 and 2). Two hard copies are to be provided to the PMT RM and one hard copy for the RM.
17. PMT RM to notify the PMT Program Director, the PMT Engineering Manager, the PMT Environmental Manager, and the Authority that the Final 15% Design Submittal has been posted to PS2.
18. PMT RM to alert the PMT Engineering and Environmental Managers via PS2 that 15% Design Submittal is available for use.
19. PMT RM to alert the PMT Program Director and the Authority via PS2 that 15% Design Submittal is available for information.
20. RC to incorporate the Final 15% Design Submittal into the Alternatives Definition Report.

4.3 Regional Consultants Submittal Procedures

Project deliverables are required to be submitted in electronic format to the PMT and the Authority as established by the scope of work at the beginning of the project. Electronic deliverables will be stored on the PS2 site. The instruction for posting documents/deliverables to the PS2 website have been provided to the RCs. This information is available upon request via link to the information. Additionally, one hard copy and one CD with electronic files in PDF and native file formats will be stored in the library that has been created in the CHSTP Sacramento office.

Appendix A Regional Consultants File Index (PS2)

01 Project Management and Administration

01.10 Work-plan

01.20 Schedule

10 Ridership and Revenue Links to Statewide ridership reports

15 Operations Planning Cost Links to Statewide engineering reports

20 Station Area Planning Regional Consultant files

25 Engineering Standards Links to Engineering PM Team documents

30 Environmental standards Link to Environmental PM team documents

35 Public Participation

35.10 Outreach Management

35.20 Outreach Materials

35.30 Press, Newsletters, etc.

35.40 Agency Coordination

35.40.10 Federal

35.40.20 State

35.40.30 Regional/Local

35.50 Scoping

35.50.10 NOI/NOP

35.50.20 Scoping Meetings

35.50.30 Scoping Report

35.60 Public Circulation

35.60.10 NOA/NOC

35.60.20 Public Hearings

35.60.30 Public Comments

40 Project Definition

40.10 Alternatives Analysis Report

40.10.10 Alternatives Analysis Working Draft

40.10.20 Alternatives Analysis Draft
40.10.30 Alternatives Analysis Final
40.10.40 Alternatives Analysis Chapter References

40.20 Alternatives Analysis Definition Report
40.20.10 Alternatives Analysis Definition Working Draft
40.20.20 Alternatives Analysis Definition Draft
40.20.30 Alternatives Analysis Definition Final
40.20.40 Alternatives Analysis Definition References

45 Alignment-Structures Engineering

46 Facilities Design

50 Capital Cost Estimating

55 ROW Preservation

56 Other Related Studies

60 EIR/EIS Technical Reports

60.10 Transportation (Traffic, Transit, Circulation, Parking and Freight Rail)"
60.10.10 Working Draft Transportation Technical Report
60.10.20 Draft Transportation Technical Report
60.10.30 Final Transportation Technical Report
60.10.40 Transportation Technical Report References

60.20 Air Quality
60.20.10 Working Draft Air Quality Technical Report
60.20.20 Draft Air Quality Technical Report
60.20.30 Final Air Quality Technical Report
60.20.40 Air Quality Technical Report References

60.30 Noise & Vibration
60.30.10 Working Draft Noise and Vibration Technical Report
60.30.20 Draft Noise & Vibration Technical Report
60.30.30 Final Noise & Vibration Technical Report
60.30.40 Noise & Vibration Technical Report References

60.40 Biological Resources & Wetlands (Wetland Delineation Report & BA)
60.40.10 Working Draft Biology & Wetlands Technical Report
60.40.20 Draft Biology & Wetlands Technical Report

60.40.30 Final Biology & Wetlands Technical Report
60.40.40 Biology & Wetlands Technical Report References

60.50 Geology, Soils, Seismicity, Paleontology"
60.50.10 Working Draft Geology Technical Report
60.50.20 Draft Geology Technical Report
60.50.30 Final Geology Technical Report
60.50.40 Geology Technical Report References

60.60 Hazardous Materials/Wastes
60.60.10 Working Draft Hazardous Technical Report
60.60.20 Draft Hazardous Technical Report
60.60.30 Final Hazardous Technical Report
60.60.40 Hazardous Technical Report References

60.70 Community Impact Assessment
60.70.10 Working Draft Community Technical Report
60.70.20 Draft Community Technical Report
60.70.30 Final Community Technical Report
60.70.40 Community Technical Report References

60.80 Land Use Report
60.80.10 Working Draft Land Use Technical Report
60.80.20 Draft Land Use Technical Report
60.80.30 Final Land Use Technical Report
60.80.40 Land Use Technical Report References

60.90 Aesthetics & Visual Quality
60.90.10 Working Draft Aesthetics Technical Report
60.90.20 Draft Aesthetics Technical Report
60.90.30 Final Aesthetics Technical Report
60.90.40 Aesthetics Technical Report References

60.100 Hydrology & Water Resources
60.100.10 Working Draft Hydrology Technical Report
60.100.20 Draft Hydrology Technical Report
60.100.30 Final Hydrology Technical Report
60.100.40 Hydrology Technical Report Reference

65 Section 106 Documentation

65.10 Archeology Survey Report

65.10.10 Section 106 Working Draft Doc
65.10.20 Section 106 Draft Doc
65.10.30 Section 106 Final Doc
65.10.40 Section 106 Doc Reference

65.20 Historic Architecture Survey Report
65.20.10 Historic Architecture Working Draft Report
65.20.20 Historic Architecture Draft Report
65.20.30 Historic Architecture Final Report
65.20.40 Historic Architecture Report References

65.30 Findings of Effect Report
65.30.10 Findings Working Draft Report
65.30.20 Findings Draft Report
65.30.30 Findings Final Report
65.30.40 Findings Report References

65.40 Memorandum of Agreement
65.40.10 Memorandum of Agreement Working Draft
65.40.20 Memorandum of Agreement Draft
65.40.30 Memorandum of Agreement Final
65.40.40 Memorandum of Agreement Report References

65.50 Treatment Plan
65.50.10 Treatment Plan Working Draft
65.50.20 Treatment Plan Draft
65.50.30 Treatment Plan Final
65.50.40 Treatment Plan Report References

70 Draft EIR/EIS Volume 1

70.10 Front Matter
70.10.10 Cover
70.10.20 Signature Page
70.10.30 Preface
70.10.40 Table of Contents

70.20 Summary
70.20.10 Summary Working Draft
70.20.20 Summary Draft
70.20.30 Summary Final

70.20.40 Summary References

70.30 Chapter1 Purpose and Need

70.30.10 Purpose and Need Working Draft Chapter

70.30.20 Purpose and Need Draft Chapter

70.30.30 Purpose and Need Final Chapter

70.30.40 Purpose and Need Chapter References

70.40 Chapter2 Alternatives

70.40.10 Alternatives Working Draft Chapter

70.40.20 Alternatives Draft Chapter

70.40.30 Alternatives Final Chapter

70.40.40 Alternatives Chapter References

70.50 Chapter3 Affected Environment and Environmental Consequences

70.50.10 3.1 Introduction

70.50.10.20 3.1 Introduction Working Draft

70.50.10.20 3.1 Introduction Draft

70.50.10.30 3.1 Introduction Final

70.50.10.40 3.1 Introduction References

70.50.20 3.2 Transportation

70.50.20.10 3.2 Transportation Working Draft

70.50.20.20 3.2 Transportation Draft

70.50.20.30 3.2 Transportation Final

70.50.20.40 3.2 Transportation References

70.50.30 3.3 Air Quality

70.50.30.10 3.3 Air Quality Working Draft

70.50.30.20 3.3 Air Quality Draft

70.50.30.30 3.3 Air Quality Final

70.50.30.40 3.3 Air Quality References

70.50.40 3.4 Noise and Vibration

70.50.40.10 3.4 Noise and Vibration Working Draft

70.50.40.20 3.4 Noise and Vibration Draft

70.50.40.30 3.4 Noise and Vibration Final

70.50.40.40 3.4 Noise and Vibration References

70.50.50 3.5 Electromagnetic Interference/Electromagnetic Fiels (EMI/EMF)

70.50.50.10 3.5 EMI/EMF Working Draft

70.50.50.20 3.5 EMI/EMF Draft

70.50.50.30 3.5 EMI/EMF Final
70.50.50.40 3.5 EMI/EMF References
70.50.60 3.6 Biological Resources & Wetlands
70.50.60.10 3.6 Biological Resources & Wetlands Working Draft
70.50.60.20 3.6 Biological Resources & Wetlands Draft
70.50.60.30 3.6 Biological Resources & Wetlands Final
70.50.60.40 3.6 Biological Resources & Wetlands References
70.50.70 3.7 Geology, Soils, Seismicity
70.50.70.10 3.7 Geology, Soils, Seismicity Working Draft
70.50.70.20 3.7 Geology, Soils, Seismicity Draft"
70.50.70.30 3.7 Geology, Soils, Seismicity Final"
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70.50.80 3.8 Hazardous Materials/Wastes
70.50.80.10 3.8 Hazardous Materials/Wastes Working Draft
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70.50.90.10 3.9 Socio Economic, Communities & EJ Working Draft
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70.50.100 3.10 Local Growth, Station Planning & Land Use
70.50.100.10 3.10 Local Growth, Station Planning & Land Use Working Draft
70.50.100.20 3.10 Local Growth, Station Planning & Land Use Draft
70.50.100.30 3.10 Local Growth, Station Planning & Land Use Final
70.50.100.40 3.10 Local Growth, Station Planning & Land Use References
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70.50.110.10 3.11 Parks, Recreation and Open Space Working Draft
70.50.110.20 3.11 Parks, Recreation and Open Space Draft
70.50.110.30 3.11 Parks, Recreation and Open Space Final
70.50.110.40 3.11 Parks, Recreation and Open Space References
70.50.120 3.12 Aesthetics & Visual Quality
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70.50.150.20 3.15 Hydrology & Water Resources Draft
70.50.150.30 3.15 Hydrology & Water Resources Final
70.50.150.40 3.15 Hydrology & Water Resources References
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70.50.180.40 3.18 Construction Methods and Impacts References
70.50.190 Cumulative and Secondary Impacts
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70.50.190.30 3.19 Cumulative and Secondary Impacts Final
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70.60 Chapter 4 Section 4(f) & 6(f) Evaluation
- 70.60.10 Chapter 4 Section 4(f) & 6(f) Evaluation Working Draft
- 70.60.20 Chapter 4 Section 4(f) & 6(f) Evaluation Draft
- 70.60.30 Chapter 4 Section 4(f) & 6(f) Evaluation Final
- 70.60.40 Chapter 4 Section 4(f) & 6(f) Evaluation Chapter

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- 70.70.10 Chapter 5 Costs Working Draft
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- 70.70.30 Chapter 5 Costs Final
- 70.70.40 Chapter 5 Costs References

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- 70.80.10 Chapter 6 Unavoidable Adverse Impacts Working Draft
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70.90 Chapter 7 Public and Agency Involvement
- 70.90.10 Chapter 7 Public and Agency Involvement Working Draft
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- 70.90.30 Chapter 7 Public and Agency Involvement Final
- 70.90.40 Chapter 7 Public and Agency Involvement References

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- 70.100.10 Chapter 8 List of Recipients Working Draft
- 70.100.20 Chapter 8 List of Recipients Draft
- 70.100.30 Chapter 8 List of Recipients Final

70.110 Chapter 9 List of Preparers
- 70.110.10 Chapter 9 List of Preparers Working Draft
- 70.110.20 Chapter 9 List of Preparers Draft
- 70.110.30 Chapte r9 List of Preparers Final

70.120 Chapter 10 References
- 70.120.10 Chapter 10 References Working Draft
- 70.120.20 Chapter 10 References Draft
- 70.120.30 Chapter 10 References Final

70.130 Chapter 11 Glossary

70.130.10 Chapter 11 Glossary Working Draft

70.130.20 Chapter 11 Glossary Draft

70.130.30 Chapter 11 Glossary Final

70.140 Appendices EIS/EIR Volume 2

75 Final EIR/EIS Document Volume 1

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75.10.10 Cover

75.10.20 Signature Page

75.10.30 Preface

75.10.40 Table of Contents

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75.20.20 Summary Draft Chapter

75.20.30 Summary Final Chapter

75.20.40 Summary Chapter References

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75.30.10 P&N Working Draft Chapter Working Draft Folders are for verification of incorporation of Comment responses.

75.30.20 P&N Draft Chapter

75.30.30 P&N Final Chapter

75.30.40 P&N Chapter References

75.40 Chapter 2 Alternatives

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75.50.10.40 3.1 Introduction References

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	75.50.30.10	3.3 Air Quality Working Draft
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	75.50.40.40	3.4 Noise & Vibration References
75.50.50	3.5 Electromagnetic Interference/Electromagnetic Field (EMI/EMF)	
	75.50.50.10	3.5 EMI/EMF Working Draft
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80.20 Draft MMP

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82 CEQA NOD

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82.20 Final NOD

83 NEPA ROD

83.10 Working Draft ROD

83.20 Draft ROD

83.30 Final ROD

85 Permitting

85.10 404(b)(1) Wetlands Delineation Report

85.10.10 Wetlands Del. Working Draft Report

85.10.20 Wetlands Del. Draft Report

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85.10.40 Wetlands Del. Report References

85.20 ESA Section 7 Biological Assessment

85.20.10 Biological Assessment Working Draft Report

85.20.20 Biological Assessment Draft Report

85.20.30 Biological Assessment Final Report

85.20.40 Biological Assessment Report References

90 Administrative Record

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90.10.10 Final, signed approval resolution

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90.10.30 Exhibit B – MMP

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90.20.10 Notice of Preparation (NOP)

90.20.20 NOP Form Letter

90.20.30 Notice of Intent

90.20.40 Fact Sheets

90.20.50 Scoping Meeting PowerPoint Presentations

90.20.60 Poster Boards

90.20.70 Post Cards

90.20.80 NOP Mailing List Spreadsheet
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90.20.100.10 Sign-in sheets
90.20.100.20 Speaker cards
90.20.100.30 Transcripts
90.20.100.40 Materials submitted by the public at the meeting
90.20.110 Scoping Comment Letters
90.20.120 Scoping Report or any final scoping summary
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90.30.20 Notice of Completion Transmittal
90.30.30 Federal Register Notice
90.30.40 Draft EIR/EIS Postcard
90.30.50 Draft EIR/EIS Postcard Distribution List
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90.30.60.10 Affected Agencies
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90.30.60.40 Other Affected Agencies
90.30.60.50 EIR Repositories
90.30.70 Draft EIR Newspaper Notices
90.30.80 Cover letter for Draft EIR/EIS
90.30.90 Summary of Draft EIR/EIS
90.30.100 Draft Program EIR/EIS, Volume 1 by chapter, with references saved in same subfolder as chapters
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90.30.100.50.20	3.2 Transportation “Three links (chapter, tech report, references)"
90.30.100.50.30	3.3 Air Quality "Three links (chapter, tech report, references)"
90.30.100.50.40	3.4 Noise & Vibration "Three links (chapter, tech report, references)"
90.30.100.50.50	3.5 EMI/EMF "Three links (chapter, tech report, references)"
90.30.100.50.60	3.6 Biological Resources & Wetlands "Three links (chapter, tech report, references)"
90.30.100.50.70	3.7 Geology, Soils, Seismicity” “Three links (chapter, tech report, references)"
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90.30.100.50.110	3.11 Parks, Recreation and Open Space "Three links (chapter, tech report, references)"
90.30.100.50.120	3.12 Aesthetics & Visual Quality "Three links (chapter, tech report, references)"
90.30.100.50.130	3.13 Public Utilities & Energy "Three links (chapter, tech report, references)"
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90.30.110 Records of Draft EIR/EIS Public Hearings

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90.30.110.60 Records of agency consultation on Draft EIR/EIS

90.30.120 Addenda or Errata to Draft EIR/EIS

90.40 Final EIR Process

90.40.10 Notice of Availability of Final EIR/EIS (CEQA notification see 90.40.80 below)

90.40.10.10 Federal Register Notice

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    - 90.40.60.50.90 3.9 Socio Economics, Communities & EJ (links to Draft document)

		90.40.60.50.100	3.10 Local Growth, Station Planning & Land Use (links to Draft document)
		90.40.60.50.110	3.11 Parks, Recreation and Open Space (links to Draft document)
		90.40.60.50.120	3.12 Aesthetics & Visual Quality (links to Draft document)
		90.40.60.50.130	3.13 Public Utilities & Energy (links to Draft document)
		90.40.60.50.140	3.14 Agricultural Land (links to Draft document)
		90.40.60.50.150	3.15 Hydrology & Water Resources (links to Draft document)
		90.40.60.50.160	3.16 Cultural Resources (links to Draft document)
		90.40.60.50.170	3.17 Safety & Security (links to Draft document)
		90.40.60.50.180	Construction Methods and Impacts (links to Draft document)
		90.40.60.50.190	3.18 Cumulative and Secondary (links to Draft document)
		90.40.60.50.200	3.19 Mitigation Summary (links to Draft document)
	90.40.60.60	Chapter 4 Section 4(f) & 6(f) Evaluation (links to Draft document)	
	90.40.60.70	Chapter 6 Unavoidable Adverse Impacts (links to Draft document)	
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	90.40.60.90	Chapter 7 Public and Agency Involvement (links to Draft document)	
	90.40.60.100	Chapter 8 List of Recipients (links to Draft document, Final EIR Distribution List Excel spreadsheet)	
	90.40.60.110	Chapter 9 List of Preparers (links to Draft document)	
	90.40.60.120	Chapter 10 References (links to Draft document)	
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90.40.80 Addenda or Errata to Final EIR/EIS Folders and associated links if needed

90.50 NOD and Filing Fees

90.50.10 Final, signed Notice of Determination

90.50.20 DFG Filing Fee Cash Receipt

90.60 EIR/EIS Reference Documents - This folder should contain a pdf copy of every item in the Draft and Final EIR reference lists.

90.70 Other Materials Prepared or Used by Consultants. This folder should contain any other items that staff/consultants have used in the EIR process that may not have been listed in the EIR reference list. Examples include:

90.70.10 Statewide Route Maps

90.70.20 High-Speed Rail Images

90.70.30 High Speed Rail Implementation Plan

90.70.40 High Speed Rail Business Plan

90.70.50 Ridership Materials

90.70.60 Draft Environmental Methodologies

90.70.70 Regional Rail Documents

90.70.80 Clean Water Act: Section 404(b)(1) Alternatives Analysis (This folder should be the location to save a copy of any correspondence, electronic or paper, that is about the EIR or the project, but is not specifically a comment letter on the EIR during the statutory comment period. For example, copies of letters fr"

90.80 Other Correspondence Related to the EIR/EIS or the Project

90.90 Consultant File Materials Advice on the content of this folder will be provided separately.

90.100 Authority Board Meeting Materials (This folder should include copies of the relevant materials for each Authority board meeting where a project-level EIR is on the agenda, and a consultant produced materials used at the meeting.) Examples of relevant items include:

90.100.10 PowerPoint Presentations

90.100.20 Individual Slides

90.100.30 Videos

90.100.40 Reports or summaries developed for the Authority to review

90.100.50 Other public information items

90.110 Public Information Brochures and Other Materials this folder should include copies of relevant materials that the Authority is producing to publicize the particular EIR or HST segment.

90.120 Videos this folder should include copies of all videos prepared on the particular project.

Appendices B – Parson Brinckerhoff Program Management File Index (PS2)

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- 00 Contracts
- 05 PMT Sub-Agreements
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  - 10 Project Protocols and Procedures
  - 15 Letter Log
  - 20 Meeting Minutes Database
  - 25 PM Project Reports
  - 26 Special Reports
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- 10 New Paper Articles
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- 05 Bay Area Programmatic Files

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  - B. Standardize Forms and Documents
  - C. Organizations
  - D. Acquisition Strategy
  - E. GIS of Parcels
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9. Procurement Documents Templates

10. Construction (Templates)

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12. Staffing Operation (Templates)

13. Maintenance (Templates)

99. Archived Files (Hidden)

Appendices C – Correspondence logging Instructions for PS2

California High Speed Train Project Letter Log - CHSTP Letter Log

The purpose of the letter log is to document all letters sent and received in regards to the California High-Speed Train Project. Each letter shall be numbered and documented in the "CHSTP Letter Log" database on PS2. The intention is that all partners will utilize the log to document their correspondence to and from the Authority and other partners on the project. The letter log database becomes the directory of all incoming and outgoing letters which creates an audit trail and a tool to find historical information.

In addition to this database, all firms are required to keep a paper file of all correspondence pertaining to the CHSTP project within their respective offices.

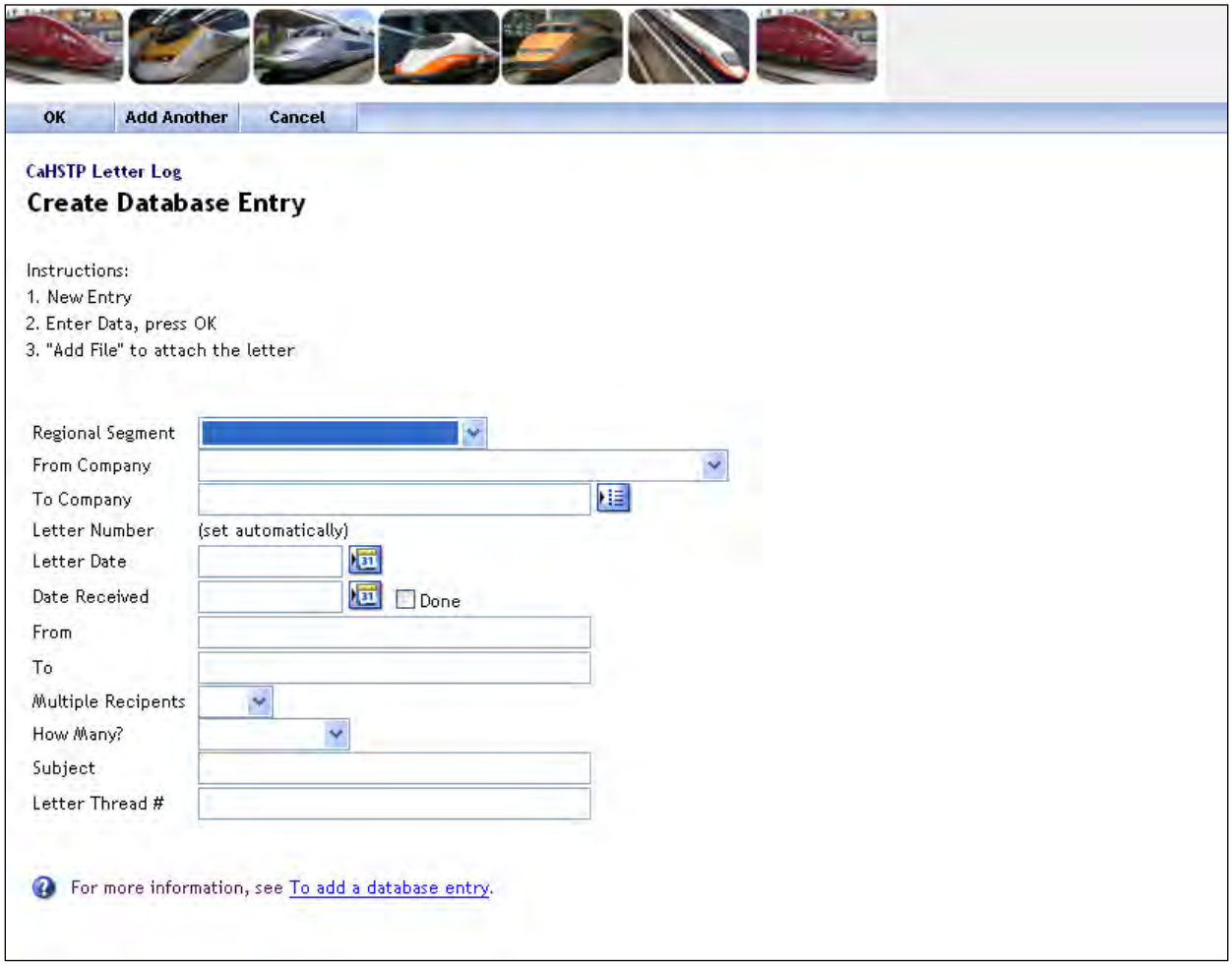
The database is simple and easy to use. The fields are defined as follows:

- Regional Segment: Regional Segment as defined by Contract
- From Company: From the Company
- To Company: To the Company receiving the letter
- Letter #: The number is automatically set by PS2. The format - From Company - To Company -#Number is illustrated as follows: PB-HSR-#00001
- Letter Date: The actual date of the letter
- Date Received: The date the letter is received (optional)
- From: The name of the sender
- To: The name of the recipient (If more than one recipient, then use the first name on the list.)
- Multiple Recipients: If the letter was addressed to more than one person. Answer Yes or No. (This does not include those who are copied.)
- How Many: Enter the number from the pull down menu
- Subject: The subject of the letter
- Letter Thread: If the letter is in response to another letter, that letter number(s) is included here which becomes helpful in seeing the entire sequence of letters over time.
- Comment: Add comment if required

- Letters Attached: The letter and its attachments can be placed in the database.

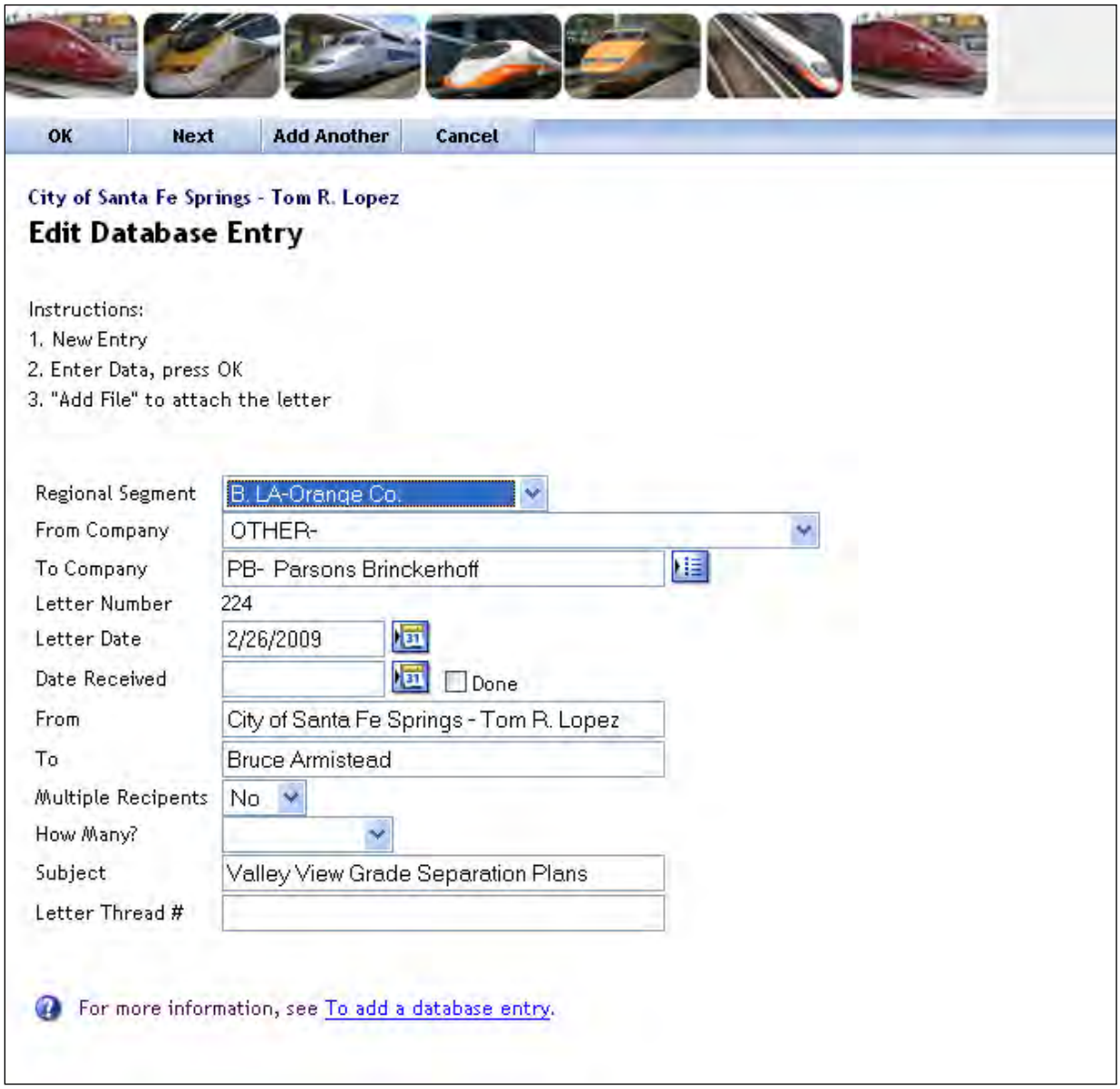
If you have questions or problems, please contact Richard Frankhuizen at Frankhuizen@pbworld.com or at 916 718-4834

The input screen.



Sample Entry

An entry of a letter log from Tom Lopez of the City of Santa Fe Springs to Bruce Armistead of Parsons Brinckerhoff.



Instructions:

1. Click “New Entry”
2. Enter Data as illustrated above and press “OK”
3. "Add File" to attach the letter.
4. Click OK

5. Write the Letter Number on the Document in the top right hand corner. In this case Letter Number 224.

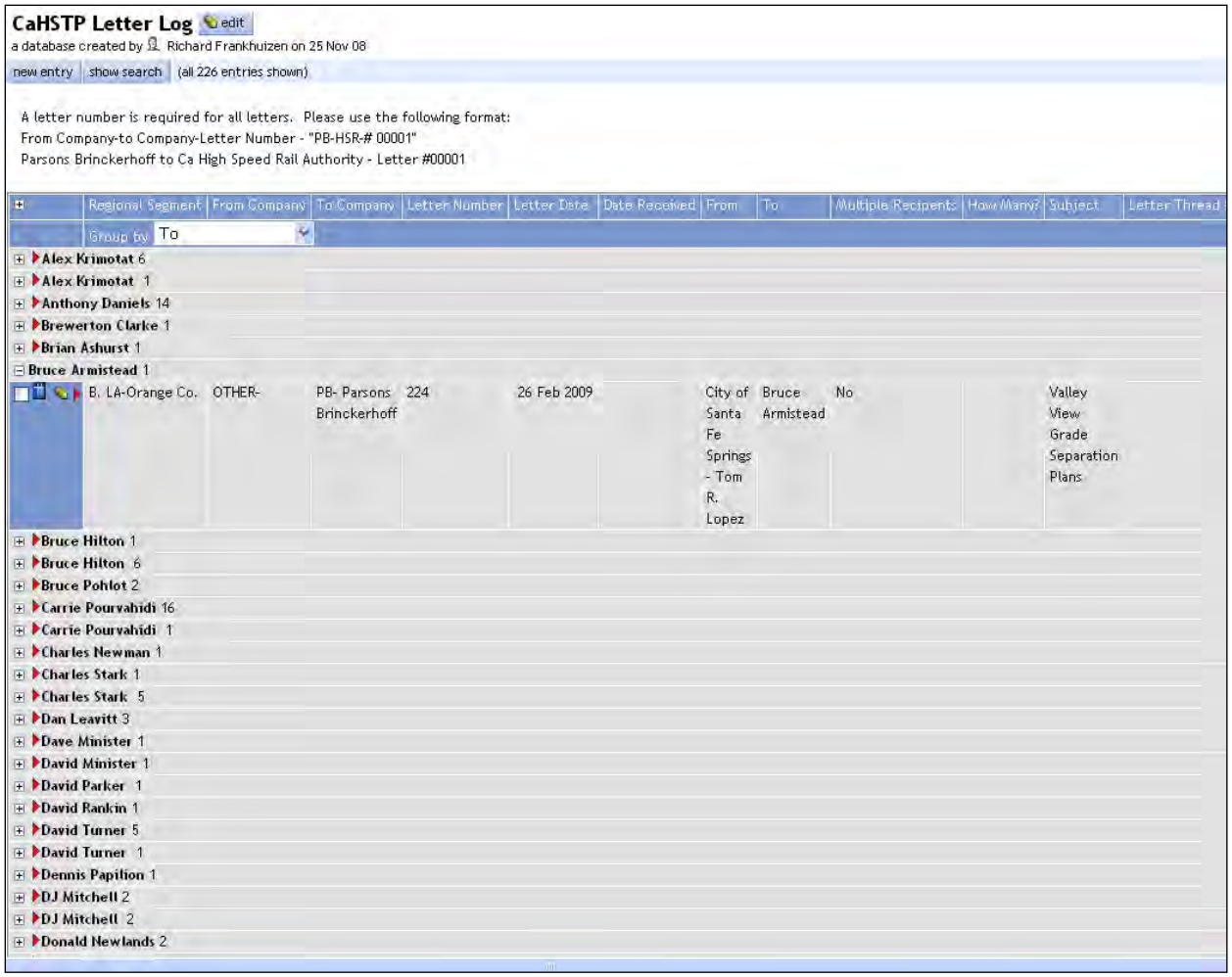
   Written as OTHER-PB–00224

6. You may attach the letter at this step or come back later to add the file by left clicking on the square button.

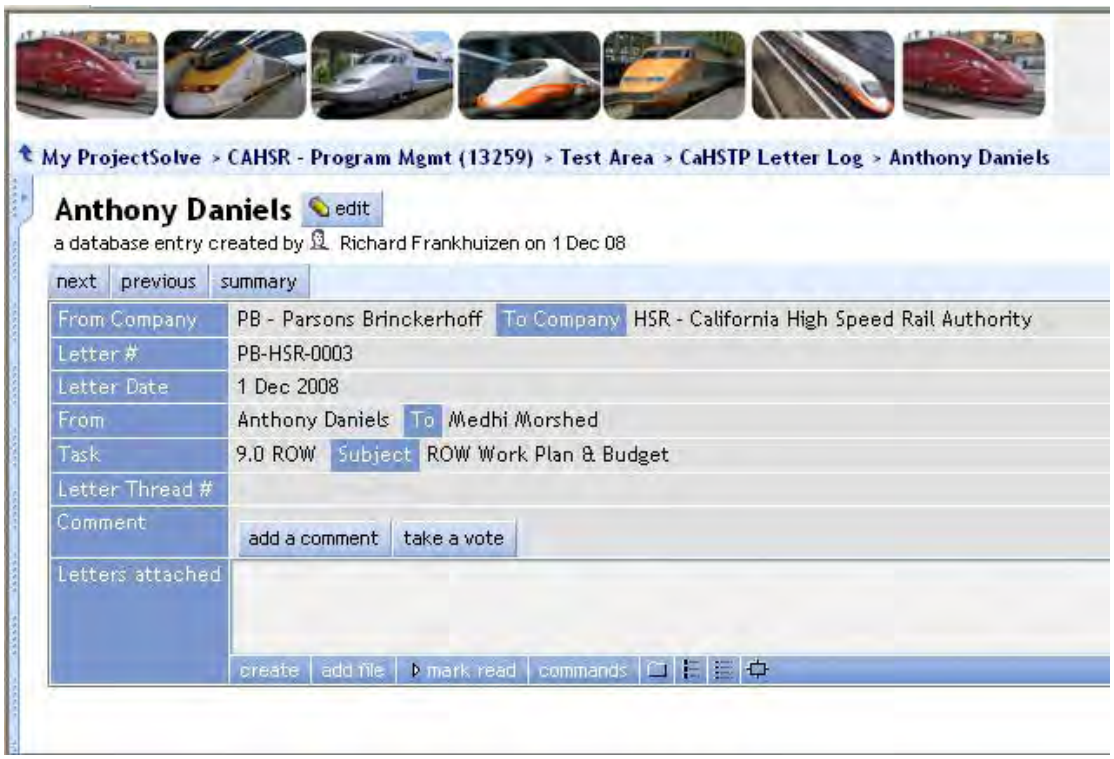
   Add another will take you to a new blank Entry Screen.

   This means that one must go the summary page after completing the entries to get the letter number for each document. At which time document them on each letter.

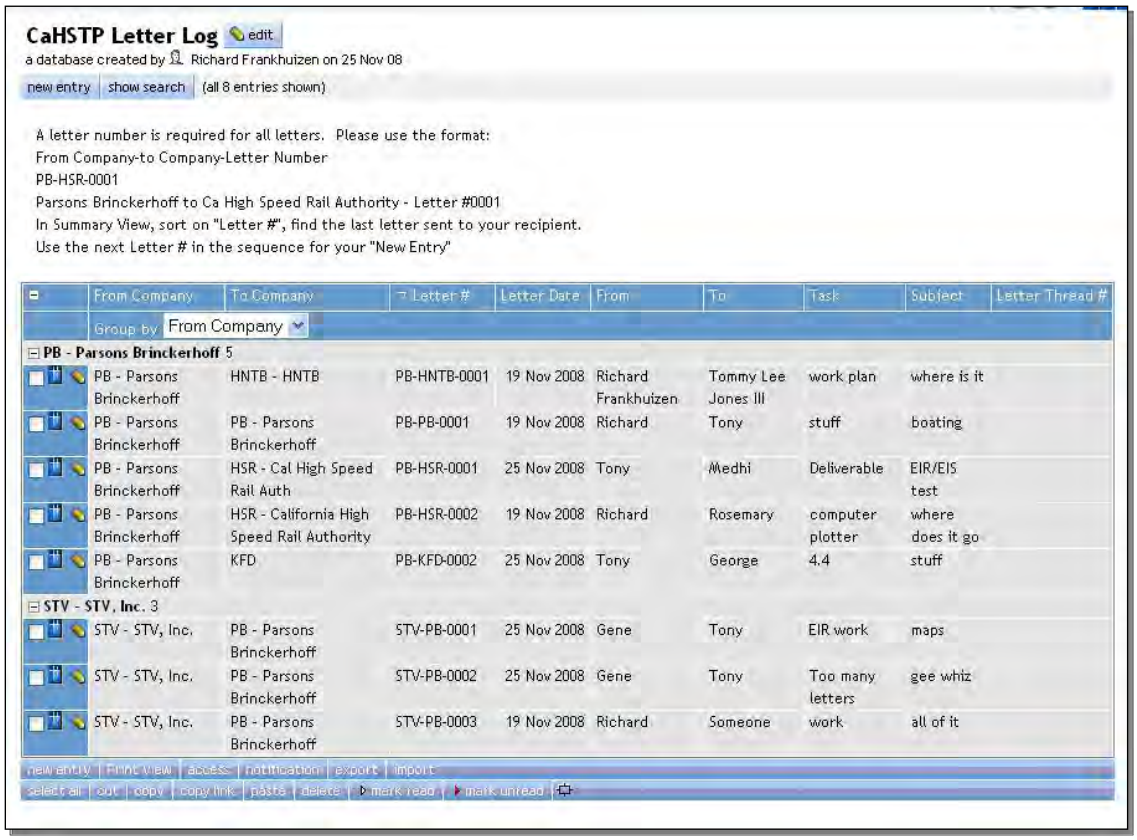
7. Your entry is complete.



If you wish to view the specific entry,



In the summary view, grouped by "From Company" the list of letters can be viewed.



A sample letter with the letter number

DRAFT submittal letter format

PARSONS BRINCKERHOFF

3840 Rosin Court
Suite 200
Sacramento, CA 95834

December 1, 2008
To: Mr. Medhi Morshed
California High Speed Rail Authority
925 L Street, Suite 1425
Sacramento CA 95814

Letter #: PB-HSR-#00003

Include the letter #

RE: Task 9.0 – ROW Work Plan & Budget

Dear Mr. Morshed,

Parsons Brinckehroff submits the requested Work Plan and Budget for the Right of Way Activities for this fiscal year.

Task	Deliverable	Quantity	Comments Due by	Status
9.0	Task 9.0 ROW Work Plan and Budget	1 hard copy + 1 CD	12/12/2008	☐X Draft for review ☐Final Draft ☐Final Submittal

This deliverable was prepared to support the High Speed Rail Program and has been internally reviews in accordance with our Quality Assurance/Control procedures.

The enclosed document is located on PS2 at _____. We request your comments by December 12, 2008. The Comment Resolution Conference is scheduled to take place on December 17, 2008 at 10 am.

Thank you,

Anthony Daniels
Program Manager

Attachments: 9.0 ROW Work Plan and Budget

cc: John Doe

PB File: Sample Letter.doc

Regional Segments

S. Statewide
A. LA - Palmdale
B. LA-Orange Co.
C. LA-San Diego
D1. Palmdale - Bakersfield
D2. Bakersfield - Fresno
E1. Fresno to Merced
E2. Merced to Sacramento
F. Altamont Pass
G. Merced to San Jose
H. San Jose - San Francisco

To and From Company Choices

AEC – AECOM
ATC – All Transit Consultants LLC
BNSF – Burlington Northern Santa Fe Railway
CAL – Caltrans-Department of Transportation
CALT – Caltrain
CC – Cordoba Corporation
CHSRA – California High Speed Rail Authority
CS – Cambridge Systematic
DCG – Deutschman Consulting Group
DOJ – Department of Justice
ELE – Elected Officials
ET – Earth Tech
FRA – Federal Railroad Administration
GS – Goldman Sachs
GVT – Embassy, Consulate, or Government office
HMM – Hatch Mott McDonald
HNTB -
IMG – Infrastructure Management Group
JE – Jacobs Engineering
JPB – Joint Powers Board
KFD – Kleinfelder, Inc
LB – Lehman Brothers
LPA – Lucas Public Affairs
MTA – Los Angeles Metropolitan Transportation Authority
NEW – Newlands & Company
OCTA – Orange County Transportation Authority
OTHER –
PAR – Parsons
Parsons Brinckerhoff
PMT – Project Management Team
PP – Paragon Partners, LTD
PP – Private Party – Individual or Corp
RC – Regional Consultants
RMC – Regional Managers & Consultants
RM – Regional Managers
SCS – SC Solutions, Inc.
SYS – SYSTRA Consulting
STV –
TALC- Transportation and Land Use Coalition
TDC – The Duffey Company
TEC – Turner Engineering Corporation
TJPA – Transbay Joint Powers Authority
UCB – UC Berkeley
UPRR – Union Pacific Railroad
URS –
VAI – Virginkar Associates Inc

Appendices D – Parsons Brinckerhoff FTP Site Procedures (for transferring large files)

For exchange of large sized files, the Parsons Brinckerhoff FTP site will be used. To access this tool, connect to the internet, open Internet Explorer and type into the Address bar http://ftp.pbworld.com

Sending a file

- Click on **Browse** and find the file you want to upload from your computer or network drive.
- Highlight the file you want to upload and click **OPEN**. You may send only one file at a time.
- Click on the **Upload** button once you have chosen the file. You will see the status bar change and you will see the message *Uploading File….please wait*.
- After the upload has completed, enter your name and your email address.
- Enter the email address of the recipient. You can send to multiple recipients by separating addresses with a semicolon e.g.: smith@IBM.com; fred@cisco.com
- If there is something specific you need to say regarding the file, you may add text to the standard message that appears. Consider adding your specific remarks at the beginning of the message where they have a better chance of being noticed.
- Click the **Send Email** button.
- If you wish to send the same file to another recipient but in a separate transmittal from your first one, you may do so after the first email has been sent. After you click on **Send Email**, note that the recipient field has been cleared but these things are still showing: (1) the uploaded file name, (2) your name, (3) your email address. All that is required is for you to enter the new recipient's email address.
- If you wish to send a different file now to the same or other recipients, click on **Public Upload** which you will now see in small letters below the Send Email button.

Receiving a file

- The recipient will receive an email, containing a link to the uploaded file.
- Click the **link to access the file.**
- The recipient will be asked to either "open" or "save" the file. We recommend that the recipient SAVE the file at this point. A window will allow the recipient to specify a filename and location. The file will be a zipped file, to be opened using WINZIP later. (If the recipient chooses Open rather than Save, they may occasionally get a WINZIP windows which appears with no file in it, depending on how their WINZIP installation was configured.)

Problems

If you are having problems uploading or downloading large files, it may be related to timeouts. Timeouts are most commonly caused by slow or busy internet links. If you are having this problem, try downloading the file during a quiet period (early morning or evenings are the best times). File size limit is 100 mb.

When downloading a file, it is a good idea to verify that the download is completed. Check the size of the file as it starts to download. When complete, check this size against the size of the file saved on your machine: they should be the same. If they are not the same this means that the download ended prematurely. To correct this, just click on the link again and save the file with exactly the same name. In most cases, the download will continue from where it stopped.

For support, Parsons Brinckerhoff staff should contact the local LAN Admin as the first step. If she/he cannot help, Parsons Brinckerhoff staff can contact one of the following people for more assistance: Ali Khomusi (Khomusi@pbworld.com) 212-465-5651 or Andrew Nolan (nolana@pbworld.com) 212-465-5369

CALIFORNIA HIGH SPEED RAIL AUTHORITY

November 2011

Edmund G. Brown Jr
Governor
State of California

SMALL AND DISADVANTAGED BUSINESS ENTERPRISE PROGRAM

The California High Speed Rail Authority is committed to making small business a top priority in all contracting phases of this historic infrastructure project. Our goal is to achieve 30 percent small and disadvantaged business participation on the project. This commitment will serve to inspire business growth, job creation and workforce development opportunities while building the vitality of California's high speed rail program.

Roelof van Ark
Chief Executive Officer
California High Speed Rail Authority
770 L Street,
Sacramento, CA 95814
www.**cahighspeedrail.ca**.gov
(916) 324-1541

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I. SUBPART A – GENERAL REQUIREMENTS

I.A. Program Authority and Applicability

Pursuant to the CHSRA's project funding assurances, the SB Program is authorized by Executive Order S-02-06; and by Title VI of the Civil Rights Act of 1964 and related statutes.

This SB Program Plan is applicable to the CHSRA's State financially assisted and Federal USDOT (FRA) financially assisted projects. To ensure success of the program, the CHSRA will require strict compliance in meeting the program objectives and corresponding requirements by all CHSRA staff, its Contractors, Consultants and subcontractors, regardless of tier.

The SB Program:

1. Complies with State laws and Federal regulations and financial assistance agreements;
2. Meets legal standards of application;
3. Ensures non-discrimination in the award of State and DOT-assisted contracts; and
4. Reaffirms the CHSRA's commitment to fairness and the principles of equal opportunity.

In the event of any conflicts or inconsistencies between the Federal regulations and the SB Program with respect to DOT-assisted contracts, the regulations shall prevail.

Design Build Contracts

The CHSRA recognizes that certain modifications are necessary to adapt the SB Program for use in connection with Design-Build contracts and has therefore set forth prescribed requirements specific to Design Build projects in compliance with the best practices of State and Federal SB/DVBE/DBE program provisions.

I.B. Definitions

Some of the most common terms, as used in the SB Program Plan, are defined as follows:

Commercially Useful Function (CUF): The definition for CUF, as used in this plan, applies to Small Business, Disabled Veteran Business Enterprise and Disadvantaged Business Enterprise as set forth below:

DVBE:

(B) ("Disabled veteran business enterprise contractor, subcontractor, or supplier" which means any person or entity that has been certified by the administering agency pursuant to this article and that performs a "commercially useful function," as defined below, in providing services or goods that contribute to the fulfillment of the contract requirements)

Pursuant to the Military and Veteran Code 999(b) (5):
(i) A person or an entity is deemed to perform a "commercially useful function" if a person or entity does all of the following:
(I)(aa) is responsible for the execution of a distinct element of the work of the contract.

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(ab) carries out the obligation by actually performing, managing, or supervising the work involved.
(ac) performs work that is normal for its business services and functions.
(II) is not further subcontracting a portion of the work that is greater than that expected to be subcontracted by normal industry practices.
(ii) a Contractor, subcontractor, or supplier will not be considered to perform a "commercially useful function" if the Contractor's, subcontractor's, or supplier's role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of a disabled veteran business enterprise participation.

DBE:

Pursuant to Title 49 CFR Part 26.55 (1), "A DBE performs a commercially useful function when it is responsible for the execution of the work of the contract and is carrying out its responsibilities by actually performing, managing, and supervising the work involved. The DBE must also be responsible, with respect, to materials and supplies used on the contract, for negotiating price, determining quality and quantity, ordering the material and installing and paying for the material itself." As stated in 49 CFR Part 26.55 (2)(3), "A DBE does not perform a CUF if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to obtain the appearance of DBE participation. A DBE does not perform a CUF if it does not perform or exercise responsibility for at least 30 percent of the total cost of its contract with its own work force, or the DBE subcontracts a greater portion of the work of a contract than would be expected on the basis of normal industry practice for the type of work involved."

SB:

Pursuant to the California Code of Regulations §1896.4(h), a CUF for SB participation is determined by:

(i) The Contractor or subcontractor is responsible for the execution of a distinct element of the work of the contract; carrying out its obligation by actually performing, managing, or supervising the work involved; and performing work that is normal for its business services and functions; and
(ii) The Contractor or subcontractor is not further subcontracting a greater portion of the work than would be expected by normal industry practices.
(iii) The Contractor or subcontractor is responsible, with respect to materials and supplies provided on the subcontract, for negotiating price, determining quality and quantity, ordering the material, installing (when applicable), and paying for the material itself.
(iv) A Contractor or subcontractor will not be considered as performing a CUF if its role is limited to that of an extra participant in a transaction, contract, or project through which funds are passed in order to achieve the appearance of small business participation.

Compliance: A Contractor has correctly implemented the requirements of the SB Program.

Contract: A legally binding relationship obligating a seller to furnish supplies or services (including, but not limited to construction and professional services) and the buyer to pay for them.

Contractor: One who participates, through a prime contract, in the CHSRA's Design Build program. In this SB Program plan, Contractor shall also mean--Design-Builder, Master Contractor, Prime Contractor, and Prime Consultant.

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DBE Directory: List of certified Disadvantaged Business Enterprises firms, which is used by the CHSRA and its Contractors to identify DBE potential Contractors and subcontractors and suppliers.

Department of Transportation or USDOT: The U.S. Department of Transportation, including the Office of the Secretary, the Federal Railroad Administration (FRA), Federal Highway Administration (FHWA), the Federal Transit Administration (FTA), and the Federal Aviation Administration (FAA). Department of Transportation is also synonymous with Operating Administration.

Disabled Veteran Business Enterprise (DVBE): A DVBE business is defined as a business that is at least 51 percent owned by a disabled veteran who has at least a 10 percent service connected disability, a veteran of the United States military, and a California resident. This certification is issued by the California Department of General Services.

Disadvantaged Business Enterprise (DBE): A for-profit small business concern—

- That is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged or, in the case of a corporation, in which 51 percent of the stock is owned by one or more such individuals;
- Whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it; and
- Has been certified as Disadvantaged in accordance with 49 CFR 26.

DBE Certification: A certification issued to a firm by a certifying member agency of the California Unified Certification Program (CUCP) which has been determined to meet all the requirements in accordance with 49 CFR Part 26. All certification determinations are evidenced by a letter of DBE certification issued by the certifying CUCP member.

DOT-Assisted Contract: A contract funded in whole or in part with DOT financial assistance, including letters of credit or loan guarantees.

Goal: A numerically expressed objective, which the CHSRA or its Contractors are required to make Good Faith Efforts to achieve.

Good Faith Efforts: Efforts to achieve a SB goal or other requirement of this part which, by their scope, intensity, and other appropriateness to the objective, can reasonably be expected to fulfill the program requirement.

Micro-Business (MB): A Micro Business is independently owned and operated; not dominant in field of operation; principal office located in California; owners (officers, if a corporation) domiciled in California; and, including affiliates, annual gross receipts of $3,500,000 or less, over the last three tax years; or is a manufacturer with 25 or fewer employees. This certification is issued by the California Department of General Services.

North American Industrial Classification System (NAICS): The five to six digit classification number which best describes the primary business of a firm. The basis for industry classification changed from the 1987 Standard Industrial Classification System (SIC) to the 2002 NAICS.

Non-compliance: A Contractor who has not correctly implemented the requirements of the SB Program.

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Professional Services: Professional services that are infrequent, technical, or unique functions performed by independent Contractors or consultants whose occupation is the rendering of such services.

Program: Any undertaking on the CHSRA to use State and DOT financial assistance authorized by laws to which the SB Program applies.

Race-Conscious Measure: A program or portion thereof that focuses specifically on assisting only DBEs, including women-owned DBEs, by the development and inclusion of numeric participation goals.

Race-Neutral Measure: A program or portion thereof that, assists all small businesses regardless of ownership through community outreach and awareness programs to participate successfully in the CHSRA's procurement program. For the purposes of the SB Program, "race neutral" includes gender neutrality.

Small Business (SB): A Small Business is independently owned and operated, principal office is located in California and owners live in California, business grosses $14 million or less over the previous three tax years, and is not dominant in its field of operations. This certification is issued by the California DGS. On the CHSRA's DOT-assisted contracts all certified SB firms are eligible to be credited toward meeting the SB goal. Certified SB firms participating on federal-assisted contracts are not required to have a principal office located in California.

Small Business Administration (SBA): The United States Small Business Administration.

Small Business Concern: With respect to firms seeking to participate as SB or DBE in DOT-assisted contracts, a business which meets the definition contained in Section 3 of the Small Business Act and Small Business Administration regulations implementing it (13 CFR Part 121) that also does not exceed the cap on average annual gross receipts specified in 49 CFR Part 26.65 (b).

Small Business Liaison Officer (SBLO): The SBLO shall be responsible for implementing all aspects of the CHSRA SB Program.

Socially and Economically Disadvantaged Individual: Any individual who is a citizen (or lawfully admitted permanent resident) of the United States and who is—

(1) Found by the CHSRA to be a socially and economically disadvantaged on a case by case basis by a certifying agency pursuant to the standards of the USDOT Title 49 CFR Part 26.

(2) A member of any one or more of the following groups, members of which are rebuttably presumed to be social and economically disadvantaged:

(i) "Black Americans" which includes persons having origins in any of the Black racial groups of Africa;

(ii) "Hispanic Americans" which includes persons of Mexican, Puerto Rican, Cuban, Dominican, Central or South American, or other Spanish or Portuguese culture or origin, regardless of race;

(iii) "Native Americans" which includes persons who are American Indians, Eskimos, Aleuts, or Native Hawaiians;

(iv) "Asian Pacific Americans" which includes persons whose origins are from Japan, China, Taiwan, Korea, Burma (Myanmar), Vietnam, Laos, Cambodia (Kampuchea), Thailand, Malaysia, Indonesia, Philippines, Brunei, Samoa, Guam, the U.S. Trust Territories of

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the Pacific Islands (Republic of Palau), the Commonwealth of the Northern Marianas Islands, Macao, Fiji, Tonga, Kirbati, Juvalu, Nauru, Federated States of Micronesia, or Hong Kong;

(v) "Subcontinent Asian Americans" which includes persons whose origins are from India, Pakistan, Bangladesh, Bhutan, the Maldives Islands, Nepal or Sri Lanka;

(vi) Women; and

(vii) Any additional group whose members are designated as socially and economically disadvantaged by the SBA, at such time as the SBA designation becomes effective.

Subcontractor: (a) Prior to contract award, any person with whom the Offeror proposed to enter into a subcontract for any part of the work, or that will enter into a sub-subcontract for any part of the work, at any tier; or (b) after contract award, any person with whom the Contractor has entered into a subcontract for any part of the work, or with whom the Contractor has entered into a subcontractor for any part of the work, or with whom any subcontractor has further subcontracted any part of the work, at all tiers. In this SB Program plan, Subcontractor shall also mean—Supplier, Vendor, Services, to include general and professional services, regardless of tier.

Work Code: A code that identifies the various components or function areas of what is associated with the products or services of a particular company. The determination of the work to be performed by a DBE is made during the certification process using the analysis in 49 CFR Section 26.71(n). The regulations state, in part, that certification to a firm is granted only for specific types of work in which the socially and economically disadvantaged owners perform. To determine if the firm is qualified to perform the type of work, a review is made by the California Unified Certification Program as a recognized certifying agency authorized by USDOT.

Unified Certification Program (UCP): One-stop certification clearinghouse, enabling applicants to apply once for DBE certification which, will be honored by all DOT recipients in the state of California.

Vendors Registry List: A list of all contractors, SB and Non-SB, which have expressed an interest in bidding on the CHSRA's prime contracts and subcontracts on the CHSRA assisted projects. The purpose of this list is to provide as accurate data as possible about the universe of SBs and non-SBs who seek to work on the CHSRA contracts.

I.C. Non-discrimination Requirements

The CHSRA will not exclude any person from participation in, deny any person the benefits of, or otherwise discriminate against anyone in connection with the award and performance of any contract.

In administering its SB Program, the CHSRA will not, directly or through contractual or other arrangements, use criteria or methods of administration that have the effect of defeating or substantially impairing accomplishment of the objectives of the SB Program with respect to individuals of a particular race, color, sex, disability or national origin.

<u>For Strictly State Funded Contracts</u>

In accordance with State nondiscrimination program requirements as set forth in Government Code Section 12990 et seq and Title 2, California Code of Regulations, Division 4, Chapter 5, Sections 8103, 8104, 8108 and 8113 (unless exempted pursuant to Section 8115) Contractors or subcontractor firms with 50 or more employees shall provide a description of the firm's nondiscrimination plan designed to eliminate discrimination based on race, color, religion, age, sex, sexual orientation, disability, or national origin.

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Each firm (Contractor or subcontractor) with fewer than 50 employees must provide a statement indicating that the firm has fewer than 50 employees and is therefore exempt from the Nondiscrimination Plan requirement.

For Federal Funded Contracts:

In accordance with Title VI of the 1964 Civil Rights Act, Contractors and Consultants (regardless of tier) shall comply with the following non-discrimination requirements.

A. **Compliance with regulations:** The Contractor shall comply with regulations relative to Title VI (nondiscrimination in federally-assisted programs of the U.S. Department of Transportation - Title 49 CFR Part 21 and Part 26.7 - Effectuation of Title VI of the 1964 Civil Rights Act). Title VI provides that the recipients of Federal assistance will implement and maintain a policy of nondiscrimination in which no person shall, on the basis of race, color, or national origin, be excluded from participation in, denied the benefits of or subject to discrimination under any program or activity by the recipients of Federal assistance or their assignees and successors in interest.

B. **Nondiscrimination:** The Contractor, with regard to the work performed by it during the Agreement shall act in accordance with Title VI. Specifically, the Contractor shall not discriminate on the basis of race, color, or national origin in the selection and retention of subcontractors, including procurement of materials and leases of equipment. The Contractor shall not participate either directly or indirectly in the discrimination prohibited by 49 CFR Part 21.5 of the USDOT's regulations, including employment practices.

C. **Solicitations for Subcontracts, Including Procurements of Services, Materials and Equipment:** In all solicitations, either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the Contractor of the Contractor's obligations under this Agreement and the Regulations relative to nondiscrimination on the grounds of race, color or national origin.

D. **Information and Reports:** The Contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and facilities as may be determined by the CHSRA or any duly authorized representative of the Federal Government to be pertinent to ascertain compliance with such regulations or directives. Where any information required of a Contractor is in the exclusive possession of another who fails or refuses to furnish this information, the Contractor shall so certify to the CHSRA, or any duly authorized Federal Agency as appropriate, and shall set forth what efforts it has made to obtain the information.

E. **Sanctions for Noncompliance:** In the event of the Contractor's noncompliance with the nondiscrimination provisions of this Agreement, the CHSRA shall impose such Agreement sanctions as it or any Federal funding agency may determine to be appropriate, including, but not limited to:

1) Withholding of payments to the Contractor under the Agreement until the Contractor complies, and/or
2) Cancellation, termination or suspension of the Agreement, in whole or in part.

F. **Incorporation of Provisions:** The Contractor shall include the provisions of paragraphs (A) through (F) in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations or directives issued pursuant thereto.

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The Contractor will take such action with respect to any subcontractor or procurement as the CHSRA or any Federal funding agency may direct as a means of enforcing such provisions including sanctions for noncompliance.

The CHSRA will ensure that the following clause is placed, verbatim in every DOT-assisted contract with statutory authority to implement Title 49 CFR Part 26 requirements and subcontract regardless of tier.

> *The Contractor, sub-recipient, or subcontractor shall not discriminate on the basis of race, color, or national origin, in the performance of this contract. The Contractor shall carry out applicable requirements of 49 CFR Part 26.13(b) in the award and administration of DOT assisted contracts. Failure by the Contractor to carry out these requirements is a material breach of this contract, which may result in the termination of this contract or such other remedy as the CHSRA deems appropriate.*

I.D. Federal Financial Assistance Agreements

Pursuant to Public Utilities Code 185036(d) the CHSRA may enter into a cooperative or joint development agreement with local governments or private entities. As a condition of receiving Federal financial assistance funds, the local government or private entities must adhere to and develop and implement a DBE Program in accordance with 49 CFR Part 26 requirements, where applicable.

Pursuant to Federal provisions, the CHSRA shall require the local government or private to provide assurances of their compliance with the Federal financial assistance agreement. The following language is to be used as required by 49 CFR Part 26.13(a), and will appear in financial assistance agreements with local governments or private entities.

> <u>Assurance: 49 CFR Part 26.13(a)</u>
>
> *The (INSERT LOCAL GOVERNMENT OR PRIVATE ENTITY NAME) shall not discriminate on the basis of race, color, national origin, or sex in the award and performance of any USDOT assisted contract or in the administration of its DBE Program or the requirements of 49 CFR Part 26. The (INSERT NAME) shall take all necessary and reasonable steps under 49 CFR Part 26 to ensure nondiscrimination in the award and administration of USDOT assisted contracts. The CHSRA SB Program, as required by 49 CFR part 26 and as approved by FRA or FTA, is incorporated by reference in this agreement. Implementation of this program is a legal obligation and failure to carry out its terms shall be treated as a violation of this agreement. Upon notification to the CHSRA of (INSERT NAME) failure to carry out its approved program, the FRA or FTA may impose sanction as provided for under Part 26 and may, in appropriate cases, refer the matter for enforcement under 18 U.S.C. 1001 and/or the Program Fraud Civil Remedies Act of 1986 (31 U.S.C. 3801 et seq.).*

The CHSRA shall maintain program oversight to ensure the local government or private entity complies with 49 CFR Part 26 requirements, where applicable, under the cooperative or joint development agreement.

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II. SUBPART B- RESPONSIBILITY OF SB PROGRAM IMPLEMENTATION

II.A SB Liaison Officer (SBLO)

The CHSRA's Chief Executive Officer (CEO) designates the SBLO to administer the day to day operations of the SB Program. The SBLO has direct, independent access to the CEO of CHSRA concerning SB Program matters. The SBLO contact information is:

Chris Ryan, Chief Deputy Director
Small Business Liaison Officer
California High Speed Rail Authority
770 L Street, Suite 800
Sacramento, CA 95814
(916) 324-1541

The SBLO or its designee, is responsible for implementing all aspects of the SB Program and ensuring that CHSRA complies with all provisions of the Executive Order S-02-06 and 49 CFR Part 26.25, where applicable. An organization chart displaying the SBLO position in the organization is found in Attachment 1 to this plan.

In this capacity, the SBLO is responsible for developing, implementing and monitoring the SB Program, in coordination with other appropriate officials. The SBLO shall have appropriate resources to assist in the administration of the program. The duties and responsibilities include, and are not limited to the following:

- Develops, implements and monitors, the SB Program plan, keeping it up-to-date with the current business environment and the latest revisions to the applicable State and Federal laws and regulations, ensuring the SB Program is responsive to and in compliance with the regulations, including, but not limited to, the Executive Order S-02-06 and 49 CFR Part 26, where applicable.
- Ensures the CHSRA employees and its vendors under contract; understand the importance of the SB Program and meeting the established SB participation goals.
- Provides SB Program training to the CHSRA employees, Program Management Teams and others as appropriate.
- Gathers and reports statistical data as required for appropriate entities.
- Reviews third party contracts and purchase requisitions for compliance with this program.
- Works with the Program Management Team to set an overall annual business goal.
- Ensures bid notices and requests for proposals are available to SBs in a timely manner.
- Identifies DOT-assisted contracts and procurements and assesses viability for race-neutral or race-conscious contract-specific goal application, where applicable.
- Analyzes progress toward goal attainments and identifies ways to improve progress.
- Participates in SB meetings and outreach events.

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- Participates in the development and review of contract specifications and solicitations.
- Advises the CEO and the CHSRA's Board on SB matters and achievements.
- Plans and participates in SB training seminars.
- Conducts business outreach and assists SBs in obtaining the necessary information to compete on contracts by providing guidance and direction, and advising SBs on where to seek management, technical business development expertise, bonding, lines of credit and other supportive services.
- Provides guidance and assistance to Contractors on the development and implementation of their SB Program Performance Plans.
- Reviews SB participation reports from Contractors and makes recommendations, where applicable.
- Monitors and conducts SB Program reviews of the Contractors adherence with the SB Program and Performance Plans.
- Ensures coordination of the SB Program deliverables with CHSRA managers, the CHSRA Board, Governor's Office, DGS, Federal Railroad Administration, Federal Transit Administration, local agencies and the business community.
- Ensures only firms meeting eligibility standards participate and count towards the overall SB goal.

II.B. Shared Responsibility

The following CHSRA divisions have a shared responsibility to achieve the overall SB Program goals and ensure compliance and success of the SB Program.

Administrative Services - Procurements and Contracts, responsibilities will include and are not limited to the following:

- Provides draft scopes of work and engineering estimates to enable the SBLO to actively engage in goal setting, outreach and the development of appropriate SB language in solicitation documents.
- Provides the SBLO with copies of final Information For Bids (IFB), Request for Proposal (RFP), Request For Interest of Qualification (RFIQ), Purchase Orders (PO), mailing lists and advanced notices on CHSRA procurements.
- Incorporates SB goals and compliance language into the solicitations.
- Notifies the SBLO of any changes to IFBs, RFIQs, RFPs and POs.
- Sends information on contracting opportunities to the SBs on the Vendors Registry list.

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- Documents the placement of legal notices in response to Title VI and 49 CFR Part 26 publication requirements for overall project and contract-specific goals, as applicable. Notices will be placed in general, trade and minority focused newspapers.

- Notifies the SBLO of pre-bid, pre-proposal and pre-construction conferences.

- Solicits and maintains SB Vendors Registry List listing organized by predetermined categories and assists in the identification of potential SB vendors and contractors.

- Requests SBLO or staff member participation on Bid and Proposal Evaluation, and Negotiation Committees or Teams.

- Forwards copies of Bids and Proposals to the SBLO for evaluation of responsiveness and or responsibility to SB requirements.

- Participates in outreach programs, including vendor fairs.

- Collects, tracks and reports quarterly and annual SB reports to State and Federal officials.

- Assists the SBLO in compiling Federal financial assistance information and data in order to calculate the appropriate DBE goal, as applicable.

- Assists the SBLO to identify SB financial institutions, bonding and insurance programs to help increase the number of SB participating in contracts and subcontracts.

- Assists on other contract administration that impacts SB participation.

II.C. Other Program Support Divisions

The CHSRA personnel, divisions and Program Management Teams share in the responsibility for ensuring the effective implementation and success of the SB Program. The program support divisions and Program Management Teams are expected to give their full cooperation and active support to the SBLO in this effort.

Program Management Teams responsibilities will include, and not limited to:

- Develops a working knowledge of the SB Program's policies, practices and procedures including race neutral and race conscious methods of achieving SB participation, by reading the SB Program requirements;

- Notifies the SBLO in a timely manner of their project's Pre-Proposal or Pre-Bid conferences and "Kick-Off" meetings.

- Structures individual contracting actions to create a level playing field and participation by SB wherever possible. This includes dividing a contract statement of work, where possible, into portions that will enable SBs to compete as Contractors. Proper use of this structuring for SB participation shall not result in the avoidance of proper approval authority. This also includes, if not prohibited by State law, waiving or reducing bonding requirements or allowing for incremental bonding.

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- Assists the SBLO to perform ongoing contract compliance and monitoring to ensure that SBs are used on the contracts and subcontracts.

- Assists the SBLO to obtain SB participation data records and reports, to include reviewing the documents for compliance with the contract terms and conditions and SB Program requirement.

- Identifies and refers potential SB utilization issues promptly to the SBLO.

- Responds promptly to other SB related requests.

Communications and Outreach Team responsibilities will include, and not limited to:

- Provides up-to-date information electronically, on the CHSRA website, regarding contracting opportunities, upcoming events and current SB Program information.

- Ensures similar business opportunities and events are posted on the DGS and BidSync website.

- Assists the SBLO to provide technical assistance to firms requesting to be placed on the Vendors Registry list, provides database information, including detailed step by step instructions on how to register on Vendors Registry database, and responds to questions about doing business with the CHSRA.

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III. SUBPART C - ADMINISTRATIVE REQUIREMENTS

III.A. Data Collection and Reporting

State SB Reporting

Pursuant to Government Code § 14838, the CHSRA will report SB participation to the CHSRA's Board, DGS, and California Legislators through the Standard Form 810—Contracting Activity Report and related Form 810's. The report shall be submitted to DGS by July 31 of each year. The data will include SB contract and subcontract awards for previous fiscal year on strictly State funded contracts (See Attachment 2—Standard Form 810).

Federal SB Reporting

The CHSRA will report SB, including DBE participation utilizing the existing USDOT Uniform Report of DBE Awards/Attainments Form. The report will be submitted to the FRA, on a semi-annual basis (June 1 and December 1) each year. The June 1 report shall include information from October 1 through March 31. The December 1 report shall include information from April 1 through September 30. These reports will capture SB, including DBE participation for DOT financially assisted contracts awarded during the reporting period and actual SB attainments based on payments made to SBs and DBEs on DOT financially assisted contracts closed within the respective reporting period (See Attachment 3 for the USDOT Uniform Report of DBE Awards and Commitments Form).

In the event that the CHSRA receives USDOT financial assistance from an Operating Administration that has directed the authority to impose 49 CFR Section 26.45(e) (2), the CHSRA will develop a DBE goal in accordance with federally prescribed goal setting methodology and submit its overall DBE goal to the appropriate DOT Operating Administration, by August 1, under a three-year goal review interval. The CHSRA will additionally, on an annual basis review its DBE attainments in contrast to its overall DBE goal to determine if any measures, including race conscious measures would need to be instituted to effectively meet its established overall DBE goal.

SB Vendors Registry List

The CHSRA will create and maintain a vendor's registry list, consisting of information regarding all SBs and non-SBs that have expressed an interest in, have bid or quoted on the CHSRA's contracting opportunities. The purpose of the vendors' registry list is to determine the availability of the SBs interested in the rail project and selected Contractor's subcontract opportunities. The Vendors Registry list is designed to capture:

- Vendor name
- Contact information—address, phone numbers
- SB certification type and status
- If the firm is not a SB, their non-SB status
- Age of business
- General or average annual gross receipts
- General business services
- Vendor's NAICS
- Central Contractor Registration number

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The Vendors Registry list will be derived through the contract procurement solicitation process and through the CHSRA's website. The listing will be distributed to prospective bidders and offerers based on the identified subcontracting possibilities associated with a bid and/or RFP solicitation.

SB/DVBE/DBE Directories:

The CHSRA shall rely on the DGS SB/DVBE Directory and the California Unified Certification Program (CUCP) to identify certified firms. A complete listing of certified SBs and DVBEs can be found at www.dgs.ca.gov/pd/programs/OSDS/aspx. A complete listing of certified DBEs can be found in the California Unified Certification Program website at www.californiaucp.org or via www.dot.ca.gov/hq/bep.

The directories provide the firm's name, address, phone number, fax number, certification status and the type of services the firm provides. (Government Code §14837 and 49 CFR 26.31)

Notification of Reporting Responsibilities

Prior to execution of all contracts, the Contractor shall be directed to the contract specification for the CHSRA's specific SB reporting and record keeping requirements.

SB Activity Reporting Forms

All Contractors shall submit monthly progress reports on SB utilization to the CHSRA. The CHSRA and Contractors will keep a running tally of actual payments to SBs for work committed to them during the contract performance. Attachment 4, *Monthly SB Subcontractors Paid Report--Summary and Payment Verification* (Form 103) will be used to keep the running tally. This reporting requirement also captures and reports SB participation at all tiers.

All Contractors shall submit the Form 103 by the 15th of each month. Failure to submit the Form 103 reports may result in the imposition of a penalty of $1,000 per day for each monthly report overdue. A person or entity that knowingly provides false information shall be subject to a civil penalty for each violation in the minimum amount of $2,500 and the maximum amount of $25,000. An action for a civil penalty under this subdivision may be brought by any public prosecutor in the name of the people of the State of California and the penalty imposed shall be enforceable as a civil judgment. [Military and Veterans Code § 999.5(d)].

The Form 103 is designed to capture the following information:

a. Name of each SB participating under the respective contract.
b. Type of work assignment designated to each SB.
c. The dollars committed to each SB.
d. The dollars paid to each SB during the reporting period.
e. The dollars paid to date for each SB.
f. The dollars paid to the SB as a result of a change order or other cost modification.
g. The dollars paid to date as a percentage of the total commitment to each SB.
h. Date of last progress payment to the Contractor.
i. Invoice number corresponding to last payment to subcontractor.
j. An authorized Contractor's Signature that certifies under penalty of perjury that it has complied with all SB Program requirements, including prompt payment and retainage requirements per State laws and 49 CFR Part 26.29.

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III.B. Record Maintenance and Confidentiality

The CHSRA shall maintain records for the period prescribed in State Records Management and Federal Records Management and requires Contractors to do the same. The CHSRA shall safeguard from disclosing to third parties information that may reasonably be regarded as confidential business information, consistent with Federal, State, and local law. The California Legislature created the Public Records Act, mindful of the right of individuals to privacy, finding and declaring that access to information concerning the conduct of the people's business is a fundamental and necessary right of every person in this state (Government Code § 6250).

III.C. SB Program Plan Updates and Amendments

The SB Program Plan will be administered in accordance with applicable statues, regulations and funding assurance conditions. The SB Program may be amended to reflect significant operation, administration, regulatory and/or statutory changes that will effect implementation of the program. Amendments to the program will be incorporated and presented to the appropriate funding partners, as deemed necessary. The amended language will be posted on the website as an "update" to the SB Program.

III.D. Prompt Payment Mechanisms

The CHSRA will include the following clause in each prime contract:

> *"The Contractor/Consultant agrees to pay each subcontractor under this prime contract for satisfactory performance of its contract no later than ten (10) days from the receipt of each payment the Contractor receives from CHSRA. The Contractor/Consultant agrees further to return retainage payments to each subcontractor within ten (10) days after the subcontractors work is satisfactorily completed. Any delay or postponement of payment from the above referenced time frame may occur only for good cause following written approval of the CHSRA. This clause applies to both SB and non-SB contracts (Government Code 927 et seq. Public Contract Codes 10261, 10262 et seq, Business and Professions Code 7108.5, Military and Veterans Code 999.5 (d) (4), and 49 CFR Part 26.29, where appropriate.)*

<u>Monitoring Payments to SBs</u>

The CHSRA shall monitor and enforce the Contractor's compliance with the prompt payment provisions to ensure all contract terms and conditions are fully adhered to. Evidence of payment made to subcontractors must be provided at the CHSRA's request, to verify compliance. Credits toward overall or individual contract goals are to be taken upon satisfactory evidence that payments were actually made to SBs. Failure to comply with these provisions or delay in payment without prior written approval from the CHSRA will constitute noncompliance, which will result in appropriate administrative sanctions, up to and including withholding of payment to the Contractor.

It is the Contractor's responsibility to maintain records and documents upon completion of the contract. These records will be made available for inspection upon request by any authorized representative of the CHSRA or FRA or USDOT. The CHSRA may perform interim audits of payments to SBs. The audit will review payments to SBs to ensure that the actual amount paid to SBs equals the dollar amounts reported on the Form 103 report.

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If CHSRA determines that the Contractor has failed to comply with the prompt payment provisions set forth, a written notice shall be given to the Contractor and the Contractor's Surety that, if the default is not remedied within a specified period of time, at least five (5) days, the contract may be terminated for cause in accordance with the terms and conditions.

III.E. Pre-Construction

Pre-Construction (Kick-off) Job Meeting

The Contractor and a representative of each SB firm shall attend the pre-construction job meeting to ensure all parties understand and are acclimated to the SB Program requirements. The CHSRA will provide an overview of the contract SB requirements, including prompt payment, retention, commercially useful function, reporting requirements, and other matters. This meeting shall be held prior to or immediately after the Notice to Proceed is issued. Further, the Contractor shall report its failure to execute subcontractor agreements for any of the listed SBs within 14 working days of signing the contract or 14 days from signing the individual SB subcontracts. The Contractor shall be responsible for informing the subcontractors, regardless of tier, of all the SB requirements as specified by the CHSRA and herein.

III.F. Contract Monitoring and Compliance

The CHSRA's Contract Compliance Officer shall be responsible for working with the designated SB Liaison Officer to ensure the following contract monitoring and enforcements actions are taken to comply with Executive Order S-02-06 and 49 CFR Part 26, where applicable.

Recordkeeping

The CHSRA has a recordkeeping mechanism that allows for timely data capturing on the Contractor's SB participation attainments. The Contractor's monthly submission of the Form 103 enables the CHSRA to effectively monitor, track and report SB contract awards and progress in attaining their respective SB goal commitments throughout the performance of the contract. The CHSRA will monitor the Contractor's compliance to ensure that work committed to SBs at contract award and thereafter is actually performed by the SBs and their subcontract values are actualized based on dollars paid to the SBs. Procedures adopted by the CHSRA also serve to comply with the Governor's Executive Order S-02-06 and that of the USDOT regulations.

The Form 103 will document the following:

1. Type of contract.
2. Name and address of each SB and certifications held.
3. The dollar amount of each contract and subcontract.
4. Dollars committed to and dollars paid to SB(s).
5. A requirement to maintain records and documents of payments to SBs for three years following the performance of the contract. These records will be made available for inspection upon request by any authorized representative of CHSRA or State Department or USDOT.

Executed SB Subcontract Agreements

The Contractor shall submit copies of all executed SB subcontracts and/or SB purchase orders (PO) within 14 working days after the Contractor executes their contract or PO with the CHSRA. The subcontractors, regardless of tier, are required to also meet this requirement. The

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Contractor and its lower tier subcontractors must incorporate prompt payment and dispute resolution provisions in all executed subcontract agreements.

Monthly Expenditure Plan

The Contractor is responsible for a monthly expenditure plan in calendar form for each of its approved SB Subcontractors/Suppliers which shall be submitted within 30 days of Notice to Proceed and the issuance of individual subcontract agreements. The planned expenditures shall equal the dollars committed to each SB subcontractor/supplier and shall be developed according to the approved project schedule. The plan shall be updated to incorporate any schedule changes and executed Changed Notices and Work Authorization Change Notices affecting the SB's work. A revised plan shall be submitted within 30 days from the incorporation of the change.

On-Site Performance Monitoring

During the course of the contract, the CHSRA will perform on-site monitoring to ensure that work committed to SB firms is actually being performed by the SBs. This monitoring effort is fully incorporated into the CHSRA's SB On-site Compliance field observation process.

The CHSRA may also utilize the Labor Compliance Field Interview process as a secondary mechanism to verify that work awarded to SBs are being performed by the listed SBs own workforce. The interview results will be reconciled against the SB agreements and Contractor's Form 103 reports.

Written Certification

As a part of the project/contract close-out process, the CHSRA will include a written certification that it has fully monitored this contract in accordance with the SB policy and program. The written certification will be maintained in the contract file.

Administrative Remedies for Non-Compliance

Areas of identified non-compliance will be subject to administrative sanctions. All Contractors deemed to be in non-compliance shall be informed in writing, by certified mail, by the SBLO or designee, that administrative remedies shall be imposed for failure to comply with the SB Program requirements. The Contractor shall be given five (5) working days from the date the notice was received, to file a written appeal to the Chief Executive Officer. Failure to respond within the five (5) day period shall constitute a waiver of appeal. The notice shall state the specific administrative remedy to be imposed.

The Chief Executive Officer, or his/her designee, at his/her sole discretion, may schedule a hearing to gather additional facts and evidence and shall issue a final determination on the matter within five (5) working days of receipt of the written appeal. The written decision of the Chief Executive Officer or designee is final and there is no further administrative appeal process.

In the event the Contractor fails to demonstrate that it undertook adequate good faith efforts to the satisfaction of the CHSRA to meet the objectives of the program and/or meet their respective SB goal commitment, the CHSRA reserves the right to initiate administrative remedies, which may include but are not limited to initiating a partial withhold of payments due equivalent to the difference between the actual SB attainment and SB goal commitment; suspension of payment to the Contractor of any other monies held by the CHSRA and or termination of the contract in part or in whole.

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The Administrative Remedies shall not apply if the Contractor is able to demonstrate to the satisfaction of the CHSRA that it has fully effectuated compliance to remedy all areas of noncompliance and/or exercised adequate efforts in an attempt to meet the overall project and/or contract-specific SB goal commitments.

For contracts subject to USDOT Operating Administration under 49 CFR Part 26, the CHSRA will bring to the attention of the affected Operating Administration through the Civil Rights Officer, any false, fraudulent, or dishonest conduct in connection with the program, so that affected Operating Administration can take the steps (e.g., referral to the US Department of Justice for criminal prosecution, referral to the USDOT Inspector General, action under suspension and debarment or Program Fraud and Civil Penalties rules) provided in 49 CFR Part 26.107. The CHSRA also will consider similar action under its own legal authorities, including responsibility determinations in future contracts.

USDOT Hotline

The USDOT provides a toll-free “hotline” service to report bid rigging activities. Bid rigging activities can be reported Monday through Friday, between 8:00 a.m. and 5:00 p.m., Eastern Time, telephone (800) 424-9071. Anyone with knowledge of possible bid rigging, bidder collusion, or other fraudulent activities should use the “hotline” to report these activities. The “hotline” is part of the USDOT’s continuing effort to identify and investigate highway construction contract fraud and abuse, and it is operated under the direction of the USDOT Inspector General. All information will be treated confidentially, and caller anonymity will be respected.

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IV. SUBPART D GOALS, GOOD FAITH EFFORTS, AND COUNTING SB PARTICIPATION

IV.A. Overall Goal

The CHSRA has established an SB overall project goal of 30 percent to be achieved through the utilization, in any combination and at any tier level, of firms who are certified as:

- ► Small Business
- ► Disabled Veteran Business Enterprises
- ► Disadvantaged Business Enterprise
- ► Micro-Business

The CHSRA will exercise good faith efforts to meet the overall SB Program goals, in partnership with its Contractors and resource partners. The selected Contractor will be responsible for establishing subsequent subcontract goals, as appropriate, for the subcontracts it lets, to meet their overall SB goal commitment (See Subpart E-- Design Build Provisions).

IV.B. Federal Financial Assisted Contract Goal

For contracts with USDOT financial assistance that are received from an Operating Administration with statutory authority to impose 49 CFR Part 26, the CHSRA shall establish an appropriate DBE goal for the individual projects and or contracts. A description of the methodology to calculate the DBE goal, for each project or contract, can be found in the USDOT Office of Small Disadvantaged Business Utilization website at www.osdbu.dot.gov.

The CHSRA will further follow accountability mechanisms in the rare instance where the CHSRA has failed to meet its overall triennial DBE goal, in good faith. If at the end of the Federal fiscal year, the CHSRA fails to meet its overall goal for that fiscal year, the CHSRA will thoroughly analyze why it fell short of meeting its overall goal for a given goal period and establish specific steps and milestones for correcting identified problems so that the CHSRA will meet its overall goal in the subsequent triennial period. The CHSRA will submit its proposed plan, as applicable to the USDOT Operating Administration within 90 days of the end of the fiscal year, as applicable to ensure compliance. The CHSRA will additionally maintain strong outreach efforts to encourage minority and women-owned firms to become certified as DBEs to increase the pool of ready, willing and able DBEs to participate in the CHSRA federally assisted contracts.

The CHSRA will provide its overall goal recommendation to the CHSRA Board, SBs and other small business resource organizations for review, comment and consultation. Following this consultation, the CHSRA will publish a notice of the proposed overall goal, informing the public that the proposed goal and its rational are available for inspection during normal business hours at its principal office for 30 days following the date of the notice, and inform the public that the CHSRA is soliciting comments for consideration on the proposed goals for 45 days from the date of the notice. The notice shall include the address to which comments may be sent and business location where the proposed goal may be reviewed.

Where applicable, the CHSRA will begin using the established overall goal on October 1, unless the CHSRA has received other instructions from the USDOT Operating Administration.

In the event, the CHSRA is directed by the USDOT Operating Administration, to operate in a race-conscious environment, the CHSRA will use DBE contract goals to meet any portion of the overall goal the CHSRA does not project being able to meet using race-neutral measures. Contract goals are

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established so that, over the period to which the overall goal applies, contract goals will cumulatively result in meeting any portion of the CHSRA's overall goal that is not projected to be met through the use of race-neutral measures.

IV.C. Good Faith Efforts (Pre and Post Award)

State Funded Contracts

The CHSRA and its Contractors, as good business stewards will exercise good faith efforts to meet the CHSRA's overall SB goal outlined in this SB Program, including developing innovative contracting strategies and providing necessary supportive services to promote and ensure the success of Small Businesses as defined in all aspects and phases of the CHSRA's contracting program. At this time the CHSRA will administer the SB Program in a race and gender neutral environment.

Good Faith Efforts procedures are not a condition of the contract award for SB and DVBE participation in meeting the State funded project goal.

The CHSRA and its Contractors will be requested to employ the following good faith effort strategies towards ensuring that Small businesses as defined have the maximum practicable opportunity to participate in the CHSRA's state and federal-assisted contracting programs. The good faith effort strategies are in no way all inclusive of the efforts expected to ensure these program goals and objectives are met:

- Selecting and breaking out contract work items into economically feasible units to facilitate SB participation, even when the Contractor might otherwise prefer to perform these work items with its own forces.
- Solicit through all reasonable and available means the interest of all SBs in the market area.
- Provide sufficient time for the SB to respond to the solicitation and takes appropriate steps to follow up the initial solicitation to the SB.
- Host pre-bid conference or "Open House" to meet and greet with potential SBs who are interested in the subcontract opportunities.
- Select portions of the work to be performed by SBs, increasing the likelihood that the SB goal will be met.
- Provide interested SBs with information about the contract in a timely manner and assists them in responding to the solicitation.
- Negotiate in good faith with interested SBs.
- Seriously consider all SB sub bids.
- Assist SBs in obtaining bonding and lines of credit.
- Assist interested SBs in obtaining equipment, supplies, materials or related assistance or services.
- Use the services of SB, DVBE, Chambers of Commerce, minority or women business organizations, government agencies or other groups to identify SBs.
- Conduct outreach activities on an ongoing basis to ensure SBs are ready, willing and able to pursue viable subcontract opportunities.

Federal Financial Assisted Projects

The demonstration of good faith efforts requirements in accordance with 49 CFR Part 26.53 may apply based on the CHSRA's funding conditions to meet established DBE contract and/or overall project DBE goal, as appropriate. The Contractor will enjoin with the CHSRA, to exercise good faith efforts to meet

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the overall DBE project goal and the subsequent subcontract specific goals it has assigned to meet its goal commitments.

In the event that the CHSRA is required to establish good faith effort requirements, as stated in 49 CFR Part 26, as a condition of award of a contract, the CHSRA will follow the prescribed standards delineated below in accordance with Appendix A of 49 CFR Part 26, (Attachment 5).

The standards represent the minimum level of effort to demonstrate that the Bidder or Proposer complied with the Good Faith Effort requirements. It is not intended to be an all inclusive list of all Good Faith Efforts that can be undertaken to meet the goals and objectives:

1	**ATTENDANCE AT PRE-BID CONFERENCE/JOB WALK**

Effort: Attendance at pre-bid proposal conference and job walk, if held by the CHSRA (or the Contractor for subsequent subcontract bid packages it lets), to solicit the interest of certified DBEs who have the capability to perform the work of the contract.

Evidence: Name, title and date of person(s) attending, to be verified by conference sign-in sheet.

2	**IDENTIFICATION OF SCOPE OF WORK FOR SUBCONTRACTS IN ORDER TO MEET THE PROJECT GOAL**

Effort: Selecting portions of the work that can be subcontracted to DBEs in order to increase the likelihood that the overall DBE goal will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the Bidder/Proposer might otherwise prefer to perform these work items with its own forces.

Evidence: Identifying scope of work the Bidder/Proposer intends to perform with its own workforce and identifying the subcontracting items the Bidder/Proposer made available to DBEs to meet the established DBE goal.

3	**ADVERTISEMENT OF SUBCONTRACTING OPPORTUNITIES**

Effort: Advertisement in trade association publications and disadvantaged/minority and women business focused media. Advertisements must identify specific subcontracting opportunities being solicited, project name and location, Bidder/Proposer contact person including name, address, phone, fax, e-mail and bid solicitation submittal due date. Advertisements should appear a minimum of 14 days prior to bid due date.

Evidence: As verification of publication, Bidder/Proposer must provide listing of advertisements placed, including copies of advertisement tear sheets and/or proof of publication containing at minimum the information specified above.

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4	WRITTEN REQUESTS FOR BIDS/PROPOSALS

Effort: Provision of written notice to the maximum number of DBE firms to solicit interest *for each subcontracting area identified sufficient to meet the established goal*. Notices should be issued at least 14 days prior to bid submittal due date.

Evidence: Copy of the solicitation letter, list of recipients grouped by each identified subcontracting area, including name, address, and phone number, and date contacted for all DBE firms *for each subcontracting area identified*, and identification of mode of communication (letter or fax), including corresponding copies of letters and/or fax confirmations.

5	SOLICITATION FOLLOW-UP

Effort: Subsequent efforts to solicit DBEs within all available *subcontracting areas*. The follow-up solicitation should occur within a reasonable time of the initial solicitation, in order to allow the Bidder/Proposer to solicit additional DBEs and identify additional subcontractable items to draw greater interest and subbids.

Evidence: Bidder/Proposer must determine with certainty if the DBEs initially solicited are interested by taking appropriate steps to follow up on initial solicitations**.** Documentation should include:

(a) Names, addresses and telephone numbers of DBEs contacted by each subcontracting area identified/solicited;
(b) Description of information timely provided to DBEs regarding plans and specifications for portions of the scope of work to assist DBEs in responding to the solicitation; and
(c) Statement of justification re: unsuccessful solicitation of DBEs.
(d) Describe additional efforts the Bidder/Proposer made to encourage greater interest from DBEs to submit subbids.

6	NEGOTIATION IN GOOD FAITH

Effort: Negotiating in good faith with interested DBEs, to facilitate DBE participation. Utilize a sound basis for selection and/or rejection of DBE subbids/proposals.

Evidence: Evidence of such negotiation includes the names, addresses, and phone numbers of all subcontractors (DBEs and non-DBEs) who submitted bids; copies of subbids for each portion of work solicited; and stated reasons for choice of subcontractor. (Barring lack of qualifications to perform work, only significant price differences of 10 percent (an applicable regulatory guideline) between the selected firm and rejected DBE firms' proposed costs would be considered as valid cause for rejecting subbids.

7	PERFORMANCE OF OTHER BIDDERS/PROPOSERS IN MEETING THE DBE GOAL

Effort: In determining whether the low Bidder/Proposer has made adequate efforts to meet the DBE goal, the CHSRA, as appropriate will take into account, the performance of other level Bidders/Proposers in meeting the established contract-specific goal requirements.

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Evidence: The individual Bidder/Proposer must meet or exceed the average DBE participation obtained by the three (3) low responsive Bidders/Proposers to adequately demonstrate that the apparent successful Bidder/Proposer has taken all reasonable efforts towards meeting the contract-specific goal.

8	PROVISION OF ASSISTANCE TO DBEs TO OBTAIN BONDING, LINES OF CREDIT AND/OR INSURANCE

Effort: Provision of assistance to interested DBEs in obtaining bonding, lines of credit, and/or insurance as required by the Bidder/Proposer.

Evidence: Brief description of the type of assistance provided by the Bidder/Proposer to interested DBEs in obtaining bonding, lines of credit and/or insurance.

9	UTILIZATION OF COMMUNITY OUTREACH SERVICES

Effort: Utilization of outreach services available within the DBE community, including construction/consultant groups, local, State and Federal DBE offices and other organizations that provide assistance in the recruitment and placement of DBEs.

Evidence: Copies of letters, faxes, telephone logs, etc., used to contact organizations, which include the names of organizations/groups, dates, names of contacts, and telephone numbers; and copies of correspondence received from these entities acknowledging contact. The Bidder/Proposer must document outreach to a minimum of five (5) organizations/groups.

Verification of Good Faith Efforts. Only those efforts made prior to bid/offer will be considered in evaluating adequate efforts to meet the goal. Failure to submit the required documentation by the time specified will be grounds for finding the bid/proposal non-responsive. Subsequent level Bidders/Proposers need not submit their DBE participation effort documentation unless requested to do so by the CHSRA.

The CHSRA will treat compliance with good faith efforts' requirements as a matter of responsiveness on any race-conscious solicitation, as applicable per 49 CFR Part 26.53(b).

Each solicitation for which a contract goal has been established will require the Bidder/Proposer to submit the following information:

1. The names and addresses of each DBE that will participate in the contract;
2. A description of the work that each DBE will perform;
3. The dollar amount of the participation of each DBE firm participating;
4. Written and signed documentation of commitment to use the listed DBEs whose participation will count towards the contract goal;
5. Written and signed confirmation from the DBEs that it is participating in the contract as provided in the Contractor's commitment; and
6. If the contract goal is not met, evidence of good faith efforts.

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Good Faith Efforts Towards SB Participation (Post Award)

As good stewards to ensure SB participation during the term of the contract, the selected Contractor shall continue to make good faith efforts to ensure SBs have an opportunity to successfully perform in the contract, and that the Contractor meets its SB goal. These efforts shall include but not be limited to the following:

1. Negotiate in good faith to attempt to finalize and execute a subcontract agreement with the SB committed to in the bid/proposal.

2. Efforts that can be documented to seek out and utilize additional SB suppliers and SB subcontractors when additional subcontractors are necessary to meet the overall goals and objectives.

3. Continue to provide assistance to SB subcontractors or suppliers in obtaining bonding, lines of credit, etc., if required by the Contractor.

4. Notify a SB in writing of any potential problem and attempts to resolve the problem prior to formally requesting the CHSRA's approval to substitute the SB.

5. As with all subcontractors, timely payment of all monies due and owed to SB subcontractors and suppliers in strict conformance with prompt payment and retainage provisions set forth in the program and contract.

6. The Contractor is advised not to count the participation of SB subcontractors towards the Contractor SB achievements until the subcontract amount being counted toward the goal has been paid to the SB.

7. Alert the CHSRA in a timely manner of any problems anticipated in attaining the SB participation goal committed to at award.

8. The Contractor may not terminate an approved SB subcontractor for convenience and perform the work of the terminated SB subcontractor with its own work forces or those of an affiliate, without the prior written consent from the CHSRA.

9. When a SB is terminated, or fails to complete its designated scope of work on the contract for any reason, the Contractor must make good faith efforts to find another SB subcontractor to substitute for the original SB. Refer to Section IV, Subpart D, item F for steps to comply with substituting and or terminated a listed SB.

10. Substitutions or additions of an approved SB subcontractor or change in any scope of work to be performed by the approved SB subcontractor must be requested in writing by the Contractor and approved by the CHSRA. The Contractor shall complete and submit the "Request For SB Subcontractor/Supplier Substitution."

11. Change in Contract Amount - The dollar amount of Change Orders or any other contract modifications that increase or decrease the work area in which SB participation has been committed shall be commensurately added to or subtracted from the respective total subcontract amount. Revised total contract dollar values shall be reflected in the monthly progress report submitted to the CHSRA with supporting evidence of an approved change.

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12. Review the Contractor's monthly progress reports to determine whether the utilization of SB firms is consistent with the commitment the Contractor stated in its bid or proposal.

Each subcontractor shall also demonstrate compliance with the post award good faith efforts.

IV.D. Counting SB Participation

The standards of crediting SB participation will be in conformance with commercially useful standards and crediting provisions as set forth in State laws and in 49 CFR Part 26 regulations when compiling the SB data reports for DGS and USDOT.

The CHSRA will count SB participation towards overall and contract specific goals as provided in the solicitation specifications and subcontract contract specifications and in accordance with standards and provisions set forth within this program.

State Funded Contracts

The CHSRA shall only count SB participation towards the contract goals when the SBs provides evidence of its certification and is performing a Commercially Useful Function on any State funded contract (Government Codes 14837, 14838.6, 14839, 14842, and 14842.5, and Military and Veterans Codes 999 and 999.6).

The CHSRA shall use the California DGS certification eligibility standards for SB, DVBE and Micro-Business. The CHSRA shall use the DGS Directory at www.dgs.ca.gov/pd/Programs/eprocure to verify the listed SB's certification.

All certified SB firms that bid on or participate in a State-funded contract must perform a CUF on the contract. This is done to prevent businesses from acting as a "pass through" when identified as the prime bidder or when identified as a subcontractor, etc. If an SB is not performing a CUF on a contract, certification may be revoked as stated in Government Code § 14842.

A determination of CUF is required when an SB is involved and participates in a State-funded contract. The SB has to be responsible for a distinct element of the contract and normal business functions. They cannot further subcontract their distinct element of work.

All certified DVBE firms that bid on or participate in a State-funded contract must perform a CUF on the contract. This is done to prevent businesses from acting as a "pass through" when identified as participating on a State-funded contract. If a DVBE is not performing a CUF on a contract, the certification may be revoked as stated in the California Government Code § 14842 (3)(e). The DVBE firm must be responsible for a distinct element of the contract as its normal business functions.

Credit for DVBE participation as a Contractor will count as 100 percent of the contract price provided the DVBE prime is performing a CUF. Credit for participation of DVBE subcontractors, suppliers, or services will be 100 percent of the dollar value of the DVBE performance provided the DVBE is performing a CUF. State departments will evaluate the DVBE participation prior to the award of the contract in order to determine if the listed DVBE is performing a CUF and thus apply the appropriate DVBE credit. DVBE brokers awarded a contract under the DVBE goal provisions must disclose their broker status to the State department prior to contract award.

A certified SB or DVBE who fails to demonstrate performance of a CUF, when bidding as a Contractor, will result in that certified bidder being eliminated from consideration. Also, for SBs who are

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participating as a subcontractor, failure to demonstrate performance of a CUF will result in the reported participation being removed. Furthermore, businesses who fraudulently obtain a certification as a SB for purposes of obtaining a State contract may be suspended from doing business with the State or Federal agencies.

Pursuant to Government Code § 14842, the following may be imposed on a business that obtains certification as a SB or a DVBE by having given incorrect, incomplete, or fraudulent information and has been awarded a contract to which it would not have been awarded otherwise:

1. Pay to the State any difference between the contract amount and what the State's costs would have been if the contract had been properly awarded.
2. Pay to the awarding State agency and the department an amount that is equal to the costs incurred to investigate the small business certification.
3. Be assessed a penalty in an amount of not more than ten percent of the amount of the contract involved.
4. The small business will be suspended from business with the State for a period of not less than three years and not more than ten years.

Failure to carry out the requirements of Section 999 of the Military and Veterans Code for DVBE firms will constitute a material breach of contract and may result in termination of the contract or other remedy that the CHSRA deems appropriate.

> As found in Public Contract Code 10115.10n (a)(1), "It shall be unlawful for a person or firm to knowingly and with intent to defraud, fraudulently obtain … aid another in fraudulently obtaining … acceptance or certification as a minority, women, or disabled veteran business enterprise…(b) Any person who violates … is guilty of a misdemeanor and shall be liable for a civil penalty…"

<u>Federal Financial Assisted Contracts</u>

The CHSRA shall only count DBE participation towards the overall and individual contract goals when the DBE provides evidence of its certification and is performing a commercially useful function on the CHSRA's USDOT funded contracts (49 CFR 26.55).

The CHSRA shall use the California Unified Certification Program (CUCP) certification eligibility standards for DBE. The CHSRA shall use the CUCP Directory at www.dot.ca.gov/hq/bep/find_certified.htm to verify the listed DBE's certification.

The following guidelines apply in calculating DBE participation toward meeting established goals in accordance with 49 CFR Part 26.55:

a) Only work proposed to be performed by a DBE's own work forces (including cost of supplies, materials and equipment leases) obtained by the DBE for the work of the contract, except supplies and equipment the subcontractor purchases and/or leases from the Contractor or its affiliate.

b) When a DBE subcontracts part of its work of its contract to another firm, the value of the subcontracted work may be counted toward DBE goals only if the DBE subcontractor is itself a certified DBE. Work that a DBE subcontracts to a non-DBE firm does not count toward DBE goals. A DBE should perform at least 30 percent of the total cost of its contract with its own workforce.

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c) In instances of joint venture, the joint venture may only count toward its DBE goal, the portion of work proposed to be performed by the DBE partnering firm, which meets certification, ownership and control standards.

d) A Contractor may count toward its DBE goal, only expenditures to firms that are proposed to perform a commercially useful function on that contract. A DBE performs a commercially useful function when it is responsible for execution of the work of the contract and is carrying out its responsibilities by actually performing, managing and supervising the work involved.

e) A Contractor may count toward its DBE goal, 60 percent of its expenditures for materials and supplies required under the contract and obtained from a DBE regular dealer and 100 percent of such expenditures to a DBE manufacturer. For purposes of this section, a manufacturer is a firm that operates or maintains a factory or establishment that produces on the premises the materials and supplies obtained by the Contractor. A regular dealer is a firm that owns, operates, or maintains a store, warehouse, or other establishment in which the materials or supplies required for performance of the contract are bought, kept in stock, and regularly sold to the public in the usual course of business.

f) A Contractor may count towards its DBE goal, fees and commissions paid to DBE firms that are not manufacturers or regular dealers, provided that the fees or commissions are determined to be reasonable and not excessive, as compared with fees customarily allowed for similar services.

g) Special Provisions for Trucking – The Contractor may count towards its goal, all transportation services provided by DBE trucking firms, who can demonstrate control of trucking operations for which it seeks credit and it owns, insures, and operates, using drivers it employs in the performance of the contract. The DBE must itself own and operate at least one fully licensed, insured, and operation truck used on the contract. The DBE trucking firm may lease trucks from another DBE firm, including an owner-operator who is certified as a DBE. The DBE who leases trucks from another DBE receives credit for the total value of the transportation services the lessee DBE provides on the contract. The DBE may also lease trucks from a non-DBE firm, including an owner-operator. The DBE who leases trucks from a non-DBE is entitled to credit only for the fee or commission it receives as a result of the lease arrangement. The DBE does not receive credit for the total value of the transportation services provided by the lessee, since these services are not provided by a DBE.

h) In cases where DBE certification has ceased during the performance period of the contract, although the Contractor will continue to report the dollar value of the worked performed to the CHSRA on the monthly Form 103, the CHSRA will not count the participation towards its overall goal.

i) The CHSRA will not count the participation of DBE subcontractors toward a Contractor's final compliance with its DBE obligations on a contract until the amount being counted has actually been paid to the DBE.

The Contractors shall also comply with the aforementioned provisions, as applicable, including those specified under the Design-Build Contract specification requirements.

For DBEs, as stated in 49 CFR Part 26.107(a) "…attempts to participate in a DOT-assisted program as a DBE on the basis of false, fraudulent, or deceitful statements or representations or under

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circumstance indicating a serious lack of business integrity or honesty, the Operating Administration may initiate suspension or debarment proceedings against the firm under 49 CFR Part 29."

IV.E. Substitution or Termination of a SB, DVBE or DBE on a Contract

The CHSRA requires that a Contractor, or its subcontractors, not substitute or terminate a SB without the CHSRA's prior written consent. This includes, but is not limited to, instances in which a Contractor or its subcontractor seeks to perform work originally designated for a SB with its own forces or those of an affiliate, a non-SB, or with another SB.

The CHSRA shall enforce the provisions of Public Contract Code § 4107 et seq and Military and Veterans Code § 999 et seq for proposed substitution of an SB or DVBE or any subcontractor.

The CHSRA will provide such written consent only if it agrees, for reasons stated in the concurrence document, that the Contractor and its subcontractor has good cause to substitute or terminate the SB. For purposes of this section, good cause includes the following circumstances:

- The listed subcontractor, after having had a reasonable opportunity to do so, fails or refuses to execute a written contract for the scope of work specified in the subcontract's bid and at the price specified in the subcontractor's bid; when that written contract, based upon the general terms, conditions, plans, and specifications for the project involved or the terms of that subcontractor's written bid, is presented to the subcontractor by the Contractor.
- The listed subcontractor becomes insolvent or the subject of an order for relief in bankruptcy.
- The listed subcontractor fails or refuses to perform the work of its subcontract.
- The listed subcontractor fails or refuses to meet the Contractor's bond requirements as set forth in Public Contract Code 4108.
- The Contractor demonstrates to the CHSRA, subject to the further provisions set forth in Section 4107.5, that the name of the subcontractor was listed as a result of an inadvertent clerical error.
- The listed subcontractor is not licensed pursuant to the Contractor's License laws.
- The CHSRA determines that the work performed by the listed subcontractor is substantially unsatisfactory and not in substantial accordance with the plans and specifications, or the subcontractor is substantially delaying or disrupting the progress of the work.
- The listed subcontractor is ineligible to work on public works projects pursuant to Section 1777.1 or 1777.7 of the Labor Code.
- The CHSRA determines that a listed subcontractor is not a responsible contractor.
- The listed subcontractor voluntarily withdraws from the project and provides written notice of its withdrawal.
- Other documented good cause that compels the substitution or termination of the SB. Provided, that good cause does not exist if the Contractor seeks to substitute or to terminate a SB it relied upon to obtain the contract so that the Contractor can self-perform the work for which the SB was engaged or so that the Contractor can substitute another SB or non-SB contractor after contract award.

Prior to approval of the Contractor's request for the substitution, the CHSRA shall give notice in writing to the subcontractor of the Contractor's request to substitute and of the reasons for the request. The notice shall be served by certified or registered mail to the last known address of the subcontractor. The listed subcontractor who has been so notified has five (5) working days within which to submit written objections to the substitution to the CHSRA. Failure to file these written objections constitutes the listed subcontractor's consent to the substitution.

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If written objections are filed, the CHSRA shall give notice in writing of at least five (5) working days to the listed subcontractor of a hearing by the CHSRA on the Contractor's request for substitution.

A Contractor may, subject to the approval of the DGS, replace a disabled veteran business enterprise identified by the Contractor in its bid or offer, pursuant to subdivision (a) of Military and Veterans § 999.10, with another DVBE. As an added step to ensure that Contractor's honor their commitments to use DVBE subcontractors and meet the commitment levels identified in bids, the following, or similar, language is to be included into the solicitations and resulting subcontract documents:

> "*After award of a contract, the successful Contractor must use the DVBE subcontractor(s) and/or supplier(s) proposed in their bid or offer to the State unless a substitution is requested and is approved by the awarding department and the DGS. The California Code of Regulations Title II section 1896.64(c) and Public Contract Code § 4107 (for Public Works) provide the current requirements for awarding departments to approve the substitution of a DVBE subcontractor."*
>
> *"Contractor understands and agrees that should award of this contract be based in part on their commitment to use the Disabled Veteran Business Enterprise (DVBE) subcontractor(s) identified in their bid or offer, per Military and Veterans Code 999.5 (e), a DVBE subcontractor may only be replaced by another DVBE subcontractor and must be approved by the Department of General Services. Changes to the scope of work that impact the DVBE subcontractor(s) identified in the bid or offer and approved DVBE substitutions will be documented by contract amendment. Failure of Contractor to seek substitution and adhere to the DVBE participation level identified in the bid or offer may be cause for contract termination, recovery of damages under rights and remedies due to the State, and penalties as outlined in Military and Veterans Code § 999.9; Public Contract Code (PCC) § 10115.10, or PCC § 4110 (applies to public works only)."*

The CHSRA shall follow the processes set forth in 2 CCR § 1894.64(c) and Public Contract Code § 4107 when a Contractor requests the substitution of a DVBE subcontractor with the added provisions that: 1) only another DVBE subcontractor shall be considered to replace a DVBE subcontractor, and 2) the awarding department shall obtain final approval to replace a DVBE subcontractor from the DGS.

Requests to replace a DVBE subcontractor must be amply documented to show that the replacement meets the criteria as previously specified. Documentation may include, but is not limited to the request, confirmation of receipt of the request, the subcontractor's objection and request for hearing and the final Statement of Decision. Requests and resulting amendments generated by the DVBE subcontractor substitution should be timely so as not to unreasonably delay the Contractor's performance of the contract, resulting in potential claims against the CHSRA for delay damages. Requests are to be sent electronically to osdshelp@dgs.ca.gov.

Substitution or Termination of a listed DBE

The CHSRA will require a Contractor to make good faith efforts to replace a DBE that is terminated or has otherwise failed to complete its work on a contract with another certified DBE, to the same extent needed to meet the contract goal established. The CHSRA will require the Contractor to notify the Contract Compliance Officer immediately of the DBE's inability or unwillingness to perform and provide reasonable documentation.

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The Contractor must first obtain the written consent of the CHSRA before any Contractor can act on the substitute for the DBE. We require the Contractor to provide us with copies of the new or amended subcontracts. If the candidate subcontractor to be substituted is not a DBE, the CHSRA also requires the Contractor to submit documentation of their good faith efforts.

A DBE subcontractor listed in the Contractor's commitment [as required by 49 CFR Part § 26.53] may be substituted or terminated only with the CHSRA's prior written consent for good cause[1] that includes the DBE:

- fails or refuses to execute a written contract;
- fails or refuses to perform the work of its subcontract consistent with normal industry standards;[2] Good cause does not exist where failure or refusal to perform the work of the subcontract results from bad faith or discriminatory action of the Contractor;[3]
- fails or refuses to meet reasonable, nondiscriminatory bond requirements;
- becomes bankrupt, insolvent, or exhibits credit unworthiness;
- is ineligible to work because of suspension and debarment proceedings;
- is not a responsible subcontractor;
- voluntarily withdraws from the project and provides written notice of its withdrawal;
- is ineligible to receive DBE credit for the type of work required;
- owner dies or becomes disabled and is unable to complete its work; or
- other documented good cause that compels termination.[4]

Before requesting the CHSRA's consent for the proposed termination, the Contractor must give written notice of the proposal, including the reason for the request, to the DBE with a copy to the CHSRA. The DBE must be given five (5) days to respond. The notice period may be reduced if required by public necessity (e.g., safety).

In addition to post-award terminations, these provisions apply to pre-award deletions or substitutions of DBE firms put forward by proposers in negotiated procurements.

Failure to Secure Prior Approval to Substitute or Terminate a SB, DVBE or DBE

If the Contractor fails or refuses to comply in the time specified, the CHSRA may take appropriate actions, as prescribed in State laws and Federal regulations. The CHSRA's contracting office may issue an order stopping all or part of payment or work until satisfactory action has been taken.

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[1] Good cause does not exist if a Contractor seeks to terminate a DBE it relied upon to obtain the contract so it could self-perform the work or substitute another DBE or non-DBE firm. For example, such a request for termination could be the result of a Contractor imposing unreasonable demands on a DBE. See 76 Fed. Reg. 5085 (2011).

[2] Industry standards may vary among projects and could be higher for some projects than others. See 76 Fed. Reg. 5085 (2011).

[3] For example, this includes the failure of the Contractor to make timely payments or the unnecessary placing of obstacles in the path of the DBE's work. See 76 Fed. Reg. 5085 (2011).

[4] The CHSRA must document the basis for any such termination. The termination must be essential, not merely discretionary or advantageous. The CHSRA need not obtain DOT Operating Administration concurrence; however, FHWA, FTA and FAA retain the right to oversee such determinations. See 76 Fed. Reg. 5085 (2011).

Accountability

The CHSRA will follow the accountability provisions in 49 CFR 26 to assure the FRA that it is committed to carry out the best practices of 49 CFR 26 to meet the USDOT intended goals and objectives of affording DBEs, including SBs a level playing field by which to actively bid/propose and successfully perform on the CHSRA's DOT assisted contracts.

If the CHSRA fails to meet its overall DBE goal at the end of the fiscal year, it will in conformance with USDOT guidance analyze the reasons for the shortfall and establish specific steps and milestones to correct problems identified in its analysis that will enable the CHSRA to meet its goal in the new fiscal year. The CHSRA must submit the analysis and corrective actions within 90 days of the end of the fiscal year for FRA approval.

If FRA approves the report, the CHSRA will be regarded as compliant with 49 CFR Part 26.47 for the remainder of the Federal fiscal year. FRA may impose conditions on its approval including, but not limited to: modifications to the overall goal methodology, changes to the race-conscious/race-neutral split, or introduction of additional race-neutral or race-conscious measures, where applicable.

The CHSRA may be regarded as being in non-compliance for failing to implement its program in good faith if: it does not submit its analysis and corrective actions within 90 days of the end of the fiscal year, FRA disapproves of its analysis or corrective actions, or it does not fully implement the corrective actions or conditions that FRA has imposed.

If it comes to the attention of FRA via the DBE report or other means that it is likely that the CHSRA will not meet its overall goal at the end of the year, FRA may require further good faith efforts such as modifying the SB Program, the overall goal and or introducing additional race-neutral measures for the remainder of the Federal fiscal year. [49 CFR Part 26.47(c) and (d)].

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V. SUBPART E – DESIGN-BUILD PROVISIONS

SB PROGRAM REQUIREMENTS-- SPECIFIC TO DESIGN-BUILD CONTRACTS

The CHSRA recognizes certain modifications are necessary to adapt the program for use in connection with design-build contracts, and has therefore established certain procedures applicable to design-build contracts under the SB Program. Subpart E Design-Build provisions represents the additional requirements the selected Contractor must comply with to meet the spirit and intent of the CHSRA's SB Program.

The CHSRA has established an SB overall project goal of 30 percent for each of its Design-Build projects, to be achieved through the utilization, in any combination and at any tier level, of firms who are certified as:

- Small Business
- Disabled Veteran Business Enterprises
- Disadvantaged Business Enterprise
- Micro-Business

The Design-Build Contractor will be responsible for establishing subsequent contract goals, as appropriate, for the subcontracts it lets, in conformance with 49 CFR Part 26.53 best practices and the CHSRA's SB Program. The CHSRA will maintain oversight of the design-build Contractor's activities to ensure activities are conducted in a manner consistent with the requirements of the CHSRA's SB Program and that of 49 CFR Part 26, as applicable.

In accordance with Executive Order S-02-06 and 49 CFR Part 26, best practices, the following are hereby incorporated into the Design Build Provisions.

V.A. SB Performance Plan Program Objectives

The selected Contractor shall establish and implement a Small Business Performance Plan, which shall incorporate the best practices of the CHSRA's SB Program. The SB Performance Plan shall be subject to approval by the CHSRA. If requested by the CHSRA either before or after award, the Contractor shall revise its SB Performance Plan to incorporate the CHSRA's comments. The SB Performance Plan shall include:

V.B. Key Personnel (Contractor Small Business Officer)

The Contractor Small Business Officer (SBO) will report directly to the Contractor's Project Executive Director and in this capacity shall be responsible for developing, implementing, monitoring and managing the day to day operations of the Contractor's SB Performance Plan in compliance with the CHSRA's Small Business Program and provisions of the Executive Order S-02-06, Title VI of the Civil Rights Act of 1964 and Title 49 CFR Part 26, where applicable.

The SBO will coordinate all elements of the Performance Plan to effectively track, monitor and report on SB utilization throughout the duration of the contract. The SBO will coordinate efforts at all subcontractor tier levels to institute innovative strategies and remedies to meet the Contractor's SB goal commitments and the intended goals and objectives of the CHSRA's SB Program. The SBO shall continue to maintain independent and direct access to the Project Executive Director concerning all SB Program and corresponding performance matters. The SBO shall develop and maintain good communication and working relationships with the CHSRA representatives and the small and general

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business community. The SBO may be a subconsultant to the Contractor and he or she may represent the Contractor as the SBO.

SBO Duties and Responsibilities

The SBO shall have appropriate resources to assist in the administration of the Contractor's SB Performance Plan. The duties and responsibilities include, but are not limited to the following:

- Serves as the Contractor's SB Officer.
- Develops, implements and monitors, the SB Performance Plan, keeping it up-to-date with the current business environment and the latest revisions to the applicable State and Federal laws and regulations, ensuring the Performance Plan is responsive to and in compliance with the regulations, including, but not limited to, the Executive Order S-02-06, Title VI and 49 CFR Part 26 best practices.
- Ensures the Contractor's employees and its subcontractors under contract, understand and are fully acclimated to the goals and objectives and ensure that the responsibly to comply are treated with the same priority as any other contractual legal obligation.
- Gathers and reports on progress in narrative form by outlining good faith efforts undertaken within the respective reporting period and providing statistical information on SB/DVBE/DBE and Micro-Business utilization on a monthly basis or as required by the CHSRA.
- Reviews third party contracts and purchase requisitions for compliance with this program.
- Ensures that bid notices and requests for proposals are readily accessible and timely disseminated to small business community.
- Monitor's and analyzes the Contractor's progress toward meeting its goal commitments and makes adjustments as necessary to remedy deficiencies.
- Participates in SB meetings.
- Attends quarterly meetings with the CHSRA's SB Liaison Officer to identify strategies to achieve the goals.
- Advises the Project Executive Director on SB matters and achievements.
- Plans and facilitates SB training seminars to promote understanding and acclimation of small business communities regarding contracting opportunities and contract administration.
- Conducts business outreach and assists all SBs in obtaining the necessary information to compete on contracts by providing guidance and direction, and advising SBs on where to seek management, technical business development expertise, bonding, lines of credit and other supportive services.
- Provides guidance and assistance to subconsultants and construction subcontractors on the importance of achieving, tracking and reporting their SB participation attainments.
- Reviews SB participation reports from subconsultants and construction subcontractors and makes recommendations for greater SB attainment, where applicable.
- Ensures coordination of the SB Program deliverables with the CHSRA, local agencies and the business community.
- Establishes and maintains a good working relationship with SBs, local agencies, non-SBs, and business organizations/associations.
- Ensure only firms meeting eligibility standards participate and count towards the SB goals.
- Ensure compliance Federal EEO Clause provisions as set forth under Title 41 CFR Part 60 et seq.
- Ensure compliance with U.S. Department of Labor provisions as set forth under Office of Federal Contract Compliance Program – Mega Project.

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- Perform other related duties as necessary to meet CHSRA's SB Program goals and objectives.

Additional elements of the SB Performance Plan:

► A policy statement, signed by Contractor's Authorized Representative, which expresses Contractor's commitment to utilize SBs in all aspects of the Work, outlines the various levels of responsibility, and states the objectives of the SB Performance Plan. Contractor shall obtain the written commitment of all Contractor related entities to comply with and advance the intent of the policy statement.

► An affidavit that the Contractor will meet or exceed the overall SB project goal for the design-build contract or will exercise good faith efforts to do so. The good faith effort determination of acceptance will be made by the CHSRA. The Overall Project SB Goal Affidavit shall be signed by the Contractor's authorized representative (party with the authority to bind the Proposer). See Attachment 6.

► Contractor's designation of a person responsible for the SB Performance Plan (refer to the SBO duties and responsibilities) to administer the program and a description of the authority, responsibility, and duties of the SBO and support staff. The SBO and staff are responsible for developing, managing, and implementing the SB Performance Plan on a day-to-day basis, for providing technical assistance to SBs, and for disseminating information on available business opportunities so that SBs are provided an equitable opportunity to engage in work as subcontractors or subconsultants. The SBO shall work in close coordination with the CHSRA, and shall report quarterly on Contractor's success in attaining the established SB participation goals during the Design work and the construction period; and

► A description of proposed actions to facilitate SB engagement in work as subcontractors and subconsultants, such as:

a) On-going quarterly strategic planning sessions with the CHSRA to establish goals for specific bid item groups by reviewing the work, available firms, strategies, anticipated obstacles and means to overcome obstacles;

b) Conduct bid-item specific outreach meetings in coordination with the CHSRA for SB firms to highlight current and upcoming appropriate subcontracting opportunities;

c) Solicit statements of qualification, proposals, and/or price quotations from qualified SB firms and arrange a time for the review of qualifications, plans, quantities, specifications, and delivery schedules, and for the preparation and presentation of proposals and/or price quotations;

d) Provide assistance, in coordination with the CHSRA, to SB firms so that these may overcome barriers such as the inability to obtain bonding, insurance, financing, or technical assistance;

e) Develop and conduct information and communication programs or workshops, in coordination with the CHSRA, on contracting procedures and specific contracting opportunities in a timely manner;

f) Encourage eligible SB firms to apply for certification with the CHSRA; and

g) Contact local/regional SB, Disadvantaged, Underutilized, Trade-Specific Contractor Associations and appropriate city agencies with programs for disadvantaged individuals for assistance in recruiting and encouraging eligible SB firms to apply for certification with DGS and the CUCP.

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► A detailed description of the planned methodology for achieving the SB goal as stated in the contract, including a description of the good faith effort the Design-Build Contractor intends to undertake to achieve the overall project goal. This plan shall include the activities that fulfill the requirements and guidance in the CHSRA's SB Program, Subpart D, "Goals, Good Faith Efforts and Counting SB Participation" developed in accordance with 49 CFR Part 26.53 and Appendix A, where applicable.

V.C. Meeting Established SB Goal

Overall SB Project Goal

It is the policy of the CHSRA to ensure that SBs, DVBEs, DBEs and MBs are provided fair and equitable access and the maximum practicable opportunities to participate in all phases of the CHSRA's contracting program. The CHSRA has committed to and has given its assurance to its funding partners that it will employ best practices and develop a Small Business Program consistent with and pursuant to the requirements set forth in the California Executive Order S-02-06; Title VI of the Civil Rights Act of 1964 and 49 CFR Part 26 best practices, as permitted by law.

This Design-Build project is subject to an Overall SB project goal of **30 percent**.

The Contractor shall include an executed Affidavit confirming that the Contractor will aggressively exercise good faith efforts to the satisfaction of the CHSRA to obtain SB/DVBE/DBE and Micro Business commitments equal to or exceeding the SB participation goal.

The Contractor shall be required to:

- Develop innovative contracting and procurement strategies that advance the participation SBEs/DVBEs/DBEs and Micro-Businesses;
- Report monthly on progress of SBE/DVBE/DBE and Micro-Business utilization (goal commitments and attainments);
- Make adjustments to the SB Performance Plan as necessary to meet goals and intended objectives of the CHSRA SB Program;
- Hold quarterly strategic planning sessions to establish goals for specific bid items, identify available SB firms, anticipate obstacles and means to overcome these obstacles, including identifying resources that aid in building capacity;
- Develop communication protocols and outreach instruments that provide ready access and effective means of timely disseminating information on contracting opportunities to the impacted business communities;
- Conduct bid-item specific outreach meetings to highlight current and upcoming subcontracting possibilities and provide for networking and marketing opportunities with other prospective proposers and bidders;
- Provide assistance to SBs/DVBEs/DBEs and Micro-Businesses to overcome barriers such as inability to obtain bonding, insurance, access capital or technical assistance;
- Implement a SB/Supportive Services Program to leverage the CHSRA SB Program;
- Develop and conduct information and communication programs on contracting opportunities, procedures and contract administration to facilitate acclimation;
- Encourage eligible SBs/DVBEs/DBEs and Micro-Businesses to apply for certification;

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- Contact, establish and maintain good working relations with SBs/DVBEs/DBEs/MBEs/WBEs, Micro-Businesses, trade and professional groups, associations and general contracting industry; and
- Any other good faith efforts that promote meeting participation goals objectives.

The dollar amount of any Supplemental Agreement or any other contract modification that increases the dollar amounts of the contract or any subcontract or subconsultant agreement will be subject to the SB goal established for this project, and the Contractor and its subcontractors and subconsultants will be required to solicit SB participation for such increases. Revised total contract dollar values shall be reflected in the Form 103 submitted on a monthly basis to the CHSRA.

V.D. Contractor Good Faith Efforts and Reporting Obligations

Ongoing good faith efforts, as described in the CHSRA SB Program, Subpart D "Goals, Good Faith Efforts and Counting SB Participation," will be monitored by the CHSRA throughout the duration of the design-build project based on the following Contractor submittals:

a. Following the award of the design-build contract, the Contractor will be required to submit a "Monthly SB Subcontractors Paid Report Summary and Payment Verification Form" (Form 103) to the CHSRA no later than the 15th of each month (and at more frequent intervals if requested by the CHSRA). The Form 103 Report is required to be submitted during both the design and construction phases of the project.

b. Following award of a design-build contract, the Contractor will be required to submit "Monthly Narrative DBE Progress Reports" to the CHSRA with each invoice and an annual report on or before August 1 of each year of the design-build contract term. Each report must include a narrative summary stating whether the Contractor is on target with respect to the SB goal set forth in the design-build contract, whether the goal has been exceeded (stating the amount of the excess), or whether the Contractor is behind target (stating the amount of the deficit) and substantiate such attainments. If any progress report shows that the Contractor is behind target, or if it anticipates being behind target, the report must include satisfactory evidence of past good faith efforts undertaken and must specify additional good faith efforts planned to be taken to remedy deficiencies towards meeting the SB goal in accordance with the CHSRA's SB Program. Following review and approval of such proposed additional good faith efforts by the CHSRA, the Contractor shall modify its SB Performance Plan accordingly.

c. The Contractor will promptly provide the CHSRA with the information required by the CHSRA in its Substitution and/or Request to Add SB form upon selection of any SB subcontractor not previously identified by the Contractor. During the course of the contract, differences must be explained and resolved by either making corrections or requesting a substitution. The CHSRA must approve all SB substitution requests with written consent prior to implementing any substitution.

d. The Contractor must fully comply with State laws and Federal regulations regarding Prompt Payment and Retainage, Subpart C- Administrative Requirements provisions of the SB Program. The Contractor must readily provide evidence of such at the request of the CHSRA.

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CONSEQUENCES OF NON-COMPLIANCE

(1) BREACH OF CONTRACT - Failure to carry out the SB requirements specified in the Contract Documents constitutes a breach of contract. The CHSRA will notify the Contractor and the USDOT of such breach, including notification that the breach may result in termination of the Contract by CHSRA or imposition of other appropriate sanctions. This notice is given pursuant to 49 CFR Part 26, where applicable. For purposes of this section, timely submittal means received by the CHSRA by the close of business on the date noted in the contract provisions of the following month.

(2) NOTICE - If the Contractor or any subcontractor, consultant, subconsultant, supplier or service provider is deemed to be in non-compliance, the Contractor will be informed in writing, by certified mail by the CHSRA that sanctions may be imposed for failure to meet SB utilization goals and/or submit documentation of good faith efforts. The notice will state the specific sanction to be imposed.

SANCTIONS

If it is determined that the Contractor's failure to meet all or part of the SB goal is due to the Contractor's inadequate good faith efforts throughout the life of the contract, including failure to submit required good faith efforts information and documentation, the Contractor may be subject to contract termination.

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VI.SUBPART F – SB SUPPORTIVE SERVICES, RESOURCE PARTNERS AND PARTNERING

VI.A. Supportive Services

The CHSRA and Contractor agree to implement a SB Supportive Services (SB/SS) Program.

The SB/SS Program will assist active SBs in securing CHSRA and subsequent Contractor State funded and Federal funded contracts and increase SB capacity to bid on and win contracts. The SB/SS will serve SBs in program services/activities designed to enhance business growth and development and to increase marketability.

The CHSRA and Contractor will work closely with the Small Business Development Centers (SBDCs) and the USDOT OSDBU to direct SB to assistance on business development, capital, and bonding assistance. The CHSRA may consider adopting a more comprehensive Business Development Program and/or a Mentor-Protégé Program in accordance with guidance provided by USDOT applicable Appendices C and D of 49 CFR Part 26. See Attachment 7. [49 CFR 26.35 and 26.51(b)].

The SB/SS model will enlist a partnering Memorandum of Understanding (MOU) (See Attachment 8) with industry, governments and community partners with the goal of leveraging mutual strengths and services, to assist SB in the areas of:

- Certification
- Capacity Building
- Communications
- Partnering
- Keys to marketing and negotiations
- Bonding and insurance
- Contract administration, including preparing schedules of values
- Access to capital
- Business counseling and training
- How to do Business with the CHSRA

These important program elements are designed to help foster and grow small businesses toward increasing their meaningful participation and success in all phases of the CHSRA's contracting program.

VI.B. Resource Partners

The State of California has numerous resources available to assist small businesses. The CHSRA will work closely with existing small business development and technical assistance resource centers and enter into partnering MOUs to increase SBs access and utilization of these resources with the goal of meeting small business participation goals and building their capacity to bid.

The partners will include and not be limited to:

- California Department of General Services
- Small Business Administration
- California Department of Transportation
- Federal Technology Center
- Small Business Development Centers
- Governor's Office of Economic Development

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- Associated General Contractors of California
- American Council of Engineering Companies
- Small Business Association
- Disabled Veteran Business Alliance
- Associated of Professionals and Contractors of California
- Minority Chambers of Commerce
- Career Technical Education
- Employment Development Department

VI.C. Partnering

Among the SS Program is the CHSRA commitment to "Partnering" which is designed to establish long term and harmonize relationships, at all levels of the contracting team towards achieving cohesiveness and mutual goals in delivering the project.

Partnering workshops will serve to identify key project issues; risk management strategies; and build partnering processes and structure, communication protocols and dispute resolution processes.

The CHSRA will institute a requirement to facilitate Partnering workshops and sessions on its Design Build contracts which will be afforded to the entire contracting team's participation regardless of subcontracting tier or industry.

The Partnering contract specifications are under consideration.

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VII. SUBPART G WORKFORCE DEVELOPMENT PARTNERS

The high speed train system will generate 600,000 construction related jobs over the life of the project. The CHSRA will work diligently to ensure maximum opportunities are afforded to all.

VII.A. Workforce Investment Act

A key component to the workforce development is the Federal Workforce Investment Act (WIA), which offers a comprehensive range of workforce development activities through statewide and local organizations. Available workforce development activities provided in local communities can benefit job seekers, laid off workers, youth, incumbent workers, new entrants to the workforce, veterans, persons with disabilities, and employers.

The CHSRA and its Contractors will collaborate with the local WIA offices to ensure California citizens have an opportunity to seek out and obtain employment opportunities on the project. The collaboration with the local WIA offices is to promote an increase in the employment, job retention, earnings, and occupational skills improvement. This, in turn, improves the quality of the workforce, reduces welfare dependency, and improves the productivity and competitiveness of the nation.

The Workforce Development Partners MOU is under development.

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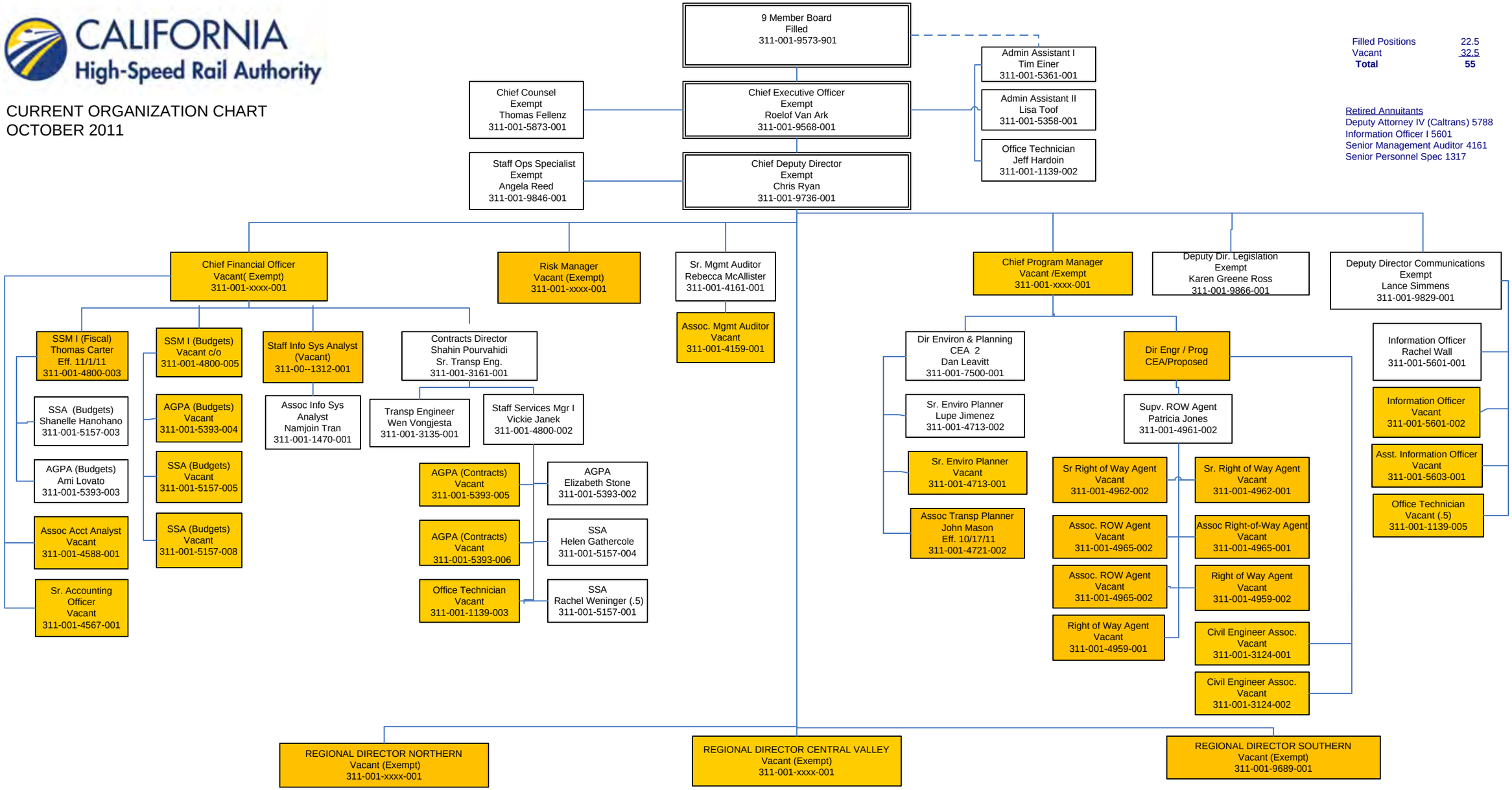
CALIFORNIA High-Speed Rail Authority

CURRENT ORGANIZATION CHART
OCTOBER 2011

Filled Positions	22.5
Vacant	32.5
Total	**55**

Retired Annuitants
Deputy Attorney IV (Caltrans) 5788
Information Officer I 5601
Senior Management Auditor 4161
Senior Personnel Spec 1317



VACANT PSN

As of October 13, 2011

CHSRA Current Organization Chart

Approved:
Roelof van Ark

Date:

STD 810 Contracting Activity Report Form (Rev. June 2008)
CONTRACTING ACTIVITY REPORT

STATE OF CALIFORNIA-DEPARTMENT OF GENERAL SERVICES
PROCUREMENT DIVISION

Fiscal Year or Midyear:		**Year of report:**	
Agency:		**Department:**	

CONTRACTING ACTIVITY CATEGORY	**Part 1**						**Part 2**								
	Certified Disabled Veteran Business Enterprise (DVBE) Participation in State Contracting Activity						Certified Small Business (SB) / Microbusiness (MB) Participation in State Contracting Activity								
	TOTAL CONTRACT AWARDS						TOTAL CONTRACT AWARDS								
	Total Contract Dollars*	Total $ to DVBE Prime Contractors	Total $ to DVBE Sub-Contractors	Total DVBE Prime & Subs $	Percentage (Column D divided by Column A)		Total Contract Dollars*		Total $ to SB/MB Prime Contractors		Total $ to SB/MB Sub-Contractors		Total SB/MB Contract Dollars		Percentage (Column J divided by Column G)
	A	**B**	**C**	**D (B+C)**	**E (D/A)**	**F**	**G**		**H**		**I**		**J (H+I)**		**K**
1. Goods (Non-IT)	$ -	$ -	$ -	$0	0.00%		$0	SB	$ -	SB	$ -	SB	$0	SB	0.00%
								MB	$ -	MB	$ -	MB	$0	MB	0.00%
2. Services** (Non-IT)	$ -	$ -	$ -	$0	0.00%		$0	SB	$ -	SB	$ -	SB	$0	SB	0.00%
								MB	$ -	MB	$ -	MB	$0	MB	0.00%
3. Construction	$ -	$ -	$ -	$0	0.00%		$0	SB	$ -	SB	$ -	SB	$0	SB	0.00%
								MB	$ -	MB	$ -	MB	$0	MB	0.00%
4. IT (Goods & Services)	$ -	$ -	$ -	$0	0.00%		$0	SB	$ -	SB	$ -	SB	$0	SB	0.00%
								MB	$ -	MB	$ -	MB	$0	MB	0.00%
5. CALCard Data	$ -			$ -	0.00%		$0					SB	$ -	SB	0.00%
												MB	$ -	MB	0.00%
TOTALS	**$0**	**$0**	**$0**	**$0**	**0.00%**		**$0**	SB	**$0**	SB	**$0**	SB	**$0**	SB	**0.00%**
								MB	**$0**	MB	**$0**	MB	**$0**	MB	**0.00%**
				DVBE							**SB**		**MB**		**0.00%**
			TOTAL NUMBER OF DVBE CONTRACTS:				*TOTAL NUMBER OF SB/MB CONTRACTS:*								

Comments:

Preparer's Information:				***Approver's Information***			
Name (Print):				Name (Print):			
Title:				Title:			
Signature:		Date:		Signature:		Date:	
Telephone		Fax:		Telephone:		Fax:	
Email Address:				Email Address:			
Street Address:				City:		Zip:	

*The amounts shown in Columns A and G should be the same. If not, submit an explanation with this report.
**Includes Architect and Engineering Services (A&E)
DVBE = Disabled Veteran Business Enterprise SB = Small Business MB = Microbusiness

INCLUDE *STD 810 Supplemental Report , STD 810 A Infrastructure Bond Acts Report, Consulting Services Report and Ethnicity, Race and Gender Reports with submission of the annual report.*

Return Annual and Mid-Year Department Reports To:
Department of General Services
Procurement Division
Attn: Reports Coordinator
707 3rd Street, 1st Floor, Room 400, IMS Z-1, MS 204
West Sacramento, CA 95605

UNIFORM REPORT OF DBE AWARDS OR COMMITMENTS AND PAYMENTS

****Please refer to the Instructions sheet for directions on filling out this form****

1. Submitted to (check only one): [ ] FHWA [ ] FAA [ ] FTA--Vendor Number _____

2. AIP Numbers (FAA Recipients Only):

3. Federal fiscal year in which reporting period falls: FY _____

4. Date This Report Submitted:

5. Reporting Period [ ] Report due June 1 (for period Oct. 1-Mar. 31) [ ] Report due Dec. 1 (for period April 1-Sept. 30)

6. Name of Recipient:

7. Annual DBE Goal(s): Race Conscious Goal _____% Race Neutral Goal _____% OVERALL Goal _____%

	A	B	C	D	E	F	G	H	I
AWARDS/COMMITMENTS MADE DURING THIS REPORTING PERIOD (total contracts and subcontracts awarded or committed during this reporting period)	Total Dollars	Total Number	Total to DBEs (dollars)	Total to DBEs (number)	Total to DBEs /Race Conscious (dollars)	Total to DBEs/Race Conscious (number)	Total to DBEs/Race Neutral (dollars)	Total to DBEs/Race Neutral (number)	Percentage of total dollars to DBEs
8. Prime contracts awarded this period									
9. Subcontracts awarded/committed this period									
TOTAL									

	A	B	C	D	E	F	G	H	I
DBE AWARDS/COMMITMENTS THIS REPORTING PERIOD-BREAKDOWN BY ETHNICITY & GENDER	**Black American**	**Hispanic American**	**Native American**	**Subcont. Asian American**	**Asian-Pacific American**	**Non-Minority Women**	**Other (i.e. not of any other group listed here)**	**TOTALS (for this reporting period only)**	**Year-End TOTALS**
10. Total Number of Contracts (Prime and Sub)									
11. Total Dollar Value									

	A	B	C	D	E
ACTUAL PAYMENTS ON CONTRACTS COMPLETED THIS REPORTING PERIOD	Number of Prime Contracts Completed	Total Dollar Value of Prime Contracts Completed	DBE Participation Needed to Meet Goal (Dollars)	Total DBE Participation (Dollars)	Percentage of Total DBE Participation
12. Race Conscious					
13. Race Neutral					
14. Totals					

15. Submitted by (Print Name of Authorized Representative)

16. Signature of Authorized Representative

17. Phone Number:

18. Fax Number:

MONTHLY SB SUBCONTRACTORS PAID REPORT SUMMARY AND PAYMENT VERIFICATION (Form 103)

Reporting Period (month): _____, 20 ____

ATT

Contract/Project Number: _____

Report Number: _____

Project Name: _____

Original Contract Award Amount: $ _____

Contract Award Date: _____

Current Contract Value: $ _____

Master Contractor Name: _____

% of Project Complete: _____

Address: _____

Telephone: _____

_____

SB Goal: _____% (% of total Contract)

Total $ Paid to Master Contractor to date:

Date of Last Progess Payment: _____

SB Commitment: _____%

Payment to Master Contractor this period: _____

Total $ Paid to

SB Goal Attainment to date:_____%

Total $ Paid to SBs this period: _____

Sub to date: _____

SBE S U B C O N T R A C T O R S	$ Amount paid this Month Date Issued	$ Amount Paid to Date	Type of Work Performed (Scope)	Original $ Amount Committed to DBE at Award	$ +/- resulting from Change Order Activity	% of Work Complete	% of Retention Withheld
Name:							
Address:							
City, State, Zip Code:							
Telephone Number: ( )							
Subcontractor ☐ Broker ☐							
Supplier: Regular Dealer ☐ or Manufacturer ☐							
( ) SB ( ) DVBE ( ) DBE ( ) MB ( ) MINORITY ( )WOMEN							
Name:							
Address:							
City, State, Zip Code:							
Telephone Number: ( )							
Subcontractor ☐ Broker ☐							
Supplier: Regular Dealer ☐ or Manufacturer ☐							
( ) SB ( ) DVBE ( ) DBE ( ) MB ( ) MINORITY ( )WOMEN							
Name:							
Address:							
City, State, Zip Code:							
Telephone Number: ( )							
Subcontractor ☐ Broker ☐							
Supplier: Regular Dealer ☐ or Manufacturer ☐							
( ) SB ( ) DVBE ( ) DBE ( ) MB ( ) MINORITY ( )WOMEN							

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By my signature, I hereby attest that we have complied with all SB Program requirements , including prompt payment and retainage provisions.

Authorized Binding Title:

Authorized Binding Signature: _____

If necessary, this form can be duplicated and/or modified; however, it must contain all requested data fields.

49 CFR PART 26 -- Appendix A to Part 26 -- Guidance Concerning Good Faith Efforts

I. When, as a recipient, you establish a contract goal on a DOT-assisted contract, a bidder must, in order to be responsible and/or responsive, make good faith efforts to meet the goal. The bidder can meet this requirement in either of two ways. First, the bidder can meet the goal, documenting commitments for participation by DBE firms sufficient for this purpose. Second, even if it doesn't meet the goal, the bidder can document adequate good faith efforts. This means that the bidder must show that it took all necessary and reasonable steps to achieve a DBE goal or other requirement of this part which, by their scope, intensity, and appropriateness to the objective, could reasonably be expected to obtain sufficient DBE participation, even if they were not fully successful.

II. In any situation in which you have established a contract goal, part 26 requires you to use the good faith efforts mechanism of this part. As a recipient, it is up to you to make a fair and reasonable judgment whether a bidder that did not meet the goal made adequate good faith efforts. It is important for you to consider the quality, quantity, and intensity of the different kinds of efforts that the bidder has made. The efforts employed by the bidder should be those that one could reasonably expect a bidder to take if the bidder were actively and aggressively trying to obtain DBE participation sufficient to meet the DBE contract goal. Mere *pro forma* efforts are not good faith efforts to meet the DBE contract requirements. We emphasize, however, that your determination concerning the sufficiency of the firm's good faith efforts is a judgment call: meeting quantitative formulas is not required.

III. The Department also strongly cautions you against requiring that a bidder meet a contract goal (i.e., obtain a specified amount of DBE participation) in order to be awarded a contract, even though the bidder makes an adequate good faith efforts showing. This rule specifically prohibits you from ignoring *bona fide* good faith efforts.

IV. The following is a list of types of actions which you should consider as part of the bidder's good faith efforts to obtain DBE participation. It is not intended to be a mandatory checklist, nor is it intended to be exclusive or exhaustive. Other factors or types of efforts may be relevant in appropriate cases.

A. Soliciting through all reasonable and available means (e.g. attendance at pre-bid meetings, advertising and/or written notices) the interest of all certified DBEs who have the capability to perform the work of the contract. The bidder must solicit this interest within sufficient time to allow the DBEs to respond to the solicitation. The bidder must determine with certainty if the DBEs are interested by taking appropriate steps to follow up initial solicitations.

B. Selecting portions of the work to be performed by DBEs in order to increase the likelihood that the DBE goals will be achieved. This includes, where appropriate, breaking out contract work items into economically feasible units to facilitate DBE participation, even when the prime contractor might otherwise prefer to perform these work items with its own forces.

C. Providing interested DBEs with adequate information about the plans, specifications, and requirements of the contract in a timely manner to assist them in responding to a solicitation.

1. Negotiating in good faith with interested DBEs. It is the bidder's responsibility to make a portion of the work available to DBE subcontractors and suppliers and to select those portions of the work or material needs consistent with the available DBE subcontractors and suppliers, so as to facilitate DBE participation. Evidence of such negotiation includes the names, addresses, and telephone numbers of DBEs that were considered; a description of the information provided regarding the plans and specifications for the work selected for subcontracting; and evidence as to why additional agreements could not be reached for DBEs to perform the work.

2. A bidder using good business judgment would consider a number of factors in negotiating with subcontractors, including DBE subcontractors, and would take a firm's price and capabilities as well as contract goals into consideration. However, the fact that there may be some additional costs involved in finding and using DBEs is not in itself sufficient reason for a bidder's failure to meet the contract DBE goal, as long as such costs are reasonable. Also, the ability or desire of a prime contractor to perform the work of a contract with its own organization does not relieve the bidder of the responsibility to make good faith efforts. Prime contractors are not, however, required to accept higher quotes from DBEs if the price difference is excessive or unreasonable.

D. Not rejecting DBEs as being unqualified without sound reasons based on a thorough investigation of their capabilities. The contractor's standing within its industry, membership in specific groups, organizations, or associations and political or social affiliations (for example union vs. non-union employee status) are not legitimate causes for the rejection or non-solicitation of bids in the contractor's efforts to meet the project goal.

E. Making efforts to assist interested DBEs in obtaining bonding, lines of credit, or insurance as required by the recipient or contractor.

F. Making efforts to assist interested DBEs in obtaining necessary equipment, supplies, materials, or related assistance or services.

G. Effectively using the services of available minority/women community organizations; minority/women contractors' groups; local, state, and Federal minority/women business assistance offices; and other organizations as allowed on a case-by-case basis to provide assistance in the recruitment and placement of DBEs.

V. In determining whether a bidder has made good faith efforts, you may take into account the performance of other bidders in meeting the contract. For example, when the apparent successful bidder fails to meet the contract goal, but others meet it, you may reasonably raise the question of whether, with additional reasonable efforts, the apparent successful bidder could have met the goal. If the apparent successful bidder fails to meet the goal, but meets or exceeds the average DBE participation obtained by other bidders, you may view this, in conjunction with other factors, as evidence of the apparent successful bidder having made good faith efforts.

OFFEROR'S OVERALL PROJECT SB GOAL
AFFIDAVIT

STATE OF _____)
)
COUNTY OF_____)

The undersigned, being first duly sworn, deposes and says that:

_____ is the Official Representative of _____,
(Contact Name) (Offeror's Name)
the Offeror submitting the foregoing Proposal. *[If the Offeror has not yet been formed, modify this form as appropriate to include the names of all of the Principal Participants and to indicate that the Official Representative is signing the form on behalf of all of the Principal Participants]*

The Offeror has carefully examined all documents that form this Request for Qualifications and is aware that California High Speed Rail Authority (Authority) has established an Overall Project Small Business goal of 30%, inclusive of Small Businesses, Disabled Veteran Business Enterprises, Disadvantaged Business Enterprises and Micro-Businesses, for Construction Package #1 of the Initial Construction Section of the California High Speed Train System, in conformance with Executive Order S-02-06, Title VI of the Civil Rights Act of 1964 and 49 CFR Part 26, where applicable.

The Offeror will aggressively exercise good faith efforts to the satisfaction of the Authority to meet the Overall Project Small Business goal and corresponding requirements which will be set forth in the Request for Proposal documents.

_____
(Signature)

_____
(Name Printed)

_____
(Title)

Subscribed and sworn to before me this _____ day of _____, 2011.

_____
Notary Public in and for said County and State

[Seal]

My commission expires: _____.

49 CFR Part 26 Appendix C to Part 26 -- DBE Business Development Program Guidelines

The purpose of this program element is to further the development of DBEs, including but not limited to assisting them to move into non-traditional areas of work and/or compete in the marketplace outside the DBE program, via the provision of training and assistance from the recipient.

A. Each firm that participates in a recipient's business development program (BDP) program is subject to a program term determined by the recipient. The term should consist of two stages; a developmental stage and a transitional stage.
B. In order for a firm to remain eligible for program participation, it must continue to meet all eligibility criteria contained in part 26.
C. By no later than 6 months of program entry, the participant should develop and submit to the recipient a comprehensive business plan setting forth the participant's business targets, objectives and goals. The participant will not be eligible for program benefits until such business plan is submitted and approved by the recipient. The approved business plan will constitute the participant's short and long term goals and the strategy for developmental growth to the point of economic viability in non-traditional areas of work and/or work outside the DBE program.
D. The business plan should contain at least the following:
    1. An analysis of market potential, competitive environment and other business analyses estimating the program participant's prospects for profitable operation during the term of program participation and after graduation from the program.
    2. An analysis of the firm's strengths and weaknesses, with particular attention paid to the means of correcting any financial, managerial, technical, or labor conditions which could impede the participant from receiving contracts other than those in traditional areas of DBE participation.
    3. Specific targets, objectives, and goals for the business development of the participant during the next two years, utilizing the results of the analysis conducted pursuant to paragraphs (C) and (D)(1) of this appendix;
    4. Estimates of contract awards from the DBE program and from other sources which are needed to meet the objectives and goals for the years covered by the business plan; and
    5. Such other information as the recipient may require.
E. Each participant should annually review its currently approved business plan with the recipient and modify the plan as may be appropriate to account for any changes in the firm's structure and redefined needs. The currently approved plan should be considered the applicable plan for all program purposes until the recipient approves in writing a modified plan. The recipient should establish an anniversary date for review of the participant's business plan and contract forecasts.
F. Each participant should annually forecast in writing its need for contract awards for the next program year and the succeeding program year during the review of its business plan conducted under paragraph (E) of this appendix. Such forecast should be included in the participant's business plan. The forecast should include:
    1. The aggregate dollar value of contracts to be sought under the DBE program, reflecting compliance with the business plan;
    2. The aggregate dollar value of contracts to be sought in areas other than traditional areas of DBE participation;
    3. The types of contract opportunities being sought, based on the firm's primary line of business; and
    4. Such other information as may be requested by the recipient to aid in providing effective business development assistance to the participant.
G. Program participation is divided into two stages; (1) a developmental stage and (2) a transitional stage. The developmental stage is designed to assist participants to overcome their social and economic disadvantage by providing such assistance as may be necessary and appropriate to enable them to access relevant markets and strengthen their financial and managerial skills. The transitional stage of program participation follows the developmental stage and is designed to assist participants to overcome, insofar as practical, their social and economic disadvantage and to prepare the participant for leaving the program.
H. The length of service in the program term should not be a pre-set time frame for either the developmental or transitional stages but should be figured on the number of years considered necessary in normal progression of achieving the firm's established goals and objectives. The setting of such time could be factored on such items as, but not limited to, the number of contracts, aggregate amount of the contract received, years in business, growth potential, etc.
I. Beginning in the first year of the transitional stage of program participation, each participant should annually submit for inclusion in its business plan a transition management plan outlining specific steps to promote profitable business operations in areas other than traditional areas of DBE participation after graduation from the program. The transition management plan should be submitted to the recipient at the same time other modifications are submitted pursuant to the annual review under paragraph (E) of this section. The plan should set forth the same information as required under paragraph (F) of steps the participant will take to continue its business development after the expiration of its program term.
J. When a participant is recognized as successfully completing the program by substantially achieving the targets, objectives and goals set forth in its program term, and has demonstrated the ability to compete in the marketplace, its further participation within the program may be determined by the recipient.

K. In determining whether a concern has substantially achieved the goals and objectives of its business plan, the following factors, among others, should be considered by the recipient:
    1. Profitability;
    2. Sales, including improved ratio of non-traditional contracts to traditional-type contracts;
    3. Net worth, financial ratios, working capital, capitalization, access to credit and capital;
    4. Ability to obtain bonding;
    5. A positive comparison of the DBE's business and financial profile with profiles of non-DBE businesses in the same area or similar business category; and
    6. Good management capacity and capability.

L. Upon determination by the recipient that the participant should be graduated from the developmental program, the recipient should notify the participant in writing of its intent to graduate the firm in a letter of notification. The letter of notification should set forth findings, based on the facts, for every material issue relating to the basis of the program graduation with specific reasons for each finding. The letter of notification should also provide the participant 45 days from the date of service of the letter to submit in writing information that would explain why the proposed basis of graduation is not warranted.

M. Participation of a DBE firm in the program may be discontinued by the recipient prior to expiration of the firm's program term for good cause due to the failure of the firm to engage in business practices that will promote its competitiveness within a reasonable period of time as evidenced by, among other indicators, a pattern of inadequate performance or unjustified delinquent performance. Also, the recipient can discontinue the participation of a firm that does not actively pursue and bid on contracts, and a firm that, without justification, regularly fails to respond to solicitations in the type of work it is qualified for and in the geographical areas where it has indicated availability under its approved business plan. The recipient should take such action if over a 2-year period a DBE firm exhibits such a pattern.

Appendix D to Part 26 -- Mentor-Protégé Program Guidelines

A. The purpose of this program element is to further the development of DBEs, including but not limited to assisting them to move into non-traditional areas of work and/or compete in the marketplace outside the DBE program, via the provision of training and assistance from other firms. To operate a mentor-protégé program, a recipient must obtain the approval of the concerned operating administration.

B.
    1. Any mentor-protégé relationship shall be based on a written development plan, approved by the recipient, which clearly sets forth the objectives of the parties and their respective roles, the duration of the arrangement and the services and resources to be provided by the mentor to the protégé. The formal mentor-protégé agreement may set a fee schedule to cover the direct and indirect cost for such services rendered by the mentor for specific training and assistance to the protégé through the life of the agreement. Services provided by the mentor may be reimbursable under the FTA, FHWA, and FAA programs.
    2. To be eligible for reimbursement, the mentor's services provided and associated costs must be directly attributable and properly allowable to specific individual contracts. The recipient may establish a line item for the mentor to quote the portion of the fee schedule expected to be provided during the life of the contract. The amount claimed shall be verified by the recipient and paid on an incremental basis representing the time the protégé is working on the contract. The total individual contract figures accumulated over the life of the agreement shall not exceed the amount stipulated in the original mentor/protégé agreement.

C. DBEs involved in a mentor-protégé agreement must be independent business entities which meet the requirements for certification as defined in subpart D of this part. A protégé firm must be certified *before* it begins participation in a mentor-protégé arrangement. If the recipient chooses to recognize mentor/protégé agreements, it should establish formal general program guidelines. These guidelines must be submitted to the operating administration for approval prior to the recipient executing an individual contractor/ subcontractor mentor-protégé agreement.

CALIFORNIA
HIGH-SPEED RAIL
AUTHORITY

Partnership Agreement
With
California High Speed Rail Authority
And
Local Workforce Development Program
Small Business Program
March 2012

We, the undersigned partners in the Local Workforce Development Program and the California High Speed Rail Authority agree to work together to promote small business participation, to meet or exceed our 30 percent participation goal by increasing the pool of qualified small business firms who are ready, willing, and able to compete for procurement, construction, architecture, engineering and professional services contracts.

We agree to work together to prepare today's youth and adults for the challenges of tomorrow's workforce by cultivating a rich learning environment where students are challenged, and encouraged to explore architecture, engineering, and construction career opportunities.

We shall develop and administer a Memorandum of Understanding that strives to accomplishment the following activities to meet our mutual objectives.

1.
2.
3.

SAMPLE

_____	_____
Roelof van Ark, CEO	Workforce Center, Executive Director
California High Speed Rail Authority	Local Workforce Center

PARTNERSHIP AGREEMENT

STATE OF CALIFORNIA
BETWEEN
CALIFORNIA HIGH SPEED RAIL AUTHORITY
AND
DEPARTMENT OF GENERAL SERVICES

We the undersigned partners within California's State Government achieve greater efficiency in the delivery of contract opportunities to Californians. We will minimize overlap, redundancy, and cost in state operations by being fully committed lo leveraging shared services and information in order to make state government more transparent, accessible and accountable, and enhance the quality of services to Small Businesses. Disabled Veteran Business Enterprises, and Disadvantaged Business Enterprises. Leveraging shared services have been proven to achieve greater efficiency, cost-effectiveness and reduced fiscal impact.

Whereas the California High Speed Rail Authority agrees to:

- **Assist business owners on where to obtain Small Business certification.**
- **Email Small Business information and certification opportunities to business owners upon request.**
- **Distribute Small Business certification brochures at outreach events.**
- **Attend outreach events in partnership with the Department of General Services to present and distribute CHSRA business opportunity material.**
- **Share information with the Department of General Services critical to maintaining the integrity of Small Business certification.**

Whereas the Department of General Services agrees to:

- **Educate the CHSRA on navigating the Web site for the Small Business and the Disabled Veteran Business Enterprise certification process.**
- **Educate the CHSRA on navigating the BidSync Web site.**
- **Distribute CHSRA contract opportunities to Small Businesses and Disabled Veteran Business Enterprises.**
- **Attend CHSRA outreach events.**

We mutually agree to actively participate in regularly scheduled meetings and to work together as a cohesive cooperative team to maximize the participation of Small Businesses and Disabled Veteran Business Enterprises including Disadvantaged Business Enterprises, in the Stale's contracting program and to strengthen and sustain California's economy."

SIGNED:

California High-Speed Train Project

Request for Proposal for Design-Build Services

RFP No.: HSR 11-16
Design Variance Request Process

DRAFT FOR RFP HSR 11-16

03/13/2012 RFP HSR 11-16

Prepared for
CALIFORNIA High-Speed Rail Authority

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ABSTRACT

This technical memorandum establishes a procedure for identifying, preparing, requesting, and documenting a design variance from design standards, standard drawings, specifications, adopted standards and design guidance established for the California High Speed Train Project (CHSTP). It is intended to provide clear guidance for preparing a clear and concise record of the relevant design standard, required variance and rationale, assessment, review and key decisions leading to the approval of the variance. This process is to be used through the Design and Delivery of the project.

The design variance request process is comprised of the following steps:

- Early identification of potential variances
- Preliminary investigation of variances
- Variance request preparation and documentation
- Variance review and analysis of potential impacts
- Approval or rejection of variance
- Communication of the approved variance to Authority and program management team
- Document control and feedback loop to design standards development

This technical memorandum also defines the roles and responsibilities associated with the requirements in requesting, approving and documenting the project's design variances.

This document includes forms for use in preparing, submitting and documenting design variance requests.

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1.0 INTRODUCTION

1.1 PURPOSE

This memorandum provides background information, defines the requirements and establishes the procedure by which designers request and obtain approval to deviate from design criteria, standard drawings, specifications, adopted standards and design guidance established for the California High Speed Train Project (CHSTP).

This technical memorandum establishes a procedure for identifying, preparing, requesting, and documenting a design variance from a CHSTP Minimum design standard, standard drawings, specifications, adopted standards and design guidance established for the California High Speed Train Project (CHSTP). It is intended to provide clear guidance for preparing a clear and concise record of the relevant design standard, required variance and rationale, assessment, review and key decisions leading to the approval of the variance.

1.2 GENERAL

Applicability: CHSTP design criteria are typically classified using three terms: Desirable, Minimum, and Exceptional standards. Design Variances are required for design elements that do not meet Minimum/maximum criterion standards.

Justification: Typical justification for design variances could include avoidance of existing physical impediments or substantial environmental or economic impacts that would severely affect project cost and implementation. Such considerations may include existing residential, commercial or industrial establishments; costly right of way acquisition; concerns over safety and liability; noise and vibration impacts; adverse terrain, and environmental impacts.

Mitigation: Safety, maintenance, and operational issues and mitigation measures required to ensure safety for a proposed alternate design must be clearly identified where Minimum/Maximum standards are not met.

Request for variance from CHSTP design criteria should be considered in light of the CHSRA goal of providing safe and reliable high-speed intercity train operations. Variances to CHSTP criteria must be considered in keeping with this primary goal.

1.2.1 Definition of Terms

The following technical terms and acronyms used in this document are defined with regard to the California High Speed Train project.

Approve	Confirms the reviewer's approval with no exceptions taken. The variance advances according to procedure.
Approve with Recommended Modification	Variance reviewer confirms approving the proposed design variance and any exception taken is not considered critical. A critical exception often reveals that the proposal did not consider one or many possible situations, (ie. operating condition, construction consideration, schedule implication, etc.) that may bring significant impact to cost, schedule, safety or functionality. The reviewer *must* provide comments if selecting this vote option and recommendations to resolve the exception taken. Once modified, the revised variance will not be subjected to a full system-level review. Instead, it is advanced according to procedure after the revision is verified.
Configuration/ Change Control	The processes by which significant changes occur to the project scope, schedule, budget, functionality, or location.
Desirable	Standard which shall be equalled or exceeded where there are no constraints on the design.

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Exceptional	Standard which shall be achieved only where Minimum standards are practicably unobtainable. Where Minimum standards are not obtainable, the Exceptional Standards must absolutely be met based upon an approved design variance with adequate analysis and justifications.
Minimum/Maximum	Standard which shall be equalled or exceeded where constraints on alignment make use of Desirable standards impractical or significantly more expensive than if Minimum standards are used. Where Desirable standards are not obtainable, the Desirable shall be approached as nearly as practical.
Non-Standard	Design Feature that does not meet Minimum criteria.
Originator	The firm or entity that develops and submits a Design Variance Request.
Rejected	Confirms the reviewer's disapproval of most or all aspects of the proposed design variance. The Variance is returned to the Originator.
Resubmit with Recommended Modification	The variance reviewer does not agree with the proposed variance as is. The reviewer must provide comments that reveal one or many critical exceptions. A critical exception demonstrates that the proposed design variance does not consider that an approval of the variance, as is, would have one or several significant impacts to cost, schedule, safety, or functionality. The variance reviewer *must* also provide recommendations to resolve any exceptions taken. This option involves another review cycle after revision of the design variance by all reviewers that voted "resubmit." Once approved, the vote will be changed to 'Approve' and the variance will advance according to procedure.
Variance	Approved deviation, or exception, from a CHSTP Minimum design criteria or Minimum design standard.

Acronyms

AREMA	American Railway Engineering and Maintenance of Way Association
AR	Authority Representative
Authority	California High-Speed Rail Authority
CCB	Change Control Board
CFR	Code of Federal Regulations
CHSTP	California High-Speed Train Project
CPUC	California Public Utilities Commission
DPM	Designers Project Manager
EM	Engineering Manager
FRA	Federal Railroad Administration
GO	General Order

1.2.2 Units

The California High-Speed Train Project (CHSTP) is based on U.S. Customary Units consistent with guidelines prepared by the California Department of Transportation (Caltrans) and defined by the National Institute of Standards and Technology (NIST). U.S. Customary Units are officially used in the U.S. and are also known in the U.S. as "English" or "Imperial" units. In order to avoid confusion, all formal references to units of measure should be made in terms of U.S. Customary Units.

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2.0 DEFINITION OF TECHNICAL TOPIC

2.1 GENERAL

Design standards for the CHSTP are under development. Initial design standards will be issued by the PMT as technical memoranda that contain information and/or procedures for project-specific design or technical elements. Additionally, directive drawings and standard drawings will be issued by the PMT that establish design standards for CHSTP.

In the case of differing values, conflicts in the various design requirements, or discrepancies in the application of design guidelines, the standard followed shall be that which results in the highest level of satisfaction for all requirements. In the unlikely possibility that the design in question does not fall under the jurisdiction of any referenced standard, the most appropriate requirement or standard will be established by the California High-Speed Rail Authority (CHSRA). All standards shall be followed as required to ensure public safety and to secure regulatory approvals.

Where applicable, the basis of design will follow the guidelines described in the CHSTP Design Manual. These design standards were developed specifically for the construction and operation of high-speed railways and are based on international best practices. Additionally, local building, planning and zoning codes and standards must be met.

2.2 LAWS AND CODES

Criteria for design elements not specific to HST operations will be governed by existing applicable standards, laws and codes. Applicable local building, planning and zoning codes and laws are to be reviewed for the stations, particularly those located within multiple municipal jurisdictions, state rights-of-way, and/or unincorporated jurisdictions.

In the case of differing values, the standard followed shall be that which results in the satisfaction of all applicable requirements. In the case of conflicts, documentation for the conflicting standard is to be prepared and approval is to be secured as required by the affected agency for which an exception is required, whether it be an exception to the CHSTP standards or another agency standards.

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3.0 ASSESSMENT / ANALYSIS

3.1 DESIGN VARIANCE REQUEST PROCESS DURING PRELIMINARY ENGINEERING

The design variance request process is comprised of the following steps:

- Early identification of potential variances
- Preliminary assessment of variances to confirm feasibility and identify potential mitigations
- Variance request preparation and documentation
- Variance review and analysis of potential impacts
- Approval or rejection of variance
- Distribution or publication of the approved variance to all program design and management teams
- Document control and feedback loop to design standards development

See the Design Variance Process Diagram further in this section.

3.1.1 Early Identification of Potential Variances

The Originator shall identify non-standard design elements that require variances early in the design process and submit an inventory of non-standard design elements to the Authority Representative. If the AR agrees that a potential variance warrants consideration, the Originator shall investigate the feasibility of alternate design solutions and assess the implications associated with the potential design exception.

3.1.2 Preliminary Investigation of Variances

The initial investigation shall include the identification of all CHSTP systems, safety, operations and maintenance factors, in terms of affected scope, cost, and schedule by introducing a design that does not achieve the Minimum standard. Affected systems include but are not limited to engineering, train operations, maintenance, right of way, cost considerations, financial impacts to businesses and industry (including railroads), traffic impacts, and other physical impediments such as natural terrain and issues related to environmental concerns.

The specific location(s) where a potential design variance would be introduced shall be clearly identified as part of the initial investigation.

Early identification and discussion with the AR regarding the design variance is recommended, particularly where the design concept and/or cost estimate is dependent on the design variance. When a design variance has substantive impact to the cost estimate, a range order of magnitude estimate must be produced and presented to the AR with the design variance proposal.

3.1.3 Variance Request Preparation and Documentation

The initiator of the design variance may originate from a Regional Consultant, Design-Build Contractor, Authority, PMT, or third party. The Originator is responsible for preparing the documentation for each design variance request. In this documentation, the Originator expands on the initial investigation, prepares appropriate qualitative and/or quantitative analysis of the impact of the variance and initiates coordination with affected parties. The assessment may include a recommendation as to the course of action.

The Originator is required to complete a Design Variance Request Form that summarizes essential information regarding the design variance. The submittal of the Design Variance Request Form shall include all relevant supporting documentation.

The Originator is required to address all comments from the AR variance review of potential impacts. Any modifications to the variance must be reflected throughout the standard submittal forms and clearly marked as a new revision. New revisions shall be submitted formally to advance in this procedure.

Further instruction and required documentation requirements are detailed below.

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3.1.4 Variance Review and Assessment of Potential Impacts

The AR will review draft variance request documentation and return comments for resolution. Only those non-standard design elements that were previously identified and reviewed by the AR and resolved all critical comments shall proceed to the stage of a formal request for approval. The AR review process is to be completed on a timely basis to keep the program on schedule. A response to the variance requestor is required within twenty (20) working days.

Note: If the same design exception occurs in multiple locations, one Design Variance Request may be submitted for multiple locations with the recurring locations identified if the justification and mitigations are identical. Each variance will have unique identifiers and will reference the same design criteria sections. If more than one criterion is exceeded, all criteria must be identified as separate variance requests.

Non-standard features identified after the approval of a design variance may require preparation of an amendment to the original Design Variance Request or submittal of a new Design Variance Request for approval.

3.1.4.1 Obtaining Required Regulatory Approvals for Variances to CFR

All design variance requests shall meet applicable CRF regulations. The Federal Railroad Administration (FRA) will be informed of all design variances that impact the program's regulatory requirements.

3.1.5 Approval or Rejection of Variance

The following flow chart demonstrates the process by which an appropriate design variance becomes approved. To keep this process efficient and timely, a draft design variance should have only two (2) review/comment cycles before being submitted as final to the CHSRA and regulatory authorities.

Some design variance requests will require revisions by the originator. These changes must be made to address all review comments and then resubmitted with a new revision number in the request title.

During technical review, the design variance will be voted upon by each subsystem and regional team reviewer. The voting options are as follows:

- Approve
- Approve with Recommended Modification
- Rejected
- Resubmit with Recommended Modification

Approve. Confirms the reviewer's approval with no exceptions taken. The variance advances according to procedure.

Approved with Recommended Modification. Variance reviewer confirms approval of the proposed design variance and any exception taken is not considered critical. A critical exception often reveals that the proposal did not consider one or more possible situations, (i.e., operating condition, construction consideration, schedule implication, etc.) that may bring significant impact to cost, schedule, safety or functionality. The reviewer must provide comments if selecting this vote option and recommendations to resolve the exception taken. Once modified, the revised variance will not be subjected to a full system-level review. Instead, it is advanced according to procedure after the revision is verified by the reviewer identifying the need for modification.

Resubmit with Recommended Modifications. The variance reviewer does not agree with the proposed variance as transmitted. The reviewer must provide comments that identify one or many critical exceptions. A critical exception demonstrates that the proposed design variance does not consider that an approval of the variance, as is, would have one or several significant impacts to cost, schedule, safety, or functionality. The reviewer must also provide recommendations to resolve any exceptions taken. This option involves another review cycle after revision of the design variance by all reviewers that voted "resubmit." Once approved, the vote will be changed to 'Approve' and the variance will advance according to procedure.

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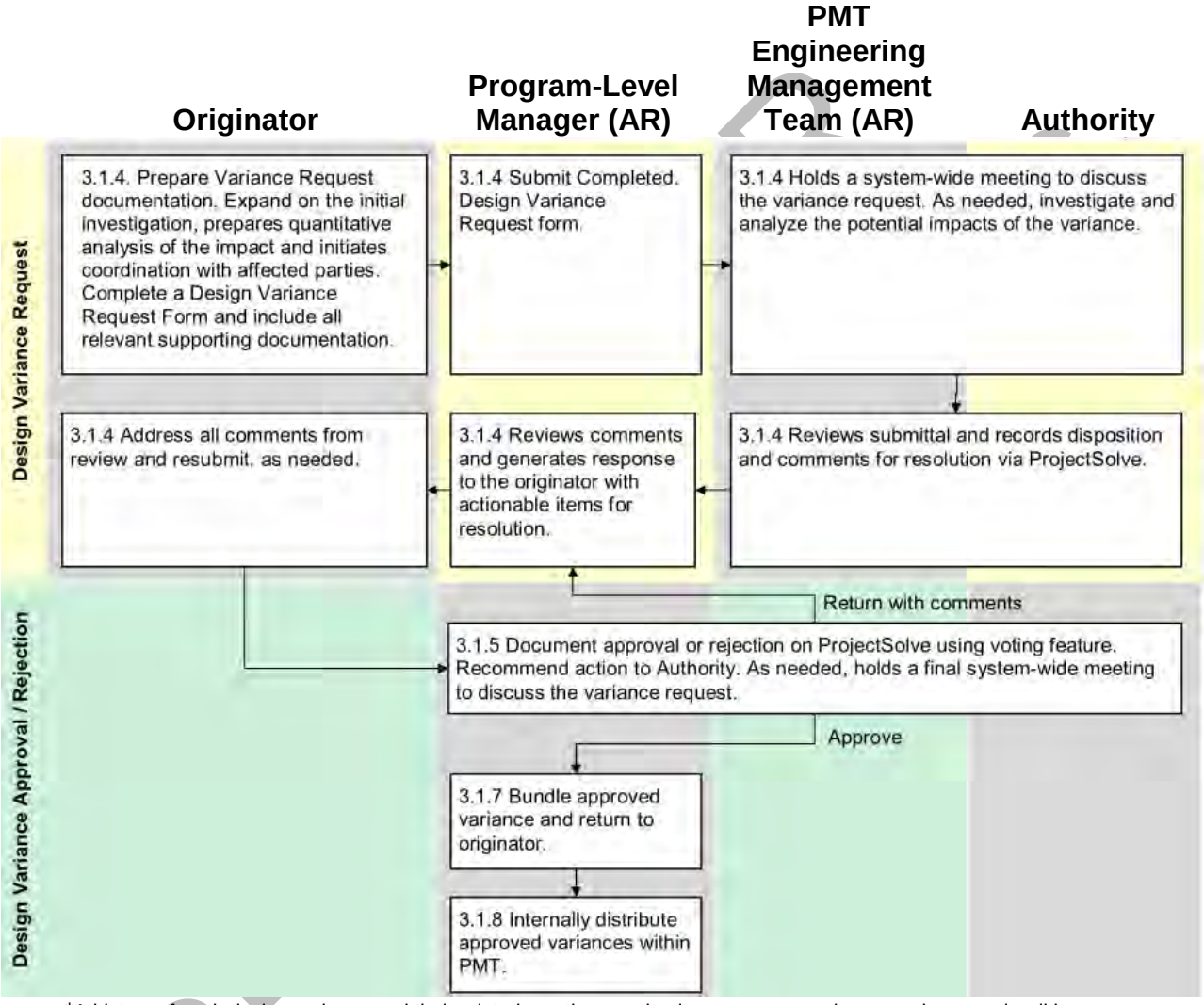
Understanding that this voting process may still leave room for interpretation, The AR will work collaboratively and quickly to reach consensus, The AR is responsible for ensuring that an audit trail is kept and the program moves forward.

Rejected. Confirms the reviewer's disapproval of the proposed design variance. The Variance is returned to its originator with comments explaining reason for disapproval.

3.1.6 Design Variance Process Diagram



*A history of each design variance and their related meetings, action items, correspondence, and approvals wil be recorded to a ProjectSolve database by the Change Control and Configuration Manager.

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3.1.7 Configuration Management and Design Variances

For design variance requests with significant impact to the overall program scope, schedule, and/or budget, these design variances must follow an additional approval by the Configuration Management Board (CMB). According to the Change Control and Configuration Management Plan, all changes that impact the CHSTP baseline documents must be approved by the CMB, including approved design variances with significant impact to scope, schedule, cost, or functionality. These unique design variances will be brought to the CMB for approval after they are approved by the Authority Representative. All submittal requirements for this process are outlined in the Change Control and Configuration Management Plan.

3.1.8 Distribution of Approved Variance to All Program Design and Management Teams

All approved design variance requests will be stored on the ProjectSolve system. Approved variances will be archived within a database for official record. Email notifications of formal approvals and links to the approved variances will be distributed to the Originator, Authority Representative, and all relevant agencies and authorities. The Originator is expected to include and implement all approved design variances when progressing design development.

A concise monthly log that tracks all approved and pending design variances will also be distributed by the AR to keep all relevant members of the CHSTP updated and informed. This log will be located on ProjectSolve and updated and circulated monthly.

3.1.9 Document Control and Feedback to Design Standards Development

ProjectSolve software allows for all review comments and authorizations to be documented and archived. ProjectSolve will provide document control as well as an audit trail history for the decisions made and rationale behind each design variance. Should duplicate design variance requests or amendments to approved design variances arise, ProjectSolve as well as the monthly design variance log shall provide the history that prevents any rework.

As design variances are approved, the approval notifications from ProjectSolve will be distributed to the AR to trigger feedback which may update critical design documents for the CHSTP. These documents include but are not limited to:

Design Requirement Documents

- Contract General Provisions
- Contract Special Provisions
- Design Manual
- Interface documents

Design Drawings

- Affected Design Drawings
- Directive Drawings
- Standard Drawings

Program Management Documents

- Design Variance Status Log
- Construction Cost Estimate
- Construction Schedule
- System Safety Plan
- CHSTP Risk Register
- Systems Interface Manual

Timely circulation of these design variances will allow for a high level of coordination between the AR as well as the Originator.

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3.1.10 Validation & Verification

Documented design variances will also support the implementation of the Validation and Verification (V&V) process. When verifying the design-build contractor's conformance to the project's established criteria, the PMT staff responsible for V&V will utilize all archived variances as backup documentation to address potential disconnects that arise from identified deviations as part of the V&V process.

3.1.11 Design Variance Request Process During Final Design

The Design-Build Contractor is expected to follow the requirements of this procedure to ensure proper management of all deviations from prescribed design criteria.

3.1.12 Design Variance Request Process During Construction

To follow.

3.2 ROLES AND RESPONSIBILITIES

Responsibilities defined in this section will be performed by a person in responsible charge.

Originator

- Application of appropriate design standards
- Early identification of non-standard design features
- Communication of non-standard design elements to the AR
- Assessment of impacted interfaces
- Assessment of alternative design solutions or appropriate mitigations
- Assessment of related prior design variance approvals, if any.
- Coordination with stakeholder, permitting, operating, and other affected agencies
- Determination of sufficient justification to warrant a variance
- Preparation and transmittal of the Design Variance Request to AR
- Response and resolution to review comments from AR
- Preparation and transmittal of required documentation
- Design variance implementation

Authority Representative

- Identification of non-standard design features
- Standardization of Design Variance Request Form
- Review of the design variance request
- Discussion of variance with CHSRA staff, as appropriate
- Provide review comments to Originator
- Approval of design variance requests
- Distribution of design variance approvals and monthly status log
- Coordination of design variance impacts to design documents
- Coordination with impacted program functions (ie. risk, project controls)
- Archival of appropriate documentation
- Final closeout to ensure all approved design variances were implemented in final drawing sets

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3.3 DOCUMENTATION

The Originator shall prepare the documentation for each design variance request.

3.3.1 Design Variance Request Form

The Design Variance Request Form is a standard form issued by the Authority Representative to be utilized across all project segments. When the form is initially processed as draft and then formally submitted as final, the Design Variance Request shall include the date of both draft and final versions of the Request, the number of the Request (generated in a sequential manner), name of the originator requesting, name of contract, contract number, the specific variance requested and why, a clear reference or link to the design criteria, the major design elements (i.e., rail, structures, right of way, utility, environmental) that may be impacted and supporting documentation.

3.3.2 Required Data

Each Design Variance Request shall include the following information:

- Identification of variance with regard to the Minimum standard and its relevance to the Desirable standard. (No variances may be requested against the Exceptional Standards.)
- Description of the specific design element and the applicable criteria, i.e. General Criteria, Standard Drawing, Specification or Minimum Design Standard.
- Rationale and justification for the request and the location(s and/or length) where the variance may be applied.
- Seal and signature of an engineer licensed in California.

For an example of the necessary level of data in a Design Variance Request, see Appendix 7.3 for a completed sample Design Variance request for use as reference.

3.3.3 Supporting Documentation

The Originator shall provide appropriate and specific documentation to allow review, assessment, concurrence and approval of the Design Variance Request. In addition to the Design Variance Request, additional information may consist of but is not limited to:

- Supporting drawings, and/or details
- Calculations, risk and cost factors and corresponding mitigations
- Other impacts: environmental, constructability, etc.
- Recommendation on proper documentation of the variance in the contract procurement documents

For examples of supporting documentation, see Appendix 7.3 for a completed sample Design Variance request for use as reference.

3.3.4 Document Control

- Design variances must be approved prior to transmittal of Preliminary design documents.
- Approval documentation to be filed in the CHSRA files.
- Originator to maintain a copy of approved Design Variance Request in the project files.
- Originator to incorporate how best to communicate the existence of the design variances to the potential bidders in the construction / design-build contract documents. The Originator must include this aspect in their QA/QC procedures.
- Originator to communicate any restrictions to the Authority Representative and CHSRA.

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4.0 SUMMARY AND RECOMMENDATIONS

4.1 DESIGN VARIANCE REQUEST GUIDELINES

The following section outlines the identification, assessment and approval of requests for Design Variances for design elements that do not achieve the Minimum design standards of the CHSTP.

4.2 DRAFT DESIGN VARIANCE REQUEST

The following are guidelines for preparing the Draft Design Variance Request. This section should be completed and transmitted to the RM for review and approval as early as practical.

Design Overview
Provide a brief overview of the design element under consideration and the applicable standard. The type and location of the feature should be referenced, as appropriate, to clearly identify the location and limits.

4.3 DESIGN VARIANCE REQUEST

The following section lists the guidelines for preparing a Design Variance Request. This information shall be completed following review and approval by the AR.

Design Details

If required, provide any clarification and or correction to the information included in the Draft Design Variance Request. Revisions should be minor in nature, such as refinement of the limits of the non-standard design element.

Features Requiring an Exception

A. Non-standard Features:

Describe the proposed non-standard feature(s) and reference plans, typical sections and/or sketches. If several non-standard features are proposed, reference a table summarizing the location and nature of the non-standard elements.

B. Standard for Which Variance Is Requested:

Reference the CHSTP Design Manual Section, Topic and Tables that apply. It is not necessary to restate the entire design standard; only state the portion that applies to the exception request

C. Reason for Requesting Variance:

Avoid open-ended statements. Clearly explain why the standards cannot be followed and what measures, if any, could be taken to mitigate impacts.

- Limitations in project scope are generally not appropriate reasons for exception from a design standard.
- The cost of providing a full standard design may be a supportive factor for approving a non-standard feature, particularly if this cost is generated by an impact such as right of way purchases or environmental mitigation.
- Project schedule should not typically be used as a reason to justify a non-standard feature but can be used as a supportive factor in terms of delay of benefits.

D. Potential Mitigations:

Identify potential and reasonable mitigations to maintain or improve performance or operations. Commitments to implementing potential mitigations are generally not appropriate for inclusion. Mitigations may be an operational rule, such as a speed restriction at the location of the non-standard feature. The Design Variance Request process is specifically established for “design” features and not exceptions to either operations or maintenance standards. If an operational or maintenance procedure is the resulting mitigation for the design variance, this operational restriction has to be

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automatically included into the operations and maintenance procedures and contract documents.

E. Requirements/Estimated Cost to Make Standard:

Provide a reasonable cost estimate summary required to achieve desirable and minimum standards for each element for which an exception is requested. Costs should be presented by major cost elements (i.e., rail, structures, right of way, utility, environmental).

Reviews

List the people/agencies that have reviewed and commented on the design exception. Include his/her title, the design exception he/she reviewed and the date of review or concurrence.

A completed Design Variance Cover Sheet should accompany the final variance request. A Design Variance Cover Sheet template is included in Section 6.4.

Form

Design Variance Request Form is a stand-alone document and must contain exhibits and drawings that show proposed non-standard features.

Design Variance Request Form template is included in Sections 6.5.

5.0 SOURCE INFORMATION AND REFERENCES

1. Manual for Railway Engineering of the American Railway Engineering and Maintenance of Way Association (AREMA Manual)
2. Federal Railroad Administration Code of Federal Regulations (CFR)
3. California Department of Transportation, Manuals and Standards, in particular the following documents:
   - Highway Design Manual, Chapter 80: Application of Design Standards (September 1, 2006)
   - Project Development Procedures Manual, Chapter 21: Exceptions to Design Standards (July 1, 1999)
4. California Public Utilities Commission General Orders
5. CHSTP Change Control and Configuration Management Plan & Procedures

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6.0 DESIGN MANUAL CRITERIA

None Applicable

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APPENDIX A

See attached reference document, filename: TM 1.1.18 CHSTP Design Variance Form Appendix A.pdf

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California High-Speed Train Project

DESIGN VARIANCE COVER SHEET

Design Variance Request Number

Design Variance Request Title

Prepared by:

_____ _____
Originator Date

PMT Review:

_____ _____
Systems Date

_____ _____
Infrastructure Date

_____ _____
Operations/Maintenance /Safety Date

_____ _____
Rolling Stock Date

_____ _____
Systems Integration Date

PMT Recommended:

_____ _____
PMT Regional Manager Date

PMT Approval:

_____ _____
Engineering Manager Date

Agency Concurrence:

_____ _____
CHSR Authority Chief Engineer Date

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CHST DESIGN VARIANCE REQUEST FORM

Part 1 – Design Variance Request Information

Title/Subject:

Number: ABC-DEF-X-0001* **Revision: X***

Contract Name & Number (Final Design):

Region:

Location:

Regional Consultant's / Contractor's Design Drawing Reference:

Date Submitted to Authority Representative

PREPARED / SUBMITTED BY: NAME: COMPANY: SIGNATURE: DATE: (MM/DD/YY)	(Engineering Seal)

******Note design variance numbers will follow the same convention:* "ABC" will abbreviate the name of the firm submitting the variance, "DEF" abbreviates the name of firm receiving the variance request, "X" is the revision number starting from 0, and the last four numbers count the number of total submittals starting from one.

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Part 2 – Design Variance Request Information

CHSTP DESIGN REQUIREMENT Include specific reference to drawings, design criteria, technical memos, specifications	
DESIGN CRITERIA REQUIRING A VARIANCE	
REASON FOR REQUESTING VARIANCE	
JUSTIFICATION FOR VARIANCE	
PROPOSED ALTERNATIVE DESIGN REQUIREMENT	

Part 3 – Impact Analysis

OPERATIONAL	
MAINTENANCE	
INFRASTRUCTURE	
RAILROAD SYSTEMS	
ROLLING STOCK	
RELIABILITY / FUNCTIONALITY	
THIRD PARTY (Utility, Freight, Caltrans, RR, other)	
SAFETY AND SECURITY	
DIRECT COST	
OTHER	

Part 4 – Mitigation Measures

Part 5 – List of Supporting Documentation to Design Variance Request

ANALYSIS	
PUBLICATION/STANDARDS EXTRACTS	
REPORTS	
RISK ASSESSMENT	
DRAWINGS	
CALCULATIONS	
EXPERT TESTIMONIALS	
CORRESPONDENCE	
OTHER	

Do not attach superfluous materials, such as complete project plan sets or engineering reports unless specifically requested.

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APPENDIX B

See attached reference document, filename: TM 1.1.18 CHSTP Sample DVR Appendix B.pdf

Sample Design Variance Request Form and Support Documentation for Information Only

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CALIFORNIA HIGH-SPEED TRAIN PROJECT
DESIGN VARIANCE REQUEST

PART 1 – DESIGN VARIANCE REQUEST INFORMATION

Title / Subject: Horizontal Alignment, Platform Approach Tangent Length

Number: TJPA/INFRA/0/0005 - 0 **Revision:** 0

Contract Name and Number (Final Design): Transbay Joint Powers Authority

Region: San Francisco to San Jose Section Subsection 0, Transbay Transit Center Program

Location: Transbay Transit Center Program

Regional Consultant's / 3RD Party Design Drawing Reference:

TR – 3004 – Track Plan and Profile, STA 141+00 to STA 150+50 (refer to the sheet at the end of this document)

Date Submitted to RMT: February 1, 2011

PREPARED / SUBMITTED BY: Name: Brian Dykes, Principal Engineer Company: Transbay Joint Powers Authority Signature: B.R. Dykes Date (MM/DD/YY): 02/01/2011	REGISTERED PROFESSIONAL ENGINEER BRIAN R. DYKES C 34582 Exp 9/30/11 CIVIL STATE OF CALIFORNIA

Sample Only

PART 2 – DESIGN VARIANCE REQUEST

CHSTP DOCUMENT REFERENCE	(Include Document Title, Revision and applicable Section / Table / Paragraph Reference)
SYS. REQ.:	N/A
DIR. DWGS.:	N/A
TECH. MEMO.:	TM 2.1.3, Turnouts and Station Tracks TM 2.2.4, Station Platform Geometric Design
DESIGN MANUAL:	N/A
STD. DWGS.:	N/A
STD. SPECS.:	N/A
CHSTP DESIGN REQUIREMENT	TM 2.1.3, Section 6.1.4 – Low and Medium Speed Turnouts, states: "Number 11 turnouts shall be used as the standard yard turnout, and as the minimum size turnout to be installed in main tracks with speeds of 125 mph or less and in station tracks." Table 6.1.4 correspondingly identifies the minimum horizontal radius associated with the Number 11 turnout as 950 feet. However, no criteria for minimum track alignment horizontal curve radius is provided, and TM 2.1.3 appears to be directed to in-line high-speed stations, and track turnouts do not specifically address minimum track horizontal curvature.

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	TM 2.1.8, Section 6.1.1, Track Alignment Design Parameter – Access and Main Line Connecting Tracks; Main Line Connecting Tracks, states: "Minimum Radius is as follows: Desirable: 2,500 feet, Minimum: 900 feet and Exceptional: 500 feet." The Downtown Rail Extension (DTX) tracks are similar to secondary mainline tracks and will be designed to minimize clearance times to and from the station platforms.
DESIGN CRITERIA REQUIRING A VARIANCE	Horizontal Alignment, Platform Approach Tangent Length TM 2.2.4 Section 3.2.1, Horizontal Alignment, has yet to be published. It is expected that this TM will include specific requirements for platform approach tangent length at terminal stations as indicated above. TM 2.1.3 Section 6.1.3, Station Connection Tracks, and Figure 6.1.4 indicate that a 75-foot to 85-foot length should be provided between the end of an intermediate platform and the start of any approach turnouts.
REASON FOR REQUESTING VARIANCE	The proposed Transbay Transit Center will be located on the site of the former Transbay Terminal in downtown San Francisco. The alignment of the DTX tunnel, which will feed rail traffic to and from the Transit Center, is primarily located within City-owned right-of-way, under Second and Townsend streets. The Transit Center location and rail alignment have been developed to minimize adjacent property impacts and subsequent right-of-way acquisition. The TJPA has worked cooperatively with the California High-Speed Train Project (CHSTP) to develop a Transit Center configuration that best meets the design requirements of CHSTP (see appendixes B and C). However, in order to maximize the available tangent platform length at the Transit Center and maintain the approach trackwork within Second Street, the TJPA requests that the requirement to provide 75 feet of additional tangent track on the approach to the Transit Center platforms be waived.
JUSTIFICATION FOR VARIANCE	Because of right-of-way constraints adjacent to the alignment and at the location of the Transit Center, accommodating the tangent approach criteria will result in significant additional right-of-way acquisition at considerable expense, or conversely in a reduced platform length. In its correspondence of August 27, 2010, California High-Speed Rail Authority (CHSRA) states, "in the absence of tangent, we assessed that platform tapers are required." (See Appendix B) Correspondingly, the TJPA has provided localized tapered platform edges at the west end of THE Transit Center to mitigate any rolling stock–platform contact arising from car swing. The request for approval of the platform taper at the Transit Center was submitted as design variance request TJPA/INFRA/0/0003 - 0, Platform Taper. Because the Transit Center is a terminal rail station, clearance is not required for exiting the platform on the east end. Therefore, the requirement for 75 feet of tangent track at the east end of the platform is not required.
PROPOSED ALTERNATIVE DESIGN REQUIREMENT	The TJPA requests that the platform approach tangent track requirements of TM 2.2.4, as they may be, and TM 2.1.3 be waived at the Transbay Transit Center.

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PART 3 – IMPACT ANALYSIS

RELIABILITY / AVAILABILITY	There is no determined impact on the reliability, availability, maintainability, and safe operation of the high-speed train arising from this design criteria variance request.
ENVIRONMENTAL	See Cost Impacts.
ROW / EASEMENT	See Cost Impacts.
3RD PARTY	See Cost Impacts and Mitigation Measures.
OPERATIONAL	There are no additional operations and maintenance impacts arising from this variance request. For impacts associated with platform taper and platform gap, refer to design variance requests TJPA/INFRA/0/0003 - 0, Platform Taper, and TJPA/INFRA/0/0004 - 0, Platform Gap, respectively.
MAINTENANCE	See Operational Impacts.
INFRASTRUCTURE	No impact to CHSTP as provided under the Transit Center project that is sponsored by the TJPA.
SYSTEMS	No impact to CHSTP as provided under the DTX project that is sponsored by the TJPA.
COST DIRECT 3RD PARTY	Accommodating the CHSTP criteria for platform approach tangent length would result in the approach tracks and structures conflicting with a significant number of properties to the west of Second Street, between approximate limits of Howard Street and the Interstate 80 Bay Bridge approach. Properties affected include: a. 182 Second Street. This building is designated in San Francisco Planning Code Article 11 as contributing to the New Montgomery–Second Street Conservation District and the Second and Howard Streets District, designated on the National Register of Historic Places. b. 222 Second Street, a proposed 35-story office building. c. 246 Second Street, a 15-story residential tower. d. 400 Second Street, a 5-story commercial building. e. 611 Folsom Street, a 19-story commercial building. This building is the central San Francisco offices of AT&T, a primary communications distribution center. AT&T has previously indicated in conversations with the TJPA that relocating its conduit facilities in Second Street alone would take approximately 10 years. f. 631 Folsom Street, the recently constructed Blu condominium building, a 21-story residential structure. g. 600 Harrison Street, a 6-story commercial building. Based on work previously undertaken to review potential CHSTP alignments on Third and Seventh streets, the environmental impacts associated with acquiring the additional properties would be significant, and the cost of acquiring this substantial number of properties would be prohibitive. Acquisition costs for the above-listed properties are anticipated to be about $450 million. Approximate order of magnitude costs for the additional property acquisition are included in Appendix A.
DESIGN SCHEDULE	Transit Center Project 100% Construction Documents submittal is due 8/17/11.

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PART 4 – MITIGATION MEASURES

Refer to design variance requests CHST-DCVR-TC003, Platform Taper, and CHST-DCVR-TC004, Platform Gap.

PART 5 - LIST OF SUPPORTING DOCUMENTATION TO DESIGN VARIANCE REQUEST

ANALYSIS	Appendix A — Additional right-of-way costs associated with accommodating CHSTP criteria for platform approach tangent length.
PUBLICATION / STANDARDS EXTRACTS	N/A
REPORTS	N/A
RISK ASSESSMENT	The TJPA has requested the use of a minimum track horizontal radius of 650 ft for the approach curvature to the Transbay Transit Center station in San Francisco, CA, due to constrained site conditions. The design will incorporate the use of head-hardened rails to reduce maintenance requirements. Other mitigating measures, as appropriate, may be incorporated at a later date.
DRAWINGS	Appendix C — Agreed Transbay Transit Center configuration
CALCULATIONS	N/A
EXPERT TESTIMONIALS	N/A
CORRESPONDENCE	Appendix B — Operator acceptance of Transbay Transit Center configuration: a. Minutes of TJPA–CHSTP Peninsula Rail Program (PRP) meeting of 8-27-10 indicating CHSTP and PRP acceptance of the use of a 650-foot minimum radius b. CHSTP and PRP letters to the TJPA dated 8-27-10 and 9-29-10, respectively, confirming agreement of the Transit Center configuration

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PART 6 – 3RD PARTY REVIEWER LISTING AND THEIR ASSOCIATED COMMENTS

3RD PARTY NAME	3RD PARTY AFFILIATION	COMMENTS
N/A	N/A	N/A

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Additional Right of Way Costs Associated with Accommodating CHSTP Criteria for Platform Approach Tangent Length

Properties not currently identified for acquisition which would be impacted by accommodating CHSTP criteria for platform approach tangent length are indicated in Figure 1 below. Costs associated with the acquisition of these properties and the relocation of owners is provided in Table 1.

Sample Only

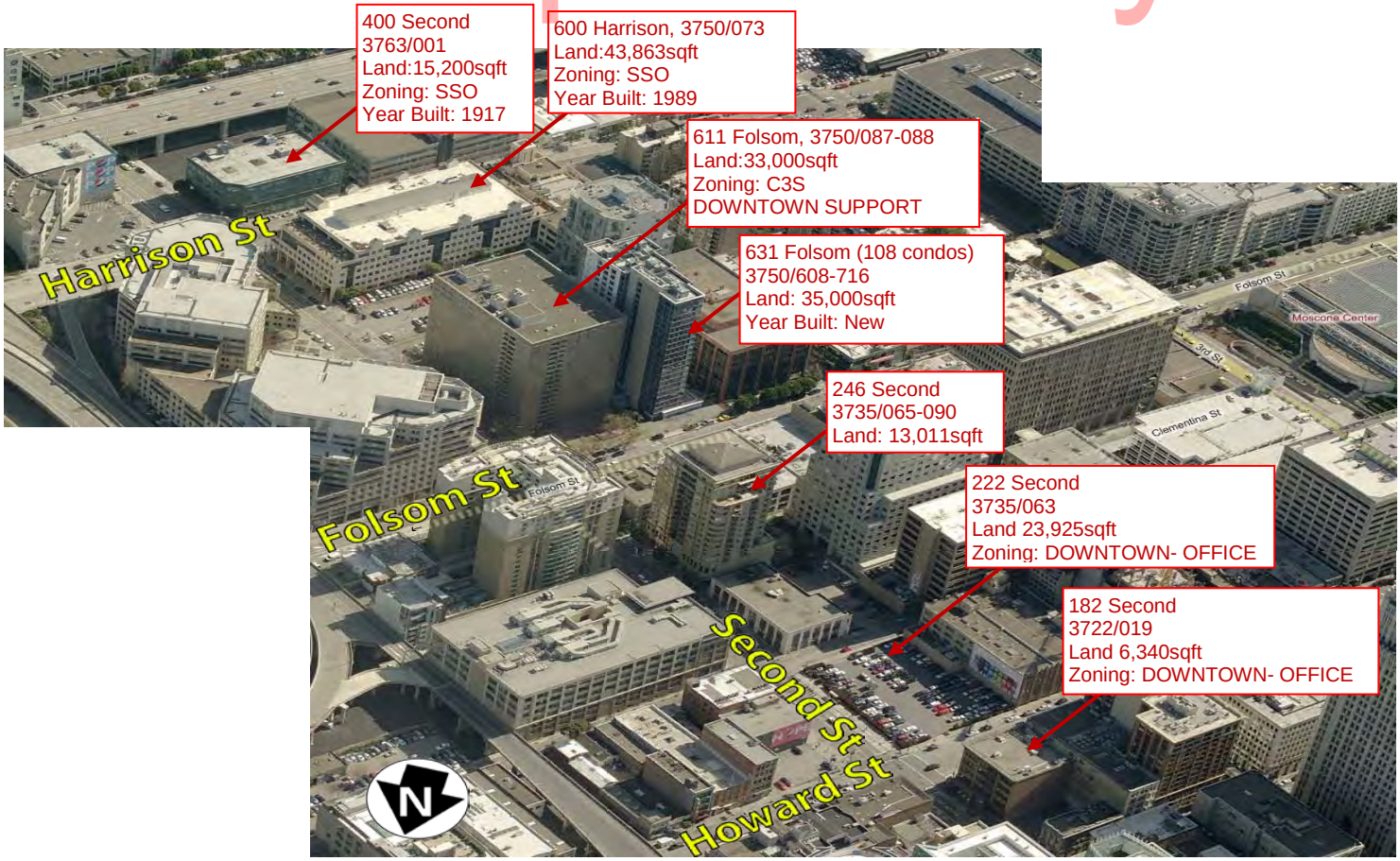

Figure 1: Additional Property Impacts, Second Street

Table 1: Right-of-Way Costs for Impacted Properties

	Block	Lot	Address	Lot Area (sq ft)	Floors	Gross Area (sq ft)	Property Value	$/sq ft	Relocation Assistance (3)	Total
a	3735	63	222 Second	23,925	35	837,375	$40,000,000	$47.77	$20,000.00	$40,020,000
b	3735	065-090	246 Second	13,011	15	220,000	$48,000,000	$218.18	$736,000.00	$48,736,000
c	3763	1	400 Second	15,200	5	76,000	$13,500,000	$177.63	$225,000.00	$13,725,000
d	3750	087-088	611 Folsom (2)	33,000	19	627,000	$52,000,000	$82.93	$1,880,000.00	$53,880,000
e	3750	608-716	631 Folsom	35,337	21	742,077	$115,000,000	$154.97	$1,620,000.00	$116,620,000
	3750	(see 631 Folsom)	282 Second	4,129	4		*(see 631)*			
f	3750	73	600 Harrison	43,862	6	263,172	$65,000,000	$246.99	$790,000.00	$65,790,000
g	3722	19	182 Second	6,340	5	31,700	$7,925,000	$250.00	$132,083.33	$8,057,083
						2,797,324	**$341,425,000**	$122.05	**$5,403,083**	**$346,828,083**
									30% Contingency (1)	$100,000,000
										$446,828,083

(1) Includes condemnation and adjustments for time. Admin costs are not included.

(2) Does not include relocation of telephone equipment and connecting underground lines.

(3) Includes goodwill costs.

Source: Transbay Transit Center Program Management/Program Controls Consultant, October 2010

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TRANSBAY JOINT POWERS AUTHORITY
TRANSBAY PROGRAM MANAGERS

Meeting Minutes

Project [300] - Downtown Extension Project

View Date 10/12/2010
Date 8/27/2010

PMPC
201 Mission Street, Suite 2750
San Francisco, CA 94105
Phone: 415-343-2460
Fax: 415-947-0603

Meeting No. DTX-Caltrain-CHSRA-6

Meeting Type	Coordination	**Date**	8/27/2010
Subject	TTC Platform Layout Discussion	**Time**	9:00 AM PT
Prepared By	Meghan Murphy	**Location**	201 Mission Street, Suite 2100

Meeting Attendance

Company - Attendee	Required	Attended	Company - Attendee	Required	Attended
Adamson Associates, Inc. (AAI) - George Metzger	☑	☑	PCJPB (Caltrain) - Robert Doty	☑	☐
Adamson Associates, Inc. (AAI) - Paul MacPhail	☑	☑	PCJPB (Caltrain) - Will Hastings	☑	☐
Adamson Associates, Inc. (AAI) - Sandor Rott	☑	☑	Pelli Clarke Pelli Architects, Inc. (PCPA) - Heather Kim	☑	☑
Arup - Rich Coffin	☑	☑	Pelli Clarke Pelli Architects, Inc. (PCPA) - Randy Volenec	☑	☑
Arup - Tony Bruzzone	☑	☑	PMPC - Alfred Lau	☑	☑
CHSRA PMT - Dominic Spaethling	☑	☑	PMPC - Bradford Townsend	☑	☑
CHSRA PMT - Johnny Kuo	☑	☑	PMPC - Derek Penrice	☑	☑
Emilio Cruz - Emilio Cruz	☑	☑	PMPC - Gerry MacClelland	☑	☐
Parsons (PTG) - Carl Wood	☑	☑	PMPC - Mark O'Dell	☑	☑
Parsons (PTG) - Chukwuma Umolu	☑	☑	PMPC - Meghan Murphy	☑	☑
Parsons (PTG) - Larry Godbold	☑	☑	Thornton Tomasetti - Albert Chen	☑	☑
Parsons (PTG) - Robert Sergeant	☑	☑	TJPA - Brian Dykes	☑	☑
PCJPB (Caltrain) - Claude Gratianne	☑	☑	TJPA - Robert Beck	☑	☑
PCJPB (Caltrain) - Michelle Bouchard	☑	☐	TranSystems Corporation - Emmanuel S. ("Bruce") Horowitz	☑	☐

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001 **Introduction**

The TJPA provided an update on the Program schedule and contractual obligations.

- Currently two packages out to bid for the Transit Center (TC).

- The bus ramps are in the demolition phase.

- There is a need to finalize the TC layout so that the design can be completed.

- A trainbox outline based on a 650-feet radii curve into the TC was previous agreed to by CSHRA and Caltrain.

- The final design for the TC is underway with 50% Construction Documents to be submitted by the end of 2010.

- It would be desirable to have a final addendum by the end of September.

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002 **Architectural Design**

See meeting handout for discussion points on the architectural design and pedestrian circulation. See attached floor plans, elevation, structural girder plan, and pedestrian flow figures for reference.

Additional notes to the handouts:

- Re-planning Elements: The trainbox extends to the east side of Main Street, however, the concourse level will stop where indicated on the drawings to provide for a utility corridor in Main Street.

- Pedestrian Circulation: There are three primary points of entry to the TC: Shaw Alley, the Grand Hall and Beale Street. Percentage of patrons utilizing each entrance is shown on the figures. Option 2B requires all escalators to be positioned east of the Grand Hall. Five escalators are required to meet pedestrian circulation requirements at peak hours. CHSRA PMT noted a concern related to the location of the escalators to the CHSRA platforms. The TC architectural team is aware of the lack of visibility of these escalators as well as the potential need for fare gates, and will work with the CHSRA team to produce a workable solution.

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003 **Rail Operations**

See meeting handout for discussion points on the rail operations. See attached exhibit 1 showing the four layout options analyzed for rail operations for reference.

Additional notes to the handouts:

- Rail Operations Performed Under Stress Conditions for Capacity:

* The DTX Team used 7 CHSRA trains and 6 Caltrain trains per hour as the basis for the evaluation. This was recommended by Caltrain in previous discussions instead of running analyses for the operator's anticipated trains per hour as it more clearly defines how the system will fail and what the limits are.

* The DTX Team analyzed both island and side platform layouts for the Fourth and Townsend Station (See Layouts 3 and 4) and did not find an appreciable difference in the time for the operations. The DTX Team's analyses included Caltrain stopping at the Fourth

and Townsend Station both inbound and outbound from the TC to add stress to the system. The DTX Team does not believe the changes to the location of the platforms at the Fourth and Townsend Station would impact the results of the operations analysis at the TC.

* CHSRA PMT is currently assuming that the approach to the Fourth and Townsend Station will be in a cut-and-cover two-track structure under Seventh Street.

* The DTX Team discouraged the use of curved cross-overs for regular operations as they require significantly more maintenance and custom parts. Curved turnout bodies are longer and require additional machines and switch rods. These would be long lead items to replace so additional spare parts would be needed to be kept in inventory. Caltrain stated that this is normal practice. It was agreed that a curved diamond crossing is not desirable. The DTX Team also noted the need for noise mitigation for the "screeching" sound as the trains use the curves/cross-overs in the TC. This mitigation will likely involve custom pads which will be on a curve and will require additional maintenance.

* Current dwell times: CHSRA: Scheduled dwell time of 26 to 33 minutes with a minimum of 20 minutes. Caltrain: Scheduled dwell time of 20 minutes with a minimum of 15 minutes. No disagreement was voiced during the meeting to these assumed dwell times.

004 **Summary**

- Moving the Caltrain platform to the north side of the TC and using a radius of 650 feet is acceptable to CHSRA and Caltrain. CHSRA hand delivered a letter to the TJPA stating it's agreement. The PMPC asked that Caltrain do the same which Caltrain agreed to.

- Caltrain desires the parallel move flexibility that is provided by Layout 2.

- The TJPA and their design consultants have concerns about the Layout 2 option (particularly if a double cross-over is utilized as it relates to the necessity for a structural arch or other framing methods which would add to the project costs as well as significantly affecting the vertical circulation through the TC. It is the PMPC's view that Layout 2 provides flexibility under adverse conditions, but is not necessary for normal operations and may otherwise be accomplished through other established emergency response procedures.

- Caltrain would like for the TJPA's design consultants to determine the extra length of platform required to accommodate a stair in the shorter platform layout. Caltrain would also like the consultants to determine the structural requirements and cost implications of a hybrid layout option which would combine the operational flexibility of Layout 2 while not overly compromising the vertical circulation benefits of the longer platform.

- Next meeting to be held on 9/3/10 at 9 am to review the further architectural and structural assessment of the hybrid option. The DTX Team will coordinate internally.

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All meeting minutes are considered to be correct and accurate unless the author is notified in writing within five (5) business days.

Linked Documents

Document Type	Document	Open	Description	Date	Size (KB)
Doc	300-00235		2010-08-26 Caltrain Ped Circ Figures	8/27/2010	941.94
Doc	300-00236		SKA-1024	8/27/2010	169.55
Doc	300-00237		SKA-1025	8/27/2010	272.23
Doc	300-00238		SKA-1026	8/27/2010	1710.07
Doc	300-00239		SKA-1030	8/27/2010	235.14
Doc	300-00240		For Webex Parsons	8/27/2010	411.28
Doc	300-00241		SSK-42 Config 2B	8/27/2010	685.89
Doc	300-00242		Meeting Handout Bullets-Rev02	8/27/2010	118.50

Distribution

Recipient	Company	Method	Date
Alfred Lau	PMPC	Message	8/30/2010
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Bradford Townsend	PMPC	Message	8/30/2010
Bradford Townsend	PMPC	Email: btownsend@transbaycenter.org	8/30/2010
Brian Dykes	TJPA	Message	8/30/2010
Brian Dykes	TJPA	Email: bdykes@transbaycenter.org	8/30/2010
Carl Wood	Parsons (PTG)	Email: Carl.wood@parsons.com	8/30/2010
Chukwuma Umolu	Parsons (PTG)	Message	8/30/2010
Chukwuma Umolu	Parsons (PTG)	Email: chukwuma.umolu@parsons.com	8/30/2010
Claude Gratianne	PCJPB (Caltrain)	Email: gratiannec@samtrans.com	8/30/2010
Derek Penrice	PMPC	Message	8/30/2010
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Emmanuel S. ("Bruce") Horowitz	TranSystems Corporation	Email: brucehorowitz@hotmail.com	8/30/2010
George Metzger	Adamson Associates, Inc. (AAI)	Message	8/30/2010
George Metzger	Adamson Associates, Inc. (AAI)	Email: gmetzger@adamson-associates.com	8/30/2010
Gerry MacClelland	PMPC	Message	8/30/2010
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Heather Kim	Pelli Clarke Pelli Architects, Inc. (PCPA)	Message	8/30/2010
Heather Kim	Pelli Clarke Pelli Architects, Inc. (PCPA)	Email: hkim@pcparch.com	8/30/2010
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Meghan Murphy	PMPC	Message	8/30/2010
Meghan Murphy	PMPC	Email: mmurphy@transbaycenter.org	8/30/2010
Michelle Bouchard	PCJPB (Caltrain)	Email: bouchardm@samtrans.com	8/30/2010
Paul MacPhail	Adamson Associates, Inc. (AAI)	Message	8/30/2010

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Paul MacPhail	Adamson Associates, Inc. (AAI)	Email: pmacphail@adamson-associates.com	8/30/2010
Randy Volenec	Pelli Clarke Pelli Architects, Inc. (PCPA)	Message	8/30/2010
Randy Volenec	Pelli Clarke Pelli Architects, Inc. (PCPA)	Email: rvolenec@pcparch.com	8/30/2010
Rich Coffin	Arup	Message	8/30/2010
Rich Coffin	Arup	Email: richard.coffin@arup.com	8/30/2010
Robert Beck	TJPA	Message	8/30/2010
Robert Beck	TJPA	Email: rbeck@transbaycenter.org	8/30/2010
Robert Doty	PCJPB (Caltrain)	Email: dotyr@samtrans.com	8/30/2010
Robert Sergeant	Parsons (PTG)	Message	8/30/2010
Robert Sergeant	Parsons (PTG)	Email: Robert.M.Sergeant@parsons.com	8/30/2010
Sandor Rott	Adamson Associates, Inc. (AAI)	Message	8/30/2010
Sandor Rott	Adamson Associates, Inc. (AAI)	Email: srott@adamson-associates.com	8/30/2010
Tony Bruzzone	Arup	Email: anthony.bruzzone@arup.com	8/30/2010
Will Hastings	PCJPB (Caltrain)	Email: hastingsw@samtrans.com	8/30/2010

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Parsons Brinckerhoff
303 Second Street
7th Floor North
San Francisco, CA 94107
Main: 415-243-4600
Fax: 415-243-9501

PB-TJPA-1127

August 27, 2010

Mr. Brian Dykes
Principal Engineer
Transbay Joint Powers Authority
201 Mission Street, Suite 2100
San Francisco, CA 94105

RE: California High-Speed Rail Program Management Comments to SF Downtown Rail Extension High Speed Rail Accommodation Study, July 16 2010

Sample Only

Dear Brian:

The CHSRA PMT has reviewed the Transbay Transit Center platform configuration study to accommodate high-speed rail, dated July 16, 2010. This is an updated configuration from the version that was reviewed in March 2010. This concept differs in that the high-speed train platforms switched locations with the Caltrain platform, and are now located on the southern side of the train box serving tracks 21 through 24, in order to not require possible changes to the foundation of 201 Mission Street. Generally, the geometric features are consistent with the March 2010 version, except for the length of platform tapers. While the California High Speed Rail Authority Program Management Team (CHSRA PMT) team did not conduct a comprehensive review of proposed station configuration and alignment, they were able to focus on the following major components of the design:

- Horizontal curve radii
- Approach alignment
- Distance required for the end stop
- Platform length
- Platform gaps

Below is a summary of the initial findings by the CHSRA PMT.

Horizontal Radius

The horizontal radius of 650-foot is commensurate with the tightest radii (622-foot / 190 m) that the EMT has found in revenue service at Cologne Central Station. This will require a design variance for it to be accepted as part of the HST system.

Approach Alignment

The alignment does not provide length of tangent track (75 foot) on either side of platform needed to ensure swing of the cars do not require a tapered platform. In the absence of the tangent, we assessed that platform tapers are required. This will require a design variance.

End Stop

In the absence of a detailed design, the 40 foot length of track allows for 30 feet inclusive of physical 'bumper' requirements plus a 10 foot distance from normal train parking position for end stop requirements. This 40 foot total distance would require a 3-5 mph operational speed.

Platform length

Platforms (Tracks 21, 22, 23, 24) do not meet the exceptional design criteria tangent useable length of 1315 feet. The 1355 feet total length shown includes 40 feet for the end stop, and platform tapers ranging from 60 to

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110 feet in length. These platform lengths do not provide for the TSI (European Technical Specifications for Interoperability) tolerance that permits train length to be increased 1% for aerodynamic design. A design variance will be required for the total usable length of the platforms.

Platform Gap

Platforms on tracks 21, 22, 23, and 24 will require additional offsets due to the adjacent or proximate curves in the platform tracks. The beginning point of the need for additional car to platform clearance is based on the point at which the swing in the car body begins due to curvature, which is based on vehicle characteristics.

Since the CHSRA has not selected its vehicle type for the system, the PMT tested the vehicle / platform interface with the Shinkansen trainset technology, assuming it is the most conservative of the compatible vehicles. The acceptable gap between the vehicle and platform is governed by two requirements:

- *Americans with Disabilities Act (ADA)* requires a maximum gap between platform and side of the train at door positions of 3 inches.
- *CHSRA PMT Design Criteria* - The design gap between platform and side of train will be 2.75 inches at the car floor level.

Sample Only

For the Shinkansen equipment, as a typical case, with a 2.75 inch standard offset, the platform tapers and gaps are described in Table 1. For comparison, the March version has also been included.

Table 1: Comparison of Transbay Transit Center HST Platforms Configurations

Track No.	March 2010 Version		July 2010 Version	
	Platform Taper	Max Platform Gap	Platform Taper	Max Platform Gap
	(Feet)	(Total Inches)	(Feet)	(Total Inches)
21	Caltrain		110	10.52
22	Caltrain		95	10.29
23	82.5	10.08	95	10.36
24	108.9	6.66	60	5.87
25	56.5	4.67	Caltrain	
26	29.1	3.70	Caltrain	

Overall, moving the HST to platforms 21 to 24 results in longer areas of platform gap than what was previously proposed in March. In both cases a design variance would be required for the potential platform gap issues.

In addition to the observations outlined above, the EMT would also need to confirm:

- Width of platform to be at least 30 feet
- Distance between face of platform and track centerline to be 5.75 feet
- Superelevation assumptions for the alignment
- Full approach with trackwork for consistency with the operational requirements
- Suitability of operational mitigations (platform gap fillers, wheel lubrication devices, etc)
- Acquisition of Phase 2 right of way
- Design of the downtown extension (DTX) beyond the TTC footprint

In conclusion, while the current design (July 16, 2010) for the Transbay Transit Center would require a series of design variances in order for it to be acceptable for the HST system, the project, as currently described, should

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accommodate the anticipated high-speed trainsets at the TTC. The appropriate next step would be to enter into a formal design variance process whereby the CHSRA and the TJPA can discuss the possible operational, design or other mitigations for the issues with the horizontal radius, approach alignment, platform length and platform gap. Finally, this terminal concept is only feasible if both Phase I and II as outlined in the plan set of July 16, 2010 are constructed before the initiation of service to the terminal. The Phase I construction alone would not be sufficient to accommodate the HST forecasted level of service.

I look forward to working with you on developing solutions for the design issues identified above. Please do not hesitate to contact me with questions regarding this letter.

Sincerely,

Dominic Spaethling
Regional Manager
CHSRA PMT

Sample Only

cc Ken Jong
Johnny Kuo
Derek Penrice

03/13/2012 RFP HSR 11-16

CALIFORNIA HIGH-SPEED RAIL AUTHORITY

Caltrain

PRP-1670-LTO-DTX-002

CIN			File Code		
Project: PW DTX TC BS BR S&U TT ET PMPC					
CW Module: ☑ Comsp. ☐ FD ☐ Contracts ☐ Drawing ☐ Permits ☐ Other					
Name	Info	Action	Name	Info	Action
Emilio	☑	☐	Phil/ Guy/ Wil	☐	☐
Steve	☐	☐	Judy/Karen	☐	☐
Jim	☐	☐	Prasad	☐	☐
Joyce / Derrick	☐	☐	Jason P/ Jason R	☐	☐
Doug	☐	☐	Jimmy	☐	☐
Alfred / Mark	☑	☐	Whitney	☐	☐
Brad/Derek/Meghan	☑	☐		☐	☐

RECEIVED SEP 30 2010

September 29, 2010

Brian Dykes
Transbay Joint Powers Authority
201 Mission Street
Suite 2100
San Francisco, Ca. 94105

Subject: Transbay Center Train Level Configuration Approval

Dear Mr. Dykes,

Sample Only

The Peninsula Rail Program wishes to express its appreciation of the TJPA's efforts over the course of the last few months in developing a train platform and track layout suitable for the needs of Caltrain and the CHSRA. The attached exhibit memorializes the agreed general configuration of platforms, tracks and crossovers for the terminal area. Of note, the layout swaps Caltrain from 21/22 to 25/26 to mitigate the property take of 201 Mission Street that would otherwise be required to accommodate the longer length of high speed train platforms.

More specifically, it is understood that the attached exhibit is a preliminary drawing and further design is required to address areas where engineering variances are required. Specific variances required for the CHSR platforms were indicated in a letter by Parsons Brinkerhoff dated August 27th, 2010 (Reference PB-TJPA-1127). In addition, engineering variances will be required by Caltrain for the crossovers required in the curved portion of the terminal approach; the reduced width of platform on Track 25 near the end post; and the tapered end of platform on Track 26- understood to be outside of the usable portion of vehicle berthing.

Reference is also made to a letter received from the TJPA describing concerns on the normal operational use of the two crossovers in the terminal approach curve (Reference Letter dated September 21st, 2010). The PRP expects that a formal submittal will be made to Caltrain of specific engineering variances required of these crossovers. Caltrain will review the variance requests and determine if any restrictions are required due to the unique configuration.

Please do not hesitate to contact me if there are any questions or concerns regarding this letter.

Sincerely,

Claude Gratianne, P.E.
Peninsula Rail Program

CC: Bob Doty, Michelle Bouchard, Doc. Control

Enc: TTC Track Configuration Drawing, dated September 20th 2010

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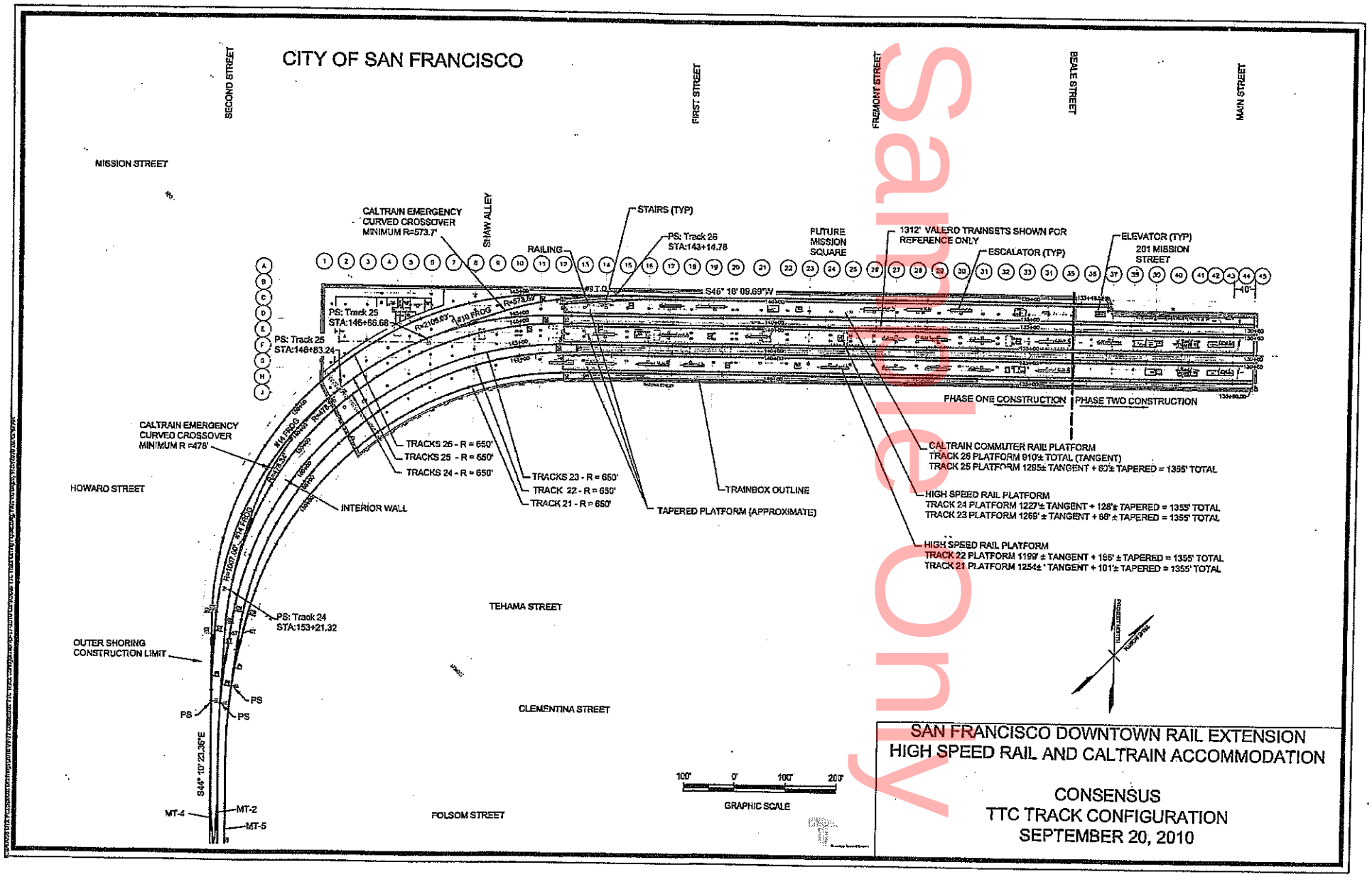
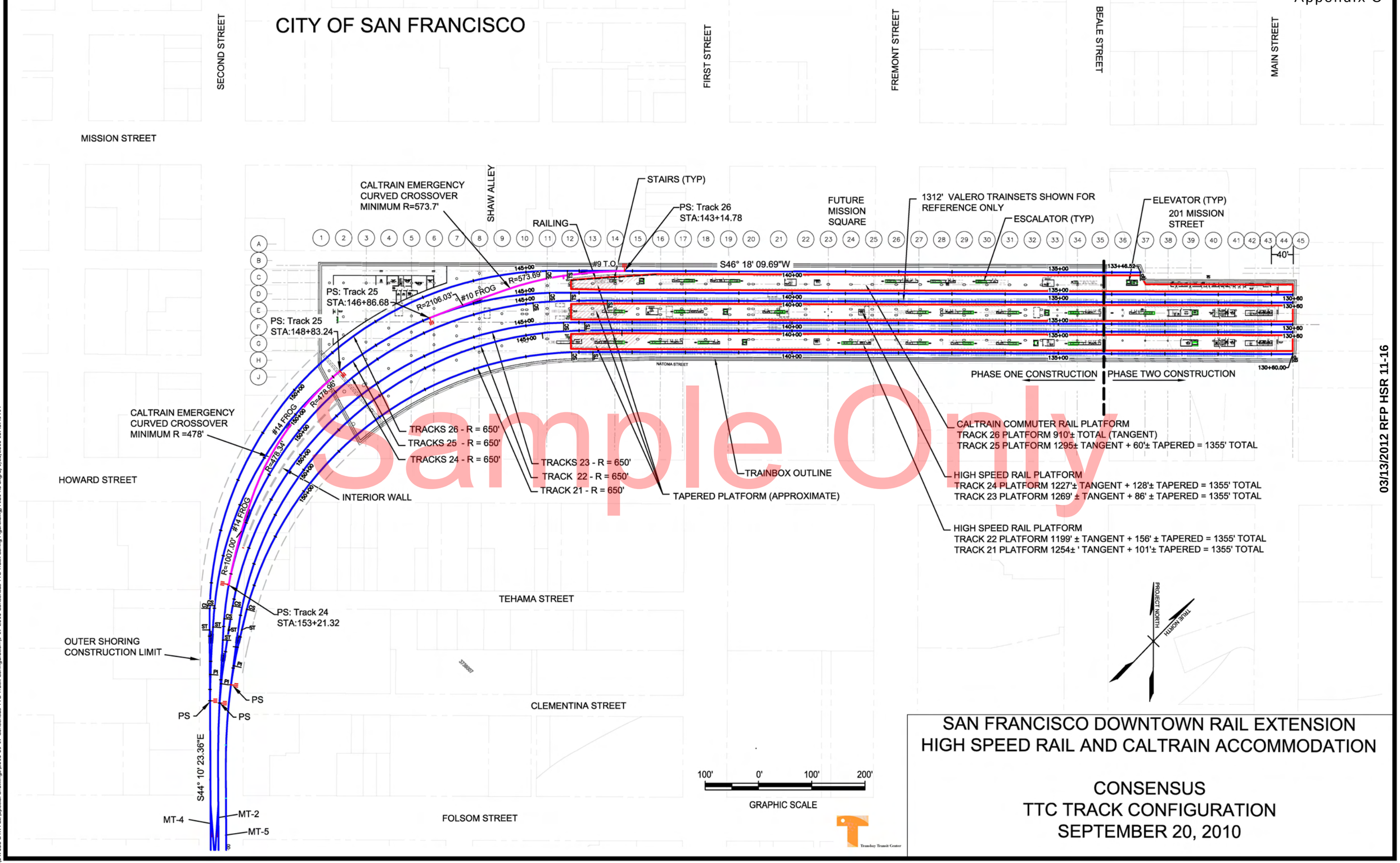

CITY OF SAN FRANCISCO
SECOND STREET
FIRST STREET
FREMONT STREET
BEALE STREET
MAIN STREET
MISSION STREET
SHAW ALLEY
HOWARD STREET
TEHAMA STREET
CLEMENTINA STREET
FOLSOM STREET
CALTRAIN EMERGENCY CURVED CROSSOVER MINIMUM R=573.7'
STAIRS (TYP)
PS: Track 26 STA:143+14.78
RAILING
FUTURE MISSION SQUARE
1312' VALERO TRAINSETS SHOWN FOR REFERENCE ONLY
ESCALATOR (TYP)
ELEVATOR (TYP)
201 MISSION STREET
S46° 18' 09.69"W
PS: Track 25 STA:146+66.68
PS: Track 25 STA:146+83.24
#10 FROG
R=573.7'
R=2106.07'
CALTRAIN EMERGENCY CURVED CROSSOVER MINIMUM R =478'
#14 FROG
R=478.3'
R=1007.00'
TRACKS 26 - R = 650'
TRACKS 25 - R = 650'
TRACKS 24 - R = 650'
TRACKS 23 - R = 650'
TRACK 22 - R = 650'
TRACK 21 - R = 650'
INTERIOR WALL
TAPERED PLATFORM (APPROXIMATE)
TRAINBOX OUTLINE
PHASE ONE CONSTRUCTION
PHASE TWO CONSTRUCTION
CALTRAIN COMMUTER RAIL PLATFORM
TRACK 26 PLATFORM 910± TOTAL (TANGENT)
TRACK 25 PLATFORM 1295± TANGENT + 60'± TAPERED = 1355' TOTAL
HIGH SPEED RAIL PLATFORM
TRACK 24 PLATFORM 1227'± TANGENT + 128'± TAPERED = 1355' TOTAL
TRACK 23 PLATFORM 1269' ± TANGENT + 86' ± TAPERED = 1355' TOTAL
HIGH SPEED RAIL PLATFORM
TRACK 22 PLATFORM 1199' ± TANGENT + 156' ± TAPERED = 1355' TOTAL
TRACK 21 PLATFORM 1254± ' TANGENT + 101'± TAPERED = 1355' TOTAL
PS: Track 24 STA:153+21.32
OUTER SHORING CONSTRUCTION LIMIT
PS
S44° 10' 23.36"E
MT-4
MT-2
MT-5
100' 0' 100' 200'
GRAPHIC SCALE
SAN FRANCISCO DOWNTOWN RAIL EXTENSION
HIGH SPEED RAIL AND CALTRAIN ACCOMMODATION
CONSENSUS
TTC TRACK CONFIGURATION
SEPTEMBER 20, 2010

Sample Only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FIRST STREET
FREMONT STREET
BEALE STREET
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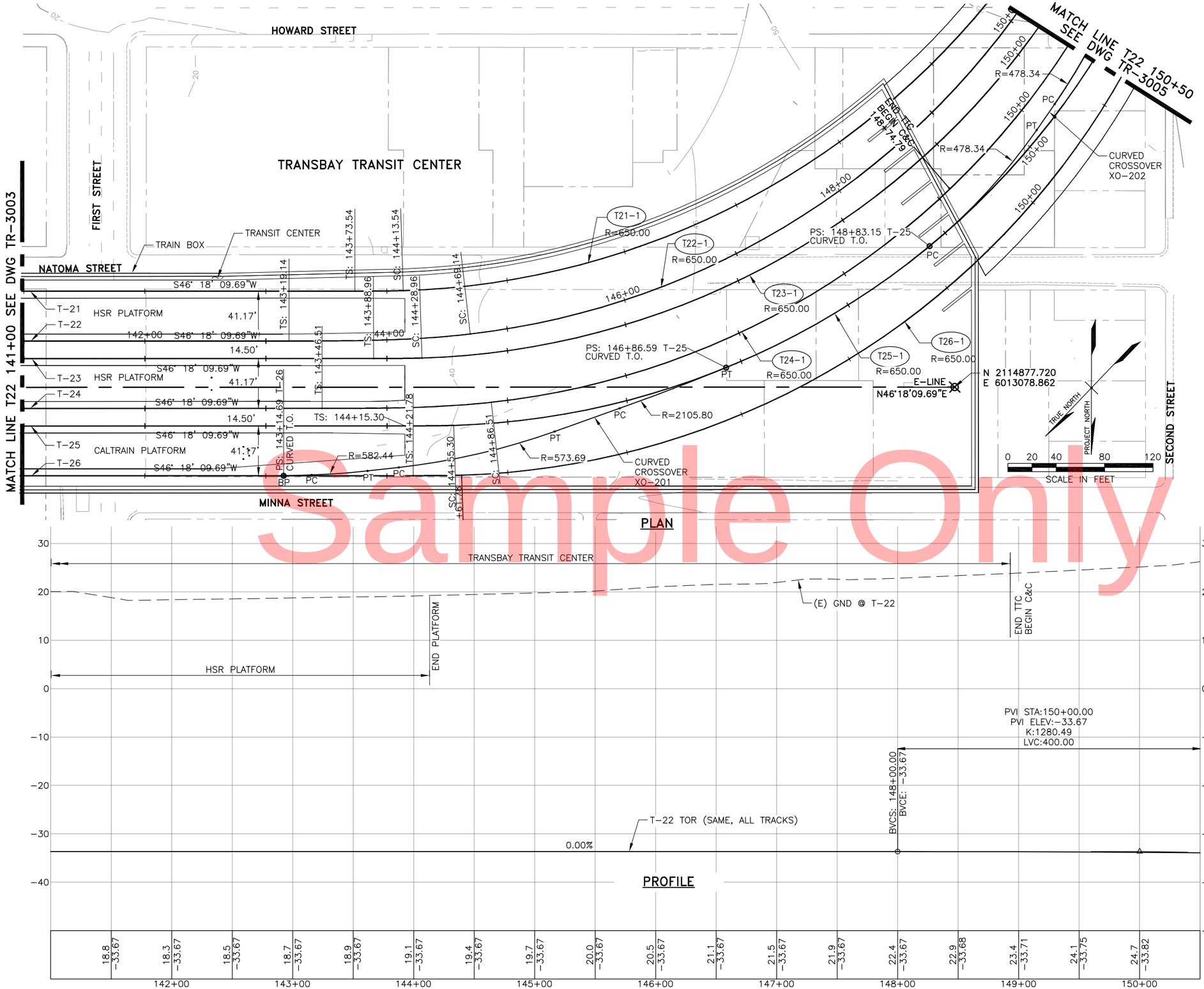
HIGH SPEED RAIL AND CALTRAIN ACCOMMODATION
CONSENSUS
TTC TRACK CONFIGURATION
SEPTEMBER 20, 2010
03/13/2012 RFP HSR 11-16

Sample Only



Sample Only

NOTE:

PLATFORM AND BUILDING OUTLINE DIMENSIONS TO BE REFINED BY TRANSIT CENTER ARCHITECT.

03/13/2012 RFP HSR 11-16

Transbay Transit Center

TRANSBAY JOINT POWERS AUTHORITY

CONSULTANT:
PARSONS
50 FREMONT STREET
SUITE 1500
SAN FRANCISCO, CA 94105

Key Map

REVISIONS

NO.	DATE	DESCRIPTION	BY
△	07-16-10	PRELIMINARY ENGINEERING PLANS	CU
△	01-14-11	UPDATE TO ACCOMMODATE HIGH SPEED RAIL	

CONTRACT NO. 03-02-DTX ENGR-001

PROJECT TITLE: TRANSBAY TRANSIT CENTER PROGRAM CALTRAIN DOWNTOWN EXTENSION SAN FRANCISCO, CA

SHEET TITLE: TRACK PLAN AND PROFILE STA 141+00 TO STA 150+50 SHEET 2 OF 11

ARCHITECT/ENGINEER SEAL

APPROVED: R. SERGEANT
PRINCIPAL ENGINEER / ARCHITECT

APPROVED: R. SERGEANT
PROJECT MANAGER

APPROVED: C. UMOLU
PROJECT ENGINEER / ARCHITECT

DESIGNED BY: L.GODBOLD, D.LIU
CHECKED BY: P. CHU
DRAWN BY: D. LIU
DATE: 01-14-2011
SCALE: 1"=40'H; 1"=10'V
FACILITY NO. 300
REVISION
SHEET NUMBER TR-3004
SEQUENCE NUMBER 74 of 465

PRELIMINARY ENGINEERING PLANS

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California High-Speed Train Project

Request for Proposal for Design-Build Services

RFP No.: HSR 11-16
Safety and Security Management Plan

03/07/2012 RFP HSR 11-16

Revision No.	Date	Description
0	01 Mar 12	Initial Release, R0

Prepared for

CALIFORNIA High-Speed Rail Authority

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CHSTP SAFETY AND SECURITY MANAGEMENT PLAN

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3. CHSTP PRELIMINARY HAZARD ANALYSIS FOR INFRSTRUCTURE, RIGHT-OF-WAY STURCTURES

03/07/2012 RFP HSR 11-16

CALIFORNIA HIGH-SPEED TRAIN PROJECT

CHSTP SAFETY AND SECURITY MANAGEMENT PLAN (SSMP)

Revision 0

Prepared by: _____ _____
John Cockle Date

Reviewed by: _____ _____
Peter Sklannik Date

Approved by: _____ _____
Joseph Metzler Date

Released by: _____ _____
Joseph Metzler Date

Document	Sections/Pages Affected	Date of Document
Rev 0	Initial Draft	06/30/11
Rev 0	2ND Draft	01/06/2012

DRAFT FOR RFP HSR 11-16

03/07/2012 RFP HSR 11-16

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ACRONYMS AND ABBREVIATIONS

Acronym or Abbreviation	Definition
Authority	California High-Speed Rail Authority
CEHL	Certifiable Elements and Hazards Log
CFR	Code of Federal Regulations
CHST	California High-Speed Train
CHSTP	California High-Speed Train Project
CIL	Critical Items List
CPUC	California Public Utilities Commission
DHS	Department of Homeland Security
EMT	Engineering Management Team
FD	Final Design Phase
FLSSC	Fire/Life Safety and Security Committee
FMEA	Failure Mode Effects Analysis
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FTAN	Fault Tree Analysis
ICS	Initial Construction Segment
OHA	Operating Hazard Analysis
OMT	Operations and Maintenance Team
PE	Preliminary Engineering Phase
PHA	Preliminary Hazard Analysis
PMO	Program Management Oversight
PMP	Project Management Plan
PMT	Program Management Team
PTEPP	Passenger Train Emergency Preparedness Plan
QC	Quality Control
RAC	Rail Activation Committee

RAP	Rail Activation Plan
RC	Regional Consultant
SEPP	Security and Emergency Preparedness Plan
SITC	System Integration Testing Committee
SSCP	Safety and Security Certification Plan
SSEC	Safety and Security Executive Committee
SEPP	Security and Emergency Preparedness Plan
SHEA	Software Hazard Effects Analysis
SSHA	Site-Specific Hazard Analysis
SSHASP	Site-Specific Health and Safety Plan
SSI	Sensitive Security Information
SSMP	Safety and Security Management Plan
SSPC	Safety and Security Project Committee
SSPP	System Safety Program Plan
SSSP	Site-Specific Security Plan
TSA	Transportation Security Administration
TVA	Threats and Vulnerabilities Assessment
V&V	Verification and Validation

1.0 MANAGEMENT COMMITMENT AND PHILOSOPHY

1.1 Safety and Security Policy Statement

It is the policy of the California High-Speed Rail Authority (Authority) to perform work on the California High-Speed Train Project (CHSTP) in a manner that ensures the safety and security of employees, contractors, emergency responders, and the public. The application of system safety and security comprises a fundamental hazard and vulnerability management process that incorporates the characteristics of planning, design, construction, testing, operational readiness, and subsequent operation of the high-speed rail system. Safety and security are priority considerations in the planning and execution of all work activities on the CHSTP.

All trains, facilities, systems and operational processes must be designed, constructed, and implemented in a manner that promotes the safety and security of persons and property. The design, construction, testing, and start-up of the CHST System will comply with applicable safety and security laws, regulations, requirements and railroad industry practices. The Authority will maintain or improve upon the public transit and railroad industry standards for safety and security. Through the Reliability, Availability, Maintainability, and Safety (RAMS) Program a standard of safety will be established that is as safe as or safer than conventional U.S. railroad operations. The design, construction, testing, and start-up of the CHST System will be accomplished in compliance with this standard.

The Authority is committed to providing a safe and secure travel and work environment. Therefore, safety, accident prevention, and security breach prevention must be incorporated into the performance of every employee task. All Authority, Program Management Team, and contractor personnel, subcontractors and employees are charged with the responsibility for ensuring the safety and security of employees, contractors, emergency responders, and the public who come in contact with the CHST System. Each individual and organization is responsible for hazard and vulnerability management, for applying the processes that are designed to ensure safety and security, and for maintaining established safety and security standards, consistent with their position and organizational function. Through a cooperative team effort and the systemic application of safety and security principles, the CHST System will be designed, constructed, tested, and placed into service in a safe and secure manner.

_____

Roelof van Ark
–Chief Executive Officer
California High-Speed Rail Authority

1.2 Background

The Federal Railroad Administration (FRA) requires that the Authority implement safety and security principles and processes throughout the CHSTP. Absent federal regulations that govern the completion of major capital projects, the Federal Railroad Administration looks to the Federal Transit Administration (FTA) regulations for guidance. Federal Transit Administration (FTA) regulations found at 49 CFR 633 requires the development of a *Project Management Plan* (PMP) for every major capital transit project. As described in FTA Circular 5800.1 *Safety and Security Management Guidance for Major Capital Projects*, (dated 8/1/07) a *Safety and Security Management Plan* (SSMP) is the element of the PMP that manages project safety and security activities, responsibilities, and verification processes throughout the project life cycle. This document fulfills the FRA requirement for managing safety and security in the execution of the CHSTP.

The SSMP does not carry over into revenue operations, but will lead to development of a System Safety Program Plan (SSPP) and Security and Emergency Preparedness Plan (SEPP) to govern safety and security for the operating system prior to the start of revenue service. The FRA is in the process of promulgating regulations that require the application of a SSPP to passenger railroad operations.

1.3 Purpose of the SSMP

The SSMP formalizes the technical and management strategies for determining safety and security risk acceptance throughout the CHSTP life cycle, from the design phase through the start of revenue service and is applied to each segment undertaken in turn. The SSMP defines the process for identifying, evaluating, and resolving safety hazards and security vulnerabilities associated with future railroad operations of the Project prior to the start of revenue service. This process helps to ensure the achievement of the highest practical level of operational safety and security for the riding public, the employees, and anyone coming into contact with the CHST system.

The purpose of the SSMP is to define the safety and security activities of the CHSTP and methods for identifying, evaluating, and resolving potential safety hazards and security vulnerabilities of the CHST system. It establishes responsibility and accountability for safety and security during the preliminary engineering, final design, construction, testing, and start-up phases of the CHSTP. Specifically, the SSMP does the following:

- Establishes the Authority‘s commitment and philosophy to achieve the highest practical level of safety and security for the Authority’s staff, Project Management Team (PMT) staff, contractors, emergency responders, and members of the public that come into contact with the CHST system
- Establishes and manages safety and security activities intended to minimize risk of injury and property damage, and to maximize the safety and security for the California High-Speed Rail passengers, employees, and the public
- Integrates the safety and security functions and activities throughout the CHSTP and its organizational structure
- Defines the safety and security responsibilities between the Authority and CHSTP design, construction, and start-up teams
- Defines the process for the documentation and verification of safety and security activities
- Evaluates project phases and activities to ensure continued development and advancement of safety and security principles
- Establishes the framework for construction safety and security

1.4 Applicability and Scope of SSMP

The SSMP is applicable to all phases of the CHSTP, from preliminary engineering through final design, construction, testing and the start of revenue service. The SSMP encompasses all equipment, infrastructure, operating and maintenance plans and procedures associated with the CHST system.

1.4.1 Project Description

The California High-Speed Train Project will construct a state-of-the-art, statewide, high-speed performance passenger railroad based on operating practices and designs of existing high-speed rail networks in Europe and Asia which have had extraordinary performance and safety records. The CHST system will require certification by federal and other regulatory agencies which have indicated they are open to approaches which provide equivalent or better safety than existing rail regulations in the United States. The Authority’s eventual goal is to develop a system of more than 800 route miles that provides

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high-speed rail service between the major metropolitan centers of the San Francisco Bay Area and Sacramento in the north, through the Central Valley, to Los Angeles, Anaheim, Irvine and San Diego in the south.

The CHST system will operate at speeds up to 220 mph within its dedicated or shared-use corridors where the CHST system has sole use of a track, and up to 125 mph in shared-use conditions where there is joint use of tracks with other passenger trains. There will be no joint use of tracks with freight trains on shared-use tracks. Freight operations, where applicable, will be temporally separated. No hazardous materials will be transported or permitted to be transported by others on Authority dedicated tracks.

The service will use high-speed steel-wheel on steel-rail technology which has been service-proven in Asia and Europe and provides a high level of service in terms of safety, comfort, and reliability. The system will operate on a mostly dedicated, fully grade-separated standard gage track with electric trains powered through the use of an overhead contact system. The right-of-way will make use of tunneling and elevated structures to achieve an ideal alignment and profile. Automotive, animal, other railroad and non-railroad equipment crossings will be accomplished by means of an underpass or overpass.

The system will include an Automatic Train Control (ATC) system based on designs for similar high-speed environments in Europe and Asia, modified only where necessary to meet regulatory requirements and functional and performance needs specific to the CHST system. The ATC system will cover all functions of a train control system including both safety critical and non-safety critical operations and will incorporate Positive Train Control in compliance with FRA regulations. A hazard detection system will be applied throughout the CHST system to alert the operating control center of natural events such as seismic activity, excessive wind speeds, high water levels, and excessive ambient temperature levels that trigger a system response; and other events such as vehicle or rail car intrusion, and trespassers.

Although Preliminary Engineering Phase activities will occur simultaneously for the entire system, the Final Design and Construction Phase activities will be developed in geographic segments, due to the size of the eventual system. The Initial Construction Segment (ICS) has been designated as a point north of Fresno to a point north of Bakersfield. Subsequent segments will extend north and south from the ICS.

The Initial Operating Segment (IOS) will encompass several construction segments into what is termed “Bay To Basin”, providing high-speed rail service from the greater San Francisco Bay Area to the greater Los Angeles Basin.

1.4.2 SSMP Scope

This SSMP encompasses the following equipment, facilities, plans, and procedures as they relate to the Project.

- System-Wide Elements − includes the passenger vehicles, train control and signaling, voice and data communications, closed-circuit television cameras and recorders, overhead contact system, traction power substations, track, and auxiliary vehicles and equipment
- Fixed Facilities − includes rail stations, pedestrian overpasses and underpasses, highway overpasses and underpasses, aerial and other structures, operations and administrative facilities, and the Central and Regional Control Facilities.
- Safety and Security Plans and Procedures − includes items such as Safety and Security Certification Plan (SSCP), Safety and Security related Design Criteria, Passenger Train Emergency Preparedness Plan (PTEPP), System Safety Program Plan (SSPP), and Security and Emergency Preparedness Plan (SEPP).
- Procedures and Instructions − includes items such as: Operations and Maintenance procedures, rulebooks and manuals; and training programs for operating, maintenance and management employees, employee qualifications, contractor training, and emergency responder training.

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1.5 SSMP Goals and Objectives

1.5.1 Goals

The goals of the SSMP are as follows:

- Achieve an acceptable level of risk through a systematic approach to hazard and threat/vulnerabilities management
- Ensure that the system initiated into revenue service is safe and secure for passengers, employees, emergency response personnel, and the general public through a formal program of safety and security certification
- Ensure that the design, acquisition, construction, fabrication, installation, and testing of critical elements of the CHST system will be verified for conformance with the established safety and security requirements and validated for effectiveness in achieving an effective level of safety and security
- Ensure that a mechanism is provided to follow to completion the resolution of any restriction to full safety and security certification
- Establish an effective, proactive Construction Safety and Security Program that results in no accidents for construction employees and the public, as well as minimizes security breaches, during all CHSTP work activities

1.5.2 Objectives

The SSMP goals will be achieved by meeting the following objectives:

- Identifying, evaluating, resolving, and documenting safety hazards and security vulnerabilities at the earliest possible phase of the CHSTP
- Establishing specific safety and security requirements for the CHST System based on applicable safety and security regulations, codes, standards, guidelines, and recognized best practices
- Verifying that all final drawings, specifications, and contracts issued for the CHSTP conform to the established safety and security requirements
- Implementing CHSTP construction safety and security programs in conformance with established construction safety and security requirements and complying with the California Occupational Safety and Health Administrative safety regulations for construction projects
- Verifying all CHST system facilities, systems, and equipment have been designed, built, procured, installed, inspected, and tested in accordance with the design criteria and specifications
- Establishing and documenting the qualifications and training programs for all personnel who will operate and maintain the CHST system in revenue service
- Verifying completion of training of personnel who will respond to emergencies, including CHST system personnel and emergency responders, on the CHST system emergency procedures, equipment, and operations
- Conducting and documenting, through after-action reports, emergency exercises and drills prior to the start of revenue service
- Documenting safety, security, and emergency rules and procedures for CHST system employees, staff, and contractors in the form of rulebooks, standard operating procedures, emergency operating procedures, and other documents

- Maintaining a process to manage and track open safety and security issues resulting from design deviations, change orders, and non-conformances from inception through closure and acceptance
- Documenting final Safety and Security Certification for the CHSTP by means of a Final Safety and Security Certification Verification Report prior to placing any segment of the CHST system into revenue service
- Ensuring coordination with the Federal Railroad Administration, California Public Utilities Commission, the Transportation Security Administration, the State Fire Marshal's Office, and other external agencies as applicable

1.6 SSMP Review and Updates

The SSMP will be reviewed at least annually, whenever the Program Management Plan or other reference documents are modified, and following any SSMP audit to ensure the safety and security management program remains current and applicable. If revised, the SSMP will be re-issued to all SSMP recipients. The SSMP will be updated to reflect changes in the CHSTP or System, the PMT, or the safety and security management program itself. The review and update process will be the responsibility of the PMT with the oversight and coordination of the PMT System Safety Manager.

1.7 SSMP Applicability to Third Parties

The safety and security requirements for third party assets (adjacent infrastructure or operations, shared-use corridors, utility interfaces, etc) will be developed following the safety and security management program of the applicable third party but in conformance to the processes and requirements of this SSMP. Safety and security certification of third party elements shall conform to the Safety and Security Certification Program requirements of the third party and Section 7.0 of this SSMP.

2.0 INTEGRATION OF SAFETY AND SECURITY INTO THE CHSTP DEVELOPMENT PROCESS

2.1 Safety and Security Activities

This section describes the safety and security activities that have been or will be performed during the major phases of the project. A list of the basic activities and the desired milestone goals are presented in Table 2-1. The California High-Speed Train Project has four phases:

- Preliminary Engineering
- Final Design
- Construction
- Testing and Startup of Revenue Operations

Within each phase of the CHSTP, activities are identified to determine the safety- and security-related certification activities expected to be accomplished at each project milestone. The California High-Speed Rail Authority will apply a detailed safety and security certification program through the assistance of the Program Management Team (PMT). The safety and security certification program, as described in Section 7.0 of this *Safety and Security Management Plan*, will ensure that the project achieves all safety and security requirements in design criteria and specifications and that the safety and security contents of the plans, procedures, and training materials are systematically reviewed and revised as required.

Leading up to and through the Preliminary Engineering phase of the project, the safety and security activities encompass the following activities:

- Develop the SSMP, including a process for achieving safety and security certification, to meet all Federal Railroad Administration (FRA) requirements for a safety and security management plan in a major capital project, in conformance with the Federal Transit Administration's Circular 5800.1 *Safety and Security Management guidance for Major Capital Projects*.
- Develop a list of safety-critical and security-critical elements and items for the CHSTP Preliminary Hazard Analyses.
- Specify safety and security certification requirements, in conformance with the *CHSTP Verification and Validation Plan*, in contract documents. Safety and security certification requirements will be part of the scope of work for the design/build contractors during the Final Design and Construction phases of the project, with oversight provided by the PMT.
- Implement a hazard and certification tracking system, to be developed by the PMT's System Safety Manager working with the PMT's Verification and Validation Manager.
- Perform Preliminary Hazard Analyses (PHA) and a Threat and Vulnerability Assessment (TVA) to identify certifiable elements and hazards/vulnerabilities requiring mitigation. Identify hazard/vulnerability mitigation from the PHA and TVA to be incorporated into preliminary and final designs. Perform additional analysis as required.
- Develop design criteria conformance checklists. The tracking system will be an integrated subset of the Verification & Validation program applied throughout the CHSTP.

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Table 2-1 Project Safety and Security Activities Matrix

Task No.	Safety and Security Task	Project Phase			
		Prelim. Engr.	Final Design	Construction	Testing and Startup
1	Develop Safety and Security Management Plan (SSMP)	√	⇒	⇒	⇒
2	Identify Certifiable Elements and Items	√	⇒	⇒	⇒
3	Specify Safety and Security Certification Requirements into Contract Documents	√	⇒		
4	Implement Certification Tracking System	√	⇒	⇒	⇒
5	Conduct Preliminary Hazard Analysis (PHA) and Threat and Vulnerability Assessment (TVA) and Resolve Unacceptable Hazards and Vulnerabilities	√	⇒	⇒	⇒
6	Develop Design Criteria Conformance Checklists	√	⇒		
7	Conduct Independent Safety and Security Audits		√	⇒	⇒
8	Verify Design Criteria Conformance Checklists and Issue Certificates		√	⇒	
9	Develop Construction Specification Conformance Checklists		√	⇒	
10	Develop Safety-Related Testing Conformance Checklists			√	⇒
11	Verify Specification Conformance Checklists			√	⇒
12	Verify Safety-Related Testing Conformance Checklists				√
13	Verify Operations and Maintenance Manuals Conformance			√	⇒
14	Complete Contractor Training			√	⇒
15	Complete Rules and Procedures and Issue Certificates			√	⇒
16	Complete Operations Training and Issue Certificates				√
17	Complete Emergency Services Training				√
18	Complete Emergency Response Exercises				√
19	Issue Final Safety and Security Certification				√
20	Issue Final Safety and Security Certification Verification Report				√

Note: Activities initiated in project phases after PE are preliminary and will be revised for the FD submission of the SSMP.

√ = Task activity initiated.

⇒ = Task activity updated

Activities 1 through 20 in Table 2-1 (Project Safety and Security Activities Matrix) are a projection of activities that will be initiated and be active in the later project stages.

2.2 Procedures and Resources

2.2.1 Procedures

A *Project Management Plan* (PMP) for the project has been prepared. The PMP establishes the framework for managing and administering all activities related to implementation of the project and provides guidance for the coordination of activities. The PMP describes that the PMT is responsible for the basic design of the high-speed rail system, ensuring that common approaches for the environmental and outreach work are used through the entire alignment, preparing and helping execute bid and procurement processes for design, construction, maintenance, and operations, and managing the work of or coordinating with a variety of other consultants to the Authority, notably the Regional Consultants (RC).

A major component of the PMP is this *Safety and Security Management Plan*, describing processes for identifying and managing hazards and vulnerabilities associated with the CHST system. It is the responsibility of the Authority and the PMT to ensure that the management of identified safety hazards and security threats and vulnerabilities is effective and integrated throughout the design, construction, testing, and startup phases of the CHSTP.

The *Verification and Validation Process* will be applied throughout the CHSTP for the purpose of tracking and verifying that critical elements are incorporated into all project phases. Critical elements include safety-critical and security-critical elements as identified though the hazard management processes identified in this SSMP.

2.2.2 Resources

The Authority Executive Officer authorizes the SSMP, ensuring that it is applied throughout the CHSTP. The PMT System Safety Manager administers and oversees the SSMP, supported by the rest of the Program Management Team. The Authority and PMT will provide additional safety and security management resources for executing the project safety and security activities during the Preliminary Engineering phase. Further resources and responsibilities will be identified as the project progresses into later phases, culminating in startup and commissioning.

The budget and schedule for implementation of the SSMP is revised each year and is held with the PMT Program Director. This assures that the requirements of the SSMP are executed by the PMT and RCs during the Preliminary Engineering phase, and by the PMT in subsequent phases of the project. This includes, but is not limited to, the performance of safety analyses and security assessments at the appropriate phases of the project; implementation of a Safety and Security Certification Program beginning at Preliminary Engineering and continuing through each subsequent phase of the project; and a process to ensure that safety issues and security concerns are addressed and tracked to resolution.

2.3 Interfacing with Management

The California High-Speed Rail Authority Executive Director through the PMT Program Manager has the ultimate decision-making authority for safety and security issues and is responsible for communication of safety and security issues to the Authority Board of Directors. The PMT System Safety Manager will oversee the overall implementation of the safety and security program and will report to the Safety and Security Project Committee the progress and challenges in its implementation. The Safety and Security Project Committee will communicate the safety and security issues to the Authority executive management through reports to the Safety and Security Executive Committee. The PMT System Safety Manager will be supported by the PMT Security Manager.

Successful implementation of the SSMP will also require significant interaction between various members of the Authority, the Program Management Team, Regional Consultants, Engineering/Construction

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Managers, and Emergency Response Agencies. These interactions will occur during regularly scheduled meetings of the Safety and Security Project Committee that focus on the safety and security aspects of the project.

During the Final Design phase, the relationships from project leadership to design/build contractors and subcontractors regarding safety and security issues will be identified.

3.0 SAFETY AND SECURITY RESPONSIBILITIES

3.1 Roles and Responsibilities

The California High-Speed Rail Authority (Authority) is responsible for developing a high-speed train system in California in a safe and secure manner, including ensuring that all trains, facilities, systems and operational processes are designed, constructed, and implemented in a manner that promotes the safety and security of persons and property. The Authority has the ultimate authority and responsibility for the implementation of the *Safety and Security Management Plan* (SSMP) for this project. The Authority is tasked to prepare a plan and design for the system, conduct environmental studies and obtain necessary permits, and undertake the construction and operation of a high-speed train passenger network in California. These tasks are collectively referred to as the California High-Speed Train Project.

The Federal Railroad Administration (FRA) is the lead agency for the Federal Environmental Impact Statement. The FRA is also the primary regulatory agency responsible for approving and certifying the system safety and security aspects of the CHST system. At the state level, the California Public Utilities Commission has specific responsibilities within the system safety and security program and the electric power system that affects the CHST system.

The Authority has contracted with Parsons Brinckerhoff (PB) as the Program Management Team (PMT), and five Regional Consultant (RC) teams to conduct the preliminary engineering on specific segments of the line and provide overall Program Management for the CHSTP. The Authority's primary vehicle for oversight of the safety and security activities is the Safety and Security Executive Committee (explained in detail in Section 3.3.1).

The PMT is responsible for the basic design of the high-speed train system, including ensuring that system safety and security is applied consistently and effectively for the environmental work, in the preparations in helping execute bid and procurement processes for design used, in construction, maintenance, and operations, as well as managing the work of or coordinating with a variety of other consultants to the Authority, notably Regional Consultants. The Program Management responsibilities will be carried out through the entire CHST system alignment and across all phases of the project.

Led by the PMT Program Director, the Program Management Team will be responsible for the application of safety and security in all aspects and phases of the project. The PMT Program Director will delegate the authority for managing the SSMP processes to the PMT System Safety Manager and PMT Security Manager, with support from the Program Deputy Directors, Discipline Managers, and Regional Managers. This support will ensure that other individual project staff members perform in accordance with the SSMP in establishing and overseeing the safety and security management tasks. The PMT's primary vehicle for oversight of the safety and security activities is the Safety and Security Project Committee (explained in detail in Section 3.3.2).

Staff members assigned to the CHSTP by the Authority, PMT, contractors, consultants, emergency response agencies, FRA and CPUC are responsible for ensuring that the design, construction, installation, and testing of all safety-critical and security-critical system elements of the project are evaluated for conformance with the safety and security requirements and verified for operational readiness before completing each phase of the project.

Refer to Figure 3-1 for the CHSTP organizational chart for safety and security activities.

The PMT acts as the Authority's representative in the management of safety and security in the CHSTP. This SSMP shall be updated to reflect any significant changes in the organizational structure or definition of responsibilities with respect to safety and security in the CHSTP.

Figure 3-1 CHSTP Organization for Safety and Security Activities

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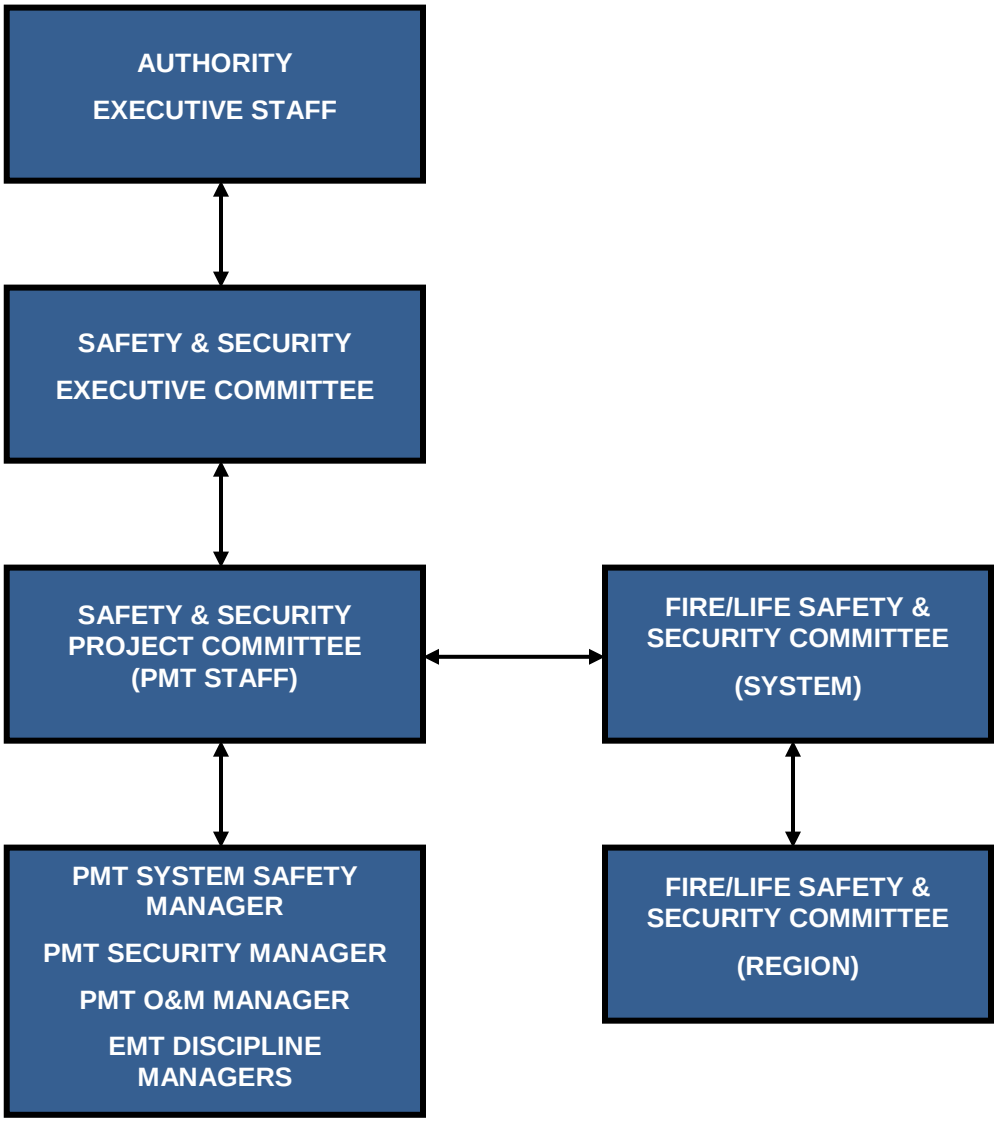

3.2 Authority Organization

The Authority has a nine-member policy board and a small core staff, supported by contract with private firms (the Program Management Team, Regional Consultants and other specialty firms) to carry out the project's system safety and security programs, environmental studies, project planning and engineering work under the supervision and guidance of Authority staff.

The project organization will remain in place throughout the CHSTP development process; however, the composition of the project organization may be revised to respond appropriately to the changing project needs as the project proceeds through from the preliminary engineering phase through to the start of revenue service. The Authority project organization during the initial project phases is composed of Authority and Program Management Team staff supplemented by Regional Consultant staff. In each phase, the Authority will use the assistance of the PMT to manage all project-related activities, as well as further assistance from professional engineering and other project management consulting firms.

The current California High-Speed Rail Authority organization is shown in Appendix A.

3.2.1 Authority Executive Director

The Authority Executive Director oversees and directs the management of all Authority staff and the Program Management Team. The day-to-day management of the California High-Speed Train Project is the functional responsibility of the PMT Program Director under the direction of the Authority Executive Director. The Authority Executive Director ensures that Authority resources are allocated to meet the SSMP goals and objectives, and is ultimately responsible for execution of the *Safety and Security Management Plan* through the Program Director and PMT. The Executive Director reports to the Authority Board of Directors.

3.2.2 PMT Program Director

The PMT Program Director is responsible for the management of the California High-Speed Train Project, including system safety and security, throughout all phases of the project. The PMT Program Director will have a direct line of reporting to the Authority Executive Director.

The PMT Program Director serves on the Safety and Security Executive Committee and is responsible for ensuring that the PMT actively participates in and supports the safety and security activities of the CHSTP.

3.2.3 PMT System Safety Manager

The PMT System Safety Manager will report through the PMT O&M Manager to the PMT Program Director. The PMT System Safety Manager will coordinate safety activities with the PMT Security Manager, PMT Discipline Managers, and chair the Safety and Security Project Committee (SSPC). The PMT System Safety Manager will also sit on the Safety and Security Executive Committee (SSEC) to ensure that safety and security are not compromised by other priorities of the design and construction teams.

The PMT System Safety Manager has the authority and responsibility for, but is not limited to the following:

- Ensuring that the SSMP requirements and processes are being implemented and that SSMP goals and objectives are being achieved
- Performing hazard analyses of CHST system design criteria to determine any potential hazards that may be created by system development, expansion or modification, and supporting the development of mitigating and controlling factors to address such hazards
- Participating in the project design reviews, including overseeing and administering formal safety and security certification programs
- Working with PMT engineering, operations and maintenance staff to ensure that the system is being designed to safety and security criteria
- Developing corrective action plans (CAPs) that result from accident/incident investigations, hazard analyses, certification of Certifiable Items List (CIL) and safety and security reviews and audits; and tracking corrective actions through closeout to ensure that all identified deficiencies are adequately mitigated or controlled
- Providing oversight for the contractors' job site safety and programs
- Reviewing and approving site-specific work plans (SSWPs)
- Investigating accidents and incidents on behalf of the Authority, when requested
- Reporting unacceptable hazardous conditions to executive management as soon as possible

3.2.4 PMT Security Manager

The PMT Security Manager will report through the PMT O&M Manager to the PMT Program Director. The PMT Security Manager will coordinate security activities with the PMT Safety Manager, PMT Discipline Managers, and sit on the Safety and Security Project Committee (SSPC). The PMT Security Manager will also sit on the Safety and Security Executive Committee (SSEC) to ensure that safety and security are not compromised by other priorities of the design and construction teams.

The PMT Security Manager has the authority and responsibility for, but is not limited to, the following:

- Ensuring that the SSMP requirements and processes are being implemented and that SSMP goals and objectives are being achieved
- Performing threat assessments of CHST system operating environments and design criteria to determine any potential vulnerabilities that may be created by system development, expansion or modification, and supporting the development of mitigating and controlling factors to address such vulnerabilities
- Participating in the project design reviews, including overseeing and administering formal safety and security certification programs
- Working with PMT engineering, operations and maintenance staff to ensure that the system is being designed to safety and security criteria
- Developing corrective action plans (CAPs) that result from accident/incident investigations, hazard analyses, certification of Certifiable Items List (CIL) and safety and security reviews and audits; and tracking corrective actions through closeout to ensure that all identified deficiencies are adequately mitigated or controlled
- Providing oversight for the contractors' job site security programs

3.2.5 Other PMT Managers

The managers of the following PMT disciplines will be responsible for implementing the SSMP requirements and process in their respective areas, participating in the SSPC and for supporting the PMT System Safety and Security Manager as required:

- Engineering, including Infrastructure and Systems
- Operation and Maintenance
- Rolling Stock
- Integration and Regulatory Approvals
- Project Risk
- Contracts and Procurement
- Verification and Validation

3.3 Committee Structure

Chapter 2 of the PMP describes the function of various project committees. In addition, various safety and security committees listed below will be established to facilitate review of issues and to provide a forum for discussion and resolution.

3.3.1 Safety and Security Executive Committee

The Safety and Security Executive Committee and its members will ensure that the CHST system is designed, built, and implemented in a safe and secure manner. The SSEC will achieve this goal by providing oversight of the application of the SSMP through all phases of the CHSTP and to act as a conduit to informing and assuring Authority executive management of safety and security issues affecting the project.

The Safety and Security Executive Committee will address safety and security issues which are Authority policy considerations, require Authority approval, require Authority direction for resolution of a dispute, or constitute final acceptance of Safety and Security Certification.

The duties and responsibilities of the Safety and Security Executive Committee are as follows:

- Approve the initial version of the SSMP and subsequent updates
- Oversee the application of the SSMP through all CHSTP phases
- Authorize the establishment of the Safety and Security Project Committee (SSPC)
- Review and approve regular reports of safety and security activities from the SSPC
- Resolve safety and security issues that cannot be resolved at the SSPC level
- Review and approve safety and security certification Certificates of Conformance and a final Certification Verification Report prior to the advancement into the next project phases
- Provide a forum for safety and security discussions among Authority and PMT Executive Management

The Safety and Security Executive Committee is comprised of the following persons:

- Authority Executive Director (Chairperson)
- Authority Safety and Security Staff
- PMT Project Director
- PMT System Safety Manager (Committee Secretary)
- PMT System Security Manager

The Chairperson of the SSEC is the Authority Executive Director or a designated Authority executive management representative. If a designated member of the SSEC is unable to attend a SSEC meeting, they must assign an appropriate representative.

3.3.2 Safety and Security Project Committee

Working at the project delivery level, the Safety and Security Project Committee will ensure that the CHST system is designed, built, and implemented in a safe and secure manner. The SSPC will achieve this goal by providing oversight of the application of the SSMP through all phases of the CHSTP and to act as a conduit to informing and assuring Authority executive management (through the Safety and Security Executive Committee) of safety and security issues affecting the project.

The Safety and Security Executive Committee will address safety and security issues which are directed to it by the Safety and Security Executive Committee, require PMT resolution, require elevation to the SSEC for Authority direction for resolution, or constitute preliminary review and approval of Safety and Security Certification.

The duties and responsibilities of the Safety and Security Project Committee are as follows:

- Recommend to the Safety and Security Executive Committee (SSEC) the initial version of the SSMP and subsequent updates
- Oversee the application of the SSMP through all CHSTP phases
- Review and approval of PHAs and TVAs as they are developed or updated
- Tracking of identified hazards or vulnerabilities listed on Certified Elements and Hazards List using the V&V Requirements Management Tool database
- Provide regular reports of safety and security activities to the SSEC
- Forward to the SSEC for resolution any safety and security issues that cannot be resolved at the SSPC level
- Review and approve safety and security certification Certificates of Conformance and a Final Certification Verification Report
- Forward Certificates of Conformance and a final Certification Verification Report to SSEC for Authority acceptance prior to the start of applicable testing phases or startup of revenue service
- Provide a forum for safety and security discussions among PMT staff members and a conduit for safety and security issues to the Authority through the SSEC

The Safety and Security Project Committee is comprised of the following persons:

- PMT System Safety Manager (Committee Chairperson)
- PMT System Security Manager
- PMT O&M Manager
- EMT Discipline Managers
- PMT Verification & Validation Manager
- PMT Contracts Manager
- PMT Project Risk Manager
- PMT RAMS Manager

If a designated member of the SSPC is unable to attend a SSPC meeting, they must assign an appropriate representative.

3.3.3 Fire Life Safety and Security Committees (FLSSC)

The Fire/Life Safety and Security Committees (FLSSC) will be composed of representatives from fire, police and local building code agencies assigned to two levels of standing committees: a system FLSSC and several regional FLSSC working on a local level. The project will form the FLSSC during the PE phase of the project. The purpose of the FLSSC will be to review issues that are critical to fire and life safety and security, to acquire input and concurrence from the state and local authorities having jurisdiction over the proposed designs to meet code requirements, and to ensure compliance with state and local fire code standards or fire/life safety hazard mitigation measures during the design phase. As the project moves into the Testing and Startup Phase the FLSSC will review operating plans and procedures, results of after-action reviews following major emergency response incidents or exercises, and training programs for content appropriateness and effectiveness.

The single system FLSSC will focus on systemic, high-level, fire/life safety and security issues, including federal and state codes or requirements impacting the regional efforts. A goal of the system FLSSCs is to obtain concurrence from federal and state authorities with respect to fire/life safety and security

concerns. The system FLSSC will include a representative from each regional FLSSC as well as representatives from state and federal agencies such as the California Highway Patrol, Office of Emergency Services, the California Emergency Management Agency, CPUC, FRA, and DHS. The system FLSSC will be co-chaired by the PMT Safety and Security Managers. Meetings will be held regularly in Sacramento with agendas, minutes, and other support materials supplied by the committee co-chairs. Minutes and action items from the meetings will be conveyed to the regional FLSSC's and to the Safety and Security Project Committee for their consideration

Regional FLSSC will focus on the CHSTP characteristics specific to their corridor segments (type/length of underground and elevated structures, access methods, terminals, etc) to provide input with respect to local building codes or requirements that are in line with the emergency response characteristics and capabilities of the local agencies. A goal of the regional FLSSC is to obtain concurrence from local authorities having jurisdiction over the proposed designs to meet code requirements. The regional FLSSC will be comprised of appropriate representatives (e.g., Fire Marshal) from local emergency response agencies (fire, police, EMT) and will be co-chaired by the PMT Safety and Security Managers. Meetings will be held regularly at a location local to the regional corridor, with agendas, minutes, and other support materials supplied by the committee co-chairs. Minutes and action items from the meetings will be conveyed to the system FLSSC and to the Safety and Security Project Committee for their consideration. One representative from each regional FLSSC will be asked to participate in the system FLSSC. Consistent membership is critical to success. Each regional representative must be the same representative attending to System FLSSC matters and reporting results to their specific Regional Committee.

3.3.4 Program Change Control Board

Change control for the CHSTP will be in conformance with *PC2.04 Program Change Control Procedure*. The procedure includes a Change Control Board made up of Authority, PMT, and PMO representatives

3.4 Rail Activation Committee (RAC)

The Rail Activation Committee (RAC) will coordinate planning and process development efforts for the operational testing of the system and eventual startup of revenue service. The RAC will be multi-disciplinary in scope and will be established during the latter stages of the Construction Phase.

3.5 System Integration Testing Committee (SITC)

The System Integration Testing Committee (SITC) will coordinate the development of an integrated testing program. The SITC will plan for the effective and efficient testing of subsystems, and then the overall system, including ensuring that as testing progresses mitigations are taken to ensure the safety of the tests. The maturity of the various subsystems will be taken into account prior to full development and assurance that the systems are proven safe. The SITC will be multi-disciplinary in scope and will be established during the latter stages of the Construction Phase.

3.6 Safety and Security Responsibilities Matrix

The requirements, authority, and activities for safety and security will be integrated into the overall project management. At each stage of project advancement, there will be a process in place to ensure that the appropriate parties are aware of their safety and security responsibility associated with the project activity. The Safety and Security Responsibility Matrix (Table 3-1) lists the activities to be performed and assigns the responsibilities from the Preliminary Engineering phase through system Start-up phase.

Table 3-1 Safety and Security Responsibilities Matrix

Key Safety and Security Certification Steps	Preliminary Engineering Phase					Final Design Engineering Phase					Construction Phase					Testing/Startup Phase				
	AUT	S/S	PMT	CMT	DBC	AUT	S/S	PMT	CMT	DBC	AUT	S/S	PMT	CMT	DBC	AUT	S/S	PMT	CMT	OMC
Develop/Update Certifiable Elements and Hazards Log	-	P	S	-	-	-	S	S	S	P	-	S	S	S	P	-	S	S	S	P
Hazard and Vulnerability Analyses	-	P	S	-	-	-	A	-	S	P	-	-	-	-	-	-	A	-	S	P
Develop S/S Design Criteria	-	S	P	-	-	-	A	-	S	P	-	-	-	-	-	-	A	-	S	P
Develop V&V Certifiable Items Lists	-	S	P	-	-	-	A	-	S	P	-	A	-	S	P	-	A	-	S	P
Verification of S/S Certifiable Items Lists	-	S	P	-	-	-	A	-	P	S	-	A	-	P	S	-	A	-	P	S
Issue Phase Certificates of Conformance	-	S	P	-	-	-	A	A	P	S	-	A	A	P	S	-	A	A	P	S
Approve Phase Certs. Of Conformance	P	S	S	-	-	P	S	S	-	-	P	S	S	-	-	P	S	S	-	-

Abbreviations: AUT = Authority; S/S = PMT Safety & Security; PMT = Program Mgmt. Team; DBC = Design/Build Contractors; OMC = Operations & Maintenance Contractors; CMT = Construction Mgmt. Team; PE = Preliminary engineering Phase; FD = Final Design Phase; CN = Construction Phase; TS = Testing & Startup Phase

Responsibilities: P = Primary S = Supporting A = Audit - = None

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4.0 SAFETY AND SECURITY ANALYSIS

4.1 Overview

A hazard is a condition or circumstance that could lead to an unplanned or undesired event which, when it occurs, can cause injury, illness, death, damage or loss of equipment or property, or severe environmental damage.

Threats are defined as specific intentional acts that will damage the system, its facilities, or its patrons. Threats include any intentional actions which detract from overall security. They range from the extreme of terrorist-initiated bombs or hostage-taking to more common events such as theft of services, pick pocketing, graffiti and vandalism. Vulnerability is defined as the susceptibility of the system to a particular type of security threat.

A formal process for the management of safety hazards and security threats and vulnerabilities will be used for the CHSTP. The purpose of the process is as follows:

- Identify and evaluate the effects of hazardous conditions and security threats and vulnerabilities on passengers, CHST system personnel, CHST system infrastructure and equipment
- Define and evaluate countermeasures to eliminate or control the identified hazards and security threats and vulnerabilities
- Provide timely notification of the identified hazards and threats and vulnerabilities to design personnel to resolve them
- Document the safety and security concepts incorporated and used during design and provide the basis for developing procedures to either complement the design safety and security concepts or resolve the hazard and security threat/vulnerability through procedures, training, or other means if the design does not satisfactorily resolve the issue

Managing hazards and security threats and vulnerabilities through identification, assessment, resolution, and tracking will be an essential function of the PMT from preliminary engineering through system start up. This process will be initiated during the preliminary engineering (PE) phase of the Project. The PMT System Safety Manager will perform a Preliminary Hazard Analysis (PHA) and the PMT Security Manager a Threat and Vulnerability Assessment (TVA) upon final selection of the alignment and in the earliest stages of design. These processes will be coordinated through and reviewed by the SSPC.

The TVA will follow the methodology in the FTA document *Public Transportation System Security and Emergency Preparedness Planning Guide*. Because of the sensitive nature of the security risk assessment, only those with a “need-to-know” will have access to the TVA, and the document will be considered Sensitive Security Information (SSI).

The development of the safety hazard analyses and security risk assessments will be coordinated with the appropriate engineering disciplines for the identification of applicable hazards/security risk issues and recommended control measures. Upon completion of PHAs and TVAs a Preliminary Hazard Analysis Report and Threat and Vulnerabilities Report will be prepared and submitted to the SSPC for review. The SSPC will elevate the reports to the SSEC as appropriate to the processes described in Section 3.3.2.

As the Project enters Final Design, the design/build contractors will review and update the PHA and TVA and perform other analyses as warranted by local or site-specific conditions or designs. Any deviations to the Design Criteria developed by the PMT or design/build contractors will require a hazard analysis or vulnerability assessment for each deviation to ensure that the same level of safety is achieved as would have occurred had the Design Criteria been followed. Other hazards or vulnerabilities may be identified during the normal course of work on the project, including such activities as design reviews, construction inspection and testing, and start-up and integrated testing. Additional hazards or vulnerabilities identified

during these activities will also require a hazard analysis or vulnerability assessment to be performed by the design/build contractor.

The SSPC will be responsible for reviewing and approving all hazard analyses and vulnerability assessments to ensure that significant safety hazards and security threats and vulnerabilities are identified and that the proposed countermeasures adequately resolve the issues. The SSPC will monitor the status of the identified hazards and vulnerabilities from initial identification through final resolution and closure in conformance with the V&V process and by utilizing reports from the V&V Requirements Management Tool database. Sensitive security issues will be tracked on a separate log per the CHSTP SSI Program.

4.2 Safety and Security Analysis Processes

This section of the SSMP describes the requirements of safety analysis for the CHSTP and the processes the Program Management Team and all contractors (including design/build contractors) will use to identify, evaluate, and resolve potential hazards or threats and vulnerabilities associated with the design, construction, testing and commissioning of the project.

The objective of safety analysis is to assess identified hazards in terms of the severity or consequence of the hazard and the probability of occurrence, and to find an acceptable resolution. Hazards which cannot be eliminated in the design are to be controlled by providing safety devices, warning devices, and providing adequate training and written instructions to the high-speed rail system operator to prevent accidents.

The safety analyses required are part of a formalized process to identify, eliminate and/or control hazards. Specifically, the safety analyses provide for the:

- Identification of hazards
- Assessment of the severity and probability of occurrence of the potential hazard
- Timely awareness of hazards for those who must resolve them
- Traceability and control of hazards through all phases of a system's life cycle.

Safety analyses are an essential part of the preventive and proactive aspect of the system safety program. Safety analyses primarily identify and describe hazards that might arise from flaws and fault conditions in the design and operation of a system or subsystem. Thus, a safety analysis is an important element in the development of a system in which hazards must be eliminated or controlled to an acceptable level.

4.2.1 Hazard Analysis Methodology

Two basic types of analytical approaches will be utilized, inductive and deductive.

The inductive approach uses a bottom-up technique, based on inductive reasoning, which applies logical reasoning from particular facts to a general conclusion. This technique investigates effects that begin with a bottom or lower level event or occurrence and proceeds upward to determine what effect the lower level event has on the total system.

The deductive approach uses a top-down technique, based on deductive reasoning, which applies logical reasoning from the general to the specific. This technique investigates causes that begin with a selected top-level unacceptable or undesirable event or hazardous occurrence, and proceed downward to determine all of the elements which contribute to the occurrence of the top-level event.

Safety analyses can be performed qualitatively or quantitatively. A qualitative analysis is a review of factors affecting the safety of a system. Possible conditions and events and their consequences should be considered to determine whether they could cause or contribute to injury or damage. The objective is

to achieve maximum safety by eliminating or controlling all hazards posing an unacceptable or undesirable risk as measured by their combined hazard severity and qualitative frequencies of occurrence.

A quantitative analysis is a mathematical assessment of an actual or potential event, such as an accident. Quantitative evaluations can be used to establish absolute or relative frequencies of occurrence. A quantitative analysis will normally be accompanied, or preceded, by a qualitative analysis. Therefore, any mention of a quantitative analysis implies that a qualitative analysis has also been performed.

The types of analyses which may be required for the CHSTP are described below.

- Preliminary Hazard Analysis (PHA) is typically the initial hazard analysis technique used during the system or subsystem design phase. A PHA is used to identify safety critical areas within the system and roughly evaluate hazards and begin to consider safety design criteria. PHA establishes the basis for the safety criteria in design, equipment, and performance specifications.
- Site-Specific Hazard Analysis (SSHA) is an expansion of the PHA, conducted as the general design criteria and system requirements are applied to specific system and subsystem elements. An example would be an SSHA for an elevated structure spanning the SR-99 highway in Fresno, applying the safety-critical criteria found in the Design Criteria to the specific characteristics and site conditions of this structure. SSHA is generally performed during the Final Design, construction, and Testing/Startup Phases. The primary output of the SSHA is the identification and evaluation of hazards and mitigations that are specific to the system element under consideration
- Failure Modes and Effects Analysis (FMEA) is an inductive analysis used to identify equipment failures. It evaluates a system or subsystem to identify possible failures of each individual component in the system. The results or effects of the subsystem and component failures are then classified according to severity.
- Fault Tree Analysis (FTAN) is representative of the deductive process. The purpose of the Fault Tree Analysis is to provide a concise and orderly description of the various combinations of possible occurrences within the system that can result in an undesired event. This is the most rigorous of the hazard identification process and analyses and is typically performed for the most complex systems.
- Interface Hazard Analysis (IHA) is performed to identify design hazards in components and subsystems of a major system. IHA determines the functional relationships between the systems, subsystems, processes, components and equipment based solely on safety considerations and also identifies all elements in which a functional failure could result in a hazardous condition or accidental loss.
- Operating Hazard Analysis (OHA) is performed to determine all applicable operational safety requirements for personnel, procedures, and equipment throughout all phases of the system life cycle. Engineering data, procedures, and instructions developed from other safety analyses, the engineering design, and initial test programs are used to support this analysis.
- Software Hazard Analysis (SHA) will be used to evaluate software design, and related software and hardware documentation will be reviewed for safety-critical software-controlled functions. The analysis will review software and hardware failures that could cause the system to operate in a hazardous manner.

4.2.2 Interrelationships

To appreciate the utility of the safety analyses described in this document it is useful to understand their interrelationships and when they should be applied during the project life cycle. Table 4-1 displays the time frame in the life of a project when each safety analytical technique provides the most benefit. It

should be understood that the number of in-process submittals of an analysis will vary and depend on the nature, complexity, and duration of the system contract and its life cycle.

Table 4-1 – Project Life Cycle

Safety Analyses	Project Life Cycle				
	Planning	Preliminary Design	Final Design	Construction/ Procurement/ Installation	Integration Test/ Startup
Preliminary Hazard Analysis (PHA)					
Site-Specific Hazard Analysis (SSHA)					
Failure Modes and Effects Analysis (FMEA)					
Fault Tree Analysis (FTAN)					
Interface Hazard Analysis (IHA)					
Operating Hazard Analysis (OHA)					
Software Hazard Effects Analysis (SHEA)					

4.2.3 Hazard Identification And Resolution Process

The process flow used for identifying hazards consist of review of the design and operational concepts, and incorporation of historical information and data from similar high-speed rail systems are identified in Table 4-2.

Table 4-2 – Hazard Identification and Resolution Process

1. DEFINE THE SYSTEM

- Define the physical and functional characteristics and understand and evaluate the people, procedures, facilities, equipment, and environment.

2. IDENTIFY HAZARDS

- Identify hazards and undesired events
- Determine the causes of hazards

3. ASSESS HAZARDS

- Determine severity
- Determine probability
- Decide to accept risk or eliminate/control

4. RESOLVE HAZARDS

- Assume risk or
- Implement corrective action
  - Eliminate
  - Control

5. FOLLOW-UP

- Monitor for effectiveness
- Monitor for unexpected hazards

4.2.3.1 Hazard Resolution

As part of the hazard assessment process, hazards can be resolved by deciding to either assume the risk associated with the hazard or to eliminate or control the hazard. Mitigation of the risk associated with each hazard to an acceptable level shall be applied in the following order of precedence:

1. Avoidance
2. Elimination
3. Substitution
4. Engineering Controls
5. Warnings
6. Administrative Controls such as Operations and Maintenance Procedures
7. Personal Protective Equipment and Guards

4.2.3.2 Residual Hazard Risk Index

After the adoption of measures of mitigation the anticipated residual hazard risk index, expressed as the combined hazard severity and probability of occurrence, will be identified on the analysis sheet for each hazard. This will help evaluate the effectiveness of the corrective action and establish whether the residual hazard is acceptable.

Hazards identified as “acceptable with review” may be accepted in an “as-is” condition with no further design mitigation required. Operating and maintenance procedures must be developed, however, for periodic tests and inspections of the subject item to ensure an acceptable level of safety is maintained throughout the life of the system. The hazards and mitigations will be reviewed by the Safety and Security Project Committee (SSPC), with recommendation made to the Safety and Security Executive Committee (SSEC) for decision. Acceptance of the level of safety will be provided by the Authority through the SSEC, chaired by the Authority Executive Director.

4.2.3.3 Residual Risk Acceptance or System Disposal

Hazards identified as having an unacceptable and undesirable risk will be analyzed using logic network analyses (such as fault tree) to determine effectiveness of corrective action. Unacceptable and undesirable risk will be reduced to an acceptable level before design acceptance, or a decision must be made to accept the hazard or dispose of the system. The hazards will be reviewed by the Safety and Security Project Committee (SSPC), with recommendation made to the Safety and Security Executive Committee (SSEC) for decision. Acceptance of the level of safety or disposal of the system will be provided by the Authority through the SSEC, chaired by the Authority Executive Director.

4.2.3.4 Documentation

For the contractor performed safety analyses, appropriate support documentation used in the development of the analysis will be identified or referenced in detail as part of each analysis, including, but not limited to, the following:

- Schematics, drawing, block diagrams
- System description including modes of operation and tasks
- Lists of Line Replaceable units (LRUs), assemblies, parts and components addressed within each subsystem and system
- Documented reliability and safety data including failure rate data obtained from service use in identical or manifestly similar equipment in similar environment
- Documented reliability and safety data obtained from formal test results, conducted in similar applications
- Documented reliability and safety data obtained from formal analyses, conducted for equipment in similar applications

4.2.4 Key Definitions

The major output of the safety analyses is the identification and evaluation of hazards. It is important to provide a uniform interpretation of the severity and probability of the hazards. The following definitions are used to develop the hazard analyses.

4.2.4.1 Hazard Severity

Hazard severity categories are defined to provide a qualitative measure of the worst credible mishap resulting from personnel error, environmental conditions, design inadequacies, procedural deficiencies, system, subsystem or component failure, or malfunction. For the CHSTP, the hazard severity definitions are defined in Table 4-3.

Table 4-3 - Hazard Severity Definitions

Hazard Category	Definition
I Catastrophic	Any hazard that can lead to: • Numerous fatalities • Numerous severe injuries • Severe damage or total loss to multiple railcars • Severe damage to rail infrastructure • Severe damage to another train or a fixed immoveable object (e.g. bridge abutment) • Other severe system loss causing all or a significant portion of the system unavailable for normal service for more than 5 calendar days • Severe environmental damage (including hazards associated with chemical, biological, radiological, nuclear and explosions)
II Critical	Any hazard that can lead to: • A fatality or multiple severe injuries • Severe occupational illness • Major but repairable damage to railcars • Major damage to rail infrastructure, but repairable within 5 calendar days to allow service to operate in the area • Other major system loss, but repairable within 5 calendar days to allow service to operate in the area • Major environmental damage (including hazards associated with the release of hazardous material into environment that may result in injury or death)
III Serious	Any hazard that can lead to: • Non-recoverable injuries or multiple minor injuries that require hospitalization and may lead to a fatality • Serious occupational illness • Serious but repairable damage to railcars • Serious damage to rail infrastructure, but repairable within 24 hours to allow service to operate in the area • Other serious system loss, but repairable within 24 hours to allow service to operate in the area • Serious environmental damage (including hazards associated with the release of hazardous material into environment that requiring evacuation)
IV Marginal	Any hazard that can lead to: • Recoverable (non life threatening) injuries that may require admittance to an emergency room for testing and/or hospital for observation • Minor occupational illness • Minor repairable damage to railcars • Minor damage to rail infrastructure, repairable within 2 hours to allow service to operate in the area • Other minor system loss, repairable within 2 hours to allow service to operate in the area • Minor environmental damage (associated with release of hazardous material into environment less than the EPA reportable amount)
V Negligible	Any hazard that can lead to: • Superficial injuries that may require first-aid treatment only • Less than minor occupational illness • Less than minor environmental damage (associated with hazardous material spill) • System shut down of less than 30 minutes

4.2.4.2 Hazard Probability

The assessment of the hazard should also include a probability of occurrence. Assigning a quantitative probability to a hazard is generally not possible early in the design or planning process. A qualitative hazard probability can be derived from research, analysis, and evaluation of historical safety data from similar systems. The hazard probability (frequency of occurrence) levels are defined in Table 4-4, which includes a column on "Period of Occurrence (T) of an Event" that can be used as a guide in determining qualitative level of frequency of occurrence of a hazard.

Table 4-4 – Frequency of Occurrence

Description	Level	Definition	Period of Occurrence (T) of an Event
Frequent	A	Likely to occur frequently in the life of an item; continuously experienced in the fleet.	T < 2 months
Probable	B	Will occur several times in the life of an item; will occur frequently in the fleet.	2 months < T < 1 year
Occasional	C	Likely to occur sometime in the life of an item; will occur several times in the fleet.	1 year < T < 10 years
Remote	D	Unlikely, but possible to occur in the life of an item, unlikely; but can reasonably be expected to occur in the fleet.	10 years < T < 30 years
Highly unlikely	E	So unlikely, it can be assumed occurrence may not be experienced. Failure of a series of risk control measures must happen before the event can occur.	T > 30 years

4.2.4.3 Hazard Risk Assessment and Acceptance Criteria

Hazard analyses establish hazard severity category (I through IV) and hazard probability ranking (A through E) which are combined into a Hazard Risk Index, reflecting the combined severity and probability ranking for each identified hazard. Risk assessment criteria are applied to the identified hazards based on their severity and probability of occurrence, to determine acceptance of the risk or the need for corrective action to further reduce the risk. The hazard risk index and risk acceptance criteria are defined in Tables 4-5 and 4-6 respectively.

Table 4-5 – Risk Assessment Matrix

Event Frequency of Occurrence	Event Severity				
	I (Catastrophic)	II (Critical)	III (Serious)	IV (Marginal)	V (Negligible)
(A) Frequent	IA	IIA	IIIA	IVA	VA
(B) Probable	IB	IIB	IIIB	IVB	VB
(C) Occasional	IC	IIC	IIIC	IVC	VC
(D) Remote	ID	IID	IIID	IVD	VD
(E) Highly unlikely	IE	IIE	IIIE	IVE	VE

Table 4-6 – Risk Acceptance Criteria

Hazard Risk Index	Acceptance Criteria
IA, IB, IC, IIA, IIB, IIC, IIIA	Unacceptable
ID, IID, IIIB, IIIC	Undesirable (decision required SSEC)
IE, IIE, IIID, IIIE, IVA, IVB	Acceptable with review by SSEC
IVC, IVD, IVE, VA, VB, VC, VD, VE	Acceptable

Hazards identified as "acceptable with review" may be accepted in an "as-is" condition with no further design mitigation required, however the hazard analysis must be reviewed and approved by the SSEC. See Section 4.2.3.3 for details.

4.2.4.4 Systems and Subsystems

A system is a composite, at any level of complexity, of personnel, procedures, materials, tools, equipment, facilities, and software. The elements of this composite entity are used together in the intended operational or support environment to perform a given task or achieve a specific production, support, or mission requirement.

A subsystem is an element of a system that in itself may constitute a system. Depending on the nature and scope of the contract or subcontract, the connotation of system and subsystem may differ. For example, if the safety analyst conducts an Interface Hazard Analysis, the system would be the entire high-speed rail system and the interfacing subsystems, for example, could be high-speed rail system elements such as the passenger vehicle, traction power, train control, and communications. If the vehicle contractor conducts an IHA, the system would be the passenger vehicle and examples of subsystems could be the vehicle propulsion subsystem and friction brake subsystem. If the propulsion supplier conducts an IHA, the system would be the propulsion system and the subsystems could be the traction motors and the gear reducer and coupling.

4.2.4.5 System Mode

System mode is the state in which the system under analysis is assumed to be. The system may be in one of three states: normal (N); abnormal (A), which is a failure recovery mode (e.g., single track operation); or, emergency (E). The following is an explanation of the three possible system modes:

- NORMAL CONDITION (N): Refers to an operating condition wherein the high-speed rail system is operating under nominal design and operating conditions. Normal conditions mean that all systems are functional and the high-speed rail system is not under pre-existing degraded performance due to an existing malfunction
- ABNORMAL CONDITION (A): Refers to an operating environment wherein the high-speed rail system is operating under conditions of faults or malfunctions, which in and of themselves is not catastrophic or critical but degrades quality of service and possibly increases risk exposure. Abnormal conditions may require departure from the nominal operating conditions, and implementation of failure management and failure recovery strategies to continue revenue service with alternative measures or workarounds. Examples could be equipment malfunctions or maintenance constraints which require single-track operation on segment of track, or the temporary implementation of a manual block system in lieu of failed ATP equipment, to provide equivalent level of safety in lieu of failed equipment.
- EMERGENCY CONDITION (E): A life threatening situation posing clear and present danger such as fire/smoke on the vehicle, fire in a station, collision/derailment of the vehicle, bomb threat, etc.

4.2.5 Hazard Analysis Types

4.2.5.1 Preliminary Hazard Analysis (PHA)

The primary output of the PHA is the early identification and evaluation of hazards and mitigations on a high-level systems requirement basis. The following instructions are used in the development of the hazard analyses.

PURPOSE	The purpose of the PHA is to provide an early assessment of the hazards associated with a design or concept.
PROCEDURE	The PHA identifies critical areas, hazards and criteria being used and considers: hazardous events, components, interfaces, environmental constraints, and operating, maintenance and emergency procedures. When possible, the corrective action should identify the approach(s) to be taken: design change, procedures, and special training and personnel qualifications.
RESULTS	The PHA will provide for verification that corrective or preventive measures or procedures are taken in safety reviews, modification of specifications, and generation of methods and procedures to eliminate, minimize or control hazards and provide inputs to the interface hazard analysis, operating hazard analysis and failure mode and effects analysis.
DOCUMENTATION	Document the analysis to show compliance with the specified safety and operational requirements, and provide for the tracking of actions and verifying effectiveness.

INSTRUCTIONS FOR COMPLETING THE PHA FORM:

- In System, enter the nomenclature of the applicable system element.
- In Subsystem, enter the nomenclature of the subsystem as broken out from the system and which includes the item or hazard undergoing PHA.
- In PHA No., enter the PHA number for the subsystem element. This coding will be sequentially numbered by each Contractor for each subsystem and will be utilized for all related analysis.
- In Rev. No., enter the revision number of the PHA to indicate the latest status.
- In Sheet _ of _, enter the individual sheet number and the total number of sheets contained in this analysis.
- In Prepared by _ Date _, the preparer will sign and enter the date of issue or completion on each sheet of the analysis.
- In Reviewed by _ Date _, the reviewer will sign and enter the date of review on each sheet of the analysis.
- In Approved by _ Date _, the person responsible for approval will sign and enter the date of approval on each sheet of analysis.
- In No., enter the reference number which uniquely identifies the high-speed rail system element and any identifiable element subsystem and item being analyzed.
- In System Mode, enter state of the system when the failure mode or hazardous condition occurs (See Definitions).
- In HAZARD DESCRIPTION, describe an immediate condition which could lead to an accident involving potential injury, death or equipment damage.
- In POTENTIAL CAUSE, enter the most likely primary and secondary causes that can potentially contribute to the presence of the hazard.
- In EFFECT ON SUBSYSTEM / SYSTEM, describe the effect that the hazardous condition may have on the system element or its element subsystem in terms of safety (e.g. delay, inconvenience, injury, damage, fatality, etc.)
- In HAZARD RISK INDEX, enter a combination of the qualitative measure of the worst potential consequence resulting from the hazard, and its probability of occurrence (e.g., IA, IIB, etc.), under the following conditions:
- In INITIAL, enter the designation for hazard risk index estimated prior to implementation of the controlling measures, considering the condition of the subsystem element if no measures of mitigation were applied.
- In RESIDUAL (PROJECTED), enter the designation for hazard risk index estimated following the adoption/implementation of the proposed controlling measures. This may result in reduction of either the probability of occurrence or the severity of the hazard, or both.
- In POSSIBLE CONTROLLING MEASURES AND REMARKS, describe the proposed measures of mitigation that can be applied to prevent or reduce the severity and probability of the hazard under analysis.
- In RESOLUTION, describe changes made or steps taken relative to design and/or procedures, training, etc., to eliminate or control the hazard. The identified reference should be as specific as possible for verification purposes.

Figure 4-1 Sample PHA

System: Infrastructure			**California High-Speed Train Project**				**Prepared by:** **Date**	
Subsystem: R-O-W, Generally			**Preliminary Hazard Analysis (PHA)**				**Reviewed by:** **Date**	
PHA No. 1.1.1 **Rev. No.** 0			**DRAFT 12/08/2011**				**Approved by:** **Date**	
General Description Derailment			**Hazard Cause / Effect**		**Hazard Risk Index**		**Corrective Action**	
No.	**System Mode**	**Hazard Description**	**Potential Cause**	**Effect on Subsystem / System**	**Initial**	**Residual** (Projected)	**Controlling Measures and Remarks**	**Resolution / Reference**
4	A	Washout	Flooding, scouring	Derailment w/mass casualties, property damage, service interruption	I-B Unacceptable	II-E Acceptable w/Review	1) Perform hydraulics analysis and incorporate results into sub-grade design, slope protection and setting of profile. 2) Install appropriate drainage. 3) Inspection and maintenance of drainage systems. 4) Identification and monitoring by O&M of potential hazardous locations.	

Note – Figure 4-1 is a sample representation only. Refer to current PHA for identified hazards and controlling measures.

4.2.5.2 Site-Specific Hazard Analysis (SSHA)

The SSHA is conducted as the general design criteria and system requirements are applied to specific system and subsystem elements. An example would be an SSHA for an elevated structure spanning the SR-99 highway in Fresno, applying the safety-critical design criteria found in the design manual to the specific characteristics and site conditions of this structure. SSHA is generally performed during the Final Design, construction, and Testing/Startup Phases. The primary output of the SSHA is the identification and evaluation of hazards and mitigations that are specific to the system element under consideration.

The instructions for completing the SSHA form are the same as for the PHA form, as identified in Section 4.2.5.1 of this SSMP.

4.2.5.3 Failure Mode and Effects Analysis (FMEA)

PURPOSE

The purpose of the FMEA is to determine the results or effects of item failures on a system operation and to classify each potential failure according to its risk index (severity and frequency of occurrence). The goal is to provide an early identification of failures with unacceptable and undesirable risks so that they can be eliminated or minimized through appropriate actions at the earliest possible time.

PROCEDURE

Variations in design complexity and available data will generally dictate the analysis approach to be used. There are two primary approaches for accomplishing an FMEA, the hardware approach and the functional approach.

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The hardware approach is normally used when hardware items can be uniquely identified from schematics, drawings, and other engineering and design data. The hardware approach is normally utilized in a part level up fashion (bottom-up approach); by listing individual hardware items and analyzing the effect of their possible failure modes on the entire system and its subsystems.

The functional approach is normally used when hardware items cannot be uniquely identified or when system complexity requires analysis from the initial indenture level downward through succeeding indenture levels (top-down approach). The functional approach recognizes that every item is designed to perform a number of functions that can be classified as outputs. The outputs are listed and their failure modes analyzed.

The FMEA may be performed as a hardware analysis, a functional analysis, or a combination analysis depending on the design detail available.

The FMEA will examine the system element by element, to evaluate the system for safety hazards and ultimately to assess risk. Each identified failure mode will be assigned a severity classification. A probability of occurrence will also be assigned in accordance with MIL-STD-882D The resulting risk index will be utilized during design to establish priorities for corrective actions. The FMEA will be reviewed on a continuous basis to verify that design modifications do not add hazards to the system.

To perform a FMEA, the following process should be implemented:

- Identify all major system components, functions, and processes
- Determine consequences of interest
- Determine the potential failure modes of interest
- Specify effects of failures of system
- Identify safety provisions to control hazards and failures
- Identify detection methods for failures
- Establish overall significance of each failure

RESULTS

The FMEA will provide information to evaluate identified hazards, identify safety critical areas and provide inputs to safety design criteria and procedures with provisions and alternatives to eliminate or control all unacceptable and undesirable hazards based on their combination of severity and probability of occurrence, and to identify critical items.

DOCUMENTATION

Document the analysis to show compliance with specified system safety requirements and to track the corrective action.

INSTRUCTIONS FOR COMPLETING THE FMEA FORM:

- In Contract No., enter the contract number for which the FMEA is being performed.
- In Contractor, enter the name of the Contractor responsible for the FMEA.
- In FMEA No., enter the FMEA number which will be coded and sequentially numbered by each Contractor for each system. This coding sequence will be utilized for all related analyses.
- In Rev. No, enter the revision number of the FMEA to indicate the latest status.
- In System, enter the nomenclature of the applicable system.
- In Subsystem, enter the nomenclature of the subsystem as broken out from the system and which includes the item undergoing FMEA.
- In Drawing No., enter the drawing number of the drawing on which the line replaceable unit (LRU) is indicated.
- In Sheet _ of _, enter the individual sheet number and the total number of sheets contained in this analysis.
- In Prepared by _, Date, the preparer will sign and enter the date of issue or completion on each sheet of the analysis.
- In Reviewed by _, Date -, the reviewer will sign and enter the date of review on each sheet of the analysis.
- In Approved by _ Date -, the Contractor's Project Manager will sign to approve and enter the date of approval on each sheet of analysis.
- In LRU NO. AND DESCTIPTION, enter the reference number nomenclature and brief functional description of the component / assembly.
- In FAILURE MODE, describe an immediate failure mode or fault condition which could lead to an accident involving potential injury, death or equipment damage.
- In CAUSE OF FAILURE, enter the most likely primary and secondary causes that can potentially contribute to the presence of the hazard.
- In EFFECT OF FAILURE ON SUBSYSTEM/ SYSTEM/ PERSONNEL, describe the effect that the failure mode or fault condition may have on the item and the next higher level, i.e., subsystem or system element in terms of inputs and outputs, and in terms of system safety and operational impact (e.g. delay, inconvenience, injury, damage, fatality, etc.)
- In SEVERITY OF OCCURRENCE, enter the potential impact of fault condition or failure mode on system operation (catastrophic, critical to insignificant).
- In PROBABILITY OF OCCURRENCE, enter a qualitative or quantitative measure of the probability of occurrence of the failure mode or fault condition in accordance with MIL-STD-882D.
- In POSSIBLE CONTROLLING MEASURES AND REMARKS, describe actions that can be taken or procedural changes that can be made to prevent the anticipated hazardous event from occurring. Enter name(s) of related analysis and reference number(s) and which approach is being proposed: Design Change, Procedures, Special Training, etc.
- In RESOLUTION, describe changes made or steps taken relative to design and/or procedures, training, etc., to eliminate or control the hazard and the resulting risk index.

4.2.5.4 Fault Tree Analysis (FTAN)

PURPOSE

The Fault Tree Analysis (FTAN) is a deductive procedure used to determine the various combinations of hardware and software failures and human errors that could cause undesired events (referred to as top events) at the system level. The FTAN has much use because of its ability to distinguish between those events that must occur (represented by an AND gate) and those that simply can occur (represented by an OR gate) in order for the top event to occur. The analysis thus helps to identify potential causes of system failures before the failures actually occur. The deductive analysis begins with a general conclusion, then attempts to determine the specific causes of the conclusion by constructing a logic diagram called a fault tree. After completing an FTAN, efforts can be directed to improve system safety.

PROCEDURE

The FTAN will be conducted on unresolved undesirable or unacceptable hazards identified in other safety analyses. Following procedure will be used to do a comprehensive FTAN:

1. Define the undesirable/unacceptable hazard, and write down the top level event.
2. Using technical information and professional judgments, determine the possible reasons for the top level event to occur. These are level two elements because they fall just below the top level event in the tree.
3. Continue to break down each element with additional gates to lower levels. Consider the relationships between elements to help decide proper selection of the logic gate.
4. .Finalize and review the complete diagram. The chain can only be terminated in a basic fault: human, hardware software.
5. If possible, evaluate the probability of occurrence for each of the lowest level elements and calculate the statistical probabilities from the bottom up.

RESULTS

The information charted on a fault tree provides a qualitative analysis by demonstrating how specific events will affect an outcome. If probability data is known for these events, then the FTA can also provide quantitative information to further evaluate the likelihood of achieving the top event. Once developed, the fault areas that are responsible for yielding an undesired event can be further evaluated.

DOCUMENTATION

Document the analysis to show compliance with specified system safety requirements and to track the corrective action.

4.2.5.5 Interface Hazard Analysis (IHA)

PURPOSE	The IHA identifies and assesses existing or potential hazards between subsystems and systems and their effect on overall System safety and operations. The emphasis is on interfaces. Through the early identification of existing or potential hazards, corrective action(s) can be taken to eliminate or control unacceptable and undesirable hazards, based on the combination of their hazard severity and probability of occurrence.
PROCEDURE	The IHA is conducted on the critical interrelationships of each subsystem and system to determine the cause and effect of possible independent, dependent and simultaneous failures that could present a hazardous condition, including failures of safety devices. When the IHA indicates a potential problem, it is made known to the responsible engineer in order to initiate a design review. The IHA will be reviewed on a continuous basis to verify that design modifications do not add hazards to the system.
RESULTS	The IHA provides for the identification and correction of possible hazards associated with subsystem and system failures. The IHA provides inputs to design reviews, maintainability, reliability and system safety and system operations.
DOCUMENTATION	Document the analysis to show compliance with specified system safety requirements and to track the corrective action.

INSTRUCTIONS FOR COMPLETING THE IHA FORM:

- In Contract No., enter the contract number for which the IHA is being performed.
- In Contractor, enter the name of the Contractor responsible for the IHA.
- In IHA No., enter the IHA number which will be coded and sequentially numbered by each Contractor for each system. This coding sequence will be utilized for all related predictions and analysis.
- In Rev. No, enter the revision number of the IHA to indicate the latest status.
- In System, enter the nomenclature of the applicable system.
- In Subsystem, enter the nomenclature of the subsystem as broken out from the system and which includes the item undergoing IHA.
- In Interfacing Subsystem, enter the nomenclature of the interfacing subsystem which interfaces with the item undergoing IHA.
- In Drawing No., enter the drawing number of the drawing on which the item undergoing IHA is indicated.
- In Sheet _ of _, enter the individual sheet number and the total number of sheets contained in this analysis.
- In Prepared by _, Date, the preparer will sign and enter the date of issue or completion on each sheet of the analysis.
- In Reviewed by _, Date -, the reviewer will sign and enter the date of review on each sheet of the analysis.

- In Approved by _ Date -, the Contractor's Project Manager will sign to approve and enter the date of approval on each sheet of analysis.
- In No., enter the reference number which uniquely identifies the high-speed rail system element and any identifiable element subsystem and item being analyzed.
- In SYSTEM MODE, enter state of the system when the failure mode or fault condition occurs. (See Definitions)
- In HAZARD DESCRIPTION, describe an immediate condition which could lead to an accident involving potential injury, death or equipment damage.
- In POTENTIAL CAUSE, enter the most likely primary and secondary causes that can potentially contribute to the presence of the hazard.
- In EFFECT ON SYSTEM, describe the effect that the hazardous condition may have on the system in terms of safety (e.g. delay, inconvenience, injury, damage, fatality, etc.)
- In EFFECT ON INTERFACING SUBSYSTEM, describe the effect that the hazardous condition may have on the interfacing subsystem in terms of safety (e.g. delay, inconvenience, injury, damage, fatality, etc.)
- In INTERFACING PARAMETERS, enter the parameters responsible for the interaction of the system with other systems.
- In HAZARD RISK INDEX, enter a combination of the qualitative measure of the worst potential consequence resulting from the hazard, and its probability of occurrence (e.g., IA, IIB, etc.), under the following conditions:
- In INITIAL, enter the designation for hazard risk index estimated prior to implementation of the controlling measures.
- In RESIDUAL, enter the designation for hazard risk index estimated following the adoption/implementation of the controlling measures. This may frequently result in reduction of the probability of occurrence of the hazard.
- In POSSIBLE CONTROLLING MEASURES AND REMARKS, describe actions that can be taken or procedural changes that can be made to prevent the anticipated hazardous event or critical failure from occurring. Enter name(s) of related analysis and reference number(s) and which approach is being proposed: Design Change, Procedures, Special Training, etc.
- In RESOLUTION, describe changes made or steps taken relative to design and/or procedures, training, etc., to eliminate or control the hazard.

4.2.5.6 Operating Hazard Analysis (OHA)

PURPOSE	The purpose of the OHA is to identify and analyze hazards associated with personnel and procedures during production, installation, testing, training, operations, maintenance and emergencies.
PROCEDURE	The OHA will be conducted on all tasks and human actions, including acts of omission and commission, by persons interacting with the system, subsystems and assemblies at any level. When the OHA indicates a potential safety hazard, it will be made known to the responsible engineer, in order to initiate a design review or a system safety working group action item. The OHA will be reviewed on a continuous basis to provide for design modifications, procedures, testing etc. that do not create hazardous conditions.

RESULTS	The OHA will provide for corrective or preventive measures to be taken to minimize the possibility that any human error or procedure will result in injury or system damage. The OHA will provide inputs for recommendations for changes or improvements in design or procedures to improve efficiency and safety, development of warning and caution notes to be included in manuals and procedures, and the requirement of special training of personnel who will carry out the operation and maintenance of the system.
DOCUMENTATION	Document the analysis to show compliance with specified system safety and operational requirements.

INSTRUCTIONS FOR COMPLETING THE OHA FORM:

- In Contract No., enter the contract number for which the OHA is being performed.
- In Contractor, enter the name of the Contractor responsible for the OHA.
- In OHA No., enter the OHA number which will be coded and sequentially numbered by each Contractor for each system. This coding sequence will be utilized for all related predictions and analysis.
- In Rev. No, enter the revision number of the OHA to indicate the latest status.
- In System, enter the nomenclature of the applicable system.
- In Subsystem, enter the nomenclature of the subsystem as broken out from the system and which includes the item undergoing OHA.
- In Drawing No., enter the drawing number of the drawing on which the item undergoing OHA is indicated.
- In Sheet _ of _, enter the individual sheet number and the total number of sheets contained in this analysis.
- In Prepared by _, Date, the preparer will sign and enter the date of issue or completion on each sheet of the analysis.
- In Reviewed by _, Date -, the reviewer will sign and enter the date of review on each sheet of the analysis.
- In Approved by _ Date -, the Contractor's Project Manager will sign to approve and enter the date of approval on each sheet of analysis.
- In TASK DESCRIPTION, enter a brief description of the task or operation for which the hazard condition is being analyzed.
- In SYSTEM MODE, enter state of the system when the failure mode or fault condition occurs. (See Definitions)
- In HAZARD DESCRIPTION, describe a human act of commission or omission, error, or fault condition, which could lead to an accident involving potential injury death or equipment damage.
- In PROBABILITY OF OCCURRENCE, enter the probability of occurrence of the error or fault condition, measured in events per million hours of operation. Give data source, such as experience and statistics in similar applications, human factor studies, etc.
- In POTENTIAL CAUSE, enter the most likely primary and secondary causes, including those induced by hardware, software, procedures and the environment, that can potentially contribute to the presence of the hazard.
- In EFFECT ON PERSONNEL/SYSTEM, describe the effect that the human error or fault condition may have on personnel, patrons, the general public, equipment, facilities and the entire system, in terms of system safety and operational impact (e.g. delay, inconvenience, injury, damage, fatality, etc.)
- In HAZARD RISK INDEX, enter a combination of the qualitative measure of the worst potential consequence resulting from the hazard, and its probability of occurrence (e.g., IA, IIB, etc.), under the following conditions:
- In INITIAL, enter the designation for hazard risk index estimated prior to implementation of the controlling measures.

- In RESIDUAL, enter the designation for hazard risk index estimated following the adoption/implementation of the controlling measures. This may frequently result in reduction of the probability of occurrence of the hazard.
- In POSSIBLE CONTROLLING MEASURES AND REMARKS, describe actions that can be taken or procedural changes that can be made to prevent the anticipated hazardous event or critical failure from occurring. Enter name(s) of related analysis and reference number(s) and which approach is being proposed: Design Change, Procedures, Special Training, etc.
- In RESOLUTION, describe changes made or steps taken relative to design and/or procedures, training, etc., to eliminate or control the hazard.

4.2.5.7 Software Hazard Effects Analysis (SHEA)

PURPOSE

The Software Hazard Effects Analysis (SHEA) is a software design evaluation and validation tool used to identify errors generated from incorrect or inadequate specifications of software functions. A software fault causing a resultant harmful system function is a software hazard.

Software faults can be described in three forms:

- Error generated through coding the software
- Faults due to incorrect software specifications implemented by the function developer
- Faults due to hardware failures that affect changes in coding software

A software hazard can be any of four types:

- An undesired signal causing an unwanted event
- An undesired signal causing an out-of-sequence event in the response
- An undesired signal preventing the occurrence of a necessary action or response
- An undesired signal causing an event to be out of tolerance

The SHEA concentrates on potential safety problem areas in the software. The purpose of the SHEA is to provide an early study of the software design for possible hazards and to initiate appropriate actions to eliminate/ control hazards.

PROCEDURE

The initial step in the analysis is to identify the safety critical areas of the system and their functional paths. These paths may contain hardware as well as software elements. Focus the analysis on the software functions within each system functional flow path. Whether the coded instructions are stored in software or firmware, analysis of the system in question for hazardous occurrences should include an analysis of the stored coded instructions.

The SHEA will be conducted on identified software fault conditions, and will proceed from a qualitative to a quantitative analysis as the design develops. When the SHEA indicates a potential problem, it will be made known to the responsible engineer in order to initiate proper action. The SHEA will be reviewed on a continuous basis to verify that software design modifications do not add hazards to the system.

The SHEA should be developed in conjunction with FMEA.

RESULTS	The SHEA will provide information to evaluate identified software related hazards, identify safety critical areas in software design and provide inputs to safety design criteria and procedures. The latter will include provisions and alternatives to eliminate or control all unacceptable and undesirable software related hazards based on their combination of severity and probability of occurrence, and to identify critical items.
DOCUMENTATION	Document the analysis to show compliance with the specified system safety requirements and to track the corrective action.

INSTRUCTIONS FOR COMPLETTNG THE SHEA FORM:

- In Contract No., enter the contract number for which the SHEA is being performed.
- In Contractor, enter the name of the Contractor responsible for the SHEA.
- In SHEA No., enter the SHEA number which will be coded and sequentially numbered by each Contractor for each system. This coding sequence will be utilized for all related predictions and analysis.
- In Rev. No, enter the revision number of the SHEA to indicate the latest status.
- In System, enter the nomenclature of the applicable system.
- In Subsystem, enter the nomenclature of the subsystem as broken out from the system and which includes the item undergoing SHEA.
- In Document No., enter the document number of the software document for the specific software function being analyzed.
- In Sheet _ of _, enter the individual sheet number and the total number of sheets contained in this analysis.
- In Prepared by _, Date, the preparer will sign and enter the date of issue or completion on each sheet of the analysis.
- In Reviewed by _, Date -, the reviewer will sign and enter the date of review on each sheet of the analysis.
- In Approved by _ Date -, the Contractor's Project Manager will sign to approve and enter the date of approval on each sheet of analysis.
- In SOFTWARE FUNCTION AND DESCTIPTION, enter the nomenclature and brief functional description of the software function within the specified module, including commands, data input or control function
- In SYSTEM MODE, enter state of the system when the software related fault condition occurs. (See Definitions)
- In HAZARD DESCRIPTION, describe a software fault condition, which could lead to an accident involving potential injury death or equipment damage.
- In PROBABILITY OF OCCURRENCE, enter the probability of occurrence of the software fault condition, measured in events per million hours of operation. Identify data source, such as experience in similar applications, etc.
- In POTENTIAL CAUSE, enter the most likely primary and secondary causes that can potentially contribute to the presence of the hazard.
- In EFFECT ON SUBSYSTEM /SYSTEM, describe the effect that the software fault condition may have on the module and the next higher level, i.e., subsystem or system element in terms of inputs and outputs, and in terms of system safety and operational impact (e.g. delay, inconvenience, injury, damage, fatality, etc.)
- In HAZARD RISK INDEX, enter a combination of the qualitative measure of the worst potential consequence resulting from the hazard, and its probability of occurrence (e.g., IA, IIB, etc.), under the following conditions:
- In INITIAL, enter the designation for hazard risk index estimated prior to implementation of the controlling measures.
- In RESIDUAL, enter the designation for hazard risk index estimated following the adoption/implementation of the controlling measures. This may frequently result in reduction of the probability of occurrence of the hazard.

- In POSSIBLE CONTROLLING MEASURES AND REMARKS, describe actions that can be taken in the software, firmware, or procedural changes that can be made to prevent the anticipated hazardous event from occurring. If changes cannot be implemented in software or firmware, propose external controls in hardware or other procedural changes. As appropriate, enter name(s) of related analysis and reference number(s) and which approach is being proposed: i.e., software, firmware, hardware design change, procedures, special training, etc.
- In RESOLUTION, describe changes made or steps taken relative to design and/or procedures, training, etc., to eliminate or control the hazard.

4.3 Threat and Vulnerability Assessment Process

Planning in advance of day-to-day passenger rail crimes, terrorist acts, or other security incidents is essential to providing CHST passengers and employees with a safe and secure environment. A breach in security may result in serious injuries or death, destruction of property and facilities, and/or the inability to continue CHST system operations to the region. To evaluate the susceptibility to potential threats and to design corrective actions that can reduce or mitigate the risk of serious consequences from a security incident, a Threat and Vulnerability Assessment (TVA) will be initiated during the preliminary phases of the CHSTP. The assessment will be reviewed and updated at each subsequent phase. The TVA process consists of four activities

- Identification of critical assets of the CHST system
- Analysis of the threats against these assets
- Identification of potential vulnerabilities within the proposed CHST system
- Summary analysis of security incident consequences

The TVA Process will identify the likelihood of specific threats that may endanger railroad assets (people and property); the potential vulnerabilities associated with the design of the CHST system; and mitigation efforts that can be designed into the CHSTP to reduce the risk and to minimize the consequences of identified potential criminal and terrorism activities. It will also identify future security training needs of transit personnel and the necessity for security procedures. The Security Risk Assessment will be protected under Sensitive Security Information (SSI) and shared *only* with those persons with a need to know.

4.3.1 Asset Identification

Assets are defined as people and property. Project assets include the following:

- People – passengers, employees, visitors, contractors, vendors, surrounding communities, and others who come into contact with the transit system
- Property – fixed infrastructure, rolling stock, software, plans and procedures

Property assets associated with the CHSTP will be identified during the TVA process and included as a listing in the Threat and Vulnerability Assessment Report.

4.3.2 Asset Criticality Determination

Assets will be prioritized in terms of criticality. Most weight will be given to those assets that present the greatest threat to life safety or service disruption. In making this determination, consideration will be given to the following:

- Impact on CHST system passengers, employees, and first responders
- Impact on CHST system operations

- Economic value of the asset, including current and replacement value
- Intrinsic value of the asset to a potential adversary
- Asset location to other critical assets

4.3.3 Identification of Threats Against Critical Assets

Threats are defined as specific intentional acts that will damage the system, its facilities, or its patrons. Passenger rail agencies face security threats from three primary classifications of crime: crimes against persons, crimes against property, and other crimes committed on railroad property. Other crimes committed on railroad property generally are minor and affect quality of life. They degrade the quality of transportation service and interfere with passengers' use of the transportation system. The majority of crimes committed do not pose a physical threat to passengers but may erode passengers' sense of security and make passengers feel intimidated.

The threat analysis will define the level or degree of threats against the proposed rail system.

4.3.4 Threat Scenarios

Threat scenarios will be developed to identify and evaluate vulnerabilities that may make the asset susceptible to an attack. Scenario development also identifies impacts of threats on critical assets and promotes mitigation strategies and capability needs. The scenarios are intended to represent creditable, real-world events and, as such, will be derived primarily from other operating systems' experiences, FTA and Transportation Security Administration resource documents, and local crime report information.

4.3.5 Vulnerabilities

Vulnerability is the susceptibility of the system to a particular type of security incident or event that can be taken advantage of to carry out a threat. Vulnerabilities may surface as a result of the following:

- Design and construction of the stations, trackway, wayside facilities, park-and-ride lots, aerial structures, underground structures, operations and maintenance facilities, and central control
- Equipment and technology used
- Operating procedures
- Policing and security practices

A vulnerability analysis will be prepared to identify specific weaknesses with respect to how the new facility or system may invite and permit a threat to be accomplished.

4.3.6 Security Incident Frequency

The likelihood of a security incident or event affecting a system or facility will be categorized as follows:

- High – Indicates that a **definite** threat exists against the asset and that the adversary has both the capability and intent to attack or commit a criminal act, and that the asset is targeted on a frequently recurring basis
- Frequent – Indicates that a **credible** threat exists against the asset based on knowledge of the adversary's capability and intent to attack or commit a criminal act against the asset, based on related incidents having taken place at similar assets or in similar situations
- Occasional – Indicates that there is a **possible** threat to the asset based on the adversary's desire to compromise similar assets
- Seldom – Indicates that there is a **low** threat against the asset and that few known adversaries would pose a threat to the asset

- Never – Indicates **no credible evidence** of capability or intent and no history of actual or planned threats against the asset

Table 4-4 describes the probability characteristics of a security incident or event. The probability categories – Levels A, B, C, D, and E – will be used in the Security Criticality Matrix.

Table 4-4 Security Event Probability Categories

Description	Level	Specific Individual Asset	Fleet or Inventory
High	A	Likely to Occur Frequently	Continuously Experienced
Frequent	B	Will Occur Several Times in Life of an Asset	Will Occur Frequently
Occasional	C	Likely to Occur Sometime in Life of an Item	Will Occur Several Times
Seldom	D	Unlikely but Possible to Occur in the Life of an Item	Unlikely but can Reasonably be Expected to Occur
Never	E	So Unlikely it can be Assumed Occurrence May not be Experienced	Unlikely to Occur but Possible

4.3.7 Security Incident Severity

In addition to threats, the worst-case consequences of security incidents will be evaluated. Consequence severity is defined as the degree of injury or amount of damage that may be expected from a successful attack or criminal act against an asset. Examples of consequences include injuries to the public or to CHST system personnel, loss of equipment causing financial losses, and disruption to CHST system operations. Severity categories will be defined to provide a qualitative measure of the result of a security breach and are summarized in Table 4-5.

Table 4-5 Threat Severity Categories

Category	Severity	Characteristics
1	High	Death or System Loss or Extensive Damage
2	Moderate	Severe Injury or Moderate System Damage
3	Low	Minor Injury or Minor System Damage

4.3.8 Security Criticality Matrix

The severity of a threat and the likelihood of occurrence will be combined into a risk level criticality matrix. The consequences will be assessed both in terms of severity of impact and probability of occurrence for a given threat. The criticality matrix organizes the resulting consequences into categories of high, serious, and low. The matrix will help to prioritize consequences and to focus available resources on the most serious threats requiring resolution while effectively managing the available resources. Threats with vulnerabilities identified as high may require further investigation and indicate that the condition cannot remain as-is but must be mitigated. A serious consequence in the matrix indicates that a countermeasure should be implemented, if at all possible, within fiscal constraints. A low consequence means that it is

acceptable to allow the risk without providing any countermeasures. The Security Criticality Matrix is shown in Table 4-6.

Table 4-6 Criticality Matrix

Frequency of Occurrence	Vulnerability Categories			
	I High		II Moderate	III Low
(A) High	H (IA)	H (IIA)	M (IIIA)	
(B) Frequent	H (IB)	H (IIB)	M (IIIB)	
(C) Occasional	H (IC)	M (IIC)	L (IIIC)	
(D) Seldom	M (ID)	L (IID)	L (IIID)	
(E) Never	M (IE)	L (IIE)	L (IIIE)	

Hazard Risk Index	Risk Decision Criteria	
IA, IB, IC, IIA, IIB	High (H)	Vulnerability must be mitigated
ID, IE, IIC, IIIA, IIIB	Moderate (M)	Vulnerability should be mitigated if possible within fiscal constraints
IID, IIE, IIIC, IIID, IIIE	Low (L)	Vulnerability is acceptable with review by the Authority

Source: Adapted from FTA's Public Transportation System Security and Emergency Preparedness Planning Guide

4.4 Verification and Validation Documentation

Each identified safety hazard and security risk will be managed to resolution through the Verification and Validation (V&V) methodology and documented in the Requirements Management Tool database system adopted by the CHSTP. The V&V methodology and documentation requirements are described in Section 7.0 of this SSMP.

5.0 DEVELOPMENT OF SAFETY AND SECURITY DESIGN CRITERIA

5.1 Prevention Through Design

Hazards can be resolved by deciding to either assume the risk associated with the hazard or to eliminate or control the hazard. The Prevention Through Design principle incorporates safety considerations into the early design of a system element so as to avoid, eliminate, or mitigate hazard risk to a level as low as reasonably practicable. The following order of precedence shall be applied when incorporating safety considerations into design:

1. Avoidance: Develop concepts of operations, basis of design, or general system requirements to avoid the introduction of hazards to the system.

2. Elimination. Design, redesign or retrofit to eliminate (i.e., design out) the hazards through design selection. This strategy generally applies to acquisition of new equipment or expansion of existing systems; however, it can also be applied to any change in equipment or individual subsystems.

3. Substitution for Minimum Risk. If an identified hazard cannot be eliminated, reduce the associated risk to an acceptable level. This may be accomplished, for example, through the use of fail-safe devices and principles in design, the incorporation of high-reliability systems and components and use of redundancy in hardware and software design.

4. Engineering Controls. Hazards that cannot be eliminated or controlled through design selection will be controlled to an acceptable level through the use of fixed, automatic or other protective safety design features or devices. This could result in the hazards being reduced to an acceptable risk level. Safety devices may be part of the system, subsystem or equipment. Examples of safety devices include interlock switches, protective enclosures and safety pins. Care must be taken to ascertain that the operation of the safety device reduces the loss or risk and does not introduce an additional hazard. Safety devices will also permit the system to continue to operate in a limited manner. Provisions will be made for periodic functional checks of safety devices.

5. Provide Warning Devices. When neither design nor safety devices can effectively eliminate nor will control an identified hazard, devices shall be used to detect the hazardous condition and generate an adequate warning signal to provide for personnel remedial action. Warning signals and their application will be designed to minimize the probability of incorrect personnel reaction to the signals and will be standardized within like types of systems. Warning signals and their application should also be designed to minimize the likelihood of false alarms that could lead to creation of secondary hazardous conditions.

6. Administrative Controls. Where it is not possible to eliminate or adequately control a hazard through design selection or use of safety and warning devices, procedures and training will be used to control the hazard. Special equipment operating procedures can be implemented to reduce the probability of a hazardous event and a training program can be conducted. The level of training required will be based on the complexity of the task and minimum trainee qualifications contained in training requirements specified for the subject system element and subsystem. Precautionary notations in manuals will be standardized. Safety critical tasks, duties and activities related to the system element and subsystem will require certification of personnel proficiency. However, without specific written approval, no warning, caution or other form of written advisory will be used as the only risk reduction method for unacceptable and undesirable hazards.

7. Personal Protective Equipment and Guards: Where no other higher-level alternative mitigations are possible, the use of personal protective equipment or the installation of guards will be used to mitigate the hazard. Personal protective equipment and guards may be used to supplement other higher-level mitigations, but when they are the only mitigation applied they are to be used only when no other alternatives exist.

5.2 Development of Design Criteria

Design criteria are developed from the engineering experience of the design team obtained from numerous other rail projects, as well as the following sources:

- Formal hazard analyses, including Preliminary Hazard Analysis
- Threat and Vulnerability Assessments
- Federal Railroad Administration regulations found in Code of Federal Regulations Title 49, Parts 200-299
- California Public Utilities Commission (CPUC) General Orders
- California Building Codes
- California State Fire Marshal's Office direction and recommendations
- Local building codes and Fire Marshal recommendations
- National Fire Protection Association (NFPA)
- American Public Transportation Association (APTA)
- American Railway Engineering and Maintenance-of-Way Association(AREMA)
- Underwriters Laboratories (UL)
- Safety and security recommendations of the Department of Homeland Security (DHS), Transportation Security Administration (TSA), and the Federal Transit Administration (FTA)
- Other industry or technical standards

CHSTP will conduct Preliminary Hazard Analysis and Threat and Vulnerability Assessment during the Preliminary Engineering phase to aid in defining safety and security design criteria.

Design criteria are developed to address system safety and security requirements applicable to the entire system. System safety and security requirements for each specific design element will be incorporated into the corresponding element design criteria contained in the *CHSTP Design Criteria*. There are no separate sections in the *CHSTP Design Criteria* specifically identified as "safety and security design criteria."

The processes described in the *CHSTP Verification and Validation Management Plan* (VVMP) will ensure that the design criteria and the basis of design report will incorporate safety and security requirements into the project design.

The following documents have been prepared by the PMT in order to achieve the project's design criteria's objectives:

- Basis of Design Report
- Risk Management Plan and Hazard Log
- System Requirements
- Infrastructure Maintenance Plan
- Design Manual
- Standard Drawings
- Standard Specifications

A consistent approach will be utilized within all the engineering efforts and will assist the CHSTP Regional Consultant Teams in preparation of their designs.

The *Basis of Design Report* defines the key CHST system performance requirements. This document serves as the guiding force in establishing the design criteria and development of design standards. The key audience for the Basis of Design Report is the Authority, the Program Manager, the Regional Project Managers, and the Section Designers. The purpose of the report is to guide the Engineering Management Team during the development of engineering criteria and provide the required performance levels for the CHST system.

A *Risk Management Plan and Hazard Log* will be developed outlining methodologies to ensure that a consistent approach to risk assessment and cost are applied throughout the CHSTP. The plan will address both system safety risk and project delivery risk, and include a Program level risk register that will be regularly updated and maintained.

The *CHSTP System Requirements* provides a common platform for which similar Code of Federal Regulations, CPUC General Orders, and European Union Technical Specifications for Interoperability, as well as other industry best practice and standards, can be collectively presented and assessed at a detailed technical level. In addition to guiding and supporting specific technical guidance at the subsystem level, the CHSTP System Requirements structure is used to demonstrate how the performance objectives of the CHSTP are to be achieved.

The *Infrastructure Maintenance Plan* is a base document outlining how the CHST system will be maintained. This document sets forth the requirements for maintenance facilities for rolling stock and the railway infrastructure, as well as the approximate location and size of supporting facilities.

Design Criteria have been prepared that is intended to serve as the design requirements for a possible Design/Build consortium. The Design Criteria identifies and specifies required elements and considerations to ensure a safe and reliable operating railway for the CHSTP. The Design Criteria will be supported by *Standard Drawings* and *Standard Specifications* as required.

5.3 Design Reviews

CHSTP drawings and specifications will be reviewed informally during development and formally during preliminary and final design. The purpose of these reviews will be to verify conformance with all of the projects design criteria. These reviews are performed by the corresponding PMT discipline design personnel, their design supervisors, applicable oversight agencies, representatives from the Regional Consultants, and the PMT System Safety and Security staff.

Design reviews will be scheduled and coordinated so as to permit ample opportunity for comments and approvals. After satisfactory resolution of comments, the specifications are “sealed” by professional engineers from the Regional Consultants design group and issued for use.

5.4 Deviations and Changes

For any instances that arise requiring a possible deviation from the safety-critical or security critical design criteria (i.e., physical constraints identified within the projects corridor conflicting with baseline requirements), the PMT and the associated segment Regional Consultant during Preliminary Engineering (and PMT and design/build contractor during Final Design) will be required to explore all reasonable alternatives to provide a design that conforms to the requirements of the existing criteria. If a reasonable alternative cannot be developed, the requesting party will submit a Design Variance Request (DVR) to the Safety and Security Project Committee (SSPC), whose members include safety and security personnel and representatives of the required engineering disciplines. The requesting party will be responsible for identifying and resolving any hazards or vulnerabilities related to any deviations.

For all contractor-identified deviations, the contractor will conduct a hazard and vulnerability analysis to identify any hazards or vulnerabilities resulting from the proposed deviation that may require resolution.

If the change request is approved, the findings and recommendations will be incorporated into the Final Design engineering and construction plans and the Final Design Verification Checklist(s) will be updated to reflect the change.

During the life cycle of the project, the SSPC may also confront design issues that require additional hazard analysis or vulnerabilities assessment, the outcome of which may result in requests for design changes. Such requests will be submitted to the SSPC for review and processed through the Design Variance Request process.

The PMT is responsible for monitoring all design requests/changes for compliance with the Design Criteria or Design Standards documents, including statutory and regulatory requirements and requirements specified in any contract.

6.0 QUALIFIED OPERATIONS AND MAINTENANCE PERSONNEL

6.1 Operations and Maintenance Requirements

The PMT Operations and Maintenance Team (OMT) will be responsible for developing system operations and maintenance requirements that support the safe and efficient operation of the California High-Speed Train system. Principle activities of the OMT include:

- Provide ongoing operations input to the Engineering Management Team and Regional Engineering teams in the development of system design elements
- Review and comment on Engineering design elements to ensure responsiveness to operations' functional requirements
- Coordinate with FRA on development of CHSTP System rules and procedures and their relationship to current regulations and new regulations that will emerge from the CHSTP. Key categories include:
    - Code of Federal Regulations (CFR) regulatory issues
    - Rail System Operating Rules
    - System Safety Rules and Procedures
    - Standard Operating Procedures
    - Emergency Action Plans and Procedures
- Coordinate with railroads, operating agencies/rail service providers and stakeholders as required

Personnel staffing requirements for the operation and maintenance of the in-service CHST system will be established and described in the *CHST System Training and Personnel Qualification Plan*, to be developed prior to the startup of revenue operations.

Development of the Operations and Maintenance Plan for any system or subsystem component will begin during CHSTP Construction Phase. Position titles, responsibilities, qualifications, and training requirements will be identified consistent with other high-speed rail operating systems using similar technologies and operating characteristics. The magnitude of the in-service CHST system (trains operated, vehicles in service, track and OCS systems to maintain) will determine staffing levels for operators, maintainers, and supervisors.

Additionally, the CHST System Infrastructure Maintenance Requirements Plan (IMRP) establishes and describes how infrastructure maintenance will be planned and implemented including methods utilized and resources required. The IMRP specifies the CHST system requirements necessary to meet passenger and public safety levels that meet or exceed FRA Class 6 Regulatory Safety Standards, consistent with FRA's High-Speed Passenger Rail Safety Strategy. IMRP requirements will be incorporated into the system Design Criteria during the Preliminary Engineering phase of the CHSTP.

6.2 Operations and Maintenance Plans, Rules and Procedures

The following documents will be revised for the CHST system during the Project Construction Phase, in preparation for Testing and Startup:

- Concept of Operations
- Code of Operating Rules
- Rolling Stock Maintenance Plan
- Infrastructure Maintenance Requirements Plan
- Training and Personnel Qualification Plan
- Service/Operating Plan
- Command and Control Facilities Plan
- On-Board Operating Plan
- Passenger Station Operating Plan
- Passenger Train Emergency Preparedness Plan
- Air Brake Operating Instructions
- Electrical Operating Instructions
- Emergency Operating Procedures
- Timetable Special Instructions
- On-Track Safety Rules
- System Safety Program Plan
- Security and Emergency Preparedness Plan

6.3 Training Program

The PMT will be responsible for ensuring qualified O&M personnel assigned to the CHST system are trained to perform pre-revenue and revenue operations. Instruction in safe methods of operation, safety requirements, and emergency response procedures will be included in manuals, handbooks, and other documentation developed for the training and certification of operations and maintenance personnel. Training plans, which include in-house classroom training and on-the-job training and testing, will be developed based on the individual characteristics of the equipment or CHST System locations.

The future CHST system Operators, Instructors and Field Supervisors will undergo familiarization training on all operational equipment, rules, plans and procedures. The future Central Control Operations Staff (including Superintendents, Supervisors, and Train Dispatchers) will require extensive training and qualification on the train control system, in addition to operating rules and procedures, and safety and security procedures.

Positions which will require detailed job descriptions and training programs prior to entering the Testing Phase of the CHSTP include, but are not limited to the following:

- Superintendents
- Operations Supervisors
- Train and Engine Service Employees
- Control Center Supervisors
- Control Center Train Dispatchers
- Equipment Maintenance Employees
- Signal and Communications Employees
- Maintenance of Way Employees
- Power and OCS Employees

Contractors and suppliers providing equipment and facilities for the CHST system will be responsible for developing training plans, training manuals, and conducting training courses for applicable CHST System Operations and Maintenance staff. Contractors will be required to develop and implement programs to train appropriate Authority personnel in the operation and maintenance of each piece of equipment or systems provided in conformance with the *CHST System Training and Personnel Qualification Plan*.

6.4 Emergency Preparedness

A *Passenger Train Emergency Preparedness Plan* (PTEPP) will be developed prior to the start of the Testing Phase of the CHSTP to prepare for emergency incidents that occur during testing. The PTEPP will be further developed and carried over into the start of revenue service. The PTEPP will contain emergency preparedness requirements and procedures for the Operations and Equipment Maintenance disciplines, in compliance with 49 CFR, Part 239. The PTEPP will identify requirements for a program of training (including instructional programs, emergency preparedness drills and tabletop exercises) of railroad operating and maintenance personnel and emergency responders. The goal of the PTEPP is to verify and validate the following:

- Adequacy of emergency plans and procedures
- Readiness of railroad operating and maintenance personnel to perform under emergency conditions
- Effective coordination between railroad operations and emergency response agencies – police, fire, and emergency medical services
- Familiarization of fire, police, and emergency medical services personnel with the physical and operating characteristics of CHSTP operations and inherent hazards

After-action reviews will be conducted following any major emergency response event or exercise prior to the start of revenue operations. A report of the findings will be provided to the Safety and Security Project Committee (SSPC). Action items will be tracked by the SSPC to completion through the V&V process. Outcomes may include recommendations for revisions to the PTEPP, operating rules or procedures, equipment or infrastructure changes, or emergency responder procedures, and changes to training plans and training programs pertaining to emergency response and personnel.

Fire/Life Safety and Security Committees will be established at both a regional and State level as described in Section 3.3.3 of this SSMP to provide a vehicle for clear, consistent communication with emergency responders.

7.0 SAFETY AND SECURITY CERTIFICATION PROGRAM

7.1 Overview

The California High-Speed Rail Authority is ultimately responsible for ensuring that all safety-critical and security-critical elements of the CHST system are designed, constructed, tested, and made operationally ready in a safe and secure manner prior to the start of revenue service. The Safety and Security Certification Program describes the responsibilities and processes required to demonstrate that the CHST system is safe and secure, in conformance to the FTA *Handbook for Transit Safety and Security Certification* and Federal Railroad Administration (FRA) Regulations 49 CFR 236, Sub-parts H and I for Positive Train Control, and other FRA Regulations as applicable. The Safety and Security Certification Program applies to all phases of the CHSTP, from preliminary engineering to the start of revenue operations, for each segment designed and built for the system.

The Safety and Security Certification Program follows the verification and validation processes and principles as outlined in the *Verification and Validation Management Plan* (VVMP) in that it seeks to verify that the safety and security system specifications that are developed as mitigations to known hazards and vulnerabilities are carried through in the final design, construction and operational readiness phases. The safety and security system specifications are also validated for their effectiveness in mitigating the target hazards and vulnerabilities. The verification and validation process will be used to verify and validate the safety and security certification checklists.

The PMT System Safety Manager, in coordination with and in conjunction with the PMT Operations Manager and Engineering Manager will be responsible for initiating the safety and security certification process during the preliminary engineering phase of the CHST Project. The Program Management Team led by the System Safety Manager, will develop a *Certifiable Elements and Hazards Log* (CEHL) for safety-critical and security-critical system elements and their associated hazards and mitigations. The CEHL will carry though all of the project phases to ensure that hazards identified in the Preliminary Engineering Phase are mitigated consistently throughout the project life cycle.

Hazards and vulnerabilities identified on the CEHL will be analyzed to determine appropriate measures for mitigation. Mitigations will provide input to the V&V process, resulting in the development of V&V Certifiable Items Lists for each project phase that in turn lead to development of V&V Certifiable Items Lists for the subsequent project phase.

V&V Certifiable Items Lists that are specific to safety and security requirements will be distinctly identified as such and tracked in conformance with the VVMP, and collectively make up the verification and validation evidence that supports safety and security certification. The PMT System Safety Manager, with the assistance of the PMT Security Manager, will have overall responsibility for the administration of the Safety and Security Certification Program.

7.2 Program Goals and Objectives

The goals of the Safety and Security Certification Program are to verify that identified safety and security requirements have been met in the preliminary engineering, final design, and construction phases and to provide evidence that the CHST system is safe and secure for revenue service. The objectives of the Safety and Security Certification Program are to document the following:

- Safety and security design criteria are reflected in contract documents
- Facilities and equipment have been designed, constructed, manufactured, inspected, installed, and tested in accordance with safety and security requirements
- Operations and maintenance procedures and rules have been developed and implemented to ensure safe operations

- Training documents have been developed for the training of operating and emergency response personnel
- Transportation and maintenance personnel have been trained and qualified
- Emergency response agency personnel have been prepared to respond to emergency situations in or along the CHST system corridor
- Safety and security systems integration tests have been conducted
- All safety and security related issues have been addressed and resolved

Certification occurs at the beginning of each project phase, and is required for advancing project elements into the next project phase. For example, the Final Design of a bridge structure must be certified to meet all safety and security design criteria prior to construction, and then must be certified to have been built in conformance to those safety and security design criteria before being placed into operation. This process assures the Authority that CHSTP elements are safe and secure as they move through each successive phase of the project.

Certification Items that are not completed prior to moving to the next phase are placed on an Open Items List and tracked to completion. The Open Items List describes a plan for closure of the Certifiable Items, including target dates and an accountable person for closure.

7.3 Safety and Security Certification Process

Safety and security certification is managed by the PMT through the oversight and participation of the Safety and Security Project Committee (SSPC), and with the ultimate approval of the Authority through the Safety and Security Executive Committee.

The SSPC will be responsible for tracking the progress of the safety and security certification through regular review and update of Hazard Log maintained by the PMT Safety Manager.

Federal Railroad Administration approval to operate will be achieved through final safety and security certification prior to the start of revenue service.

7.3.1 Certifiable Elements and Hazards

A *Certifiable Elements and Hazards Log* will be established during the Preliminary Engineering Phase. The CEHL identifies the major elements of the CHST system that are to be proven to be safe and secure prior to the startup of revenue service and acts as a guide for the certification process throughout project life cycle. Hazards associated with each major element that can reasonably be expected to occur in the CHST system will be identified through a System Hazard Analysis process and placed on the CEHL. The CEHL will be developed by the PMT System Safety Manager in collaboration with the other PMT discipline technical experts and presented to the SSPC for review and approval. The CEHL will be updated and expanded following the completion of analyses during the various phases of the CHSTP. A sample CEHL is shown in Figure 7-1.

Figure 7-1 Sample CEHL

Certifiable Elements and Hazards Log

Certifiable Elements			Hazards			Mitigations		
No.	System Elements	Sub-Elements	No.	Date Identified	Description	Mitigation Description	PE Phase Reference	FD Phase Reference
1.1	R-O-W Generally							
1.1.1	R-O-W Generally	Derailment	1.1.1.1	8/30/2011	Track Failure - Cracked or broken track component	1) Implement an inspection program and remedial maintenance methodology that meet or exceed FRA Guidelines for Track Class to operate at 220 MPH (when developed).		
						2) Implement track component quality standards that meet or exceed AREMA requirements.	DM 5.4.2 DM 5.5.1 DM 5.5.3	
						3) Install on-board derailment containment devices.		
						4) Install in-track derailment containment elements.		
						5) Require positive indication of broken rail through track circuit system.		
			1.1.1.2	8/30/2011	Track Abnormality - Worn track components, cross-level	1) Implement an inspection program and remedial maintenance methodology that meet or exceed FRA Guidelines for Track Class to operate at 220 MPH (when developed).		
						2) Implement track component quality standards that meet or exceed AREMA requirements.	DM 5.4.2 DM 5.5.1 DM 5.5.3	
						3) Install on-board derailment containment devices.		
						4) Install in-track derailment containment elements.		
						5) Require positive indication of broken rail through track circuit system.		
			1.1.1.3	8/30/2011	Roadbed failure due to subsidence, shifting ground, etc.	1) Perform geotechnical analysis and incorporate results into sub-grade design.	DM 10.5	
						2) Install appropriate drainage.	DM 8.4.3 DM 8.4.9	
						3) Inspection and maintenance of drainage systems.		
			1.1.1.4	8/30/2011	Washout caused by flooding or scouring	1) Perform hydraulics analysis and incorporate results into sub-grade design, slope protection and setting of profile.	DM 10.5 DM 10.8	
						2) Install appropriate drainage.	DM 8.4.3 DM 8.4.9	
						3) Inspection and maintenance of drainage systems.		
						4) Identification and monitoring by O&M of potential hazardous locations.		

Note – Figure 7-1 is a sample representation only. Refer to current CEHL for identified hazards and required mitigations. Due to space considerations Figure 7-1 only depicts Preliminary Engineering and Final Design phases; subsequent phases will be added as the project matures.

7.3.2 Identification of Hazards and Vulnerabilities

Safety and security are addressed during project design through the identification of safety and security design criteria for each certifiable element in the CEHL. The principle means of identifying safety-related design criteria is a Preliminary Hazard Analysis conducted by the PMT Safety Manager in collaboration with the other PMT discipline technical experts. Other analyses are conducted as necessary. These analyses include Failure Mode Effects Analysis (FMEA), Interface Hazard Analysis (IHA), Software Hazard Effects Analysis (SHEA), Fault Tree Analysis (FTA) and Operations Hazard Analysis (OHA). See Section 4.0 for a detailed description of these analysis methods, including sample work sheets.

The principle means of identifying security-related design criteria are Threat and Vulnerability Assessments (TVA) conducted by the PMT Security Manager in collaboration with the other PMT discipline technical experts. Other analyses are conducted as necessary. The TVA will be developed in the form of a technical report.

7.3.3 Tracking of Hazards and Vulnerabilities

The *Certifiable Elements and Hazards Log* will be developed and maintained by the PMT System Safety Manager and PMT Security Manager collaboratively. The log will track the process of mitigation efforts throughout the CHSTP life cycle. Regular updates of the log will be presented to the SSPC and included in the quarterly reports to the SSEC.

7.3.4 Design Verification

Hazard and vulnerability mitigations will be identified as output from the hazard analysis (PHA, TVA, FMEA, IHA, SHEA, FTA and/or OHA). These mitigations will be required to be incorporated into Final

Design drawings in order to meet the projected Residual Hazard Risk Index. The verification and validation process, as identified in the *CHSTP Verification and Validation Management Plan*, will be utilized for verifying that the identified mitigations have been satisfactorily incorporated into the Final Design. The tool for tracking V&V compliance is the Certifiable Items List. A sample Certifiable Items List is shown in Figure 7-2.

Figure 7-2 Sample Certifiable Items List

CHSTP SAFETY & SECURITY CERTIFICATION PROGRAM
CERTIFIABLE ITEMS LIST

Hazard # _____ Hazard Description _____

Project Phase _____ Developed By _____
Name Date

Item #	Description	Evidence of Criteria/Requirement	Verification Date	Verification Initials	Means of Verification
1					
2					
3					
4					
5					
6					
7					
8					
Comments / Restrictions					

Safety Manager Review _____ SSPC Review _____
Manager Date Chairman Date

The design/build contractor shall be responsible for the development of site-specific hazard analysis (principally PHAs, but also TVA, FMEA, IHA, SHEA, FTA and OHA as appropriate) required as the safety-critical or security-critical design criteria are applied to specific, local CHST system elements. The design/build contractor shall also be responsible for developing the V&V Certifiable Items Lists as output from the site-specific hazard analysis. The design/build contractor will be responsible for completing the Certifiable Items Lists applicable to their specific project scope during the Final Design Phase. The design/build contractors will identify in the resolution section of the Certifiable Items Lists objective evidence that demonstrates compliance with the required safety-critical or security-critical design criteria. Requests for variance from the requirements identified in the Certifiable Items Lists will be handled through the process identified in Section 5.4.

All completed Certifiable Items Lists, along with associated supporting material, will be compiled by the design/build contractor and available for audit by the PMT System Safety Manager upon request. When all Certifiable Items Lists for a particular element or infrastructure component are completed, a Final Design Certificate of Conformance Package (consisting of a Certificate of Conformance for the project element, all completed Certifiable Items Lists, and all supporting documentation such as hazard analysis, drawings, and design element descriptions) will be compiled and forwarded to the PMT System Safety Manager. The PMT System Safety Manager will review the Final Design Certificate of Conformance Package for completeness and content accuracy, and will then forward the Final Design Certificate of Conformance Package to the SSPC for review and acceptance through the issuance of a Statement of

No Objection (SONO). If accepted by the SSPC, the Final Design Certificate of Conformance Package is forwarded to the SSEC for ultimate Authority review and approval. A sample Certificate of Conformance is shown in Figure 7-3.

Figure 7-3 – Certificate of Conformance (Sample)

Certificate of Conformance

CIL # _____ CIL Name: _____

Project Phase _____ Date of Issuance _____

Description: _____

_____

This is to verify that the above-named Certifiable Item has been verified for safety and security certification in conformance with the *CHSTP Design Criteria* and safety-critical and security-critical requirements with the following exceptions:

☐ No Exceptions

☐ Exceptions:

_____

_____

_____

_____

_____

_____

Project Manager – Contractor (Signature)	Project Manager – Contractor (Print)	Date
Project Safety Officer – Contractor (Signature)	Project Safety Officer – Contractor (Print)	Date
Contractor Company Name		
Independent 3rd Party Audit (Signature)	Independent 3rd Party Audit (Print)	Date
Independent 3rd Party Company Name		

The Certifiable Items Lists will be expanded by the design/build contactor to include a Construction section upon completion of the Final Design phase of a particular CHST system element. The safety- and security-critical items identified during the Final Design Phase will be carried over into the Construction Phase.

The design/build contractors will be responsible for completing the Certifiable Items Lists that apply to their scope of work during the Construction Phase. The design/build contractors shall identify in the resolution section of the Certifiable Items Lists objective evidence that demonstrates compliance with design features that are identified as safety-critical or security-critical. Requests for variance from the requirements identified in the Certifiable Items Lists will be handled through the process identified in Section 5.4.

All completed Critical Items Verification Checklists, along with associated supporting material, will be compiled by the design/build contractors and available for audit by the PMT System Safety Manager upon request. When all Certifiable Items Lists for a particular element or infrastructure component are completed, a Construction Certificate of Conformance Package (consisting of a Certificate of Conformance for the project element, all completed Certifiable Items Lists, and all supporting documentation such as hazard analysis, field reports, photographs, and drawings) will be compiled and forwarded to the PMT System Safety Manager. The PMT System Safety Manager will review the Construction Certificate of Conformance Package for completeness and content accuracy, and will then forward the Construction Certificate of Conformance Package to the SSPC for review and acceptance through the issuance of SONO. If accepted by the SSPC, the Construction Certificate of Conformance Package is forwarded to the SSEC for ultimate Authority review, approval and certification.

7.3.5 Testing Verification

The Certifiable Items Lists will be expanded by the PMT System Safety Manager to include a Testing section upon completion of the Final Design phase of a particular CHST System element. The safety- and security-critical items for systems identified during the Final Design and Construction Phases will be carried over into the Testing Phase. In addition, the relationships between systems and subsystems will be analyzed for systems integration requirements as identified in a Systems Integration Test Plan, and Certifiable Items Lists for integrated testing will be developed to prove the integration of associated systems.

The Systems Contractor(s) will be responsible for any additional analyses that are required (PHA, TVA, FMEA, IHA, SHEA, FTA and OHA as appropriate), as the safety-critical or security-critical testing criteria are developed and applied to specific CHST system or subsystem elements. The systems contractor(s) will be responsible for developing and completing the Certifiable Items Lists that apply to their scope of work during the Testing Phase. The system(s) contractor must identify in the resolution section of the Certifiable Items Lists objective evidence that demonstrates compliance with testing requirements that are identified as safety-critical or security-critical. Requests for variance from the requirements identified in the Certifiable Items Lists will be handled through the process identified in Section 5.3.

All completed Certifiable Items Lists for system testing or system integration, along with associated supporting material, will be compiled by the systems contractor(s) and available for audit by the PMT System Safety Manager upon request. When all Certifiable Items Lists for a particular system element or integrated system relationship are completed, a Testing Certificate of Conformance Package (consisting of a Certificate of Conformance for the required system tests, all completed Verification Checklists, and all supporting documentation such as hazard analysis, field reports, photographs, and drawings) will be compiled and forwarded to the PMT System Safety Manager. The PMT System Safety Manager will review the Testing Certificate of Conformance Package for completeness and content accuracy, and will then forward the Testing Certificate of Conformance Package to the SSPC for review and acceptance through the issuance of SONO. If accepted by the SSPC, the Testing Certificate of Conformance Package is forwarded to the SSEC for ultimate Authority review, approval and certification.

7.3.6 Startup Verification

The Certifiable Items Lists will be expanded by the PMT System Safety Manager to include a Startup section as the CHST system is prepared for the start of revenue operations. The safety- and security-critical items for operational readiness of the CHST System identified during the Final Design, Construction and Testing Phases will be carried over into Startup. Certifiable startup items include but are not limited to operation plans, emergency preparedness plans, training programs, timetables and rulebooks.

The O&M contractor(s) will be responsible for completing the Certifiable Items Lists that apply to their scope of work prior to Startup. The O&M contractor(s) must identify in the resolution section of the Verification Checklists objective evidence that demonstrates compliance with requirements for the start of revenue operations that are identified as safety-critical or security-critical. The O&M contractor(s) will be responsible for any additional analyses that are required (PHA, TVA, FMEA, IHA, SHEA, FTA and OHA as appropriate), as the safety-critical or security-critical criteria for startup are applied to specific CHST system, subsystem or operational elements. Requests for variance from the requirements identified in the Certifiable Items Lists will be handled through the process identified in Section 5.3.

All completed Certifiable Items Lists for the start of revenue operations, along with associated supporting material, will be compiled by the O&M Contractor(s) and available for audit by the PMT System Safety Manager upon request. When all Certifiable Items Lists for a particular system or operational element are completed, a Startup Certificate of Conformance Package (consisting of a Certificate of Conformance for the startup requirements, all completed Certifiable Items Lists, and all supporting documentation such as hazard analysis, field reports, photographs, and drawings) will be compiled and forwarded to the PMT System Safety Manager. The PMT System Safety Manager will review the Startup Certificate of Conformance Package for completeness and content accuracy, and will then forward the Startup Certificate of Conformance Package to the SSPC for review and acceptance through the issuance of SONO. If accepted by the SSPC, the Startup Certificate of Conformance Package is forwarded to the SSEC for ultimate Authority review, approval and certification.

7.3.7 Open Items List

Certifiable Items that cannot be closed prior to the start of the next project phase shall be placed on an Open Items List for tracking purposes. The Open Items List will describe the Certifiable Item itself, restrictions or conditions that allow permit the movement of the project element to the next project phase, a target date for closure, and a person of accountability for the certifiable item. The Open Items List will be periodically reviewed by the SSPC for progress and completeness.

7.3.8 Conditional Use Permit

Certifiable Items that require placement on the Open Items List will be reviewed by the PMT System Safety Manager and additional hazard analysis applied as appropriate. The results of the hazard analysis will be incorporated into a Conditional Use permit that describe the conditions or restrictions that allow the use or advancement of the certifiable item into the next project phase before certification for that item is complete. The Conditional Use permit will be presented to the SSPC for review and SONO. The Conditional Use permit will describe all conditions or restrictions associated with the Certifiable Item, and an expiration date. Extension of the expiration date will require further review and SONO by the SSPC.

8.0 CONSTRUCTION SAFETY AND SECURITY

8.1 Overview

The purpose of the construction safety and security program is to define the minimum health, safety and security requirements to which all participating CHSTP staff, contractors and subcontractors shall adhere to in fulfilling the Authority's commitment to ensuring a safe and secure construction project. This commitment includes the prevention of job-related injuries and illnesses for the workers engaged in project construction activities, as well as providing safe and secure conditions during construction of the project for the members of the public, who live, work or travel near to the project work areas.

All applicable codes and regulations must be followed by employees engaged in construction activities, including but not limited to:

- California Code of Regulations Title 8 Construction Safety Orders
- Federal Railroad Administration regulations as found at 49 CFR 214, 49 CFR 219, 49CFR225, 49 CFR 228, 49 CFR 236
- CPUC General Orders
- Other applicable federal and state OSHA regulations

Contractors will be required to develop a Site-Specific Health and Safety Plan (SSHASP) and a Site-Specific Security Plan (SSSP) that identifies the local conditions and requirements peculiar to the site and work to be performed, and is in compliance with the above regulations.

Contractors are responsible for ensuring the compliance of their employees and subcontractor's with the SSHASP and SSSP.

8.2 Construction Safety and Security Program Elements

The *CHSTP Construction Safety and Security Program* (Appendix B) describes the basic programmatic requirements for construction safety and security, compliance to which is required through the CHSTP construction contract documents. Basic elements of the construction Safety and Security Program include Site-Specific Health and Safety Plans, which are described below.

8.2.1 Site-Specific Health and Safety Plans

The Construction Contractor will be responsible for all aspects of safety and security at the project work site, as required through the standard contract provisions. The Construction Contractor will be required to develop and implement a Site-Specific Health and Safety Plan (SSHASP) specific to its contract work on the CHSTP, in conformance with the *CHSTP Construction Safety and Security Program*. A site-specific Job Hazard Assessment (JHA) will be performed by the Contractor to determine the safety processes, equipment utilized, and personnel assignments to be provided by the Contractor at each project work site.

The SSHASP will provide details on how the contractor will fulfill the contract safety and security requirements, and will be submitted to the PMT for review and approval.

8.2.2 Construction Safety and Security Management

The construction contractor will be responsible for developing and implementing a Site-Specific Health and Safety Plan and Site-Specific Security Plan in conformance with the requirements of the *CHSTP Construction Safety and Security Program*. The construction contractors will also be responsible for demonstrating self-certification of safety-critical and security-critical certifiable items as identified through the CHSTP V&V process and documented in the V&V Requirements Management Tool database.

The CHSTP Construction Manager will be responsible for the management oversight of the entire construction safety and security program. The CHSTP Construction Management staff will verify

contractor compliance with the safety and security requirements of the approved SSHASP and other safety/security related contract provisions, and applicable regulations throughout the construction, testing and start-up phases of the CHSTP. The CHSTP Construction Management staff will audit Construction contractor submissions involving safety and security designs, testing, construction activities and V&V Conformance Checklists. Results will be reported to the Safety and Security Project Committee in compliance with the CHSTP Safety and Security Certification Program described in Section 7.0.

8.2.3 Stop Work Order

The CHSTP construction management plan will establish procedures regarding control of nonconforming work and stop work orders. In the event that a failure to meet safety and/or security requirements results in imminent danger to workers or the general public or property, a Stop Work Order will be issued by the CHSTP Construction Manager.

The CHSTP stop-work procedure shall apply to all construction activities. The stop-work procedure will be used only where imminent danger situations exist. An “imminent danger” is any condition or practice that could reasonably be expected to cause death or serious physical harm immediately or before the danger can be eliminated by normal means.

Stop-work orders will be in effect until the issuing authority determines that the problem(s) is resolved and the work area(s) is brought to satisfactory conformance with health, safety and security requirements.

8.3 Construction Phase Hazard and Vulnerability Analysis

The CHSTP is committed to identifying and managing construction safety hazards and security vulnerabilities as subdivisions within the general issue of project risk. Risk in this context includes those events that, if they do occur, could impact on safety, security, the environment, CHSP System’s interests or the interests of third parties, including property owners and municipalities.

8.3.1 Risk Management

Risk Management is utilized by the CHSTP as a decision support tool, specifically identifying areas of high risks, which are reviewed to ensure that all reasonable practicable measures are taken to mitigate them. Risk Control measures shall be identified for all risks to the Project. These include financial and schedule risks as well as property, safety and security risks.

For the construction phase, prior to finalization of the contract documents, surveys to identify any unique hazards, threats, or vulnerabilities that may exist for the particular construction elements will be conducted and actions to mitigate these hazards or vulnerabilities will be included in the Special Provisions of the specific contract package.

During construction, each contractor shall co-operate with CHSTP staff and other interested parties in providing information needed in connection with risk management of its contract works. The contractor will prepare and submit to the PMT Risk Manager a Risk Management Plan for review and acceptance. The Risk Management Plan shall be based upon the CHSTP Risk Management strategy and shall include a means of monitoring progress in the reduction of the overall number and impact of risks through the use of a Risk Register which shall be in a format acceptable to the PMT Risk Manager. Safety hazards and security vulnerabilities shall be identified as risks, and will be included as special categories in the Risk Register.

During the contract each contractor’s Risk Register shall be updated monthly and submitted to the PMT in hard copy and electronic formats. The risks identified by the contractor shall be integrated into the CHSTP Risk Register.

The Contractor’s Risk Management process shall ensure that as far as is reasonably practicable:

- All risks are identified

- Judgments are made as to risk importance
- Risk exposure is reduced to acceptable levels
- Risk control measures are assessed against cost benefit as appropriate
- Control measures are reviewed and managed until close out

For the top “critical” risks from the Risk Register each contractor shall provide a narrative for each Critical risk identified in this category section and the mitigation plan proposed. Safety hazards and security vulnerabilities will be treated as separate categories of risk, and will be classified as Critical depending on specific site conditions.

9.0 STATE SAFETY OVERSIGHT REGULATIONS

9.1 Applicability

The California High-Speed Train Project does not fall under the Federal Transit Administration applicability regulations for State Safety Oversight, described in 49 CFR 659. As such, this section does not apply. The Federal Railroad Administration has authority for oversight of safety regulations.

10.0 COORDINATION WITH FEDERAL RAILROAD ADMINISTRATION

10.1 Activities

The California High-Speed Train Project will design and construct a railroad system that is regulated by the Federal Railroad Administration. FRA regulation is by directive under the United States Department of Transportation.

Effective on the date the Railroad begins revenue operations, the following generally applicable federal railroad safety regulations from Title 49, Code of Federal Regulations, and any amendments thereto are made applicable to the CHSTP, except where the CHSTP is granted relief through an FRA waiver.

- Part 207, Railroad Police Officers
- Part 209, Railroad Safety Enforcement Procedures
- Part 210, Railroad Noise Emission Compliance Regulations
- Part 211, Rules of Practice
- Part 212, State Safety Participation Regulations
- Part 213, Track Safety Standards
- Part 214, Railroad Workplace Safety
- Part 215, Freight Car Safety Standards
- Part 216, Special Notice and Emergency Order Procedures
- Part 217, Railroad Operating Rules
- Part 218, Railroad Operating Practices
- Part 219, Control of Alcohol and Drug Use
- Part 220, Railroad Communications
- Part 221, Rear End Marking Device
- Part 222, Use of Locomotive Horns at Public highway-Rail Grade Crossings
- Part 225, Railroad Accidents / Incidents: Reports, Classification and Investigations
- Part 227, Occupational Noise Exposure
- Part 228, Hours of Service of Railroad Employees
- Part 229, Railroad Locomotive Safety Standards
- Part 231, Railroad Safety Appliance Standards
- Part 232, Brake System Safety Standards
- Part 233, Signal Systems Reporting Requirements
- Part 235, Instructions Governing Applications for Approval of a Discontinuance
- Part 236, Rules, Standards and Instructions Governing the Installation, Inspection, Maintenance and Repair of Signal and Train Control Systems, Devices, and Appliances
- Part 237, Bridge Safety Standards
- Part 238, Passenger Equipment Safety Standards

- Part 239, Passenger Train Emergency Preparedness
- Part 240, Qualification and Certification of Locomotive Engineers
- Part 242, Passenger Train System Safety Plans

The CHSTP will submit to the FRA any plans, programs, and procedures that affect the safe operation of the system, or which are required to demonstrate compliance with the applicable regulations.

Throughout Preliminary Engineering and Final Design phases the CHSTP will communicate with FRA to assure knowledge of the system as it is developed. CHSTP will maintain regular contact with FRA during development of operating rules, training of maintenance and operating personnel and development of operating practices prior to the start of revenue service.

As detailed in Section 7.0 of this SSMP the CHSTP will manage a safety and security certification program to record and demonstrate that all safety and security requirements for the project are identified and integrated into the final system.

10.2 Implementation

The CHSTP, through the Program Management Team, will maintain communications with the FRA representatives throughout the Planning, Preliminary Engineering, Final Design, Construction, and Testing and Start-up phases.

10.3 Coordination Process

Interface and coordination with FRA will be conducted through the Program Management Team (PMT). The PMT will designate those persons authorized to interface with agents of the FRA to assure that information and decisions communicated between CHSTP and FRA are consistent, correct and authorized.

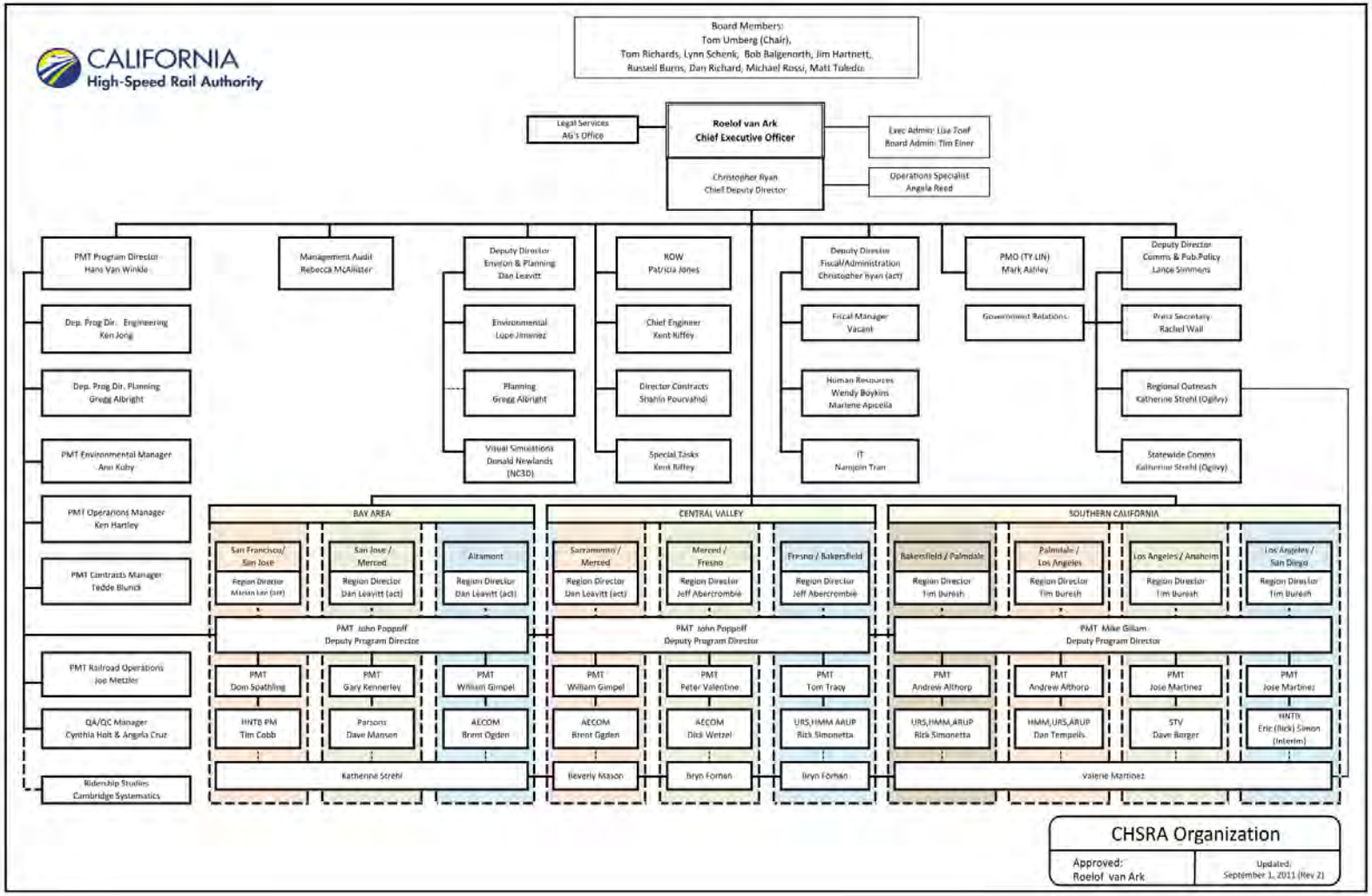
The FRA will provide guidance to the PMT with regard to applicable regulations, documents that will require formal submission and approval, and how any variances may be processed.

11.0 DEPARTMENT OF HOMELAND SECURITY COORDINATION

There are currently no DHS requirements or security directives that have been issued by the Transportation Security Administration (TSA) applicable to new builds, and particularly high-speed rail. The Authority will develop a Security and Emergency Preparedness Plan (SEPP) prior to revenue operation. The SEPP will fulfill DHS/TSA requirements for an operating railroad, which include development of an SEPP, and designating a primary and alternate Security Coordinator and providing TSA with names and contact information for 24 hour/7 days per week availability. The Security Coordinator will have a direct reporting relationship to the Authority Chief Executive Officer regarding matters of security.

The Authority has established liaison with the TSA Mass Transit and Rail Department through the project's lead security consultant who reports directly to the project operations manager. This liaison has been established to ensure all DHS/TSA requirements will be met once the project is complete, and to stay current with all security concerns, threats, best practices and developing security regulations that affect rail security.

APPENDIX A – CALIFORNIA HIGH-SPEED RAIL AUTHORITY ORGANIZATIONAL CHART



APPENDIX B – CHSTP CONSTRUCTION SAFETY PROGRAM REQUIREMENTS

1. CHSTP Construction Safety and Security Program

1.1 Program Goals and Objectives

The Construction Safety Program is established by the California High-Speed Rail Authority (Authority) to implement safety initiatives associated with the construction of the California High Speed Train Project (CHSTP) and all other construction, repair, maintenance, and related services required by the Authority. The Construction Safety Program applies to all persons or entities involved in the warranty service of the post-construction California High-Speed Train Project, including but not limited to the Authority and Program Management Team personnel, and warranty service Contractors (prime contractors and subcontractors).

Construction Safety and Security Program goals are as follows:

- Prevent personal injuries and property damage or loss
- Provide safe and secure work environment for employees, contractors, passengers, emergency responders, and the public at large
- To convey the CHSTP Safety and Security Policy Statement to all warranty service Contractors and sub-contractors
- To ensure compliance with the stated objectives and requirements contained in the CHSTP Safety and Security Policy Statement; Contractor's Site-Specific Health and Safety Plan (SSHASP); contract provisions; applicable federal, state and local laws and regulations; and industry consensus standards
- To identify specific requirements for the Warranty service Contractors' workplace safety and security programs
- To identify a process for Authority approval of the SSHASP and SSSP submittals.

The effectiveness of the Construction Safety Program depends upon active participation, cooperation, and compliance by Authority staff, Authority's Program Management Team (PMT) staff, and Contractors (and sub-contractors) project managers, superintendents, supervisors, and employees. Direct coordination with and between all parties is essential to the successful application of the following objectives:

- Plan and execute all Work to prevent personal injury, property damage or loss
- Comply with federal, state, and local laws, ordinances, regulations, industry consensus standards; and Authority and contractor regulations, policies, procedures, and requirements
- Implement and maintain a system of prompt identification and correction/abatement of unsafe and unhealthy practices and conditions

- Implementation and maintain a system of prompt detection and reporting of security breaches, incidents of conditions.
- Prompt notification and investigation of all incidents of injury, damage, or near-miss incidents to determine causes and take necessary corrective action
- Establish and conduct an educational program to stimulate and maintain the interest and cooperation of all employees through safety and security meetings and training programs
- Proper utilization of Personal Protective Equipment and all required safety equipment/devices
- Employ capable/competent personnel and develop processes providing safe and secure working environments for the construction work force, management facilities, the affected public, and private businesses and their properties
- Establish and maintain a comprehensive security program encompassing personnel, facility, and site management in conjunction with emergency planning and response procedures

1.2 California High-Speed Rail Authority Responsibilities

The California High-Speed Rail Authority is responsible for ensuring that the CHSTP is designed, built, tested, and placed into revenue service in a safe and secure manner. To that end, the Authority is responsible for the following:

- Formulation and implementation of acceptable policies, processes, work practices, and standards to promote the goals of the safety and security program.
- Compliance with existing federal, state, and municipal statutory and regulatory safety and health laws, standards, codes, regulations, etc.

The Authority shall provide oversight and guidance with respect to the application and enforcement of the CHSTP Safety and Security Policy Statement (Section 1.25.1 of this contract section). The Authority shall audit the Contractor's activities and documentation to ensure compliance with the CHSTP Safety and Security Policy Statement and the approved Site-Specific Health and Safety Plan. The Authority may choose to delegate oversight responsibility for safety and security to a Program Management Team. Reference to the "Authority" in this contract section includes the Authority's Program Management Team or other designated representative.

1.3 Contractor Responsibilities

The Contractor is responsible for ensuring safety and security at all of its work sites, including the activities of subcontractors. Safety and security management and enforcement for each contract shall be administered by employees (direct hire) of the Contractor. This responsibility shall not be delegated nor contracted out to subcontractors, suppliers, consultant service/company, or any other persons/agency without written approval from the Authority. In compliance with these provisions, the Contractor shall perform the following:

- Perform a Job Hazard Analysis (JHA) for each job assignment within the scope of the contract for which a person may be exposed to incidents of injury or illness. JHAs previously performed by the Contractor will be acceptable for use in determining preventative measures if the scope and functionality of the jobs under review are justifiably the same. The previously-performed JHAs, however, must address the specific characteristics of each site and tasks performed within the project scope. JHAs shall be documented in electronic format and available for review by the Authority at any time.

- Develop a Site-Specific Health and Safety Plan (SSHASP) which shall address field work-related hazards and mitigation measures. The SSHASP must:

  - Consider all work to be performed by the Contractor (including any activities subcontracted);
  - Conform to the Contractor's corporate work site health and safety program;
  - Conform to applicable workplace safety regulations including but not limited to California Code of Regulations Title 8 Construction Safety Orders, Federal Railroad Administration regulations as found at 49CFR214, 49CFR219, 49CFR225, 49CFR228, 49CFR236, CPUC General Orders, Federal and State OSHA regulations; and,
  - Meet the SSHASP element requirements identified in Section 1.25.4.4 of this document
- Develop a Site-Specific Security Plan (SSSP) which shall address field work-related threats/vulnerabilities and mitigation measures. This plan must:

  - Consider all work to be performed by the Contractor (including any activities subcontracted);
  - Conform to the Contractor's corporate work site security program; and,
  - Meet the element requirements identified in Section 2.2 of this document
- Plan and execute all work in compliance with the stated objectives and requirements contained in the *CHSTP Safety and Security Policy Statement*; Contractor's SSHASP and SSSP; contract provisions; applicable federal, state and local laws, regulations; and industry consensus standards

- Ensure all subcontractors, suppliers, etc. are provided with a copy of the *CHSTP Safety and Security Policy Statement*, and Contractor's SSHASP and SSSP, and are properly informed of their obligations with regards to compliance.

- Participate in and support applicable safety and security certification processes as identified in Section 1.25.5 of this contract.

- Designate one or more persons as the safety and security representatives responsible to ensure the proper implementation of the SSHASP and SSSP respectively. Identify the response plan for the representative(s) and reporting responsibilities. The representatives will have sufficient knowledge and experience to demonstrate competency for applicable subject matter. The minimum qualifications shall be five years of diversified construction health and safety experience, 30 hour OSHA outreach Construction Training card, competent person training certifications for trenching and excavations, confined space entry and rescue (as applicable), tunnel construction and ventilation (as applicable), fall protection, certification as a Construction Health and Safety Technician (CHST), Certified Safety Professional (CSP), or Certified Industrial Hygienist (CIH), and two years experience related to the Contract scope of work. The qualifications of proposed safety and security representatives shall be submitted to the Authority for review and approval 30 days prior to field work taking place.

- The contractor shall be responsible for obtaining permits from the California Division of Occupational Safety for the following:

  - Erection or demolition of any building, falsework, scaffolding, or structure the equivalent 25 feet or higher.
  - Performing any work related to hazardous materials.
  - Performing any work subject to Cal/OSHA Tunnel Safety Orders.

  Permits will be kept on file at the work site and available for immediate review upon request by the Authority.

- For any engineering or construction equipment (such as drills, cranes, concrete pump trucks, back hoes, and the like) that could encroach into the operating right-of-way of other railroads, the Contractor shall comply with the requirements of the other railroads including obtaining permits and taking the necessary precautions to be taken to preclude any accidental encroachment of the right-of-way. Encroachment shall be as defined by the other railroads and may include equipment such as cranes which could swing into or fall into the right-of-way. The Contractor will comply with the safety requirements specified by the adjacent railroad for work in and adjacent to other railroad's rights-of-way.

- For any engineering or construction equipment (such as drills, cranes, concrete pump trucks, back hoes, and the like) that could encroach into operating public right-of-way, such as streets and highways, the Contractor shall submit and obtain Authority Representative's approval and approval from local authorities having jurisdiction over the public right-of-way of a plan describing the use of such equipment and the precautions to be taken to preclude any accidental encroachment to the operating right-of-way. Encroachment shall be understood to include equipment such as cranes which could swing into or fall into the public operating right-of-way. The Contractor shall comply with the safety requirements of the local authorities having jurisdiction over the operating right-of-way for work in and adjacent to that right-of-way.

1.4 Site-Specific Health and Safety Plan Elements

The safety processes, equipment utilized, and personnel assignments to be provided by the Contractor at each work site may differ based upon a site-specific Job Hazard Analysis (JHA) performed by the Contractor. The Site-Specific Health and Safety Plan shall include, but not be limited to, the following elements:

- Safety and security policy statement
- Identification of the makeup, reporting structure, and inter-action processes of the Contractor's Site Warranty Service Team, including the Contractor's Safety Manager, with the rest of the project work force (including sub-contractors and the Authority), and with third-parties such as emergency responders, utilities, and adjacent railroad operators
- Identification of roles and responsibilities of all employees for the Contractor and subcontractors with respect to safety
- Process for managing hazards or incident of injury or damage through identification, reporting, and correction or abatement or mitigation, including descriptions for processes and applicability of Job Hazard Analyses

- Procedures for work site safety audits and inspections, including assignment of responsibility, frequency, documentation method, and actions following various audit results
- Employee communication program that identifies individual responsibilities for all employees, schedules for specific communication techniques, and a process for recording and tracking communication program performance. The employee communication program will include but not be limited to:
  - Job briefing procedures/requirements
  - Hazard communications (HazComm)
  - Employee safety committees
  - Project safety committees
  - Notification to employees and the Authority of incidents or hazards when identified
- Site-specific workplace health and safety rules and procedures that conform to regulatory requirements of local, state, and federal occupational safety and health regulations, including but not limited to California Code of Regulations Title 8 Construction Safety Orders, Federal Railroad Administration regulations 49 CFR 200-299, California MUTCD, the Contractor's corporate safety plan, and the CHSTP Safety and Security Policy Statement. Rules and procedures must address site-specific work activities and conditions including but not limited to:
  - Personal protective equipment for all work site hazards and conditions, including equipment issuance/availability procedures.
  - Mobile equipment operation procedures and training program, including qualification process and requirements, and performance observation/evaluation requirements.
  - Fall protection and scaffolding procedures, including minimum fall protection equipment requirements, a process for training workers, and performance observation/evaluation requirements.
  - Motor vehicle operation program, including rules and procedures for specific equipment to be used at the work site (including industrial lift trucks), operator screening and qualification process and requirements, and performance observation/evaluation requirements.
  - Roadway worker protection (on-track safety) for Authority right-of-way in compliance with FRA regulations contained in 49 CFR Part 214.
  - Hazardous materials handling and storage plan specific to each work site, including a plan for cataloguing Material Safety Data Sheets and submitting same to the Authority, and for communicating MSDS information to employees.
  - Lockout/tagout programs for all applicable energy sources, including but not limited to electrical, hydraulic, and kinetic.
  - Fire prevention and suppression plan, including procedures for identification of hazards that could lead to fire, procedures for local fire suppression and notification to authorities, inspection processes, and a detailed training and exercise program.

- Safety and security program training requirements and documentation including training curriculum, frequencies of and method of delivery for training, training records and lists of qualified/competent persons for specific tasks.
- Roadway worker protection for adjacent railroad right-of-ways. Employees working in these locations shall be trained by the Contractors to ensure they become fully familiar with railway operations, procedures, rules, and safety requirements; and a daily Jobsite Hazard Analysis (JHA) shall be conducted.

- A plan for coordinating roadway worker protection activities and compliance with adjacent railroads. All Contractors working in the shared corridor will meet frequently with the responsible representatives of the operating railway and coordinate activities to minimize risks and hazards to Contractor personnel, and to avoid hazards or disruptions to the operation of the railway.
- Work site first-aid resources and a training program for employees.
- An Emergency Response Plan for management of emergency situations associated with, but not limited to, the following: injury to an employee or member of the public; fire; flood; earthquake; property damage and damage to various utilities (such as, electrical, gas, sewage, water, telephone or public roadways); public demonstrations; acts of sabotage including threats of sabotage; hazardous materials encountered; toxic spills; explosions; vehicular accidents; and confined space rescues. The Emergency Response Plan shall be updated when conditions or procedures change. The Emergency Response Plan shall include the following: items, at minimum:
  - Identification of the person responsible for handling an emergency.
  - Establishment of teams for handling each type of emergency.
  - Identification of the person responsible for making emergency call (preferably the ranking Supervisor present).
  - The requirement to conspicuously post a list of an emergency phone numbers, along with information to be transmitted. Include with the emergency phone numbers, the number of the Authority representative to be contacted. Request telephone number and name of Authority contact person or persons from the Authority Representative.
  - Trench and confined space rescue plan or tunnel evacuation plan, as applicable.
  - The procedure for contacting the Authority Representative when an incident of emergency response occurs.
  - Scene management for the emergency response including procedures for ensuring the safety of employees and emergency responders, safeguarding the scene from unwanted entry, and handling on-scene media.
- A plan for ensuring public safety at work sites and avoiding damage to public property. The public shall be considered as any persons and property not employed

or owned by the Contractor or its Subcontractors. The plan must address site-specific work activities and conditions including but not limited to:

- Identification of potential hazards to the public
- Erection and proper warranty service at all times of all necessary safeguards for the protection of the public, including pedestrian and vehicle traffic, and the assignment of trained and competent flaggers whose sole duties shall consist of directing the movement of public traffic through or around the Work site
- Posting of signs warning against the hazards created by warranty service activities
- Elimination of unnecessary noise, obstructions, and other annoyances to nearby residents and businesses
- Procedures and competency training for employees assigned to public safety and public property protection
- Designated work zones. Work outside of the designated work zones shall be performed only when specifically stated in writing from the Authority Representative.

- Other elements that conform to the Contractor's corporate health and safety plan.

1.5 Site-Specific Security Plan Elements

Security at construction sites is to ensure all personnel working at the site, and the surrounding communities, are protected from crime and security-related conditions. This includes protection of materials, tools, equipment and personal property of workers at sites. Each construction site will vary, from type of equipment, machinery, materials and tools to adjacent public and private areas and local zoning ordinances. The types of security to be provided by the Contractor at each construction site may differ based upon a site-specific security assessment performed by the Contractor. The Site-Specific Security Plan shall include, but not be limited to, the following elements:

- Safety and security policy statement
- Identification of the makeup, reporting structure, and inter-action processes of the Contractor's Project Management Team, including the Contractor's Security Management Team, with the rest of the project work force (including sub-contractors and the Authority) and with third-parties such as local law enforcement agencies.
- Identification of roles and responsibilities of all employees for the Contractor and subcontractors with respect to security.
- Protection of the public and property, materials, equipment and tools through the use of fencing, access control, locks, alarms, intrusion detection, lighting, and security guards as necessary, and any other security requirements that may be applicable.
- Personnel security program including employee background requirements, a code of conduct and expectations for employee behavior, and procedures for internal and external notification when personnel security is violated.

- Access control program to identify authorized persons for each work site, procedures for authorizing new employees or visitors, and procedures for monitoring access control performance.
- Plan for coordination with local law enforcement for incident reporting, traffic control and other security related conditions or events.
- Other elements that conform to the Contractor's corporate security plan.

California High-Speed Train Project

Request for Proposal for Design-Build Services

RFP No.: HSR 11-16
Aesthetic Guidelines for Non-Station Structures

03/07/2012 RFP HSR 11-16

Prepared for

CALIFORNIA High-Speed Rail Authority

California High-Speed Train Project

TECHNICAL MEMORANDUM

Aesthetic Guidelines for Non-Station Structures
TM 200.06

Prepared by:	*Signed document on file* Gary Newgard, AIA	03 Nov 11 Date
Checked by:	*Signed document on file* Douglas Frazier, AIA	03 Nov 11 Date
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Released by:	*Signed document on file* Hans Van Winkle, Program Director	12/5/2011 Date
Reviewed by:	*Signed document on file* Michael D. Lewis, PE Project Management Oversight	12/2/2011 Date
Reviewed by:	*Signed document on file* Roelof van Ark, Chief Executive Officer	12/15/2011 Date

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ABSTRACT

This memorandum provides a preliminary system-wide description of aesthetic standards for California High-Speed Train Project (CHSTP) non-station structures, including:

- HST Aerial Structures
- HST Bridges and Overpasses
- Tunnel Portals
- Retaining Walls
- Sound Barriers (or "Walls")

Many of the visual design principles established for CHSTP stations apply to other essential structures. Designers shall consider the visual quality of structures concurrent with technical and functional quality. Station aesthetics are addressed in a separate document.

HST aerial structure aesthetics address site influences, horizontal and vertical components, detailing and integration of systems elements. Key aesthetic concerns for HST bridges and overpasses include proportion and context, site factors, structural conditions and design approach as either a functional or iconic aesthetic solution. HST bridges and overpasses addressed include railway and pedestrian types.

Other structures requiring aesthetic attention from the outset of design include tunnel portals and retaining walls. Both are addressed in this document.

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1.0 INTRODUCTION

This document provides aesthetic guidance for the planning, design, detailing, material selection and construction of structural elements including HST aerial structures, HST bridges and overpasses, tunnel portals and retaining walls. Design of these elements will require collaboration between planners, engineers, architects and community stakeholders in order to ensure consistently high aesthetic standards for structures.

Aesthetics is a discipline concerned with the visual quality of the objects which we view. It studies the ways in which people see and perceive the world around us, particularly with regard to the creation and appreciation of beauty. It is not an objective science; judgments of aesthetic value are relative and dependent upon "the eye of the beholder"; his or her sense of "taste". Still, when a building or structure is viewed, it can display a character which is generally classifiable on a subjective scale of aesthetic quality, from low to high.

1.1 PURPOSE OF TECHNICAL MEMORANDUM

It is the intent of this document to establish principles which will guide designers toward an appropriate level of aesthetic quality while satisfying the Project's functional and budgetary requirements. HST bridge and overpasses, HST aerial structures and other structural elements are not merely utilitarian building components; their aesthetic quality must be considered early in design. Aesthetic character should be integral to the concept and detailing of structures and should not be an afterthought.

The settings into which HST structures will be introduced will be widely diverse, from high-density urban environments to unpopulated, rural places. Structural aesthetics therefore must be responsive to these settings with concern for human scale, building scale (present and future), and the vantage points from which the structures will be viewed.

These guidelines are not intended to prescribe a particular design approach for structural elements. Rather, the guidelines herein allow for contextual design responses to site-specific or unique conditions ("context-sensitive solutions") while ensuring the design objectives are satisfied.

1.2 STATEMENT OF TECHNICAL ISSUE

The following aesthetic principles apply to CHSTP structures:

1. The design principles for stations will be the foundation for aesthetic quality of non-station structures. These include:
   - **Design Excellence.** Pursue the highest visual quality.
   - **Sustainability.** Prioritize energy savings and environmental friendliness.
   - **Art Integration.** Take opportunities to integrate artistic expression into structure.
   - **Cost Effectiveness.** Use performance standards and life-cycle costing to deliver value.
   - **Contribution to Communities.** Enhance local environments and community context.
   - **Preservation of Historic Structures of Value.** Preserve structures of lasting value.
2. Structures should be conceived, designed, detailed and constructed with an emphasis on aesthetic character and visual harmony with the surrounding environment while satisfying primary functional and engineering requirements.
3. Civil works, systems elements, and station design should be coordinated to ensure aesthetic consistency and continuity.
4. Aesthetic character should be an integral element of structural design, rendering surface treatments unnecessary. Finishes should only be necessary where structural material requires protection, i.e., steel structures. Where steel is selected as the primary structural material, coating colors should harmonize with adjacent structures and with the immediate setting.
5. Exposed pipes, ducts, cables, etc. should be minimized. Where these elements are unavoidable, they should be concealed in recesses or with coordinated covers.

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6. Communities will coexist with CHSTP structures for generations and therefore should be partners in conceiving appropriate aesthetic character for these structures. As with stations, stakeholders shall be engaged early in the design process to establish an aesthetic vision for design of structures, including articulation of purpose, image, context and presence.

1.3 General Information

1.3.1 Definition of Terms

Acronyms/Abbreviations

Authority	California High-Speed Rail Authority
CEQA	California Environmental Quality Act
CHSTP	California High-Speed Train Project
CPTED	Crime Prevention through Environmental Design
EIR/EIS	Environmental Impact Report/Environmental Impact Statement
HSR	High-Speed Rail
HST	High-Speed Train
MSE	Mechanically Stabilized Earth
OCS	Overhead Contact System
PMT	Program Management Team
ROW	Right of Way
TM	Technical Memorandum

2.0 DEFINITION OF TECHNICAL TOPIC

2.1 General

2.1.1 CHSTP Design Considerations

This document provides aesthetic guidance for the planning, design, detailing, material selection and construction of structural elements including HST aerial structures, HST bridges and overpasses, tunnel portals and retaining walls. Design of these elements will require collaboration between planners, engineers, architects and community stakeholders in order to ensure consistently high aesthetic standards for structures.

2.1.2 Roles and Responsibilities

Although the primary purpose of this document is to establish principles to guide visual design decisions for CHSTP structural elements regardless of location, this document also establishes state-wide roles and responsibilities to enable collaborative aesthetic decisions, guide project delivery, and establish public outreach to communities throughout the entire HSR system.

2.2 Laws and Codes

None Applicable

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3.0 ASSESSMENT AND INVESTIGATION REQUIREMENTS

3.1 HST AERIAL STRUCTURES

3.1.1 General

Introduction

HST aerial structures will be perhaps the most frequently viewed of all CHSTP structures, occurring throughout the high-speed train system. It is important that these long, continuous structures harmonize visually with local environments and adjacent infrastructure. Viewed from a distance, continuous HST aerial structures may be a dominant feature upon the landscape in relation to other major man-made and natural features. Viewed close-up, HST aerial structures must be sensitive to pedestrian scale. They should therefore convey an attractive and harmonious composition of structure and architecture.

Sandstone Colored Concrete

Natural Grey Concrete

California High Speed Rail Aerial Structure Images

HST Aerial Structure Defined

A HST railway aerial structure is a continuous elevated trackway consisting of moderate-length and consistently-spaced segments spanning across obstacles such as roadways, railways, valleys, or water features. HST aerial structures may be distinguished from HST bridges and overpasses by their repetition, continuity and shorter spans whereas HST bridges and overpasses will likely be unique solutions to unique design conditions. Primary HST aerial structure components include columns and girders. Secondary components may include straddle bents, pocket tracks, sound barriers, and the overhead contact system (OCS).

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Spain HSR Aerial Structure

Taiwan HSR Aerial Structure

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3.1.2 Aesthetic Principles for HST Aerial Structures

General

HST aerial structures should exhibit appropriate scale, balance, symmetry, unity and proportion in aesthetic design, i.e., proportional relationships of height, width and thickness of structure should convey slenderness, strength and durability.

Aesthetic design of HST aerial structures should fit with, contribute to, be harmonized with and sensitive to the surrounding visual landscape. Where HST aerial structures go through previously undeveloped locations, thoughtful aesthetic design of structures, topography and vegetative restoration shall be a high priority.

Consistency and Unity

A. HST aerial structures should present a high level of project-wide aesthetic consistency and unity within regional contexts. HST aerial structures are to be attractive, expressing elegance in efficient structural design. Combining aesthetic design of HST aerial structures, landscape and urban design can create a positive contribution to the surrounding visual context. Unity of design strives for regional consistency while allowing local variation in HST aerial structure appearance, such as at stations and station approaches, or to address unique community contexts as described in these guidelines.

B. Consistent span lengths are desirable in order to establish a visual rhythm. Distances between columns or piers shall be optimized structurally and standardized visually to the

greatest extent possible with a typical span being approximately 100 - 120 feet.

C. Although span consistency is a system-wide aesthetic objective, resonant frequency must also be considered for long HST aerial structures. Span lengths for high-speed train structures generally cannot be constant over multiple spans for long distances due to harmonics, which can induce a resonance of the train and the structure and can affect structural performance and passenger comfort. This condition can typically be mitigated by including an odd span length to break the natural harmonics. A long HST aerial structure where typical spans are 100 feet should include two shorter 75 or 80 foot spans every 20 spans or thereabouts. The odd spans should not be common divisors of the typical spans (such as a pair of 50 feet spans).

French HSR

Japanese HSR

Consistent Spans and Column Sizes

Inconsistent Spans: Spain HSR

D. As tracks gradually ascend to clear existing structures, or as the level of the existing topography drops along the alignment, column size should not vary in cross sectional area within a series of spans until an appropriate landscape feature or HST structure (station, tunnel portal, abutment, etc.) provides an appropriate point of transition.

E. Design and construction teams shall coordinate points of design interfaces with adjacent contracts to ensure aesthetic consistency between construction segments. Significant changes in construction methods resulting in noticeable variations within a single series of HST aerial structure spans shall be avoided.

F. A series of girder spans should maintain a consistent cross sectional profile, even when varying spans might permit structural differences in girder depths. Abrupt changes in structural member sizes or proportions of HST aerial structures should be avoided.

G. Quality control of concrete batches and formwork shall be closely monitored to ensure visual consistency between segments.

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H. Particular attention shall be given to consistency of secondary elements visible from below, including soffits, finishes, drainage components and power/systems conduits.

I. As appropriate, CHSTP concrete structures should be identifiable by their use of consistent integral color. Three shades of color additive will be designated as acceptable concrete infrastructure colors.

Variability

HST aerial structure design should strive for regional consistency, yet respond to and respect distinctive local context. Elements of aesthetic design variability include span lengths, column height and shape, column capital vs. column flare, girder slope, overhang, taper, soffit, parapet height and sound wall. Similar to the station design process, there shall be a collaborative effort between designers and stakeholders to develop quality aesthetic design and mitigate visual impacts.

Taiwan HSR: Aerial Structure Variability (note varied columns, caps, girders, sound walls, etc)

Simplicity

HST aerial structures shall be visually uncomplicated and structurally efficient assemblies. Essential aesthetic quality should emanate from flowing line and proportion inherent in the primary structural elements.

Decorative elements, patterns, textures may be used on extensive flat surfaces to create shadow lines or to adjust or improve the perceived proportions of a HST aerial structure. Applied colors or textures that may require routine maintenance and/or replacement, are not recommended.

Construction Materials

Concrete structures are generally preferred over steel structures due to their cost, strength, low maintenance and inherent, almost limitless ability to be formed into shapes, curves, bevels, reveals and other architectural profiles. In some situations, steel elements may be preferred over concrete due to lighter weight and specific construction conditions such as constructing over operating railroads.

Artwork

Consistent with federal, state and local policies promoting the integration of art into public buildings and places, artistic expression can be integrated into CHSTP structures when appropriate and feasible in accordance with Authority policy on public art.

3.1.3 Site Factors

Integration into Urban Context

While HST aerial structure structures introduced into urban areas must satisfy their primary engineering function, they should also be designed with sensitivity to surrounding communities

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and businesses. Care should be exercised to avoid physically dividing communities and altering the character of neighborhoods. HST aerial structures and associated landscape and hardscape features should be judiciously placed, sized and detailed.

Sun and Shadow

Sun and shadow conditions will be altered by the introduction of HST aerial structures into the urban context. Portions of the community will be shaded by new structures. Consideration may be given to special spacing of HST aerial structure piers to reduce shadows at sensitive locations. Where wider trackways are required, such as at station approaches, individual girders may be considered to allow sunlight to penetrate between girder decks.

Preservation of Natural Rural Environments

In some cases, the greatest contributor to the aesthetic character of HST structures will be the surrounding natural environment. Therefore HST aerial structures which pass through undeveloped environments should be designed with sensitivity to this context. Preservation of natural character, habitat quality and migratory corridors will be priorities. Native vegetation should be restored in kind.

Utilization of Space Under HST Aerial Structures

Space underneath HST aerial structures located within the right-of-way can be usable for purposes unrelated to high-speed rail, per the Authority's policy on air-rights consistent with restrictions related to HST operations, maintenance and security. Appropriate uses under HST aerial structures are to be identified by Authority policy, such as active uses that enhance community quality of life, safety, accessibility, economic development, and/or other community serving uses.

Community Involvement

After a HST aerial structure profile is established during or following the environmental review process, communities may be invited to provide additional input on aesthetic design and/or use of public spaces underneath the HST aerial structure for public uses

3.1.4 Horizontal Components

Trackway Height

Where it is necessary for a HST aerial structure to pass over existing roadways, railways or other infrastructure, consideration may be given to providing clearance in excess of the minimum required. Views to and from existing buildings or natural features should be considered and an optimum height established which considers human scale, views and a recognition that higher HST aerial structures will typically be less imposing and oppressive than low HST aerial structures when viewed from street or ground level.

Low Clearance: Rome

High Clearance: Taiwan

Trackway Height

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Trackway Consistency

Alignment of adjacent horizontal units should be smooth and consistent. Where long sections of HST aerial structure are visible from a distance, straightness should not be interrupted with abrupt changes in elevation or curvature

Visual Inconsistency

Visual Consistency

Dubai Metro Aerial Structure

Trackway Width

The width of trackway structure supported by columns is a function of the number of tracks required for operation, track spacing, walkway and cable tray widths, and space for OCS poles and/or sound barriers, if required. The overall width of the combined trackway components should be kept to the project standard minimum in order to reduce the visual impact, shadow casting, and required right-of-way. Where trackways widen at approaches to stations, storage tracks or crossovers, the same principle applies to reduce the component width.

Box Girders

Each box girder section will typically support two running tracks, communications conduits, emergency walkways, OCS poles, and parapet walls. Box girders can be assembled side by side when more than two tracks are required. A positive, upward camber is generally the preferred profile for the bottom of long box girders.

A. Girder Shape: Box girder shape may significantly influence the perception of structural mass. Angling girder sides and soffits creates a deep shadow and reduces the perceived girder depth. Curving the girder sides and soffits eliminates sharp shadow lines and presents a softened appearance. The potential girder shapes illustrated below may be constructed in precast single spans, precast segmental or cast-in-place methods.

Potential HST Girder Shapes

Unique Box Girder Shapes

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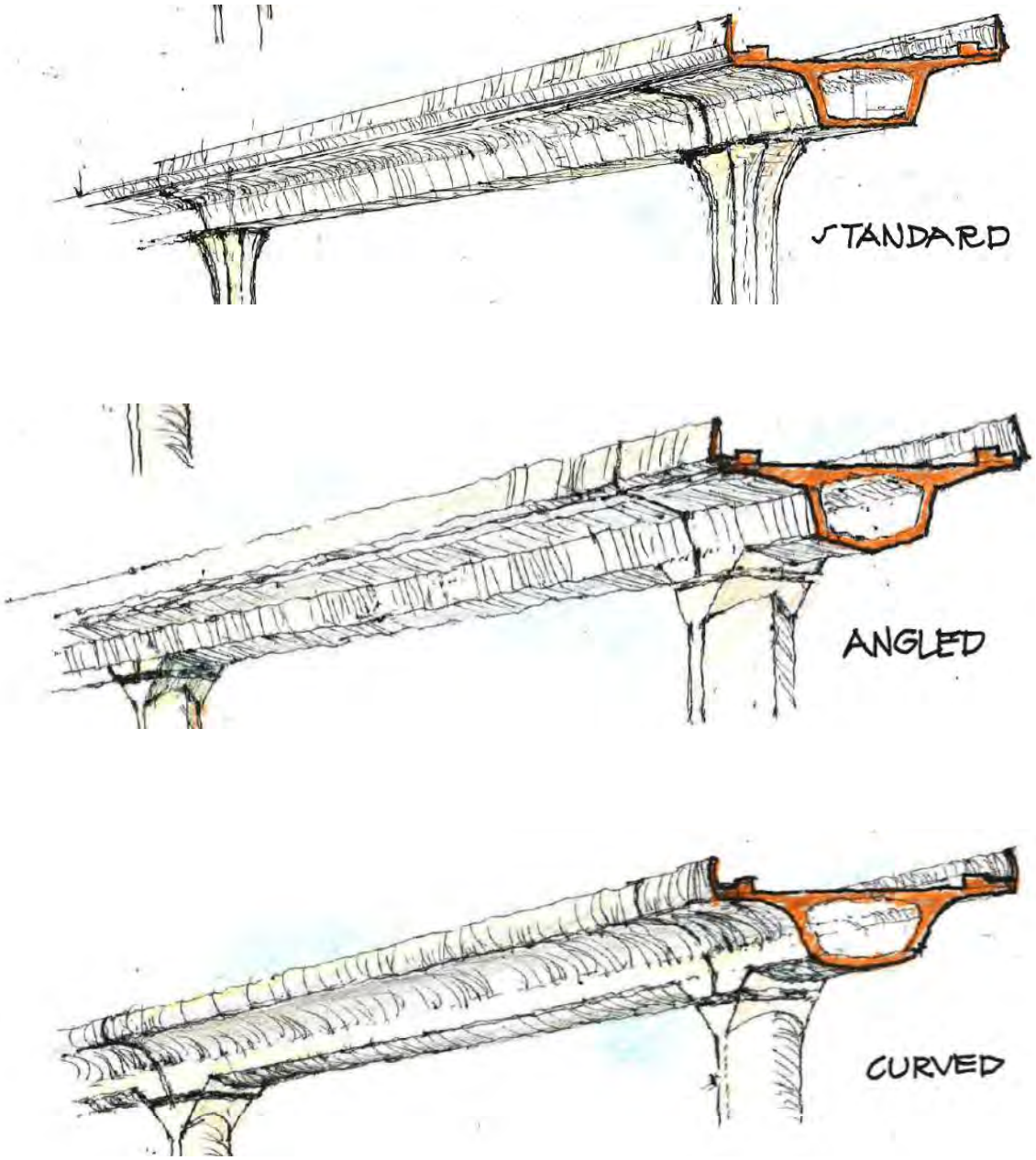

Girder and Column Coordination

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Spain HSR Box Girder

France HSR Box Girder

Box Girders

B. Girder Soffits: The undersides of HST aerial structure girders and projecting cantilevers, viewed from below, are often the most visible portions of structure. Transitions from the soffit of the box girder to the tapered sides and from the sides to the cantilever should be detailed to integrate a generous radius or transitional slope. Radiused or sloped corners, both inside and outside, provide a smooth transition between vertical and horizontal portions of the girders.

Particular attention should be given to the quality and consistency of concrete finish at the soffits of box girder sections within stations if girders are intended to remain exposed within the station.

Taiwan HSR

Korea HSR

Girder Soffits

Storage Tracks and Crossovers

Ideally, storage tracks should not occur on HST aerial structures. However where storage tracks are unavoidable on HST aerial structures, transition to a wider girder section should be smooth, long, and continuous. Crossovers in the running tracks should not require special HST aerial structure construction that would create inconsistency or aesthetic concerns.

Straddle Bents

Straddle bents are used where columns cannot be located under the guide way, such as highway and railroad crossings. These should be consistently detailed and aesthetically compatible with other standard HST aerial structure proportions, detailing and finishing. Avoid dissimilar or unrelated structural detailing.

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Composite Bent: Not Preferred

Integrated Bent: Preferred

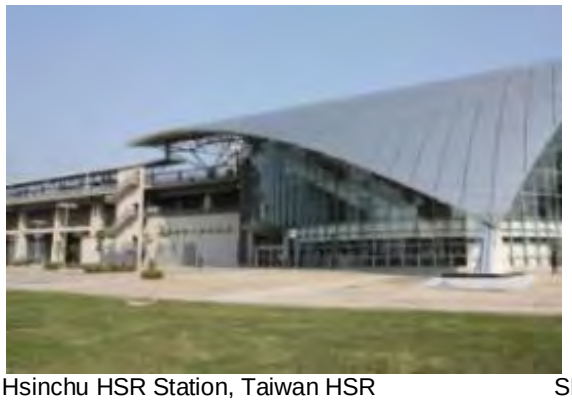
Straddle Bents

HST Aerial Station Structures

At elevated stations, HST aerial structures will run continuously from station approaches through the station. The majority of intermediate HST elevated stations will likely be configured with platform stopping tracks and side platforms outboard of center through-tracks. As such, the HST aerial structure can be considered a continuous structure through the station enclosed by an architectural envelope.

Shin-Aomori Station, Japan HSR

Station architecture and structures should be coordinated using standard modular dimensions in order to provide a consistency and economy of station finish materials. It may be appropriate to adjust typical HST aerial structure column spacing, size, and profile within the station zone in order to make interior columns within sight and touch of the public more suited to human scale. It may also be advantageous to raise track profile columns slightly to allow adequate height for a mezzanine or to achieve a sense of volume within station public areas.



Hsinchu HSR Station, Taiwan HSR

Shin-Tosu HSR Station, Japan HSR

Aerial Structure Column Interface with Station

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HST aerial structure columns within station interior public areas should be sized, shaped and located to avoid creating obstructions to passenger flow and with regard for aesthetic unity.

Hsinchu HSR Station, Taiwan HSR

Taichung HSR Station, Taiwan HSR

Aerial Structure Column Interior Placement

3.1.5 Vertical Components

Columns/Piers

A. Shape: Columns for support of trackway HST aerial structures may be round, oblong, square, or rectangular in cross section. Within populated areas however, round or oblong columns are preferred to meet Crime Prevention through Environmental Design (CPTED) safety recommendations and to optimize seismic detailing. Column design and detailing should display consistency which identifies the structures as components of the CHSTP.

Potential Column Cross Sections

Oblong piers, Taiwan HSR

Round Columns, Korea HSR

Column Shape

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B. Proportion: Column width and height should be structurally optimized to accommodate existing site conditions and for economy. However, there may be cases where the columns should be oversized in order to improve the proportion of height to thickness; i.e., a tall column may be deliberately thickened in order to improve the proportion of thickness to height and thereby improving its perceived strength.

C. Multiple Columns: Single columns spaced at a consistent distance are preferred over pairs of columns. However multiple columns may be appropriate at specific locations.

Multiple columns: Ruyff Valley Aerial Structure, Belgian HSR

D. Column Flare: Column profiles may be flared out at the top for a more graceful transition to the column capital or beam.

Spain HSR

Meuse, France HSR

Flared piers

E. Patterns: In urban areas, columns may be finished with cast-in patterns and textures that recognize local preferences and/or historical characteristics.

Phoenix Light Rail

Texas Highway

Patterns and Textures

03/07/2012 RFP HSR 11-16

F. Column Caps: Caps may or may not be utilized depending on the aesthetic approach selected. However, the preferred approach is to reduce the number of structural elements within the HST aerial structure unit to achieve clean visual lines, i.e., elimination of column caps as separate structural elements where structurally feasible. The interface between column and box girder is an important aesthetic detail warranting attention and coordination.

Preferred

Not Preferred

Column Caps

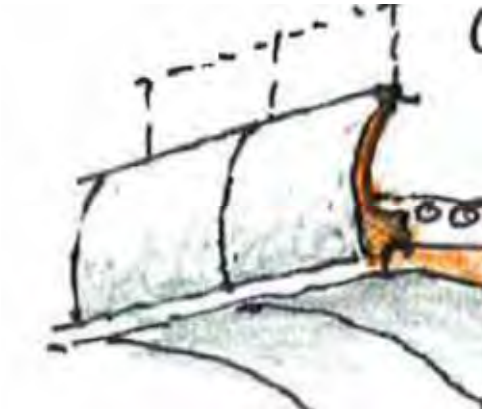
Sound Walls

Train noise may be dampened by continuous vertical sound walls attached at the exterior edges of HST aerial structures or located along the right-of-way to be closer to the noise receptor. These walls shall be as high as required to mitigate noise (at locations where a mitigation need has been identified) while remaining sensitive to the passengers' preference for a low wall to allow views. Although low walls are minor structural elements, they influence the overall appearance of the HST aerial structure assembly and should be detailed with aesthetic care.

The shape of parapet walls shall be appropriate for the girder shape, with consistently spaced joints. Changes in wall shape should only occur at major structural transitions (HST aerial structure to grade, HST aerial structure to tunnel portal, etc).

Where sound mitigation necessitates high walls which obstruct passenger views, transparent noise barriers may be considered, combining a metal framing system with glass or other transparent material.

Sound Wall/ Parapet for Angled Girder



Sound Wall/ Parapet for Curved Girder

External Sound Wall/ Parapet

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Solid

Transparent

External Sound Walls

Sound walls can significantly influence the overall proportions of a section of HST aerial structure. The continuous vertical surface areas of sound barriers provide an opportunity to integrate aesthetic surface treatments where walls face urban areas.

Where sound walls occur near or within stations, integral patterns may be considered for inward-facing vertical surfaces for viewing by passengers on platforms.

Taiwan HSR

Korea HSR

Internal Sound Walls

Security/Safety Barriers

Vertical barriers along trackways will be highly visible components and should present a simple but studied exterior and interior appearance. Typical safety barriers along running trackways should be simple guardrails to satisfy statutory life safety requirements for railings. In areas where the safety barrier is a solid material such as concrete, the exterior (and interior where appropriate) surface may be detailed with integral patterns and textures similar to sound walls.

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Korea HSR

Spain HSR

Security/Safety Barriers

Access/Egress Stairs

HST aerial structures may require stairs to provide emergency egress or maintenance access. These stairs will be visible in both rural and urban areas. Stairs in urban areas should be designed as essential HST aerial structures first and second as opportunities for expression of functional sculpture. Existing urban context can also provide opportunities for expression of local identity and compatibility.

As potential access points to the trackway, unauthorized access to these stairs must be prevented through use of fences and lockable gates which combine security with aesthetically appropriate fence design.

Aerial Structure Stairs: Taiwan HSR

3.1.6 Aesthetic Detailing

Purposes

Structures should integrate aesthetic detailing where exposed to public view. HST aerial structures are often repetitive and continuous structures and their aesthetic qualities may be accentuated by detailing with reveals, patterns, curves, chamfers, and accentuated joints to create shadow lines. This detailing may be vertical, horizontal, circumferential, and projected or recessed in order to convey a sense of depth and visual character.

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Patterns and Shadow Lines

Vertical reveals or patterns are preferred over horizontal; vertical articulation will generally retain less dust and dirt and therefore will cause less staining resulting from rainfall.

Long, continuous vertical elements such as parapets and sound barriers are desirable locations for integration of patterns, reveals, or other aesthetic detailing. In urban locations close to stations, patterns or bas-reliefs may be integrated into vertical elements in order to satisfy art integration principles and requirements.

San Francisco BART: Wall Pattern and Line

Korea HSR: Sound Barriers

Concrete Pattern and Texture

Fencing

Fence context will heavily influence selection of fence materials and detailing; fences in highly visible or aesthetically sensitive locations shall be designed to a higher level of care and quality than low-visibility fencing.

3.1.7 Site Considerations

Community Collaboration

Use of land underneath elevated HST structures will be determined collaboratively by the Authority and the community/region through which the structure passes. The standard approach to site use will be to reinstate the land to its use prior to HST construction. However, alternative uses may be considered based on technical and economical feasibility, including landscaping, parks, public artwork, roadways, parking, utility stations or other uses as deemed acceptable by the Authority.

Public space beneath elevated structures should promote public safety and attractiveness, contributing to the aesthetic quality of the community/region. Pedestrian and bicycle access routes shall be maintained or reinstated.

Landscaping Beneath HST Aerial Structures

A. General: Landscaping may be used to soften the presence of HST structures in urban and rural environments and reduce the apparent scale of elevated structures. Plantings selected shall be consistent with native and prevalent local species. Landscaping may be utilized to create visual interest for pedestrians and bicyclists. Drought-resistant plants shall be selected wherever reasonable. Landscaping may be a deterrent to graffiti on HST structures. Aesthetic design shall consider provision of adequate right-of-way for landscape screen plantings.

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B. Urban Areas: Plantings may be used in urban locations to visually integrate HST infrastructure into the local context and create visual unity in highly visible locations. Plantings can introduce color and texture and become a visual focus in the foreground to filter views of HST structures. Pocket parks may be introduced under HST aerial structures to create recreational opportunities. Rows of tall, closely-spaced street trees may also screen HST structures from public view in visually sensitive neighborhoods.

C. Rural Areas: Plantings in rural locations, including agricultural and open space shall recreate the natural setting into which HST structures are constructed.

Maintenance

Plantings shall be selected for low maintenance wherever reasonable. Responsibility for maintenance of space beneath HST elevated structures will be as described in section 3.5.

Urban Landscaping: pocket park

Rural Landscaping

Landscaping Beneath Aerial Structures

Public Artwork

Consistent with federal, state and local policies promoting the integration of art into public buildings and places, artistic expression should be integrated into CHSTP structures when appropriate and feasible. Space may be identified by the Regional Consultants and the community for introduction of artwork underneath HST aerial structures. Candidate locations for artwork shall have high potential for public visibility and public use. Artwork should enhance and reflect the unique character of the surrounding neighborhood or geographical region. Artwork may be freestanding or attached to HST facilities.

The Authority will engage with communities to establish a budget for public art appropriate for the HST project and consistent with state and national policies. Refer to section 3.5 Roles and Responsibilities for further information.

3.1.8 Systems Integration

OCS Supports

The overhead contact (catenary) system (OCS) will comprise a significant visual presence along the entire length of the CHST. Although the OCS function mandates rigid geometric standards in relation to the HST vehicles, the steel OCS supports may be shaped or configured in a way which reduces or enhances their visual impact. Where station configuration allows, the OCS may be suspended from overhead station superstructure which will allow elimination of standard OCS poles along the platform length.

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Conduit Integration

Where trackside power and communications cables enter the station zone or rise from ground level to HST aerial structure level, cables should be integrated into the structural system. Cables and ducts should not be mounted to structural members without prior aesthetic planning. Exposed cable trays and duct banks should be either recessed into structural members or covered with appropriately coordinated, removable cover plates with access panels.

Drainage Integration

Pipes functioning as drainage leaders for HST aerial structures and elevated station drains should be integrated into structural members within urban areas. In urban areas, it may be desirable to cast a recess into the surface of columns to recess the vertical leaders for concealment and to protect them from damage. Beyond urban areas, external rain leaders may be secured to the outside of columns.

Integrated Drainage

Non-integrated Conduits

Integration of Drainage on Structures

Signage

Signage mounted to HST aerial structures will conform to the CHSTP Signage and Graphics standards.

Lighting

In special cases, it may be appropriate to illuminate exterior surfaces of trackways and/or columns within developed areas for a dramatic effect. Refer to the Lighting section under HST bridges and overpasses for similar aesthetic guidelines.

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3.2 HST BRIDGES AND OVERPASSES

3.2.1 General

Introduction

Bridges and overpasses have symbolic as well as functional importance. Bridges and overpasses connect places, communities and people. A bridge or an overpass has the potential to be a more significant object than simply a utilitarian connector between two points. Unique and creative bridge and overpass forms have the potential to stir the imagination and render the landscape even more inspiring than its natural state.

This section sets forth the fundamental aesthetic concepts of HST bridge and overpass design.

Sydney

Natchez Trace, Tennessee

Big Sur, California

Tunkhannock, Pennsylvania

Inspirational Bridge and Overpass Designs

HST Bridge and Overpass Purposes

Numerous HST bridges and overpasses will be needed throughout the HST system to carry high-speed trains as well as conventional railroads, highway vehicles and pedestrians across a diversity of geographical and topographical conditions. HST bridges and overpassss should visually exemplify the efficiency, strength, permanence and beauty which characterize the Project.

HST Bridge and Overpass Functions

In contrast to HST aerial structures, HST bridges and overpasses will typically be required where shorter, standardized HST aerial structure spans are not feasible. By Project definition, HST bridges will be required where high-speed trains cross waterways. HST overpasses will cross canyons, highways, railways or grade separations. HST bridges and overpasses are physical connectors with potential to become urban or rural landmarks.

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3.2.2 Aesthetic Principles for HST Bridges and Overpasses

While there are no absolute rules by which the visual impact of HST bridges and overpasses can be evaluated, the following principles, derived from successful bridge and overpass solutions elsewhere, should be followed in the design of HST bridges and overpasses.

Simplicity

HST bridge and overpass forms should utilize contemporary technology to emphasize simplicity, lightness and gracefulness.

Yangtze River, China

Linearity

HST bridge and overpass appearance will generally be optimized when its horizontal lines are extended as far as possible. Extending guard rails, parapet walls or barriers beyond the face of abutments accentuates linear character and helps visually anchor the HST bridge or overpass to the ground. Cantilevered decks, railings, and parapets can create strong shadow lines to reinforce the horizontal lines of the HST bridge or overpass.

Proportion

All HST bridge and overpass types should exhibit principles of correct proportion, i.e., the relationship of height, width and thickness, to convey slenderness and strength.

Variability and Commonality

HST bridges and overpasses will be built in widely diverse locations and will span across a wide variety of conditions, from urban to rural, high to low visibility, in residential, commercial, industrial, agricultural, and natural settings. Context-sensitive design solutions are encouraged in a collaborative process with local stakeholders. Common attributes will include quality, longevity, life cycle value and low maintenance.

Public Artwork

Consistent with federal, state and local policies promoting the integration of art into public buildings and places, artistic expression should be integrated into CHSTP structures when appropriate and feasible. Refer to section 3.5 Roles and Responsibilities for further information,

Cultural Context

In some cases, HST bridge and overpass design may respond directly and literally to the unique cultural or architectural context into which it is to be built, reflecting intrinsic values, culture or tradition.

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Kanchanapisek Bridge Thailand

Esfahan, Iran

Cultural Context

Natural Context

Indigenous materials may be considered in HST bridge and overpass design where a specific contextually sensitive environment such as mountains, canyons or waterways renders conventional materials inappropriate. Approaches, abutments or other transitional structures may consider use of local materials.

Glen Canyon, Arizona

Pont du Gard, France

Natural Context

Viewpoints

HST bridge and overpass design should take advantage of potential public viewing opportunities whenever they occur. As locations for landmark structures are identified by a community, full opportunity should be developed to integrate a HST bridge and overpass into the natural landscape or accentuate a major urban feature such as a gateway into a city center.

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Lighting

Where justifiable by potential views and public interaction, HST bridge and overpass aesthetics may be accentuated with the use of accent lighting. Selection of energy-efficient lighting systems is a critical factor in the decision to illuminate HST bridge and overpass exteriors. Use of cut-off fixtures around the light source will limit or prevent light pollution.

Tower Bridge, London

Roosevelt Bridge, Stuart, Florida

Bridge and Overpass Lighting

Maintainability and Finish Materials

Maintenance, durability and longevity of structures are primary concerns. Reinforced concrete requiring no finish treatment and minimal maintenance is the preferred structural and finish solution. Integral color may be considered where raw grey concrete color is not appropriate in the surrounding context. If steel is determined to be the preferable superstructure material, surfaces shall be protected with a high-performance, long-lasting coating in a context-sensitive color.

Interfaces with Other Structures

Special site conditions or irregular spans within a HST aerial structure section may necessitate a special HST bridge or overpass section. This interface between HST bridge or overpass and HST aerial structure or trackway should clearly emphasize the transition to a special structure.

Where HST bridges and overpasses abut an at-grade section of trainway, the transition should be simple and graceful using a contextually appropriate material and finish.

Cologne-Rhine, Germany

Mosel, Germany

Bridge and Aerial Structure Transitions

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3.2.3 Site Factors

Urban Sites

Just as the site conditions, context and span influence the choice of structural system for an urban HST bridge or overpass, these are primary determinants in aesthetic treatment of an HST bridge or overpass. Future land use must be considered; a HST bridge or overpass crossing industrial land today may cross over a housing development in the future. Urban character will change over time; HST bridges and overpasses must be designed with this fact in mind.

Public exposure must always be a factor in aesthetic decisions. Whereas a HST bridge or overpass spanning a railroad switching yard may be seldom seen by the public, a HST bridge or overpass spanning a public highway will be viewed countless times each day and its exposure may warrant special design treatment.

Tsing Ma Bridge, Hong Kong

Overpass in San Diego

Urban Bridges and Overpasss

Space Under HST bridges and overpasses

Space beneath HST bridges and overpasses provides opportunities for development of parks and other public spaces. Where adequate height would allow sunlight to penetrate under an HST bridge or overpass, consideration should be given to developing public space beneath it.

Park under Urban Bridge, Sydney

Cathedral Park Bridge, Portland

Space under Bridges and Overpasses

Rural Sites

A remote bridge or overpass in a rural setting may be viewed less frequently than an urban highway span. However, remoteness does not relieve the need for aesthetic care. In fact, a rural context often renders the aesthetic character of a bridge or overpass even more critical due to the importance of complementing its natural setting. HST bridge and overpass components should conform to the natural topography.

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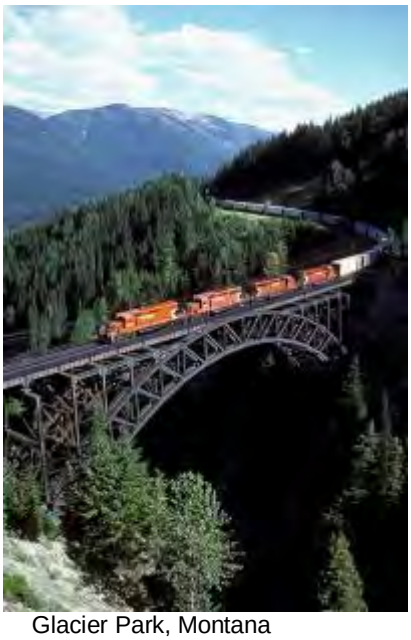
Suburban Minneapolis



Glacier Park, Montana

Rural Bridges

Abutments

The hard, straight lines of a HST bridge and overpass structure should transition gently into the soft lines of the natural terrain of the countryside. Abutments are best left open and sloped to meet the underside of the girders.

Natural Abutment, Spain HSR

Retained Abutment, France HSR

Abutments

3.2.4 Structural Factors

HST Bridge and Overpass Superstructure: Types and Materials

Selection of bridge or overpass superstructure is highly dependent on location, span, design loads and purpose. The superstructure form selected will establish the overall aesthetic character of the HST bridge or overpass. Superstructure may be constructed of reinforced concrete or steel. Generally, lighter, thinner structural members will result in a more pleasing appearance. Depth of structural members is highly dependent upon span length; in order to lighten horizontal members, spans may be shortened and columns increased.

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Representative HST bridge and overpass types include the following:

Concrete Arch, Cologne-Rhine, Germany

Steel Girder, Mosel, Germany

Steel Arch, Korea HSR

Steel Truss, New York

Cable Suspension, Hong Kong

Cable Stayed, East Huntington

HST Bridge and Overpass Types

Substructure

HST bridge and overpass substructures may be nearly as visible from below as the superstructure. As the examples above illustrate, a visually successful bridge or overpass integrates visible structural elements into a cohesive design.

Seismic Considerations

California's structural design standards often result in bridge and overpasss with robust individual members and a stout presence. When a structural member appears to be out of proportion compared to other members, bridge and overpass proportions should be carefully adjusted.

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3.2.5 Functional Approach

General Principles

A typical HST bridge or overpass will employ conventional engineering methods. Type and material selected will be appropriate for the location and purpose without necessitating a specialized or innovative approach. Typical highway bridges and overpasses will follow Caltrans aesthetic standards.

Aesthetic Principles

HST bridges and overpasses will satisfy the Project's design excellence goals. Designs shall integrate aesthetic character together with resolution of each structure's unique functional requirements (span, column size and placement, optimal structural type). Simplicity and the design objectives described in this document should be the primary aesthetic drivers.

Context

The emphasis of aesthetics relative to functionality will be dependent upon the visibility of the HST bridge or overpass and the degree of involvement and financial partnering requested by community stakeholders. The level of aesthetic emphasis will not necessarily depend upon an urban or rural setting. Some communities may prefer a simple HST bridge or overpass to avoid drawing attention to it while another community may choose an "iconic" design to create a special aesthetic emphasis as described in the following section.

3.2.6 Iconic Approach

General Iconic Characteristics

As an alternative to functional design, local agencies desiring a more dynamic and impactful HST bridge or overpass presence may choose to work with the Authority to develop an iconic design. Iconic HST bridges and overpasses shall satisfy HST functional requirements but with a greater emphasis upon aesthetics. Iconic character is not necessarily a response to a particular urban location or a highly-visible context; any HST bridge or overpass may be considered for iconic design. An iconic HST bridge or overpass may be characterized by a sense of prominence in the environment, structural innovation, aesthetic expressiveness, organic or curvilinear form, unique detailing and/or rich materials.

Specific Iconic Attributes:

- **Innovation.** Iconic bridges and overpasses may provide unique, innovative and creative solutions to challenging spans or settings. They are originals, not merely copies of other bridges and overpasses. They may push or break the limits of engineering ingenuity and may be constructed using advanced materials and techniques.
- **Beauty.** The beauty of an iconic bridge or overpass can leave a lasting impression upon the viewer through the creative use of form, line and color.
- **Harmony.** An iconic bridge or overpass appears to have been custom-designed for its unique surroundings. It harmonizes with and complements its surroundings.
- **Clarity.** An iconic bridge or overpass generally expresses how it functions. Its structural behavior is generally simple and understandable to the public.
- **Recognition.** An iconic bridge or overpass may become a landmark, easily recognizable by the general public, symbolizing the people or community for whom it was built.

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Alamillo Bridge, Spain

Da Vinci Bridge, Norway

Kubitschek Bridge, Brasilia, Brazil

Iconic Bridges

3.2.7 HST Pedestrian Bridges and Overpasses

General

HST pedestrian bridges and overpasses will be provided throughout the CHST for the use of rail passengers, urban pedestrians, rural walkers and bicyclists.

Context

Pedestrian bridges and overpasses connecting to stations shall be integrated into the station design. In urban contexts remote from stations, HST pedestrian bridges and overpasses should be visually compatible with the context. In rural areas they should complement the existing terrain and vegetation.

Image

Pedestrian bridges and overpasses can be functional or iconic in the same sense as HST rail and highway bridges and overpasses. Relatively light loads often allow innovation and creative engineering.

Safety

Pedestrian bridges and overpasses over railways or highways shall be partially or totally enclosed to prevent objects from falling onto the tracks or OCS system.

Coordination

As locations of HST pedestrian bridges and overpasses are identified, local planning officials shall be consulted to integrate the site details with specific area plans, urban design plans, related property development, bike routes, etc.

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Functional: Jack London Square, Oakland, CA

Functional: Route 9, MTA New York

Iconic: Sundial Bridge, Redding, CA

Iconic: Schroder Bridge, Walnut Creek, CA

Pedestrian Bridges and Overpasses

3.3 TUNNEL PORTALS AND VENTILATION STRUCTURES

3.3.1 General

Tunnel portals will significantly contribute to the system-wide visual image of the CHST. Portal aesthetic and technical solutions shall be developed concurrently. Unlike automobile tunnels, high-speed rail portals will not be perceived by passengers. Nevertheless, portals will be visible from multiple vantage points; in remote mountainous areas and agricultural lands as well as from developed urban settings. The portal context will largely determine whether each portal will be blended into the local environment or distinguished from it through the use of distinctive architectural features.

This section describes aesthetic guidelines and concerns specific to tunnel portals and tunnel ventilation structures. Detailed information describing technical design elements required for tunnel portals are found in Technical Memorandum 2.4.6, HST Tunnel Portal Facilities.

3.3.2 Portal Components

Components of tunnel portals requiring aesthetic consideration include:

A. Noise Mitigation Hoods: Hoods may be necessary at portals to mitigate noise radiating out from the tunnels as trains enter and exit, and to protect trains and facilities from debris falling from adjacent slopes. These arching concrete tunnel extensions will vary in

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length and may flare out at the portal. Hoods may be exposed or backfilled and landscaped. The primary aesthetic medium will be the surrounding landscaping; however the exposed concrete may be distinctively detailed.

B. Ventilation Structures: Required for longer tunnels, ventilation structures over the tunnel openings could be two or three stories in height and may including traction power, facilities power, telecommunications and signaling, maintenance and fire protection in addition to ventilation equipment space.

C. Traction Power Facilities (freestanding): Generally located remotely from tunnels. The degree of aesthetic treatment will depend upon the location of the facilities, i.e., high or low visibility.

Korea HSR Tunnel Portal

Portal Components

3.3.3 Aesthetic Principles for Portal Design

Configuration

Depending on the tunnel configuration selected, portals may be configured for either two parallel single track tunnels or a single, larger diameter, dual-track tunnel. The exposed portal face may be vertical or sloping to follow the natural topography as much as forty-five degrees, depending on site conditions and train speed.

High Speed, Sloping Face, Korea HSR

Low Speed, Vertical Face, Japan

Portal Face Slopes

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Interfaces

Where HST aerial structures or trainway berms transition into tunnel portals, the transition shall be as natural and seamless as possible, utilizing coordinated and contextually appropriate materials, textures and detailing of exposed surfaces.

Drainage

Slopes above tunnel portals require storm water diverters to protect the portal opening and trainway facilities. Drainage channels should be integrated into the portal design.

Landscaping

Portal design should strive to minimize disturbance to existing slopes. Cut slopes and native vegetation surrounding portals should be restored to a natural state with smooth, natural transitions. Hood extensions may be backfilled and replanted with native species. Once established, landscaping should not require irrigation or maintenance except in urban areas where a portal interrupts existing landscaping; relocated or restored plant materials should be used to create a seamless interface with the existing site area.

Low Maintenance: German HSR Portal

Natural Vegetation: French Highway Portal

Portal Landscaping

Finish Materials

Tunnel portals will likely be constructed with cast in place concrete. Concrete finish may be integrally colored to blend into the surrounding environment. Large concrete surfaces at vertical portal walls or ventilation structures may be articulated with integral color or applied texture to establish an appropriate relationship between manmade forms and the existing natural landscape.

Spain HSR

Spain HSR

Applied Portal Finish

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Urban Portals

Where trainways enter trenches visible within an urban environment, consideration may be given to dramatic architectural expression at the portal, in accordance with HST aesthetic principles. As a portal enters a trench, the cover may be landscaped to create a park-like setting. Highway tunnel portals found in urban settings as shown below exemplify urban portal types.

Trench Portal with Landscaping

Architectural Portal

Urban Portals

Artwork

The vertical face of a tunnel portal may provide an excellent opportunity for large-scale artwork, signage or bas-relief sculpture. As a tunnel portal will not be visible to the HST riders, this is a practical approach only where the portal will be frequently viewed from the surrounding area.

Murals

Graphics

Portal Artwork

3.3.4 Aesthetic Principles for Ventilation Buildings

Ventilation Buildings

Portions of tunnel ventilation structures may be exposed as much as thirty feet above the tunnel or surrounding grade. These structures require aesthetic attention not unlike other smaller HST facilities. Where a ventilation building is freestanding, its architectural expression should recognize the site context, system image and presence within the environment.

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Hong Kong MTR

Taiwan HSR

Ventilation Structures

Integration of Portal and Ventilation Shafts

Ventilation structures, where integrated into tunnel portals, may be appropriate locations for unique aesthetic/architectural expression. Where portal and ventilation shafts are in close proximity, construction, finish materials and detailing should be harmonized.

3.4 RETAINING WALLS

3.4.1 General

This section outlines aesthetic guidelines for design of retaining walls, noise barriers and collision intrusion protection barriers. Although retaining walls are primarily structural elements, their significant height and breadth relative to ground level necessitate aesthetic attention. Retaining walls will contribute significantly to the visual character of HST facilities and infrastructure. Careful consideration of wall height and surfaces treatments will incorporate walls favorably into surrounding landscape.

3.4.2 Aesthetic Principles for Retaining Walls

Site and Context Factors

The built environment and the natural environment as they exist within and around retaining walls will influence retaining wall aesthetic design. Walls should be coordinated with adjacent HST bridges and overpasses, HST aerial structures or other structures and should blend with surrounding landscape. Railings, guardrails and parapets should be coordinated with those on surrounding HST bridges, overpasses, aerial structures or existing walls to create a harmony of materials while making a distinctive aesthetic statement for the high-speed train system. Retaining walls should express continuity of design within specific regions.

Consistency

Retaining wall design elements within a particular site area or a regional corridor should convey a consistent aesthetic character. Wall design elements for which consistency is important include exposed concrete finish, texture, color, top of wall detailing and railings.

Height

Although retaining wall heights are often no more than a few feet above adjacent grade, higher walls may present a highly visible feature upon the landscape. As such, walls and retained fill should be kept as low as possible. Effective wall height can be reduced by different means, including:

- Terracing
- Emphasizing horizontal lines rather than vertical
- Raising or varying top of grade at the base of wall to reduce apparent grade differential
- Adding plantings at the base and the tops of walls.
- Sloping tops of walls gradually or in small increments as the topography changes
- Using metal railings on top of walls (where required) in lieu of raising retaining walls

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Effective Reduction of Apparent Wall Height

3.4.3 Wall Treatment

Structural Materials

Depending on the height, retaining or noise walls may be reinforced cast-in-place concrete, shotcrete, or soil nailed. Reinforced masonry may be cost effective on low to mid-height walls. Masonry options include split face units of many sizes. Mechanically stabilized earth walls may be used where structurally appropriate. Collision intrusion protection barriers shall be reinforced concrete.

Finish Materials

- Exposed cast-in-place concrete, plain or stamped using various types of formwork
- Concrete formliners
- Gunite/shotcrete
- Masonry veneers of brick, tile, or under special conditions, terra cotta
- Stone veneer
- Plantings to cover masonry or rough concrete
- Wall caps: precast concrete or stone
- Railings: stainless steel in high exposure, high moisture areas, otherwise galvanized and painted steel.

Terrraced Stone Veneer

Terraced Plantings

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Retaining Wall Finish Materials

Surface Design Enhancements

General: Surface finishes will significantly influence the way a retaining wall is perceived. Some walls will be utilitarian and will not justify surface design enhancements. However walls with a significant visual presence justify a higher level of finish quality. Surface treatments for retaining walls can be integral or applied, however integral finish is preferred to minimize maintenance.

Planting: Integration of vegetation on top of, in front of, or attached to a retaining wall serves to soften the wall and provides visual relief.

Color: Wall color should be coordinated with surrounding built and natural features. Color can be integral with the structural material to reduce maintenance.

Bas-relief

Formliner

Retaining Wall Finishes

Texture/Pattern: Patterns and reveals use light and shadow to enhance wall surfaces. When considering a reveal or joint pattern, the length and height of the wall must first be considered. A long continuous wall may be visually shortened by adding a regular vertical pattern. A horizontal pattern tends to accentuate the length of the wall while reducing the perceived height. Patterned, rusticated concrete provides good visual interest, Bas-relief patterns may be considered to express a local theme or artistic sensibilities.

MSE Mechanically Stabilized Earth wall patterns

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3.5 ROLES AND RESPONSIBILITIES

3.5.1 Purpose

This section identifies Authority and local agency roles and responsibilities related to aesthetic design of non-station structures, mitigation of visual impacts and allocation of capital and maintenance costs. The Authority may work with local agencies to define more specific roles and responsibilities depending on project needs and local circumstances.

3.5.2 Collaboration

The Authority seeks to collaborate with communities on aesthetic design and mitigation of visual resource impacts per CEQA and NEPA. The Authority is committed to achieving high quality design within project costs and funding. Local agencies along HST corridors can benefit by collaborating with the Authority early in the project delivery process; aesthetic design issues can be identified and creative, context responsive solutions that contribute to the unique character of communities can be incorporated into project design. A benefit to the Authority is establishing an efficient project delivery process that brings certainty to resolving aesthetic and visual resource impact issues with local agencies.

3.5.3 Aesthetic Design of Non-station Structures

Authority

At the Authority's discretion, the PMT can contact local agencies to provide input on aesthetic design of non-station structures. The PMT's role is to manage an efficient collaboration to solicit input, focus on aesthetic design, and work toward aesthetic design solutions that achieve design/build[1] procurement objectives. Design/build procurement objectives guide the way by which the scope of work for design/build proposals will be defined. For aesthetic design, procurement objectives include: 1) clarifying project scope to meet environmental and community commitments, 2) providing flexibility to enable innovative design, engineering and construction solutions (the synergistic relationship of designer and builder inherent in design/build to deliver the HST project on budget and schedule is beneficial to the Authority) 3) identifying quality of design and performance requirements so design/build contractors can compete to meet or exceed requirements, and 4) minimizing project risk and cost uncertainty by defining roles, responsibilities and schedule commitments with local agencies on project design and design review.

Local Agencies

Local agencies can request to work with the Authority to review aesthetic design per the roles and responsibilities of this section. Local agencies that are contributing funding or right-of-way, planning for HST station area development or use of air rights will be Authority priorities for local engagement on aesthetic design review.

The Authority expects local agencies to constructively engage with the Authority. Constructive engagement means participation of elected officials, local agency staff and representative stakeholders to identify aesthetic design outcomes and solutions that are locally acceptable, reasonable, within project costs and consistent with locally adopted plans. Local agency leadership is to be engaged and supportive of the process for the Authority to commit time and resources. Local agency staff is to be empowered to represent the community's position and make constructive recommendations that are supported by community leadership.

Process

The Authority and the PMT will assess where to collaborate on aesthetic design based on local agency participation in the HST project. The PMT will identify structural elements warranting local agency input and review and acceptance of aesthetic design and visual mitigations. The

[1] Design/build is the anticipated method of project delivery.

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Authority, PMT and local agency will work together to establish a technical working group to conduct the work, select stakeholders, plan a progressive sequence of stakeholder discussion and input, and define shared process outcomes. Interviewing local and regional opinion leaders is recommended to gauge attitudes, select stakeholders that represent a balance of key interests, establish the process and identify outcomes. Local agencies and the Authority will mutually agree upon a schedule consistent with statewide program funding and schedule.

A baseline process to develop the aesthetic design content may include the following steps: 1) begin with the EIR/EIS visual impact assessment and recommended mitigations, 2) validate the location of key viewpoints and aesthetic elements that characterize the landscape unit(s), 3) identify shared aesthetic design issues, opportunities and outcomes, 4) explore context responsive aesthetic design solutions, using the guidelines as a design resource, and 5) select mutually agreed-upon and documented aesthetic design guidance and visual impact mitigations.

The Authority may undertake these steps independently with local agency input on the final recommendations, collaborate with the local agency to provide input on each step, or develop a unique collaborative process with the local agency, depending on the Authority, PMT and local agency assessment of the most effective approach.

Output

At minimum, the output of an aesthetic design process should identify and quantify, by allowance or quantity, aesthetic and visual mitigations for preliminary cost estimating. The PMT will need to evaluate whether aesthetic design and visual mitigations are within project cost guidelines.

The output can be a table listing mitigation design concepts based on these guidelines with a map of the extent of application, advancing preliminary engineering documentation, or documentation of context specific aesthetic design guidance.

The output of this process will be used as input to the design/build procurement process to ensure that Authority and local agreements on aesthetic design and visual mitigations are implemented.

3.5.4 Environmental Process

Authority

The Authority or the PMT can collaborate with local agencies during the environmental process to solicit input on aesthetic design and visual resource mitigations, consistent with CEQA and NEPA. The Authority will need to evaluate, with consultation with local agencies as appropriate, how to organize and conduct local agency input to the environmental analysis. Content and process should be reasonable, fair and equitable for both the Authority and local agencies. A benefit of incorporating aesthetic design guidance into the EIR/EIS is the opportunity for public comment on the mitigations, furthering environmental process transparency.

Aesthetic design guidance can be incorporated in the environmental documents as part of the project description, 15% preliminary design, and/or as visual mitigation. These guidelines can be incorporated by reference, either in whole or in part, into the EIR/EIS documentation for individual project sections for certification by the Authority and the Federal Railroad Administration.

Local Agencies

Local agencies are responsible to review and provide comment per CEQA and NEPA on visual mitigations consistent with local context, standards and plans. It is the Authority's expectation that by working collaboratively with a local agency on aesthetic design guidance, that the local agency will accept that the process meets CEQA and NEPA requirements for stakeholder engagement with development of visual mitigations.

3.5.5 Design Build Procurement

Authority

The Authority and PMT can initiate an aesthetic design review process with local agencies after the certification of the environmental documents as an input to design/build procurement. This benefits the Authority by fostering greater clarity of the scope of work and reducing risk of

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changes to the design/build contract time and scope by working with local agencies to address aesthetic design prior to the design/build contract. The Authority will be responsible for developing aesthetic design guidance that will be consistent with the certified environmental documents.

Local Agencies

Local agencies are responsible for focusing on aesthetic design guidance that implements the certified environmental documents. Local agencies will assist in managing stakeholder engagement to identify aesthetic design guidance that provides a range of directions to the design/builder, rather than defining a specific solution.

3.5.6 Aesthetic Design Review During Design/Build

Authority

After the design/builder contracts with the Authority, the design/builder will be responsible for implementing aesthetic design and visual resource mitigations as specified in the design/build contract. The PMT will be responsible for oversight of the design/build contract to ensure that design work is in conformance with the Authority contract and procurement requirements.

The Authority, PMT or design/builder needs to engage local agencies in aesthetic design review which may include: 1) design of project mitigations, 2) coordination of project design to implement station area planning, use air-rights or design local project interfaces such as rebuilding grade-separations, 3) design details developed for the procurement such as landscape, lighting or public art as mitigation, 4) proposals for innovative solutions not previously considered, and/or 5) proposing changes to the project and/or project mitigations.

The Authority can have the design/builder conduct aesthetic design review with local agencies to view and comment on HST infrastructure concept plans and final design as needed to provide local agencies with assurance that project aesthetics are consistent with local expectations for aesthetic design and visual mitigation. The Authority will work with local agencies to set time frames for aesthetic design review consistent with the design/build contract objectives.

Local Agencies

Local agency responsibilities will vary depending on the type of coordination, input and design review needed based on local participation in the HST project. Baseline responsibilities include: 1) timely review and input to design/build documents per the design/build contract schedule, 2) respecting Authority project budget and funding, 3) reasonable feedback that contributes to feasible solutions.

3.5.7 Capital Costs and Maintenance

Capital Costs

In general, the Authority pays for the capital costs of the project, environmental mitigations, and right-of-way acquisition costs. Local agencies are to pay fair share capital costs for improvements not included in the scope of the HST project or project mitigations as presented in Table 1.

Maintenance

In general, the responsibility for the facility maintenance and the cost of maintenance belongs to the party who owns the facility, as summarized in Table 1. In cases where the Authority or local agency can provide maintenance on behalf of the other, resulting in more efficient use of resources, the Authority and local agencies can enter a maintenance agreement.

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Table 1: Capital and Maintenance Responsibilities: Non-Station Structures

	AUTHORITY		LOCAL JURISDICTION	
Category	***Capital Cost***	***Ownership and Maintenance***	***Capital Cost***	***Ownership and Maintenance***
Structures	100% All structures comprising HST facilities, including HST aerial structures, HST bridges and overpasses, trenches, sound walls, retaining walls and barriers.	100%	0%	0%
Grade separations and roadways	100% Project grade separations, retaining walls, berms, pavement, pavement markings, bike lanes, curbs, sidewalks and guardrails.	100% Grade separation substructure and super structures, railway approaches and infrastructure.	0% Or fair share proportion of expansion of existing roadway capacity.	0% Roadways, roadway approaches and grade separation berms or retaining walls including pedestrian and bicycle facilities
Landscape	100% All project landscaping, irrigation and hardscape	100% and up to first three years until landscaping is established for landscape located outside HST right-of-way	0%	100% After landscape established outside HST right-of-way, including irrigation, planting and hardscape
Lighting	100% All functional and safety lighting for Authority facilities	100% All functional and safety lighting for Authority facilities within HST right-of-way	0%	100% City lighting in city right-of-way

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	AUTHORITY		LOCAL JURISDICTION	
Category	***Capital Cost***	***Ownership and Maintenance***	***Capital Cost***	***Ownership and Maintenance***
Public Art[2]	100% For public art as visual impact mitigation per budget to be established by Authority	0%	0% or fair share proportion for public art costs in addition to what is required for mitigation	100% For all public art, including art attached to HST infrastructure
Facilities using air rights[3]	100% All facilities owned and operated by Authority.	100% All facilities owned and operated by Authority.	100% All facilities developed publicly or privately per air rights agreement with Authority.	100% All facilities developed publicly or privately per air rights agreement with Authority.
Utilities	100% Authority facilities.	100% Authority owned facilities.	0% or fair share proportion of any expansion of existing capacity.	100% of city owned facilities.
Signage	100% Authority signs	100% Authority signs except signage for others located in the HST right-of-way maintained by others through encroachment agreements.	0% of city signage.	100% of city signage per encroachment agreement.

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[2] The Authority is developing a policy regarding Public Art to be consistent with existing state and federal policies. The Authority's capital cost for public art for HST stations is to pay for cost to integrate public art into HST station design, with cost for the artwork itself and maintenance to be funded in fair share proportion by the City and others as part of a value capture program for station area development. The Authority's capital cost for public art for non-station structures is to cover the cost of public art as visual mitigation, with any additional public art costs to be paid for by the local agency. The Authority's policies for public art will address funding public art as mitigation.

[3] The Authority is developing a policy regarding use of air space above and below HST facilities, including developing restrictions related to HST operations, access, maintenance and security. The Authority supports locating active uses under aerial structures in urban areas to create safe, secure environments and reduce the potential for graffiti.